CONGESTION AND CRASH SITE ANALYSIS PROGRAM

IMPROVING THE DESIGN AND OPERATIONS OF INTERSECTIONS

DELAWARE VALLEY REGIONAL
PLANNING COMMISSION

OCTOBER
2007

Created in 1965, the Delaware Valley Regional Planning Commission (DVRPC) is an interstate, intercounty and intercity agency that provides continuing, comprehensive and coordinated planning to shape a vision for the future growth of the Delaware Valley region. The region includes Bucks, Chester, Delaware, and Montgomery counties, as well as the City of Philadelphia, in Pennsylvania; and Burlington, Camden, Gloucester and Mercer counties in New Jersey. DVRPC provides technical assistance and services; conducts high-priority studies that respond to the requests and demands of member state and local governments; fosters cooperation among various constituents to forge a consensus on diverse regional issues; determines and meets the needs of the private sector; and practices public outreach efforts to promote two-way communication and public awareness of regional issues and the Commission.

Our logo is adapted from the official DVRPC seal, and is designed as a stylized image of the Delaware Valley. The outer ring symbolizes the region as a whole, while the diagonal bar signifies the Delaware River. The two adjoining crescents represent the Commonwealth of Pennsylvania and the State of New Jersey.

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INTRODUCTION

The goals of the Congestion and Crash Site Analysis Program are improving access to and efficiency of the region's transportation system; improving safety and air quality, and reducing congestion through analyses for specific highway locations with demonstrated problems in both New Jersey and Pennsylvania. Unlike a typical corridor study that examines a larger geographic area, the intent of this program is to examine individual intersections or specific problem sites. Although, the program preceded the DVRPC's Regional Safety Action Plan, this program also addresses one of our established emphasis areas: "improving the design and operations of intersections."

Due to their many conflict points, intersections experience more crashes than mid-block locations. In addition, the geometry of an intersection can present many issues for the road user. Assuring the efficient operation of the intersections is an increasingly important issue as municipalities attempt to maximize vehicle roadway capacity to serve the growing demand for travel. The goal of this program is to identify cost-effective improvements that will reduce crashes and congestion created by limited capacity and design deficiencies.

These selected locations may experience high levels of congestion and/or have a high number of crashes. Crashes may not only result in fatalities, injuries, and property damage, but also add to the congestion and deficiency in the operation of the intersection. This report examines these selected locations and identifies potential improvement strategies, which would improve the safety and mobility of all road users.

The six study locations evaluated in this effort include two locations in Pennsylvania—one each in Chester County and the City of Philadelphia; and four in New Jersey—one in each of the DVRPC's member counties.

DVRPC solicited input from each of the counties in the region from both Pennsylvania and New Jersey to identify potential problem locations. Working with the counties, DVRPC selected six locations to study. Each of the locations is distinct and has its own particular set of issues and problems. With each location being unique, there is no one cure-all solution. In fact, for each location, a combination of strategies may need to be implemented to have an impact on improving safety and reducing congestion.

Methodology

All nine counties in the DVRPC region were asked to submit two locations for further study. To assist in the selection process, the New Jersey counties were given a number of locations that were identified through analysis using the DVRPC-developed *Cluster Finder Tool,* which represented locations with a high number of crashes. The counties could select the locations from this list or select another based on other criteria. DVRPC received selections from seven of the nine counties; and, in cooperation with county and state Department of Transportation (DOT) officials, six locations were selected to be analyzed. The selections were based on the locations demonstrating high levels of congestion and/or crashes and were not already programmed for improvement.

Selections were also determined by whether the locations provide a regional function and, in the case of New Jersey, are on the county or local network.

The study team field-viewed all locations to observe the issues. Data was then compiled and analyzed. This included crash records data, Average Annual Daily Traffic (AADT), turning movement counts and traffic signal timings. For each location, stakeholders meetings were held with the appropriate state, county and municipal officials and others as deemed necessary, with follow-up multi-agency field views. These meetings assisted in the identification of problems, with discussion of the study team observations and local stakeholder feedback.

The study team conducted follow-up field views to better define the existing conditions, observe the operating conditions, and refine the identification of problems. Subsequently, technical analysis was performed to quantify the identified transportation problem areas. This included the preparation of collision diagrams displaying crash patterns and conducting level of service analyses for existing conditions.

Based on analyses, a set of improvements were developed that address the specific problems. Level of service analyses were conducted for recommended improvements as well as for future year volumes.

Stakeholders meetings were then held again to present findings and preliminary recommendations. The purpose of these meetings was also to discuss and get a sense from the local officials of how practical the recommendations were from their perspective.

The Structure

The report is organized into six separate sections: one for each of the study locations. Within each section, the report is structured in a similar format that consists of: Location Description, Existing Conditions, Opportunities and Constraints, Potential Improvement Scenarios, and Recommendations.

The *location description* section provides an account of each location and examines the study area in terms of regional setting. This includes a general depiction of the local area surroundings, lane configurations and adjacent land uses.

Existing conditions present additional background information for each site. For each location, turning movement counts were collected during the peak periods in 15-minute increments to determine the peak-hour traffic volumes. Traffic signal timing and operation plans for each intersection were collected from either the county, local municipalities, or the state Department of Transportation. At each location, a crash analysis and a level of service (LOS) analysis was conducted.

Crash analysis was used to substantiate problems presented during the municipal field views and identify any probable causes and potential improvements. For each location, reportable crash records for at least a three-year period were collected from either the local municipalities or Pennsylvania or New Jersey Departments of Transportation. Reportable crashes typically involve an injury, fatality and/or significant property damage. In some of the locations, non-reportable crashes are included in the analysis. Although, a non-reportable crash is one where there is no injury to the occupant(s) of the vehicle(s), and the vehicles involved do not need to be towed, the crash may have negative effects on the operation of the intersection.

The *opportunities and constraints* section discusses specific issues or problems that may effect any potential improvements that have been identified. A typical issue may be the restriction of right-of-way expansion to increase capacity. Expansion may be cost prohibitive due to encroaching land uses or nearby bridge widths.

Potential improvement scenarios were developed to address operational and safety problems. Typical improvement scenarios range from optimizing signal timing and signal coordination to adding turning lanes and intersection redesign/reconstruction. For each scenario, a level of service analysis is conducted and compared to the existing LOS analysis. This process helps to determine the level of improvement to the efficiency and operations of the intersection, if the scenario is implemented.

Recommendations are based on their ability to correct existing or potential problems or deficiencies. The potential improvement scenario concepts presented in this document have been categorized as short-term, mid-range or long-term. Short-term improvement recommendations typically considered a lower cost operational/safety improvement that can be completed with little lead time and no additional major studies. Long-range improvement concepts should only be pursued if the implemented set of short and mid-range improvements are evaluated and determined to be ineffective. These improvements, such as additional signing, resurfacing or enhancing pavement markings, may be completed primarily through maintenance activities. A mid-range improvement may require additional costs with regard to signal coordination and pedestrian enhancements. A long-term improvement may have a higher capital cost, and require the acquisition of right-of-way and construction of new infrastructure.

For each section of this document there is a corresponding Appendix that contains the detailed technical data documentation for crash records, turning movement counts and level of service analysis.

Level of Service Analysis

The level of service analysis (LOS) is a common tool for assessment of transportation facilities and is used extensively in this report. For each location, the LOS for existing conditions and potential improvement scenarios is evaluated. When applied as a measure of performance for an entire intersection or a particular component of it, LOS has a precise meaning: the average delay experienced by a vehicle traveling through the intersection or a specific component of it. In other words, LOS is a reflection of the average delay experienced by vehicles traversing an intersection. The exact limits of delay that determine the various LOS categories for a signalized and an unsignalized intersection are displayed in ***Table 1***.

Table 1 **Level of Service (LOS) Designations and Associated Delays**

Level of Service	Signalized Intersection Total Delay per Vehicle (seconds/vehicle)	Unsignalized Intersection Control Delay per Vehicle (seconds/vehicle)
A (Desirable)	≤ 10	≤ 10
B (Desirable)	> 10 and ≤ 20	> 10 and ≤ 15
C (Desirable)	> 20 and ≤ 35	> 15 and ≤ 25
D (Acceptable)	> 35 and ≤ 55	> 25 and ≤ 35
E (Undesirable)	> 55 and ≤ 80	> 35 and ≤ 55
F (Unsatisfactory)	> 80	> 50

For each of the project intersections, a review of the existing conditions and of the various improvement scenarios was conducted using SYNCHRO traffic signal software. Necessary information for determining delay and LOS measures include: turning movement counts, roadway geometry, signal timing, and actuation plans. The turning movement counts were mostly gathered by DVRPC staff, whereas the signal timing and actuation data were supplied by the relevant municipality, county or state agency; roadway geometrics were accumulated from either source.

For signalized intersections, SYNCHRO calculates a control delay and a queue delay. The control delay is calculated by a percentile delay method; this approach uses formulas from the Highway Capacity Manual (HCM) to calculate delay, however, the final delay measure is taken from an average of the 10^{th}, 30^{th}, 50^{th}, 70^{th}, and 90^{th} percentile volume levels. As a result, the calculated delay is a product of the various operating conditions that a signal may actually encounter. The queue delay is utilized whenever two signalized intersections are located within a critical distance to one another. If so, calculations are made to determine the extent to which queue interactions (such as queue spillback and queue blocking) reduce capacity and consequently increase delay.

For an unsignalized intersection, SYNCHRO only utilizes control delay, for which it relies exclusively upon HCM methods.

For the revision of timing plans, SYNCHRO is capable of optimizing intersection splits, cycle lengths, and offsets. These efforts seek to establish a timing plan that provides the most efficient performance that serves a critical volume of vehicles.

BURLINGTON

PEMBERTON, BURLINGTON COUNTY

LOCATION DESCRIPTION

The study location is the intersection of Trenton Road (CR 545) and Juliustown Road/Lakehurst Road (CR 530). At the request of Pemberton Township and Burlington County, the study was extended to include the intersections of Juliustown Road (CR 669)/Pemberton Browns Mills Road (CR 530)/Broadway, Broadway/Trenton Road (CR 545), Clubhouse Road (CR 667)/Lakehurst Road (CR 530), and Junction Road/Lakeshore Drive/Lakehurst Road (CR 530). The analysis tries to examine the issues on a network basis. In some instances that analysis was successful, but in others the analysis had to be done on a location basis due to the distance between intersections.

The study area, as shown in ***Figure B1,*** is located in the northeastern section of Pemberton Township. It consists of three main roadways—CR 669/CR530, CR 545, and CR 530/Broadway. All of the roadways are two lanes—one lane in each direction—except for Lakehurst Road between Trenton Road and Rancocas Lane, which is two lanes in each direction.

As shown in ***Figure B2a,*** the intersection of Juliustown-Browns Mills Road (CR 669)/Pemberton-Browns Mills Road (CR 530)/Broadway is a four-legged signalized intersection. The Pemberton-Browns Mills Road (CR 530) eastbound approach has two lanes—a shared through and left-turn lane and a dedicated right-turn lane. The westbound Broadway (CR 667) approach has a shared through and left-turn lane and a dedicated right-turn lane. Juliustown Road (CR 669), the southbound approach, has a shared through and right-turn lane and a dedicated left-turn lane. Lakehurst Road (CR 530), the northbound approach, has a shared through and right-turn lane and a dedicated left-turn lane. A Burger King restaurant, a CVS Pharmacy, Browns Mills Medical Center, and Browns Mills Shopping Plaza flank the four corners of the intersection. Burger King and the medical center have driveways close to the intersection. The area is zoned as a Town Center Redevelopment area. Sidewalks exist throughout the area.

The Broadway/Trenton Road intersection (CR 545) is signalized with four legs. The signal is actuated for preferred left turns at the Broadway approaches. All approaches carry two lanes: one shared through and right-turn lane and a dedicated left-turn lane. Trenton Road north of the intersection has wide shoulders on the east side of the road. The speed limit in this area is 25 MPH. A shopping center is located at the northeast corner of the intersection, with churches on the northwest and southwest corners. A cemetery is located on the church grounds on the southwest corner. There is a commercial business located on the southeast corner of the intersection. The traffic signal has pedestrian signal heads; and push buttons and crosswalks are available at all approaches.

Figure B1

Congestion and Crash Site Analysis

Study Area

Pemberton Twp., Burlington Co., NJ

Analysis Area / Intersection

0 1,000 2,000

Feet

Delaware Valley Regional
Planning Commission
July 2007


Figure B2a
Congestion and Crash Site Analysis
Existing Lane Configuration
Pemberton Twp., Burlington Co., NJ
CR 667 BROADWAY ST
PEMBERTON - BROWNS MILLS RD
CR 669 JULIUSTOWN RD
CR 530
CR 545 TRENTON RD
CR 530 LAKEHURST RD
0
100
200
Feet
DVRPC Aerial Imagery: Spring, 2005
Delaware Valley Regional
Planning Commission
July 2007

Figure B2b
Congestion and Crash Site Analysis
Existing Lane Configuration
Pemberton Twp., Burlington Co., NJ
CR 545 TRENTON RD
PEAR AVE
CR 530 LAKEHURST RD
CLUBHOUSE RD
Mirror Lake
NOTEBOOM AVE
RANCOCAS LN
LAKESHORE DR
CR 645 JUNCTION RD
0 100 200
Feet
DVRPC Aerial Imagery: Spring, 2005
Delaware Valley Regional
Planning Commission
July 2007

The Trenton Road (CR 545) and Lakehurst Road (CR 530) intersection is a signalized intersection with three legs. The driveway of the auto parts business makes up the fourth leg of the intersection. As shown in ***Figure B2b***, Trenton Road connects with Lakehurst Road at an angle. This makes left turns from Lakehurst Road southbound onto Trenton Road difficult, as well as right turns from Trenton Road onto Lakehurst Road. The approaches to the intersection have two lanes. The northbound approach lanes of Lakehurst Road are separated by a painted median. For this approach, the right lane has continuous movement onto Trenton Road, unless the pedestrian signal for the crosswalk at Trenton Road is activated or the auto parts driveway gets a green light. The traffic signals across the Trenton Road approach and the southbound Lakehurst Road approach have pedestrian signal heads and activation buttons. Sidewalks are available throughout the area. Along with the auto parts store, other commercial and municipal establishments in the area include a bank on the east side of Lakehurst Road at Trenton Road, a vacant gas station between Lakehurst and Trenton roads, a Wawa, post office, fire department and emergency services, school, and restaurants.

The Clubhouse Road (CR 667)/Lakehurst Road (CR 530) intersection is unsignalized. This is a T-intersection. Clubhouse Road is two lanes—one lane in each direction; and Lakehurst Road is four lanes—two lanes in each direction. There is the bank on the north corner of Clubhouse Road, and Mirror Lake is on the southern corner. Clubhouse Road has wide shoulders and no sidewalks.

The Junction Road (CR 645)/Lakeshore Drive (CR 676)/Lakehurst Road (CR 530) intersection has four approaches and is signalized. The eastbound and northbound approaches of the intersection have two lanes—a shared through and right lane and a dedicated left-turn lane. The southbound approach has three lanes—a dedicated right turn, dedicated through, and dedicated left-turn lanes. The westbound approach to the intersection is one lane—a shared right turn, through, left-turn lane.

Land use throughout the study area is predominantly residential with areas of commercial activity. Pockets of wetland and vacant land are also in the area as shown in ***Figure B3.*** A major employment center, McGuire Air Force Base/Fort Dix Military Reservation Army Base, is located to the northwest of this location. Other traffic generators in the area are Deborah Heart and Lung Center, schools, and shopping centers.

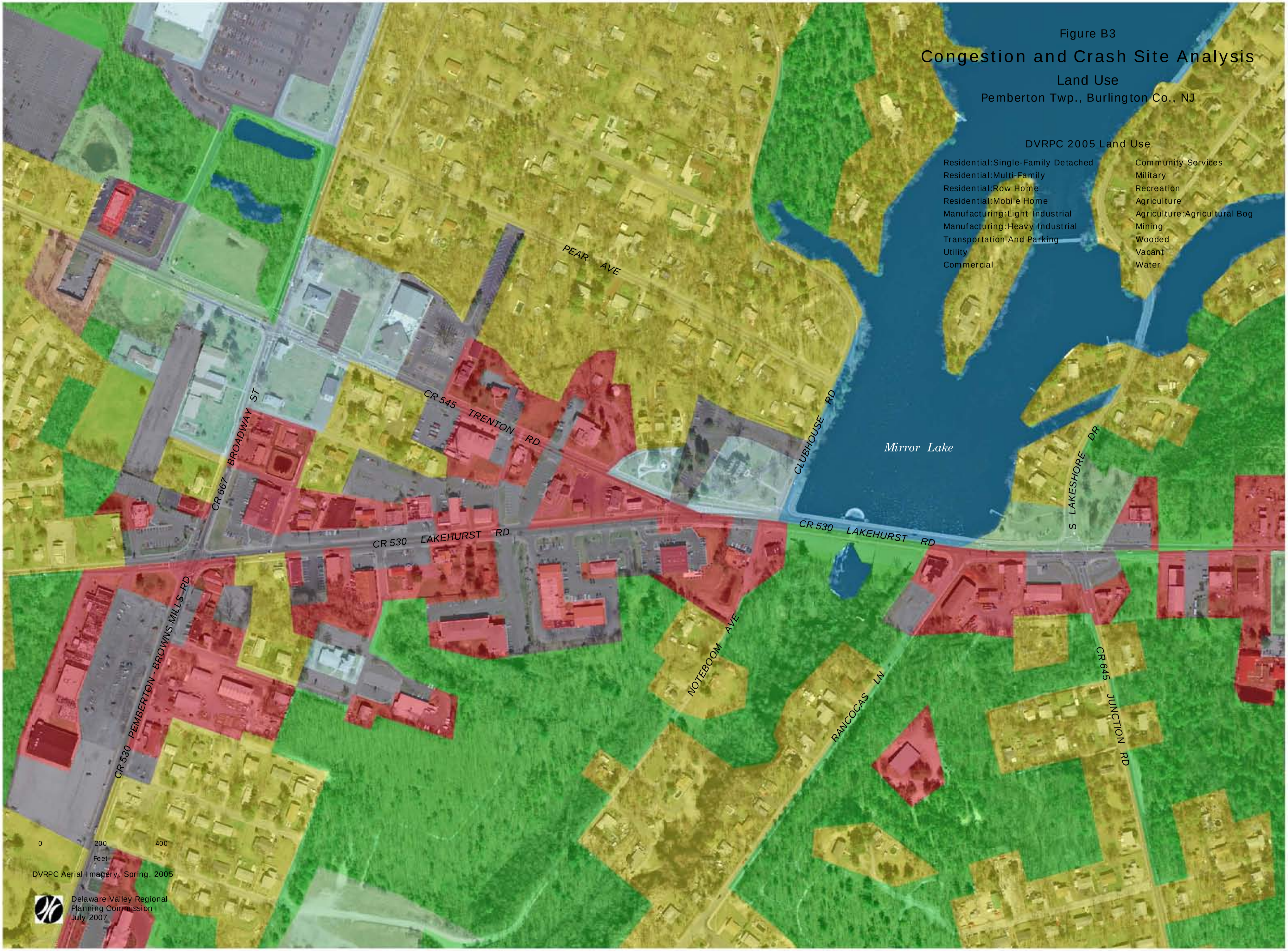

Figure B3
Congestion and Crash Site Analysis
Land Use
Pemberton Twp., Burlington Co., NJ
DVRPC 2005 Land Use
Residential:Single-Family Detached
Residential:Multi-Family
Residential:Row Home
Residential:Mobile Home
Manufacturing:Light Industrial
Manufacturing:Heavy Industrial
Transportation And Parking
Utility
Commercial
Community Services
Military
Recreation
Agriculture
Agriculture:Agricultural Bog
Mining
Wooded
Vacant
Water
Mirror Lake
PEAR AVE
CLUBHOUSE RD
S LAKESHORE DR
CR 530 LAKEHURST RD
CR 545 TRENTON RD
BROADWAY ST
CR 667
NOTEBOOM AVE
RANCOCAS LN
CR 645 JUNCTION RD
CR 530 PEMBERTON - BROWNS MILLS RD
0
200
400
Feet
DVRPC Aerial Imagery, Spring, 2005
Delaware Valley Regional
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July 2007

EXISTING CONDITIONS

Congestion

There is congestion at the intersections during peak hours, especially during the evening peak period. The two Broadway intersections are only 0.15 miles apart. This results in queuing into the adjacent intersection. Heavy traffic volumes, along with numerous curb cuts for businesses, exacerbate the congestion in the area.

At the Pemberton Browns-Mills Road/Lakehurst Road/Juliustown Road/Broadway intersection, vehicles making through movements from the Pemberton Browns Mills Road/Broadway approaches often veer into the right-turn-only lane to avoid traffic making lefts turns. For the Pemberton Browns Mills Road approach, the lane width is wide (near O'Brien's Hardware), and vehicles begin to use this unmarked lane as the turning lane. This causes confusion for motorists making opposing left turns into commercial properties or onto Brook Street. At this intersection and its vicinity there are access management issues. Along Pemberton Browns Mills Road, there are three local streets and six additional curb cuts into commercial properties within 0.14 miles of the intersection. Brook Street is used to access the post office located on Dearborn Street.

Turning Movement Counts

In order to better understand the vehicular volumes and subsequent delay and level of service measures of the project intersections, a manual count of the vehicular turning movements was conducted for each of the locations. For the three intersections along Lakehurst Road, from Pemberton Browns Mills Road to Clubhouse Road, the counts were taken by DVRPC staff in 2006. Turning movement counts were provided by the Burlington County Engineer's Office for the remaining two locations. The count for the Trenton Road and Broadway intersection took place in February 2007, and for the Lakehurst Road and Junction Road intersection in August 2005. All turning movement counts were taken on a weekday—Tuesday, Wednesday, or Thursday. In addition, all counts recorded turning movements from 6 AM to 9 AM and from 3 PM to 7 PM.

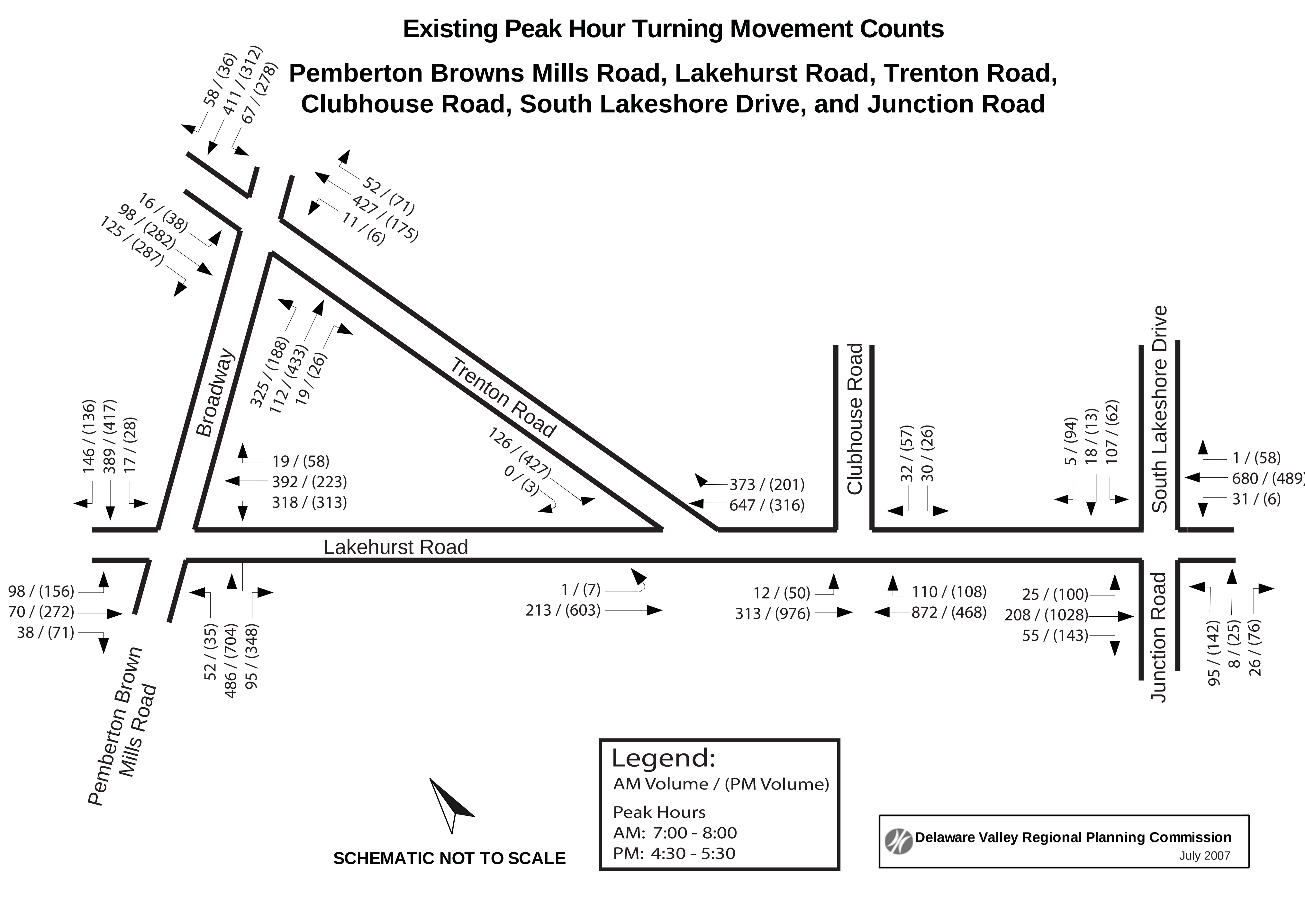
Due to the close proximity and subsequent interaction of the intersections to each other, a "system-wide" peak hour was utilized. The "system-wide" peak hour was determined by combining the sum of all turning movements for each quarter-hour period per intersection; from this the four consecutive quarter-hours with the overall highest volume of vehicles constituted the peak hour. The morning and afternoon "system-wide" peak hours for these three intersections are 7 AM to 8 AM and 4:30 PM to 5:30 PM, respectively.

Figure B4 displays the peak-hour turning movement counts diagram for all five intersections. The complete data from each of the manual counts are included in **Appendix A**.

Pemberton Browns Mills Road, Lakehurst Road, Juliustown Road, and Broadway

Data shows that this intersection experiences the highest volumes of all five intersections for both peak hours, with 2,120 vehicles in the morning and 2,761 vehicles

Figure B4: Turning Movement Diagram



in the afternoon. At this intersection, for both AM and PM peak hours, the highest single movement is the Pemberton Browns Mills Road eastbound through movement with 486 and 704 vehicles, respectively. However, in the morning peak hour the heaviest single approach leg is northbound Lakehurst Road, with 729 vehicles. Almost half of that approach's AM peak hour volume is comprised of left turns, with 318 vehicle movements. Three hundred thirteen left-turning vehicles constitute over half of that approach's volumes during the afternoon peak hour. In the afternoon, the Pemberton Browns Mills Road eastbound approach leg has the highest approach volume, carrying 1,087 vehicles, approximately 40 percent of all PM peak-hour intersection volume. In summary, the northbound Lakehurst Road and eastbound Pemberton Browns Mills Road approach legs experience the heaviest volumes for both morning and afternoon peak hours.

Trenton Road and Broadway
Combining the volumes for AM and PM peak hours, the Broadway and Trenton Road intersection carries the second highest volume with 3,853 vehicles. The morning peak hour experiences 1,721 movements, or 45 percent of the combined peak-hour total. During the AM peak hour, the dominant approach leg is westbound Broadway with 536 vehicles, or 31 percent of the morning peak-hour intersection total. The second and third largest approach volumes comprise 28 percent and 27 percent of the overall AM peak-hour volumes, and these occur at the northbound Trenton Road and eastbound Broadway approaches, respectively. The eastbound Broadway approach experiences a left-turn rate of 71 percent; of the 456 movements experienced at this approach during the AM peak hour, 325 are left turns. Conversely, the 427 through movements from the northbound Trenton Road approach constitute 87 percent of that approach's peak-hour movements, or 25 percent of the intersection morning peak-hour volumes.

During the PM peak hour, there are 2,132 vehicular movements in the intersection, which represents an increase of more than 400 vehicles from the AM peak hour. Within the afternoon peak hour, the dominant approach is the eastbound Broadway leg; this is opposite the morning's dominant approach on westbound Broadway. Though this dominant approach carries 647 vehicles—or 30 percent of the total intersection PM peak-hour volume—it is closely followed by the westbound Broadway and southbound Trenton Road approaches, which carry 29 percent and 28 percent of the afternoon's total peak-hour volume, respectively. Both of the Broadway approaches experience high left-turn volumes. Eastbound Broadway carries 188 left turns, which constitute 29 percent of that approach's PM peak-hour volume. Whereas there are 278 left turns along westbound Broadway, and these constitute 44 percent of that approach's afternoon peak-hour volume.

Lakehurst Road and Trenton Road
The intersection of Lakehurst Road and Trenton Road, along with the previous two intersections completes a triangular street network serving the commercial core of the township. This intersection layout is a T and therefore the number of movements is less than the previously described intersections. The acutely angled geometry of the intersection discourages the Trenton Road southbound right turn and the eastbound

Lakehurst Road left turn. Overall, the intersection carries 1,360 and 1,557 vehicles in the morning and afternoon peak periods, respectively. This total is the lowest among all five intersections. During the AM peak hour, the heaviest approach is by far westbound Lakehurst Road, with 1,020 vehicles or 75 percent of all movements made in this peak hour. At 647 vehicles or 48 percent of all morning peak period movements, the majority of these are through movements. The opposing eastbound Lakehurst Road approach only carries 213 through movements during this peak period. The Trenton Road approach exhibits 126 left turns, though in practice these are comparable to through movements. During the PM peak hour, the approximately 200 vehicle increase over the morning peak hour is a result of a threefold increase in the number of vehicles traveling along the Trenton Road and eastbound Lakehurst Road approaches. There are 427 Trenton Road left turns, and 603 eastbound Lakehurst Road through movements, which constitute 27 percent and 39 percent of the intersection PM peak-hour volume, respectively. The westbound Lakehurst Road PM peak-hour volumes of 316 through and 201 right–turn movements are approximately half of the AM peak-hour volumes.

Lakehurst Road and Clubhouse Road
This intersection’s geometry and close proximity to the previous intersection accounts for similar absolute volumes on the Lakehurst Road approaches. Overall, it carries 1,369 and 1,685 vehicles in the morning and afternoon peak hours, respectively. During the AM peak hour, the heaviest approach is westbound Lakehurst Road, with 982 vehicles or 72 percent of all movements in this time period. This approach has two movements. The through movement carrying 872 vehicles or 89 percent of the approach’s morning peak-period volume. Those 872 vehicles constitute 64 percent of the entire intersection’s AM peak-hour volume. The opposing through movement is the second largest movement, with 313 or 23 percent of the intersection AM peak-hour volume. The eastbound Lakehurst Road approach left-turn movement consists of only 12 vehicles in the morning peak hour. The Clubhouse Road approach’s 62 movements are about evenly split between the left and right turns. During the PM peak hour, the majority of traffic occurs along the eastbound Lakehurst Road approach, with 976 of the approach’s 1,026 vehicles committing through movements, while the 50 remaining movements are left turns into Clubhouse Road. This growth in the eastbound approach is countered by a decrease in the westbound direction, which experiences 576 movements, or 400 fewer vehicles than the AM peak hour. This reduction takes place almost entirely among the through movements, since the 108 right turns are essentially identical to the number made during the morning peak hour. Compared to the morning peak hour, the 82 vehicles exiting Clubhouse Road represent a minor increase in volume, though there are slightly fewer left turns at this time.

Lakehurst Road, South Lakeshore Drive, and Junction Road
This intersection’s combined morning and afternoon peak period volume of 3,495 vehicles is the third largest among the five locations. That combined volume is not equally shared among the peak periods, as the AM peak hour carries only 1,259 vehicles compared to the 2,236 vehicles of the PM peak hour. Of these morning peak-hour vehicles, over half (680) are utilizing the intersection from the westbound Lakehurst Road approach. The opposing approach carries a total of only 288 vehicles.

The southbound Lakeshore Drive and northbound Junction Road approaches have even fewer vehicles, though they experience high left-turn movements with 107 and 95 movements, or 82 percent and 74 percent of their respective approaches' volumes. During the afternoon peak hour, the dominant approach is eastbound Lakehurst Road; and with 1,271 vehicles it carries 57 percent of the intersection's PM peak-hour volume. At 1,028 vehicles, the vast majority of this approach is comprised of through movements. The westbound approach carries 553 vehicles or approximately 200 fewer than its volume from the AM peak hour. The proportion of left turns along the north and southbound approaches is noticeably lower, with 58 percent and 37 percent of their respective approaches' volumes.

Level of Service

SYNCHRO software was used to analyze and determine the effectiveness of existing and potential alternative scenarios for the project intersections. As a result, performance measures such as Level of Service (LOS) and average delay-per-vehicle were obtained for each approach and for the overall intersection. Such measures provide insight into the intersection operation and direction necessary to efficiently guide the improvement process.

There are five intersections in Pemberton Township that were analyzed as part of Burlington County's project location. All but one of the intersections lies along County Route 530, with that exception sited slightly north of 530. Initially, the intersections were evaluated individually in order to determine location-specific obstacles and subsequent solutions. Afterwards, certain combinations of intersections were analyzed in groups to ascertain the effects of signal coordination. The presentation of the intersections is organized from west to east.

EXISTING LOS

Intersection of Pemberton Browns Mills Road, Broadway, Juliustown Road, and Lakehurst Road

During the morning peak hour, the intersection operates at an overall LOS of D with 42 seconds of delay (see ***Table B1***). This is identical to the eastbound Pemberton Browns Mills Road approach. The opposing westbound Broadway approach operates with just 16 seconds of delay and at a LOS of B. The poorest performing approaches are northbound Lakehurst Road and southbound Juliustown Road, with 57 and 56 seconds of delay, respectively, and LOS E.

During the afternoon peak period, the intersection operates at an overall LOS of E with 79 seconds of delay. Similar to the AM peak hour, the poorest performing approaches are northbound Lakehurst Road and southbound Juliustown Road; both have a LOS of F and 136 and 140 seconds of delay, respectively. Unlike the AM peak hour, the best performing approach is eastbound Pemberton Browns Mills Road, with a LOS of C and 32 seconds of delay. The opposing approach, westbound Broadway operates with a LOS of D and 49 seconds of delay.

TABLE B1 Existing Intersection Performance					
Pemberton Browns Mills Road, Broadway, Juliustown Road, and Lakehurst Road					
Scenario	**Direction of Travel**	**Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle**			
Existing Conditions		AM Peak 90s Cycle Length		PM Peak 100s Cycle Length	
		LOS	Delay (sec)	LOS	Delay (sec)
	Pemberton Browns Mills Road EB	D	42	C	32
	Broadway WB	B	16	D	49
	Juliustown Road SB	E	57	F	140
	Lakehurst Road NB	E	56	F	136
	Intersection	D	42	E	79

Source: *DVRPC, 2007*

Intersection of Broadway and Trenton Road

During the morning peak period, the intersection operates with an overall LOS of E with 57 seconds of delay (see ***Table B2***). The poorest performing approaches are eastbound Broadway with a LOS of F and 84 seconds of delay, and northbound Trenton Road with a LOS of E with 59 seconds of delay. These approaches carry the largest volumes of left-turning traffic and through traffic, respectively; these volumes serve as primary sources of delay within those approaches.

TABLE B2 Existing Intersection Performance					
Broadway and Trenton Road					
Scenario	**Direction of Travel**	**Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle**			
Existing Conditions		AM Peak		PM Peak	
		LOS	Delay (sec)	LOS	Delay (sec)
	Broadway EB	F	84	C	25
	Broadway WB	D	41	C	30
	Trenton Road NB	E	59	C	29
	Trenton Road SB	C	33	F	114
	Intersection	E	57	D	52

Source: *DVRPC, 2007*

For the afternoon peak period, the intersection operates with an overall LOS of D with 52 seconds of delay. The overwhelmingly poorest performing approach is southbound Trenton Road, with a LOS of F and 114 seconds of delay. The remaining approaches all operate at a LOS of C and delay ranging from 25 to 30 seconds.

Intersection of Lakehurst Road and Trenton Road
For the AM peak hour, the intersection operates at an excellent LOS of A with seven seconds of overall delay, as shown in *Table B3*. Both Lakehurst Road approaches operate with a LOS of A and with less than 10 seconds of delay. The sole Trenton Road approach experiences a LOS of B with noticeably more delay at 19 seconds.

TABLE B3
Existing Intersection Performance
Lakehurst Road and Trenton Road

Scenario	**Direction of Travel**	**Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle**			
Existing Conditions		AM Peak		PM Peak	
		LOS	Delay (sec)	LOS	Delay (sec)
	Lakehurst Road EB	A	4	B	13
	Lakehurst Road WB	A	6	A	9
	Trenton Road SB	B	19	B	13
	Intersection	A	7	B	12

Source: *DVRPC, 2007*

For the PM peak hour, the intersection operates at a LOS of B with an overall delay of 11 seconds. Both Lakehurst Road approaches experience delays greater than exhibited in the morning peak hour; however, they continue to operate effectively. The poorest performing approach is southbound Trenton Road, at a LOS of B with 15 seconds of delay.

Intersection of Lakehurst Road, Clubhouse Road, and Noteboom Drive
During the morning peak hour, the intersection operates at a LOS of A with two seconds of average delay per vehicle (see ***Table B4***). This LOS and minimal delay is a result of the “free-flow” for both the east and westbound approaches of Lakehurst Road. However, the “stop-controlled” Clubhouse Road approach operates at a LOS of D with 34 seconds of delay. The performance of this approach is hindered by the large volumes of vehicles traveling along Lakehurst Road.

For the afternoon peak period, the intersection operates at a LOS of A with four seconds of overall delay. Again, the “free-flow” along Lakehurst Road provides an excellent LOS and negligible delay for vehicles traveling on those approaches. However, this same “free-flow” induces dramatic delays for the “stop-controlled”

Clubhouse Road approach leg. As a result, Clubhouse Road operates at a LOS of E, with 46 seconds of delay.

TABLE B4
Existing Intersection Performance
Lakehurst Road and Clubhouse Road

Scenario	Direction of Travel	Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle			
Existing Conditions		AM Peak		PM Peak	
		LOS	Delay (sec)	LOS	Delay (sec)
	Lakehurst Road EB	A	1	A	1
	Lakehurst Road WB	A	0	A	0
	Clubhouse Road SB	D	34	E	46
	Intersection	A	2	A	4

Source: *DVRPC, 2007*

Intersection of Lakehurst Road, Junction Road, and Lakeshore Drive
During the morning peak period, the intersection operates at a LOS of B with 12 seconds of overall delay, as shown in ***Table B5***. Three of the approaches experience delays less than 12 seconds. However, the remaining approach, northbound Junction Road operates with a noticeably longer delay of 34 seconds and a LOS of C. This is a result of the large volume of left-turning vehicles within this approach.

TABLE B5
Existing Intersection Performance
Lakehurst Road, Junction Road, and Lakeshore Drive

Scenario	Direction of Travel	Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle			
Existing Conditions		AM Peak		PM Peak	
		LOS	Delay (sec)	LOS	Delay (sec)
	Junction Road NB	C	34	C	34
	Lakeshore Drive SB	B	12	F	89
	Lakehurst Road EB	A	5	D	41
	Lakehurst Road WB	A	10	B	14
	Intersection	B	12	D	40

Source: *DVRPC, 2007*

For the afternoon peak period, the intersection operates at a LOS of D with an average of 43 seconds of total delay. The best performing approach is westbound Lakehurst Road at a LOS of B with 16 seconds of delay. The poorest performing approaches are eastbound Lakehurst Road with 57 seconds of delay and a LOS of E, and southbound Lakeshore Drive with 53 seconds of delay and a LOS of D. The eastbound Lakehurst Road carries an hourly volume greater than 1,200 vehicles and the southbound Lakeshore Drive experiences a high proportion of left turns.

Safety

The congestion evidenced in this area is a major contributor to crashes and unsafe conditions, but there are other contributing factors. For instance, in much of the area, lane designation and crosswalk striping is faded or missing. Existing sidewalks have deteriorated. Jaywalking is observed around the area. Appropriate pedestrian crossing signs are missing. Lakehurst Road is designated a bike route, however, there are no "Share the Road" signs in locations where there are no bike lanes or shoulders. The many access and egress points along the roadway increase potential vehicular conflicts. The skewed geometry of the Lakehurst Road/Trenton Road intersection results in some difficult turning movements. Sign clutter at some intersections lead to driver confusion. In addition, sun glare for motorists traveling westbound in the evening rush hour can have unsafe consequences.

Crash Analysis

A crash analysis was conducted for each intersection individually.

Pemberton Browns Mills Road, Lakehurst Road, Juliustown Road, and Broadway

Table B6 - Pemberton Browns Mills Road, Lakehurst Road, Juliustown Road, and Broadway Intersection Crash Summary

	2003	2004	2005	Total		2003 %	2004 %	2005 %	Total %
Crashes	19	22	20	61					
Reportable	18	14	17	49		94.7%	63.6%	85.0%	80.3%
Non-Reportable	1	8	3	12		5.3%	36.4%	15.0%	19.7%
Severity									
Fatal	0	0	0	0					
Injury	4	11	5	20		21.1%	50.0%	25.0%	32.8%
Property Damage									
Collision									
Same Direction - Rear End	3	12	6	21		15.8%	54.5%	30.0%	34.4%
Same Direction - Sideswipe	2	0	1	3		10.5%	0.0%	5.0%	4.9%
Angle	9	8	10	27		47.4%	36.4%	50.0%	44.3%
Left Turn	2	1	3	6		10.5%	4.5%	15.0%	9.8%
Head On	1	0	0	1		5.3%	0.0%	0.0%	1.6%
Fixed Object	0	1	0	1		0.0%	4.5%	0.0%	1.6%
Hit Bicyclist	1	0	0	1		5.3%	0.0%	0.0%	1.6%
Other or Unknown	1	0	0	1		5.3%	0.0%	0.0%	1.6%
Weather									
Clear	16	18	20	54		84.2%	81.8%	100.0%	88.5%
Rain	2	2	0	4		10.5%	9.1%	0.0%	6.6%
Snowy or Icy	1	1	0	2		5.3%	4.5%	0.0%	3.3%
Fog	0	0	1	1		0.0%	0.0%	5.0%	1.6%
Light									
Daylight	14	19	18	51		73.7%	86.4%	90.0%	83.6%
Night, Dawn or Dusk	5	3	2	10		26.3%	13.6%	10.0%	16.4%
Surface Condition									
Dry	15	18	17	50		78.9%	81.8%	85.0%	82.0%
Wet	4	2	3	9		21.1%	9.1%	15.0%	14.8%
Snowy or Ice	0	1	0	1		0.0%	4.5%	0.0%	1.6%

Source: Pemberton Township Police Department, 2003-2005
NJDOT, Bureau of Safety Programs, Accident Summary For County Road System, July 19, 2006

Crash data for this intersection was provided by the Pemberton Township Police Department for the years 2003, 2004 and 2005. The NJDOT Accident Summary for the County Road System for 2005 is used for comparison. Over the three-year period there were 61 crashes—49 reportable and 12 non-reportable. Reportable crashes are crashes that result in a fatality, injury, and/or property damage of $500 or more. There were no fatal crashes, but 20 crashes resulted in one or more injuries. Compared to the statewide averages for injury crashes, in 2004 this intersection with 50 percent of the crashes resulting in injury exceeded the statewide average of approximately 29 percent. Angle crashes were the most predominant crash type over the three years with 44 percent. This exceeded the statewide average of approximately 20 percent. As shown in ***Table B6*,** each of the three years almost exceeded the statewide average for this crash type. Rear-end crashes were the second most predominant crash type for the intersection with 34 percent exceeding the statewide average. Only 2003 did not exceed the statewide average for this crash type. Left-turn and sideswipe crashes made up 10 percent and 7 percent of the three year total, respectively. The majority of the crashes occurred in daylight conditions and on dry road surfaces, exceeding the statewide average. There was one crash involving a bicyclist in 2003, but there were no crashes involving pedestrians.

The predominance of angle crashes can be attributed to aggressive driving and possible red light running. The proximity of commercial driveways and other access ways to the intersection also contributes to angle crashes. The large number of rear end crashes at this intersection is a result of congestion during peak periods.

Trenton Road and Broadway Street Intersection
The crash data was provided by the NJDOT Crash Database for a four-year period, 2002 to 2005. All these crashes were reportable. As shown in ***Table B7***, the intersection experienced 16 crashes over the four-year period. At this intersection there were seven crashes in 2002, four crashes in 2003, one crash in 2004, and four crashes in 2005. During the four years, there were 3 injury (19 percent) and 13 property-damage-only crashes (81 percent). The injury crashes were below the statewide average and property-damage-only crashes were above the statewide average at this location. There were six rear-end crashes and five angle crashes, which made up 69 percent of the total crashes. Angle crashes at this intersection were above the 20.18 percent statewide average. Half of the crashes occurred during daytime lighting conditions, which is lower than the statewide average. Exceeding the 2005 statewide average of 74.49 percent, 81 percent of the crashes took place during clear weather conditions.

Figure B5 shows intersection crashes by the day of the week. More than half of the crashes occurred on Mondays. There were no crashes recorded during the four year study period for Thursdays or Fridays. Only two crashes took place over the weekend. The analysis revealed that there were no crashes in the months of January, February, and March. The month of June had four crashes, which is the highest number of crashes reported for any month over the four years.

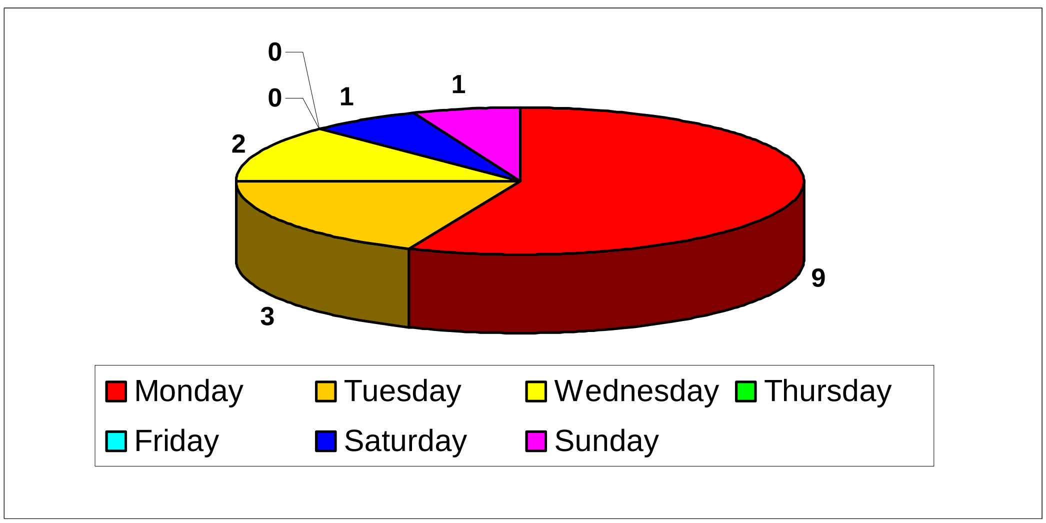
Table B7 – Trenton Road and Broadway Intersection Crash Summary

	2002		2003		2004		2005		Total		2005 NJ Statewide Average
	Crash	%	Crash	%	Crash	%	Crash	%	Crash	%	County Rd
Crashes											
Reportable	7	44%	4	25%	1	6%	4	25%	16	100%	N/A
Severity											
Fatalities	0	0%	0	0%	0	0%	0	0%	0	0%	0.25%
Injuries	1	14%	1	25%	0	0%	1	25%	3	19%	29.33%
PDO	6	86%	3	75%	1	100%	3	75%	13	81%	70.42%
Crash Type											
Rear End	4	57%	0	0%	0	0%	1	25%	5	31%	29.82%
Other	0	0%	1	25%	0	0%	0	0%	1	6%	4.38%
Sideswipe	1	14%	0	0%	0	0%	0	0%	1	6%	11.07%
Angle	2	29%	2	50%	0	0%	2	50%	6	38%	20.18%
Left Turn	0	0%	1	25%	1	100%	1	25%	3	19%	6.69%
Lighting Conditions											
Daylight	3	43%	2	50%	0	0%	3	75%	8	50%	71.38%
Dark	1	14%	2	50%	1	100%	1	25%	5	31%	27.99%
Unknown	3	43%	0	0%	0	0%	0	0%	3	19%	0.63%
Weather Conditions											
Clear	7	100%	2	50%	1	100%	3	75%	13	81%	N/A
Rainy	0	0%	2	50%	0	0%	1	25%	3	19%	N/A
Road Surface Conditions											
Dry	7	100%	2	50%	1	100%	3	75%	13	81%	74.49%
Wet	0	0%	2	50%	0	0%	1	25%	3	19%	19.09%

Source: New Jersey DOT Crash Database (2002 – 2005)

Figure B5 – Crashes by Day of Week

Source: New Jersey DOT Crash Database (2002 – 2005)



Lakehurst Road and Trenton Road Intersection

Table B8 – Lakehurst Road and Trenton Road Intersection Crash Summary

	2002		2003		2004		2005		Total		2005 NJ Statewide Average
	Crash	%	Crash	%	Crash	%	Crash	%	Crash	%	County Rd
Crashes											
Reportable	4	15%	8	31%	7	27%	7	27%	26	100%	N/A
Severity											
Fatalities	0	0%	0	0%	0	0%	0	0%	0	0%	0.25%
Injuries	1	25%	1	12%	0	0%	4	57%	6	23%	29.33%
PDO	3	75%	7	88%	7	100%	3	43%	20	77%	70.42%
Crash Type											
Rear End	4	100%	2	25%	2	29%	4	57%	12	46%	29.82%
Other	0	0%	1	12.5%	1	14%	1	14%	3	12%	4.38%
Sideswipe	0	0%	3	37.5%	1	14%	0	0%	4	15%	11.07%
Angle	0	0%	1	12.5%	1	14%	2	29%	4	15%	20.18%
Left Turn	0	0%	0	0%	1	14%	0	0%	1	4%	6.69%
Hit Fixed Object	0	0%	0	0%	1	14%	0	0%	1	4%	12.35%
Pedestrian	0	0%	1	12.5%	0	0%	0	0%	1	4%	1.87%
Lighting Conditions											
Daylight	3	75%	8	100%	6	86%	6	86%	23	88%	71.38%
Dark	1	25%	0	0%	1	14%	1	14%	3	12%	27.99%
Weather Conditions											
Clear	4	100%	4	50%	6	86%	6	86%	20	77%	N/A
Rainy	0	0%	3	37%	1	14%	1	14%	5	19%	N/A
Snow	0	0%	1	13%	0	0%	0	0%	1	4%	N/A
Road Surface Conditions											
Dry	4	100%	4	50%	6	86%	5	71%	19	73%	74.49%
Wet	0	0%	3	37%	1	14%	2	29%	6	23%	19.09%
Ice or Snow	0	0%	1	13%	0	0%	0	0%	1	4%	6.02%

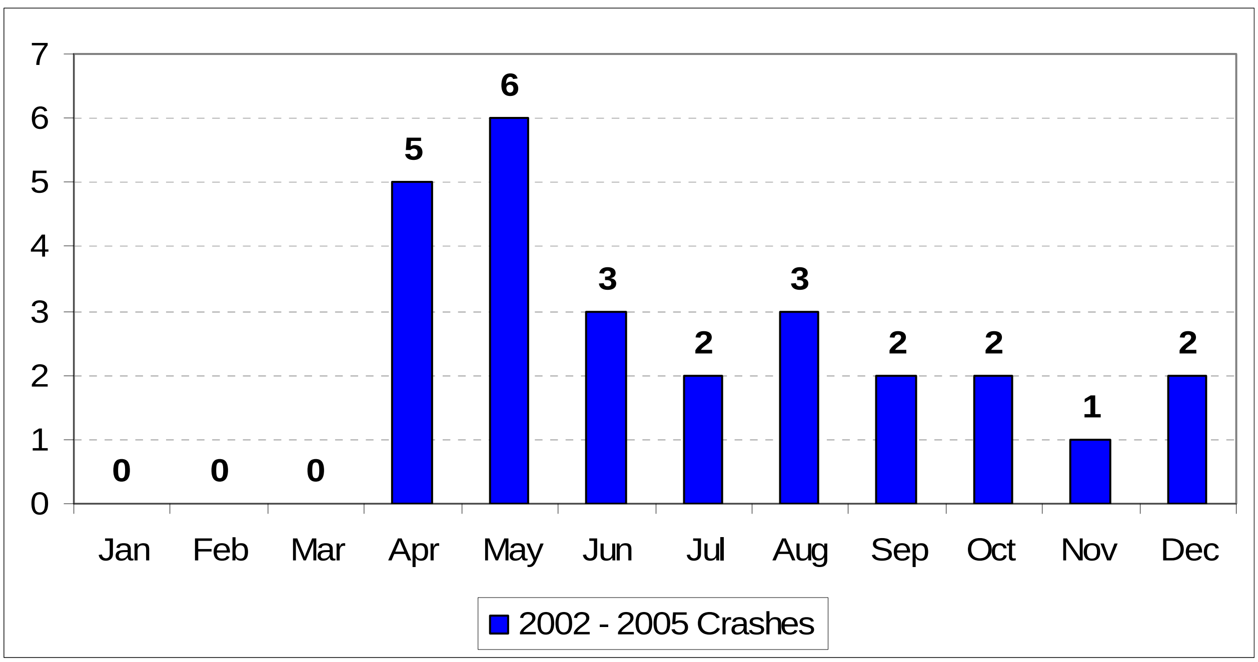
Source: New Jersey DOT Crash Database (2002 – 2005)

The crash data was provided by the NJDOT Crash Database for the four year period of 2002 to 2005. All these crashes are reportable. As depicted in ***Table B8***, there were a total of 26 crashes at this location. While there were no fatal crashes, there were 6 injury crashes and 20 property-damage-only crashes. Only in 2005 did the injury crashes exceed the statewide average of approximately 29 percent. Rear-end collisions were predominant with 46 percent exceeding the 29.82 percent statewide average. Only in 2003, the statewide average for rear-end crashes was not exceeded. But in that year sideswipes were the predominant crash type accounting for 38 percent of the year's total, exceeding the 2005 statewide total of 11 percent. In year 2002, all of the four crashes reported were angle crashes. There were four angle crashes over the four years, and there was one crash involving a pedestrian in 2003. As shown, the majority of the crashes at this location occurred during the daytime under clear weather and dry road surface conditions.

The predominance of rear-end crashes at this location is indicative of a congestion issue.

Figure B6 shows the monthly breakdown of crashes over the four-year study period. There were no crashes reported for the months of January, February, and March. April and May had the highest number of reported crashes. Nearly 73 percent of the crashes at this location occurred between the hours of 12PM and 6PM. Nine of the 26 crashes occurred on Saturdays.

Figure B6 – Crashes by Month



Source: New Jersey DOT Crash Database (2002 – 2005)

Lakehurst Road and Clubhouse Road Intersection

Crash data for the Lakehurst Road and Clubhouse Road intersection was provided by the Pemberton Township Police Department for the three years of 2003, 2004 and 2005. The majority of the crashes were coded along Lakehurst Road. The NJDOT 2005 statewide averages for the County Road system are used for comparison. This is shown in ***Table B9***.

There were 36 reportable crashes for the three-year period. At this intersection there were no fatalities, however, there were 10 injury and 24 property-damage-only crashes. The status of severity was unknown for two of the reported crashes. The injury and property-damage-only crashes that occurred at this intersection were near the statewide average of 29.33 percent and 70.42 percent respectively.

Table B9 – Lakehurst Road and Clubhouse Road Intersection Crash Summary

	2003		2004		2005		Total		2005 NJ Statewide Average
	Crash	%	Crash	%	Crash	%	Crash	%	County Rd
Crashes									
Reportable	11	31%	17	47%	8	22%	36	100%	N/A
Severity									
Fatalities	0	0%	0	0%	0	0%	0	0%	0.25%
Injuries	4	36%	4	24%	2	25%	10	28%	29.33%
PDO	7	64%	13	76%	4	50%	26	72%	70.42%
Unknown	0	0%	0	0%	2	25%	0	0%	N/A
Crash Type									
Angle	8	73%	12	71%	5	63%	25	69%	20.18%
Other	0	0%	1	6%	0	0%	1	3%	4.38%
Left Turn	2	18%	0	0%	1	13%	3	8%	6.69%
Sideswipe	0	0%	4	24%	2	25%	6	17%	11.07%
Head On	1	9%	0	0%	0	0%	1	3%	2.58%
Lighting Conditions									
Daylight	11	100%	13	76%	6	75%	30	83%	71.38%
Dark	0	0%	4	24%	2	25%	6	17%	27.99%
Weather Conditions									
Clear	9	82%	13	76%	6	75%	28	78%	N/A
Rainy	2	18%	4	24%	1	12.5%	7	19%	N/A
Other	0	0%	0	0%	1	12.5%	1	3%	N/A
Road Surface Conditions									
Dry	9	82%	12	71%	6	75%	27	75%	74.49%
Wet	1	9%	5	29%	2	25%	8	22%	19.09%
Unknown	1	9%	0	0%	0	0%	1	3%	0.39%

Source: Pemberton Township Police Crash Report, 2003 – 2005

During this study period there were 11 crashes in 2003 (31 percent), 17 crashes in 2004 (47 percent), and 2005 there was a 50 percent reduction of crashes over 2004 with 8 crashes. Angle crashes represent 69 percent of total crashes at this location, which is significantly higher than the approximately 20 percent statewide average. As depicted in the collision diagram, ***Figure B7*****,** half of the crashes occurred from vehicles traveling northbound on Lakehurst Road and the other half of crashes were from vehicles coming from Clubhouse Road. Other types of crashes occurring at this intersection include six sideswipes, three left turn, and one head on. Over the three-year period, 30 of the 36 crashes occurred in daylight conditions, which is greater than the 71 percent statewide average. The six crashes that took place under dark conditions were below the 28 percent statewide average. Representing 78 percent of total crashes, 28 of the 36 crashes happened under clear weather conditions. The same trend is shown regarding road surface conditions where 75 percent of the crashes occurred on dry road surfaces.

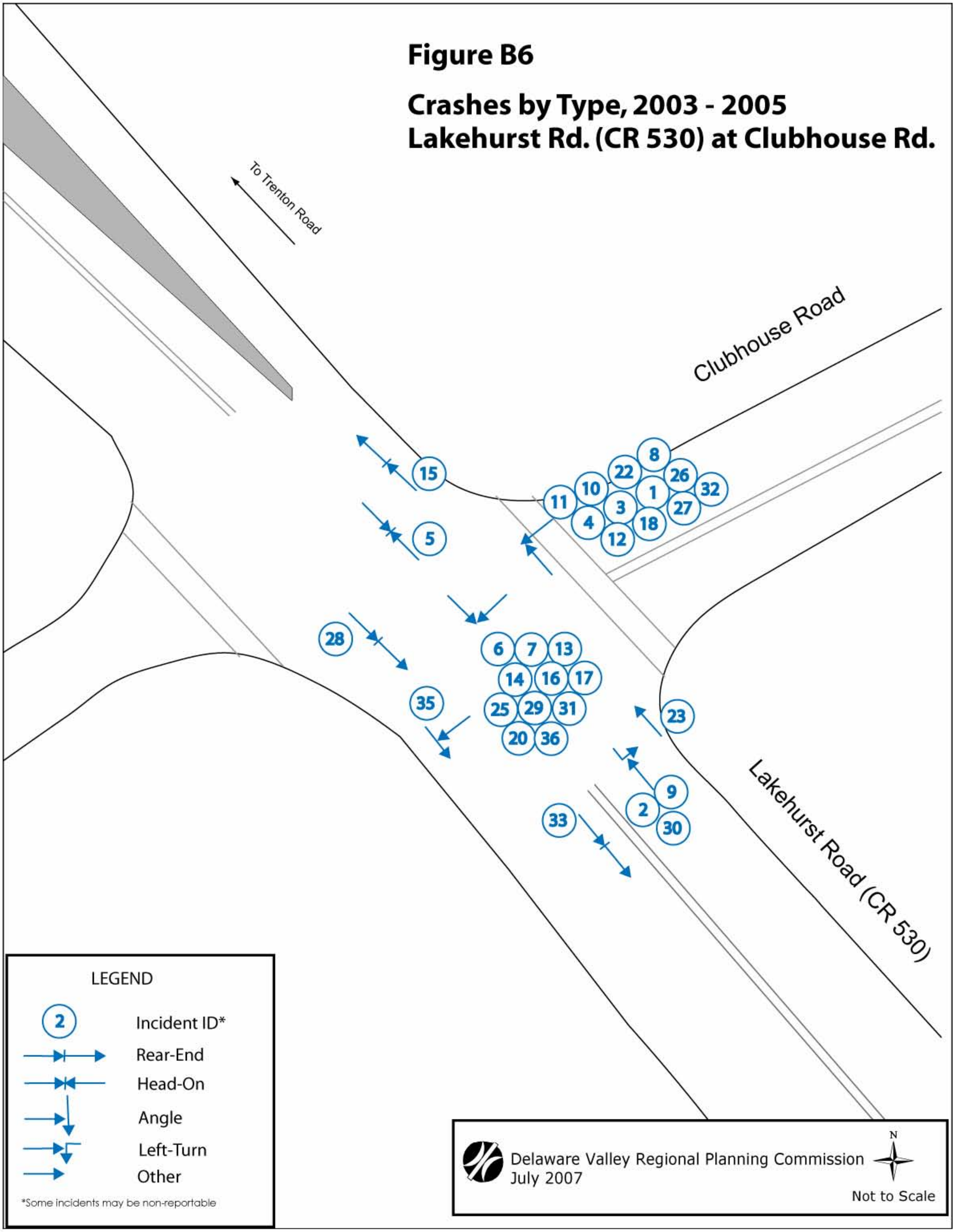


Figure B6

Crashes by Type, 2003 - 2005
Lakehurst Rd. (CR 530) at Clubhouse Rd.

In comparison with the road surface condition statewide data, the crashes at this intersection were approximately the same as the statewide averages.

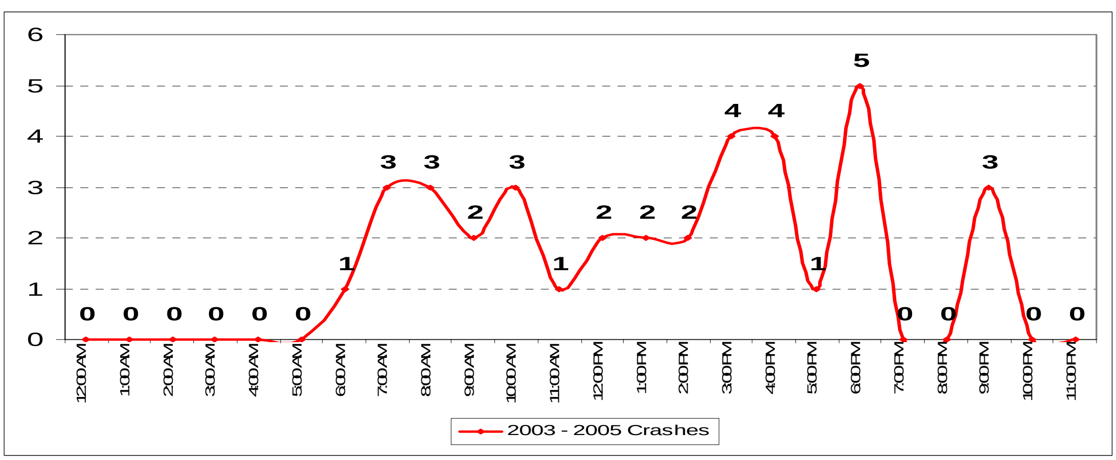
Figure B8 – Crash Summary by Month

Source: Pemberton Township Police Crash Report, 2003 - 2005

Figure B8 shows the monthly breakdown of crashes at this intersection over the three-year study period. There were no more than seven crashes in any given month for the three years. No crashes occurred at this intersection in the months of August and October, which could be a result of incomplete data given that data provided did not have any crash records between August and December 2005.

As depicted in ***Figure B9***, no crashes occurred during the overnight hours. From 6 AM to 7 PM the number of crashes fluctuated. The highest number of crashes at this location took place during the 6 PM hour.

Figure B9 – Crashes by Time of Day



Source: Pemberton Township Police Crash Report, 2003 - 2005

Lakehurst Road and Junction Road/S. Lakeshore Drive Intersection

According to the New Jersey DOT Crash Database, there were 21 crashes reported at this intersection for the years 2002 – 2005. As indicated in ***Table B10*** there were 7 injury and 14 property-damage-only crashes with injury crashes above the statewide 2005 average for county roads. Rear-end crashes were the dominant type of collision representing 33 percent of all crashes at this location. In 2003 and 2004, this crash type at 50 percent and 67 percent, respectively, was above the statewide average of 29.33 percent. Other crash types at the intersection during the four year study period were three sideswipe, two angles, and four left-turn crashes. Two-thirds of the crashes occurred in daylight and clear weather conditions. Seven crashes occurred in dark and rainy conditions. Fifty-seven percent of the crashes occurred on dry road surface conditions; this is below the 2005 statewide average of 74.49 percent. In 2005, there was one reported crash that took place on this roadway.

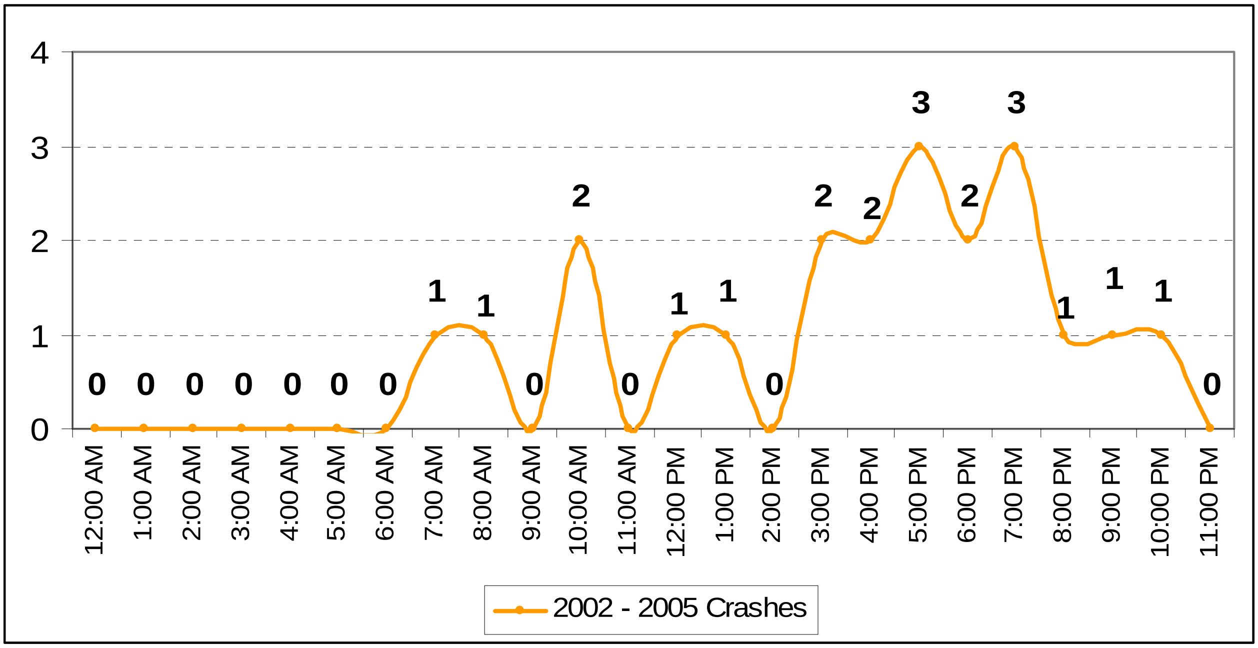
Table B10 – Lakehurst Road and Junction Road/S. Lakeshore Drive Intersection Crash Summary (2002 – 2005)

	2002		2003		2004		2005		Total		2005 NJ Statewide Average
	Crash	%	Crash	%	Crash	%	Crash	%	Crash	%	County Rd
Crashes											
Reportable	7	33%	6	29%	3	14%	5	24%	21	100%	N/A
Severity											
Fatalities	0	0%	0	0%	0	0%	0	0%	0	0%	0.25%
Injuries	3	43%	1	17%	0	0%	3	60%	7	33%	29.33%
PDO	4	57%	5	83%	3	100%	2	40%	14	67%	70.43%
Crash Type											
Rear End	2	29%	3	50%	2	67%	0	0%	7	33%	29.82%
Other	1	14%	1	17%	0	0%	3	60%	5	24%	4.38%
Sideswipe	2	29%	1	17%	0	0%	0	0%	3	14%	11.07%
Angle	1	14%	0	0%	0	0%	1	20%	2	10%	20.18%
Left Turn	1	14%	1	17%	1	33%	1	20%	4	19%	6.69%
Lighting Conditions											
Daylight	6	86%	4	67%	2	67%	2	40%	14	67%	71.38%
Dark	1	14%	2	33%	1	33%	3	60%	7	33%	27.99%
Weather Conditions											
Clear	5	71%	3	50%	2	67%	4	80%	14	67%	N/A
Rainy	2	29%	3	50%	1	33%	1	20%	7	33%	N/A
Road Surface Conditions											
Dry	5	71%	2	33%	2	67%	3	60%	12	57%	74.49%
Wet	2	29%	4	67%	1	33%	1	20%	8	38%	19.09%
Icy	0	0%	0	0%	0	0%	1	20%	1	5%	6.02%

Source: New Jersey DOT Crash Database (2002 – 2005)

As depicted in ***Figure B10***, no crashes took placed during overnight hours at this intersection from 2002 – 2005. Two crashes occurred during the morning peak period. The crashes fluctuate in the mid morning to early afternoon hours. As shown, most of the crashes at this location took place between 3 PM and 8 PM. The crash records indicated that all of the seven crashes reported in 2002 occurred on consecutive days in the beginning of March. There were no crashes reported in February, May, and July. Nearly half of the crashes at this location occurred over the weekend.

Figure B10 – Crashes by Time of Day



Source: New Jersey DOT Crash Database (2002 – 2005)

OPPORTUNITY AND CONSTRAINTS

Intersection of Pemberton Browns Mills Road, Broadway, Juliustown Road, and Lakehurst Road

There are a number of factors that contribute towards a congested and potentially unsafe situation at this intersection. Primarily, the proximity of this intersection to the Broadway/Trenton Road intersection coupled with heavy traffic volumes hinders traffic from efficiently flowing between the two intersections. Vehicle queues from one intersection back up and affect the operations at the other intersection. Additionally, the designation of a shared left-and-through lane along the Pemberton Browns Mills Road and Broadway approaches obstructs the through movement due to left-turn queues, even though left-turn volumes from either approach for both peak periods are relatively low. In conjunction, there are numerous access management issues, as there are commercial properties along each intersection approach leg. This results in conflicts, even though, other than the parcel on the southwest corner, the commercial structures are setback a considerable distance from the roadway.

Intersection of Broadway and Trenton Road

There is an exclusive left turn and a shared through-and-right lane at all four approaches. The signal currently utilizes protected left-turn phasing along Broadway. This protected phase may be individually terminated early to assist the respective through movement. Three of the four corners are currently developed with physical structures. The church on the southwest corner is immediately adjacent to the sidewalk and curb and may possibly be historic.

Intersection of Lakehurst Road and Trenton Road

Given the intersection’s unconventional layout, with three roadway approach legs and one driveway approach, the third approach being skewed, some turning movements are extremely especially difficult. Currently, the driveway approach serves vehicles exiting the Advance Auto Parts retail store located on the western side of Lakehurst Road. The signal plan provides an additional phase for exiting vehicles upon loop-detector actuation. Consequently, if the store was replaced with a business that would generate greater vehicular volumes, there may be a strong adverse effect upon the overall performance of the intersection. The operations of this intersection are closely tied with the operations of the Lakehurst Road/Clubhouse Road intersection to the south; therefore, any modifications to the Lakehurst Road/Trenton Road intersection must also consider the impacts to that intersection as well.

Intersection of Lakehurst Road, Clubhouse Road, and Noteboom Drive

This location is currently arranged as a T-intersection, with “free-flow” across the top of the T. In particular, vehicles traveling eastbound along Lakehurst Road are descending along a slight downhill gradient from the upstream intersection of Lakehurst Road and Trenton Road. This grade not only encourages higher speeds but also limits sight distance for vehicles queuing along Clubhouse Road. These queuing vehicles must determine an appropriate gap in a traffic stream that is traveling in two lanes along either direction. Additionally, vehicles turning left into Clubhouse Road do not have a designated turn lane, and consequently must queue in a through-lane. This can induce delays as well as create unsafe driving conditions through vehicle conflicts.

Intersection of Lakehurst Road, Junction Road, and Lakeshore Drive
All of the approaches, except for southbound Lakeshore Drive, have an exclusive left-turn lane. The parcel of land immediately adjacent to the southbound Lakeshore Drive travel lane is currently undeveloped. Additionally, the eastbound Lakehurst Road approach has an exclusive right-turn lane. With minor widening of the westbound approach, two receiving lanes may be produced. Consequently, the exclusive right-turn lane may be reassigned as a shared through and right lane. The current signal timing plan utilizes a two-phase timing program that does not vary with time-of-day or with day-of-week. Thus, one opportunity to improve the intersection's performance is to create time-of-day or peak-hour-specific timing plans.

All signals in this area operate separately, though the distance between some intersections may warrant coordination. Signal coordination may benefit the area by alleviating congestion through efficient operation and, as a result, improving safety.

CLUBHOUSE ROAD AND TRENTON ROAD INTERSECTIONS WITH LAKEHURST ROAD
Source: DVRPC, 2007

POTENTIAL IMPROVEMENT SCENARIOS

Intersection of Pemberton Browns Mills Road, Broadway, Juliustown Road, and Lakehurst Road

The combination of potential alternatives is structured within a time-sensitive strategy. As a result, improvement scenarios are labeled as either short, medium, or long-term. Generally, the signal timing alternatives are considered short-term while geometric modifications fall under medium to long-term strategies.

Scenario 1

Characteristics

- Optimization of the existing signal timing plan.
- A “short-term” scenario.

Advantages

- The new split and cycle lengths are more reflective of current traffic volumes.
- No equipment cost required.

Level of Service Analysis

During the morning peak period, the intersection operates at a LOS of D with 42 seconds of delay shown in ***Table* 11**. These overall performance measures are identical to the current AM peak hour conditions. However, the individual approaches slightly differ from existing conditions. For instance, the westbound Broadway and southbound Juliustown Road approaches exhibit a one- and eight-second reduction in delay, respectively. However, the northbound Lakehurst Road undergoes a three-second increase in delay.

During the afternoon peak periods, the intersection operates at a failing LOS, with 82 seconds of delay. This is a three-second increase from current PM peak-hour conditions. This may be the result of the scenario providing for a slightly shorter cycle length, which may be more successful at minimizing the spillover effects of lingering queues. With regard to individual approaches, the east and westbound legs experience increases of 5 and 27 seconds, respectively, whereas delays along the north and southbound legs improve by 14 and 6 seconds, respectively.

Scenario 2

Characteristics

- Signal coordination between this intersection and the intersection of Broadway and Trenton Road.
- Coordination would occur during the east and westbound Broadway phases during both peak periods.
- Optimization of the existing timing plan.
- A “medium-term” scenario.

TABLE B11
Intersection Performance for Existing and Alternative Scenarios
Pemberton Browns Mills Road, Juliustown Road, and Lakehurst Road.

Scenario	Direction of Travel	Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle			
		AM Peak		PM Peak	
Existing Conditions		90s Cycle Length		100s Cycle Length	
		LOS	Delay (sec)	LOS	Delay (sec)
	Pemberton Browns Mills EB	D	42	C	32
	Broadway WB	B	16	D	49
	Juliustown SB	E	57	F	140
	Lakehurst NB	E	56	F	136
	Intersection	D	42	E	79
Scenario 1 (Short): Optimize Existing Timing Plan		AM Peak		PM Peak	
		75s Cycle Length		90s Cycle Length	
		LOS	Delay (sec)	LOS	Delay (sec)
	Pemberton Browns Mills EB	D	42	D	37
	Broadway WB	B	15	E	76
	Juliustown SB	D	49	F	134
	Lakehurst NB	E	59	F	122
	Intersection	D	42	F	82
Scenario 2 (Medium): Coordination with Broadway and Trenton Road Intersection		AM Peak 106s Cycle Length		PM Peak 106s Cycle Length	
		LOS	Delay (sec)	LOS	Delay (sec)
	Pemberton Browns Mills EB	D	43	D	38
	Broadway WB	A	5	E	64
	Juliustown SB	E	58	F	126
	Lakehurst NB	E	60	F	117
	Intersection	D	42	E	77

TABLE B11 Continued					
Intersection Performance for Existing and Alternative Scenarios					
Pemberton Browns Mills Road, Juliustown Road, and Lakehurst Road.					
Scenario	**Direction of Travel**	**Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle**			
Scenario 3 (Medium): Restriction of Westbound Pemberton Browns Mills Left-Turns; Optimize Existing Timing Plan		AM Peak		PM Peak	
		75s Cycle Length		100s Cycle Length	
		LOS	Delay (sec)	LOS	Delay (sec)
	Pemberton Brown Mills EB	D	41	E	66
	Broadway WB	B	12	B	18
	Juliustown SB	D	48	F	90
	Lakehurst NB	E	59	F	97
	Intersection	D	41	E	68
Scenario 4 (Medium): EB Pemberton Lead Phase with Restriction of WB Broadway Left Turns; Optimize Existing Timing Plan		AM Peak		PM Peak	
		90s Cycle Length		100s Cycle Length	
		LOS	Delay (sec)	LOS	Delay (sec)
	Pemberton Browns Mills EB	D	42	D	46
	Broadway WB	B	14	B	16
	Juliustown SB	D	46	F	120
	Lakehurst NB	E	61	F	98
	Intersection	D	42	E	66
Scenario 5 (Long): Add Through Lane on Eastbound and Westbound Approaches of Pemberton Browns Mills; Optimize Existing Timing Plan		AM Peak		PM Peak	
		50s Cycle Length		75s Cycle Length	
		LOS	Delay (sec)	LOS	Delay (sec)
	Pemberton Browns Mills EB	C	23	C	26
	Broadway WB	B	12	B	19
	Juliustown SB	C	22	C	32
	Lakehurst NB	C	26	C	34
	Intersection	C	21	C	28

Source: *DVRPC, 2007*

Advantages

- A reduction in queue spillback along Broadway.
- Increased vehicular throughput along Broadway.
- The new split and cycle lengths are more reflective of current traffic volumes and of their interaction between the two closely spaced intersections.

Disadvantages
- The uncoordinated north and southbound approaches may experience an increase in delay in order to ensure a reduction in queue spillback along the coordinated east and westbound approaches.
- This would require the construction of a buried closed-loop hardwire between the two intersections with upgraded controllers, system software and signal heads.

Level of Service Analysis
Table 11 shows that, during the morning peak period, the intersection operates at a LOS of D with 42 seconds of delay. This is identical to overall AM peak-hour performance for both *Scenario 1* and existing conditions. The individual approaches perform comparably to their counterparts in *Scenario 1*. The greatest difference in delay is along the westbound Broadway approach, which operates at a LOS of A with 5 seconds of delays, and this represents a 10 second improvement from *Scenario 1*. However, the remaining three approaches experience an increase in delay.

During the afternoon peak period, the intersection operates at a LOS of E with 77 seconds of delay. This is a five-second improvement from *Scenario 1*, though that equates to only a two-second improvement from current conditions. Unlike the AM peak hour, all but one of the approaches reduces its delay measure. Compared to *Scenario 1*, the reduction in delay ranges from 5 to 12 seconds. The approach that experiences a delay increase is the dominant eastbound Pemberton Browns Mills Rd, though only one second compared to *Scenario 1*, but six seconds compared to the existing conditions.

Scenario 3
Characteristics
- Elimination of westbound Broadway left turns.
- Reassignment of the current shared left-and-through lane into an exclusive through lane.
- Optimization of the existing timing plan.
- A “medium-term” scenario.

Advantages
- The new split and cycle lengths are more reflective of lane reassignment and of current traffic volumes.
- Westbound Broadway through movement vehicles are no longer delayed by slowing or queuing left-turning vehicles.

Disadvantages
- Westbound left-turning vehicles must take alternate routes to reach their original destination. This may move the problem to other intersections in the area.

Level of Service Analysis
During the morning peak period, the intersection operates at a LOS of D with 41 seconds of delay. This represents a marginal one-second improvement when compared

to the overall AM peak-hour performance of *Scenario 1*. There is little impact on any of the approaches except westbound Broadway. This approach's LOS of B with 12 seconds of delay is a 3-second improvement from *Scenario 1.*

During the afternoon peak period, the intersection operates at a LOS of E with 68 seconds of delay. When compared to *Scenario 1*, this is a 14-second improvement. Unlike the AM peak hour, this scenario has a major impact upon all of the approaches. For instance, though both the northbound Lakehurst Road and southbound Juliustown Road approaches experience a failing LOS, their respective 97 seconds and 90 seconds of delay represent a 25-second and 44-second improvement from *Scenario 1*. Conversely, the westbound Broadway approach operates at a LOS of B with 18 seconds of delay, which represents a 58-second decrease in delay with LOS improvement from E to B from *Scenario 1*.

Scenario 4
Characteristics

- Introduction of a lead phase for the Pemberton Browns Mills Road eastbound approach.
- Elimination of westbound Broadway left turns.
- Reassignment of the current westbound shared left-and-through lane into an exclusive through lane.
- Optimization of the existing timing plan.
- A "medium-term" scenario.

Advantages

- Vehicles traveling eastbound are provided a protected signal phase thus benefiting the throughput and safety of such movements.
- The new split and cycle lengths are more reflective of lane reassignment and of current traffic volumes.
- Westbound Broadway through movement vehicles are no longer delayed by slowing or queuing left-turning vehicles.

Disadvantages

- Westbound left-turning vehicles must take alternate routes to reach their original destination. This may move the problem to other intersections in the area.
- The eastbound lead phase will reduce the green time available for the remaining three approaches.

Level of Service Analysis
During the morning peak period, the intersection operates at a LOS of D with 43 seconds of delay. This represents a two-second increase in delay from the previous scenario. This slight performance decline is the result of the westbound Broadway and southbound Juliustown Road approaches, which average a six-second delay increase. The remaining approaches, including eastbound Pemberton Browns Mills Road are unaffected by the introduction of an eastbound lead phase.

During the afternoon peak period, the intersection operates at a LOS of E with 66 seconds of delay. Compared to *Scenario 3*, this is a two-second improvement in overall intersection performance. The greatest improvement among the approaches is exhibited by the eastbound Pemberton Browns Mills Road approach, as its 46 seconds of delay reflect a 20-second improvement and an upgrade in LOS from *Scenario 3*. Conversely, the southbound Juliustown Road approach experiences a 30-second increase in delay while retaining its failing LOS from the previous scenario.

Scenario 5
Characteristics
- Addition of a through lane on both the eastbound Pemberton Browns Mills Road and westbound Broadway approaches.
- Optimization of the existing timing plan.
- A “long-term” scenario.

Advantages
- Increased capacity at the eastbound and westbound approaches.
- The new split and cycle lengths are more reflective of increased approach capacities and of current traffic volumes.

Disadvantages
- Acquisition of right-of-way may be necessary along the eastbound and westbound approach legs.
- A wider approach will increase pedestrian crossing distance and time.

Level of Service Analysis
During the morning peak period, the intersection operates at a LOS of C with 21 seconds of delay. This represents a 50 percent, or 21-second decrease, and an upgrade in overall intersection performance from *Scenario 1*, the most comparable scenario. Similar to the prior scenarios, westbound Broadway is the least delayed approach, with a LOS of B and 12 seconds of delay. However, all of the remaining approaches operate at an unprecedented adequate LOS C and with no more than 26 seconds of delay.

During the afternoon peak period, the intersection operates at a LOS of C with 28 seconds of delay. Compared to *Scenario 1*, this is a 54-second improvement. The individual approaches reflect the drastic overall improvement, with southbound Juliustown Road experiencing the greatest decline in delay, with a reduction of 102 seconds from *Scenario 1*. This is possible due to a shift in green time towards the north and southbound approaches since it is less necessary along the widened east and westbound approaches.

Recommendations
The intersection currently operates with poor LOS and delay during both peak periods, though it is noticeably worse for the PM peak hour. To mitigate these congestion levels,

there are several modifications that are recommended. Primarily, this intersection and the Broadway and Trenton Road intersection should be coordinated during the east and westbound phases. This will reduce queue spillback along Broadway. Westbound left turns should be restricted in order to prevent left-turn queues within the shared left-and-through lane. As a long-term consideration, the feasibility of an additional through lane along the east and westbound approaches should be explored.

In addition the following should be considered with selected improvement scenario as appropriate:

- Signage
    - Install overhead lane designation signage. Additional street signs should be placed in advance of the intersection designating the lane configuration on Pemberton Browns Mills Road. Currently, only the pavement marking designates the lanes at the intersection. Motorists do not realize the right lane is for right only and use this lane to avoid vehicles making a left turn.
    - Install “Do not block Intersection” signs at the local roads (Brook Street, Ashton Street, Fairfield Street).
    - Consolidate signage as appropriate to eliminate sign clutter.
- Pavement markings
    - Re-stripe pavement markings to identify turning movements and reduce driver confusion.
    - Repainting the stop bars that are needed to help avoid conflicts in the intersection and create space for turning vehicles.
- Pedestrian enhancements
    - Repair sidewalks.
    - Crosshatch crosswalks for better visibility to the motorists and install pedestrian crossing signs as appropriate.
    - Upgrade pedestrian signal heads and push buttons to include pedestrian countdown signals.
- Access Management
    - Access management treatments should be considered at commercial properties adjacent to the intersection.
    - Consolidate access points, especially those closest to the intersection that conflict with queuing traffic.
    - Consider limiting direct access to local streets.
- There should be further study of making Brook Street a “one-way” street to access the post office. Traffic could exit via Dearborn Street. This may, however, shift the problem from Pemberton Brown Mills Road to Lakehurst Road. The Burlington County plan to convert Lakehurst between Broadway and Trenton Road to three lanes should address this issue. If this problem continues to grow, a long-term solution would be to investigate extending Dearborn Avenue south to connect to other local streets to provide additional access.

Intersection of Broadway and Trenton Road

Potential Improvement Scenarios

TABLE B12
Intersection Performance for Existing and Alternative Scenarios
Broadway and Trenton Rd.

Scenario	Direction of Travel	Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle			
Existing Conditions		AM Peak		PM Peak	
		LOS	Delay (sec)	LOS	Delay (sec)
	Broadway EB	F	84	C	25
	Broadway WB	D	41	C	30
	Trenton NB	E	59	C	29
	Trenton SB	C	33	F	114
	Intersection	E	57	D	52
Scenario 1 (Short): Optimize Existing Timing Plan		AM Peak 90s Cycle Length		PM Peak 90s Cycle Length	
		LOS	Delay (sec)	LOS	Delay (sec)
	Broadway EB	E	65	D	45
	Broadway WB	D	54	E	57
	Trenton NB	E	61	C	22
	Trenton SB	C	33	E	56
	Intersection	E	56	D	49
Scenario 2 (Medium): Coordination with Lakehurst/Pemberton/ Juliustown Intersection		AM Peak 106s Cycle Length		PM Peak 106s Cycle Length	
		LOS	Delay (sec)	LOS	Delay (sec)
	Broadway EB	C	27	C	33
	Broadway WB	D	53	E	62
	Trenton NB	E	73	C	25
	Trenton SB	D	40	E	58
	Intersection	D	49	D	47

TABLE B12 Continued Intersection Performance for Existing and Alternative Scenarios					
Broadway and Trenton Rd.					
Scenario	**Direction of Travel**	**Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle**			
Scenario 3 (Medium): Channelized RT on SB Trenton; Optimization of Existing Timing Plan		AM Peak 90s Cycle Length		PM Peak 70s Cycle Length	
		LOS	Delay (sec)	LOS	Delay (sec)
	Broadway EB	E	65	D	41
	Broadway WB	D	54	D	48
	Trenton NB	E	61	C	20
	Trenton SB	C	26	D	53
	Intersection	D	54	D	44
Scenario 4 (Long): Add and Reassign NB & SB Approaches; Optimization of Existing Timing Plan		AM Peak 60s Cycle Length		PM Peak 60s Cycle Length	
		LOS	Delay (sec)	LOS	Delay (sec)
	Broadway EB	C	35	C	24
	Broadway WB	C	26	C	29
	Trenton NB	D	45	B	19
	Trenton SB	D	37	D	38
	Intersection	D	35	C	29

Source: *DVRPC, 2007*

Scenario 1

Characteristics

- Optimization of the existing signal timing plan.
- A “short-term” scenario.

Advantages

- The new split and cycle lengths are more reflective of current traffic volumes.
- No equipment cost required.

Level of Service Analysis

During the morning peak hour, the intersection operates at an overall LOS of E with 56 seconds of delay, shown in ***Table 12***. This is only a one-second improvement from existing morning conditions. Similar to the existing AM peak hour, the poorest performing approach is eastbound Broadway, but with an improvement from its existing

LOS going from F to E and 19 seconds of improved delay. The westbound and northbound approaches experience increases in delay of 13 and 2 seconds, respectively; while the southbound approach remains the same.

During the afternoon peak period, the intersection operates at an overall LOS of D with 49 seconds of delay. This is a three-second improvement from existing afternoon conditions. The previously failing southbound approach improves to a LOS E with 56 seconds of delay, a difference of 58 seconds. However, this improvement increases at both Broadway approaches—eastbound goes from a LOS C to D with a 20-second increase in delay and westbound from LOS C to E with a 27-second increase in delay.

Scenario 2

Characteristics

- Signal coordination between this intersection and the intersection of Pemberton Browns Mills Road, Juliustown Road, Lakehurst Road, and Broadway.
- Coordination would occur during the east and westbound Broadway phases during both peak periods.
- A “medium-term” scenario.

Advantages

- A reduction in queue spillback along Broadway.
- Increase throughput along Broadway.
- The new split and cycle lengths are more reflective of current traffic volumes and of their interaction between the two closely spaced intersections.

Disadvantages

- The uncoordinated north and southbound approaches may experience an increase in delay in order to ensure a reduction in queue spillback along the coordinated east and westbound approaches.
- This would require the construction of a buried closed-loop hardwire between the two intersections with upgraded controllers, system software and signal heads.

Level of Service Analysis

During the morning peak period, the intersection operates at a LOS of D with 49 seconds of overall delay. Compared to *Scenario 1*, this is an improvement in LOS and a seven-second decrease in delay. As designed, the Broadway approaches experience noticeably less delay than the Trenton Road approaches in order to reduce queue spillback along Broadway. Consequently, on average the Broadway approaches experience less delay than in *Scenario 1,* but the Trenton Road approaches see an increase in delay and, in the case of the southbound approach, deterioration in LOS.

During the afternoon peak period, the intersection operates at a LOS of D with 47 seconds of delay. This represents a two-second decrease in overall delay versus *Scenario 1*. The eastbound approach has a 12-second reduction in delay over *Scenario 1* and improves from LOS D to C. All other approaches had increases in delay ranging from 2 to 5 seconds; LOS remains the same.

Scenario 3
Characteristics

- A channelized right turn is introduced along the southbound Trenton Road approach.
- Optimization of the existing timing plan.
- A "medium-term" scenario.

Advantages

- An increase in capacity for the southbound approach.
- The new split and cycle lengths are more reflective of current traffic volumes and the increase in capacity.

Disadvantages

- The acquisition of right-of-way is necessary at the northwest corner of the intersection. Shifting the approach lanes slightly to the east to make opposing left turn lanes on Trenton Road align would minimize right-of-way acquisition. The northbound receiving lane is wide and could accommodate this shift with no residual effect.

Level of Service Analysis
During the morning peak period, the intersection operates at an overall LOS of D with 54 seconds of delay. Although this is an improvement in LOS from *Scenario 1*, it is only a three-second reduction in delay. All but one of the approaches maintains the same LOS and delay measure as was exhibited in *Scenario 1*. Southbound Trenton Road experiences a seven-second improvement in approach delay to 26 seconds, but its LOS remains at C.

During the afternoon peak period, the intersection operates at an overall LOS of D with 44 seconds of delay. This is a five-second improvement from the overall delay in *Scenario 1*. In addition, all of the approaches experience a reduction in delay compared to *Scenario 1*. During the afternoon peak hour the Broadway approaches operate less efficiently than in their existing conditions. This is due to the existing poor performance of the southbound approach, which consequently receives additional green time after optimization but at the expense of the other phase.

Scenario 4
Characteristics

- Widen the northbound Trenton Road approach to add a second receiving lane.
- Reassign the existing southbound left-turn lane into a shared left-turn and through lane.
- Reassign the northbound approach lanes to shared left-turn and through lane and shared through and right-turn lane.
- Optimization of the existing timing plan.
- A "long-term" scenario.

Advantages
- An increase in capacity for the north and southbound Trenton Road approaches.
- Increase in throughput for the Trenton Road approaches.
- The new split and cycle lengths are more reflective of current traffic volumes and the increase in capacity.

Disadvantages
- Road widening will require the acquisition of right-of-way along the northbound approach.

Level of Service Analysis
During the morning peak hour, the intersection operates at an overall LOS D with 35 seconds of delay. This represents a 21-second improvement from the overall delay experienced in *Scenario 1*. For the AM peak hour, the impact of increased capacity is felt the greatest along the Broadway approaches because the Trenton Road approaches no longer require as large a proportion of the cycle length. This is exemplified by the 30-second reduction along eastbound Broadway, and the 4-second increase in delay for the southbound Trenton Road approach.

During the afternoon peak period, the intersection operates at an overall LOS C with 29 seconds of delay. In comparison to *Scenario 1*, this is a 20-second reduction in overall delay as well as an upgrade in LOS to C from D. Despite the increase in capacity, the southbound approach is still the poorest performing with a LOS of D and 38 seconds of delay. However, this represents an upgrade in LOS and an 18-second improvement from *Scenario 1*. This capacity increase also benefits the Broadway approaches, as they upgrade their LOS to Cs and reduce delays by 21 and 28 seconds.

Recommendations
Currently, the intersection performs poorly during both AM and PM peak hours. The southbound approach during the PM peak hour requires immediate attention, as well as the eastbound approach in the AM peak hour. The eastbound approach has high left-turn volumes conflicting with equally high westbound through volumes. Queue spillback from the Pemberton, Lakehurst, and Juliustown roads intersection must be addressed. This adversely affects the performance of the intersection. Therefore it is recommended that signal coordination between this and the aforementioned intersection should be instituted. This coordination should occur during the east and westbound phases. In the long term, the feasibility of acquiring the necessary right-of-way to construct a southbound channelized right turn should be explored.

In addition the following should be considered with selected improvement scenario as appropriate:
- Signage
    - Install overhead lane designation signage. Additional street signs should be placed in advance of the intersection designating the lane configuration.

   - Consolidate signage as appropriate to eliminate sign clutter.
- Pavement markings
   - Re-stripe pavement markings to identify turning movements and reduce driver confusion.
   - Repainting the stop bars that are needed to help avoid conflicts in the intersection and create space for turning vehicles.
- Pedestrian enhancements
   - Repair sidewalks to make them pedestrian friendly.
   - Cross hatch crosswalks for better visibility to the motorists and install pedestrian crossing signs as appropriate.
   - Upgrade pedestrian signal heads and push buttons to include pedestrian countdown signals.

Intersection of Lakehurst Road and Trenton Road

Potential Improvement Scenarios

Scenario 1

TABLE B13
Intersection Performance for Existing and Alternative Scenarios
Lakehurst Road and Trenton Road

Scenario	**Direction of Travel**	**Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle**			
Existing Conditions		AM Peak		PM Peak	
		LOS	Delay (sec)	LOS	Delay (sec)
	Lakehurst EB	A	4	B	13
	Lakehurst WB	A	6	A	9
	Trenton SB	B	19	B	13
	Intersection	A	7	B	12
Scenario 1 (Short): Optimize Existing Timing Plan		AM Peak		PM Peak	
		LOS	Delay (sec)	LOS	Delay (sec)
	Lakehurst EB	A	4	B	12
	Lakehurst WB	A	6	A	8
	Trenton SB	B	19	B	15
	Intersection	A	7	B	11

Source: *DVRPC, 2007*

Characteristics
- Optimization of the existing signal timing plan.
- A “short-term” scenario.

Advantages
- The new split and cycle lengths are more reflective of current traffic volumes.
- No equipment cost required.

Level of Service Analysis
During the morning peak period, the intersection operates at a LOS of A with seven seconds of delay. There is no change in the approaches’ LOS or seconds of delay compared to the existing. Consequently, it can be inferred that the intersection is performing optimally, and does not require signal timing remediation.

During the afternoon peak period, the intersection operates at a LOS of B with 11 seconds of delay. This is a one-second improvement from existing conditions. The Lakehurst Road approaches each reduce their delay by one second, while the Trenton Road approach increases its delay by two seconds. Overall, it can again be inferred that the intersection performs with little difficulty in the PM peak hour, and that it does not currently require any timing or capacity improvements.

Recommendations
Currently, the intersection’s performance for both peak periods is sufficient. As a result, it is recommended to maintain the intersection’s current geometric configuration and timing plan.

In addition the following should be considered with selected improvement scenario as appropriate:
- Signage
    - Install overhead lane designation signage, especially for the westbound Lakehurst Road approach. Additional street signs should be placed in advance of the intersection designating the lane configuration and direction.
    - Consolidate signage as appropriate to eliminate sign clutter.
    - Trim trees to prevent branches from blocking signs.
    - Install “Share the Road” signs especially in areas where there are no shoulders or bike lane.
    - Install signs prohibiting right turns onto Lakehurst Road from Trenton Road and left turns from eastbound Lakehurst Road to Trenton Road, given the difficulty of those turning movements.
- Pavement markings
    - Re-stripe pavement markings to identify turning movements and reduce driver confusion.
    - Repainting the stop bars that are needed to help avoid conflicts in the intersection and create space for turning vehicles.

    - Install pavement marking tracks for southbound Trenton Road to guide motorists for designated lanes on eastbound Lakehurst Road.
    - Replace the current triangle separator of the two westbound approach lanes with a raised median to avoid conflicts.
- Pedestrian enhancements
    - Repair sidewalks to make them pedestrian friendly.
    - Crosshatch crosswalks for better visibility to the motorists and install pedestrian crossing signs as appropriate.
    - Upgrade pedestrian signal heads and push buttons to include pedestrian countdown signals.

Intersection of Lakehurst and Trenton Roads - Existing
Source: *DVRPC*

Intersection of Lakehurst and Trenton Roads
Rendering of Proposed Improvements
Source: *DVRPC*

Intersection of Lakehurst Road, Clubhouse Road, and Noteboom Drive

Potential Improvement Scenarios

Scenario 1
Characteristics
- A restriction of left turns into and out of Clubhouse Road from Lakehurst Road.

Advantages
- Reduction of queues for vehicles exiting the Clubhouse Road approach.
- Elimination of left-turning queue along the eastbound Lakehurst Road approach.
- Eliminate conflict of left-turning vehicles with through traffic.

Disadvantages
- Clubhouse Road left-turning vehicles must take alternate routes to reach their original destination. This may induce congestion and delay at other intersections in the area.

Level of Service Analysis
During the morning peak period, the intersection operates at a LOS of A with just one second of delay. Due to the elimination of conflicting turning movements along Lakehurst Road, both the east and westbound approaches are free of any delay. The “stop-controlled” Clubhouse Road exhibits a LOS of C with 16 seconds of delay. This represents an 18-second decline in delay from existing conditions, and is the result of the elimination of left-turn queuing vehicles.

During the afternoon peak period, the intersection operates at a LOS of A, also with just one second of delay. Again, similar to the AM peak hour, there is no delay along the Lakehurst Road approaches of the intersection. The Clubhouse Road leg operates at a LOS of B with 12 seconds of delay. Compared to current conditions, this reflects a 34-second improvement in delay. And once more, this is a product of eliminating left turns exiting the approach leg.

Scenario 2
Characteristics
- Reduce the number of westbound Lakehurst Road travel lanes from two to one with a center turn lane from the Rancocas Lane intersection to the Clubhouse Road intersection, effectively the length of the Mirror Lake Dam.
- A “medium-term” scenario.

Advantages
- Reduces the total number of conflicting travel lanes for vehicles along the Clubhouse Road approach.
- Eastbound left turns to Clubhouse Road can queue in turn lane.
- Left-turning vehicles from Clubhouse Road can complete the turn in stages utilizing the center turn lane.

Disadvantages

- Decreases through-put capacity for vehicles traveling westbound along Lakehurst Road.
- Decreases the frequency and length of gaps in the westbound travel lane to accommodate turning movements from Clubhouse Road.
- The center turn lane is not warranted given there are no left turns across the Mirror Lake Dam.

TABLE B14
Intersection Performance for Existing and Alternative Scenarios
Lakehurst Rd. and Clubhouse Rd.

Scenario	Direction of Travel	Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle			
		AM Peak		PM Peak	
		LOS	Delay (sec)	LOS	Delay (sec)
Existing Conditions	Lakehurst EB	A	1	A	1
	Lakehurst WB	A	0	A	0
	Clubhouse SB	D	34	E	46
	Intersection	A	2	A	4
Scenario 1 (Short): Eliminate Left Turns Into and Out of Clubhouse Rd	Lakehurst EB	A	0	A	0
	Lakehurst WB	A	0	A	0
	Clubhouse SB	C	16	B	12
	Intersection	A	1	A	1
Scenario 2 (Medium): Eliminate a Westbound Lakehurst Rd Travel Lane	Lakehurst EB	A	1	A	1
	Lakehurst WB	A	0	A	0
	Clubhouse SB	F	53	E	50
	Intersection	A	3	A	4

Source: *DVRPC, 2007*

Level of Service Analysis

During the morning peak hour, the intersection operates at an overall LOS of A with three seconds of delay. The Lakehurst Road approaches retain their LOS of A with a negligible trace of delay. Unfortunately, the delay at the Clubhouse Road approach increases by 19 seconds. Consequently, that approach operates at LOS of F with 53 seconds of delay.

During the afternoon peak period, the intersection operates at an overall LOS of A with four seconds of overall delay. The approaches along Lakehurst Road retain their LOS of A. However, the “stop-controlled” Clubhouse Road approach maintains its LOS of E while its 50 seconds of average delay is a four-second increase in delay.

Recommendations
At this location, the combination of large vehicular volumes and “free-flow” control along Lakehurst Road induces delay and unsafe conditions for the Clubhouse Road approach. As a consequence, it is recommended to restrict left turns entering and exiting Clubhouse Road. Lakehurst Road should retain its current lane configuration of two lanes in each direction. Any reduction in lanes will create a bottleneck that would restrict flow on Lakehurst Road and reduce gaps for Clubhouse Road vehicles accessing Lakehurst Road.

Intersection of Lakehurst Road, Junction Road, and Lakeshore Drive

Potential Improvement Scenarios

Scenario 1
Characteristics
- Optimization of the existing signal timing plan.
- A “short-term” scenario.

Advantages
- The new split and cycle lengths are more reflective of current traffic volumes.
- No equipment cost required.

Disadvantages
- None

Level of Service Analysis
During the morning peak period, the intersection operates at a LOS of B with 11 seconds of overall delay. This represents a marginal improvement of one second from existing AM peak-hour conditions. The most notable change is exhibited by the northbound Junction Road approach, which reduces its delay by 11 seconds to 23 seconds of vehicle delay, though it retains its LOS of C.

During the afternoon peak period, the intersection operates at a LOS of D with 40 seconds of total delay. This is the same as existing conditions. For the individual approaches, the only impact is for southbound Lakeshore Drive, which has a six-second reduction of delay from the existing LOS.

TABLE B15
Intersection Performance for Existing and Alternative Scenarios
Lakehurst Road, Junction Road, and Lakeshore Drive

Scenario	Direction of Travel	Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle			
Existing Conditions		AM Peak		PM Peak	
		LOS	Delay (sec)	LOS	Delay (sec)
	Junction NB	C	34	C	34
	Lakeshore SB	B	12	F	89
	Lakehurst EB	A	5	D	41
	Lakehurst WB	A	10	B	14
	Intersection	B	12	D	40
Scenario 1 (Short): Optimize Existing Timing Plan		AM Peak 55s Cycle Length		PM Peak 90S Cycle Length	
		LOS	Delay (sec)	LOS	Delay (sec)
	Junction NB	C	23	C	34
	Lakeshore SB	B	11	F	83
	Lakehurst EB	A	5	D	41
	Lakehurst WB	B	11	B	14
	Intersection	B	11	D	40
Scenario 2 (Short): Optimize with Lakehurst Eastbound Lead Phase (PM Only)		AM Peak		PM Peak 90s Cycle Length	
		LOS	Delay (sec)	LOS	Delay (sec)
	Junction NB		N/A	C	34
	Lakeshore SB		N/A	F	83
	Lakehurst EB		N/A	D	41
	Lakehurst WB		N/A	C	24
	Intersection		N/A	D	42

TABLE B15 Cont'd
Intersection Performance for Existing and Alternative Scenarios
Lakehurst Rd., Junction Rd., and Lakeshore Dr.

Scenario	Direction of Travel	Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle			
Scenario 3 (Medium): Add Southbound Left Turn Lane; Optimize Existing Timing Plan		AM Peak 60s Cycle Length		PM Peak 90s Cycle Length	
		LOS	Delay (sec)	LOS	Delay (sec)
	Junction NB	C	25	D	43
	Lakeshore SB	A	10	D	54
	Lakehurst EB	A	6	C	24
	Lakehurst WB	B	12	B	11
	Intersection	B	12	C	28
Scenario 4 (Long): Reassign the eastbound lanes; Add a westbound receiving lane; Optimize existing timing plan		AM Peak 55s Cycle Length		PM Peak 60s Cycle Length	
		LOS	Delay (sec)	LOS	Delay (sec)
	Junction NB	C	22	B	20
	Lakeshore SB	A	10	D	36
	Lakehurst EB	A	5	C	20
	Lakehurst WB	B	12	C	21
	Intersection	B	11	C	23

Source: *DVRPC, 2007*

Scenario 2

Characteristics
- Introduce an eastbound lead phase during the PM peak hour.
- A "short-term" scenario.

Advantages
- Will provide an opportunity for protected left-turns, and potentially alleviate some of the delay along this approach.

Disadvantages
- May introduce additional delay on the remaining approaches.

Level of Service Analysis
During the afternoon peak period, the intersection operates at a LOS of D with 42 seconds of delay. This represents a two-second increase in overall delay from *Scenario 1.* For the individual approaches, all but one operates at the exact same LOS and delay

as in *Scenario 1*. The exception is the westbound Lakehurst Road approach, which experiences a LOS decline from a B to a C with a 10-second increase in delay. This is the consequence of the lead phase shortening the time given to that approach. It may also indicate that the intersection is currently operating at capacity.

Scenario 3

Characteristics

- Add an exclusive left-turn lane for the southbound Lakeshore Drive approach.
- Optimization of the existing signal timing plan.
- A “medium-term” scenario.

Advantages

- Increased capacity for the congested southbound approach.
- The new split and cycle lengths are more reflective of current traffic volumes and of revised capacity.

Disadvantages

- Roadway right-of-way must be expanded and thus land acquisition is a necessity. It may be possible that the existing right of way is adequate for the additional lane.

Level of Service Analysis

For the morning peak period, the intersection operates at a LOS of B with 12 seconds of total delay. This represents a one-second increase in delay from *Scenario 1*. The southbound approach would experience a one-second delay reduction. All approaches except the Lakeshore Drive approach experience an increase in delay between one and two seconds.

For the afternoon peak period, the intersection operates at a LOS of C with 28 seconds of overall delay. This represents an upgrade in LOS and a 12-second delay reduction from *Scenario 1*. The largest improvement is exhibited by southbound Lakeshore Drive, with a 29-second reduction and an upgrade in LOS from F to D. In addition, the west and eastbound Lakehurst Road approaches also reduce their delays by 3 and 17 seconds, respectively from *Scenario 1*. The only approach that does not benefit from the increased capacity is northbound Junction Road, which shows a decline in performance from LOS C to D and a 9-second increase in delay.

Scenario 4

Characteristics

- Add a second receiving lane along the westbound Lakehurst Road approach to the intersection.
- Reassign the eastbound exclusive right turn into a shared through-and-right.
- Optimization of the existing signal timing plan.
- A “medium-term” scenario.

Advantages

- Increase in eastbound capacity.
- The new split and cycle lengths are more reflective of current traffic volumes and of revised capacity.
- Associated cost is low.

Disadvantages

- Roadway right-of-way must be expanded and thus land acquisition is a necessity. Roadway width may permit the additional receiving lane in the existing right-of-way.

Level of Service Analysis
During the morning peak period, the intersection operates at a LOS of B with 11 seconds of delay. This is the same overall performance measure as exhibited in *Scenario 1* and consequently almost the same as *Scenario 3*. The performances of the individual approaches are almost identical to *Scenario 1*; eastbound Lakehurst Road operates with the least amount of delay and a LOS of A, while northbound Junction Road carries the largest delay of 22 seconds with a LOS of C.

During the afternoon peak period, the intersection operates at a LOS of C with 23 seconds of delay. This represents a 17-second improvement from *Scenario 1*, and a 5-second improvement from the other capacity-adding alternative, *Scenario 3*. The approach with the greatest amount of delay is southbound Lakeshore Drive with 36 seconds of average delay at a LOS of D. This is balanced by the remaining three approaches each operating with about 20 seconds in average delay.

Recommendations
The current timing plan is not time-of-day, or peak-hour specific. It is recommended that two unique timing plans be established for each peak period. For the AM peak hour, a two-phase optimized timing plan will suffice. Whereas for the PM peak hour, either the optimized two-phase or the optimized phase with an eastbound lead would assist with the intersection's performance. However, the intersection operates at or near capacity, which is visible by the marginal improvements that a revised timing plan offers. As a result, additional capacity via an increased eastbound Lakehurst Road through lane is recommended. Thus, the feasibility of an additional westbound receiving lane in combination with a lane reassignment at the eastbound approach should be explored.

In addition the following should be considered with selected improvement scenario as appropriate:

- Signage
    - Additional street signs should be placed in advance of the intersection designating the lane configuration and direction.
    - Consolidate signage as appropriate to eliminate sign clutter.
    - Install "Share the Road" signs, especially in areas where there are no shoulders or bike lanes.

- Pavement markings
    - Re-stripe pavement markings to identify turning movements and reduce driver confusion.
    - Repaint the stop bars that are needed to help avoid conflicts in the intersection and create space for turning vehicles.
    - Install pavement marking tracks to guide turning movements.
- Pedestrian enhancements
    - Repair sidewalks to make them pedestrian friendly.
    - Crosshatch crosswalks for better visibility to the motorists and install pedestrian crossing signs as appropriate.
    - Upgrade pedestrian signal heads and push buttons to include pedestrian countdown signals.

Area Circulation Recommendations

As mentioned before, the area is zoned as a Town Center Redevelopment Area. With redevelopment it is expected that trip generation to and from this area will increase.

The following should be considered to improve circulation and facilitate the safe and efficient throughput of traffic in the area. Further analysis is required.

- Convert Lakehurst Road between Broadway and Trenton Road to three lanes; one travel lane in each direction and a dual center-left-turn lane. This will facilitate throughput and improve safety in this section of the roadway by getting left-turning vehicles into their own lane without blocking through traffic in the travel lanes.
- Restrict left turns from the driveways on Pemberton Browns Mills Road from Ashton Street to Lakehurst Road.
- Consider converting Brooke Street to “one way” southbound. This would alleviate conflicts with traffic exiting Brooke Street with traffic on Pemberton Browns Mills Road. This traffic can utilize Dearborn Avenue, which is a greater distance from the intersection.
- Over the long term, consider connecting Busansky Lane through the driveway to connect with Noteboom Avenue and Berkshire Street. This would provide access to Pemberton Browns Mills Road without using the Pemberton Browns Mills Road/Broadway/Lakehurst Road/Juliustown Road intersection and vice versa.

CAMDEN

GLOUCESTER TOWNSHIP, CAMDEN COUNTY

LOCATION DESCRIPTION

This study area incorporates three intersections along County Route 534 (Blackwood-Clementon Road) in Gloucester Township in Camden County, New Jersey, shown on ***Figure C1***. The intersecting roads are NJ 42 southbound off-ramp and Erial Road, NJ 42 northbound on-ramp and CR 706 (Erial Road). NJ 42 is a state-owned and operated facility. It is a north-south, limited-access highway, which is functionally classified as an urban freeway/expressway. The highway where it crosses Blackwood-Clementon Road carries six lanes—three lanes in each direction with shoulders and a grass median. The speed limit is 55 MPH. To the north, NJ 42 connects to I-76, which goes into Philadelphia, and I-295 with access to New Jersey northern points and the state of Delaware in the south. To the south, NJ 42 connects with the Atlantic City Expressway and other major roadways with access to several communities and shore points. Blackwood-Clementon Road (CR 534) is a county-owned and maintained facility. In this area, it is functionally classified as an urban principal arterial, which runs in an east-west direction. The roadway is generally two lanes—one lane in each direction—but there are sections of four and three lanes. There are some sections where a shoulder is provided and the speed limit ranges from 35-40 MPH. Blackwood-Clementon Road goes from NJ 45 in Woodbury to US 30 in Berlin. Erial Road (CR 706) is a county-owned and maintained roadway. It travels in a north-south direction and is functionally classified as an urban minor arterial south of Blackwood-Clementon Road. It carries two lanes—one lane in each direction with additional turning lanes at some intersections. The speed limit is 45 MPH. Erial Road goes from NJ 168 in Blackwood to Sicklerville Road in New Brooklyn.

At the Blackwood-Clementon Road/Erial Road intersection, Erial Road has two approach lanes—an exclusive left-turn lane and a shared left-turn, through and right-turn lane in the northbound direction. As shown in ***Figure C2***, at this approach there are also two receiving lanes that taper to one. At the southbound approach, Erial Road has a channelized right-turn lane and exclusive through and left-turn lane. The Blackwood-Clementon Road eastbound approach carries four lanes—an exclusive left-turn lane, a right-turn lane, a through lane and a shared right-turn and through lane. The westbound approach carries three lanes—one each exclusive left-turn and through lanes and a shared through and right-turn lane. There are crosswalks at the northbound and westbound approaches of the intersection.

The Blackwood-Clementon Road/NJ 42 on-ramp intersection forms a “T.” There are two lanes westbound on Blackwood-Clementon Road and two through lanes and a left-turn slot eastbound. The eastbound and westbound Blackwood-Clementon Road accesses to the NJ 42 on-ramp are separate and form a triangle at the intersection.

Figure C1

Congestion and Crash Site Analysis

Study Area

Gloucester Twp., Camden Co., NJ

Analysis Area / Intersection

42

168

GLOUCESTER

PETERS LA

ERIAL RD

42

Big Timber Creek

CR 534 BLACKWOOD - CLEMENTON RD

CR 534 E CHURCH ST

168

STATE ST

ERIAL RD

GLOUCESTER CO.
CAMDEN CO.

CAMDEN CO.
GLOUCESTER CO.

Grenlock Lake

42

0 1,000 2,000

Feet

168

Delaware Valley Regional
Planning Commission
July 2007

Figure C2

Congestion and Crash Site Analysis

Existing Lane Configuration

Gloucester Twp., Camden Co., NJ

DVRPC Aerial Imagery: Spring, 2005

Delaware Valley Regional Planning Commission
July 2007

The Blackwood-Clementon Road/NJ 42 off-ramp/Erial Road intersection is the westernmost intersection of the study area. The NJ 42 off-ramp is one lane and at the approach it has all movement in separated exclusive lanes. The Erial Road approach does not align with the NJ 42 off-ramp. This approach carries one approach lane for all movements and a receiving lane. The Blackwood-Clementon Road approaches to the intersection both have one lane, which has all movements. In the case of the eastbound approach, the movements are through and left only. Eastbound Blackwood-Clementon Road has two receiving lanes—one to accommodate right-turning traffic from the NJ 42 off-ramp and the other to accommodate through traffic.

The NJ Transit Route 400 bus from Sicklerville to Philadelphia serves the area with limited trips along Church Street/Blackwood-Clementon Road to the PennCO Tech Trade School on Erial Road. The average weekday boardings in 2005 were 5,021 passengers, on 128 trips per weekday.

As shown in ***Figure C3***, land use in the area is mixed. The predominant land use in the immediate study area is residential, mainly single family housing units. A small number of multifamily units are also located in the area. In addition, there are several other trip generators in the area. There are several schools, including Camden County Community College, and students use the roadways mentioned to access these institutions. Commercial land uses are in several pockets in and around the area.

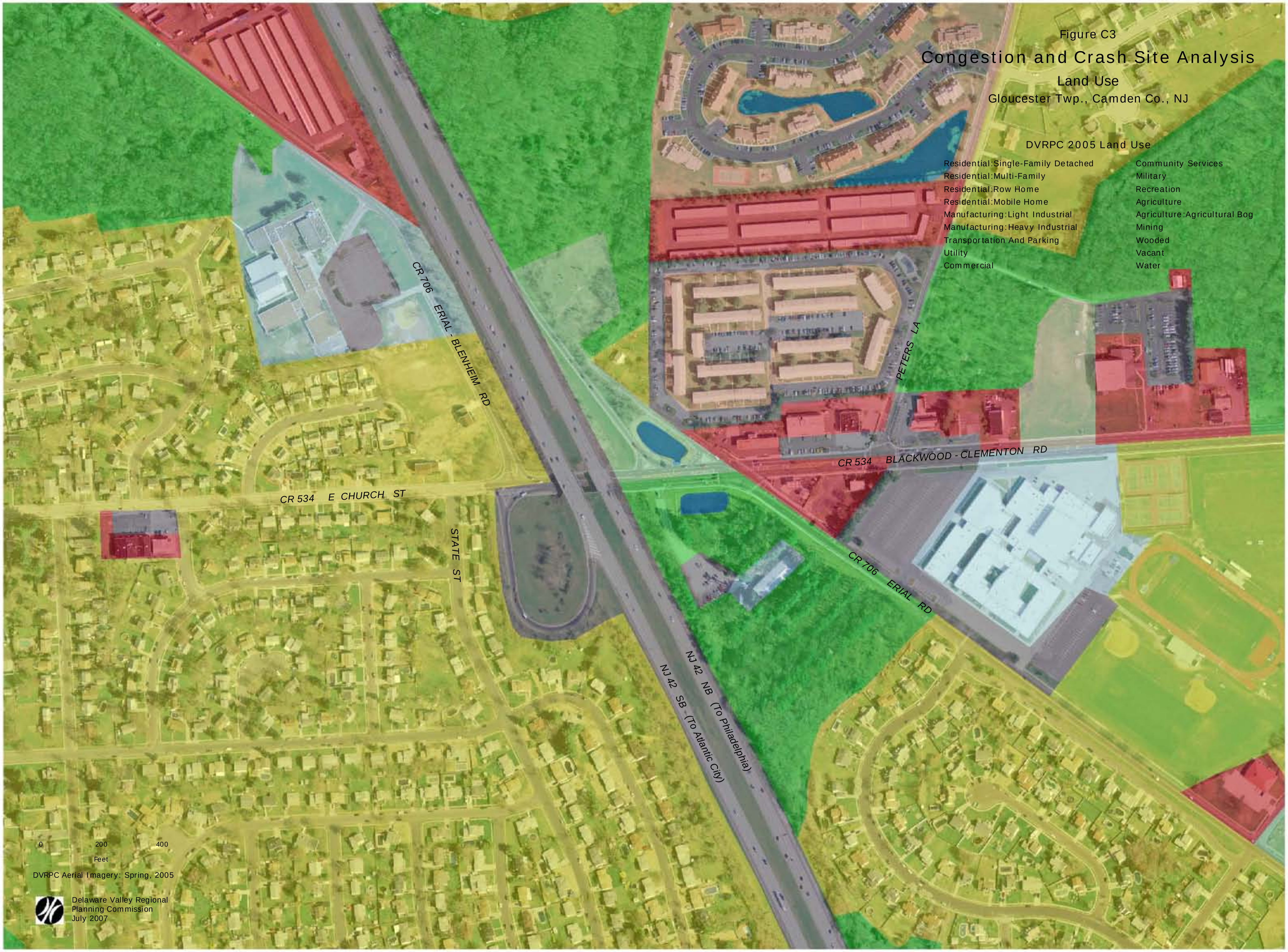


Figure C3
Congestion and Crash Site Analysis
Land Use
Gloucester Twp., Camden Co., NJ
DVRPC 2005 Land Use
Residential:Single-Family Detached
Residential:Multi-Family
Residential:Row Home
Residential:Mobile Home
Manufacturing:Light Industrial
Manufacturing:Heavy Industrial
Transportation And Parking
Utility
Commercial
Community Services
Military
Recreation
Agriculture
Agriculture:Agricultural Bog
Mining
Wooded
Vacant
Water
CR 706 ERIAL - BLENHEIM RD
PETERS LA
CR 534 BLACKWOOD - CLEMENTON RD
CR 534 E CHURCH ST
STATE ST
CR 706 ERIAL RD
NJ 42 NB (To Philadelphia)
NJ 42 SB (To Atlantic City)
0 200 400
Feet
DVRPC Aerial Imagery: Spring, 2005
Delaware Valley Regional
Planning Commission
July 2007

EXISTING CONDITIONS

NJ 42 is a major commuting route leading to and from the City of Philadelphia. It is heavily traveled daily by South Jersey residents working in the city. According to *NJDOT Straight Line Diagrams* an Average Annual Daily Traffic (AADT) count of 118,290 was recorded in 2004 just north of the study area on NJ 42. Congestion at this site occurs during the morning and afternoon peaks on weekdays. Blackwood-Clementon Road, which according to *NJDOT Straight Line Diagrams* has recorded an AADT of 25,161 in 2004, feeds a significant amount of commuter traffic traveling from the east and south into NJ 42 during the morning peak period. Traffic constantly backs up on westbound Blackwood-Clementon Road and northbound Erial Road to access the northbound ramp onto NJ 42. The single northbound NJ 42 on-ramp at Blackwood-Clementon Road is the only access to NJ 42 in the area and is accessed by both east and westbound traffic. Currently, NJ 42 is operating close to its capacity in the morning peak period. Therefore, traffic access to NJ 42 backs up on the ramp and spills over onto Blackwood-Clementon Road. The on-ramp has limited capacity to store excess vehicles.

In the evening peak period, congestion occurs at the single-lane southbound NJ 42 exit ramp onto Blackwood-Clementon Road. This traffic accesses east and westbound Blackwood-Clementon Road and northbound Erial Road to a lesser extent. Exiting vehicles back up onto NJ 42 during the afternoon peak period. The deceleration lane at this exit is limited and therefore provides little stacking space for backed up traffic. In addition, the off-ramp curve radius is small making it difficult to maneuver by larger vehicles. This contributes to the identified safety issues at this location as evidenced by the crash data. There are multiple turning conflicts at this intersection due to the high volumes from the off-ramp that's associated with Blackwood-Clementon Road and Erial Road.

Highland High School is a major trip generator in the morning peak period. The multiple accesses to/from the institution on both Erial Road and Blackwood-Clementon Road exacerbate the congestion and safety problems, through additional volume and increased conflicts. In addition, other conflicts were observed with the access and egress points of the gas stations located at the northeast and southeast corners of the Blackwood-Clementon Road/Erial Road intersection.

The area is not pedestrian or bike friendly due to the wide intersection crossings at the Blackwood-Clementon Road/Erial Road intersection and the speed, volumes and multiple turning movements at the intersections. In addition, sidewalks are discontinuous and crosswalks in many areas are nonexistent or inadequate.

Turning Movement Counts

Manual turning movement counts of the project intersections were taken in September and October of 2006. In order to capture the recurring issue of the morning and afternoon peak travel periods, counts were taken exclusively on weekdays, from 6 AM to 9 AM and from 4 PM to 7 PM. Furthermore, a “system-wide” approach was utilized to ascertain the peak hour. This method combines the vehicular volumes of all three intersections for each quarter-hour period and selects the 60-minute period with the highest overall volume. Consequently, for these three intersections, the “system-wide” peak hours are 7:15 to 8:15 in the morning and 5:00 to 6:00 in the afternoon. A complete record of the manual turning movement counts is available in **Appendix B**.

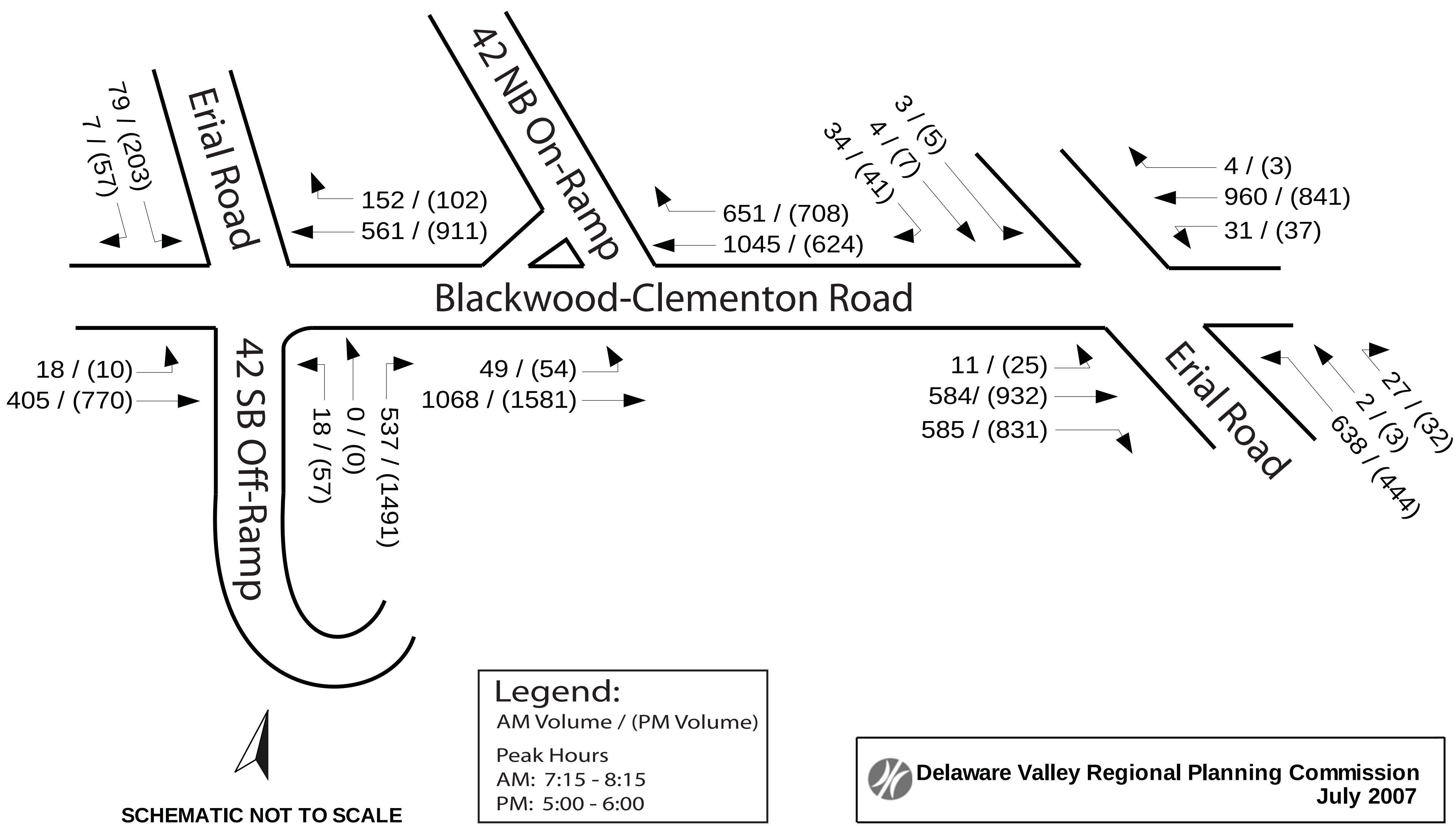
The peak-hour turning movement diagram for all three intersections is shown in ***Figure C4***. At the intersection of Blackwood-Clementon Road with the NJ 42 off-ramp and the southbound approach leg of Erial Road, afternoon peak-hour traffic more than doubles the morning’s volume. Of this PM peak hour’s 3,601 vehicles, which has the largest volume of any of the intersection’s peak hours, over 40 percent make right turns from the off-ramp. Such a high volume of vehicles merging onto Blackwood-Clementon Road greatly contributes to the high crash rate at the base of the off-ramp. In addition, there are 203 southbound left-turning vehicles in the afternoon peak hour that must not only negotiate gaps within the westbound through movement of 911 vehicles in the peak hour, but also within the eastbound through movement of 770 vehicles during that hour. This situation is exacerbated by the lack of signs or signal controls for the east and westbound movements.

At the intersection of Blackwood-Clementon Road and the NJ 42 on-ramp, the morning and afternoon peak hours carry a comparable amount of traffic, respectively 2,813 and 2,967 vehicles. However, the predominant direction of the traffic is time-of-day dependent, with the AM peak period experiencing a mainly westbound flow while the afternoon experiences the opposite, a predominantly eastbound flow. Regardless, there is heavy traffic in either direction during both peak hours. With regards to the on-ramp volumes, relatively few vehicles enter the on-ramp via a left turn from eastbound Blackwood-Clementon Road, though there is a slight increase when comparing the morning peak hour to the afternoon. However, these left-turning vehicles must complete their maneuver against a consistently heavy westbound through movement. Nonetheless, there is a major difference in the direction from which vehicles enter the freeway; in both the AM and PM peak hour, 93 percent enter from the westbound direction.

The Blackwood-Clementon Road and the northbound approach leg of the Erial Road intersection carries comparable AM and PM volumes. The busiest approach is eastbound Blackwood-Clementon Road with approximately 41 percent and 56 percent of the morning and afternoon peak-hour volumes, respectively. Of these approach volumes, approximately half of the movements are right turns onto Erial Road for either peak period. Left-turning vehicles constitute over 90 percent of the movements of the northbound Erial Road approach for both the AM and PM peak hours at this intersection. This is mainly offset by the minimal volume of vehicles exiting from the unnamed road in the opposing direction.

Figure C4: Turning Movement Diagram

Existing Peak Hour Turning Movement Counts
NJ 42 On/Off-Ramp, Blackwood-Clementon Road, & Erial Road



Legend:
AM Volume / (PM Volume)

Peak Hours
AM: 7:15 - 8:15
PM: 5:00 - 6:00

Delaware Valley Regional Planning Commission
July 2007

Level of Service

SYNCHRO traffic analysis software was utilized to ascertain the current and potential future performance levels of the project intersections. It provides multiple measures of effectiveness such as Level of Service (LOS) and average delay-per-vehicle for individual approaches and movements, as well as overall intersections. These measures will assist in determining the most appropriate scenarios for alleviation of existing issues.

Blackwood-Clementon Road, NJ 42 Off-ramp, and Erial Road

Existing LOS
During the morning peak period, the intersection currently operates at an overall LOS of F, as shown in ***Table C1***. The intersection's average delay per vehicle is unmeasured by SYNCHRO software because that performance measure is unavailable for the southbound Erial Road approach. This is a reflection of the scarcity of suitable gaps for left-turning southbound vehicles, which is due to an extremely heavy volume of vehicles traveling along Blackwood-Clementon Road. This undetermined delay is reflected in the opposing northbound NJ 42 off-ramp approach, which also operates at a LOS of F with 103 seconds of delay. These excessive delays are countered by the Blackwood-Clementon Road approaches, which operate at a LOS of A and minimal delay—products of "free flow" along these approaches.

TABLE C1
Existing Intersection Performance
Blackwood-Clementon Road, NJ 42 Off-Ramp, and Erial Road

Scenario	Direction of Travel	Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle			
Existing Conditions		AM Peak		PM Peak	
		LOS	Delay (sec)	LOS	Delay (sec)
	Blackwood-Clementon EB	A	1	A	2
	Blackwood-Clementon WB	A	0	A	0
	NJ 42 Off-Ramp NB	F	103	F	N/A
	Erial Road SB	F	N/A	F	N/A
	Intersection	F	N/A	F	N/A

Source: *DVRPC, 2007*

During the afternoon peak period, the intersection also operates at a LOS of F. An overall delay-per-vehicle is unavailable due to immeasurable levels of delay along southbound Erial Road and the NJ 42 off-ramp. The delay measures along these approaches are beyond practical measure due to severe conflicting flow rates, exceptionally heavy movement volumes, and inadequate capacity. Again, these excessive delays are balanced by negligible delay incurred by the Blackwood-Clementon Road approaches, both of which operate at a LOS of A.

Blackwood-Clementon Road and Erial Road

Existing LOS
The intersection of Blackwood-Clementon Road and Erial Road performs adequately during both peak periods, as shown in ***Table C2***. For the AM peak hour, it operates with a LOS of C and 28 seconds of delay. The best performing approach is eastbound Blackwood-Clementon Road with a LOS of B and with 19 seconds of delay. The poorest performing approach is northbound Erial Road, with a LOS of D and 49 seconds of delay. During the PM peak hour, the overall performance levels are comparable, as it also operates at a LOS of C and with 29 seconds of delay. The westbound Blackwood-Clementon Road approach operates most efficiently, with a LOS of B and an average of 18 seconds of delay. This is a contrast to the AM peak hour that exhibited eastbound Blackwood-Clementon Road as the best performing approach. Lastly, similar to the morning peak period, the northbound Erial Road approach operates poorly, with a LOS of E and 67 seconds of delay.

TABLE C2
Existing Intersection Performance
Blackwood-Clementon Road and Erial Road.

Scenario	Direction of Travel	Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle			
Existing Conditions		AM Peak 90s Cycle Length		PM Peak 90s Cycle Length	
		LOS	Delay (sec)	LOS	Delay (sec)
	Blackwood-Clementon EB	B	19	C	23
	Blackwood-Clementon WB	C	24	B	19
	Erial Road SB	C	22	C	22
	Erial RoadNB	D	49	E	67
	Total Intersection	C	28	C	29

Source: *DVRPC, 2007*

<u>*Crash Analysis*</u>

Crash data for the Erial Road/ Blackwood-Clementon Road, State Road and NJ 42 off-ramp location was provided by the Gloucester Township Police for a three-year period from 2004 to 2006. The crash information provided did not clearly distinguish between the reportable or non-reportable crashes. This document summarizes the Erial Road and Blackwood-Clementon Road intersection and the Church Street/State Road/Erial-Blenheim Road and NJ 42 off-ramp intersection separately. Given that the NJ 42 off-ramp is part of the state highway system and the majority of the crashes were coded at the Church Street intersection, the crashes for this report are compared to the NJDOT 2005 statewide data for the county road system.

Erial Road and Blackwood-Clementon Road Intersection
As shown in ***Table C3*** there were a total of 86 crashes at the Erial Road and Blackwood-Clementon Road intersection. There were no fatalities recorded, however, there were 23 injury and 63 property-damage-only crashes. The injury crashes was lower than the statewide average of 29.33 percent.

Table C3 – Erial Road and Blackwood-Clementon Road Intersection Crash Summary (2004 – 2006)

	2004		2005		2006		Total		2005 NJ Statewide Average
	Crash	%	Crash	%	Crash	%	Crash	%	County Rd
Crashes									
Reportable	29	34%	32	37%	25	29%	86	100%	N/A
Severity									
Fatalities	0	0%	0	0%	0	0%	0	0%	0.25%
Injuries	10	34%	8	25%	5	20%	23	27%	29.33%
PDO	19	66%	24	75%	20	80%	63	73%	70.42%
Crash Type									
Rear End	18	62%	18	56%	16	64%	52	60%	29.82%
Angle	5	17%	5	16%	3	12%	13	15%	20.18%
Sideswipe	2	7%	4	13%	2	8%	8	9%	11.07%
Other	2	7%	1	3%	3	12%	6	7%	4.38%
Left Turn	2	7%	3	9%	0	0%	5	6%	6.69%
Hit Parked Vehicle	0	0%	1	3%	0	0%	1	1%	5.97%
Head On	0	0%	0	0%	1	4%	1	1%	2.58%
Lighting Conditions									
Daylight	20	69%	28	88%	18	72%	66	77%	71.38%
Dark	9	31%	4	13%	7	28%	20	23%	27.99%
Weather Conditions									
Clear	23	79%	19	59%	18	72%	60	70%	N/A
Rainy	2	7%	8	25%	6	24%	16	19%	N/A
Wintry	0	0%	2	6%	1	4%	3	3%	N/A
Other	4	14%	3	9%	0	0%	7	8%	N/A
Road Surface Conditions									
Dry	23	79%	19	59%	19	76%	61	71%	74.49%
Wet	1	3%	8	25%	6	24%	15	17%	19.09%
Icy	2	7%	2	6%	0	0%	4	5%	6.02%
Unknown	3	10%	3	9%	0	0%	6	7%	0.39%

Source: Gloucester Township Police Crash Records (2004 – 2006)

During this study period, there were 29 crashes in 2004 (34 percent), 32 crashes in 2005 (37 percent), and 25 crashes in 2006 (29 percent). The majority of the crashes were rear ends (52), which represented 60 percent of all crashes at the intersection. This is consistent with the fact that this intersection is heavily congested. As depicted in the collision diagram in ***Figure C5*** several of these crashes occurred along the northbound approach of Erial Road. Compared to the statewide data, rear-end crashes at this location exceeded the statewide average of 29 percent. Other types of crashes at this intersection included 13 angle, 8 sideswipe, 5 left turns, 1 hit parked vehicle, 1 head on, and 6 other or unknown crashes. Over the three-year period, 66 of the 86 crashes occurred in daylight conditions, which is slightly above the approximate 71 percent statewide average. The 20 crashes that occurred under dark conditions were slightly below the 28 percent statewide average. As indicated in ***Table C3***, 60 of the 86 crashes occurred under clear weather conditions representing 70 percent of the crashes.

NJ 42 Off-ramp/Church Street/Erial-Blenheim Road/State Street vicinity

There were a total of 64 crashes in the NJ 42 off-ramp/Erial-Blenheim Road/State Street vicinity. At this location there were no fatalities, however, there were 17 injury and 47 property-damage-only crashes. The injury crashes, as shown in ***Table C4***, that occurred at this intersection are below the statewide average, which is 29.33 percent.

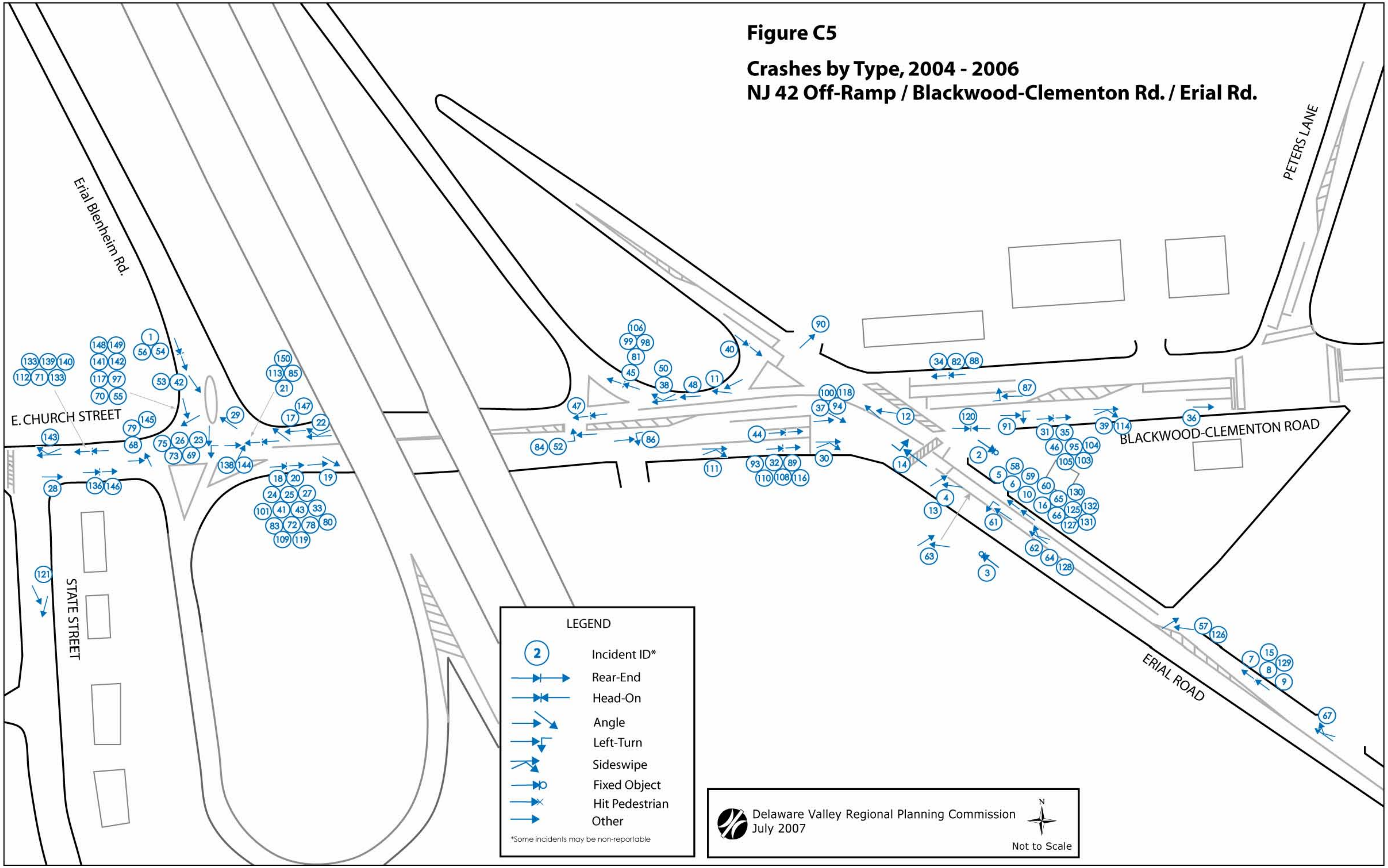
According to the crash data, there were 22 crashes in 2004 (26 percent), 19 crashes in 2005 (22 percent), and 23 crashes in 2006 (27 percent). The majority of the crashes at this location were 24 rear ends, which represented 38 percent of all crashes at the intersection. Compared with the statewide data, rear-end crashes at this location exceeded the statewide average of approximately 30 percent. This is consistent with the fact that this intersection is heavily congested.

Other types of crashes at this intersection include 12 angle (19 percent), 10 left turns (16 percent), 5 sideswipe (8 percent), 1 hit parked vehicle (2 percent), and 12 other or unknown crashes (19 percent). The high percentage of angle crashes suggests a problem associated with finding adequate gaps to access opposing roadways. Over the three-year period, 50 of the 64 crashes occurred in daylight conditions, which is slightly below the 71 percent statewide average. The 14 crashes that occurred under dark conditions were below the approximately 28 percent statewide average. As indicated in ***Table C4***, 44 of the 64 crashes occurred under clear weather conditions representing 69 percent of the crashes.

Figure C6 compares the crashes on a monthly basis over the three-year study period for the study area. The pattern of crashes varies over the course of the year for both locations. The months of January, February, September and October have the highest number of incidents at the Erial Road and Blackwood-Clementon Road intersection. Although, January had a total of 12 crashes for the three-year period; 6 of the crashes occurred in 2004, 5 in 2005, and only 1 in 2006. The month of July had the highest

Figure C5

Crashes by Type, 2004 - 2006
NJ 42 Off-Ramp / Blackwood-Clementon Rd. / Erial Rd.



number of crashes at or near the NJ 42 off-ramp vicinity. The month of May had the fewest crashes for both study locations.

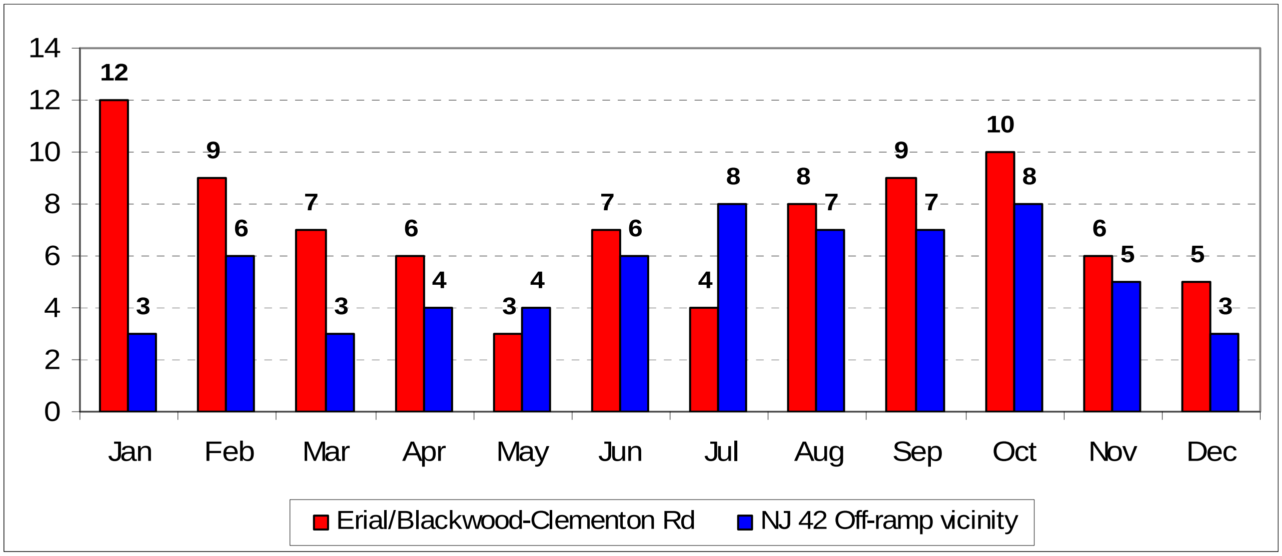
Table C4 – NJ 42 Off-ramp/ Blackwood-Clementon Road/Erial Road Intersection Crash Summary (2004 – 2006)

	2004		2005		2006		Total		2005 NJ Statewide Average
	Crash	%	Crash	%	Crash	%	Crash	%	County Rd
Crashes									
Reportable	22	26%	19	22%	23	27%	64	100%	N/A
Severity									
Fatalities	0	0%	0	0%	0	0%	0	0%	0.25%
Injuries	4	18%	5	26%	8	35%	17	27%	29.33%
PDO	18	82%	14	74%	15	65%	47	73%	70.42%
Crash Type									
Rear End	9	41%	6	32%	9	39%	24	38%	29.82%
Angle	1	5%	5	26%	6	26%	12	19%	20.18%
Other	7	32%	2	11%	3	13%	12	19%	4.38%
Left Turn	2	9%	6	32%	2	9%	10	16%	6.69%
Sideswipe	3	14%	0	0%	2	9%	5	8%	11.07%
Hit Parked Vehicle	0	0%	1	5%	0	0%	1	2%	5.97%
Lighting Conditions									
Daylight	15	68%	17	89%	18	78%	50	58%	71.38%
Dark	7	32%	2	11%	5	22%	14	16%	27.99%
Weather Conditions									
Clear	12	55%	13	68%	19	83%	44	69%	N/A
Rainy	6	27%	4	21%	3	13%	13	20%	N/A
Other	4	18%	2	11%	1	4%	7	11%	N/A
Road Surface Conditions									
Dry	12	55%	13	68%	19	83%	44	69%	74.49%
Wet	6	27%	4	21%	4	17%	14	22%	19.09%
Unknown	4	18%	2	11%	0	0%	6	9%	0.39%

Source: Gloucester Township Police Crash Records (2004 – 2006)

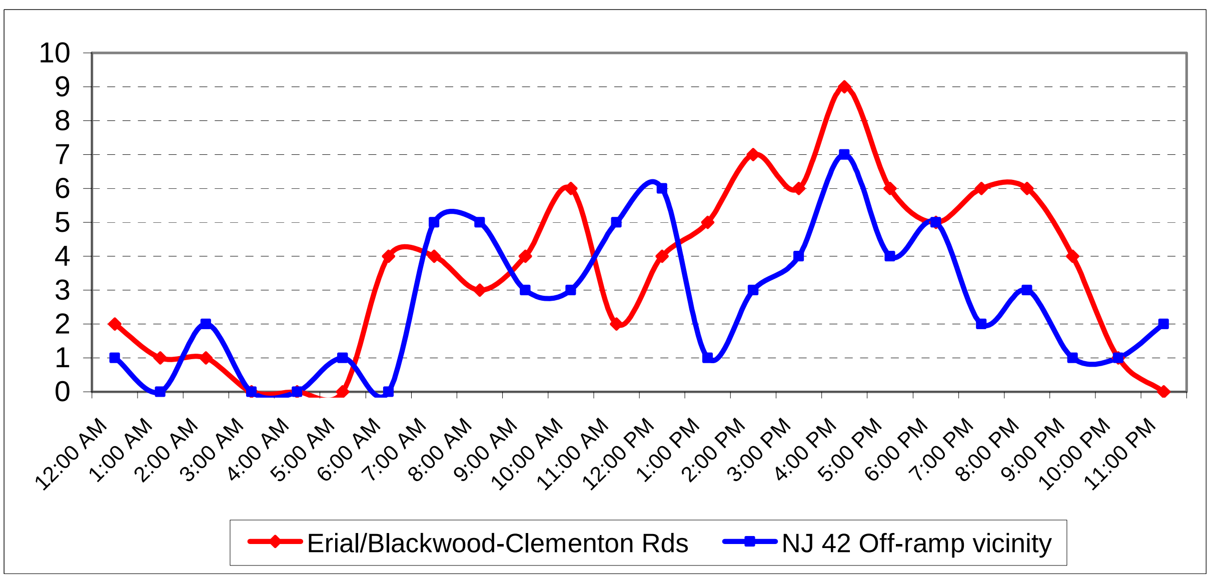
Figure C7 depicts the crashes at both intersections by time of day. The trend of crashes during the overnight and into the morning peak hour is similar for both intersections. In the mid-morning and midday hours, the pattern of crashes at both locations tends to fluctuate. At both intersections the highest number of crashes occurs between 4 PM and 5 PM. After the afternoon rush hour, the amount of crashes decreases. Over the three year period, the majority of the crashes at both locations occur on weekdays. A complete listing of the crash data is provided in **Appendix B**.

Figure C6 – Crashes by Month



Source: Gloucester Township Police Crash Records (2004 – 2006)

Figure C7 – Crashes by Time of Day



Source: Gloucester Township Police Crash Records (2004 – 2006)

OPPORTUNITY AND CONSTRAINTS

Blackwood-Clementon Road, NJ 42 Off-ramp, and Erial Road
The intersection of Blackwood-Clementon Road, the NJ 42 off-ramp, and Erial Road is currently unsignalized. However, the concept of signalizing the intersection was explored in detail by NJDOT in 1999, the results of which include a traffic signalization plan and a signal timing plan. It is unknown as to why a traffic signal was never consequently installed. In addition, there is a TIP project seeking to construct an interchange at College Drive on NJ 42, about 1.3 miles south of the Blackwood-Clementon Road off-ramp. Scheduled to be completed in 2010, this project has various implications upon traffic circulation in the surrounding areas. Specifically, it is estimated to reduce traffic along the Blackwood-Clementon Road on- and off-ramps by approximately 9 percent of existing volumes, and a further 18 percent to 23 percent when compared to the 2030 “no-build” scenario. This analysis is available in **Appendix B**.

Blackwood-Clementon Road and Erial Road
The intersection of Blackwood-Clementon Road and Erial Road was overhauled in 2003. This project provided an updated signal timing plan, additional turning lanes, as well as revised signage and pavement markings. Therefore, any recommended improvements to this intersection requiring major investment have a high probability to be shelved. Consequently, any recommendations should focus upon short-term, low-cost improvements, such as signal retiming.

POTENTIAL IMPROVEMENT SCENARIOS

Blackwood-Clementon Road, NJ 42 Off-ramp,and Erial Road

Scenario 1
Characteristics

- Installation of a semi-actuated traffic signal.
- Signal plan will be two-phased.
- All minor street movements other than right turns from the NJ 42 off-ramp will be signal controlled.

Advantages

- Signal protection for vehicles traveling along the NJ 42 off-ramp and southbound Erial Road approach.

Disadvantages

- Signal control will incur delay upon the previously free-flowing Blackwood-Clementon Road approaches.
- Due to the existing offset of the north and southbound approach legs, there may be potential vehicle conflicts between southbound Erial Road right turns and NJ 42 off-ramp left turns.

Level of Service Analysis
During the morning peak period, the intersection operates at a LOS of A with only six seconds of delay, as shown in ***Table C5***. This represents a dramatic performance improvement from current conditions. Most of the individual approaches reflect the excellent overall performance level, as three of the approaches share a LOS of A. This includes the NJ 42 off-ramp, whose previous 102 second delay measure is almost entirely eliminated. The remaining approach, southbound Erial Road operates at an adequate LOS of C and with 28 seconds of delay, yet this also represents an extensive improvement to the approach's performance.

During the afternoon peak period, the intersection operates at a LOS of D with 42 seconds of delay. Despite this LOS, this scenario also represents a significant improvement in performance from existing conditions. Unlike the AM peak hour, there are delays incurred by vehicles traveling on Blackwood-Clementon Road, most noticeably along the eastbound approach, which operates at a LOS of E with 66 seconds of delay. This is a sharp departure from the negligible delays currently experienced by vehicles along Blackwood-Clementon Road. However, the operations of the large volume of vehicles exiting the NJ 42 off-ramp is dramatically improved from current conditions, despite exhibiting a LOS of C and 27 seconds of delay. The southbound Erial Road approach again experiences the most congestion, with 137 seconds of delay and a failing LOS. However, this still represents an improvement from existing afternoon peak period conditions.

TABLE C5
Intersection Performance for Existing and Alternative Scenarios
Blackwood-Clementon Road, NJ 42 Off-Ramp, and Erial Road

Scenario	Direction of Travel	Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle			
Existing Conditions		AM Peak		PM Peak	
		LOS	Delay (sec)	LOS	Delay (sec)
	Blackwood-Clementon EB	A	1	A	2
	Blackwood-Clementon WB	A	0	A	0
	NJ 42 Off-Ramp NB	F	103	F	N/A
	Erial Rd SB	F	N/A	F	N/A
	Intersection	F	N/A	F	N/A
Scenario 1 (Medium): Signalize Intersection with a 2-Phase Signal Plan		AM Peak 40s Cycle Length		PM Peak 130s Cycle Length	
		LOS	Delay (sec)	LOS	Delay (sec)
	Blackwood-Clementon EB	A	6	E	66
	Blackwood-Clementon WB	A	6	B	19
	NJ 42 Off-Ramp NB	A	2	C	27
	Erial Rd SB	C	28	F	137
	Intersection	A	6	D	42
Scenario 2 (Medium): Signalize Intersection with a 3-Phase Signal Plan		AM Peak 60s Cycle Length		PM Peak 150s Cycle Length	
		LOS	Delay (sec)	LOS	Delay (sec)
	Blackwood-Clementon EB	A	8	F	87
	Blackwood-Clementon WB	A	8	C	26
	NJ 42 Off-Ramp NB	A	2	D	36
	Erial Rd SB	C	29	F	155
	Intersection	A	7	D	54

Source: *DVRPC, 2007*

Scenario 2
Characteristics
- Installation of a semi-actuated traffic signal.
- All movements, with the exception of right turns from the NJ 42 off-ramp will be signal controlled.
- Signal plan will be three-phased, with the third phase exclusively accommodating southbound Erial Road right turns.

Advantages
- Signal protection for vehicles exiting NJ 42 and southbound Erial Road approach. Signal will establish gaps to enter Blackwood-Clementon Road.
- Will prevent the aforementioned potential conflict between southbound Erial Road right turns and NJ 42 off-ramp left turns.

Disadvantages
- Signal control will incur delay upon the previously free-flowing Blackwood-Clementon Road approaches.

Level of Service Analysis
During the morning peak period, the intersection operates at a LOS of A with seven seconds of delay. This is comparable to *Scenario 1*, since it represents a marginal delay increase of one second. This minor increase is reflected in most of the approaches. The delay measures for both Blackwood-Clementon Road approaches increase by two seconds to a delay of eight seconds at each. Southbound Erial Road continues to operate at a LOS of C with 29 seconds of delay, a 1-second increase over *Scenario 1*. The NJ 42 off-ramp retains the same LOS of A and two second delay as it exhibited in the prior scenario.

During the afternoon peak period, the intersection operates at a LOS of D with 54 seconds of delay. This represents a 12-second increase in overall delay from *Scenario 1*. This is attributable to the introduction of a third phase in the signal plan, which inherently contributes additional delay upon the unserviced movements. This increase is reflected in all the approaches, including southbound Erial Road. This approach operates at a failing LOS with the greatest amount of delay at 155 seconds; most importantly it represents18 seconds of deterioration. Compared to *Scenario 1*, the remaining three approaches all suffer a downgrade in their respective LOS.

The long delay and failing LOS of Erial Road is due to its current volumes, which are low compared to the other approaches, therefore it is assigned less green time.

Recommendations
Due to the failing LOS and immeasurable amount of delay experienced at the intersection during the morning and afternoon peak hours, remediation is necessary to relieve the high levels of congestion. A traffic signal at the intersection will greatly reduce the amount of vehicular delay as shown in the SYNCHRO analysis. The signal should utilize a two-phase timing plan as described in *Scenario 1*. This represents the

Figure C8
Congestion and Crash Site Analysis
Proposed Intersection Improvements
Gloucester Twp., Camden Co., NJ
CR 706 ERIAL - BLENHEIM RD
NJ 42 SB (To Atlantic City)
NJ 42 NB (To Philadelphia)
PETERS LA
Re-align approach to intersect at right angle
Install a semi-actuated, two-phased traffic signal
Install pavement markings to guide left turning traffic
CR 534 E CHURCH ST
CR 534 BLACKWOOD - CLEMENTON RD
Convert high school driveway to right out only
Convert high school driveway to right in/out only
Install raised curb to minimize weaving conflicts
Eliminate existing through movement
STATE ST
Extend left turn lane to accomodate additional stacking of left turning vehicles
CR 706 ERIAL RD
Widen ramp from curve to accomodate two lanes
0 50 100
Feet
DVRPC Aerial Imagery: Spring, 2005
Delaware Valley Regional Planning Commission
July 2007

least amount of delay for the intersection. The potential conflict between southbound Erial Road right turns and NJ 42 off-ramp left turns can be addressed with relevant signage, pavement markings, and minor adjustment to geometrics. The Blackwood-Clementon Road approaches will experience increased delays, but there will be increased efficiency of the operation of the intersection and decrease the spillover effects of conflicts on mainline NJ 42.

In addition to the recommendation for signal installation and timing, the following should also be considered for this intersection as shown in ***Figure C8***:

- Install a pedestrian-activated signal for the NJ 42 off-ramp approach. This signal would be activated only when a pedestrian pushes the button. Given the proximity of several schools and other pedestrian generators in the vicinity, as well as sidewalks leading to this intersection, pedestrian amenities should be installed and upgraded for their safety.
- Install pedestrian continental-style crosswalks.
- Eliminate the through lane from the NJ 42 off-ramp for Erial Road.
- Widen the ramp from the curve as shown in the rendering to accommodate two lanes—an exclusive right-turn lane and an exclusive left-turn lane.
- Separate the eastbound receiving lanes on Blackwood-Clementon Road with a curb to prevent conflict between Blackwood-Clementon Road eastbound through vehicles and NJ 42 off-ramp right-turning vehicles. Extend the curb to the NJ 42 northbound bridge.
- Realign Erial Road approach to intersect Blackwood-Clementon Road at right angles.
- Install appropriate directional and lane designation signage.

Blackwood-Clementon Road and Erial Road

Scenario 1

Characteristics

- Removal of the actuated split-phase along the Erial Road approaches.
- Optimization of the signal timing plan.

Advantages

- Since the southbound Erial Road phase can be triggered by a sole vehicle, the elimination of this phase may reduce the amount of underutilized green time.
- The new split and cycle lengths are more reflective of the revised timing plan and of current traffic volumes.

Disadvantages

- May induce an unsafe situation, as the prevalent northbound Erial Road left turn no longer has a protected phase.

Level of Service Analysis

During the morning peak period, the intersection operates at a LOS of C with 25 seconds of delay, as shown in ***Table C6*.** This represents a slight three-second improvement from current conditions. For the individual approaches, the southbound Erial Road approach operates at a LOS of A with eight seconds of delay. This 14-second improvement is the result of southbound vehicles receiving more green time from their ability to travel concurrently with vehicles along northbound Erial Road. Northbound Erial Road remains the poorest performing approach with a LOS of D and 47 seconds of delay.

During the afternoon peak period, the intersection operates at a LOS of C and with 23 seconds of delay. Similar to the AM peak hour, the best and worst performing approaches are southbound Erial Road and northbound Erial Road, respectively. Southbound Erial Road operates at a LOS of B with 10 seconds of delay, which represents a 12-second improvement from the current morning peak hour. Northbound Erial Road operates at a LOS of D with 53 seconds of delay, which constitutes a 14-second improvement from existing conditions.

Scenario 2

Characteristics

- Removal of the protected left-turn phase along Blackwood-Clementon Road.
- Removal of the actuated split-phase along the Erial Road approaches.
- Optimization of the revised timing plan.

Advantages

- The new split and cycle lengths are more reflective of the revised timing plan and of current traffic volumes.

TABLE C6
Intersection Performance for Existing and Alternative Scenarios
Blackwood-Clementon Road and Erial Road

Scenario	Direction of Travel	Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle			
Existing Conditions		AM Peak 90s Cycle Length		PM Peak 90s Cycle Length	
		LOS	Delay (sec)	LOS	Delay (sec)
	Blackwood-Clementon EB	B	19	C	23
	Blackwood-Clementon WB	C	24	B	19
	Erial SB	C	22	C	22
	Erial NB	D	49	E	67
	Total Intersection	C	28	C	29
Scenario 1 (Short): Optimize Existing Timing Plan		AM Peak 70s Cycle Length		PM Peak 80s Cycle Length	
		LOS	Delay (sec)	LOS	Delay (sec)
	Blackwood-Clementon EB	B	17	B	18
	Blackwood-Clementon WB	C	23	B	17
	Erial SB	D	39	D	46
	Erial NB	D	39	D	51
	Intersection	C	24	C	24
Scenario 2 (Short): Remove Split-Phase Along Erial Rd; Optimize Revised Timing Plan		AM Peak 75s Cycle Length		PM Peak 75s Cycle Length	
		LOS	Delay (sec)	LOS	Delay (sec)
	Blackwood-Clementon EB	B	17	B	18
	Blackwood-Clementon WB	C	21	B	15
	Erial SB	A	8	B	10
	Erial NB	D	47	D	53
	Intersection	C	25	C	23

TABLE C6 Cont'd.
Intersection Performance for Existing and Alternative Scenarios
Blackwood-Clementon Road and Erial Road

Scenario	Direction of Travel	Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle			
Scenario 3 (Short): Remove Protected Left-Turns Along Blackwood-Clementon Rd; Remove Split-Phase Along Erial Rd; Optimize Revised Timing Plan		AM Peak 60s Cycle Length		PM Peak 60s Cycle Length	
		LOS	Delay (sec)	LOS	Delay (sec)
	Blackwood-Clementon EB	B	12	B	13
	Blackwood-Clementon WB	B	20	B	12
	Erial SB	A	9	A	8
	Erial NB	D	39	D	45
	Intersection	C	21	B	18

Source: *DVRPC, 2007*

Disadvantages

- May induce multiple unsafe situations, since the prevalent northbound Erial Road left turn no longer has a protected phase, and there will no longer be a protected phase for Blackwood-Clementon left turns.

During the morning peak period, the intersection operates at a LOS of C with 21 seconds of delay. Compared to the previous scenario, this represents a four-second reduction in delay, though both scenarios share the same LOS. The southbound Erial Road approach again operates most efficiently, with its LOS of A and nine seconds of delay. Northbound Erial Road is again the poorest performing approach, with its LOS of D and 39 seconds of delay, though this does represent an 8-second improvement from *Scenario 1*. The Blackwood-Clementon Road approaches, which are also affected by the timing plan revisions, exhibit a three-second average improvement from *Scenario 1*.

Level of Service Analysis
During the afternoon peak period, the intersection operates at a LOS of B with 18 seconds of delay. This represents a five-second improvement as well as a LOS upgrade from *Scenario 1's* overall PM peak hour. This reduction in delay is most visible in the northbound Erial Road approach and both Blackwood-Clementon Road approaches. The former exhibits an eight-second improvement, though it still operates at a LOS of D, while the latter approaches average a four-second improvement for their counterparts in *Scenario 1*.

Recommendations
Both intersections currently operate at overall adequate Levels of Service and with reasonable measures of delay. Unfortunately, the northbound Erial Road approach

performs poorly during both afternoon and morning peak hours. Modifications to the signal timing and the overall signal plan provide some benefit to all approaches and the overall intersection. However, such modifications may introduce unsafe conditions for vehicles traveling through the intersection. As a result, the recommendation for this location is to maintain its current timing arrangement.

The following should be considered for this intersection:

- Extend the exclusive left-turn lane on the northbound Erial Road, as shown in ***Figure C8***, to provide more stacking for left-turning vehicles to provide greater throughput from this approach.
- Convert the westernmost Highland High School access on Blackwood-Clementon Road to right-out-only. This access point is too close to the intersection of Blackwood-Clementon Road/Peters Lane and presents potential conflicts with entering and exiting.
- Convert the northernmost access to Highland High School on Erial Road to right-in/right-out-only. Left turning vehicles are in conflict with two active travel lanes at this location. This situation is exacerbated with congestion during peak periods.

GLOUCESTER

DELSEA DRIVE/SWEDESBORO ROAD/COLES MILL ROAD/PORCHTOWN ROAD INTERSECTION

LOCATION DESCRIPTION

The study location is the five-legged intersection of Delsea Drive (NJ 47)/Swedesboro Road (CR 538)/Coles Mill Road (CR 538)/Porchtown Road (CR 613) in the northwest section of the Township of Franklin in Gloucester County, see ***Figure G1***. The intersection is signalized with a three-phased signal. Delsea Drive (NJ 47) runs in a north-south direction paralleling NJ 55, which is a limited access expressway. It travels from Woodbury through many towns including Vineland and on to Wildwood serving New Jersey shore points. This roadway is classified as an urban minor arterial at the study location. At the study location the speed limit is 35 MPH, but it goes up to 50 MPH in other areas. Swedesboro Road (CR 538) is classified as an urban minor arterial roadway, which runs east-west. It ends at the study intersection and Coles Mill Road begins and travels east. Coles Mill Road is classified as an urban collector. Coles Mill Road runs into US 322 to the east of the intersection. The speed limit at the study location is 40 MPH, but the road goes up to 45 MPH in some locations. Porchtown Road (CR 613) is classified as an urban collector and runs in a north-south direction from where it begins at the study intersection. All these roads, except Delsea Drive, are county owned and maintained roadways. Delsea Drive is a state owned and maintained roadway.

As shown in ***Figure G2***, all roadways are two lanes—one lane in each direction. At the intersection all approaches are a single lane for all movements except for southbound Delsea Drive, which is two lanes at the intersection—one right-turn lane and one lane for through and left-turn movements. South of the intersection, Delsea Drive has wide shoulders, approximately eight feet wide. The other roadways also have shoulders, but these are narrow. The intersection geometry is skewed because Delsea Drive curves where the other three legs connect with it.

Land use in the area is predominantly residential, as shown in ***Figure G3***. At the intersection there are businesses, institutional and residential land use activity. There is a Wawa with multiple active driveways on Delsea Drive and Porchtown Road. A gas station, currently closed, sits on the north corner of Delsea Drive with Swedesboro Road, which also has driveways in close proximity to the intersection. The restaurant on the north corner of Delsea Drive and Coles Mill Road also have driveways close to the intersection. Several smaller businesses are at or close to the intersection. The Franklinville Fire and Emergency Medical Services departments are housed in the building on the corner at Porchtown Road and Swedesboro Road. The community center is a block away on Coles Mill Road.

The New Jersey Transit Route 408 bus serves this corridor. It travels from Philadelphia, Pennsylvania, to Millville south of the study location. The route operates 40 weekday buses, and averaged 1,361 daily boardings in 2005.

Figure G1

Congestion and Crash Site Analysis

Study Area

Franklin Township, Gloucester Co., NJ

Analysis Area / Intersection

Clayton

ELK

55

47

FRANKLIN

DELSEA DR

CR 538 SWEDESBORO RD

CR 604 MONROEVILLE RD

CR 538 SWEDESBORO RD

55

Franklinville Lake

CR 657 BLACKWOOD AVE

CR 538 COLES MILL RD

CR 613 PORCHTOWN RD

DELSEA DR

Idle Acres Lake

47

Timothy Lake

Iona Lake

0 1,000 2,000

Feet

GLOUCESTER CO.

SALEM CO.

55

Delaware Valley Regional
Planning Commission
July 2007


Figure G2
Congestion and Crash Site Analysis
Existing Lane Configuration
Franklin Township, Gloucester Co., NJ
NJ 47 DELSEA DR
CR 538 SWEDESBORO RD
CR 538 COLES MILL RD
RAILROAD AVE
CR 613 PORCHTOWN RD
NJ 47 DELSEA DR
0
50
100
Feet
DVRPC Aerial Imagery: Spring, 2005
Delaware Valley Regional Planning Commission
July 2007


Figure G3
Congestion and Crash Site Analysis
Land Use
Franklin Twp., Gloucester Co., NJ
DVRPC 2005 Land Use
Residential:Single-Family Detached
Residential:Multi-Family
Residential:Row Home
Residential:Mobile Home
Manufacturing:Light Industrial
Manufacturing:Heavy Industrial
Transportation And Parking
Utility
Commercial
Community Services
Military
Recreation
Agriculture
Agriculture:Agricultural Bog
Mining
Wooded
Vacant
Water
Franklinville
Lake
NJ 47 DELSEA DR
CR 538 SWEDESBORO RD
MACARTHUR AVE
CR 538 COLES MILL RD
CR 657 VETERANS WAY
CR 613 PORCHTOWN RD
NJ 47 DELSEA DR
ROYAL AVE
NJ 55 NB
NJ 55 SB
0 200 400
Feet
DVRPC Aerial Imagery: Spring, 2005
Delaware Valley Regional
Planning Commission
July 2007

Curbside parking is permitted for the businesses on the west side of Delsea Drive at the southbound approach.

EXISTING CONDITIONS

Congestion

As mentioned previously, the intersection geometry is skewed. Delsea Drive has a curve in the road where the other three roads connect, which makes left-turning movement difficult. In addition, right-turn movement from northbound Delsea Drive onto Coles Mill Road is also compromised, as well as right-turn movement from Swedesboro Road onto Porchtown Road. Single-lane intersection approaches have multiple movements, therefore, turning vehicles frequently block through movements.

Multiple driveways at the intersection with heavy vehicle movement result in conflicts and exacerbate the congestion at the intersection.

Curbside parking potentially impedes the efficient flow of traffic through the intersection.

Turning Movement Counts

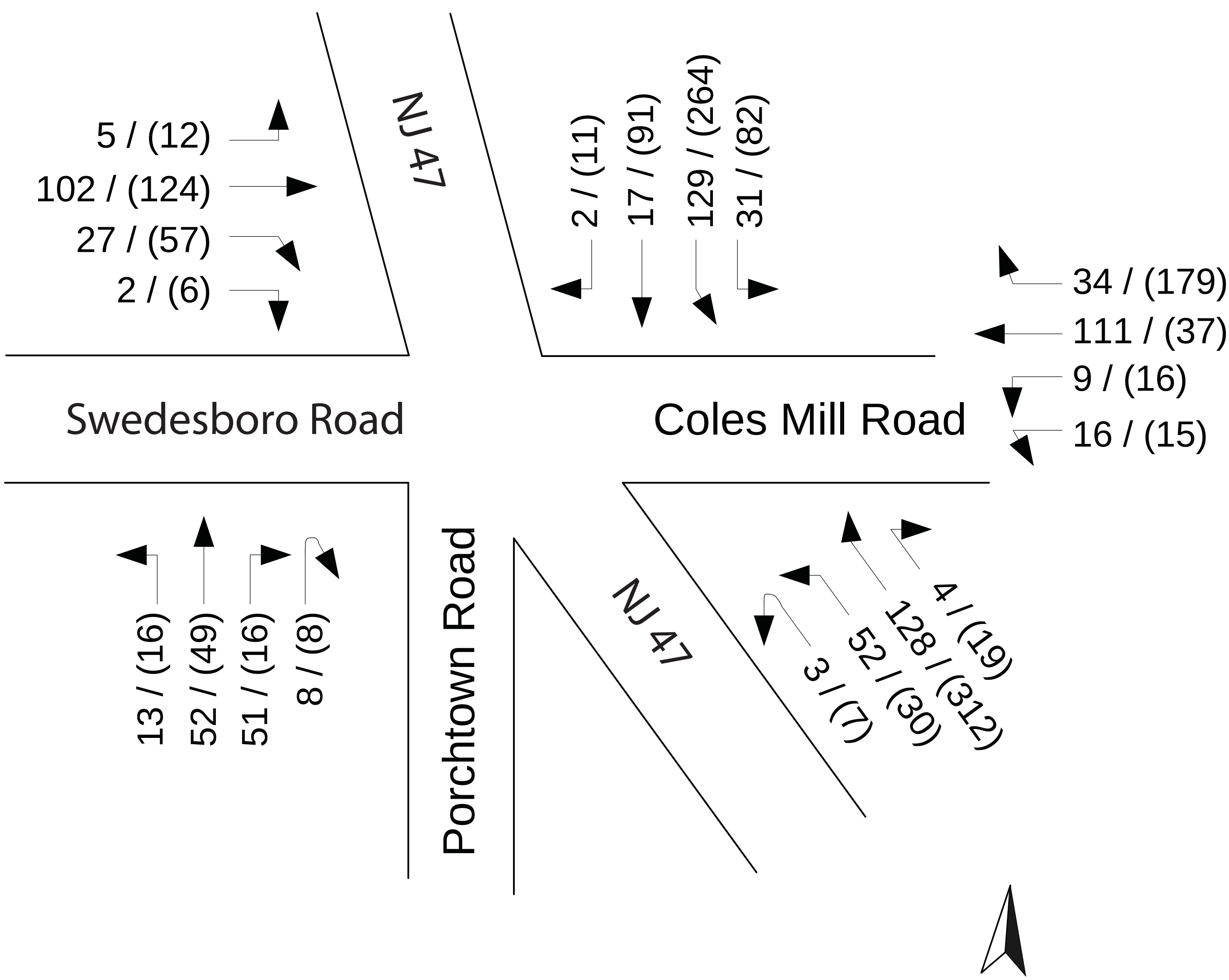
A manual turning movement count at the intersection of NJ 47 (Delsea Drive), Coles Mill Road, Swedesboro Road, and Porchtown Road was taken on Wednesday, January 31, 2007 between the hours of 6 and 9 AM, and 3:30 PM and 6:30 PM. From count information, the morning and afternoon peak hours are 6:45-7:45 AM and 3:45-4:45 PM, respectively. The complete manual count data is available in **Appendix C**.

The turning movement diagram is shown in ***Figure G4***. The total morning peak hour volume is approximately 800 vehicles. Of the five approach legs, no single one stands out as the dominant approach direction during the morning peak. Instead, three approaches carry approximately 21 percent to 23 percent of the overall morning peak-hour traffic; the heaviest of these approaches is northbound Delsea Drive, with 187 vehicles. From this approach, 55 vehicles—or 29 percent of all movements—are making left turns. The southbound Delsea Drive approach carries 179 vehicles, or 22 percent of the total morning peak-hour volume. From this approach, 129 or 72 percent of vehicles are completing the through movement. As a result, and given the intersection geometry, these movements may conflict, thus potentially creating unsafe conditions and/or traffic congestion.

During the afternoon peak hour, there are a total of 1,351 vehicles traveling through the intersection, a 70 percent increase over the morning peak-hour volume. All approaches other than Porchtown Road experience an increase in traffic volumes. Of the intersection’s total PM peak-period volume, 448 vehicles (or one-third) come from the southbound Delsea Drive approach. Of this approach traffic volume, 82 movements (18 percent) are left turns onto Coles Mill Road, whereas, 264 or 59 percent are through movements along Delsea Drive. With the skewed angle of Delsea Drive, the through movement of southbound vehicles appear to be making left turns, consequently confusing motorists traveling in both directions of Delsea Drive.

Figure G4: Turning Movement Counts

Existing Peak Hour Turning Movement Counts NJ 47, Swedesboro Road, Coles Mill Road, and Porchtown Road



SCHEMATIC NOT TO SCALE

Legend:

AM Volume / (PM Volume)

Peak Hours
AM: 6:45 - 7:45
PM: 3:45 - 4:45

Delaware Valley Regional Planning Commission
July 2007

The Porchtown Road approach leg is responsible for only 10 percent of the overall morning and afternoon peak-hour traffic.

Level of Service (LOS)

SYNCHRO traffic analysis software was utilized in order to conduct evaluations of the intersection's existing performance, as well as for all potential improvement scenarios. After inputting several variables—such as vehicle volume, intersection geometry, and signal timing—SYNCHRO provides Level of Service (LOS) measures and the average delay-per-vehicle for the entire intersection, every approach, and each movement.
The LOS analysis was conducted for the AM and PM peak hours. Currently the traffic signal operates with three phases, which include Delsea Drive, Coles Mill Road and Swedesboro Road; and Porchtown Road. All left turns are permissive on all approaches of the intersection.

TABLE G1
Existing Intersection Performance
NJ 47 (Delsea Drive)/Swedesboro Road/Coles Mill Road/Porchtown Road

Scenario	Direction of Travel	2007 Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle			
Existing Conditions		AM Peak (110 sec)		PM Peak (110 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Swedesboro Road Eastbound	D	43	D	44
	Coles Mill Road Westbound	E	61	F	84
	NJ 47 Delsea Drive Southbound	B	15	B	20
	NJ 47 Delsea Drive Northbound	B	15	B	18
	Porchtown Road Northbound	D	54	E	56
	Intersection	D	36	D	37

Source: *DVRPC, 2007*

The overall LOS for this intersection is a D during the morning and evening peak hours with average delays of 36 and 37 seconds respectively. In the morning and evening, the northbound and southbound NJ 47 approaches operate at a LOS B, with no more than 20 seconds of vehicle delay. In the morning, Swedesboro Road and Porchtown Road both operate at a LOS of D, with 43 and 54 seconds delay respectively. In the afternoon, the LOS on the Swedesboro Road approach remains at a LOS D, with 44 seconds of vehicle delay. The Porchtown Road approach has a LOS of E, with 56 seconds of vehicle delay in the afternoon peak hour. The Coles Mill Road approach experiences the highest amount of delay for the intersection with a LOS E (61 seconds) in the morning peak hour and LOS F (84 seconds) in the afternoon peak hour. This intersection currently has a cycle length of 110 seconds for both the morning and afternoon peak periods. ***Table G1*** presents the LOS data for existing traffic conditions.

Safety

The unconventional intersection geometry has manifested in safety issues. Left-turning movements are problematic and several right turns are difficult. This may also cause sight-distance problems. The long cycle length of the traffic signal to accommodate all movements can potentially result in aggressive driving and red-light running. Multiple driveways at the intersection with heavy vehicle movement result in conflicts and cause unsafe conditions at the intersection.

Crash Analysis

Table G2 – Intersection Crash Summary (2003 – 2006)

	2003		2004		2005		2006		Total		2005 NJ State Average
	Crashes	%	Crashes	%	Crashes	%	Crashes	%	Crashes	%	State Hwy
Reportable	11	32%	8	24%	10	29%	5	15%	34	100%	N/A
Fatalities	0	0%	0	0%	0	0%	0	0%	0	0%	0%
Injuries	4	36%	2	25%	0	0%	1	20%	7	21%	35%
PDO	7	64%	6	75%	10	100%	4	80%	27	79%	65%
Angle	4	36%	3	38%	7	70%	3	60%	17	50%	26%
Rear End	4	36%	3	38%	2	20%	1	20%	10	29%	41%
Sideswipe	1	9%	1	13%	0	0%	1	20%	3	9%	10%
Left Turn	1	9%	0	0%	1	10%	0	0%	2	6%	12%
Head On	1	9%	0	0%	0	0%	0	0%	1	3%	2%
Hit Fixed Object	0	0%	1	13%	0	0%	0	0%	1	3%	4%
Daylight	8	73%	6	75%	8	80%	4	80%	26	76%	71%
Dark	3	27%	2	25%	2	20%	1	20%	8	24%	29%
Clear	5	45%	7	88%	6	60%	4	80%	22	65%	N/A
Rainy	6	55%	1	13%	4	40%	0	0%	11	32%	N/A
Wintry	0	0%	0	0%	0	0%	1	20%	1	3%	N/A
Dry	6	55%	6	75%	6	60%	4	80%	22	65%	77%
Wet	5	45%	1	13%	4	40%	1	20%	11	32%	20%
Icy	0	0%	1	13%	0	0%	0	0%	1	3%	3%

Source: Franklin Township Police Records (2003 – 2006)

Crash data for the NJ 47/Coles Mill Road/Swedesboro Road/Porchtown Road intersection was provided by the Franklin Township Police for a four-year period from 2003 to 2006. The database showed that there were a total of 34 reportable crashes that occurred at the intersection. Reportable crashes are crashes that result in a fatality, injury, and/or property damage of $500 or more. For comparison, 2005 statewide averages for signalized intersection on state system roads are shown in ***Table G2***. All the crash data gathered have been summarized.

At this intersection there were no fatalities reported, however, there were seven injury and 27 property-damage-only crashes. Of the seven injury collisions, there were 18 persons hurt at the scene of the crashes. Six of these incidents occurred along Delsea Drive. The occurrence of property-damage-only crashes was above the statewide average of approximately 65 percent.

During this study period, there were 11 crashes in 2003 (32 percent), 8 crashes in 2004 (24 percent), 10 crashes in 2005 (29 percent), and 2006 saw a 50 percent reduction of crashes over 2005 with 5 crashes. The most common types of crashes that occurred at this intersection were 17 angle, and 10 rear ends representing 50 percent and 29 percent, respectively, of the total number of crashes. The predominance of angle and rear-end crashes can be indicative of red-light running and congestion issues.

As shown in the collision diagram in ***Figure G5***, most of the crashes occurred in the middle of the intersection and were angle crashes among vehicles turning onto either Swedesboro Road or Coles Mill Road. Many of the crashes may have been documented as angle crashes due to the intersection configuration when they were actually left-turn crashes. In comparison with the statewide totals, angle crashes were higher than the approximately 26 percent state crash rate. The majority of the rear-end crashes occurred along the three county roads. Other types of crashes at this intersection include three sideswipe, two left turns, one head on and one hit-fixed-object. Over the four-year period, 26 of the 34 crashes occurred in daylight conditions, which is slightly higher than the approximate 71 percent statewide average. The eight crashes that took place under dark conditions were below the approximately 29 percent statewide average. Twenty-two of the 34 crashes happened under fair weather and dry road surface conditions, representing 65 percent of the crashes. The majority of the rainy and wet road surface crashes were along Delsea Drive. There were 11 rainy and wet road crashes and only 1 snowy and icy crash. In comparison with the statewide data, wet road crashes were higher at this intersection than the statewide averages.

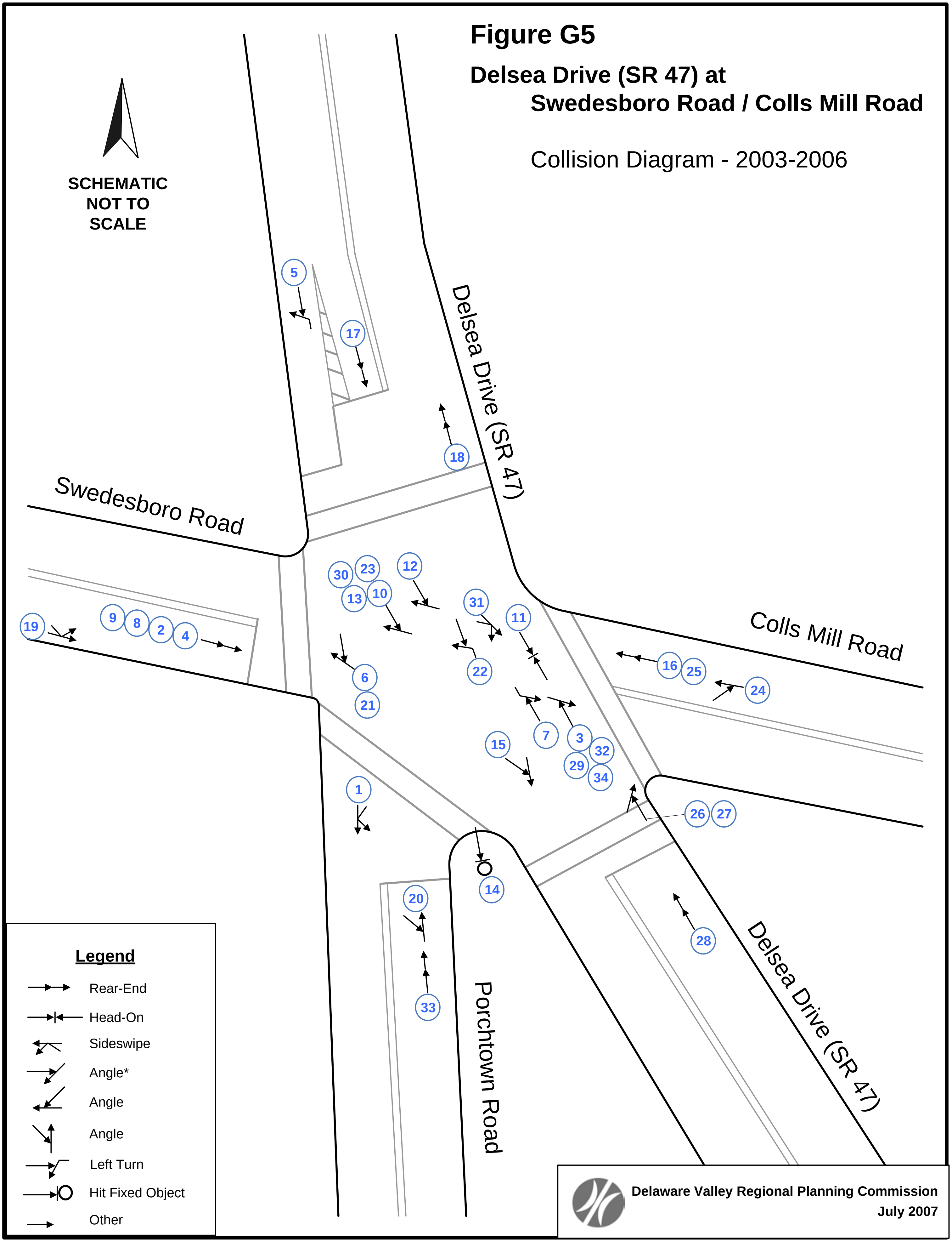
Figure G6 shows the monthly breakdown of crashes over the four-year study period. May had the highest number of crashes with six crashes over the period. Five of the six were rear-end crashes. January, February, and April had the least number of crashes with one crash being reported. The trend indicates that late spring into fall experiences the most crashes.

Figure G7 shows the crashes by day of the week. As shown, over half of the incidents occurred over the weekend period, with Friday having 34 percent of the crashes. Most of the crashes on Friday and Saturday were angle (nine crashes) and rear ends (eight crashes). The high number of weekend crashes may be a result of additional shore traffic on weekends.

Figure G5

Delsea Drive (SR 47) at Swedesboro Road / Colls Mill Road

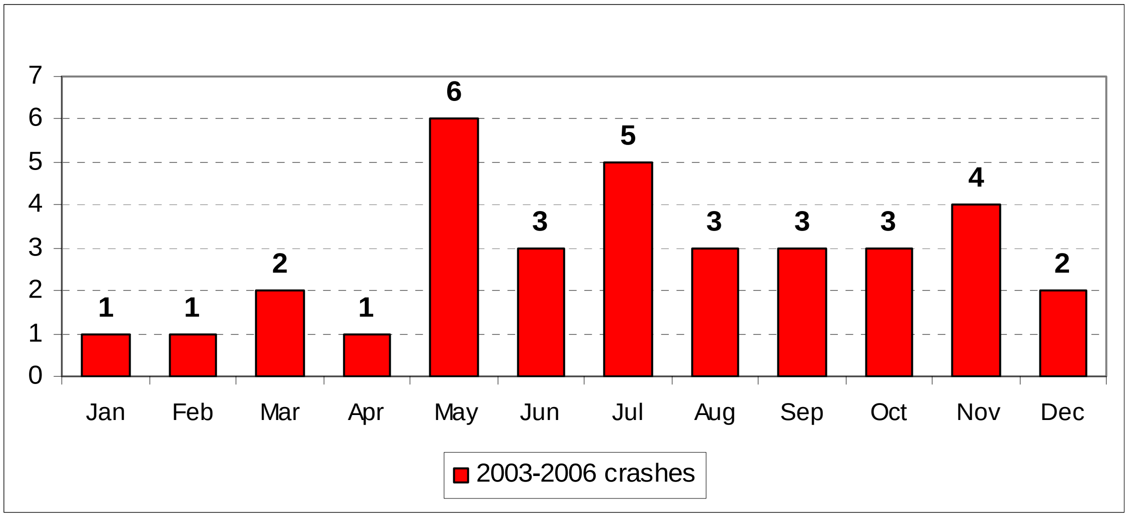
Collision Diagram - 2003-2006



* Due to skew, many Left Turn crashes were reported as Angle crashes

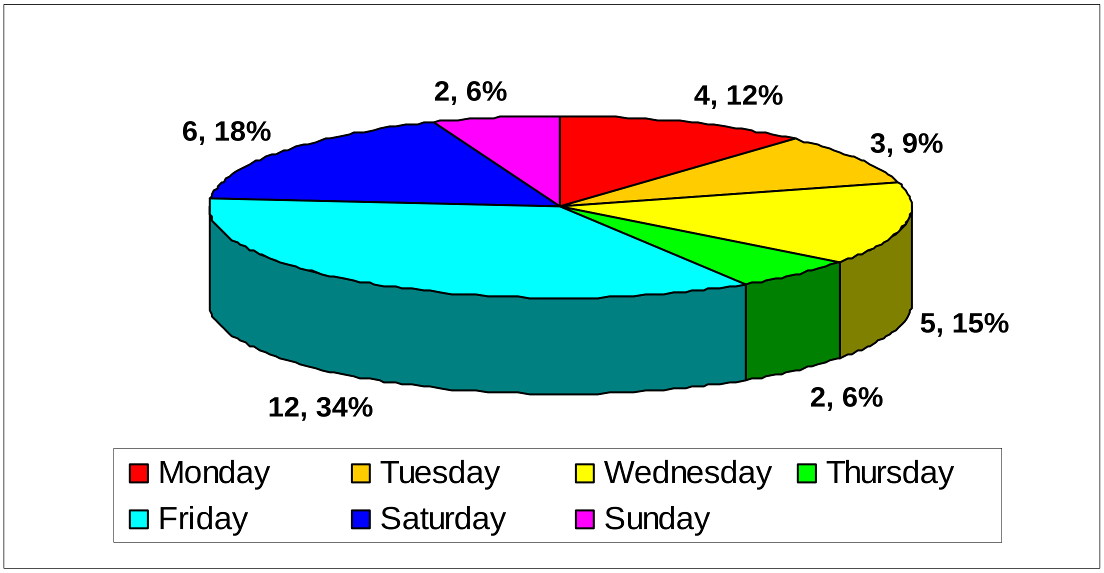
The age of the persons involved in the crashes ranged from 17 to 86 years of age. On average the majority of persons in the crashes were 20 to 50 years old. Fifteen of the 34 crash records had information containing driver factors including driver inattention, cell phone use, backing up, speeding and DUI. A complete listing of the crash data is provided in **Appendix D**.

Figure G6 – Crashes by Month



Source: Franklin Township Police Records (2003 – 2006)

Figure G7 – Crashes by Day of Week



Source: Franklin Township Police Records (2003 – 2006)

OPPORTUNITY AND CONSTRAINTS

Considering existing traffic volumes, this intersection overall is operating efficiently, with Delsea Drive carrying the most traffic. Based on field observations and the LOS analysis conducted, the main issue for this intersection is safety involving turning movements. Other important issues include access to property around the intersection and congestion for specific approaches. Improvements for safety may conflict with those addressing congestion and vice versa. However, recommendations will strive to accomplish a balance, improving safety while promoting the efficient movement of traffic through the intersection.

The geometry of the intersection restricts the safe, efficient movement of traffic through the intersection and provides contradicting signals to motorists. The fire station and emergency services housed in the building at the intersection between Porchtown Road and Swedesboro Road establish constraints on the possible types of improvements.

Additionally, all approaches of the intersection are built out. In some instances, parking for businesses is curbside, which conflicts with potential traffic movement.
Access to businesses increases the potential for crashes at this location and should be addressed. Many of the trips at this intersection are through trips with Delsea Drive serving as the north-south main arterial providing access from Woodbury to points along the New Jersey shore.

POTENTIAL IMPROVEMENT SCENARIOS

Based on the technical analysis of the existing conditions and observations made during field visits to the intersection, five potential improvement scenarios have been developed to determine possible effective improvements that can potentially reduce congestion. Future traffic growth for year 2030 was also taken into consideration. For each scenario, the SYNCHRO software was used to determine the LOS and amount of delay. LOS summaries are shown in ***Tables G3*** and ***G4.***

Scenario 1
Characteristics
- Optimize the signal timing, with the optimal cycle length of 85 seconds in the morning peak period and 100 seconds in the afternoon peak period.

Advantages
- Cost is minimal and optimization can be implemented immediately.
- The cycle length for the intersection is reduced, which will allow more vehicles through the intersection.

Level of Service Analysis
By optimizing the signal, the operation and efficiency of the intersection is enhanced, improving the overall LOS for both the AM and PM from a LOS D to a LOS C. The northbound and southbound approaches of Delsea Drive remain the same as existing conditions at a LOS B. The most significant improvement is in the afternoon along the Coles Mill Road approach, which is operating at a LOS F with 84 seconds of vehicle delay. The optimization of the signal will improve this approach to a LOS E with 61 seconds of delay. The Swedesboro and Porchtown roads approaches are relatively consistent with the current morning and afternoon LOS and delay.

Scenario 2
Characteristics
- Add exclusive left-turn lane to northbound Delsea Drive approach.
- Reconfigure southbound Delsea Drive approach for new exclusive left-turn lane and one through/turn lane and a right-turn lane.
- Add protected left-turn phase for Delsea Drive.
- Close the northernmost driveway of Wawa on Delsea Drive.
- Close the southernmost driveway of the restaurant on the northeast corner of Delsea Drive and Coles Mill Road, and convert the other Delsea Drive driveway to right-in/right-out-only.
- Improve signal heads and provide back plates.
- Upgrade pedestrian amenities—continental style crosswalks with appropriate signage, ADA compatible curb ramps with truncated domes and bus shelter.
- Provide gates for the railroad crossing with appropriate signage.
- Upgrade all pavement markings.

TABLE G3
Intersection Performance for Existing and Alternative Scenarios
NJ 47 (Delsea Dr.)/Swedesboro Road/Coles Mill Road/Porchtown Road

Scenario	Direction of Travel	2007 Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle			
Existing Conditions		AM Peak (110 sec)		PM Peak (110 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Swedesboro Rd. EB	D	43	D	44
	Coles Mill Rd. WB	E	61	F	84
	NJ 47 Delsea Dr. SB	B	15	B	20
	NJ 47 Delsea Dr. NB	B	15	B	18
	Porchtown Rd. NE	D	54	E	56
	Intersection	D	36	D	37
Scenario 1 - Signal Optimization		AM Peak (85 sec)		PM Peak (100 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Swedesboro Rd. EB	C	34	D	38
	Coles Mill Rd. WB	D	47	E	61
	NJ 47 Delsea Dr. SB	B	15	B	20
	NJ 47 Delsea Dr. NB	B	15	B	18
	Porchtown Rd. NE	D	46	E	59
	Intersection	C	30	C	32
Scenario 2 - Exclusive LT lanes on NJ 47 with protected LT phase		AM Peak (90 sec)		PM Peak (90 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Swedesboro Rd. EB	D	41	C	34
	Coles Mill Rd. WB	E	63	D	53
	NJ 47 Delsea Dr. SB	C	24	C	34
	NJ 47 Delsea Dr. NB	C	28	C	30
	Porchtown Rd. NE	D	54	D	48
	Intersection	D	41	D	37

TABLE G3 (continued)
Intersection Performance for Existing and Alternative Scenarios
NJ 47 (Delsea Dr.)/Swedesboro Road/Coles Mill Road/Porchtown Road

Scenario	Direction of Travel	2007 Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle			
Scenario 3 - Restriction of NJ 47 SB LT and NJ 47 RT onto Coles Mill Rd.		AM Peak (80 sec)		PM Peak (90 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Swedesboro Rd. EB	C	34	C	30
	Coles Mill Rd. WB	D	48	D	44
	NJ 47 Delsea Dr. SB	B	14	B	20
	NJ 47 Delsea Dr. NB	B	14	B	20
	Porchtown Rd. NE	D	49	D	53
	Intersection	C	30	C	28
Scenario 4 - Porchtown Rd. One-Way SB with NJ 47 NB LT lane		AM Peak (40 sec)		PM Peak (50 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Swedesboro Rd. EB	B	16	B	18
	Coles Mill Rd. WB	C	22	C	28
	NJ 47 Delsea Dr. SB	A	8	B	13
	NJ 47 Delsea Dr. NB	A	8	B	10
	Intersection	B	13	B	16
Scenario 5 - Porchtown Rd. One-Way NB with NJ 47 NB LT lane		AM Peak (55 sec)		PM Peak (65 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Swedesboro Rd. EB	C	23	C	27
	Coles Mill Rd. WB	C	31	D	49
	NJ 47 Delsea Dr. SB	B	16	D	53
	NJ 47 Delsea Dr. NB	B	16	B	18
	Porchtown Rd. NE	C	34	D	40
	Intersection	C	23	D	38

Source: *DVRPC, 2007*

Advantages

- Allow for safer left turns from Delsea Drive.
- Delsea Drive through traffic will flow more freely through intersection separated from left turns.
- Allow for a shorter cycle length of 90 seconds, which will allow more vehicles through the intersection.
- Eliminates sight-distance issues associated with the left turns.
- Improved access management at the intersection, resulting in safer operation.
- Safer environment for pedestrians, especially for the physically challenged.

Disadvantages

- Requires reconfiguring of the intersection.
- Does not allow traffic on Delsea Drive to make left turns when gaps in the opposing through traffic are provided.
- Access/egress from restaurant needing a left turn will use Coles Mill Road.

Level of Service Analysis

With this scenario, the overall LOS for this intersection is a D, which is consistent with the current morning and afternoon LOS and delay. In the morning and afternoon, the Delsea Drive northbound and southbound approaches' LOS ratings increase from B to C. The Coles Mill Road, Swedesboro Road and Porchtown Road approaches remain the same as existing conditions in the morning peak period. In the afternoon, these approaches see a reduction of delay between 8 and 31 seconds.

Scenario 3

Characteristics

- Prohibits Delsea Drive southbound left turns onto Coles Mill Road.
- Prohibits Delsea Drive northbound right turns onto Coles Mill Road.
- Adds a dedicated left-turn lane onto northbound approach of Delsea Drive.
- Add "No Left Turns" and "No Right Turns" signage prior to the approach of Coles Mill Road.
- Add directional signage at Veterans Way to divert Coles Mill Road bound traffic.
- Close the northernmost driveway of Wawa on Delsea Drive.
- Close the southernmost driveway of the restaurant on the northeast corner of Delsea Drive and Coles Mill Road and convert the other Delsea Drive driveway to right-in/right-out-only.
- Improve signal heads and provide back plates.
- Upgrade pedestrian amenities—continental-style crosswalks with appropriate signage, ADA compatible curb ramps with truncated domes and bus shelter.
- Provide gates for the railroad crossing with appropriate signage.
- Upgrade all pavement markings.

Advantages

- Eliminates the problematic left turns from southbound Delsea Drive onto Coles Mill Road.
- Eliminates the awkward and tight right turns from northbound Delsea Drive onto Coles Mill Road.
- Improves safety and reduces congestion at the study intersection.
- No right-of-way acquisition required.
- Improved access management at the intersection, resulting in safer operation.
- Safer environment for pedestrians, especially for the physically challenged.

Disadvantages

- Adds additional traffic onto Veterans Way.
- Access/egress from restaurant needing a left turn will use Coles Mill Road.

Level of Service

The LOS for this intersection increases from a D to a C in both peak periods. The northbound and southbound approaches of Delsea Drive remain at the current LOS B in both the morning and afternoon peak hours. In the morning peak, the Swedesboro Road, Coles Mill Road, and Porchtown Road approaches benefit with a smaller vehicle delay ranging from 5 to 13 seconds. In the afternoon, delay on these approaches ranges from 3 to 40 seconds, the most improvement given to the Coles Mill Road approach.

Scenario 4

Characteristics

- Add a new two-lane roadway located south of Wawa that will connect Porchtown Road to Delsea Drive.
- Add an exclusive left-turn lane on northbound Delsea Drive.
- Convert the section of Porchtown Road between the new two-lane roadway and the study intersection to one-way southbound traffic only.

Advantages

- Eliminates one phase of the signal timing.
- The intersection will operate more efficiently.

Disadvantages

- Inconvenience to northbound motorists to use new road to access the intersection.
- There is one house, the driveway into the Wawa, and the fire station that would be impacted by this change. However, this will minimally impact the fire station, since the fire engines are able to pre-empt the signal travel northbound on Porchtown Road when necessary.
- Right-of-way acquisition and cost of construction for a new road.
- May be problematic making left turns from new road onto northbound Delsea Drive.

- Proposed location is the septic area for the Wawa property.

Level of Services Analysis
With the elimination of one traffic phase and the addition of the new access road, this option significantly improves the operation of the intersection overall from a LOS D with 36- and 37-second delays to LOS B with 13- and 16-second delays in the peak morning and afternoon peak periods, respectively. The Delsea Drive approaches are improved from a LOS B to a LOS A in the morning peak hour and remain the same in the afternoon with a LOS B. The Swedesboro Road and Coles Mill Road approaches both experience the same LOS B and C, respectively, in the morning and afternoon peak periods. The cycle length for both the AM and PM are significantly reduced from the existing 110 seconds to 40 seconds in the morning and 50 seconds in the afternoon.

Scenario 5
Characteristics
- Add a new two-lane roadway located south of Wawa that will connect Porchtown Road to Delsea Drive.
- Add an exclusive left-turn lane on northbound Delsea Drive.
- Convert the section of Porchtown Road between the new access road and intersection to one-way northbound traffic only.

Advantages
- Eliminates the high travel speeds from southbound Delsea Drive traffic onto Porchtown Road.
- No turns entering onto Porchtown Road at intersection, reducing confusion.

Disadvantages
- Inconvenience to southbound motorists to use new road to access Porchtown Road.
- Right-of-way acquisition and cost of construction on a new road.
- May be problematic for northbound Delsea Drive traffic to make left turns onto new road.
- May be problematic for making left turns from access road onto northbound Delsea Drive.
- Proposed location is the septic area for the Wawa property.

Level of Service Analysis
The LOS and delay in the morning peak is decreased from a LOS D with 36 seconds delay to LOS C with 23 seconds delay. The overall LOS in the afternoon is consistent with the existing condition of LOS D. The LOS worsens in the afternoon on the Delsea Drive southbound approach from a LOS B with 20 seconds delay to LOS D with 53 seconds of delay. The cross street approaches are LOS C in the morning and in the afternoon the delay at these approaches decrease, ranging from 16 to 35 seconds.

Projected 2030 Traffic Conditions

TABLE G4 Intersection Performance for Existing and Alternative Scenarios - 2030					
NJ 47 (Delsea Dr.)/Swedesboro Rd/Coles Mill Rd/Porchtown Rd					
Scenario	**Direction of Travel**	**2030 Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle**			
Existing Conditions		AM Peak (110 sec)		PM Peak (110 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Swedesboro Rd. EB	D	44	C	21
	Coles Mill Rd. WB	E	68	C	24
	NJ 47 Delsea Dr. SB	B	17	F	177
	NJ 47 Delsea Dr. NB	B	17	D	51
	Porchtown Rd. NE	E	57	E	57
	Intersection	D	39	E	57
Scenario 1 - Signal Optimization		AM Peak (85 sec)		PM Peak (95 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Swedesboro Rd. EB	D	35	D	36
	Coles Mill Rd. WB	D	54	E	68
	NJ 47 Delsea Dr. SB	B	16	C	29
	NJ 47 Delsea Dr. NB	B	17	C	23
	Porchtown Rd. NE	D	52	E	70
	Intersection	C	33	D	38
Scenario 2 - Exclusive LT lanes on NJ 47 with protected LT phase		AM Peak (100 sec)		PM Peak (95 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Swedesboro Rd. EB	D	40	C	35
	Coles Mill Rd. WB	E	58	E	64
	NJ 47 Delsea Dr. SB	C	28	D	44
	NJ 47 Delsea Dr. NB	C	33	C	35
	Porchtown Rd. NE	E	60	E	64
	Intersection	D	43	D	45

TABLE G4 (continued)
Intersection Performance for Existing and Alternative Scenarios - 2030
NJ 47 (Delsea Dr.)/Swedesboro Rd/Coles Mill Rd/Porchtown Rd

Scenario	**Direction of Travel**	**2030 Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle**			
Scenario 3 - Restriction of NJ 47 SB LT and NJ 47 RT onto Coles Mill Rd.		AM Peak (90 sec)		PM Peak (80 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Swedesboro Rd. EB	C	35	C	30
	Coles Mill Rd. WB	D	50	D	52
	NJ 47 Delsea Dr. SB	B	17	C	24
	NJ 47 Delsea Dr. NB	B	18	C	27
	Porchtown Rd. NE	D	49	D	55
	Intersection	C	32	C	33
Scenario 4 - Porchtown Rd. One-Way SB with NJ 47 NB LT lane		AM Peak (40 sec)		PM Peak (60 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Swedesboro Rd. EB	B	16	B	18
	Coles Mill Rd. WB	C	24	C	29
	NJ 47 Delsea Dr. SB	A	8	B	19
	NJ 47 Delsea Dr. NB	A	8	B	13
	Intersection	B	14	B	19
Scenario 5 - Porchtown Rd. One-Way NB with NJ 47 NB LT lane		AM Peak (60 sec)		PM Peak (90 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Swedesboro Rd. EB	C	23	D	35
	Coles Mill Rd. WB	C	33	E	69
	NJ 47 Delsea Dr. SB	B	19	D	40
	NJ 47 Delsea Dr. NB	B	16	B	17
	Porchtown Rd. NE	D	39	F	152
	Intersection	C	25	D	46

Source: *DVRPC, 2007*

Using DVRPC's *2007 Conformity Findings Report*, a growth rate was applied to the existing traffic volumes to project 2030 future volumes for the intersection.

The overall LOS for the morning and afternoon peak hours is projected to be at a D and E with a 39- and 57-second vehicle delay, respectively, in the year 2030 if there are no improvements at the intersection. Traffic along Delsea Drive in the morning is expected to remain the same with its current LOS of B and 17-second vehicle delay. In the afternoon the delay along NJ 47 increases on both the northbound and southbound approaches to a LOS D and F with a 51- and 177-second vehicle delay. In the morning, Swedesboro Road, Coles Mill Road, and Porchtown Road will likely experience the same amount of delays as with current conditions. During the afternoon peak, the LOS and delay on the Swedesboro Road and Coles Mill Road approaches decreases greatly to a LOS C and delay ranges between 21 to 24 seconds. The LOS and delay on Porchtown Road is estimated to remain the same as existing conditions. The future data is used with the same existing cycle length of 110 seconds for both the morning and afternoon peak periods. ***Table G4*** presents the LOS data for projected 2030 traffic conditions.

A SYNCHRO analysis was performed for the five scenarios. With the projected traffic volumes, all five options improved the overall performance of the intersection in the morning and afternoon peak periods. *Scenario 4* generated the largest improvement on the Delsea Drive southbound approach, reducing the afternoon LOS from F with 177 seconds of delay to LOS B with 19 seconds of vehicle delay. With the exception of the afternoon optimization for existing conditions, all of the 2030 scenarios presented were similar to the existing condition options.

Complete SYNCHRO data for existing and year 2030 potential improvement scenarios are located in **Appendix C.**

Recommendations

The dominant issue observed at this location was the problematic left-turning movement from Delsea Drive onto Coles Mill Road and Swedesboro Road. Several of the improvements presented in the analysis addressed this safety issue by adding an exclusive left-turn lane onto Delsea Drive and modifying the signal timing and/or eliminating select movements at approaches.

Scenarios 2 and *3* are both feasible options that present improvement to safety and efficiency to the operation of the intersection. Although, some aspects of *Scenario 2* may be easier to implement than those of *Scenario 3*, *Scenario 3* offers the safest option with no negative impact on operation over *Scenario 2*.

Both scenarios can be implemented in the short term. Although some aspects need to be implemented together—for example signal timing, striping and signage—others can be done separately. To realize improvements to the intersection for all users, all improvements should be included from the scenario.

CHESTER

NEWARK ROAD (SR 3033) AND BALTIMORE PIKE WEST (SR 3046) INTERSECTION

LOCATION DESCRIPTION

The study location is the intersection of Baltimore Pike West (SR 3046) and Newark Road (SR 3033) in the northern section of New Garden Township, as shown in ***Figure H1***. Newark Road connects with US 1 (Kennett Oxford Bypass), SR 926 (West Street Road) at London Grove, and PA 82 (Doe Run Road), which runs into Coatesville to the north. Newark Road connects with SR 41 (Gap Newport Road) to the south of the intersection, which travels southeast through the state of Delaware. Baltimore Pike West connects with US 1 outside Kennett Square and provides access to Avondale and points beyond to the east and west of the intersection, respectively.

As shown in ***Figure H2***, each approach of the intersection has one approach lane eastbound and one departure lane. Baltimore Pike West has shoulders on both sides of the road. The shoulder on the north side of the road is minimal. Newark Road south of the intersection has shoulders on both sides of the road whereas there is none on the north side of the intersection. Sidewalk is available on the northwest and southeast corners of the intersection but ends there. No parking is permitted along the curb in and around the intersection.

The intersection is signalized with a three-phased signal. This signal is timed for a lead green protected left turn for westbound Baltimore Pike West. There is emergency vehicle preemption at the intersection. The intersection is skewed with the Newark Road southbound approach offset to the east from the northbound approach. In addition to the awkward alignment of Newark Road there is a steep grade with an associated horizontal curve on the southbound approach.

Land use in the area is mixed, as shown in ***Figure H3.*** There are large areas of single-family residential, commercial, agriculture and vacant land with smaller pockets of manufacturing. In the area there are large cold storage and mushroom processing facilities. At the intersection, the property on the northwest corner was acquired by the township and the buildings were demolished. On the southeast corner are residential properties, some of which have been converted to commercial use. The property on this corner is currently unoccupied due to a crash. On the other two corners of the intersection there are commercial uses, a car dealership on the northeast and a food market on the southwest. Poor access management is evident at the commercial establishments at the intersection. There are no curbs, and access and egress to these businesses are not defined.

The intersection is served by SCCOOT transit service. SCCOOT is a service of the Transportation Management Association of Chester County (TMACC) and a partnership with the Southern Chester County Organization on Transportation, a joint committee of the Southern Chester County Chamber of Commerce and the Oxford Area Chamber of

Figure H1

Congestion and Crash Site Analysis

Study Area

New Garden Twp., Chester Co., PA

WEST
MARLBOROUGH

EAST
MARLBOROUGH

Analysis Area / Intersection

1

NEWARK RD

BALTIMORE PIKE WEST

NEW GARDEN

BALTIMORE PIKE WEST

NEWARK RD

Avondale

White Clay Creek

41

0 1,000 2,000
Feet

Delaware Valley Regional
Planning Commission
July 2007

Figure H2
Congestion and Crash Site Analysis
Existing Lane Configuration
New Garden Twp., Chester Co., PA
ROSE HILL LN
NEWARK RD
BALTIMORE PIKE WEST
NEWARK RD
CHURCH ST
0 25 50
Feet
DVRPC Aerial Imagery: Spring, 2005
Delaware Valley Regional
Planning Commission
July 2007

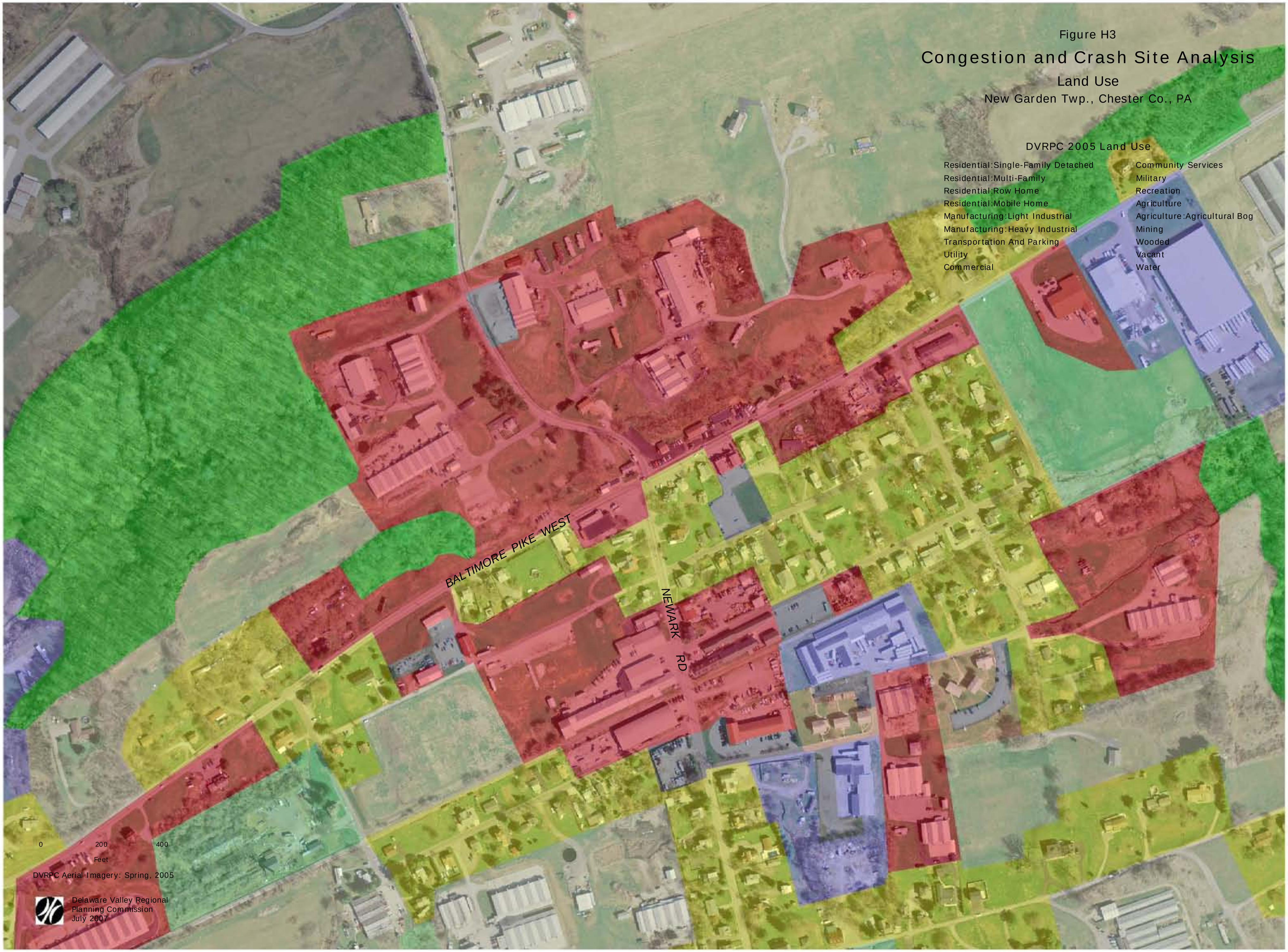


Figure H3
Congestion and Crash Site Analysis
Land Use
New Garden Twp., Chester Co., PA
DVRPC 2005 Land Use
Residential:Single-Family Detached
Residential:Multi-Family
Residential:Row Home
Residential:Mobile Home
Manufacturing:Light Industrial
Manufacturing:Heavy Industrial
Transportation And Parking
Utility
Commercial
Community Services
Military
Recreation
Agriculture
Agriculture:Agricultural Bog
Mining
Wooded
Vacant
Water
BALTIMORE PIKE WEST
NEWARK RD
0
200
400
Feet
DVRPC Aerial Imagery: Spring, 2005
Delaware Valley Regional
Planning Commission
July 2007

Commerce. The service runs Monday through Saturday and connects Oxford to West Chester with stops in West Grove, Lincoln University, Kennett Square and Longwood Gardens. Fare information can be found on each schedule. SCCOOT serves the West Chester Transportation Center providing connections to SEPTA routes 92, 104, 314 and Krapf's Coaches “A” bus. Transfers are available for the SCCOOT bus, and SEPTA routes connecting with the SCCOOT bus.

EXISTING CONDITIONS

Congestion

The intersection experiences congestion especially during peak periods. With projected future growth in the region, traffic volumes will also increase. Proposed developments include expansion of the airport on Newark Road north of the study intersection and a major commercial development between the Kennett Oxford bypass and Route 52.

Currently, southbound Newark Road traffic backs up to the airport during the afternoon peak period. Truck traffic through the intersection is heavy and the geometry of the intersection makes turns difficult for many of these trucks. This also contributes to the congestion at the intersection. Trucks move through the intersection much slower and in many instances block through traffic. Southbound left-turning trucks use the parking lot on the southeastern corner to complete their turns. Westbound left-turning traffic queues in the intersection and many times gets caught in the middle of the intersection after the signal has turned red.

Traffic backup from the westbound approach on Baltimore Pike West
Source: DVRPC

Turning Movement Counts

Manual turning movement counts of the intersection of Baltimore Pike West and Newark Road were taken on Wednesday, September 6, 2006 from 6 to 9 AM and on Tuesday, November 7, 2006 from 4 to 6 PM. In order to have a better understanding of the proportion of truck traffic through the intersection, the afternoon counts distinguished “heavy vehicles” from passenger vehicles. The data ascertain that the peak hours were 8-9 AM and 4:45-5:45 PM in the morning and afternoon, respectively. The complete manual turning movement counts are located in **Appendix D**.

Figure H4 shows the turning movement counts for the morning and afternoon peak hours. The 1,365 vehicles counted during the morning peak period are relatively balanced among all four approaches, though the eastbound approach carries 31 percent of this peak-hour traffic. In contrast, the eastbound through movement is the single largest movement, with 350 vehicles or 26 percent of the AM peak period's total volume. In the opposite westbound direction, there are 78 left-turn movements, which represent 29 percent of that approach's morning peak-hour volume. Therefore a significant proportion of the morning's westbound traffic will conflict with the dominant eastbound flow. For the southbound leg of Newark Road, 25 percent of all movements are left turns, which may potentially incur more congestion and/or unsafe conditions.

The afternoon's peak hour total of 1,608 vehicles is noticeably greater than the morning peak hour's volume. The westbound approach leg has the highest volume within the PM peak period with 588 vehicles. The westbound through movement is 415 vehicles in the afternoon peak hour. There were 89 southbound left-turning vehicles during the afternoon peak hour, or 27 percent of that approach's total traffic. The larger overall volumes will be more likely to induce congestion and/or potentially unsafe conditions.

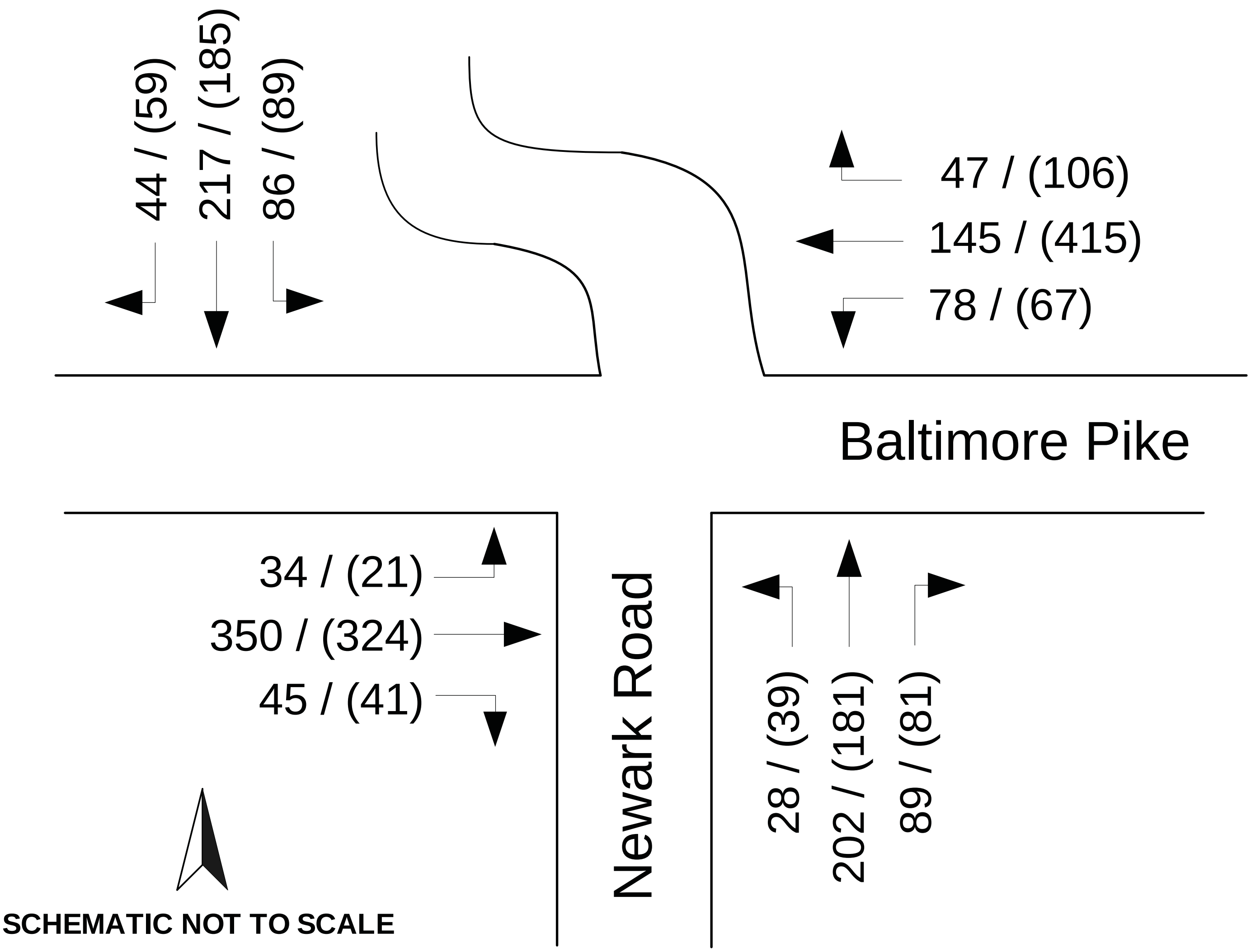
Level of Service
SYNCHRO Traffic Analysis Software was utilized to evaluate the intersection's current performance levels and then subsequently to compare the effectiveness of potential improvements. In its evaluations of intersection performance, SYNCHRO considers several factors, including but not limited to vehicular volume, intersection geometry, and signal timing. From this data, SYNCHRO is capable of providing a Level of Service (LOS) and the average delay-per-vehicle, among other measures of effectiveness. These measures are detailed for each movement and approach, as well as for the entire intersection.

TABLE H1
Existing Intersection Performance
Baltimore Pike West and Newark Road

Scenario	**Direction of Travel**	**2007 Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle**			
Existing Conditions		AM Peak (60 sec)		PM Peak (60 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Baltimore Pike eastbound	C	35	D	38
	Baltimore Pike westbound	A	8	B	18
	Newark Road northbound	E	69	D	40
	Newark Road southbound	F	171	E	77
	Intersection	E	72	D	39

Figure H4: Turning Movement Counts

Existing Peak Hour Turning Movement Counts
Baltimore Pike and Newark Road



Legend:

AM Volume / (PM Volume)

Peak Hours
AM: 8:00 - 9:00
PM: 4:45 - 5:45

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Table H1 shows the existing LOS. During the morning peak hour, the intersection operates at an overall LOS of E, with an average of 72 seconds of delay. The poorest performing approaches are the north and southbound Newark Road legs, a LOS of E and F, respectively. The southbound approach operates with an average delay close to three minutes (171 seconds). This is primarily a result of the approach's high percentage of left turns, steep downhill gradient, and above average proportion of heavy vehicles. Conversely, the westbound Baltimore Pike approach operates at a LOS of A, with an average delay of eight seconds.

During the afternoon peak hour, the intersection operates at an overall LOS of D, with an average of 39 seconds of delay. The north and southbound Newark Road approaches experience the heaviest delays, with a LOS of D and E, respectively. Southbound Newark Road operates with the greatest average delay of all the intersection approaches, 77 seconds, while the westbound Baltimore Pike approach has the least delay, 18 seconds, and a LOS of B.

Safety

Crash Analysis

According to the PennDOT Crash Database, there were 24 reportable crashes recorded at the study location for the three-year period from 2003 to 2005. Reportable crashes are crashes that result in a fatality, injury, and/or property damage rendering the vehicle disabled whereas, non-reportable crashes are those where there are no injuries and/or fatalities and the vehicle(s) can be driven away from the crash scene. ***Table H2*** depicts a summary of the crashes at the intersection between 2003 and 2004, including the 2003 – 2004 statewide average.

As shown there were 8 crashes in 2003, 10 crashes in 2004, and 2005 saw a 40 percent reduction of crashes over 2004 with 6 crashes. No fatal crashes occurred at this intersection; however, there were 16 injury crashes and 8 property-damage-only crashes. Nine of the ten crashes that occurred in 2004 involved injuries. The injury crashes reported at this intersection over the three-year period were above the statewide average. Ten of the crashes were angle, representing 42 percent of the total crashes, which is greater than the statewide average of 27 percent. Angle crashes at this location were greater than the 27 percent statewide average during 2003 - 2004. Other types of crashes recorded at this location include 6 rear end, 5 hit fixed object, 1 sideswipe, 1 head on, and 1 non-collision. As indicated in the collision diagram in ***Figure H5***, the angle crashes are located in the middle of the intersection, which could be a result of the awkward alignment of the intersection and issues with vehicles making left turns. Seventeen (71 percent) of the 24 crashes occurred during daylight conditions. This was above the statewide average of 63 percent. The majority of the crashes occurred on clear days and on dry road surface conditions. Only six crashes occurred with inclement road surface conditions. The database reported one incident when the road surface was icy.

Figure H5

Crashes by Type, 2003 - 2005
Newark Road (SR 3033) & Baltimore Pike (SR 3046)

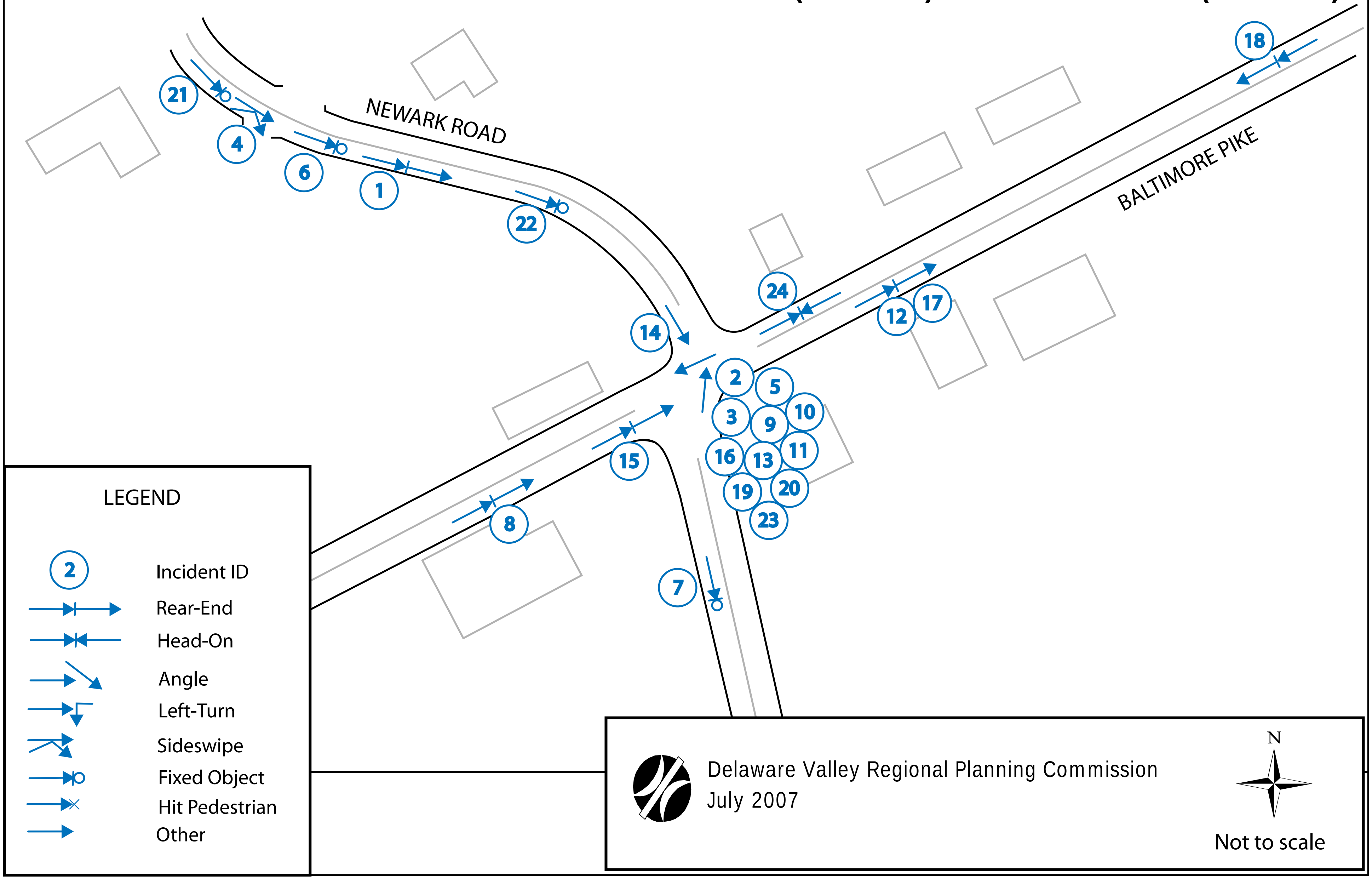

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Table H2 – Intersection Crash Summary (2003 – 2005)

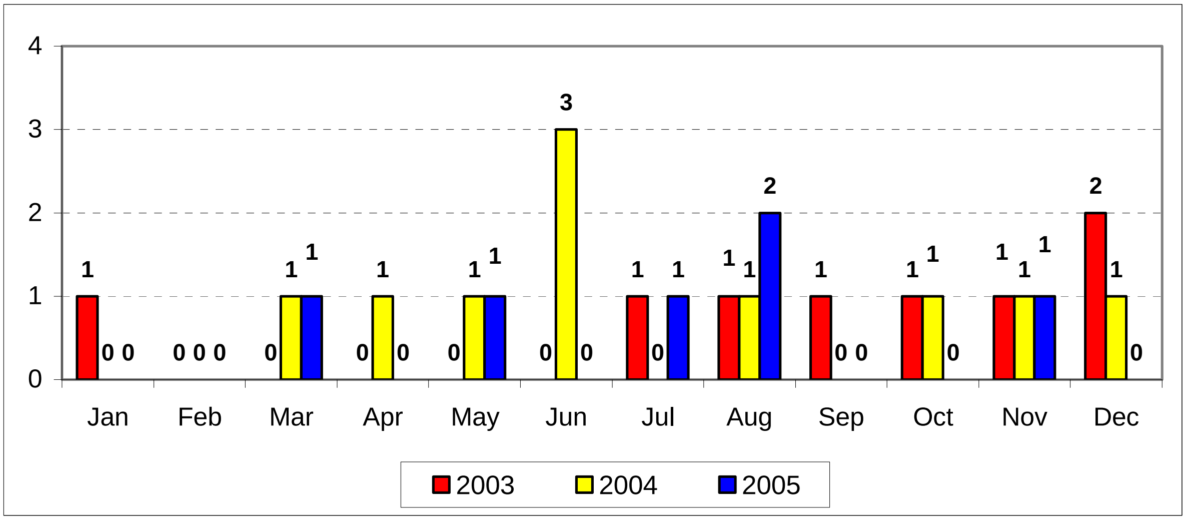
	2003		2004		2005		Total		
	Crashes	%	Crashes	%	Crashes	%	Crashes	%	03-'04 PA Statewide Average
Crashes									
Reportable	8	33%	10	42%	6	25%	24	100%	N/A
Severity									
Fatalities	0	0%	0	0%	0	0%	0	0%	1%
Injuries	4	50%	9	90%	3	50%	16	67%	53%
Property Damage Only	4	50%	1	10%	3	50%	8	33%	46%
Crash Type									
Angle	2	25%	5	50%	3	50%	10	42%	27%
Rear End	2	25%	4	40%	0	0%	6	25%	21%
Hit Fixed Object	3	38%	0	0%	2	33%	5	21%	32%
Sideswipe	1	13%	0	0%	0	0%	1	4%	6%
Head On	0	0%	0	0%	1	17%	1	4%	4%
Non Collision	0	0%	1	10%	0	0%	1	4%	4%
Lighting Conditions									
Daylight	5	63%	7	70%	5	83%	17	71%	63%
Dark	3	38%	3	30%	1	17%	7	29%	17%
Weather Conditions									
Clear	6	75%	8	80%	4	67%	18	75%	75%
Rainy	2	25%	1	10%	2	33%	5	21%	14%
Unknown	0	0%	1	10%	0	0%	1	4%	1%
Road Surface Conditions									
Dry	4	50%	8	80%	4	67%	16	67%	66%
Wet	1	13%	2	20%	2	33%	5	21%	20%
Icy	1	13%	0	0%	0	0%	1	4%	5%
Other	2	25%	0	0%	0	0%	2	8%	1%

Source: PennDOT Crash Database (2003 – 2005)

Figure H6 shows the crashes by month for the three-year study period at the intersection. As shown, there were no crashes reported for the month of February for any of the years studied. June and December 2004 had three crashes each, which is the highest number of crashes reported for any of the months. The months between July and December had a higher concentration of crashes. With the exception of June and December 2004 and August 2005, 17 and 16 of the months had 1 and 0 crashes reported, respectively.

With four crashes, August had the highest number of crashes of all the months for the three-year period. June 2004 had the highest single month crashes with a total of three, but there were no crashes for June for the other two study years. Overall, the monthly data does not show a pattern; the crashes occurred randomly as shown in ***Figure H6.***

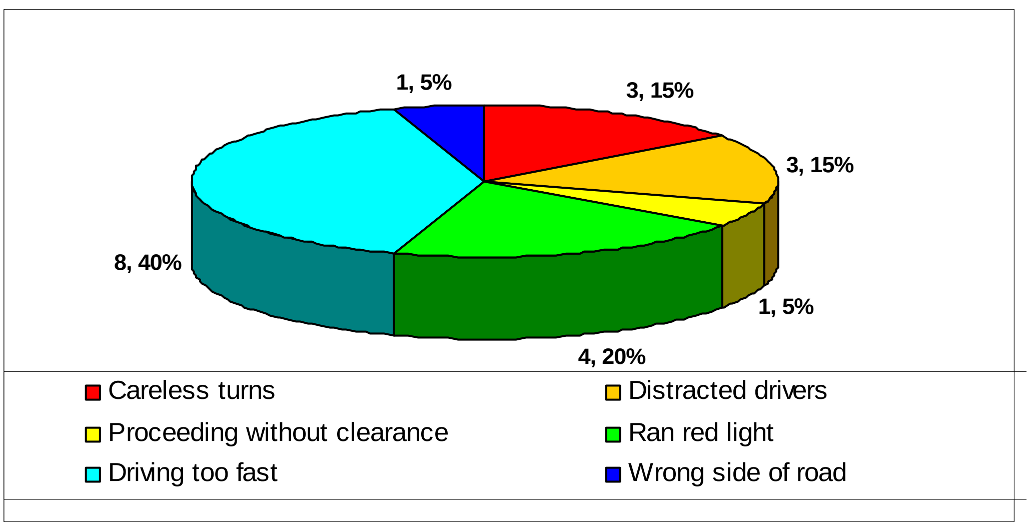
Figure H6 – Crashes by Month



Source: PennDOT Crash Database (2003 – 2005)

Figure H7 depicts driver actions that resulted in 19 of the 24 crashes that occurred at the intersection. Forty percent of the crashes involved speeding and 20 percent involved running red lights. Other driver behavior reported includes careless turns, distracted drivers, proceeding without clearance, and driving on the wrong side of the road.

Figure H7 – Driver Actions



Source: PennDOT Crash Database (2003 – 2005)

Nineteen of the 24 crashes occurred between the hours of 9 AM and 9 PM. There were no crashes reported during the morning peak period, however, during the afternoon peak period there were six reported crashes, which were mainly angle and rear-end crash types. Twenty-one of the 24 crashes occurred between Sunday and Friday. Mondays had the highest number of crashes (4) and Saturday had the lowest number of crashes (1) reported. The detailed crash summary of this intersection is provided in **Appendix D**.

Access Management
The numerous access and egress points for commercial activity at the intersection create conflict points for traffic at the intersection. The risk for angle and rear-end crashes is increased as a result of this poor access management.

Intersection Geometry and Striping
Truck traffic through the intersection is high, with up to 12 percent of the vehicle count on Baltimore Pike in mid-morning. Due to the intersection layout and tight turning radii, it is difficult for trucks to negotiate the intersection. Trucks, therefore, use the curbed areas or oncoming lanes to complete their turns. This can be detrimental to pedestrians who use curbed areas and motorists in the opposing lanes.

As a result of the skew at the intersection, westbound Baltimore Pike traffic makes a left-turn queue in the middle of the intersection. Vehicles get caught in the intersection at the red light. This results in conflicts with Newark Road through traffic.

All pavement markings at the intersection are faded. This can be extremely unsafe at night and during inclement weather.

Vehicle leaving business on the northeast corner of the intersection – open driveway at intersection
Source: DVRPC, 2007

Truck making left turn from northbound Newark Road
On to westbound Old Baltimore Pike
Source: DVRPC, 2007

Pedestrians

Pedestrian amenities are minimal. Existing sidewalks at the intersection lead nowhere. Crosswalks are restricted to southbound and westbound approach legs. There are no pedestrian signs posted at the intersection. Crosswalk pavement markings are faded and hardly visible. Traffic signals include push buttons and man-hand signals.

Pedestrians on Old Baltimore Pike – no pedestrian amenities
Source: DVRPC, 2007

OPPORTUNITIES AND CONSTRAINTS

In order to devise a strategy with which to improve the operations of the intersection, a number of variables must first be considered, including roadway geometry, signal timing, and surrounding land-use.

With regards to geometry, the southbound approach consists of horizontal curves and a steep gradient. This approach is offset slightly to the east of the opposing northbound approach. For the land use and right-of-way, New Garden Township recently acquired the property at the northwest corner of the intersection in anticipation of improvements to the intersection. The other corners of the intersection are occupied. The existing signal plan is relatively new, as it was incorporated in 2002. A unique feature of the timing plan is its employment of a westbound lead phase for both peak periods. This lead phase provides an additional seven seconds of green time for vehicles traveling along that approach leg.

POTENTIAL IMPROVEMENT SCENARIOS

The analysis of potential scenarios to improve the service and safety of the intersection involved changes to the signal timing and intersection geometry, and, as a result, potential changes to land use. Potential improvements were identified as either short-, medium-, or long-term solutions. This progression allows comparisons between the proposed scenario and preceding scenarios, as well as against the existing conditions.

Scenario 1

Characteristics

- Optimization of the existing timing plan.

Advantages

- The new split and cycle lengths are more reflective of current traffic volumes.
- A short-term scenario that can be implemented with minimum cost.

Level of Service Analysis

For the morning peak period, the intersection LOS improves from an E to a D, while the average delay is halved to 36 seconds. This improvement in overall delay is a result of the average delay reductions for the Newark Road approaches, with an upgrade of LOS from E to C and from F to D for the north and southbound directions, respectively. These advances in performance are at the cost of slightly longer delays for the Baltimore Pike approaches, though on average it is only an increase of five seconds per approach. In addition, the cycle length increases by 15 seconds, for a complete cycle length of 75 seconds.

For the afternoon peak period, the intersection's overall LOS improves from a D to a C, while delay is reduced 5 seconds to an average of 34 seconds. Similar to the AM peak hour, there is a noticeable improvement in the performance of the Newark Road approaches; specifically, the north and southbound legs improve 10 seconds for a LOS of C and 28 seconds for a LOS of D, respectively. However, the delays along the Baltimore Pike approaches increase an average of four seconds.

Scenario 2

Characteristics

- Elimination of the westbound lead phase.
- Optimization of the revised timing plan.

Advantages

- The new splits and cycle length are more reflective of current traffic volumes.
- A short-term scenario.

Disadvantages

- Westbound left-turning traffic no longer has any opportunities for protected movements.

TABLE H3
Intersection Performance for Existing and Alternative Scenarios
Baltimore Pike West and Newark Road

Scenario	Direction of Travel	2007 Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle			
Existing Conditions		AM Peak (60 sec)		PM Peak (60 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Baltimore Pike eastbound	C	35	D	38
	Baltimore Pike westbound	A	8	B	18
	Newark Rd northbound	E	69	D	40
	Newark Rd southbound	F	171	E	77
	Intersection	E	72	D	39
Scenario 1 - Optimize Cycle Length and Splits		AM Peak (75 sec)		PM Peak (70 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Baltimore Pike eastbound	D	41	D	41
	Baltimore Pike westbound	B	12	C	23
	Newark Rd northbound	C	32	C	30
	Newark Rd southbound	D	53	D	49
	Intersection	D	36	C	34
Scenario 2 - Eliminate WB Lead Phase; Optimize Cycle Length and Splits		AM Peak (55 sec)		PM Peak (60 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Baltimore Pike eastbound	C	21	B	15
	Baltimore Pike westbound	B	15	C	28
	Newark Rd northbound	C	20	C	26
	Newark Rd southbound	C	27	D	38
	Intersection	C	21	C	27

TABLE H3 (continued)					
Intersection Performance for Existing and Alternative Scenarios					
Baltimore Pike West and Newark Road					
Scenario	**Direction of Travel**	**2007 Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle**			
Scenario 3 – Add SB Lead Phase; Eliminate WB Lead Phase; Optimize Cycle Length and Splits		AM Peak (60 sec)		PM Peak (80 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Baltimore Pike eastbound	C	26	B	17
	Baltimore Pike westbound	B	18	C	26
	Newark Rd northbound	B	18	C	27
	Newark Rd southbound	C	22	D	38
	Intersection	C	21	C	26
Scenario 4 - Add Exclusive SB Left Turn Lane; Optimize Cycle Length and Splits		AM Peak (60 sec)		PM Peak (60 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Baltimore Pike eastbound	D	44	D	36
	Baltimore Pike westbound	A	8	B	16
	Newark Rd northbound	D	50	D	48
	Newark Rd southbound	C	28	C	26
	Intersection	C	34	C	29
Scenario 5 - Eliminate WB Lead Phase; Add Exclusive SB Left Turn Lane; Optimize Cycle Length and Splits		AM Peak (50 sec)		PM Peak (60 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Baltimore Pike eastbound	B	19	B	13
	Baltimore Pike westbound	B	13	C	21
	Newark Rd northbound	C	23	C	34
	Newark Rd southbound	B	16	C	22
	Intersection	B	18	C	22

TABLE H3 (continued) **Intersection Performance for Existing and Alternative Scenarios**					
Baltimore Pike West and Newark Road					
Scenario	**Direction of Travel**	**2007 Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle**			
Scenario 6 – Add SB Lead Phase; Eliminate WB Lead Phase; Add Exclusive SB Left Turn Lane; Optimize Cycle Length and Splits		AM Peak (60 sec)		PM Peak (80 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Baltimore Pike eastbound	C	33	B	20
	Baltimore Pike westbound	C	24	D	35
	Newark Rd northbound	D	44	D	50
	Newark Rd southbound	B	12	B	19
	Intersection	C	28	C	31
Scenario 7 - Add Exclusive WB and SB LT Lanes; Optimize Cycle Length and Splits		AM Peak (60 sec)		PM Peak (60 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Baltimore Pike eastbound	D	43	D	37
	Baltimore Pike westbound	A	7	B	11
	Newark Rd northbound	D	49	D	46
	Newark Rd southbound	C	27	C	26
	Intersection	C	33	C	27
Scenario 8 – Add NB & SB Channelized RT Lanes; Add Exclusive WB and SB LT Lanes; Optimize Cycle Length and Splits		AM Peak (60 sec)		PM Peak (60 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Baltimore Pike eastbound	D	38	D	37
	Baltimore Pike westbound	A	6	B	11
	Newark Rd northbound	D	51	D	40
	Newark Rd southbound	C	29	C	24
	Intersection	C	32	C	25

TABLE H3 (continued)
Intersection Performance for Existing and Alternative Scenarios
Baltimore Pike West and Newark Road

Scenario	**Direction of Travel**	**2007 Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle**			
Scenario 9 – Add LT Lanes on All Approaches; Optimize Cycle Length and Splits		AM Peak (70 sec)		PM Peak (60 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Baltimore Pike eastbound	C	31	C	28
	Baltimore Pike westbound	A	7	B	11
	Newark Rd northbound	D	36	C	32
	Newark Rd southbound	C	28	C	27
	Intersection	C	27	C	22

Source: *DVRPC, 2007*

Level of Service Analysis
For the morning peak period, the overall intersection operates at a LOS of C with 21 seconds of delay, which is an improvement of 15 seconds from *Scenario 1*.Though the westbound lead is removed, that approach retains a LOS of B, with just a three-second increase in average delay. The remaining three approaches experience drastic reductions in delay; for comparison, delays along the Newark Road approaches are further reduced by an average of 19 seconds versus *Scenario 1*.

For the afternoon peak period, the overall intersection also operates at a LOS of C with 27 seconds of delay. This is a seven-second improvement from *Scenario 1*. The elimination of the westbound lead phase deteriorates that approach's performance by 5 seconds to an average delay of 28 seconds for a LOS of C. However, this decline is balanced by improvements in the remaining three approaches. This is exemplified by the 26-second decline in delay and upgrade in LOS for the eastbound approach.

Scenario 3
Characteristics
- Elimination of the westbound lead phase.
- Addition of a southbound lead phase.
- Optimization of the revised timing plan.

Advantages
- Introduces a protected phase for southbound left-turning vehicles, which may be appropriate given the approach's steep gradient and limited sight distance.
- The new splits and cycle length are more reflective of current traffic volumes.
- A short-term scenario.

Disadvantages

- Westbound left-turning traffic no longer has any opportunities for protected movements.
- The southbound lead phase may increase cycle length, while limiting the split lengths of other approaches.

Level of Service Analysis

For the morning peak period, the overall intersection operates at a LOS of C, with 21 seconds of delay; this is comparable to *Scenario 2*. As expected, the average delay for southbound vehicles decreased by five seconds from *Scenario 2*, though it continues to operate at a LOS of C. The reduction in southbound delay is countered by an average increase of four seconds in west and eastbound delay, though their respective LOS remains the same as in *Scenario 2*.

For the afternoon peak period, the overall intersection operates at a LOS of C, with 26 seconds of delay. Compared to *Scenario 2*, this is a one-second decrease in delay. This similarity in performance is echoed throughout the approaches, as there is no change in any LOS and with minimal differences in seconds of delay per approach. Consequently, it may be inferred that the addition of a southbound lead phase may provide little benefit to the efficiency of the intersection's operations.

Scenario 4

Characteristics

- Add an exclusive southbound Newark Road left-turn lane.
- Optimization of the existing timing plan.

Advantages

- Increases capacity for the heavy southbound approach.
- The new splits and cycle length are more reflective of current traffic volumes.
- A medium-term scenario.

Disadvantages

- Right-of-way acquisition required.

Level of Service Analysis

For the morning peak period, the overall intersection operates at a LOS of C, with 34 seconds of delay. Though this is an upgrade in LOS from *Scenario 1*, it is only a two-second improvement in overall delay. The impact of the southbound turning lane can be seen on the southbound approach. It reduces its delay by 47 percent, from 53 seconds to an average delay of 28 seconds, and improves its LOS from a D to a C. However, it comes at the cost of the northbound approach, which suffers an 18-second lengthening in delay, as well as a reduction in LOS from a C to a D.

For the afternoon peak period, the overall intersection operates at a LOS of C with 29 seconds of delay, which is a 5-second improvement from *Scenario 1*. Similar to the morning peak period, the southbound approach experiences a significant reduction in delay; its 26 seconds of delay for this scenario is 23 seconds less than for *Scenario 1*, and its LOS improves from a D to a C. However, as seen in the AM peak hour, this improvement is balanced by performance deterioration for the northbound approach.

Scenario 5

Characteristics

- Add an exclusive southbound Newark Road left-turn lane.
- Eliminate the westbound lead phase.
- Optimization of the revised timing plan.

Advantages

- The new splits and cycle length are more reflective of current traffic volumes.
- A medium-term scenario.

Disadvantages

- Westbound left-turning traffic no longer has any opportunities for protected movements.

Level of Service Analysis

For the morning peak period, the overall intersection operates at a LOS of B with 18 seconds of delay. This is a 16-second improvement from *Scenario 4*, as well as an upgrade in the LOS. The elimination of the westbound lead phase will lengthen the delay experienced by that approach by five seconds. As a result, the remaining three approaches will reduce their delays. Consequently, no approach experiences delays that are greater than 23 seconds, nor perform worse than a LOS of C.

For the afternoon peak period, the overall intersection operates at a LOS of C with 22 seconds of delay. Compared to *Scenario 4*, this is a seven-second improvement, though the LOS remains the same. Similar to the morning peak period, the westbound approach delay is increased by five seconds, due to the removal of that approach's lead phase. This also provides reduction for the remaining three approaches.

Scenario 6

Characteristics

- Add an exclusive southbound Newark Road left-turn lane.
- Eliminate of the westbound lead phase.
- Add a southbound lead phase
- Optimization of the revised timing plan.

Advantages

- Increases capacity for the heavy southbound approach.
- Introduces a protected phase for southbound left-turning vehicles.
- The new splits and cycle length are more reflective of current traffic volumes.
- A medium-term scenario.

Disadvantages

- Westbound left-turning traffic no longer has any opportunities for protected movements.
- The southbound lead phase may increase cycle length, while limiting the split lengths of other approaches.

Level of Service Analysis

For the morning peak period, the overall intersection operates at a LOS of C, with 28 seconds of delay. When compared to *Scenario 5*, this result is a 10-second increase in delay as well as a reduction in LOS, from a B to a C. These effects are shared by three of the four individual approaches; predictably, the only approach that improves with these measures is southbound Newark Road. This approach reduces its delay by 4 seconds to an average of 12 seconds, the lowest among all approaches. However, the remaining approaches increased their delays as well as degraded their respective LOS.

For the afternoon peak period, the overall intersection operates at a LOS of C, with 31 seconds of delay. This is nine seconds greater than *Scenario 5*, though both share the same LOS. Similar to the relationship described for the morning peak period, all but one of the approaches suffers delay increases or a decline in LOS. This delay increase is most significant for the westbound approach, which experiences a LOS of D after a 14-second, or a 67 percent, increase in delay for an average delay of 35 seconds. Conversely, the southbound Newark Road approach experiences a 19-second delay, an improvement of just 3 seconds from *Scenario 5*.

Scenario 7

Characteristics

- Add exclusive left-turn lanes at the southbound Newark Road and westbound Baltimore Pike approaches.
- Optimization of the existing timing plan.

Advantages

- Increases capacity for the heavy southbound and westbound approaches.
- The new splits and cycle length are more reflective of current traffic volumes.
- A medium-term scenario.

Disadvantages

- Will require right-of-way acquisition along the westbound Baltimore Pike approach.

Level of Service Analysis

For the morning peak period, the overall intersection operates at a LOS of C with 33 seconds of delay. *Scenario 4* offers the most appropriate comparison because like this scenario it includes geometry changes. The addition of a westbound turning lane improves the overall intersection delay by just one second. This marginal improvement is reflected equally among all of the approaches, since they each reduce their delay by a second from their respective *Scenario 4* counterparts.

For the afternoon peak period, the overall intersection operates at a LOS of C with 27 seconds of delay, which is a slight 2-second improvement from *Scenario 4*. The greatest impact of the westbound left-turn lane is a 5-second reduction to an average delay for the approach of 11 seconds. This approach is the best performing within the intersection, while the delays experienced by the remaining approaches are comparable to *Scenario 4*, averaging 36 seconds. Consequently, for either peak hour, the addition of a westbound left-turn lane will provide a marginal improvement to the intersection, though much of it will be mainly for the already well-performing westbound approach.

Scenario 8

Characteristics

- Add exclusive left-turn lanes at the southbound Newark Road and westbound Baltimore Pike approaches.
- Add channelized right turns on the northbound and southbound Newark Road approach legs. The proposed change in geometry is shown in ***Figure H8***.
- Optimization of the existing timing plan.

Advantages

- Increases capacity for the southbound, westbound, and northbound approaches.
- The new splits and cycle length are more reflective of current traffic volumes.
- A medium-term scenario.

Disadvantages

- Will require right-of-way acquisition along the westbound Baltimore Pike and northbound Newark Road approaches.

Level of Service Analysis

For the morning peak period, the overall intersection operates at a LOS of C with 32 seconds of delay. This is a marginal improvement to the overall AM peak-hour service provided in *Scenario 7*. Furthermore, the individual approaches perform comparably to their counterparts in the previous scenario. Similar to *Scenario 7*, the westbound approach operates with the least delay (six seconds) and LOS A, however, the north and southbound approaches suffer an increase of two seconds in delay. This minor increase in delay, despite the additional capacity along these approaches is the result of a shift of green time from Newark Road onto Baltimore Pike.

For the afternoon peak period, the overall intersection operates at a LOS of C with 25 seconds of delay. This is a minor improvement compared to *Scenario 7*. Unlike the morning peak period, the additional capacity provided by the channelized right turn provides a reduction in delay for the Newark Road approaches; six seconds on the northbound approach and two seconds on the southbound approach. The delays and LOS experienced by the Baltimore Pike approaches remain unchanged from *Scenario*


Figure H8
Congestion and Crash Site Analysis
Proposed Intersection Improvements
New Garden Twp., Chester Co., PA
NEWARK RD
Add a channelized right turn lane
for Baltimore Pike West traffic
Widen to the west of the southbound
approach to eliminate the skew
and add additional lanes
Add an exclusive left turn lane
and a channelized right turn lane
ONLY
ONLY
Widen Baltimore Pike in this area
Add an exclusive left turn lane
to the westbound approach
Add a channelized right turn lane
for the northbound approach
Re-stripe pavement markings
BALTIMORE PIKE WEST
0 25 50
Feet
DVRPC Aerial Imagery: Spring, 2005
Delaware Valley Regional
Planning Commission
July 2007

7. As a result, the channelized right turns will provide slight improvements to service for both peak hours.

Scenario 9
Characteristics
- Add exclusive left-turn lanes at all four approaches.
- Optimization of the existing timing plan.

Advantages
- Increases capacity at all four approaches.
- The new splits and cycle length are more reflective of current traffic volumes.

Disadvantages
- Will require right-of-way acquisition along the east and westbound Baltimore Pike and northbound Newark Road approaches.
- A long-term scenario.

Level of Service Analysis
For the morning peak period, the overall intersection operates at a LOS of C with 27 seconds of delay. This represents a five-second improvement from *Scenario 8*, though it retains the same LOS. All approaches except for westbound Baltimore Pike perform as well or even better in comparison to *Scenario 8*; whereas the westbound Baltimore Pike approach continues to operate efficiently with seven seconds of delay. When compared to all the other scenarios, this scenario's approach legs operate with the least amount of delay, and with the best performing LOS.

For the afternoon peak period, the overall intersection operates at a LOS of C with 22 seconds of delay. This is the least amount of average delay experienced by the intersection in all afternoon peak-period scenarios. Individual approaches operate at a LOS of C or better, with the northbound approach's 32 seconds of delay being the highest among the four approaches. The best performing approach is westbound Baltimore Pike, with 11 seconds of delay and a LOS of B. Overall, the increased capacity provided by left-turn lanes has a noticeable impact and benefit on the intersection's operation.

Projected Future Volume Impacts/Considerations
A sketch level analysis was performed to understand the effectiveness of select scenarios when applied to future traffic volumes. Such volumes were acquired using existing volumes and a growth factor from DVRPC's *Route 41 Corridor Study*. This study investigated the impacts of anticipated growth along the corridor as well as upon neighboring roadways and intersections. For the project intersection, the study indicates a 59 percent and a 53 percent vehicular volume growth rate by 2027 along Newark Rd and Baltimore Pike, respectively. These forecasted growth percentages were applied equally to each movement for the appropriate approach leg.

Three scenarios were analyzed with these forecasted growth rates, *Scenarios 4*, *7*, and *8*. These represent the medium-term scenarios that considered geometric change and optimization of the existing timing plan.

An analysis of *Scenario 4* carrying anticipated 2027 traffic volumes reveals a dramatic deterioration in overall LOS with a corresponding surge in average delay. For both peak periods, however, the change in performance on the southbound Newark Road approach is low compared to the others. This may be a result of the additional capacity provided by the exclusive southbound left-turning lane.

For *Scenario 7*, the impacts of the anticipated future traffic volumes are detrimental towards the overall performance of the intersection for either peak period, though less dramatically for the morning peak hour. The westbound and southbound approaches continue to operate at adequate levels, while the eastbound and northbound approaches fail significantly. This demonstrates the effectiveness of the exclusive turning lanes recommended for these respective approaches.

The evaluation of *Scenario 8* with 2027 volumes for either peak period reveals an impact upon the overall intersection similar to *Scenario 7*. The westbound and southbound approaches operate at adequate levels due to the presence of exclusive turning lanes in those directions. In addition, the north and southbound approaches exhibit slightly shorter delays than seen in *Scenario 7*. This is due to the channelized right turns for those respective approaches.

TABLE H4
Intersection Performance for Select Alternative Scenarios - 2027
Baltimore Pike West and Newark Rd

Scenario	**Direction of Travel**	**2027 Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle**			
Scenario 4 - Add Exclusive SB Left Turn Lane; Optimize Cycle Length and Splits		AM Peak (60 sec)		AM Peak (150 sec)	
		LOS	LOS	LOS	LOS
	Baltimore Pike eastbound	F	102	E	57
	Baltimore Pike westbound	E	67	F	202
	Newark Rd northbound	F	120	F	244
	Newark Rd southbound	D	41	D	48
	Intersection	F	84	F	143
Scenario 7 - Add Exclusive WB and SB LT Lanes; Optimize Cycle Length and Splits		AM Peak (140 sec)		PM Peak (130 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Baltimore Pike eastbound	F	105	F	145
	Baltimore Pike westbound	C	22	C	33
	Newark Rd northbound	F	109	F	332
	Newark Rd southbound	D	39	D	51
	Intersection	E	73	F	120
Scenario 8 – Add NB & SB Channelized RT Lanes; Add Exclusive WB and SB LT Lanes; Optimize Cycle Length and Splits		AM Peak (150 sec)		PM Peak (120 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Baltimore Pike eastbound	F	101	F	173
	Baltimore Pike westbound	C	24	C	33
	Newark Rd northbound	F	100	F	273
	Newark Rd southbound	D	39	D	45
	Intersection	E	70	F	115

Source: *DVRPC, 2007*

Recommendations

During the existing morning peak period, the overall intersection experiences 72 seconds of delay at a LOS E, and this is more than 30 seconds greater than the existing afternoon peak period, despite an 18 percent increase in total volume. This is primarily due to the 13-second westbound lead within the timing plans for both peak periods. This lead phase sufficiently accommodates the large afternoon westbound volumes, whereas it is an underutilized phase during the morning peak hour. Consequently, for the short-term in the morning peak period, *Scenario 2* will provide the best overall improvements in delay and LOS. Also for the short-term, *Scenario 1* will provide minor overall improvement during the afternoon peak period.

With regards to medium-term improvements, *Scenario 5* will have the greatest impact upon the morning peak period's overall delay and LOS. For the afternoon peak period, *Scenario 4* will provide a sizable reduction in overall delay, while still accommodating the large westbound volumes. Regardless of peak hour, the additional capacity provided by a southbound left-turn lane will benefit all four approaches to the intersection. If increased right-of-way becomes available along westbound Baltimore Pike and northbound Newark Road, then the installation of a westbound left-turn lane (as presented in *Scenario 7*) and a northbound channelized right (as presented in *Scenario 8*) will assist with the overall operations of the intersection. However, the impacts of such improvements would be less significant than the aforementioned southbound left-turn lane. Nonetheless, increased capacity at all approaches will provide the greatest improvement among all geometric improvements. Thus, *Scenario 9* represents the ideal long-term situation, though its implementation is highly dependent upon right-of-way acquisition.

With increased capacity the intersection should be realigned to correct the skew. This will facilitate a more efficient movement of all vehicle types through the intersection. The township should work with the businesses to provide defined access and egress points instead of the multiple points that exist currently.

Pedestrian amenities need to be improved. Install sidewalks and bus shelters for pedestrian safe travel in the area. Crosswalks should be re-painted in the continental style to make them visible with the appropriate pedestrian signs installed.

Repaint pavement markings and with the improvement install raised pavement markers to enhance visibility at night and during inclement weather.

Follow-up

The findings from the study were presented to stakeholders on February 20, 2007.
On March 26, 2007 a field meeting was held at the intersection with PennDOT personnel and local stakeholders. The purpose of this meeting was the removal of the earthen bank on the west side of Newark Road to allow the construction of an exclusive left turn lane for the southbound Newark Road approach.

In a letter dated May 10, 2007 to the Chester County Planning Commission, the Kennett Area Regional Planning Commission submitted the Newark Road/Old Baltimore Pike intersection improvement as a regional priority for inclusion in PennDOT's Candidate Projects Twelve Year Program.

MERCER

HAMILTON AVENUE (CR 606) AND CHAMBERS STREET (CR 626) INTERSECTION

LOCATION DESCRIPTION

The study location is the intersection of Hamilton Avenue (CR 606) and Chambers Street (CR 626) in the eastern section of the City of Trenton as indicated on ***Figure M1***. This is a signalized intersection with four legs and all types of movements. Chambers Street and Hamilton Avenue are both functionally classified as urban minor arterial roadways and county-owned and maintained. Hamilton Avenue runs in an east-west direction from South Broad Street in the west; it enters Hamilton Township and ends at Nottingham Way (NJ 33) in the east. NJ 33 is a major east-west roadway, which goes from NJ 71 in Bradley Beach in Monmouth County to US 1 in Trenton. Hamilton Avenue traverses several major highways in the region: US 206, NJ 129, South Olden Avenue (CR 622) and I-295. The speed limit along Hamilton Avenue varies, but in the City of Trenton the speed limit is 25 MPH and goes as high as 35 MPH outside the city. Throughout its length the roadway is mainly two travel lanes—one in each direction with additional turning lanes at some intersections. In 2005, an AADT of 13,887 was recorded east of the study location on Hamilton Avenue. Chambers Street runs in a northwest-southeast direction from US 206 to where it crosses the Northeast Corridor Rail Line and becomes Lincoln Avenue and leads into North Clinton Avenue and Perry Street. In addition to US 206, Chambers Street connects to other major roadways—NJ 33 and East State Street (CR 635)—north of the study intersection. There are two travel lanes on Chambers Street with additional turning lanes at select intersections and no shoulders. The roadway width varies, but immediately north of the study intersection it is 49 feet while it carries a width of 40 feet just south of the intersection. The speed limit for the entire length of the roadway is 25 MPH.

As shown in ***Figure M2***, Hamilton Avenue has one approach lane eastbound and one departure lane at the study intersection. Westbound has the same configuration. The Chambers Street northbound and southbound approaches have two lanes and one departure lane. The southbound approaches have a dedicated left-turn lane. Parking is permitted away from the intersection on both sides of Hamilton Street, while on Chambers Street parking is permitted on the west side of the street south of the study intersection. Pedestrian crosswalks are on all four legs of the intersection.

The NJ Transit Route 609 bus serves the study intersection. This bus goes from Mercer County College in West Windsor serving Edinburg Road, Hamilton Avenue, downtown the City of Trenton and terminates at the NJ Department of Transportation offices at Lower Ferry Road. There are 104 trips on this route on a weekday; and the average weekday ridership in March 2005 was 3,333. On Saturdays there are 91 trips, with average ridership in March 2005 at 2,247; while on Sundays there are 32 trips with average ridership of 675 for the same time period.

Figure M1

Congestion and Crash Site Analysis

Study Area

City of Trenton, Mercer Co., NJ

Analysis Area / Intersection

EWING

206 S

206 N

31

1

Assunpink Creek

NJ Transit Northeast Corridor Line

Trenton

GREENWOOD AVE

33

HAMILTON

CR 606 HAMILTON AVE

ANDERSON ST

CR 626 CHAMBERS ST

BROAD ST

129

MERCER CO., NJ

BUCKS CO., PA

NJ Transit River LINE

Morrisville

29

206

Delaware River

0 1,000 2,000

Feet

Delaware Valley Regional
Planning Commission
July 2007

FALLS

295


Figure M2
Congestion and Crash Site Analysis
Existing Lane Configuration
City of Trenton, Mercer Co., NJ
CULBERTSON AVE
CR 626 CHAMBERS ST
MOODY ALY
CR 606 HAMILTON AVE
FRANKLIN ST
CR 626 CHAMBERS ST
0 25 50
Feet
DVRPC Aerial Imagery: Spring, 2005
Delaware Valley Regional
Planning Commission
July 2007

Although the land use in the surrounding area is primarily residential, the intersection is dominated by retail and institutional land uses as shown in ***Figure M3***. Trenton High School is on the northeast corner of the intersection, while St Francis Medical Center is situated on the southeast corner of the intersection and occupies the whole block. Wachovia Bank is located on the northwest corner of the intersection with other commercial land uses adjacent, including an accounting office, restaurant and cleaners. Many of these building are mixed use, with commercial use on the ground floor and residential use above. On the southwest corner there is a restaurant, and adjacent are a liquor store, bakery, accounting office and other businesses. The buildings on this side of the intersection also have mixed uses—residential uses on the upper floors with commercial/retail on the ground floors.

Figure M3

Congestion and Crash Site Analysis

Land Use

City of Trenton, Mercer Co., NJ

EXISTING CONDITIONS

Congestion

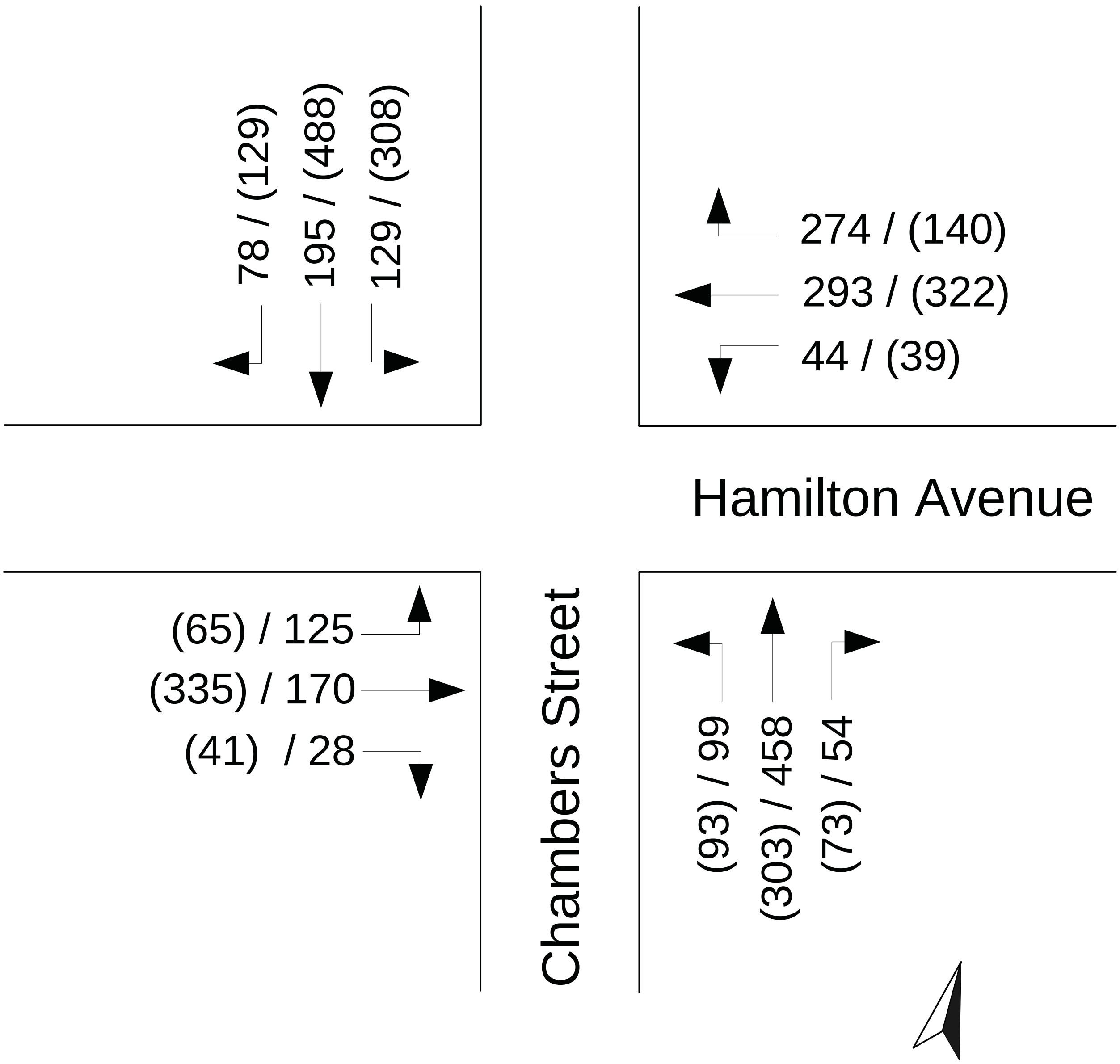
The intersection of Hamilton Avenue and Chambers Street consistently experiences high traffic volumes. As a result there are congested conditions especially during the morning and afternoon peak periods in this location. Hamilton Avenue provides access to the Central Business District of the state capital and can be used as an alternate for NJ 33. Westbound, it provides access to NJ 29 and points north, while eastbound it provides access to I-295 and other points north and south. Additionally, it connects with NJ 33 to access eastern locations.

Turning Movement Counts

Figure M4 shows turning movement counts for morning and afternoon peak periods. From the traffic count data collected in the fall of 2006, the morning peak hour is 7:45 AM to 8:45 AM and the afternoon peak is 4:30 PM to 5:30 PM. During the morning peak hour, approximately 1,947 vehicles traverse the intersection, with the heaviest movements from the northbound and westbound approaches with 611 vehicles each. Forty-eight percent (293 vehicles) constitute a through movement westbound on Hamilton Avenue, while 45 percent (274 vehicles) make a right turn northbound on Chambers Street. On the northbound approach of Chambers Street, 75 percent (458 vehicles) of the traffic continues on Chambers Street through the intersection with 16 percent (99 vehicles) making a left turn for westbound Hamilton Avenue. The southbound approach of Chambers Avenue has the heaviest left turns in the AM peak hour; 32 percent of the traffic on that approach makes a left turn. During the afternoon peak hour 2,436 vehicles traverse the intersection. During this period the southbound approach of Chambers Street and the westbound approach of Hamilton Avenue experience the most traffic. The heaviest movement is the southbound approach of Chambers Street with 925 vehicles in that hour. This more than doubles the morning peak volumes for this approach. Of the other three approaches, only eastbound Hamilton Avenue has higher volumes in the afternoon peak hour than the morning; 36 percent higher. The through movement also doubles for this approach going from 170 vehicles in the AM peak hour to 335 vehicles in the PM peak hour. The left-turn movement was reduced to almost half, from 125 in the AM peak hour to 65 in the PM peak hour. This may be a result of motorists wanting to avoid making left turns from this approach of the intersection, due to the difficulty of making such turns. Left turns are difficult because of heavy through traffic from the opposing approaches. One-third of the vehicles from the southbound approach of Chambers Street make a left turn for eastbound Hamilton Avenue during the PM peak hour.

Figure M4: Turning Movement Diagram

Existing Peak Hour Turning Movement Counts
Chambers Street and Hamilton Avenue



SCHEMATIC NOT TO SCALE

Legend:
AM Volume / (PM Volume)

Peak Hours
AM: 7:45 - 8:45
PM: 4:30 - 5:30

Delaware Valley Regional Planning Commission
July 2007

Level of Service (LOS)

TABLE M1 Existing Intersection Performance					
Chambers Street and Hamilton Avenue					
Scenario	Direction of Travel	2007 Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle			
Existing Conditions		AM Peak (70 sec)		PM Peak (70 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Hamilton Avenue EB	F	352	E	70
	Hamilton Avenue WB	F	102	D	42
	Chambers Street SB	A	8	C	22
	Chambers Street NB	C	30	D	53
	Intersection	F	36	D	41

Source: *DVRPC, 2007*

The level of service analysis for the intersection was conducted using SYNCHRO software for the AM and PM peak periods. ***Table M1*** shows the existing LOS analysis. Currently this intersection is operating with a southbound lead on Chambers Avenue. All other left-turning movements are permissive. The overall LOS for this intersection is F and D during the morning and evening peaks, with average delays of 102 and 41 seconds respectively. In the morning, both approaches of Hamilton Avenue are at LOS F, with the longest delay of 352 seconds at the eastbound approach. Hamilton Avenue is two lanes in each direction with on-street parking. The delay is a result of through traffic not being able to pass left-turning traffic due to the configuration of the intersection and on-street parking. The LOS at the Chambers Street northbound approach is C with 30 seconds of delay, and A with 8 seconds of delay at the southbound approach. The LOS and delay for the afternoon peak at the Hamilton Avenue eastbound approach is E with 70 seconds of vehicle delay; and for the westbound approach it is LOS D with 42 seconds vehicle delay. The LOS and delay on the Chambers Street approaches are greater in the afternoon compared to the morning, with a LOS of D and C and delays of 53 and 22 seconds delay for the northbound and southbound approaches, respectively. This intersection currently has a cycle length of 70 seconds for both the morning and afternoon peak periods.

On-street Parking and Buses

On-street, curbside parking close to the intersection contributes to the high level of congestion in this area. Additionally, buses stop in the travel way for passengers to board or disembark. This further delay traffic and causes major backups at the intersection.

Passengers boarding the NJ Transit Route 609 bus at the intersection
Source: DVRPC, 2007

Vehicles parked at the intersection impede the efficient flow of traffic
Source: DVRPC, 2007

Safety

<u>Crash Analysis</u>
Four years of New Jersey Department of Transportation (NJDOT) crash data was collected and analyzed for the Chambers Street and Hamilton Avenue intersection. ***Table M2*** shows the intersection crash summary for 2002-2005 and compares it the 2005 New Jersey statewide data for county roads.

Table M2 – Intersection Crash Summary (2002 – 2005)

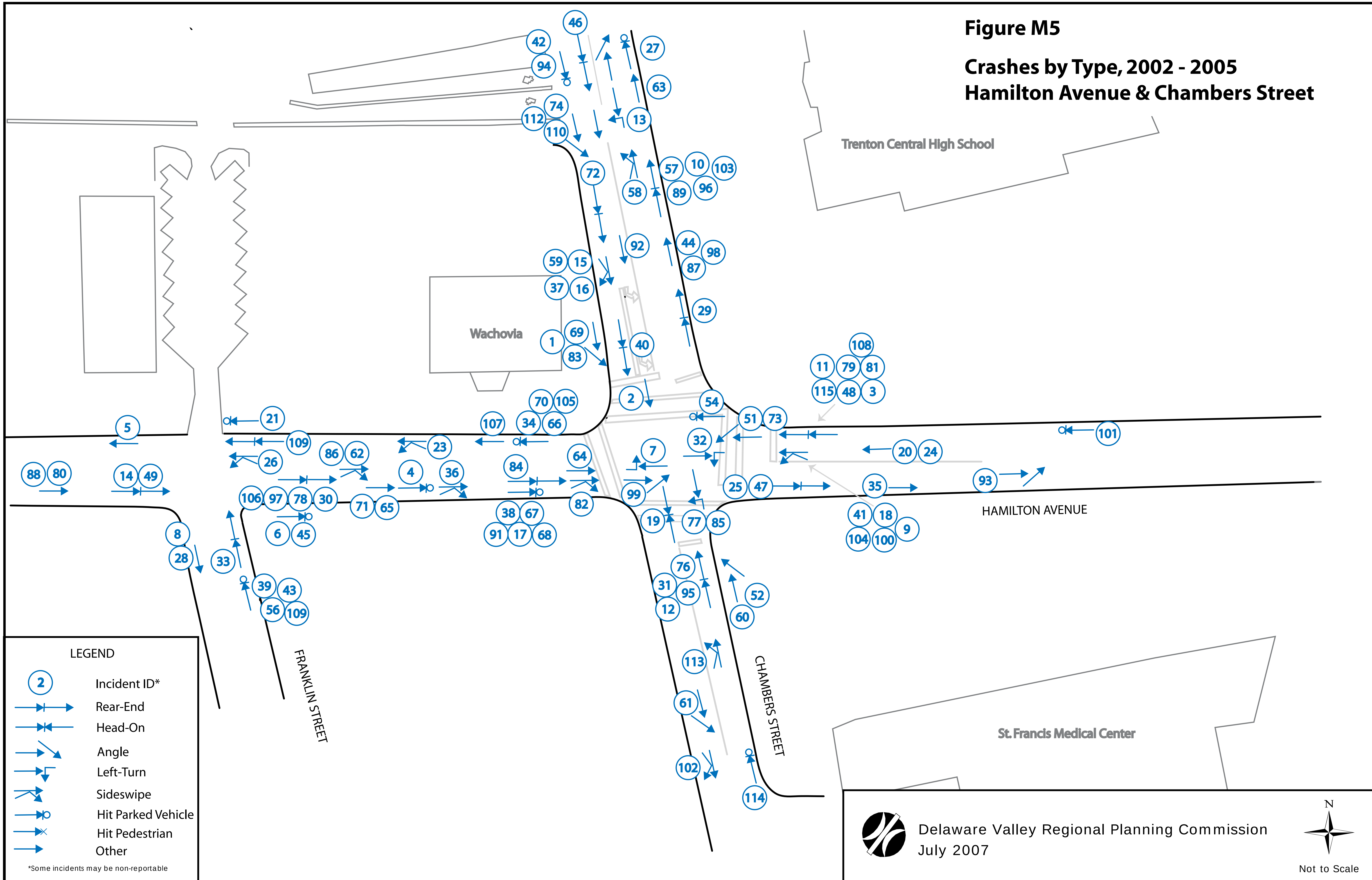
	2002		2003		2004		2005		Total		2005 NJ Statewide County Road
	Crash	%	Crash	%	Crash	%	Crash	%	Crash	%	%
Crashes											
Reportable	31	27%	31	27%	29	25%	24	21%	115	100%	N/A
Severity											
Fatalities	0	0%	0	0%	0	0%	0	0%	0	0%	0.25%
Injuries	2	6%	5	16%	8	28%	5	21%	20	17%	29.33%
PDO	29	94%	26	84%	21	72%	19	79%	95	83%	70.42%
Crash Type											
Rear End	9	29%	9	29%	9	31%	8	33%	35	30%	29.82%
Hit Parked Vehicle	5	16%	7	23%	5	17%	5	21%	22	19%	5.97%
Other	7	23%	4	13%	7	24%	3	13%	21	18%	4.38%
Sideswipe	6	19%	5	16%	2	7%	4	17%	17	15%	11.07%
Angle	1	3%	5	16%	4	14%	4	17%	14	12%	20.18%
Left Turn	2	6%	1	3%	2	7%	0	0%	5	4%	6.69%
Head On	1	3%	0	0%	0	0%	0	0%	1	1%	2.58%
Lighting Conditions											
Daylight	18	58%	21	68%	22	76%	18	75%	79	69%	71.38%
Dark	12	39%	9	29%	7	24%	5	21%	33	29%	27.99%
Unknown	1	3%	0	0%	1	3%	1	4%	3	3%	0.63%
Weather Conditions											
Clear	23	74%	20	65%	24	83%	19	79%	86	75%	N/A
Rainy	6	19%	10	32%	5	17%	4	17%	25	22%	N/A
Wintry	1	3%	1	3%	0	0%	1	4%	3	3%	N/A
Other	1	3%	0	0%	0	0%	0	0%	0	0%	N/A
Road Surface Conditions											
Dry	23	74%	18	58%	24	83%	17	71%	82	71%	74.49%
Wet	7	23%	10	32%	5	17%	5	21%	27	23%	19.09%
Icy	2	6%	1	3%	0	0%	2	8%	5	4%	6.02%
Unknown	1	3%	0	0%	0	0%	0	0%	1	1%	0.39%

Source: New Jersey DOT Crash Database (2002 – 2005)

There were a total of 115 reportable crashes for the four-year period. Reportable crashes are crashes that result in a fatality, injury, and/or property damage of $500 or more. There were no fatal crashes, however, there were 20 injury crashes and 95 crashes resulting in property damage only. Injury crashes at this intersection were

Figure M5

Crashes by Type, 2002 - 2005
Hamilton Avenue & Chambers Street



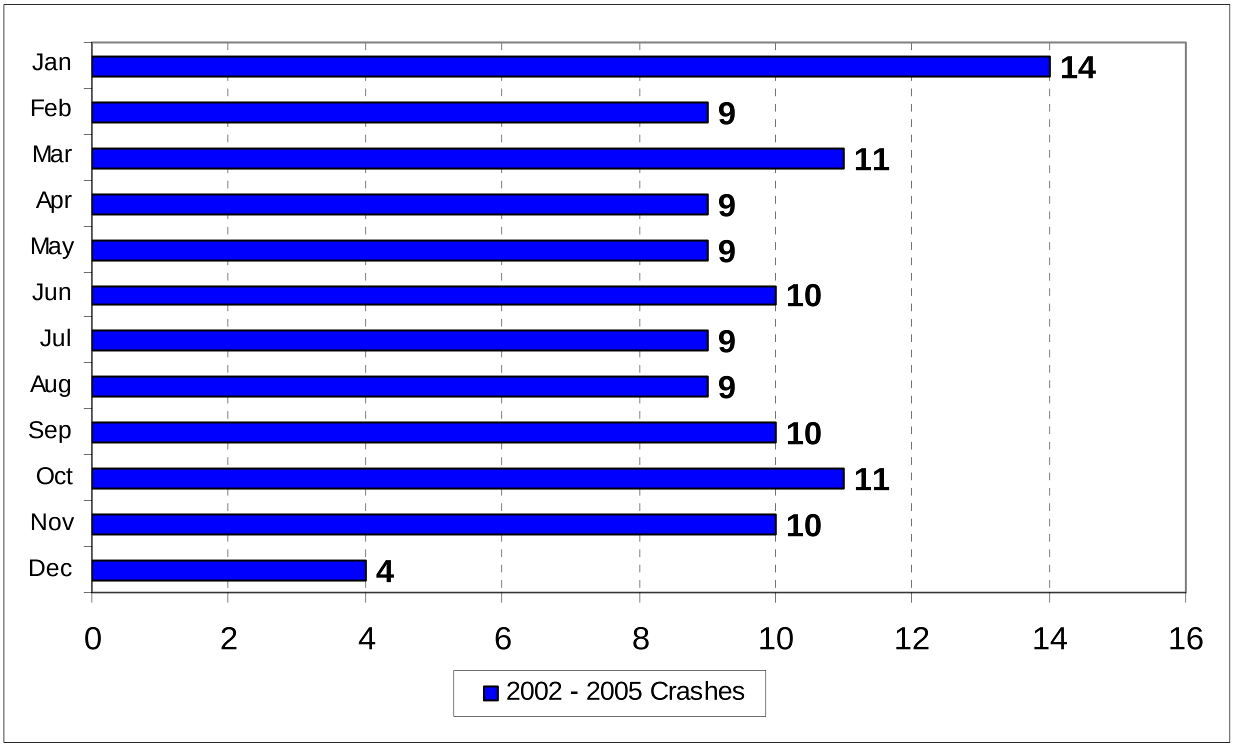
below the statewide average of 29.33 percent. However the property-damage-only crashes represented 83 percent of all crashes, which is above the statewide average of 70.42 percent. The high number of property-damage-only crashes, which represents the lowest level of severity in the database, may be attributed to the lower speed limit and congestion at the study location.

During this study period there were 31 crashes in both 2002 and 2003 (27 percent); 29 crashes in 2004 (25 percent) and 24 crashes in 2005 (15 percent). The most common types of crashes were rear ends and hit parked vehicles, 35 and 22 crashes, respectively. Rear-end crashes accounted for 30 percent of the total number of crashes, which was about the same as the statewide average (29.82 percent); while hit-parked-vehicle crashes at 19 percent was significantly higher than the 5.97 percent statewide average. As shown in the collision diagram in ***Figure M5***, several of the rear-end and hit-parked-vehicle crashes were located along Hamilton Avenue. Other types of crashes at this intersection included 17 sideswipes, 14 angle, 5 left turns, and 1 head on. Angle and left-turn crash averages were lower than the 2005 statewide averages. The high number of rear-end crashes are indicative of a congestion issue at this location.

Over the four-year period, 79 of the 115 crashes occurred in daylight conditions. This 69 percent average is comparable to the 2005 statewide average of 71 percent. Thirty-three crashes occurred under dark conditions. As indicated in ***Table M2***, 86 crashes occurred under clear conditions, 25 crashes occurred under rainy conditions, and 3 crashes occurred under wintry weather conditions. These represented 75 percent, 22 percent, and 3 percent of the crashes respectively. A similar trend is shown for dry, wet, and icy roadway conditions. In comparison with the road surface condition statewide data, the crashes at this intersection were the same with the statewide averages.

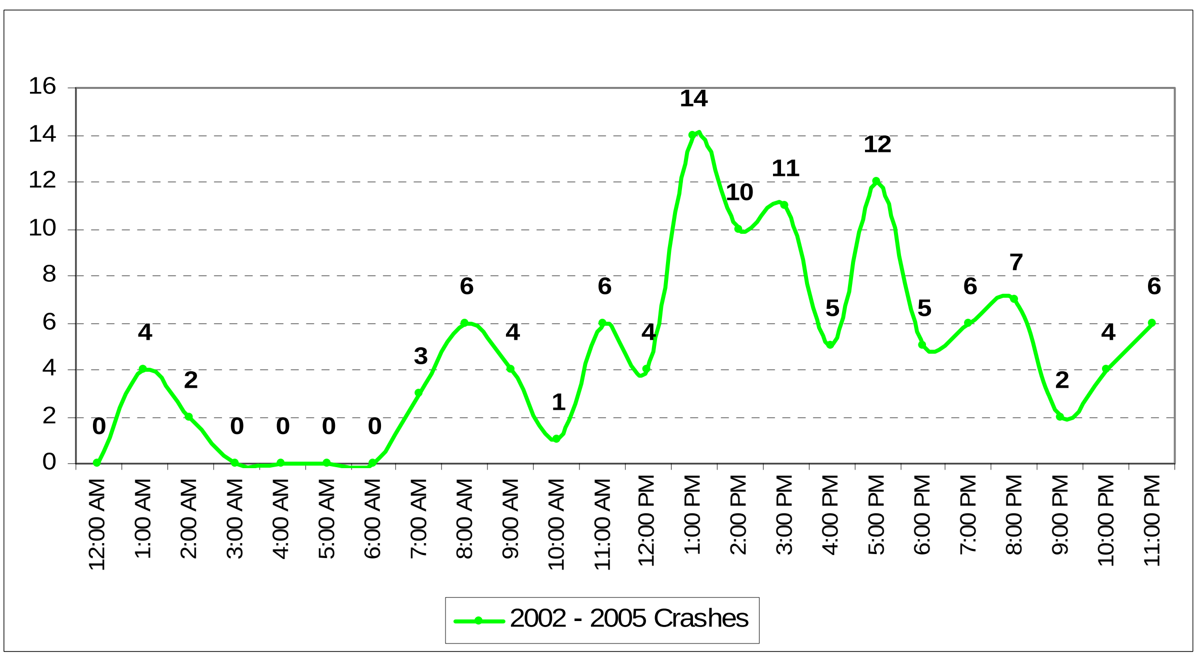
Figure M6 shows the monthly breakdown of crashes over the four-year study period. January had the highest number of crashes with 14, and December had the lowest amount of crashes with 4. Overall, the number of crashes ranged between 9 and 11 crashes by month for the study period. The line graph in ***Figure M7*** shows crashes distributed over the course of a day. Nearly 71 percent of the crashes occurred between the hours of 1 PM and midnight. The majority of the crashes did not occur during the morning or afternoon peak hours. Thirty-five crashes occurred during the midday hours, between 1 PM and 3 PM. Most of these crashes were hit-parked-vehicles, rear-end and angle collisions, which took place along Hamilton Avenue during weekdays. According to the data, driver actions that attributed to the crashes included obstructed view, backing, following too closely, and 21 were due to driver inattention.

Figure M6 – Crash Summary by Month



Source: New Jersey Department of Transportation Crash Database (2002 – 2005)

Figure M7 – Crashes by Time of Day



Source: New Jersey Department of Transportation Crash Database (2002 – 2005)

Pedestrian
Pedestrian amenities are available and in fairly good condition, but the pavement markings for the crosswalks need to be upgraded.

Jaywalking is prevalent in the study area. Pedestrians were observed crossing the roadway from mid-block locations to access commercial and retail establishments on the opposite side of the road.

Students crossing Chambers Street in front of school
Source: *DVRPC, 2007*

Students crossing Chambers Street in front of school between moving vehicles
Source: *DVRPC, 2007*

When the Trenton High School dismisses in the afternoons there is complete chaos in and around the study area. Disregarding vehicular traffic, students cross Chambers Street along school frontage. This creates congestion and an unsafe environment in the area.

OPPORTUNITY AND CONSTRAINTS

The intersection of Hamilton Avenue and Chambers Street is congested due to high traffic volumes. This situation is exacerbated by curbside, on-street parking on Hamilton Avenue west of the intersection and New Jersey Transit buses that serve the intersection. Although much of the traffic is through traffic, there are a number of traffic generators and attractors around the intersection that makes it a destination also. With the St. Francis Hospital poised to move its main entrance to Chambers Street and the City of Trenton's plans to revitalize the area, there will be more traffic traversing the intersection, adding to the existing congestion.

On-street parking that serves commercial activity around the intersection limits capacity increase; but county-owned right-of-way, currently used for wide sidewalks and parking adjacent to businesses on the northwest side of Hamilton Avenue, can be utilized with little effort.

Heavy pedestrian activity in the area is generated by the adjacent land uses. Pedestrian amenities in most cases are minimal. Crosswalks are currently two parallel lines that are hardly visible to the motorists. Jaywalking is prevalent among school children, as well as adults accessing businesses in the area. Bus passengers are exposed to the elements as they wait to board a bus. The opportunity exists for upgrading existing and installing new pedestrian amenities.

POTENTIAL IMPROVEMENT SCENARIOS

Eight potential improvement scenarios have been developed and considered to potentially alleviate congestion at the intersection and at the same time improve safety. These used the existing traffic counts and compared them to present day conditions. In an effort to analyze how the intersection would operate in the future, a 2030 growth rate from *DVRPC Conformity Findings Report, December 2006* was utilized. For each scenario, SYNCHRO software analysis was used to determine the LOS and delay for both the existing and future conditions.

Scenario 1

Characteristics

- Optimize the signal timing for the morning and afternoon peak periods.

Advantages

- There are no associated costs for hardware.
- Optimization can be implemented immediately.

Disadvantages

- Hamilton Avenue approaches have only one lane in each direction. Through traffic is blocked by left-turning traffic.

Level of Service Analysis

The optimization results in enhanced operation and efficiency of the intersection, improving the overall LOS for both the AM and PM to a LOS D. The cycle length is increased to allow more time on the approaches in order to get more vehicles to move through the intersection. The overall delay in the morning is reduced from 102 seconds to 42 seconds. As shown in ***Table M3*** the majority of the relief is given along Hamilton Avenue in both the morning and afternoon. The LOS and delay on Chambers Street is slightly increased.

Scenario 2

Characteristics

- Add exclusive left-turn lanes on all approaches of the intersection.
- Eliminate the southbound approach lead phase for Chambers Street.
- Left turns for all intersection approaches will be permissive.
- Remove on-street, curbside parking along Hamilton Avenue to the west of the intersection to Franklin Street.
- Replace on-street, curbside parking with angled parking on the northwest side of Hamilton Avenue on county-owned reserved right-of-way.
- Move parking on Hamilton Avenue east of the intersection beyond the high school playground fence.
- Install bus pull-out with shelter at the high school walkway adjacent to the fence.

TABLE M3
Intersection Performance for Existing and Alternative Scenarios
Chambers Street and Hamilton Avenue

Scenario	Direction of Travel	2007 Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle			
Existing Conditions		AM Peak (70 sec)		PM Peak (70 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Hamilton Ave. EB	F	352	E	70
	Hamilton Ave. WB	F	102	D	42
	Chambers St. SB	A	8	C	22
	Chambers St. NB	C	30	D	53
	Intersection	F	36	D	41
Scenario 1 - Signal Optimization		AM Peak (90 sec)		PM Peak (90 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Hamilton Ave. EB	E	66	D	46
	Hamilton Ave. WB	D	36	C	33
	Chambers St. SB	B	16	C	32
	Chambers St. NB	D	53	D	46
	Intersection	D	42	D	38
Scenario 2 - Left Turns on All Approaches without SB Lead		AM Peak (70 sec)		PM Peak (70 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Hamilton Ave. EB	D	35	C	27
	Hamilton Ave. WB	B	18	C	29
	Chambers St. SB	C	26	C	29
	Chambers St. NB	C	26	B	14
	Intersection	C	25	C	26

TABLE M3 (continued)
Intersection Performance for Existing and Alternative Scenarios
Chambers Street and Hamilton Avenue

Scenario	Direction of Travel	2007 Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle			
Scenario 3 - With SB Lead		AM Peak (100 sec)		PM Peak (75sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Hamilton Ave. EB	D	54	C	34
	Hamilton Ave. WB	C	26	D	36
	Chambers St. SB	B	20	B	18
	Chambers St. NB	E	59	C	35
	Intersection	D	40	C	29
Scenario 4 - With Protected NB and SB		AM Peak (110 sec)		PM Peak (85 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Hamilton Ave. EB	D	54	E	57
	Hamilton Ave. WB	C	27	E	58
	Chambers St. SB	E	61	D	44
	Chambers St. NB	E	78	D	51
	Intersection	D	55	D	51
Scenario 5 - EB Lead Only		AM Peak (90 sec)		PM Peak (90 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Hamilton Ave. EB	D	36	C	28
	Hamilton Ave. WB	D	49	E	58
	Chambers St. SB	C	22	D	35
	Chambers St. NB	C	25	B	18
	Intersection	C	34	D	35

TABLE M3 (continued)
Intersection Performance for Existing and Alternative Scenarios
Chambers Street and Hamilton Avenue

Scenario	Direction of Travel	2007 Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle			
Scenario 6 - With Protected EB and WB		AM Peak (90 sec)		PM Peak (85sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Hamilton Ave. EB	E	62	E	57
	Hamilton Ave. WB	E	65	E	61
	Chambers St. SB	C	25	D	36
	Chambers St. NB	C	26	B	18
	Intersection	D	44	D	42
Scenario 7 - EB and SB Lead		AM Peak (90 sec)		PM Peak (90 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Hamilton Ave. EB	D	37	C	26
	Hamilton Ave. WB	E	62	D	51
	Chambers St. SB	B	16	C	32
	Chambers St. NB	D	53	D	45
	Intersection	D	46	D	38
Scenario 8 - All Left Turns Protected		AM Peak (120 sec)		PM Peak (95 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Hamilton Ave. EB	E	69	E	70
	Hamilton Ave. WB	E	76	E	76
	Chambers St. SB	D	54	E	55
	Chambers St. NB	E	64	E	60
	Intersection	E	67	E	63

Source: *DVRPC, 2007*

Advantages

- Safer and more efficient left-turning movement.
- Increased traffic flow of through movement at the intersection.
- Bus pull-out eliminates the need for buses to stop in the travel way.

- Bus shelter keeps passenger out of inclement weather while waiting for the bus.

Disadvantages

- Elimination of parking spaces along the Hamilton Avenue approaches will be an issue for businesses in the area.
- Angled parking requires vehicles to back into travel lane to vacate parking space.
- Utilizing parking spaces on Franklin Street north of Hamilton Avenue may be inconvenient, especially for the elderly and handicapped needing to access businesses closer to the Hamilton Avenue/Chambers Street intersection.

Level of Service Analysis

As shown in ***Table M3*****,** the overall LOS for this scenario is a C with 25 and 26 seconds vehicle delay for the morning and afternoon peak periods, respectively. With the exception of northbound Chambers Street, all the intersection approaches significantly improve in LOS and seconds of delay in both the morning and afternoon peak periods. The greatest reduction is shown in the morning peak at the Hamilton Avenue approaches due to the removal of on-street parking. This allows for the exclusive left and through lanes. The cycle length for this scenario is 70 seconds.

Scenario 3

Characteristics

- Same as *Scenario 2*.
- Southbound Chambers Street gets lead phase as the existing configuration.

Advantages

- Same as *Scenario 2*.
- Southbound Chambers Street with high afternoon peak traffic volumes will move through the intersection more efficiently.

Disadvantages

- Same as *Scenario 2*.
- Will increase the overall cycle length of intersection.

Level of Service Analysis

This intersection is generally improved with a LOS D and C with 40 and 29 seconds vehicle delay for the morning and afternoon peak periods, respectively, as depicted in ***Table M3***. During the morning peak period, most of the benefit is for Hamilton Avenue. However, the delay along Chambers Street increases in both directions from 30 to 59 seconds in the northbound direction, and from 8 to 20 seconds in the southbound direction. In the afternoon peak period, all approaches of the intersection show a decrease in the vehicle seconds of delay. In order to accommodate this improvement, the cycle length was increased to 100 seconds in the morning and 75 seconds in the afternoon.

Scenario 4

Characteristics

- Same as *Scenario 3*.
- Chambers Street approaches have protected left-turn phase.

Advantages

- Same as *Scenario 3*.
- Conflict from left-turning traffic from Chambers Street onto Hamilton Avenue is minimized.

Disadvantages

- Same as *Scenario 3*.

Level of Service Analysis

From the SYNCHRO analysis, and shown in ***Table M3***, the overall LOS is decreased only for the morning peak period, but the overall delay has increased by 19 seconds. This scenario benefits Hamilton Avenue approaches in the morning peak, which decreases from LOS F with 352 and 102 seconds of delay to LOS D and C with 54 and 27 seconds of delay. The LOS on Chambers Street increases to an E with a delay of 78 and 61 seconds in the northbound and southbound direction respectively. In the afternoon, the overall LOS for the intersection is D and the delay increases by 10 seconds from the existing conditions. The only decrease in delay is on the eastbound Hamilton Avenue approach from 70 seconds to 57 seconds of delay. The northbound approach is about the same with existing conditions; and the westbound Hamilton Avenue and southbound Chambers Street increase in LOS and delay from a D (42 seconds) and C (22 seconds) to a E (58 seconds) and D (44 seconds) respectively. With this scenario, the cycle length was increased to 110 seconds in the morning and 85 seconds in the afternoon.

Scenario 5

Characteristics

- Same as *Scenario 2*.
- Eastbound Chambers Street approach gets a lead left-turn phase.

Advantages

- Same as *Scenario 2*.
- Safer left-turn movement of left-turning traffic from eastbound Hamilton Avenue onto Chambers Street.
- More efficient movement of traffic on the eastbound approach of Hamilton Avenue.

Disadvantages

- Same as *Scenario 3.*

Level of Service Analysis
The LOS for this intersection with this scenario is C and D in the morning and afternoon peak periods, respectively, shown in ***Table M3***. With the exception of the Hamilton Avenue westbound approach during the afternoon peak, Hamilton Avenue approaches are more efficient in both the morning and afternoon peak periods. Northbound Chambers Street will experience an improvement in throughput, but there is a decline in the efficiency for the southbound movement. With this scenario the cycle length is 90 seconds for both peak hours.

Scenario 6
Characteristics
- Same as *Scenario 3.*
- Hamilton Avenue approaches have protected left-turn phase.
- Chambers Street left turns are permissive only.

Advantages
- Same as *Scenario 2.*
- Conflict from left-turn movement from Hamilton Avenue onto Chambers Street is minimized.

Disadvantages
- Same as *Scenario 2.*
- Will increase the overall cycle length of intersection.

Level of Service Analysis
Based on the SYNCHRO analysis, the overall LOS is a D for both the morning and afternoon peak hour. With this scenario, the delays at the Hamilton Avenue approaches and the northbound Chambers Street approach are decreased to 62, 65, and 26 seconds in the morning peak hour. ***Table M3*** shows the delay on the southbound Chambers Street approach is increased from 8 seconds to 25 seconds in the morning peak period. During the afternoon peak hour, Hamilton Avenue approaches are LOS E with 57 and 61 seconds in vehicle delay. The LOS and delay on the northbound approach of Chambers Street is reduced from LOS D and 53 seconds to LOS B and 18 seconds delay. The southbound approach on Chambers increases by 14 seconds to a LOS D. With this scenario, the cycle length was increased to 91 seconds in the morning and 85 seconds in the afternoon.

Scenario 7
Characteristics
- Same as *Scenario 6*.
- Hamilton Avenue eastbound and Chambers Street southbound approaches have protected left-turn phases.
- All other approaches left turns are permissive only.

Advantages
- Same as *Scenario 6.*

- Conflicts from left-turn movement from eastbound Hamilton Avenue onto Chambers Street is minimized.
- Conflicts from left-turn movement from southbound Chambers Street onto Hamilton Avenue is minimized.
- More efficient movement of traffic on the eastbound approach of Hamilton Avenue.
- More efficient movement of traffic on the southbound approach of Chambers Street.

Disadvantages

- Same as *Scenario 6.*
- Will increase the overall cycle length of the intersection.

Level of Service Analysis
Based on the SYNCHRO analysis, the overall LOS for this intersection is D in both the morning and afternoon peak hours. As shown in ***Table M3***, the morning delay on Hamilton Avenue is greatly reduced to 37 and 67 seconds of delay on the eastbound and westbound approaches, respectively. The delay on Chambers Street is increased by 33 and 8 seconds on the northbound and southbound approaches of the intersection, respectively. In the afternoon peak period, the LOS and delay on the eastbound Hamilton Avenue and northbound is reduced to LOS C (26 seconds) and LOS D (45 seconds), respectively. The increase in delay on the westbound and southbound approaches of the intersection ranged from 9 to 10 seconds. With this scenario, the cycle length is 90 seconds for both peak hours.

Scenario 8
Characteristics

- Same as *Scenario 6.*
- Left turns at all approaches have protected phase

Advantages

- Same as *Scenario 6*.
- Conflicts from left-turn movements on all approaches are minimized.
- More orderly flow of traffic through the intersection.

Disadvantages

- Same as *Scenario 6.*
- Will increase the overall cycle length of the intersection.

Level of Service Analysis
As shown in ***Table M3*****,** the overall LOS for this intersection is E in both the morning and afternoon peak hours. During the morning and afternoon peak hour, the Hamilton Avenue approach is LOS E, with delays of 69 and 76 seconds. Based upon the SYNCHRO analysis, the LOS and delay on both legs of Chambers Street is greater than the existing conditions. The LOS and delay on Chambers Street in the morning is increased by 34 and 46 seconds on the northbound and southbound approaches,

respectively. With this scenario, the cycle length is 120 seconds in the morning and 95 seconds in the afternoon.

Projected 2030 Traffic Conditions

As mentioned earlier, a 2030 growth rate from *DVRPC Conformity Findings Report, December 2006* was utilized to analyze how the intersection would operate in the future. For each scenario, future LOS and vehicle delay was determined using SYNCHRO software and the projected traffic counts.

Table M4 shows the result of this analysis. If no changes are made to the signal and the intersection configuration in the year 2030, the operation of the intersection would deteriorate. This is especially so for the Hamilton Avenue approaches. For all eight potential improvement scenarios, the level of service deteriorated with associated increases in vehicle delays. Although *Scenario 2* shows the shortest delay of the scenarios analyzing both morning and afternoon peak periods, *Scenario 5* in the morning peak period shows the least amount of change in delay between existing and future conditions.

The cycle length was increased in the optimization of the signal timings for all the 2030 scenarios.

SYNCHRO output for the existing and future year 2030 potential improvement scenarios analyses are shown in **Appendix E.**

Eastbound Hamilton Avenue left-turning vehicles trapped in the middle of the intersection against the signal
Source: DVRPC, 2007

TABLE M4
Intersection Performance for Existing and Alternative Scenarios - 2030
Chambers Street and Hamilton Avenue

Scenario	Direction of Travel	2030 Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle			
Existing Conditions		AM Peak (70 sec)		PM Peak (70 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Hamilton Ave. EB	F	618	F	134
	Hamilton Ave. WB	F	161	E	71
	Chambers St. SB	A	9	C	29
	Chambers St. NB	D	42	F	82
	Intersection	F	168	E	68
Scenario 1 - Signal Optimization		AM Peak (90 sec)		PM Peak (90 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Hamilton Ave. EB	F	147	F	83
	Hamilton Ave. WB	D	54	D	47
	Chambers St. SB	B	19	D	54
	Chambers St. NB	E	79	E	77
	Intersection	E	70	E	62
Scenario 2 - Left Turns on All Approaches without SB Lead		AM Peak (100 sec)		PM Peak (75 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Hamilton Ave. EB	F	105	D	50
	Hamilton Ave. WB	C	27	D	51
	Chambers St. SB	E	57	D	39
	Chambers St. NB	D	35	B	16
	Intersection	D	49	D	39

TABLE M4 (continued) **Intersection Performance for Existing and Alternative Scenarios - 2030**					
Chambers Street and Hamilton Avenue					
Scenario	**Direction of Travel**	**2030 Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle**			
Scenario 3 - With SB Lead		AM Peak (130 sec)		PM Peak (90sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Hamilton Ave. EB	F	81	D	46
	Hamilton Ave. WB	C	31	D	47
	Chambers St. SB	D	43	C	30
	Chambers St. NB	F	92	D	40
	Intersection	E	61	D	39
Scenario 4 - With Protected NB and SB		AM Peak (140 sec)		PM Peak (95 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Hamilton Ave. EB	F	95	E	63
	Hamilton Ave. WB	C	34	E	57
	Chambers St. SB	F	83	E	68
	Chambers St. NB	F	114	E	71
	Intersection	E	79	E	66
Scenario 5 - EB Lead Only		AM Peak (90 sec)		PM Peak (110 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Hamilton Ave. EB	D	46	D	41
	Hamilton Ave. WB	E	71	F	94
	Chambers St. SB	D	44	D	51
	Chambers St. NB	C	31	C	23
	Intersection	D	48	D	53

TABLE M4 (continued)
Intersection Performance for Existing and Alternative Scenarios - 2030
Chambers Street and Hamilton Avenue

Scenario	Direction of Travel	2030 Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle			
Scenario 6 - With Protected EB and WB		AM Peak (100 sec)		PM Peak (115 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Hamilton Ave. EB	E	76	F	90
	Hamilton Ave. WB	F	98	F	104
	Chambers St. SB	D	49	D	52
	Chambers St. NB	C	33	C	24
	Intersection	E	64	E	65
Scenario 7 - EB and SB Lead		AM Peak (120 sec)		PM Peak (110 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Hamilton Ave. EB	D	53	D	35
	Hamilton Ave. WB	F	85	E	65
	Chambers St. SB	C	30	E	55
	Chambers St. NB	E	68	E	61
	Intersection	E	63	D	55
Scenario 8 - All Left Turns Protected		AM Peak (130 sec)		PM Peak (115 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Hamilton Ave. EB	E	72	F	81
	Hamilton Ave. WB	F	106	F	101
	Chambers St. SB	E	69	E	79
	Chambers St. NB	F	97	F	89
	Intersection	F	90	F	86

Source: *DVRPC, 2007*

Recommendations

Congestion is an issue at the Hamilton Avenue/Chambers Street intersection, especially during the peak periods. As a result of the existing congestion issues, safety is compromised. Studies have shown that traffic congestion is one of the main causes of aggressive driving. This is translated here into crashes of the types discussed previously. Given the heavy pedestrian traffic in the study area, pedestrian safety needs to be addressed.

Recommended strategies are short- and medium-term, which attempt to achieve the balance between moving traffic efficiently through the intersection and doing so safely.

Short Term

- Optimize the traffic signal timing. Although this results in an increase in cycle length, overall flow of traffic through the intersection is improved.
- To facilitate through movement from the eastbound approach when blocked by left-turning vehicles, the “No Parking” area on the southwest corner of the intersection on Hamilton Avenue should be strictly enforced.
- Existing parking on Hamilton Avenue east of the intersection should be eliminated to the high school playground fence. This would facilitate the installation of a bus pull-out with shelter at the high school walkway adjacent to the fence for the convenience of pedestrians. This will take the buses out of the travel lane when passengers are boarding or disembarking.

Existing Intersection
Source: DVRPC, 2007

Rendering of Proposed Improvements
Source: DVRPC, 2007

- Currently, the crosswalks at the intersection are faded and hardly visible. Upgrade intersection crosswalks to continental style or colored concrete to make them more visible to motorists.

- Install crosswalk across Hamilton Avenue at Franklin Street to accommodate patrons of the south side of Hamilton Avenue businesses who park in the spaces on Franklin Street.
- Students from the high school cross Chambers Street directly in front of the school, which is an unsafe practice. This disrupts the flow of traffic. Install continental or colored concrete crosswalk with appropriate signs in front of high school to accommodate students and be more visible to motorists.
- A number of cyclists were observed in the study area and there are no bike lanes. Install “Share the Road” signs in the study area.
- North of Hamilton Avenue, Chambers Street northbound lane is too wide. The wide lane encourages motorists to speed. Install a painted shoulder on the east side of Chambers Street. This will narrow the lane and encourage slower speeds. The shoulder can be used as a bike lane.

Figure M8 shows a rendering of proposed improvements to the study intersection

Medium Term

- Eliminate on-street curbside parking along the south side of Hamilton Avenue to the west of the intersection to Franklin Street.
- Widen Hamilton Avenue to the west of the intersection to Franklin Street utilizing county-owned reserved right-of-way to accommodate three lanes—one through lane in each direction and an exclusive left-turn lane and parking.
- Add exclusive left-turn lanes to the westbound intersection approach of Hamilton Avenue and northbound intersection approach of Chambers Street.
- According to the SYNCHRO analysis, having left turns for all intersection approaches as permissive with a 70-second cycle length operates the most efficiently (*Scenario 2*). Given the high volume of left turns this may not be the safest option since left turns are not protected. Therefore, southbound Chambers Street should continue to be given a lead phase and eastbound Hamilton Avenue should have an actuated protected phase.
- Signal heads should be upgraded with back plates installed. Replace existing pedestrian signal heads with pedestrian countdown heads.

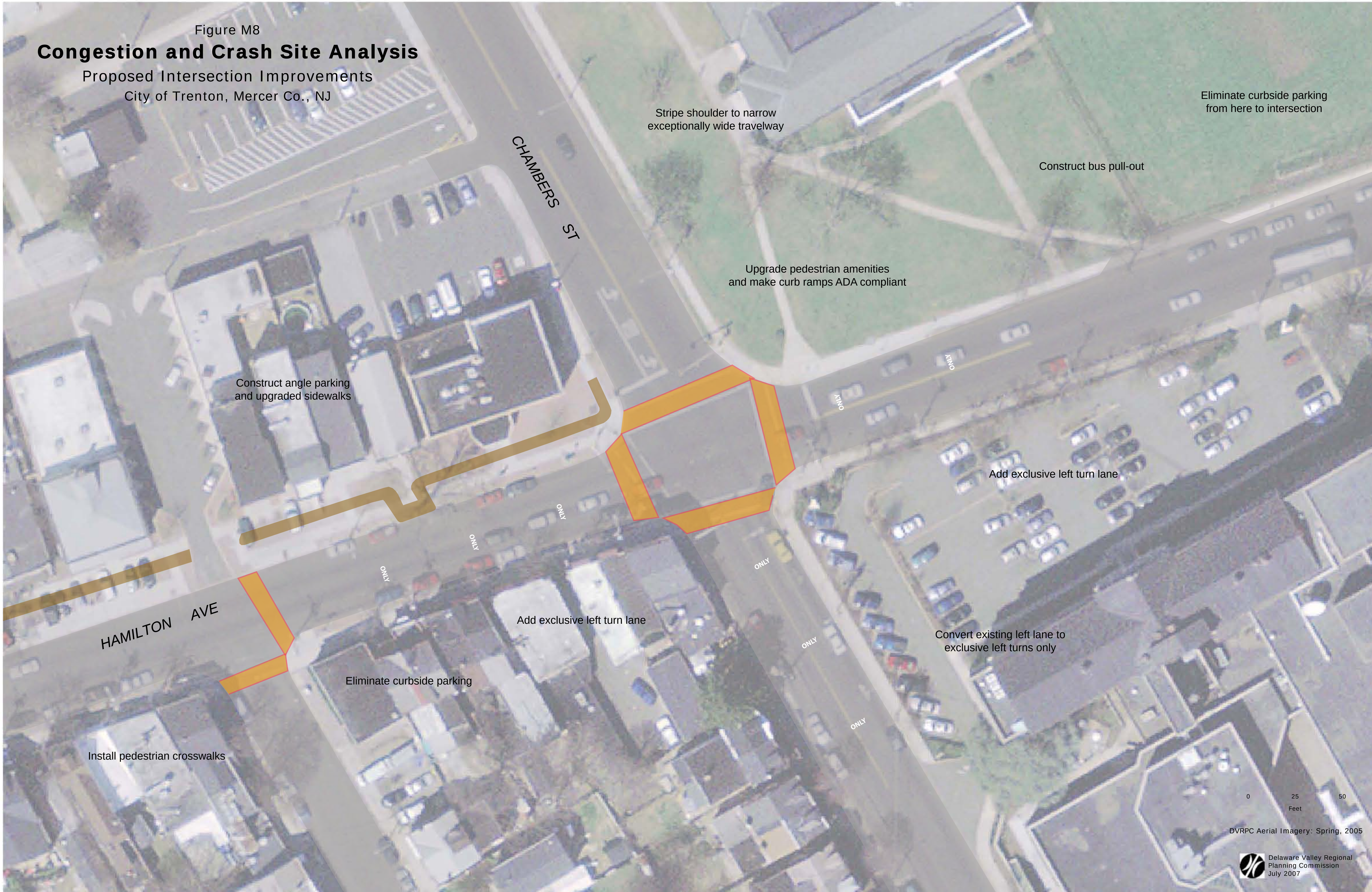


Figure M8

Congestion and Crash Site Analysis

Proposed Intersection Improvements

City of Trenton, Mercer Co., NJ

Existing parking on north side of Hamilton Avenue
Source: DVRPC, 2007

Rendering of recommended parking on north side of Hamilton Avenue
Source: DVRPC, 2007

CIRCULATION

At the request of the stakeholders, circulation in and around the study area was examined. Collected data was limited, therefore assessment is based on field observations, field measurements and conversations with the City of Trenton.

North Anderson Street is narrow. Left-turning movement from North Anderson Street to Hamilton Avenue is difficult, especially during the afternoon peak period. Improvements to the Chambers Street/Hamilton Avenue intersection will alleviate backups, which assists the movement of traffic from North Anderson Street. Additionally, making a right turn from Hamilton Avenue onto North Anderson Street is problematic because of the tight radius and narrow roadway. This problem is exacerbated if a vehicle is waiting to leave North Anderson Street. Given the constraints, ideally this should be made one way northbound; but this would be problematic for Culbertson Avenue (one way eastbound) residents needing to access Hamilton Avenue westbound.

Baldassari Lane has a width of approximately 13 feet. It carries two-way traffic and at the Chambers Avenue intersection it gets confusing with the Wachovia Bank drive-through teller lanes. Converting Baldasarri Lane to one way eastbound would complement the one way eastbound of Culbertson Avenue.

Washington Street and Anderson Street join together as one before coming to the intersection at Hamilton Avenue. Both roadways are two-way, resulting in conflict due to multiple movements. Convert Washington Avenue from Kent Street north to one way northbound and Anderson Street from Hamilton Avenue to Kent Street one way southbound. Construct a slip road south of the park as shown on ***Figure M9*** to accommodate traffic from Washington Avenue accessing Anderson Street.

There is heavy pedestrian traffic in the area. For their accommodation, and to get the attention of motorists of pedestrian activity, install continental crosswalks with the appropriate signs along Hamilton Avenue as shown on ***Figure M9***.

Figure M9
Congestion and Crash Site Analysis
Proposed Circulation Improvements
City of Trenton, Mercer Co., NJ

HAMILTON AVENUE (CR 606) AND CHESTNUT STREET (CR 626) INTERSECTION

Utilizing NJDOT crash data, an analysis was done of the Hamilton Avenue/Chestnut Street intersection for the years 2003, 2004 and 2005. ***Table M5*** shows the crash data and compares it to the New Jersey statewide average for county roads.

Table M5 – Intersection Crash Summary (2003 – 2005)

	2003		2004		2005		Total		2005 NJ Statewide Average
	Crash	**%**	**Crash**	**%**	**Crash**	**%**	**Crash**	**%**	**County Rd**
Crashes									
Reportable	37	45%	29	35%	15	18%	82	100%	N/A
Severity									
Fatalities	0	0%	0	0%	0	0%	0	0%	0.22%
Injuries	17	46%	12	41%	4	27%	33	40%	29.33%
PDO	20	54%	17	59%	11	73%	48	59%	70.42%
Crash Type									
Rear End	4	11%	4	14%	0	0%	8	10%	29.82%
Hit Parked Vehicle	4	11%	1	3%	0	0%	5	6%	5.97%
Other	3	8%	3	10%	3	20%	9	11%	4.38%
Sideswipe	2	5%	2	7%	2	13%	6	7%	11.07%
Angle	20	54%	18	62%	6	40%	44	54%	20.18%
Left Turn	1	3%	1	3%	4	27%	6	7%	6.69%
Pedestrian	4	11%	4	14%	0	0%	8	10%	1.87%
Lighting Conditions									
Daylight	22	59%	25	86%	10	67%	57	70%	71.38%
Dark	14	38%	4	14%	5	33%	23	28%	27.99%
Unknown	1	3%	2	7%	0	0%	3	4%	0.63%
Weather Conditions									
Clear	29	78%	24	83%	11	73%	64	78%	N/A
Rainy	8	22%	5	17%	0	0%	13	16%	N/A
Road Surface Conditions									
Dry	28	76%	21	72%	10	67%	59	72%	74.49%
Wet	8	22%	8	28%	1	7%	17	21%	19.09%
Icy	1	3%	0	0%	0	0%	1	1%	6.02%

Source: New Jersey DOT Crash Database (2002 – 2005)

There were 82 reportable crashes over the three-year period. Crashes have steadily declined each year for the study period. In 2003, there were 37 reportable crashes, while in 2005 there were 15 crashes, approximately a 60 percent decrease. The predominant crash type was angle crashes, which represent more than 50 percent of the three-year total; in 2004, 62 percent of that year's crashes were angle crashes. This is substantially above the statewide average for this crash type, which is approximately

20 percent. Studies have shown that a vast number of angle crashes at a signalized intersection may be indicative of a red-light running issue. Rear-end crashes at this intersection were relatively low compared to the state's average. The City of Trenton thought that the number of rear-end crashes at this intersection was much higher than the NJDOT records showed. We did not have access to the Trenton police crash records, therefore, analysis was based solely on NJDOT statistics. Of note, there were eight crashes involving pedestrians at this intersection over the study period. This represents approximately 10 percent of the three-year total, which far exceeds the statewide average of approximately 2 percent.

Hamilton Avenue and Chestnut Street intersection showing post-mounted signals
Source: DVRPC, 2007

This intersection requires a more in-depth study than is provided here. Given the prevalence of angle crashes, there may exist a red-light running issue. A contributing factor could be the traffic signals. Traffic signals at this location are post mounted therefore they represent a challenge to motorists. They are easily blocked by larger vehicles and are out of the line of sight for the motorist.

These signals should be upgraded and mounted on overhead mast arms. The upgrade should include pedestrian heads for all legs of the intersection. In the short term, an all-red phase should be added to the signal timing. In addition, repaint the crosswalk to continental style or use colored concrete to make it more visible.

PHILADELPHIA

BALTIMORE AVENUE/COBBS CREEK PARKWAY/58TH STREET INTERSECTION

LOCATION DESCRIPTION

The study location is at the intersection of Baltimore Avenue/Cobbs Creek Parkway/58th Street in the western section of Philadelphia, shown in ***Figure P1***. This is a signalized intersection with five legs. Baltimore Avenue, which is functionally classified as a principal arterial highway, runs in an east-west direction from University Avenue to Delaware County where it becomes Baltimore Pike, connecting with several major north-south roadways. Cobbs Creek Parkway runs in a north-south direction, except for a small distance before it gets to the study intersection where it travels in a northwest-southeasterly direction. Cobbs Creek Parkway begins at Woodland Avenue traveling north along the Cobbs Creek to Hoffman Avenue; here it runs in an east-west direction along Hoffman Avenue to 58th Street. It becomes 58th Street for a short distance to Baltimore Avenue. On the north side of Baltimore Avenue, Cobbs Creek Parkway begins again and travels northward where it becomes 63rd Street at Market Street. Sixty-third Street runs north and ends at US 1 (City Avenue). Cobbs Creek Parkway, north of Baltimore Avenue, is functionally classified as a principal arterial highway, but becomes a minor arterial south of Baltimore Avenue. Cobbs Creek has access to I-95 and the Philadelphia Airport via Island Avenue in the south. Fifty-eighth Street runs in a north-south direction from Lansdowne Avenue to the South Philadelphia Industrial Area. Fifty-eighth Street has access to I-95 and the Philadelphia Airport via Woodland Avenue and Island Avenue. North of Baltimore Avenue, 58th Street is one way in the northbound direction. Between Baltimore Avenue and Hoffman Avenue, 58th Street is functionally classified as a minor arterial and south of Hoffman Avenue as an urban collector.

Baltimore Avenue carries one lane in each direction, with parking at the curb on both sides of the street. At the northbound approach of the intersection, 58th Street has three lanes—one left-turn-only lane, a through lane, and a right-turn lane. There is only one departure lane with a bike lane on the opposite side. To the south of the intersection on 58th Street, the roadway carries two lanes northbound—one lane southbound with bike lanes in both directions and curbside parking on the southbound side of the street. At the southbound approach to the intersection on Cobbs Creek Parkway, there are two travel lanes—one lane for through and right-turn movements and a left-turn lane. There is one departure lane and curbside parking is permitted on both sides of the street. To the north of the intersection, 58th Street has no pavement markings to indicate travel lanes and parking is permitted on both sides of the street. The intersection configuration is depicted in ***Figure P2.***

Figure P1

Congestion and Crash Site Analysis

Study Area

City of Philadelphia, PA

Analysis Area / Intersection

SEPTA Market/Frankford El
MARKET ST
CHESTNUT ST
WALNUT ST
3
3
3
UPPER DARBY
Philadelphia
58TH ST
PHILADELPHIA CO.
DELAWARE CO.
COBBS CREEK PKWY
BALTIMORE AVE
13
East Lansdowne
58TH ST
SEPTA R3 Media/Elwyn
Cobbs Creek
CHURCH LN
Yeadon
MACDADE BLVD
Darby
13
SEPTA R2 Marcus Hook/Wilmington/Newark
SEPTA R1 Airport

0 1,000 2,000
Feet

Delaware Valley Regional
Planning Commission
July 2007

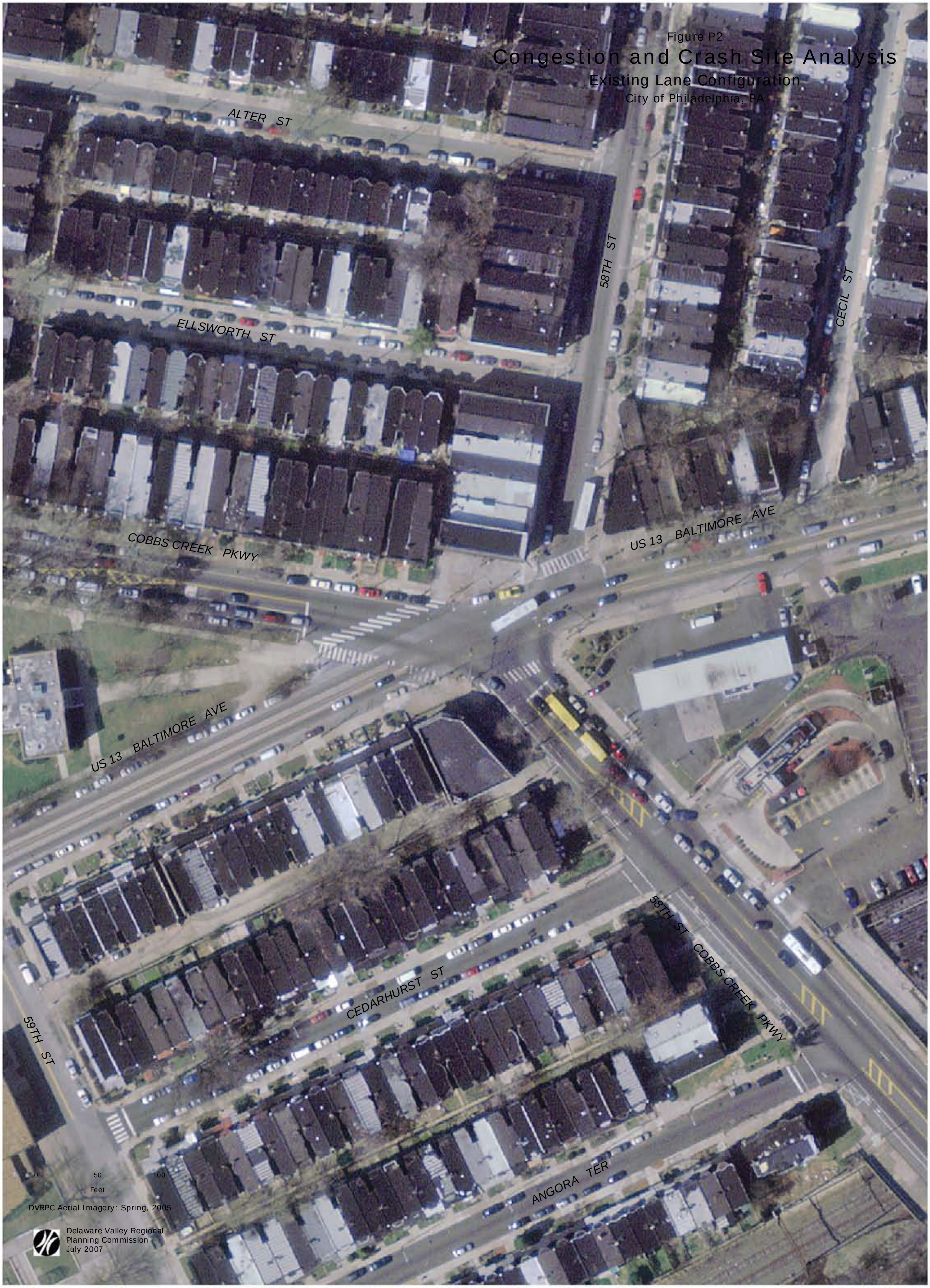


Figure P2
Congestion and Crash Site Analysis
Existing Lane Configuration
City of Philadelphia, PA

Baltimore Avenue carries the Route 34 trolley, which had 10,164 average daily boardings in 2005. The Route 34 trolley goes from 13th Street in Center City to 61st Street. The headway varies from 20 minutes off-peak to 4 minutes during the peak period on a weekday. In addition, the 46 and G bus routes serve the study intersection. The Route 46 bus had 5,393 average daily boardings in 2005 and travels from the study intersection to 63rd Street and Malvern Avenue in Overbrook. The Route G bus had 13,870 average daily boardings in 2005. It begins at Galloway Street and Packer Avenue (Food Distribution Center) in South Philadelphia and ends at the Overbrook Station. In addition, the Angora Station is two blocks from the study location carrying the R3 Regional Rail line.

There are retail uses on Baltimore Avenue, but the area is primarily residential. There are four schools and four parks located within a half-mile radius of the intersection. One of those parks is Cobbs Creek Park, which is a regionally significant recreation site. There are bike lanes on the southern leg of Cobbs Creek Parkway. The southeast quadrant of the intersection is occupied by a gas station, which has several access points on Baltimore Avenue and 58th Street. Next to the gas station are several retail establishments, including the Cobbs Creek Mall. On the north side of Baltimore Avenue, between Cobbs Creek Parkway and 58th Street, the land use is mainly retail, while a park and library take up the area on the northwest corner of the intersection. ***Figure P3*** shows the area land uses.


Figure P3
Congestion and Crash Site Analysis
Land Use
Philadelphia, PA
DVRPC 2005 Land Use
Residential:Single-Family Detached
Residential:Multi-Family
Residential:Row Home
Residential:Mobile Home
Manufacturing:Light Industrial
Manufacturing:Heavy Industrial
Transportation And Parking
Utility
Commercial
Community Services
Military
Recreation
Agriculture
Agriculture:Agricultural Bog
Mining
Wooded
Vacant
Water
CHRISTIAN ST
CARPENTER ST
62ND ST
MONTROSE ST
59TH ST
CARPENTER ST
58TH ST
CECIL ST
ALDEN ST
57TH ST
WASHINGTON AVE
ELLSWORTH ST
ALTER ST
ELLSWORTH ST
BALTIMORE AVE
ANGORA TER
COBBS CREEK PKWY
LATONA ST
61ST ST
60TH ST
WHARTON ST
MILLICK ST
EDGEWOOD ST
BALTIMORE AVE
59TH ST
CEDARHURST ST
ANGORA TER
60TH ST
CEDARHURST ST
ANGORA TER
57TH ST
56TH ST
ITHAN ST
FRAZIER ST
HOFFMAN AVE
FERNWOOD ST
ASHLAND AVE
ELLIOTT ST
59TH ST
58TH ST
THOMAS AVE
COBBS CREEK PKWY
Philadelphia Co.
Delaware Co.
Cobbs Creek
0
200
400
Feet
DVRPC Aerial Imagery, Spring, 2005
Delaware Valley Regional
Planning Commission
July 2007

EXISTING CONDITIONS

Configuration
The intersection has a complicated geometric configuration. Cobbs Creek Parkway and 58th Street meets Baltimore Avenue at an angle, which makes traversing the intersection difficult for all users. The intersection is wide to accommodate all movements. As a result, turning vehicles are caught in the intersection after the traffic signal has changed. This also causes difficulty in making specific turns. Many vehicles were observed running the red light. A product of the complicated geometric configuration of the intersection, long crosswalks make it difficult for pedestrians to cross under the existing cycle lengths. Pedestrians are frequently observed jaywalking, an unsafe practice at this location given the number of vehicular movements. Illegally parked cars obstruct the view of both pedestrians and drivers at the intersection.

Congestion
The intersection of Cobb Creek Parkway/Baltimore Avenue/ 58th Street consistently experiences high traffic volumes. As a result there are congested conditions, especially during the morning and afternoon peak periods.

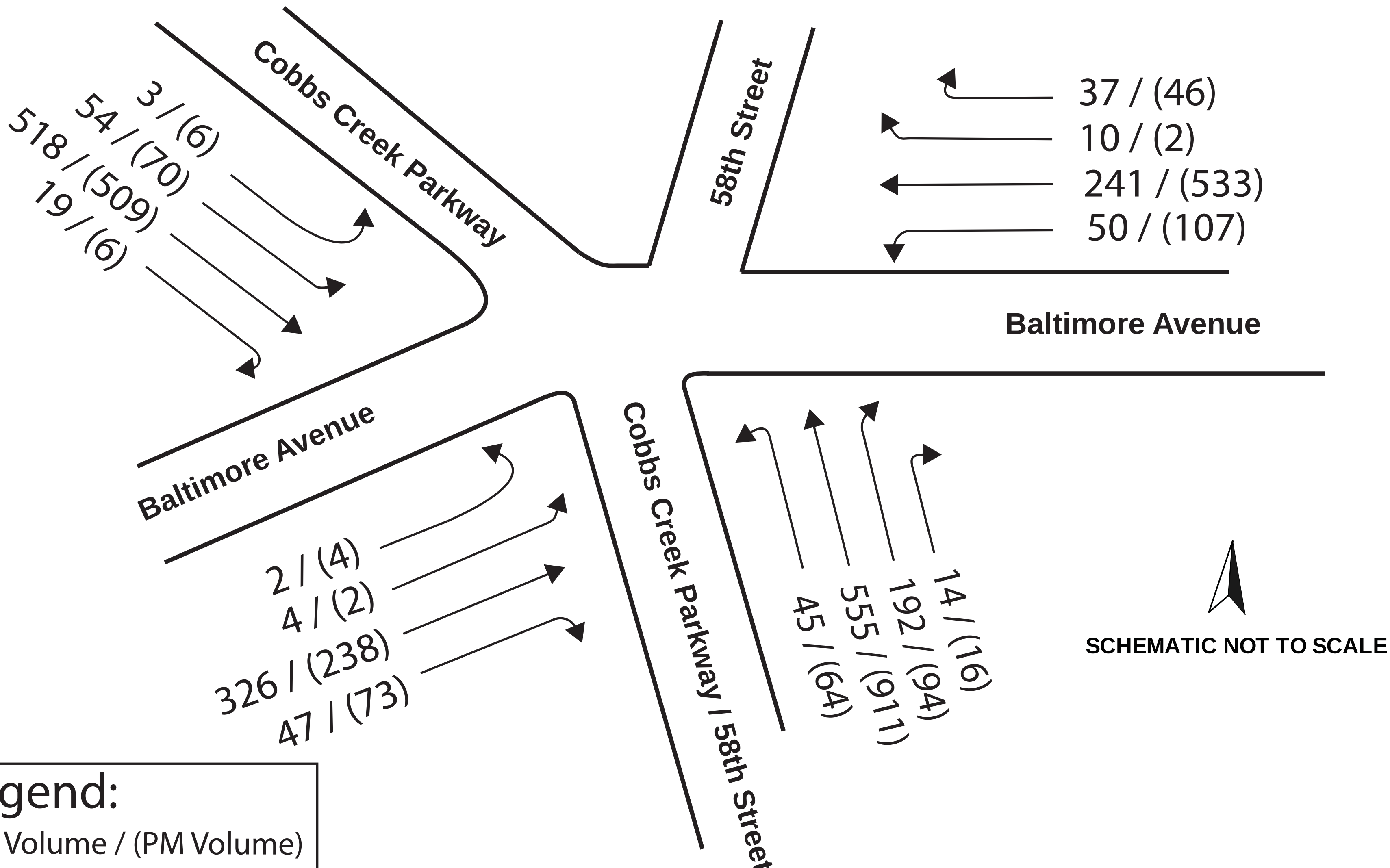
Turning Movement Counts
Manual turning movement counts were taken at the project intersection on Tuesday, September 19, 2006. The morning count took place from 6 AM to 9 AM, while the afternoon count began at 3 PM and ended at 6 PM. From this information, it was determined that the peak hours are 7:30 to 8:30 AM and 4:45 to 5:45 PM for the morning and afternoon. The complete manual count data can be found in **Appendix F**.

As shown in ***Figure P4***, during the morning peak hour approximately 2,117 vehicles traverse the intersection, with the heaviest movement from the northbound approach of 58th Street with 806 vehicles. Sixty-nine percent (555 vehicles) constitute a through movement onto Cobbs Creek Parkway, while 24 percent (192 vehicles) continue on 58th Street. The southbound approach of Cobbs Creek Parkway has the next highest movement of 594 vehicles, of which 84 percent (518 vehicles) constitute a through movement onto southbound 58th Street. On Baltimore Avenue the highest volumes are eastbound in the morning peak.

During the afternoon peak hour 2,681 vehicles traverse the intersection. During this period the northbound approach of 58th Street and westbound approach of Baltimore Avenue experience the most traffic. Like the morning peak, the afternoon peak hour's heaviest movement is the northbound approach of 58th Street with 1,085 vehicles. The through movement onto Cobbs Creek Parkway almost doubles over the morning peak, whereas the movement to continue along 58th Street remains the same. The southbound Cobbs Creek Parkway approach has similar morning and afternoon peak-hour volumes. This approach experiences 10 percent and 13 percent of all approach movements as left turns during the AM and PM peak periods, respectively. These left turns conflict with the northbound 58th Street through movement. This situation leads to traffic congestion and safety issues at the intersection.

Figure P4: Turning Movement Diagram

Existing Peak Hour Turning Movement Counts
Baltimore Avenue, Cobbs Creek Parkway, & 58th Street



Legend:
AM Volume / (PM Volume)
Peak Hours
AM: 7:30 - 8:30
PM: 4:45 - 5:45

Delaware Valley Regional Planning Commission
July 2007

The volumes for the westbound approach of Baltimore Avenue experience more than double the volume in the morning peak hour continuing on Baltimore Avenue and making a left onto 58th Street southbound. There are 107 westbound left turns in the afternoon peak period, and these will conflict with the 238 eastbound through vehicles, potentially creating traffic obstructions and an unsafe situation.

Existing Level of Service

SYNCHRO traffic analysis software was utilized in order to conduct evaluations of the intersection's existing performance, as well as for all potential improvement scenarios. After inputting several variables—such as vehicle volume, intersection geometry, and signal timing—SYNCHRO provides Level of Service (LOS) measures and the average delay-per-vehicle for the entire intersection, every approach, and each movement.

TABLE P1
Existing Intersection Performance
Cobbs Creek Parkway and Baltimore Avenue

Scenario	**Direction of Travel**	**2007 Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle**			
Existing Conditions		AM Peak		PM Peak	
		LOS	Delay (sec)	LOS	Delay (sec)
	Baltimore Avenue EB	C	28	C	20
	Baltimore Avenue WB	C	27	F	328
	Cobbs Creek Pkwy SEB	E	67	E	65
	58th Street NWB	E	56	F	242
	Intersection	D	45	F	200

Source: *DVRPC, 2007*

The level of service for the intersection, shown in ***Table P1***, under existing conditions is a D in the morning peak with 45 seconds of delay, and F in the afternoon peak with 200 seconds of delay. However, both approaches on Baltimore Avenue experience LOS C in the morning peak with 28 seconds of delay. While in the afternoon peak, the eastbound approach remains at C with reduced delay at 20 seconds, the westbound approach drops significantly to failing at LOS F with 328 seconds of delay. The Cobbs Creek Parkway/58th Street approaches experience LOS E in the morning peak with 67 seconds of delay southbound and 56 seconds of delay northbound. For the afternoon peak, the southbound approach remained at LOS E with a slight drop in the delay to 65 seconds, but the northbound approach is now failing with LOS F and 242 seconds of delay.

Transit and Parking

Illegally parked cars contribute to the level of congestion in this area—as well as the buses and trolleys that stop in the travelway for passengers to board or disembark.

Safety

Crash Analysis

Table P2 – Intersection Crash Summary

	2004		2005		2006		Total		
	Crashes	%	Crashes	%	Crashes	%	Crashes	%	2004 PA Statewide Average
Crashes									
Reportable	7	37%	6	32%	6	32%	19	100%	N/A
Non reportable	36	38%	36	38%	23	24%	95	100%	N/A
Unknown	6	40%	6	40%	3	20%	15	100%	N/A
Total Crashes	49	38%	48	37%	32	25%	129	100%	N/A
Severity*									
Fatalities	0	0%	0	0%	0	0%	0	0%	1%
Injuries	4	8%	7	15%	4	13%	15	12%	53%
PDO	45	92%	41	85%	28	88%	114	88%	46%
Crash Type									
Rear End	15	31%	22	46%	11	34%	48	37%	21%
Angle	9	18%	15	31%	11	34%	35	27%	26%
Sideswipe	13	27%	5	10%	1	3%	19	15%	6%
Other	7	14%	2	4%	5	16%	14	11%	3%
Hit Pedestrian	2	4%	3	6%	1	3%	6	5%	3%
Unknown	1	2%	1	2%	3	9%	5	4%	N/A
Head On	1	2%	0	0%	0	0%	1	1%	5%
Bicyclist	1	2%	0	0%	0	0%	1	1%	1%
Lighting Conditions									
Daylight	34	69%	36	75%	22	69%	92	71%	63%
Dark (no street lights)	13	27%	10	21%	8	25%	31	24%	16%
Unknown	2	4%	2	4%	2	6%	6	5%	0%
Weather Conditions*									
Clear	9	18%	0	0%	0	0%	9	18%	76%
Rainy	2	4%	0	0%	0	0%	2	4%	14%
Wintry	0	0%	0	0%	0	0%	0	0%	8%
Other	0	0%	1	2%	0	0%	1	2%	2%
Road Surface Conditions*									
Dry	8	16%	0	0%	0	0%	8	6%	68%
Wet	1	2%	1	2%	0	0%	2	2%	20%
Icy	1	2%	1	2%	0	0%	2	2%	5%

* The crash report database did have complete listing available

Source: Philadelphia Streets Department Crash Report (2004 – 2006)

Crash data for the Cobbs Creek Parkway/Baltimore Avenue/58th Street intersection was provided by the Philadelphia Streets Department for a three-year period from 2004 to 2006. Data collected from the Philadelphia Streets Department does not present a full detailed account of the incidents recorded, therefore, this data could not be evaluated in detail. Given the large number of crashes at this location, for the purpose of this analysis, all of the crash data gathered (reportable, non-reportable, and unknown status) have been jointly summarized in the charts and table.

As indicated in ***Table P2***, there were a total of 129 crashes, including 19 reportable and 95 non-reportable crashes. The status of 15 of the crashes was not recorded. Reportable crashes are crashes that result in a fatality, injury, and/or property damage rendering the vehicle disabled; and non-reportable crashes are those where there are no injuries and/or fatalities and the vehicle(s) can be driven away from the crash scene. At this intersection, there were no fatal crashes, however, there were 15 injury and 114 property-damage-only crashes. Compared with the 2004 Pennsylvania statewide severity levels, injury crashes at this location were below the 53 percent statewide average; however, the property-damage-only crashes were higher than the 46 percent statewide average.

There were 49 crashes in 2004 (38 percent), 48 crashes (37 percent) in 2005, and 2006 had a 12 percent reduction of crashes over 2005 with 32 crashes. The most common crash types were 48 rear end, 35 angle, and 19 sideswipe crashes representing 37 percent, 27 percent and 15 percent respectively of the total crashes at the intersection. In comparison with the statewide totals, these three types of crashes at this intersection were above the statewide averages; of which rear-end crashes were significantly higher than the statewide average of 21 percent. The predominance of rear-end and angle crashes can be indicative of congestion and red-light running.

As indicated by the collision diagram in ***Figure P5*****,** the majority of the rear-end crashes are located along the northbound approach of 58th Street and southbound approach of Cobbs Creek Parkway, as well as near the Baltimore Avenue/58th Street intersection. There were no crashes located along the eastbound Baltimore Avenue approach of the intersection. There were only 6 pedestrian crashes reported, which is slightly higher than the 3 percent statewide average in 2004.

Other crash types at this intersection included head-on crashes and crashes involving bicyclists. Over the three-year period, 92 of the 129 crashes occurred during daylight conditions and 31 of the crashes occurred at nighttime. The daylight, dark, and unknown crashes were above the 2004 statewide crash average. With the exception of 2004, the data gathered from the crash report system did not provide a substantial amount of information for weather and road surface conditions for years 2005 and 2006. As indicated, the majority of crashes for 2004 occurred on clear days, with dry road surface conditions.

Figure P6 shows the crash data by month for the three-year study period at the intersection. The month of June had the highest overall number of crashes, with half of those crashes occurring in 2005. The months of March, May, July, and November had the least amount of crashes. 2006 had the least number of crashes, with the highest being 4 crashes in June and July.

Figure P5

Crashes by Type, 2004 - 2006
Baltimore Avenue / Cobbs Creek Parkway / 58th Street

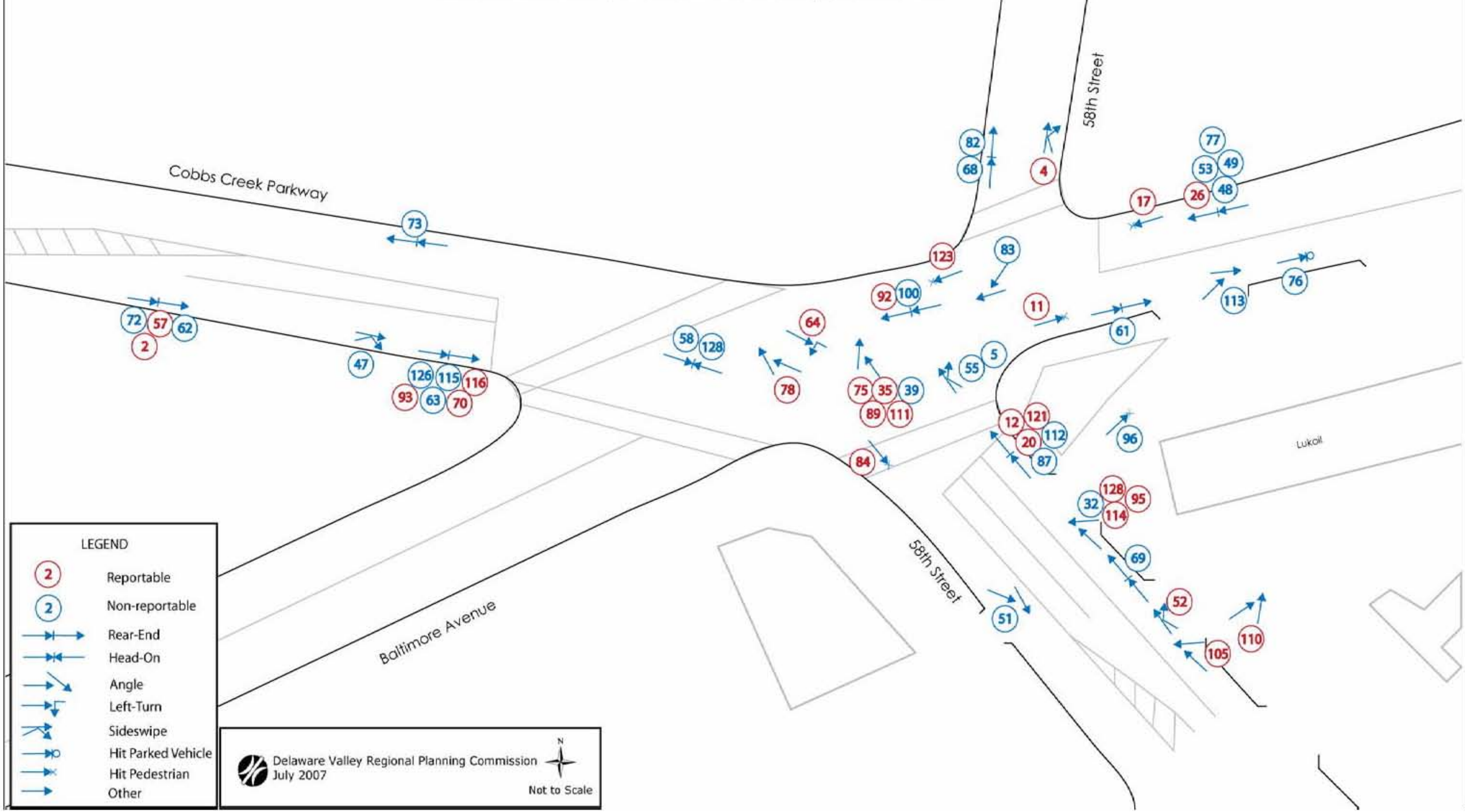
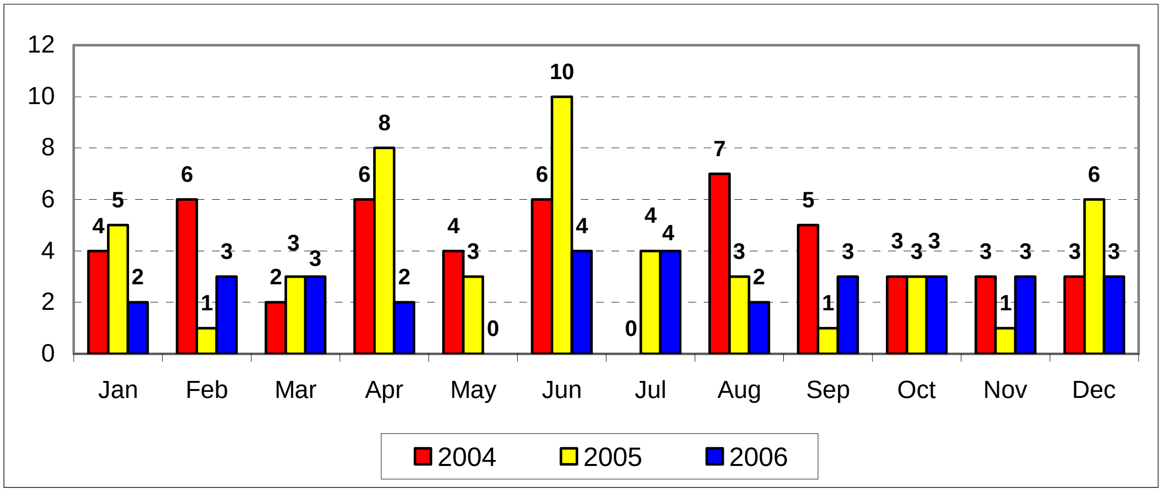


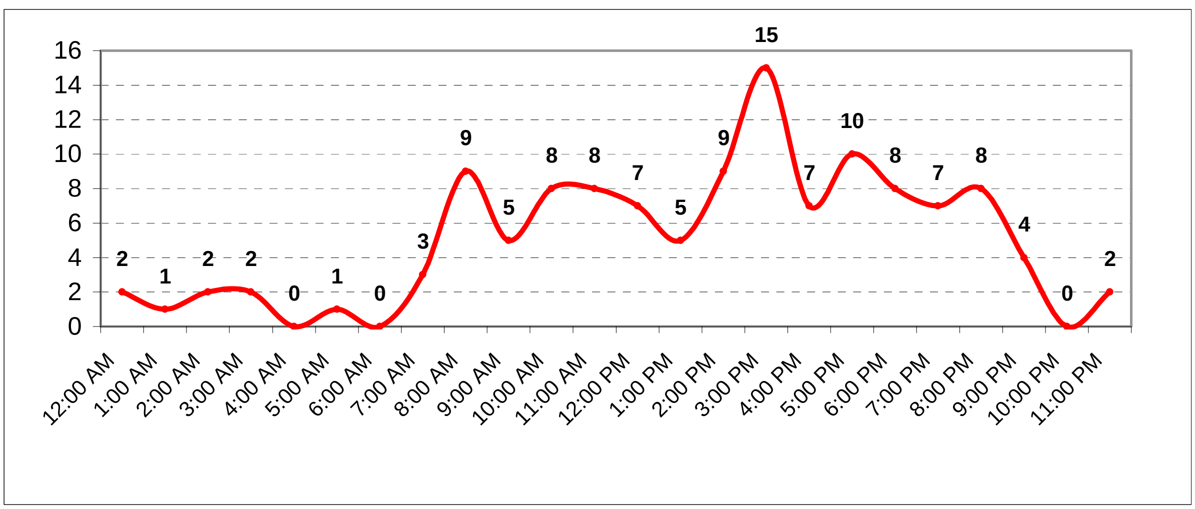
Figure P6: Crashes by Month



Source: Philadelphia Streets Department Crash Report (2004 – 2006)

Figure P7 shows the crashes by time of day. The number of crashes during the overnight hours is low, with no more than two crashes in one hour. In the morning peak period there were 17 crashes, of which 9 occurred during the 8 o'clock hour. In the mid-morning to early afternoon, the crashes remained steady, averaging about seven crashes for those hours. The 3 o'clock hour had the most crashes for the study period with 15 crashes at the intersection. The majority of these crashes involved parked vehicles and was rear-end collisions. After 8 PM the number of crashes decreases. This may be due to lower traffic volumes traveling through the intersection.

Figure P7 – Crashes by Time of Day



Source: Philadelphia Streets Department Crash Report (2004 – 2006)

The ages of the persons involved in the crashes ranged from under 1 year to 93 years old. The youngest and oldest persons involved were pedestrians. On average, the majority of the persons in the crashes were between the ages of 20 and 50 years old.

Based upon the limited data provided, the dominant causes for crashes at this intersection were careless passing and turning. The data also indicated that there were two SEPTA buses and one trolley involved in the crashes during the study period. A detailed crash summary is presented in Appendix F.

Pavement Markings and Signage

Pavement markings are in poor condition. On Baltimore Avenue, the centerline pavement markings are virtually nonexistent while other markings are faded. All the crosswalks are faded and hardly visible to motorists and pedestrians. Several of the traffic signs are faded and sign clutter is evident at the intersection, which can cause driver confusion. Several of the pedestrian man/hand heads are out of order.

Access Management

The gas station at the southeast corner of the intersection currently has four access and egress points for that property. They are at the intersection and vehicles slowing to access or leave this business are in conflict with traffic moving through the intersection. Additionally, vehicles leaving the fast food restaurant adjacent to the gas station travel across four lanes of traffic to access Cedarhurst Street.

Study intersection looking east along Baltimore Avenue
Source: *DVRPC, 2007*

OPPORTUNITIES AND CONSTRAINTS

With a LOS of F, the efficiency of the intersection is failing during the afternoon peak hour. However, during the morning peak hour the overall intersection is operating fairly well. Northbound 58th Street and southbound Cobbs Creek Parkway approaches are operating poorly. In the effort to improve the operation of the intersection, there are a number of geometric, signal timing, and land-use attributes that must first be considered.

The operations of all traffic signals within Philadelphia are managed by the Department of Streets, and their citywide policy mandates a cycle length of 60 seconds. As a result, the project intersection's cycle length must remain at 60 seconds. In addition to the fixed cycle length, the signal timing is also affected by a 4.2-second pedestrian lead that was instituted due to the high volume of pedestrian activities from nearby schools, residences, and commercial developments. The remaining time is divided evenly between the two splits, with each receiving 25.8 seconds. There is a possibility that this does not reflect actually balanced vehicular movement volumes and thus split optimization may provide timing improvements.

The current presence of exclusive left-turn lanes along the Cobbs Creek Parkway approaches may offer the opportunity for a protected left-turn phase. There is currently on-street parking along three of the four approach legs, and, as a result, the number of travel lanes may be expanded without widening the cartway by eliminating parking in some areas. However, the removal of on-street parking may encounter resistance from local residents.

Pedestrian amenities can be improved without a huge expenditure of scarce funds. There is an opportunity to decrease the length of the crosswalks using bump-outs, which would improve pedestrian operations at the intersection. In fact, the application of Sprinkle Consulting's "Level-of-Service Model for Pedestrians at Signalized Intersections" demonstrates an improvement in pedestrian LOS from a D to a C for a bump-out that reduces the crossing distance along the Cobbs Creek Parkway approach. As a result, pedestrian signal-compliance may increase, and thus reduce the occurrence of illegal and dangerous jaywalking. However, it could also negatively affect the flow of traffic through the intersection and consequently aggravate the congestion and safety of the location.

Therefore, in improving the operations of the intersection, a balance must be reached to minimize adverse effects for all users.

POTENTIAL IMPROVEMENT SCENARIOS

All of the alternative scenarios that were studied retained the 4.2-second pedestrian lead phase, and all but one scenario maintains the 60-second cycle length. The progression of alternatives begins with short-term measures such as optimizing the signal, and then progresses to medium-term measures that involve changes to lane configuration. The intersection and approach LOS and average delay has been tabulated in ***Table P3***. Proposed improvements are shown in ***Figure P8.***

Scenario 1

Characteristics

- Optimize the signal timing splits between the Baltimore Avenue and Cobbs Creek Parkway/58th Street approaches.
- Construct bump-outs on the northwest corner of the intersection (Cobbs Creek Parkway and Baltimore Avenue); southwest corner of the intersection (58th Street and Baltimore Avenue).
- Re-stripe pavement markings, specifically those on Baltimore Avenue—crosswalks should be continental.
- Remove redundant signage, replace faded signs and install additional appropriate signage.

Advantages

- This can be implemented in the short term.
- Minimal expenditure necessary.
- Reduces the length of the crosswalks.
- Improves pedestrian visibility.
- Upgrading pavement markings and signage will decrease motorist confusion.

Level of Service Analysis

This alternative was applied within SYNCHRO to understand its impacts upon the intersection.

This adjustment provides a small improvement in the morning peak hour, but does not benefit the afternoon peak hour. The intersection's overall AM peak period operation improves by about 8 seconds to 37 seconds, a LOS of D. This improvement is most noticeable along the Cobbs Creek Parkway and 58th Street approaches, where the existing LOS of E improves to a D and C. However, the Baltimore Avenue approaches' LOS deteriorates from Cs to Ds.

This alternative does not enhance the intersection's performance during the afternoon peak period. There are relatively minor improvements along the Baltimore Avenue approaches, while there is a relatively minor deterioration along the Cobbs Creek Parkway and 58th Street approaches. Overall, the average delay is 203 seconds.

TABLE P3
Intersection Performance for Existing and Alternative Scenarios
58th Street, Cobbs Creek Parkway and Baltimore Avenue

Scenario	Direction of Travel	AM Peak LOS	AM Peak Delay (sec)	PM Peak LOS	PM Peak Delay (sec)
Existing Conditions		AM Peak		PM Peak	
		LOS	Delay (sec)	LOS	Delay (sec)
	Baltimore Eastbound	C	28	C	20
	Baltimore Westbound	C	27	F	328
	Cobbs Creek Southeastbound	E	67	E	65
	58th Street Northwestbound	E	56	F	242
	Intersection	D	45	F	200
Scenario 1 – Splits Optimized		AM Peak		PM Peak	
		LOS	Delay (sec)	LOS	Delay (sec)
	Baltimore Eastbound	D	38	B	19
	Baltimore Westbound	D	40	F	291
	Cobbs Creek Southeastbound	D	44	E	76
	58th Street Northwestbound	C	30	F	264
	Intersection	D	37	F	203
Scenario 2 – Cycle Length Optimized		AM Peak (75 sec)		PM Peak (120 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Baltimore Eastbound	C	33	C	28
	Baltimore Westbound	C	33	F	195
	Cobbs Creek Southeastbound	D	36	E	71
	58th Street Northwestbound	C	27	F	134
	Intersection	C	32	F	124
Scenario 3 - Two WB Baltimore Ave Departure Lanes		AM Peak		PM Peak	
		LOS	Delay (sec)	LOS	Delay (sec)
	Baltimore Eastbound	C	35	C	33
	Baltimore Westbound	C	23	F	107
	Cobbs Creek Southeastbound	D	49	E	62
	58th Street Northwestbound	C	33	F	236
	Intersection	D	36	F	144

TABLE P3 (continued) **Intersection Performance for Existing and Alternative Scenarios**					
58th Street, Cobbs Creek Parkway and Baltimore Avenue					
Scenario	**Direction of Travel**	**2007 Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle**			
Scenario 4 - Two NW Cobb Creek Pkwy Receiving Lanes		AM Peak		PM Peak	
		LOS	Delay (sec)	LOS	Delay (sec)
	Baltimore Eastbound	C	34	B	15
	Baltimore Westbound	C	34	F	149
	Cobbs Creek Southeastbound	D	49	F	142
	58th Street Northwestbound	C	20	F	169
	Intersection	C	33	F	140
Scenario 5 - Full Alternative		AM Peak		PM Peak	
		LOS	Delay (sec)	LOS	Delay (sec)
	Baltimore Eastbound	C	34	C	25
	Baltimore Westbound	C	23	F	89
	Cobbs Creek Southeastbound	D	49	E	76
	58th Street Northwestbound	C	20	F	87
	Intersection	C	31	E	78

Source: *DVRPC, 2007*

Scenario 2

Characteristics

- Optimize the cycle length and splits between Baltimore Avenue and Cobbs Creek Parkway.
- Construct bump-outs on the northwest corner of the intersection (Cobbs Creek Parkway and Baltimore Avenue); southwest corner of the intersection (58th Street and Baltimore Avenue).
- Re-stripe pavement markings, specifically those on Baltimore Avenue—crosswalks should be continental.
- Remove redundant signage, replace faded signs and install additional appropriate signage

Advantages

- This can be implemented in the short term.
- Minimal expenditure necessary.

- Reduces the length of the crosswalks.
- Improves pedestrian visibility.
- Upgrading pavement markings and signage will decrease motorist confusion.

Disadvantages
- Violates the City of Philadelphia Streets Department's citywide policy of a 60-second cycle length.
- Longer cycle length can potentially encourage pedestrian noncompliance with pedestrian signal and jaywalking.

Level of Service Analysis
For the morning peak period, the optimal cycle length is 75 seconds. With this cycle length, the Cobbs Creek Parkway and 58th Street approaches have a longer split than the Baltimore Avenue approaches—36 seconds compared to 30.6 seconds. All approaches, except the Cobbs Creek Parkway southbound approach, operates at a LOS of C, as does the overall intersection. For the afternoon peak hour, the optimal cycle length is 120 seconds, or twice as long as the current signal timing. Within this cycle length, the Cobbs Creek Parkway/58th Street and Baltimore Avenue splits are 57 and 54.6 seconds, respectively. Although, there is an approximate two-minute decline in the average delay for the westbound Baltimore Avenue and northbound 58th Street approaches, both continue to operate with a LOS of F. The overall intersection also continues to perform at a LOS F, though it reduced its average delay by over a minute, to 124 seconds.

Scenario 3
Characteristics
- Eliminate on-street parking along the westbound Baltimore Avenue approach. Specifically, at the intersection approach, approximately 150 feet from 58th Street to South Cecil Street.
- Add a dedicated left-turn-only lane along this approach.
- Optimize the timing splits.
- Construct bump-outs on the northwest corner of the intersection (Cobbs Creek Parkway and Baltimore Avenue); southwest corner of the intersection (58th Street and Baltimore Avenue).
- Re-stripe pavement markings, specifically those on Baltimore Avenue—crosswalks should be continental.
- Remove redundant signage, replace faded signs and install additional appropriate signage.

Advantages
- Increased capacity via the addition of a westbound left-turn lane.
- The segment of the approach that was previously on-street parking may now be utilized as a through and right-turn lane.
- This can be implemented in the short term.
- Minimal expenditure necessary.
- Reduces the length of the crosswalks.

- Improves pedestrian visibility.
- Upgrading pavement markings and signage decreases motorist confusion.

Disadvantages
- The removal of on-street parking along a residential block. However, the elimination of on-street parking could be confined to weekday peak periods.
- The operation of the SEPTA 34 surface trolley may be negatively affected. The conversion of the on-street parking lane into a travel lane will require a modification to the stop location or to waiting and boarding practices.

Level of Service Analysis
For the morning peak period, the overall intersection continues to operate at a LOS of D, though its average delay declines by 9 seconds to 36 seconds. Although the LOS for both Baltimore Avenue approaches do not change, the LOS for the southbound Cobbs Creek Parkway and northbound 58th Street approaches improve to a D and a C, respectively. The addition of Baltimore Avenue capacity appears to most benefit the Cobbs Creek Parkway/58th Street approaches. This is due to the reduced split time necessary for vehicles traveling along Baltimore Avenue (24.2 seconds), and as a result the Cobbs Creek Parkway/58th Street approaches gain additional split time (27.4 seconds).

For the afternoon peak period, the overall intersection continues to operate at a LOS of F, however, its average delay declines by almost a minute, to 144 seconds. Unlike the AM peak hour, the Cobbs Creek Parkway/58th Street approaches do not experience any notable improvement. This is due to the much higher vehicular volume that westbound Baltimore Avenue carries in the afternoon, and as a result the extra capacity reduces that approach's delay by almost four minutes. At 107 seconds, it still operates at a failing LOS.

Scenario 4
Characteristics
- Eliminate on-street parking along the east side Cobbs Creek Parkway between Baltimore Avenue and 59th Street.
- Reconfigure the northbound 58th Street lane assignments. Retain the exclusive left and exclusive through, but reassign the exclusive right into a shared through and right.
- Optimize the timing splits.
- Construct bump-outs on the northwest corner of the intersection (Cobbs Creek Parkway and Baltimore Avenue); southwest corner of the intersection (58th Street and Baltimore Avenue).
- Re-stripe pavement markings, specifically those on Baltimore Avenue—crosswalks should be continental.
- Remove redundant signage, replace faded signs and install additional appropriate signage.

Advantages

- Increased capacity via an additional northbound through movement lane.
- Reduces the length of the crosswalks.
- Improves pedestrian visibility.
- Upgrading pavement markings and signage decreases motorist confusion.

Disadvantages

- The removal of on-street parking along a residential block. However, the elimination of on-street parking could be confined to weekday peak periods.

Level of Service Analysis

For the morning peak period, the overall intersection LOS improves to a C, with an average delay of 33 seconds. Although the LOS for both Baltimore Avenue approaches do not change, the LOS for southbound Cobbs Creek Parkway and northbound 58th Street approaches improve to a D and a C, respectively. The greatest improvement is exhibited by the northbound 58th Street approach, with a decline of over 30 seconds to an average delay of 20 seconds. The impacts upon LOS are reflected in the split balance, with Cobbs Creek Parkway/58th Street receiving 27.2 seconds, whereas Baltimore Avenue has 24.4 seconds.

For the afternoon peak period, the overall intersection continues to operate at a LOS of F, though its average delay improves by a complete minute to 140 seconds. Whereas the intersection currently has two approaches with a LOS of F, in this scenario there are three approaches with a failing LOS. This is due to the increased capacity of the northbound 58th Street approach allowing a shorter split for that phase, and therefore providing additional split time for the westbound Baltimore Avenue approach. This is exhibited by Baltimore Avenue having a split of 29.6 seconds while the Cobbs Creek Parkway/58th Street split is 22 seconds. Consequently, there is a three-minute decrease in the average delay for westbound Baltimore Avenue vehicles, whereas the northbound approach is reduced to 73 seconds.

Scenario 5

Characteristics

- Eliminate on-street parking along the westbound Baltimore Avenue approach. Specifically, at the intersection approach, approximately 150 feet from 58th Street to South Cecil Street.
- Add a dedicated left-turn only lane to the westbound approach.
- Eliminate on-street parking along the east side of Cobbs Creek Parkway between Baltimore Avenue and 59th Street.
- Reconfigure the northbound 58th Street lane assignments. Retain the exclusive left and exclusive through, but reassign the exclusive right into a shared through and right.
- Optimize the timing splits.
- Construct bump-outs on the northwest corner of the intersection (Cobbs Creek Parkway and Baltimore Avenue); southwest corner of the intersection (58th Street and Baltimore Avenue)

Figure P8

Congestion and Crash Site Analysis

Proposed Intersection Improvements

Philadelphia, PA

DVRPC Aerial Imagery: Spring, 2005

Delaware Valley Regional Planning Commission
July 2007

- Re-stripe pavement markings, specifically those on Baltimore Avenue—crosswalks should be continental.
- Remove redundant signage, replace faded signs and install additional appropriate signage.

Advantages

- The segment of the approach that was previously on-street parking may now be utilized as a through and right-turn lane.
- Increased capacity for the westbound Baltimore Avenue and northbound 58th Street approaches.
- Reduces the length of the crosswalks.
- Improves pedestrian visibility.
- Upgrading pavement markings and signage decreases motorist confusion.

Disadvantages

- The removal of on-street parking along two separate residential blocks. However, the elimination of on-street parking may be confined to weekday peak periods.
- The operation of the SEPTA 34 surface trolley may be negatively affected. The conversion of an on-street parking lane into a travel lane will require a modification to the stop location or to waiting and boarding practices.

Level of Service Analysis

During the morning peak period, the LOS for the overall intersection improves from a D to a C, with a corresponding decline in average delay from 45 to 31 seconds. The Baltimore Avenue approaches continue to operate at a LOS of C. However, the southbound Cobbs Creek Parkway and northbound 58th Street approaches improve to a LOS of D and C, respectively. These results are comparable to the collective improvements seen in *Scenario 3* and *Scenario 4*. This is reflected in the imbalanced split proportion, where Cobbs Creek Parkway/58th Street receives 27.2 seconds while Baltimore Avenue is granted 24.4 seconds.

For the afternoon peak period, the overall intersection improves to a LOS E, with 78 seconds of average delay. This is a two-minute improvement from the existing average delay. Unfortunately, none of the approaches improve upon their existing LOS. However, there are significant reductions in average delay; most extensive are the westbound Baltimore Avenue approach and the northbound 58th Street approach, which improve by 239 seconds and 155 seconds, respectively. These were the only approaches where capacity improvements were made.

Projected 2030 Traffic Conditions

A growth rate was applied to the existing traffic volumes to project 2030 future volumes for the intersection. Using DVRPC's *2007 Conformity Findings Report*, a 6.65 percent growth rate was applied. This growth rate is based upon the total vehicle miles traveled (VMT) expected from vehicles within the city of Philadelphia by the year 2030. When applied to the various scenarios, the approach and intersection LOS and average delays are affected in similar patterns. However, in absolute terms, these performance measures are noticeably worse. The LOS summary for all Scenarios for the year 2030 is shown in ***Table P4.***

TABLE P4
Intersection Performance for Existing and Alternative Scenarios - 2030
58th Street, Cobbs Creek Parkway and Baltimore Avenue

Scenario	Direction of Travel	2030 Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle			
Existing Conditions		AM Peak		PM Peak	
		LOS	Delay (sec)	LOS	Delay (sec)
	Baltimore Eastbound	C	31	C	22
	Baltimore Westbound	C	32	F	398
	Cobbs Creek Southeastbound	F	87	F	110
	58th Street Northwestbound	E	57	F	278
	Intersection	E	57	F	241
Scenario 1 – Splits Optimized		AM Peak		PM Peak	
		LOS	Delay (sec)	LOS	Delay (sec)
	Baltimore Eastbound	D	45	C	20
	Baltimore Westbound	D	53	F	357
	Cobbs Creek Southeastbound	E	56	F	127
	58th Street Northwestbound	D	37	F	302
	Intersection	D	46	F	245
Scenario 2 – Cycle Length Optimized		AM Peak (80 sec)		PM Peak (150 sec)	
		LOS	Delay (sec)	LOS	Delay (sec)
	Baltimore Eastbound	D	37	C	34
	Baltimore Westbound	D	40	F	279
	Cobbs Creek Southeastbound	D	41	F	86
	58th Street Northwestbound	C	29	F	152
	Intersection	D	36	F	155

TABLE P4 (continued)
Intersection Performance for Existing and Alternative Scenarios
Cobbs Creek Parkway and Baltimore Avenue

Scenario	Direction of Travel	2030 Peak AM Hour and Peak PM Hour LOS with Average Delay / Vehicle			
		AM Peak		PM Peak	
		LOS	Delay (sec)	LOS	Delay (sec)
Scenario 3 - Two WB Baltimore Ave Departure Lanes					
	Baltimore Eastbound	D	53	F	192
	Baltimore Westbound	C	27	F	186
	Cobbs Creek Southeastbound	D	48	E	71
	Cobbs Creek Northwestbound	C	32	F	220
	Intersection	D	40	F	176
Scenario 4 - Two NW Cobbs Creek Pkwy Receiving Lanes					
		AM Peak		PM Peak	
		LOS	Delay (sec)	LOS	Delay (sec)
	Baltimore Eastbound	D	45	B	16
	Baltimore Westbound	D	53	F	235
	Cobbs Creek Southeastbound	D	54	F	213
	Cobbs Creek Northwestbound	C	20	F	205
	Intersection	D	39	F	193
Scenario 5 - Full Alternative					
		AM Peak		PM Peak	
		LOS	Delay (sec)	LOS	Delay (sec)
	Baltimore Eastbound	D	53	D	37
	Baltimore Westbound	C	27	F	113
	Cobbs Creek Southeastbound	D	46	F	127
	Cobbs Creek Northwestbound	B	19	F	115
	Intersection	C	34	F	108

Source: *DVRPC, 2007*

Recommendations

The intersection currently performs at a tolerable LOS of D in the AM peak hour, and dramatically fails in the PM peak hour. This difference is mainly a result of significantly higher vehicular volumes in the afternoon peak period; specifically, in the westbound Baltimore Avenue and northbound 58th Street approaches.

All but one of the alternatives retains the current 60-second cycle length, and all of them maintain a 4.2-second pedestrian lead. Given these constraints, *Scenario 5* will provide the most overall improvement of congestion and vehicle delay, especially for the afternoon peak period. Overcoming the disadvantages of this alternative will require consultation and collaboration with SEPTA, law enforcement, and local community representatives.

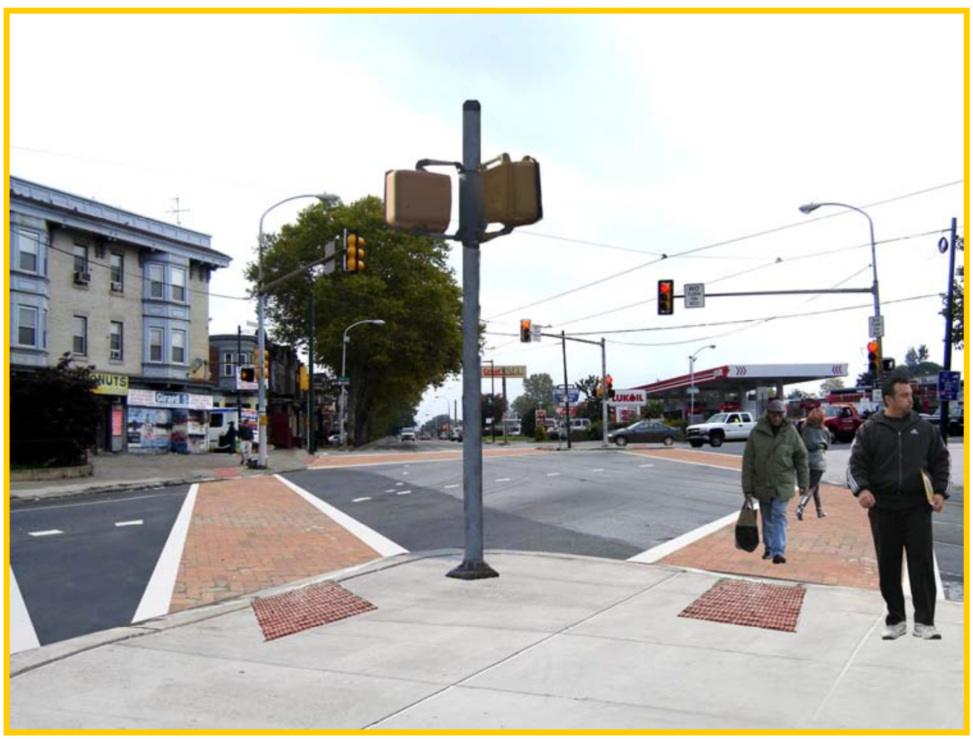
Pedestrian traffic in and around the study location is high. Therefore pedestrian amenities need to be improved. In order to reduce the length of the crosswalk and improve pedestrian visibility, construct bump-outs as described previously. These could also be beneficial to transit passengers to board and disembark trolleys and buses.

A sign inventory for the intersection should be taken; and signs should be removed, replaced or added as appropriate. Currently there are too many signs at the intersection, which can add to driver confusion.

Pavement markings and roadway surfaces need to be upgraded throughout the intersection. In many places, pavement markings are not visible and holes are evident in the roadway surface.

The city needs to work with property owners to have sidewalks in the area repaired and clear of debris.

Existing Study Intersection
Source: *DVRPC, 2007*



Rendering of Proposed Improvements
Source: *DVRPC, 2007*

APPENDIX A

BURLINGTON

SYNCHRO ANALYSIS
Source: DVRPC, 2007

Lakehurst Road and Trenton Road Intersection
PEMBERTON TOWNSHIP - BURLINGTON COUNTY

Reportable crashes (2002 - 2005)

MAP ID	DATE	DAY/TIME	TOTAL KILLED	TOTAL INJURED	WEATHER COND.	ROAD COND.	ROAD SYSTEM	ROAD	CROSS ROAD	CRASH TYPE	AGE OF DRIVER 1	DRIVER 1 FACTOR	DRIVER 1 ACTION	AGE OF DRIVER 2	DRIVER 2 FACTOR	DRIVER 2 ACTION
1	4/13/2002	SA/1538	0	0	Clear	Dry	County	CR 530	TRENTON RD	Rear End						
2	7/4/2002	TH/2121	0	0	Clear	Dry	County	CR 530	TRENTON RD	Rear End						
3	7/17/2002	W/1256	0	1	Clear	Dry	County	CR 530	TRENTON RD	Rear End						
4	11/18/2002	M/1626	0	0	Clear	Dry	County	CR 530	TRENTON RD	Rear End						
5	5/3/2003	SA/1238	0	0	Clear	Dry	County	ROUTE 530	TRENTON RD	Other						
6	5/13/2003	TU/1328	0	0	Clear	Dry	County	ROUTE 530	TRENTON RD	Angle						
7	10/28/2003	TU/1546	0	0	Clear	Dry	County	ROUTE 530	TRENTON RD	Rear End						
8	12/6/2003	SA/951	0	0	Snow	Snowy	County	ROUTE 530	TRENTON RD	Other						
9	4/28/2004	W/1326	0	0	Clear	Dry	County	ROUTE 530	TRENTON RD	Rear End						
10	6/12/2004	SA/1124	0	0	Clear	Dry	County	ROUTE 530		Other						
11	8/26/2004	TH/1653	0	0	Clear	Dry	County	ROUTE 530	TRENTON RD	Rear End						
12	9/25/2004	SA/527	0	0	Clear	Dry	County	ROUTE 530	TRENTON RD	Other						
13	10/2/2004	SA/1435	0	0	Rain	Wet	County	ROUTE 530	TRENTON RD	Sideswipe						
14	4/30/2005	SA/1251	0	1	Rain	Wet	County	ROUTE 530	TRENTON RD	Angle						
15	5/29/2005	S/1232	0	0	Clear	Dry	County	ROUTE 530	TRENTON RD	Rear End						
16	6/4/2005	SA/1319	0	1	Clear	Dry	County	ROUTE 530	TRENTON RD							
17	6/12/2005	S/1135	0	0	Clear	Dry	County	ROUTE 530	TRENTON RD	Rear End						

Source: New Jersey Department of Transportation Crash Database

Lakehurst Road and Clubhouse Road Intersection
PEMBERTON TOWNSHIP - BURLINGTON COUNTY

Reportable crashes (2002 - 2005)

MAP ID	DATE	DAY/TIME	TOTAL KILLED	TOTAL INJURED	ROAD SYSTEM	WEATHER COND.	ROAD COND.	ROAD	CROSS ROAD	CRASH TYPE	AGE OF DRIVER 1	DRIVER 1 FACTOR	DRIVER 1 ACTION	AGE OF DRIVER 2	DRIVER 2 FACTOR	DRIVER 2 ACTION
1	1/24/2003	F/1611	0	2	Local	clear	dry	Clubhouse Rd.	Lakehurst Rd.	Rt Angle			SB right			SB right
2	2/5/2003	W/1213	0	0	County	clear	dry	Lakehurst Rd.	Clubhouse Rd.	Left Turn			EB thru			EB thru
3	4/7/2003	M/1849	0	0	Local	rain	snowy	Clubhouse Rd.	Lakehurst Rd.	Rt Angle			SB left turn			NB thru
4	4/23/2003	W/1525	0	0	Local	clear	dry	Clubhouse Rd.	Lakehurst Rd.	Rt Angle			EB waiting			EB waiting
5	5/15/2003	Th/1503	0	0	County	clear	dry	Lakehurst Rd.	Clubhouse Rd.	Head On			NB left turn			SB thru
6	5/26/2003	M/1051	0	0	County	rain	wet	Lakehurst Rd.	Clubhouse Rd.	Rt Angle			NB left turn			SB right
7	6/19/2003	Th/1311	0	0	County	clear	dry	Lakehurst Rd.	Clubhouse Rd.	Rt Angle			SB left turn			NB thru
8	9/12/2003	F/708	0	1	Local	clear	dry	Clubhouse Rd.	Lakehurst Rd.	Rt Angle			WB thru			WB at light
9	11/26/2003	W/1528	0	1	County	clear	dry	Lakehurst Rd.	Clubhouse Rd.	Left Turn			WB thru			WB thru
10	12/20/2003	Sa/1551	0	1	Local	clear	dry	Clubhouse Rd.	Lakehurst Rd.	Rt Angle			SB THRU			NB left
11	12/25/2003	Th/1248	0	0	Local	clear	dry	Clubhouse Rd.	Lakehurst Rd.	Rt Angle			SB left turn			NB thru
12	1/3/2004	Sa/1802	0	0	Local	clear	dry	Clubhouse Rd.	Lakehurst Rd.	Rt Angle			SB thru			WB thru
13	2/14/2004	Sa/1125	0	4	County	clear	dry	Lakehurst Rd.	Clubhouse Rd.	Rt Angle			NB left turn			SB thru
14	2/18/2004	W/1620	0	0	County	clear	dry	Lakehurst Rd.	Clubhouse Rd.	Rt Angle			SB thru			
15	3/2/2004	Tu/631	0	0	County	rain	wet	Lakehurst Rd.	Clubhouse Rd.	Same Dir			WB left			EB right
16	4/1/2004	Th/937	0	0	County	rain	wet	Lakehurst Rd.	Clubhouse Rd.	Rt Angle			WB thru			WB waiting
17	4/19/2004	M/708	0	3	County	clear	dry	Lakehurst Rd.	Clubhouse Rd.	Rt Angle			SB thru			SB waiting
18	4/23/2004	F/1345	0	0	Local	clear	dry	Clubhouse Rd.	Lakehurst Rd.	Rt Angle			NB thru			NB thru
19	4/23/2004	F/1641	0	0	County	clear	dry	Lakehurst Rd.	Clubhouse Rd.	Same Dir			EB thru			
20	7/24/2004	Sa/1018	0	0	County	clear	dry	Lakehurst Rd.	Clubhouse Rd.	Rt Angle			SB - from NB			NB waiting
21	9/19/2004	Su/1031	0	0	County	clear	dry	Lakehurst Rd.	Clubhouse Rd.	Rt Angle			NB left turn			SB right
22	9/29/2004	W/829	0	1	Local	clear	wet	Clubhouse Rd.	Lakehurst Rd.	Rt Angle			NB left turn			Sb thru
23	11/1/2004	M/2150	0	0	County	clear	dry	Lakehurst Rd.	Clubhouse Rd.	Other			SB thru			NB left
24	11/12/2004	F/1835	0	0	County	rain	wet	Lakehurst Rd.	Clubhouse Rd.	Same Dir			NB right			WB thru
25	11/18/2004	Th/1612	0	1	County	clear	dry	Lakehurst Rd.	Clubhouse Rd.	Rt Angle			WB waiting			WB waiting
26	11/23/2004	Tu/839	0	0	Local	clear	dry	Clubhouse Rd.	Lakehurst Rd.	Rt Angle			NB thru			NB right
27	12/9/2004	Th/1820	0	0	Local	rain	wet	Clubhouse Rd.	Lakehurst Rd.	Rt Angle			NB thru			Nb right
28	12/15/2004	W/1830	0	0	County	clear	dry	Lakehurst Rd.	Clubhouse Rd.	Same Dir			Nb thru			NB waiting
29	1/15/2005	Sa/2122	0	0		clear	dry	Clubhouse Rd.	Lakehurst Rd.	Rt Angle			SB left turn			NB thru

Source: Pemberton Township Police Crash Reports

Lakehurst Road and Clubhouse Road Intersection
PEMBERTON TOWNSHIP - BURLINGTON COUNTY

Reportable crashes (2002 - 2005)

MAP ID	DATE	DAY/TIME	TOTAL KILLED	TOTAL INJURED	ROAD SYSTEM	WEATHER COND.	ROAD COND.	ROAD	CROSS ROAD	CRASH TYPE	AGE OF DRIVER 1	DRIVER 1 FACTOR	DRIVER 1 ACTION	AGE OF DRIVER 2	DRIVER 2 FACTOR	DRIVER 2 ACTION
30	2/4/2005	F/700	0	0	County	clear	snowy	Lakehurst Rd.	Clubhouse Rd.	Rt Angle			NB - left turn			SB - thru
31	2/15/2005	Tu/820	0	1	County	clear	dry	Lakehurst Rd.	Clubhouse Rd.	Rt Angle			SB - thru			SB - left turn
32	4/21/2005	Th/922	0	0	County	snow	dry	Lakehurst Rd.	Clubhouse Rd.	Left Turn			SB - left turn			NB - thru
33	5/9/2005	M/1457	0	0	County	clear	dry	Lakehurst Rd.	Clubhouse Rd.	Same Dir			NB - straight			NB - waiting
34	5/20/2005	F/1746	0	1	County	rain	wet	Lakehurst Rd.	Clubhouse Rd.	Same Dir			SB - left turn			NB - thru
35	7/2/2005	Sa/2104			County	clear	dry	Lakehurst Rd.	Clubhouse Rd.	Rt Angle						
36	7/7/2005	Th/1401			County	clear	dry	Lakehurst Rd.	Clubhouse Rd.	Rt Angle						

Source: Pemberton Township Police Crash Reports

Trenton Road and Broadway Street Intersection
PEMBERTON TOWNSHIP - BURLINGTON COUNTY

Reportable crashes (2002 - 2005)

MAP ID	DATE	DAY/TIME	TOTAL KILLED	TOTAL INJURED	WEATHER COND.	ROAD COND.	ROAD SYSTEM	ROAD	CROSS ROAD	CRASH TYPE	AGE OF DRIVER 1	DRIVER 1 FACTOR	DRIVER 1 ACTION	AGE OF DRIVER 2	DRIVER 2 FACTOR	DRIVER 2 ACTION
1	8/19/2002	M/1616	0	0	Clear	Dry	County	Trenton Rd	Broadway Street	Sideswipe						
2	12/3/2002	TU/1551	0	0	Clear	Dry	County	Trenton Rd	Broadway Street	Rear End						
3	12/2/2002	M/1800	0	0	Clear	Dry	County	Trenton Rd	Broadway Street	Rear End						
4	10/14/2002	M/1606	0	0	Clear	Dry	County	Trenton Rd	Broadway Street	Angle						
5	6/12/2002	W/2035	0	0	Clear	Dry	County	Trenton Rd	Broadway Street	Rear End						
6	6/10/2002	M/902	0	1	Clear	Dry	County	Trenton Rd	Broadway Street	Angle						
7	6/10/2002	M/854	0	0	Clear	Dry	County	Trenton Rd	Broadway Street	Rear End						
8	9/15/2003	M/2019	0	0	Rain	Wet	County	Trenton Rd	TRENTON RD	Left Turn						
9	10/27/2003	M/1203	0	0	Rain	Wet	County	Trenton Rd	PBM RD.	Angle						
10	5/5/2003	M/1657	0	0	Clear	Dry	County	Trenton Rd	Broadway Street	Other Types						
11	4/23/2003	W/2015	0	1	Clear	Dry	County	Trenton Rd	Broadway Street	Angle						
12	11/29/2004	M/2109	0	0	Clear	Dry	County	Trenton Rd	Broadway Street	Left Turn						
13	4/2/2005	SA/1853	0	0	Rain	Wet	County	Trenton Rd		Angle						
14	4/3/2005	S/514	0	1	Clear	Dry	County	Trenton Rd		Rear End						
15	6/21/2005	TU/1150	0	0	Clear	Dry	County	Trenton Rd	Broadway Street	Left Turn						
16	7/5/2005	TU/1236	0	0	Clear	Dry	County	Trenton Rd	Broadway Street	Angle						

Source: New Jersey Department of Transportation Crash Database

Lakehurst Road and Junction Road/South Lakeshore Drive Intersection
PEMBERTON TOWNSHIP - BURLINGTION COUNTY

Reportable crashes (2002 - 2005)

MAP ID	DATE	DAY/TIME	TOTAL KILLED	TOTAL INJURED	WEATHER COND.	ROAD COND.	ROAD SYSTEM	ROAD	CROSS ROAD	CRASH TYPE	AGE OF DRIVER 1	DRIVER 1 FACTOR	DRIVER 1 ACTION	AGE OF DRIVER 2	DRIVER 2 FACTOR	DRIVER 2 ACTION
1	3/3/2002	S/1640	0	0	Rain	Wet	County	Lakehurst Rd	JUNCTION ROAD	Sideswipe						
2	3/4/2002	SA/1341	0	1	Clear	Dry	County	Lakehurst Rd	S. LAKESHORE DRIVE	Left Turn						
3	3/5/2002	W/1022	0	0	Clear	Dry	County	Lakehurst Rd	S. LAKESHORE DRIVE	Rear End						
4	3/6/2002	S/1508	0	1	Clear	Dry	County	Lakehurst Rd	S. LAKESHORE DRIVE							
5	3/7/2002	SA/1024	0	2	Clear	Dry	County	Lakehurst Rd	S. LAKESHORE DRIVE	Angle						
6	3/8/2002	F/1945	0	0	Clear	Dry	County	Lakehurst Rd	S. LAKESHORE DRIVE	Sideswipe						
7	3/9/2002	W/1626	0	0	Rain	Wet	County	Lakehurst Rd	S. LAKESHORE DRIVE	Rear End						
8	6/21/2003	SA/1240	0	0	Rain	Wet	County	Lakehurst Rd	S. LAKESHORE DRIVE	Rear End						
9	8/30/2003	SA/1707	0	0	Rain	Wet	County	Lakehurst Rd	S. LAKESHORE DRIVE	Rear End						
10	8/31/2003	S/1914	0	1	Clear	Dry	County	Lakehurst Rd	S. LAKESHORE DRIVE	Other						
11	10/18/2003	SA/812	0	0	Clear	Wet	County	Lakehurst Rd	JUNCTION ROAD	Left Turn						
12	12/14/2003	S/1844	0	0	Rain	Wet	County	Lakehurst Rd	JUNCTION RD (CR 645)	Rear End						
13	12/25/2003	TH/1957	0	0	Clear	Dry	County	Lakehurst Rd	S. LAKESHORE DRIVE	Sideswipe						
14	8/25/2004	W/1716	0	0	Clear	Dry	County	Lakehurst Rd	S. LAKESHORE DRIVE	Rear End						
15	9/23/2004	TH/1733	0	0	Clear	Dry	County	Lakehurst Rd	JUNCTION ROAD	Left Turn						
16	11/12/2004	F/1822	0	0	Rain	Wet	County	Lakehurst Rd	JUNCTION ROAD	Rear End						
17	1/23/2005	S/2137	0	0	Clear	Icy	County	Lakehurst Rd	S LAKESHORE DRIVE	Other						
18	8/5/2005	F/2202	0	1	Clear	Dry	County	Lakehurst Rd	JUNCTION ROAD							
19	9/7/2005	W/2053	0	1	Clear	Dry	County	Lakehurst Rd	S. LAKESHORE DRIVE							
20	10/12/2005	W/753	0	1	Rain	Wet	County	Lakehurst Rd	S. LAKESHORE DRIVE	Left Turn						
21	4/5/2005	TU/1504	0	0	Clear	Dry	County	Lakehurst Rd		Angle						

Source: New Jersey Department of Transportation Crash Database

Lakehurst Road and Rancocas Lane Intersection
PEMBERTON TOWNSHIP - BURLINGTON COUNTY

Reportable crashes (2002 - 2005)

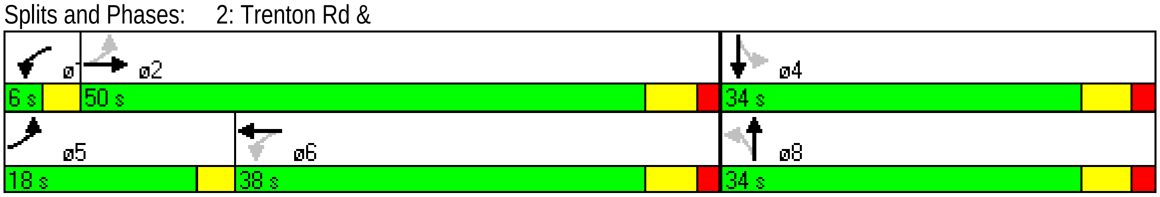
MAP ID	DATE	DAY/TIME	TOTAL KILLED	TOTAL INJURED	WEATHER COND.	ROAD COND.	ROAD SYSTEM	ROAD	CROSS ROAD	CRASH TYPE	AGE OF DRIVER 1	DRIVER 1 FACTOR	DRIVER 1 ACTION	AGE OF DRIVER 2	DRIVER 2 FACTOR	DRIVER 2 ACTION
1	11/19/2002	TU/1731	0	0	Rain	Wet	County	Lakehurst Rd	RANCOCAS LANE	Angle						
2	5/18/2003	S/1324	0	2	Clear	Dry	County	Lakehurst Rd	RANCOCAS LANE	Angle						
3	7/11/2003	F/1706	0	4	Rain	Wet	County	Lakehurst Rd	RANCOCAS LANE	Head-On						
4	8/15/2003	F/1600	0	0	Clear	Dry	County	Lakehurst Rd	RANCOCAS LANE	Angle						
5	10/3/2003	F/1152	0	0	Clear	Dry	County	Lakehurst Rd	RANCOCAS LANE	Angle						
6	11/28/2003	F/630	0	0	Clear	Dry	County	Lakehurst Rd	RANCOCAS LANE	Other						
7	2/7/2004	SA/1331	0	1	Clear	Dry	County	Lakehurst Rd	RANCOCAS LANE	Left Turn						
8	3/19/2004	F/1829	0	1	Clear	Wet	County	Lakehurst Rd	RANCOCAS LANE	Angle						
9	5/8/2004	SA/1419	0	1	Clear	Dry	County	Lakehurst Rd	RANCOCAS LANE	Angle						
10	5/15/2004	SA/922	0	0	Clear	Dry	County	Lakehurst Rd	RANCOCAS LANE	Sideswipe						
11	9/5/2004	S/2008	0	0	Clear	Dry	County	Lakehurst Rd	RANCOCAS LANE	Angle						
12	10/21/2004	TH/1802	0	1	Clear	Dry	County	Lakehurst Rd	RANCOCAS LANE	Angle						
13	11/9/2004	TU/1727	0	0	Clear	Dry	County	Lakehurst Rd	RANCOCAS LANE	Rear End						
14	2/4/2005	F/1713	0	1	Clear	Wet	County	Lakehurst Rd	RANCOCAS LANE	Angle						
15	12/22/2005	TH/1604	0	1	Clear	Dry	County	Lakehurst Rd	RANCOCAS LANE	Angle						

Source: New Jersey Department of Transportation Crash Database

Lane Group	EBL	EBT	EBR	WBL		WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	112	19	67		58	11	427	52	16	98	125
Ideal Flow (vphpl)	1900	1900	1900	1900		1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	200		0	200		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Satd. Flow (prot)	1770	1824	0	1770		0	1770	1827	0	1770	1706	0
Flt Permitted	0.147			0.649			0.405			0.144		
Satd. Flow (perm)	274	1824	0	1209		0	754	1827	0	268	1706	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30						30			30	
Link Distance (ft)		279						1310			476	
Travel Time (s)		6.3						29.8			10.8	
Lane Group Flow (vph)	471	171	0	88		0	16	548	0	32	330	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	18.0	50.0	0.0	6.0	38.0	0.0	34.0	34.0	0.0	34.0	34.0	0.0
Total Lost Time (s)	3.0	6.0	4.0	3.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)	51.6	43.9		36.6	30.6		27.8	27.8		27.8	27.8	
Actuated g/C Ratio	0.58	0.50		0.41	0.35		0.31	0.31		0.31	0.31	
v/c Ratio	1.14	0.19		0.17	0.89		0.07	0.95		0.38	0.62	
Control Delay	110.0	13.5		10.9	45.2		22.9	59.7		39.9	32.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	110.0	13.5		10.9	45.2		22.9	59.7		39.9	32.0	
LOS	F	B		B	D		C	E		D	C	
Approach Delay		84.3			40.6			58.6			32.7	
Approach LOS		F			D			E			C	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 88.4	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.14	
Intersection Signal Delay: 56.5	Intersection LOS: E
Intersection Capacity Utilization 82.1%	ICU Level of Service E
Analysis Period (min) 15	

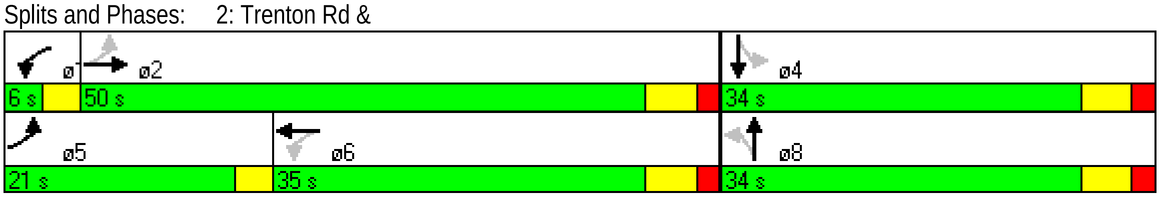
Splits and Phases: 2: Trenton Rd &



Lane Group	EBL	EBT	EBR	WBL		WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	112	19	67		58	11	427	52	16	98	125
Ideal Flow (vphpl)	1900	1900	1900	1900		1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	200		0	200		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Satd. Flow (prot)	1770	1824	0	1770		0	1770	1827	0	1770	1706	0
Flt Permitted	0.124			0.649			0.401			0.143		
Satd. Flow (perm)	231	1824	0	1209		0	747	1827	0	266	1706	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30						30			30	
Link Distance (ft)		279						1310			476	
Travel Time (s)		6.3						29.8			10.8	
Lane Group Flow (vph)	471	171	0	88		0	16	548	0	32	330	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	21.0	50.0	0.0	6.0	35.0	0.0	34.0	34.0	0.0	34.0	34.0	0.0
Total Lost Time (s)	3.0	6.0	4.0	3.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)	52.7	44.9		34.7	28.7		27.9	27.9		27.9	27.9	
Actuated g/C Ratio	0.59	0.50		0.38	0.32		0.31	0.31		0.31	0.31	
v/c Ratio	1.06	0.19		0.18	0.96		0.07	0.96		0.39	0.62	
Control Delay	84.1	13.5		11.7	60.1		23.0	61.9		40.4	32.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	84.1	13.5		11.7	60.1		23.0	61.9		40.4	32.5	
LOS	F	B		B	E		C	E		D	C	
Approach Delay		65.3			53.5			60.8			33.2	
Approach LOS		E			D			E			C	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 89.6	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.06	
Intersection Signal Delay: 55.5	Intersection LOS: E
Intersection Capacity Utilization 82.1%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 2: Trenton Rd &



Lane Group	EBL	EBT	EBR	WBL		WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	112	19	67		58	11	427	52	16	98	125
Ideal Flow (vphpl)	1900	1900	1900	1900		1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	200		0	200		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Satd. Flow (prot)	1770	1824	0	1770		0	1770	1827	0	1770	1706	0
Flt Permitted	0.180			0.588			0.378			0.124		
Satd. Flow (perm)	335	1824	0	1095		0	704	1827	0	231	1706	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30						30			30	
Link Distance (ft)		279						1310			476	
Travel Time (s)		6.3						29.8			10.8	
Lane Group Flow (vph)	471	171	0	88		0	16	548	0	32	330	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	25.0	62.0	0.0	6.0	43.0	0.0	38.0	38.0	0.0	38.0	38.0	0.0
Total Lost Time (s)	3.0	6.0	4.0	3.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)	59.9	56.9		37.9	34.9		32.3	32.3		32.3	32.3	
Actuated g/C Ratio	0.57	0.54		0.36	0.33		0.30	0.30		0.30	0.30	
v/c Ratio	0.92	0.17		0.21	0.93		0.07	0.98		0.45	0.63	
Control Delay	35.1	9.1		23.8	58.2		27.8	72.0		53.8	38.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	35.1	9.1		23.8	58.2		27.8	72.0		53.8	38.4	
LOS	D	A		C	E		C	E		D	D	
Approach Delay		28.2			53.5			70.8			39.8	
Approach LOS		C			D			E			D	

Intersection Summary

Area Type: Other

Cycle Length: 106

Actuated Cycle Length: 106

Offset: 8 (8%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

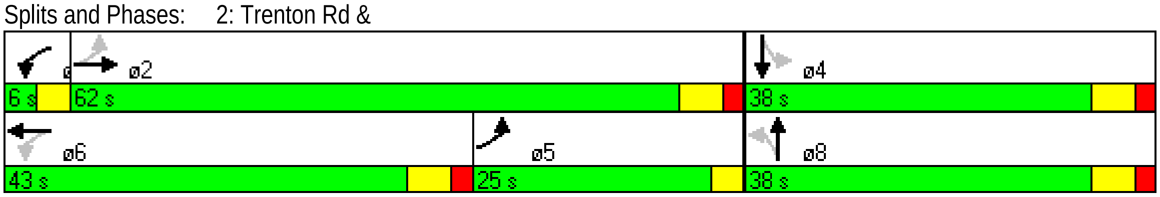
Maximum v/c Ratio: 0.98

Intersection Signal Delay: 48.3 Intersection LOS: D

Intersection Capacity Utilization 82.1% ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 2: Trenton Rd &

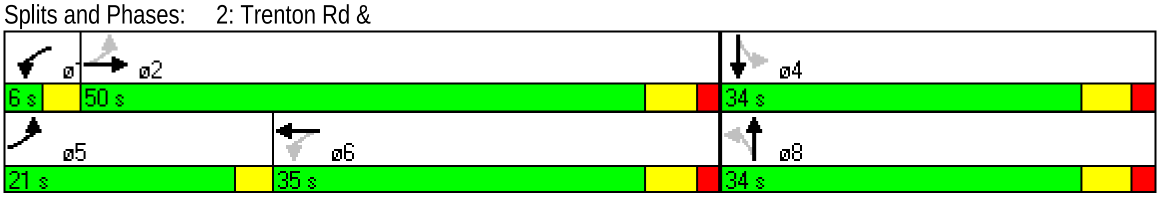


Lane Group	EBL	EBT	EBR	WBL		WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	112	19	67		58	11	427	52	16	98	125
Satd. Flow (prot)	1770	1824	0	1770		0	1770	1827	0	1770	1706	0
Flt Permitted	0.124			0.649			0.401			0.143		
Satd. Flow (perm)	231	1824	0	1209		0	747	1827	0	266	1706	0
Satd. Flow (RTOR)											73	
Lane Group Flow (vph)	471	171	0	88		0	16	548	0	32	330	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	21.0	50.0	0.0	6.0	35.0	0.0	34.0	34.0	0.0	34.0	34.0	0.0
Total Lost Time (s)	3.0	6.0	4.0	3.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)	52.7	44.9		34.7	28.7		27.9	27.9		27.9	27.9	
Actuated g/C Ratio	0.59	0.50		0.38	0.32		0.31	0.31		0.31	0.31	
v/c Ratio	1.06	0.19		0.18	0.96		0.07	0.96		0.39	0.57	
Control Delay	84.1	13.5		11.7	60.1		23.0	61.9		40.4	24.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	84.1	13.5		11.7	60.1		23.0	61.9		40.4	24.3	
LOS	F	B		B	E		C	E		D	C	
Approach Delay		65.3			53.5			60.8			25.7	
Approach LOS		E			D			E			C	

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 89.6
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.06
Intersection Signal Delay: 54.2 — Intersection LOS: D
Intersection Capacity Utilization 82.1% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 2: Trenton Rd &



Lane Group	EBL	EBT	EBR	WBL		WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	112	19	67		58	11	427	52	16	98	125
Satd. Flow (prot)	1770	1824	0	1770		0	0	3472	0	0	3257	0
Flt Permitted	0.207			0.649				0.931			0.740	
Satd. Flow (perm)	386	1824	0	1209		0	0	3236	0	0	2420	0
Satd. Flow (RTOR)												
Lane Group Flow (vph)	471	171	0	88		0	0	564	0	0	362	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	13.0	37.0	0.0	6.0	30.0	0.0	17.0	17.0	0.0	17.0	17.0	0.0
Total Lost Time (s)	3.0	6.0	4.0	3.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)	36.9	29.2		26.9	20.9			11.0			11.0	
Actuated g/C Ratio	0.65	0.51		0.46	0.37			0.19			0.19	
v/c Ratio	0.95	0.18		0.15	0.84			0.90			0.77	
Control Delay	44.2	8.5		5.1	29.6			44.7			36.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	44.2	8.5		5.1	29.6			44.7			36.6	
LOS	D	A		A	C			D			D	
Approach Delay		34.7			26.3			44.7			36.6	
Approach LOS		C			C			D			D	

Intersection Summary

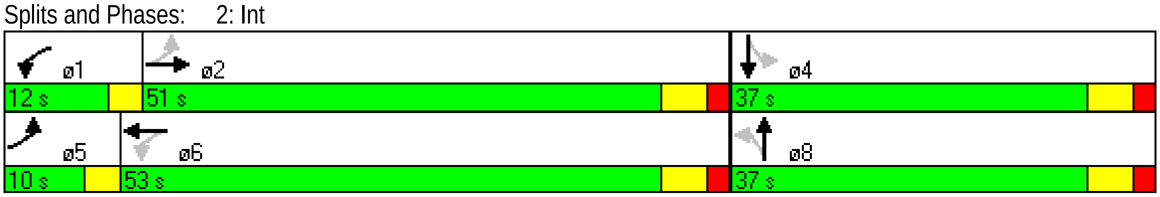
Cycle Length: 60
Actuated Cycle Length: 57
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 35.1 Intersection LOS: D
Intersection Capacity Utilization 77.9% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 2: Trenton Rd &

Lane Group	EBL		EBR	WBL		WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	188		26	278		36	6	175	71	38	282	287
Ideal Flow (vphpl)	1900		1900	1900		1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	200		0	200		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Satd. Flow (prot)	1770		0	1770		0	1770	1775	0	1770	1723	0
Flt Permitted	0.434			0.236			0.129			0.464		
Satd. Flow (perm)	808		0	440		0	240	1775	0	864	1723	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)								30			30	
Link Distance (ft)								1310			476	
Travel Time (s)								29.8			10.8	
Lane Group Flow (vph)	247		0	331		0	8	295	0	60	666	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	10.0	51.0	0.0	12.0	53.0	0.0	37.0	37.0	0.0	37.0	37.0	0.0
Total Lost Time (s)	3.0	6.0	4.0	3.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)	48.3	38.3		52.3	40.3		31.0	31.0		31.0	31.0	
Actuated g/C Ratio	0.52	0.41		0.56	0.43		0.33	0.33		0.33	0.33	
v/c Ratio	0.50	0.72		0.88	0.50		0.10	0.50		0.21	1.16	
Control Delay	14.6	29.4		39.4	21.8		26.7	28.9		25.5	121.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.6	29.4		39.4	21.8		26.7	28.9		25.5	121.7	
LOS	B	C		D	C		C	C		C	F	
Approach Delay		24.8			29.8			28.9			113.7	
Approach LOS		C			C			C			F	

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 93.3	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.16	
Intersection Signal Delay: 52.1	Intersection LOS: D
Intersection Capacity Utilization 92.0%	ICU Level of Service F
Analysis Period (min) 15	

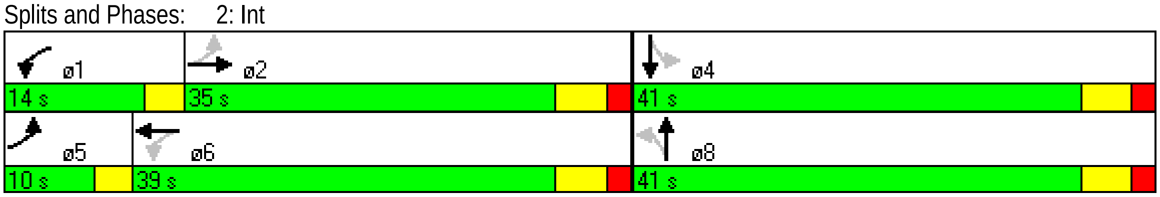
Splits and Phases: 2: Int



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	188		26	278		36	6	175	71	38	282	287
Ideal Flow (vphpl)	1900		1900	1900		1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	200		0	200		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Satd. Flow (prot)	1770		0	1770		0	1770	1775	0	1770	1723	0
Flt Permitted	0.415			0.129			0.114			0.504		
Satd. Flow (perm)	773		0	240		0	212	1775	0	939	1723	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)								30			30	
Link Distance (ft)								1310			476	
Travel Time (s)								29.8			10.8	
Lane Group Flow (vph)	247		0	331		0	8	295	0	60	666	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	10.0	35.0	0.0	14.0	39.0	0.0	41.0	41.0	0.0	41.0	41.0	0.0
Total Lost Time (s)	3.0	6.0	4.0	3.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)	38.0	28.0		45.0	32.0		35.0	35.0		35.0	35.0	
Actuated g/C Ratio	0.43	0.31		0.51	0.36		0.39	0.39		0.39	0.39	
v/c Ratio	0.60	0.94		1.06	0.60		0.10	0.42		0.16	0.98	
Control Delay	21.3	56.0		92.5	27.8		21.2	22.3		19.5	59.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	21.3	56.0		92.5	27.8		21.2	22.3		19.5	59.4	
LOS	C	E		F	C		C	C		B	E	
Approach Delay		45.1			57.3			22.3			56.1	
Approach LOS		D			E			C			E	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 89	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.06	
Intersection Signal Delay: 49.0	Intersection LOS: D
Intersection Capacity Utilization 85.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 2: Int

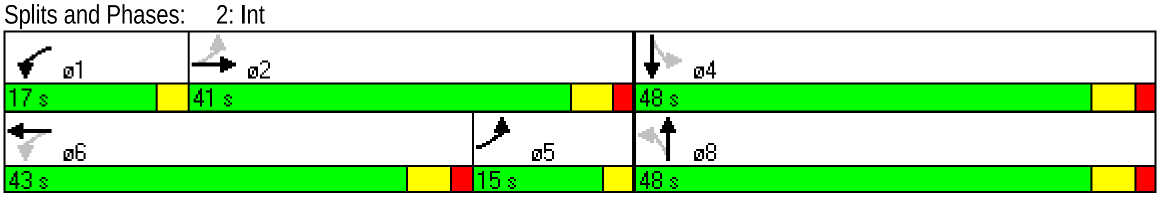


Lane Group	EBL		EBR	WBL		WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	188		26	278		36	6	175	71	38	282	287
Ideal Flow (vphpl)	1900		1900	1900		1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	200		0	200		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Satd. Flow (prot)	1770		0	1770		0	1770	1775	0	1770	1723	0
Flt Permitted	0.529			0.274			0.103			0.490		
Satd. Flow (perm)	985		0	510		0	192	1775	0	913	1723	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)								30			30	
Link Distance (ft)								1310			476	
Travel Time (s)								29.8			10.8	
Lane Group Flow (vph)	247		0	331		0	8	295	0	60	666	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	15.0	41.0	0.0	17.0	43.0	0.0	48.0	48.0	0.0	48.0	48.0	0.0
Total Lost Time (s)	3.0	6.0	4.0	3.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)	37.0	34.0		32.6	29.6		42.1	42.1		42.1	42.1	
Actuated g/C Ratio	0.35	0.32		0.31	0.28		0.40	0.40		0.40	0.40	
v/c Ratio	0.51	0.92		0.99	0.77		0.11	0.42		0.17	0.97	
Control Delay	22.7	37.4		81.4	45.7		24.7	25.4		22.3	61.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.7	37.4		81.4	45.7		24.7	25.4		22.3	61.1	
LOS	C	D		F	D		C	C		C	E	
Approach Delay		32.8			62.0			25.4			57.9	
Approach LOS		C			E			C			E	

Intersection Summary

Area Type: Other	
Cycle Length: 106	
Actuated Cycle Length: 106	
Offset: 29 (27%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 47.4	Intersection LOS: D
Intersection Capacity Utilization 85.5%	ICU Level of Service E
Analysis Period (min) 15	

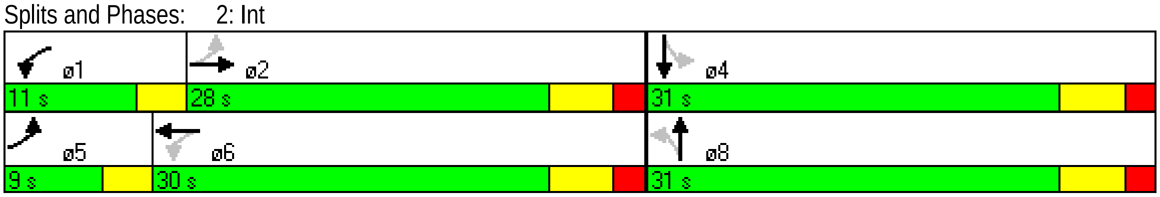
Splits and Phases: 2: Int



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	188		26	278		36	6	175	71	38	282	287
Satd. Flow (prot)	1770		0	1770		0	1770	1775	0	1770	1723	0
Flt Permitted	0.409			0.168			0.160			0.515		
Satd. Flow (perm)	762		0	313		0	298	1775	0	959	1723	0
Satd. Flow (RTOR)											80	
Lane Group Flow (vph)	247		0	331		0	8	295	0	60	666	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	9.0	28.0	0.0	11.0	30.0	0.0	31.0	31.0	0.0	31.0	31.0	0.0
Total Lost Time (s)	3.0	6.0	4.0	3.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)	30.8	21.8		34.8	23.8		25.0	25.0		25.0	25.0	
Actuated g/C Ratio	0.44	0.31		0.50	0.34		0.36	0.36		0.36	0.36	
v/c Ratio	0.58	0.94		1.02	0.63		0.08	0.46		0.17	1.00	
Control Delay	17.1	52.2		74.8	24.8		17.2	20.3		17.2	56.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.1	52.2		74.8	24.8		17.2	20.3		17.2	56.5	
LOS	B	D		E	C		B	C		B	E	
Approach Delay		41.2			47.6			20.2			53.3	
Approach LOS		D			D			C			D	

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 69.8	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.02	
Intersection Signal Delay: 44.0	Intersection LOS: D
Intersection Capacity Utilization 85.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 2: Int

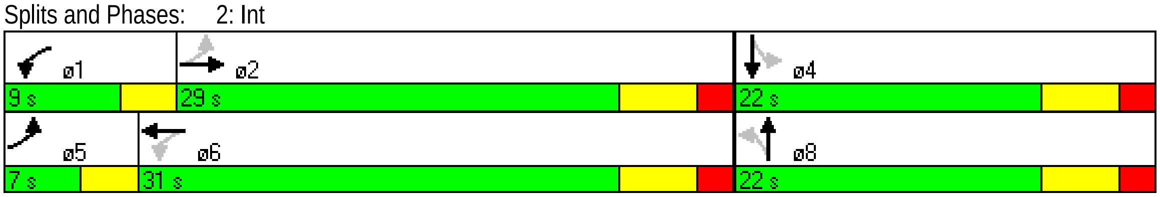


Lane Group	EBL		EBR	WBL		WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	188		26	278		36	6	175	71	38	282	287
Satd. Flow (prot)	1770		0	1770		0	0	3373	0	0	3282	0
Flt Permitted	0.481			0.214				0.927			0.886	
Satd. Flow (perm)	896		0	399		0	0	3130	0	0	2919	0
Satd. Flow (RTOR)												
Lane Group Flow (vph)	247		0	331		0	0	303	0	0	726	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	7.0	29.0	0.0	9.0	31.0	0.0	22.0	22.0	0.0	22.0	22.0	0.0
Total Lost Time (s)	3.0	6.0	4.0	3.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)	27.2	20.2		31.3	22.2			15.9			15.9	
Actuated g/C Ratio	0.48	0.35		0.55	0.39			0.28			0.28	
v/c Ratio	0.51	0.83		0.91	0.55			0.35			0.90	
Control Delay	11.4	30.1		42.7	16.9			18.6			37.7	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	11.4	30.1		42.7	16.9			18.6			37.7	
LOS	B	C		D	B			B			D	
Approach Delay		24.2			28.7			18.6			37.7	
Approach LOS		C			C			B			D	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 57.2
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 28.7 Intersection LOS: C
Intersection Capacity Utilization 83.5% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 2: Int

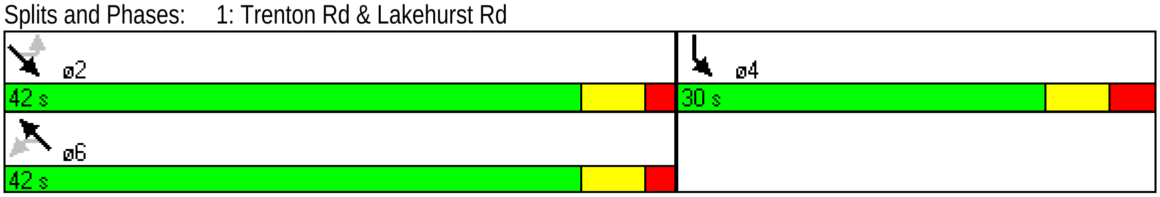


Lane Group	SBL	SBR	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations										
Volume (vph)	126	0	1	213	0	0	647	373	0	0
Satd. Flow (prot)	3433	0	0	3536	0	0	1863	1583	0	0
Flt Permitted	0.950			0.947						
Satd. Flow (perm)	3433	0	0	3352	0	0	1863	1583	0	0
Satd. Flow (RTOR)								310		
Lane Group Flow (vph)	135	0	0	267	0	0	780	439	0	0
Turn Type			Perm			Perm		Free		
Protected Phases	4			2			6			
Permitted Phases			2			6		Free		
Total Split (s)	30.0	0.0	42.0	42.0	0.0	42.0	42.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.0	4.0
Act Effct Green (s)	6.6			36.0			36.0	55.6		
Actuated g/C Ratio	0.12			0.65			0.65	1.00		
v/c Ratio	0.33			0.12			0.65	0.28		
Control Delay	24.7			4.1			9.4	0.4		
Queue Delay	0.0			0.0			0.0	0.0		
Total Delay	24.7			4.1			9.4	0.4		
LOS	C			A			A	A		
Approach Delay	24.7			4.1			6.2			
Approach LOS	C			A			A			

Intersection Summary

Cycle Length: 72
Actuated Cycle Length: 55.6
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.65
Intersection Signal Delay: 7.4 Intersection LOS: A
Intersection Capacity Utilization 48.5% ICU Level of Service A
Analysis Period (min) 15

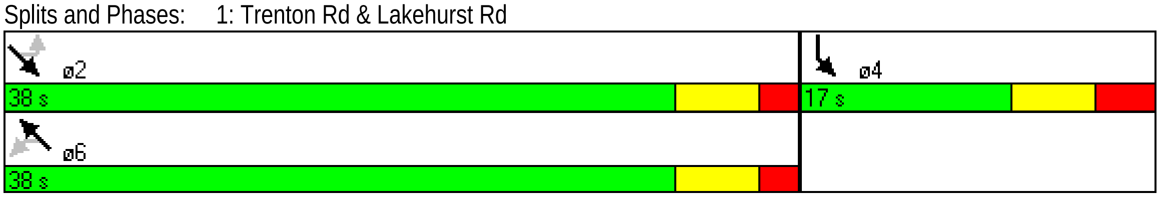
Splits and Phases: 1: Trenton Rd & Lakehurst Rd



Lane Group	SBL	SBR	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations										
Volume (vph)	126	0	1	213	0	0	647	373	0	0
Satd. Flow (prot)	3433	0	0	3536	0	0	1863	1583	0	0
Flt Permitted	0.950			0.947						
Satd. Flow (perm)	3433	0	0	3352	0	0	1863	1583	0	0
Satd. Flow (RTOR)								405		
Lane Group Flow (vph)	135	0	0	267	0	0	780	439	0	0
Turn Type			Perm			Perm		Free		
Protected Phases	4			2			6			
Permitted Phases			2			6		Free		
Total Split (s)	17.0	0.0	38.0	38.0	0.0	38.0	38.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.0	4.0
Act Effct Green (s)	7.8			46.2			46.2	66.3		
Actuated g/C Ratio	0.11			0.70			0.70	1.00		
v/c Ratio	0.35			0.11			0.60	0.28		
Control Delay	19.0			3.9			8.5	0.4		
Queue Delay	0.0			0.0			0.0	0.0		
Total Delay	19.0			3.9			8.5	0.4		
LOS	B			A			A	A		
Approach Delay	19.0			3.9			5.6			
Approach LOS	B			A			A			

Intersection Summary	
Cycle Length: 55	
Actuated Cycle Length: 66.3	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 6.5	Intersection LOS: A
Intersection Capacity Utilization 48.5%	ICU Level of Service A
Analysis Period (min) 15	

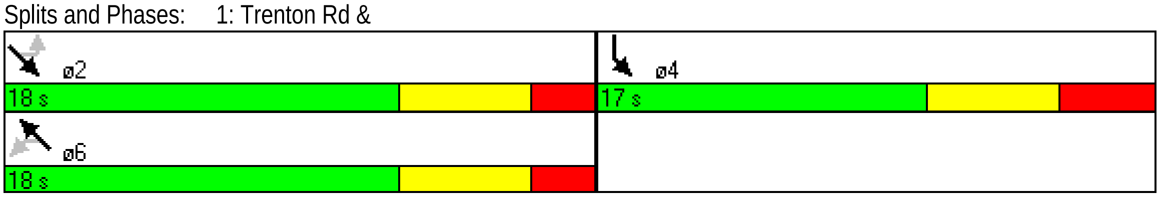
Splits and Phases: 1: Trenton Rd & Lakehurst Rd



Lane Group	SBL	SBR	SBR2	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations											
Volume (vph)	427	0	3	7	603	0	0	316	201	0	0
Satd. Flow (prot)	3434	0	0	0	3532	0	0	1863	1583	0	0
Flt Permitted	0.953				0.926						
Satd. Flow (perm)	3434	0	0	0	3277	0	0	1863	1583	0	0
Satd. Flow (RTOR)	6								231		
Lane Group Flow (vph)	559	0	0	0	659	0	0	367	231	0	0
Turn Type				Perm			Perm		Free		
Protected Phases	4				2			6			
Permitted Phases				2			6		Free		
Total Split (s)	17.0	0.0	0.0	18.0	18.0	0.0	18.0	18.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	4.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.0	4.0
Act Effct Green (s)	8.8				10.3			10.3	32.2		
Actuated g/C Ratio	0.27				0.32			0.32	1.00		
v/c Ratio	0.60				0.63			0.61	0.15		
Control Delay	13.2				12.5			14.6	0.2		
Queue Delay	0.0				0.0			0.0	0.0		
Total Delay	13.2				12.5			14.6	0.2		
LOS	B				B			B	A		
Approach Delay	13.2				12.5			9.0			
Approach LOS	B				B			A			

Intersection Summary	
Cycle Length: 35	
Actuated Cycle Length: 32.2	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.63	
Intersection Signal Delay: 11.6	Intersection LOS: B
Intersection Capacity Utilization 44.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Trenton Rd &



Lane Group	SBL	SBR	SBR2	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations											
Volume (vph)	427	0	3	7	603	0	0	316	201	0	0
Satd. Flow (prot)	3434	0	0	0	3532	0	0	1863	1583	0	0
Flt Permitted	0.953				0.928						
Satd. Flow (perm)	3434	0	0	0	3284	0	0	1863	1583	0	0
Satd. Flow (RTOR)	5								231		
Lane Group Flow (vph)	559	0	0	0	659	0	0	367	231	0	0
Turn Type				Perm			Perm		Free		
Protected Phases	4				2			6			
Permitted Phases				2			6		Free		
Total Split (s)	17.0	0.0	0.0	23.0	23.0	0.0	23.0	23.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	4.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.0	4.0
Act Effct Green (s)	8.8				11.3			11.3	33.3		
Actuated g/C Ratio	0.26				0.34			0.34	1.00		
v/c Ratio	0.61				0.59			0.58	0.15		
Control Delay	14.6				11.5			13.2	0.2		
Queue Delay	0.0				0.0			0.0	0.0		
Total Delay	14.6				11.5			13.2	0.2		
LOS	B				B			B	A		
Approach Delay	14.6				11.5			8.2			
Approach LOS	B				B			A			

Intersection Summary	
Cycle Length: 40	
Actuated Cycle Length: 33.3	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.61	
Intersection Signal Delay: 11.4	Intersection LOS: B
Intersection Capacity Utilization 44.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Trenton Rd &

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR						NWR
Lane Configurations												
Volume (vph)	95	8	26	5	18	107						1
Satd. Flow (prot)	1770	1658	0	0	1664	0						0
Flt Permitted	0.658				0.971							
Satd. Flow (perm)	1226	1658	0	0	1622	0						0
Satd. Flow (RTOR)		44			116							
Lane Group Flow (vph)	136	60	0	0	152	0						0
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Total Split (s)	19.0	19.0	0.0	19.0	19.0	0.0	51.0	51.0	51.0	51.0	51.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0
Act Effct Green (s)	11.5	11.5			11.5		45.0	45.0	45.0	45.0	45.0	
Actuated g/C Ratio	0.17	0.17			0.17		0.66	0.66	0.66	0.66	0.66	
v/c Ratio	0.66	0.19			0.41		0.09	0.20	0.07	0.08	0.61	
Control Delay	43.5	12.9			12.3		5.5	5.4	1.5	5.0	9.8	
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	43.5	12.9			12.3		5.5	5.4	1.5	5.0	9.8	
LOS	D	B			B		A	A	A	A	A	
Approach Delay		34.2			12.3			4.6			9.5	
Approach LOS		C			B			A			A	

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 68.5	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.66	
Intersection Signal Delay: 11.8	Intersection LOS: B
Intersection Capacity Utilization 97.8%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 17: Junction & Lakehurst

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR						NWR
Lane Configurations												
Volume (vph)	95	8	26	5	18	107						1
Satd. Flow (prot)	1770	1658	0	0	1664	0						0
Flt Permitted	0.768				0.968							
Satd. Flow (perm)	1431	1658	0	0	1617	0						0
Satd. Flow (RTOR)		44			116							
Lane Group Flow (vph)	136	60	0	0	152	0						0
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Total Split (s)	17.0	17.0	0.0	17.0	17.0	0.0	38.0	38.0	38.0	38.0	38.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0
Act Effct Green (s)	9.3	9.3			9.3		32.0	32.0	32.0	32.0	32.0	
Actuated g/C Ratio	0.17	0.17			0.17		0.60	0.60	0.60	0.60	0.60	
v/c Ratio	0.55	0.19			0.40		0.11	0.22	0.07	0.08	0.67	
Control Delay	28.9	10.6			10.6		6.2	5.9	1.8	5.4	11.3	
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	28.9	10.6			10.6		6.2	5.9	1.8	5.4	11.3	
LOS	C	B			B		A	A	A	A	B	
Approach Delay		23.3			10.6			5.1			10.9	
Approach LOS		C			B			A			B	

Intersection Summary

Cycle Length: 55
Actuated Cycle Length: 53.3
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 11.1 Intersection LOS: B
Intersection Capacity Utilization 63.9% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 17: Junction & Lakehurst

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR						NWR
Lane Configurations												
Volume (vph)	95	8	26	5	18	107						1
Satd. Flow (prot)	1770	1658	0	1770	1632	0						0
Flt Permitted	0.668			0.718								
Satd. Flow (perm)	1244	1658	0	1337	1632	0						0
Satd. Flow (RTOR)		44			116							
Lane Group Flow (vph)	136	60	0	12	140	0						0
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Total Split (s)	20.0	20.0	0.0	20.0	20.0	0.0	40.0	40.0	40.0	40.0	40.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0
Act Effct Green (s)	10.8	10.8		10.8	10.8		34.1	34.1	34.1	34.1	34.1	
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.60	0.60	0.60	0.60	0.60	
v/c Ratio	0.58	0.17		0.05	0.35		0.11	0.22	0.07	0.08	0.67	
Control Delay	31.1	10.3		18.6	8.9		7.0	6.5	2.0	6.1	12.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	31.1	10.3		18.6	8.9		7.0	6.5	2.0	6.1	12.2	
LOS	C	B		B	A		A	A	A	A	B	
Approach Delay		24.7			9.7			5.6			11.8	
Approach LOS		C			A			A			B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 56.9	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 11.8	Intersection LOS: B
Intersection Capacity Utilization 63.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 17: Junction & Lakehurst

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR						NWR
Lane Configurations												
Volume (vph)	95	8	26	5	18	107						1
Satd. Flow (prot)	1770	1658	0	0	1664	0						0
Flt Permitted	0.773				0.969							
Satd. Flow (perm)	1440	1658	0	0	1619	0						0
Satd. Flow (RTOR)		44			116							
Lane Group Flow (vph)	136	60	0	0	152	0						0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Total Split (s)	18.0	18.0	0.0	18.0	18.0	0.0	37.0	37.0	0.0	37.0	37.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)	9.6	9.6			9.6		31.1	31.1		31.1	31.1	
Actuated g/C Ratio	0.18	0.18			0.18		0.59	0.59		0.59	0.59	
v/c Ratio	0.52	0.18			0.39		0.11	0.16		0.09	0.68	
Control Delay	26.8	10.1			10.0		6.7	4.3		5.8	12.1	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	26.8	10.1			10.0		6.7	4.3		5.8	12.1	
LOS	C	B			A		A	A		A	B	
Approach Delay		21.7			10.0			4.5			11.7	
Approach LOS		C			A			A			B	

Intersection Summary

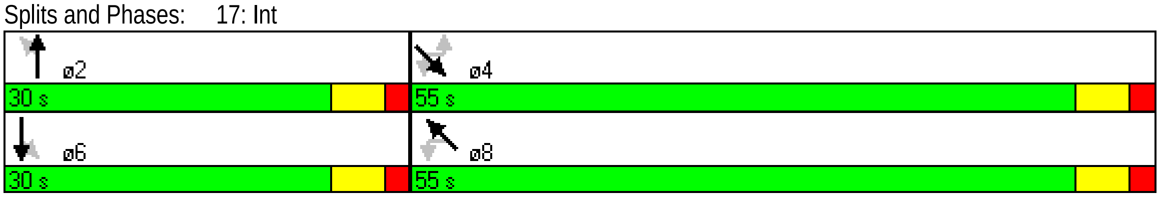
Cycle Length: 55
Actuated Cycle Length: 52.7
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 11.1 — Intersection LOS: B
Intersection Capacity Utilization 63.9% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 17: Junction & Lakehurst

Lane Group			NBR	SBL	SBT	SBR						NWR
Lane Configurations												
Volume (vph)			76	94	13	62						58
Satd. Flow (prot)			0	0	1736	0						0
Flt Permitted					0.708							
Satd. Flow (perm)			0	0	1271	0						0
Satd. Flow (RTOR)												
Lane Group Flow (vph)			0	0	370	0						0
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Total Split (s)	30.0	30.0	0.0	30.0	30.0	0.0	55.0	55.0	55.0	55.0	55.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0
Act Effct Green (s)	24.0	24.0			24.0		49.0	49.0	49.0	49.0	49.0	
Actuated g/C Ratio	0.28	0.28			0.28		0.58	0.58	0.58	0.58	0.58	
v/c Ratio	0.78	0.27			1.03		0.34	1.01	0.16	0.09	0.57	
Control Delay	47.3	11.6			88.5		12.9	49.3	1.9	11.2	13.7	
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	47.3	11.6			88.5		12.9	49.3	1.9	11.2	13.7	
LOS	D	B			F		B	D	A	B	B	
Approach Delay		34.4			88.5			40.6			13.6	
Approach LOS		C			F			D			B	

Intersection Summary	
Cycle Length: 85	
Actuated Cycle Length: 85	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.03	
Intersection Signal Delay: 40.2	Intersection LOS: D
Intersection Capacity Utilization 109.5%	ICU Level of Service H
Analysis Period (min) 15	

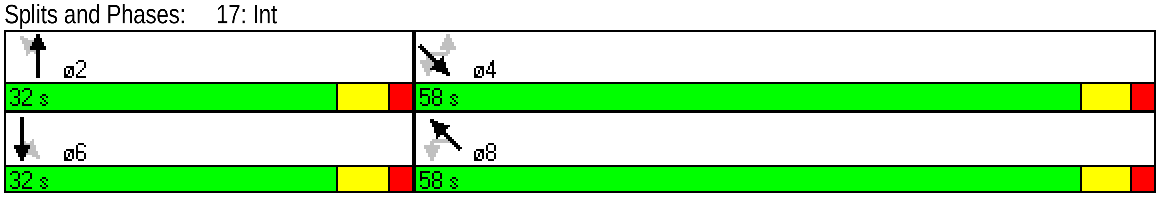
Splits and Phases: 17: Int



Lane Group	NBL	NBT	NBR	SBL	SBT	SBR						NWR
Lane Configurations												
Volume (vph)	142	25	76	94	13	62						58
Satd. Flow (prot)	1770	1669	0	0	1736	0						0
Flt Permitted	0.613				0.708							
Satd. Flow (perm)	1142	1669	0	0	1271	0						0
Satd. Flow (RTOR)		91										
Lane Group Flow (vph)	254	144	0	0	370	0						0
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Total Split (s)	32.0	32.0	0.0	32.0	32.0	0.0	58.0	58.0	58.0	58.0	58.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0
Act Effct Green (s)	26.0	26.0			26.0		52.0	52.0	52.0	52.0	52.0	
Actuated g/C Ratio	0.29	0.29			0.29		0.58	0.58	0.58	0.58	0.58	
v/c Ratio	0.77	0.26			1.01		0.34	1.01	0.16	0.10	0.57	
Control Delay	46.9	11.7			83.3		13.4	49.5	2.1	12.0	14.2	
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	46.9	11.7			83.3		13.4	49.5	2.1	12.0	14.2	
LOS	D	B			F		B	D	A	B	B	
Approach Delay		34.2			83.3			40.9			14.2	
Approach LOS		C			F			D			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 39.7	Intersection LOS: D
Intersection Capacity Utilization 88.8%	ICU Level of Service E
Analysis Period (min) 15	

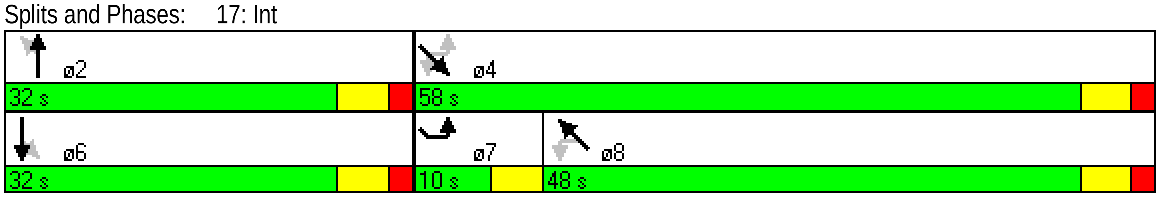
Splits and Phases: 17: Int



Lane Group	NBL	NBT	NBR	SBL	SBT	SBR						NWR
Lane Configurations												
Volume (vph)	142	25	76	94	13	62						58
Satd. Flow (prot)	1770	1669	0	0	1736	0						0
Flt Permitted	0.613				0.708							
Satd. Flow (perm)	1142	1669	0	0	1271	0						0
Satd. Flow (RTOR)		91										
Lane Group Flow (vph)	254	144	0	0	370	0						0
Turn Type	Perm			Perm			pm+pt		Perm	Perm		
Protected Phases		2			6		7	4			8	
Permitted Phases	2			6			4		4	8		
Total Split (s)	32.0	32.0	0.0	32.0	32.0	0.0	10.0	58.0	58.0	48.0	48.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	4.0	6.0	6.0	6.0	6.0	4.0
Act Effct Green (s)	26.0	26.0			26.0		54.0	52.0	52.0	42.0	42.0	
Actuated g/C Ratio	0.29	0.29			0.29		0.60	0.58	0.58	0.47	0.47	
v/c Ratio	0.77	0.26			1.01		0.35	1.01	0.16	0.10	0.70	
Control Delay	46.9	11.7			83.3		10.6	49.5	2.1	17.2	24.1	
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	46.9	11.7			83.3		10.6	49.5	2.1	17.2	24.1	
LOS	D	B			F		B	D	A	B	C	
Approach Delay		34.2			83.3			40.7			24.0	
Approach LOS		C			F			D			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 41.8	Intersection LOS: D
Intersection Capacity Utilization 88.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 17: Int



Lane Group	NBL	NBT	NBR	SBL	SBT	SBR						NWR
Lane Configurations												
Volume (vph)	142	25	76	94	13	62						58
Satd. Flow (prot)	1770	1669	0	1770	1622	0						0
Flt Permitted	0.682			0.665								
Satd. Flow (perm)	1270	1669	0	1239	1622	0						0
Satd. Flow (RTOR)		100										
Lane Group Flow (vph)	254	144	0	254	116	0						0
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4		4	8		
Total Split (s)	28.0	28.0	0.0	28.0	28.0	0.0	62.0	62.0	62.0	62.0	62.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	4.0
Act Effct Green (s)	20.6	20.6		20.6	20.6		56.0	56.0	56.0	56.0	56.0	
Actuated g/C Ratio	0.23	0.23		0.23	0.23		0.63	0.63	0.63	0.63	0.63	
v/c Ratio	0.86	0.31		0.88	0.31		0.29	0.92	0.15	0.10	0.52	
Control Delay	61.0	12.2		64.6	30.5		10.0	29.1	1.5	10.2	10.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	61.0	12.2		64.6	30.5		10.0	29.1	1.5	10.2	10.9	
LOS	E	B		E	C		A	C	A	B	B	
Approach Delay		43.4			53.9			24.3			10.9	
Approach LOS		D			D			C			B	

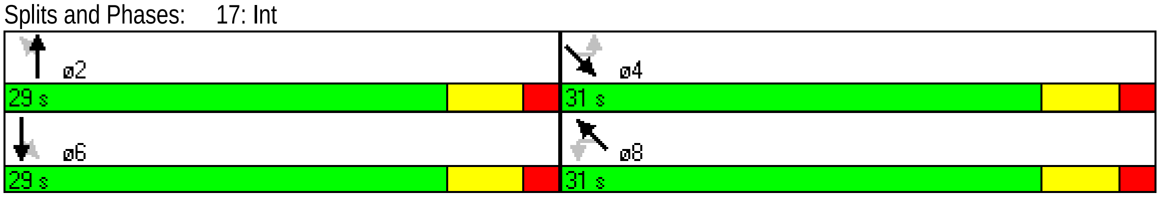
Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 88.6	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 28.1	Intersection LOS: C
Intersection Capacity Utilization 87.0%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 17: Int

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR						NWR
Lane Configurations												
Volume (vph)	142	25	76	94	13	62						58
Satd. Flow (prot)	1770	1669	0	0	1736	0						0
Flt Permitted	0.592				0.708							
Satd. Flow (perm)	1103	1669	0	0	1271	0						0
Satd. Flow (RTOR)		33										
Lane Group Flow (vph)	254	144	0	0	370	0						0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Total Split (s)	29.0	29.0	0.0	29.0	29.0	0.0	31.0	31.0	0.0	31.0	31.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)	19.8	19.8			19.8		25.1	25.1		25.1	25.1	
Actuated g/C Ratio	0.35	0.35			0.35		0.44	0.44		0.44	0.44	
v/c Ratio	0.66	0.24			0.84		0.56	0.80		0.06	0.74	
Control Delay	24.9	11.1			35.8		26.8	19.6		12.2	21.3	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	24.9	11.1			35.8		26.8	19.6		12.2	21.3	
LOS	C	B			D		C	B		B	C	
Approach Delay		19.9			35.8			20.2			21.2	
Approach LOS		B			D			C			C	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 57	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 22.5	Intersection LOS: C
Intersection Capacity Utilization 67.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 17: Int



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	12	313	872	110	32	30
Satd. Flow (prot)	0	3529	3468	0	1693	0
Flt Permitted		0.997			0.977	
Satd. Flow (perm)	0	3529	3468	0	1693	0
Lane Group Flow (vph)	0	353	1227	0	92	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Control Type: Unsignalized	
Intersection Capacity Utilization 37.9%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	325	872	110	0	62
Satd. Flow (prot)	0	3539	3468	0	0	1611
Flt Permitted						
Satd. Flow (perm)	0	3539	3468	0	0	1611
Lane Group Flow (vph)	0	346	1227	0	0	98
Sign Control		Free	Free		Stop	

Intersection Summary	
Control Type: Unsignalized	
Intersection Capacity Utilization 38.1%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	12	313	872	110	32	30
Satd. Flow (prot)	0	3529	1829	0	1693	0
Flt Permitted		0.997			0.977	
Satd. Flow (perm)	0	3529	1829	0	1693	0
Lane Group Flow (vph)	0	353	1227	0	92	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Control Type: Unsignalized	
Intersection Capacity Utilization 62.8%	ICU Level of Service B
Analysis Period (min) 15	

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	50	976	468	108	57	26
Satd. Flow (prot)	0	3529	3426	0	1722	0
Flt Permitted		0.997			0.967	
Satd. Flow (perm)	0	3529	3426	0	1722	0
Lane Group Flow (vph)	0	1089	651	0	124	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Control Type: Unsignalized	
Intersection Capacity Utilization 59.6%	ICU Level of Service B
Analysis Period (min) 15	

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	0	1026	468	108	0	83
Satd. Flow (prot)	0	3539	3426	0	1611	0
Flt Permitted						
Satd. Flow (perm)	0	3539	3426	0	1611	0
Lane Group Flow (vph)	0	1069	651	0	128	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Control Type: Unsignalized	
Intersection Capacity Utilization 40.2%	ICU Level of Service A
Analysis Period (min) 15	

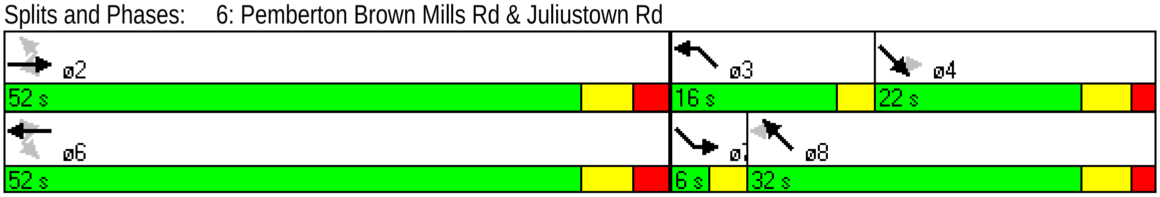
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	50	976	468	108	57	26
Satd. Flow (prot)	0	3529	1811	0	1722	0
Flt Permitted		0.997			0.967	
Satd. Flow (perm)	0	3529	1811	0	1722	0
Lane Group Flow (vph)	0	1089	651	0	124	0
Sign Control		Free	Free		Stop	

Intersection Summary	
Control Type: Unsignalized	
Intersection Capacity Utilization 74.4%	ICU Level of Service D
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	52	486	95	17	389	146	98	70	38	318	392	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	10	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		175	0		75	125		0	100		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Satd. Flow (prot)	0	1793	1478	0	1859	1583	1770	1753	0	1770	1840	0
Flt Permitted		0.889			0.785		0.250			0.507		
Satd. Flow (perm)	0	1601	1478	0	1462	1583	466	1753	0	944	1840	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			108			139		31			5	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		938			529			737			1424	
Travel Time (s)		21.3			12.0			16.8			32.4	
Lane Group Flow (vph)	0	762	128	0	443	192	148	164	0	388	540	0
Turn Type	Perm		Perm	Perm		Perm	pm+pt			pm+pt		
Protected Phases		2			6		7	4		3	8	
Permitted Phases	2		2	6		6	4			8		
Total Split (s)	52.0	52.0	52.0	52.0	52.0	52.0	6.0	22.0	0.0	16.0	32.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	3.0	6.0	4.0	3.0	6.0	4.0
Act Effct Green (s)		43.5	43.5		43.5	43.5	22.0	16.0		35.0	26.0	
Actuated g/C Ratio		0.49	0.49		0.49	0.49	0.25	0.18		0.40	0.29	
v/c Ratio		0.97	0.16		0.62	0.23	0.92	0.48		0.79	0.99	
Control Delay		48.7	4.0		20.9	4.8	84.1	32.0		35.1	70.0	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		48.7	4.0		20.9	4.8	84.1	32.0		35.1	70.0	
LOS		D	A		C	A	F	C		D	E	
Approach Delay		42.2			16.1			56.8			55.4	
Approach LOS		D			B			E			E	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 88.6	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 42.3	Intersection LOS: D
Intersection Capacity Utilization 97.1%	ICU Level of Service F
Analysis Period (min) 15	

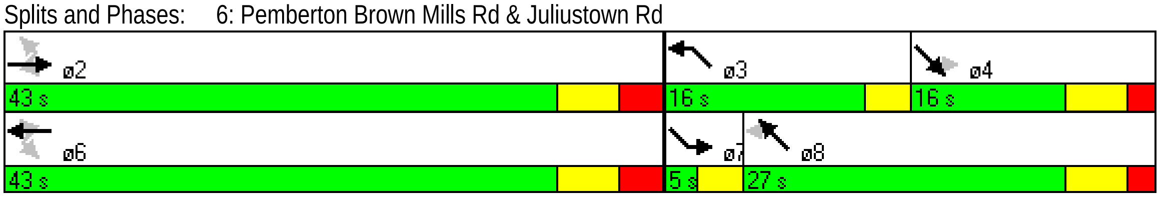
Splits and Phases: 6: Pemberton Brown Mills Rd & Juliustown Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	52	486	95	17	389	146	98	70	38	318	392	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	10	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		175	0		75	125		0	100		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Satd. Flow (prot)	0	1793	1478	0	1859	1583	1770	1753	0	1770	1840	0
Flt Permitted		0.908			0.778		0.396			0.479		
Satd. Flow (perm)	0	1635	1478	0	1449	1583	738	1753	0	892	1840	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			124			160		35			6	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		938			529			737			1424	
Travel Time (s)		21.3			12.0			16.8			32.4	
Lane Group Flow (vph)	0	762	128	0	443	192	148	164	0	388	540	0
Turn Type	Perm		Perm	Perm		Perm	pm+pt			pm+pt		
Protected Phases		2			6		7	4		3	8	
Permitted Phases	2		2	6		6	4			8		
Total Split (s)	43.0	43.0	43.0	43.0	43.0	43.0	5.0	16.0	0.0	16.0	27.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	3.0	6.0	4.0	3.0	6.0	4.0
Act Effct Green (s)		35.8	35.8		35.8	35.8	15.1	10.1		29.0	21.0	
Actuated g/C Ratio		0.48	0.48		0.48	0.48	0.20	0.14		0.39	0.28	
v/c Ratio		0.97	0.17		0.64	0.23	0.84	0.61		0.78	1.04	
Control Delay		48.0	3.1		19.9	3.7	63.4	35.1		31.6	78.2	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		48.0	3.1		19.9	3.7	63.4	35.1		31.6	78.2	
LOS		D	A		B	A	E	D		C	E	
Approach Delay		41.5			15.0			48.6			58.7	
Approach LOS		D			B			D			E	

Intersection Summary	
Area Type: Other	
Cycle Length: 75	
Actuated Cycle Length: 74.8	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.04	
Intersection Signal Delay: 42.0	Intersection LOS: D
Intersection Capacity Utilization 97.1%	ICU Level of Service F
Analysis Period (min) 15	

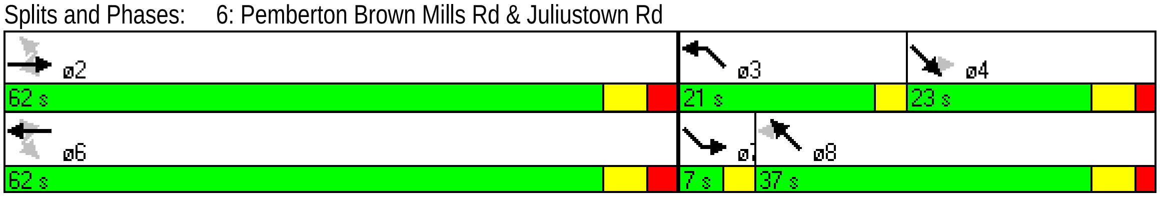
Splits and Phases: 6: Pemberton Brown Mills Rd & Juliustown Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	52	486	95	17	389	146	98	70	38	318	392	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	10	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		175	0		75	125		0	100		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Satd. Flow (prot)	0	1793	1478	0	1859	1583	1770	1753	0	1770	1840	0
Flt Permitted		0.870			0.793		0.214			0.480		
Satd. Flow (perm)	0	1567	1478	0	1477	1583	399	1753	0	894	1840	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			95			122		26			4	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		938			529			737			1424	
Travel Time (s)		21.3			12.0			16.8			32.4	
Lane Group Flow (vph)	0	762	128	0	443	192	148	164	0	388	540	0
Turn Type	Perm		Perm	Perm		Perm	pm+pt			pm+pt		
Protected Phases		2			6		7	4		3	8	
Permitted Phases	2		2	6		6	4			8		
Total Split (s)	62.0	62.0	62.0	62.0	62.0	62.0	7.0	23.0	0.0	21.0	37.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	3.0	6.0	4.0	3.0	6.0	4.0
Act Effct Green (s)		53.8	53.8		53.8	53.8	26.9	18.7		42.2	31.0	
Actuated g/C Ratio		0.51	0.51		0.51	0.51	0.25	0.18		0.40	0.29	
v/c Ratio		0.96	0.16		0.59	0.22	0.88	0.50		0.77	1.00	
Control Delay		49.0	4.9		6.9	1.8	77.4	39.8		37.7	76.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		49.0	4.9		6.9	1.8	77.4	39.8		37.7	76.5	
LOS		D	A		A	A	E	D		D	E	
Approach Delay		42.7			5.3			57.6			60.3	
Approach LOS		D			A			E			E	

Intersection Summary	
Area Type: Other	
Cycle Length: 106	
Actuated Cycle Length: 106	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green, Master Intersection	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 41.7	Intersection LOS: D
Intersection Capacity Utilization 97.1%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 6: Pemberton Brown Mills Rd & Juliustown Rd

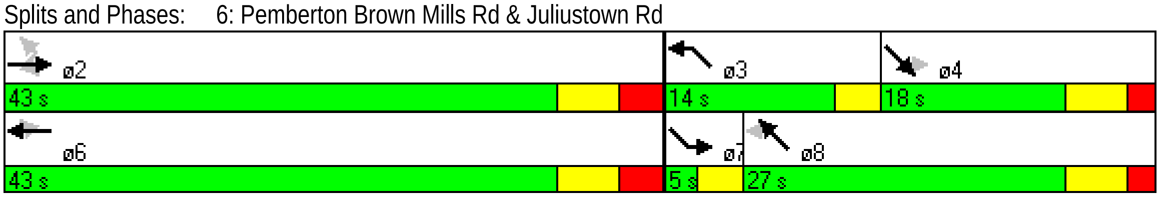


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	52	486	95	0	406	146	98	70	38	318	392	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	10	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		175	0		75	125		0	100		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Satd. Flow (prot)	0	1793	1478	0	1863	1583	1770	1753	0	1770	1840	0
Flt Permitted		0.910					0.333			0.510		
Satd. Flow (perm)	0	1639	1478	0	1863	1583	620	1753	0	950	1840	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			124			161		37			6	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		938			529			737			1424	
Travel Time (s)		21.3			12.0			16.8			32.4	
Lane Group Flow (vph)	0	762	128	0	441	192	148	164	0	388	540	0
Turn Type	Perm		Perm			Perm	pm+pt			pm+pt		
Protected Phases		2			6		7	4		3	8	
Permitted Phases	2		2			6	4			8		
Total Split (s)	43.0	43.0	43.0	0.0	43.0	43.0	5.0	18.0	0.0	14.0	27.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	4.0	7.0	7.0	3.0	6.0	4.0	3.0	6.0	4.0
Act Effct Green (s)		35.7	35.7		35.7	35.7	17.0	12.0		29.0	21.0	
Actuated g/C Ratio		0.48	0.48		0.48	0.48	0.23	0.16		0.39	0.28	
v/c Ratio		0.97	0.17		0.50	0.23	0.86	0.52		0.79	1.03	
Control Delay		47.8	3.1		15.7	3.7	67.6	29.0		32.7	77.7	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		47.8	3.1		15.7	3.7	67.6	29.0		32.7	77.7	
LOS		D	A		B	A	E	C		C	E	
Approach Delay		41.3			12.1			47.3			58.9	
Approach LOS		D			B			D			E	

Intersection Summary

Area Type: Other
Cycle Length: 75
Actuated Cycle Length: 74.7
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.03
Intersection Signal Delay: 41.2 Intersection LOS: D
Intersection Capacity Utilization 97.0% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 6: Pemberton Brown Mills Rd & Juliustown Rd

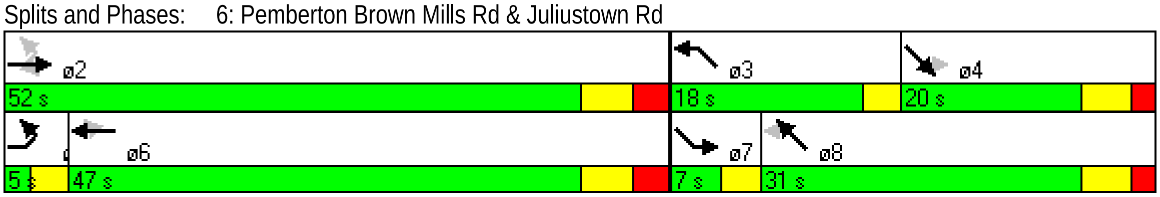


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	52	486	95	0	406	146	98	70	38	318	392	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	10	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		175	0		75	125		0	100		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Satd. Flow (prot)	0	1793	1478	0	1863	1583	1770	1753	0	1770	1840	0
Flt Permitted		0.891					0.278			0.487		
Satd. Flow (perm)	0	1604	1478	0	1863	1583	518	1753	0	907	1840	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			108			125		30			5	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		938			529			737			1424	
Travel Time (s)		21.3			12.0			16.8			32.4	
Lane Group Flow (vph)	0	762	128	0	441	192	148	164	0	388	540	0
Turn Type	pm+pt		Perm			Perm	pm+pt			pm+pt		
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2			6	4			8		
Total Split (s)	5.0	52.0	52.0	0.0	47.0	47.0	7.0	20.0	0.0	18.0	31.0	0.0
Total Lost Time (s)	3.0	7.0	7.0	4.0	7.0	7.0	3.0	6.0	4.0	3.0	6.0	4.0
Act Effct Green (s)		43.5	43.5		43.5	43.5	21.4	14.4		35.0	25.0	
Actuated g/C Ratio		0.49	0.49		0.49	0.49	0.24	0.16		0.40	0.28	
v/c Ratio		0.97	0.16		0.48	0.23	0.81	0.53		0.77	1.03	
Control Delay		48.5	4.0		17.1	5.5	58.4	35.3		33.9	80.8	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		48.5	4.0		17.1	5.5	58.4	35.3		33.9	80.8	
LOS		D	A		B	A	E	D		C	F	
Approach Delay		42.1			13.6			46.3			61.2	
Approach LOS		D			B			D			E	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 88.5
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.03
Intersection Signal Delay: 42.4 Intersection LOS: D
Intersection Capacity Utilization 97.0% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 6: Pemberton Brown Mills Rd & Juliustown Rd

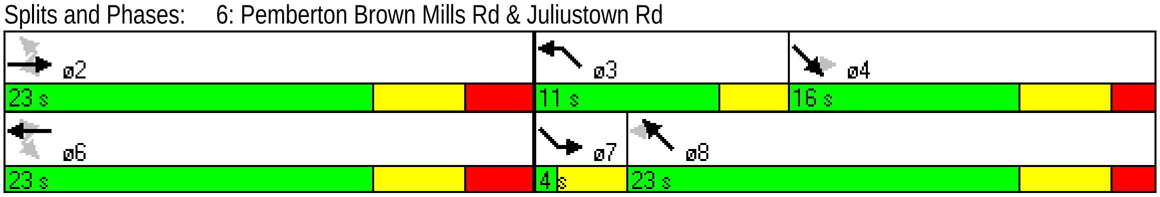


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	52	486	95	17	389	146	98	70	38	318	392	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	10	12	12	12	12	12	12	12	12	12
Storage Length (ft)	0		175	0		75	125		0	100		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Satd. Flow (prot)	0	3408	1478	0	3532	1583	1770	1753	0	1770	1840	0
Flt Permitted		0.852			0.888		0.435			0.493		
Satd. Flow (perm)	0	2915	1478	0	3143	1583	810	1753	0	918	1840	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			128			192		58			10	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		938			537			737			1441	
Travel Time (s)		21.3			12.2			16.8			32.8	
Lane Group Flow (vph)	0	762	128	0	443	192	148	164	0	388	540	0
Turn Type	Perm		Perm	Perm		Perm	pm+pt			pm+pt		
Protected Phases		2			6		7	4		3	8	
Permitted Phases	2		2	6		6	4			8		
Total Split (s)	23.0	23.0	23.0	23.0	23.0	23.0	4.0	16.0	0.0	11.0	23.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	3.0	6.0	4.0	3.0	6.0	4.0
Act Effct Green (s)		15.2	15.2		15.2	15.2	13.2	9.2		23.2	16.2	
Actuated g/C Ratio		0.31	0.31		0.31	0.31	0.27	0.19		0.48	0.33	
v/c Ratio		0.83	0.23		0.45	0.31	0.62	0.43		0.67	0.87	
Control Delay		25.9	4.4		15.2	4.1	27.5	16.1		16.0	33.3	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		25.9	4.4		15.2	4.1	27.5	16.1		16.0	33.3	
LOS		C	A		B	A	C	B		B	C	
Approach Delay		22.8			11.8			21.5			26.1	
Approach LOS		C			B			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 50
Actuated Cycle Length: 48.5
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 21.2 — Intersection LOS: C
Intersection Capacity Utilization 73.4% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 6: Pemberton Brown Mills Rd & Juliustown Rd

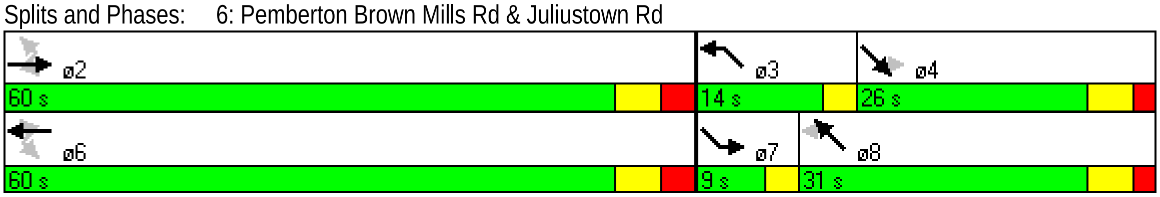


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	35	704	348	28	417	136	156	272	71	313	223	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		175	0		75	125		0	100		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Satd. Flow (prot)	0	1857	1583	0	1855	1583	1770	1796	0	1770	1779	0
Flt Permitted		0.950			0.507		0.345			0.174		
Satd. Flow (perm)	0	1770	1583	0	944	1583	643	1796	0	324	1779	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			283			102		14			21	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		938			529			737			1424	
Travel Time (s)		21.3			12.0			16.8			32.4	
Lane Group Flow (vph)	0	896	414	0	494	164	175	471	0	386	355	0
Turn Type	Perm		Perm	Perm		Perm	pm+pt			pm+pt		
Protected Phases		2			6		7	4		3	8	
Permitted Phases	2		2	6		6	4			8		
Total Split (s)	60.0	60.0	60.0	60.0	60.0	60.0	9.0	26.0	0.0	14.0	31.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	3.0	6.0	4.0	3.0	6.0	4.0
Act Effct Green (s)		53.0	53.0		53.0	53.0	29.0	20.0		37.0	25.0	
Actuated g/C Ratio		0.53	0.53		0.53	0.53	0.29	0.20		0.37	0.25	
v/c Ratio		0.96	0.43		0.99	0.18	0.69	1.27		1.38	0.77	
Control Delay		44.1	5.7		62.7	5.5	40.5	176.5		218.4	45.4	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		44.1	5.7		62.7	5.5	40.5	176.5		218.4	45.4	
LOS		D	A		E	A	D	F		F	D	
Approach Delay		32.0			48.5			139.7			135.6	
Approach LOS		C			D			F			F	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.38
Intersection Signal Delay: 78.8 Intersection LOS: E
Intersection Capacity Utilization 115.7% ICU Level of Service H
Analysis Period (min) 15

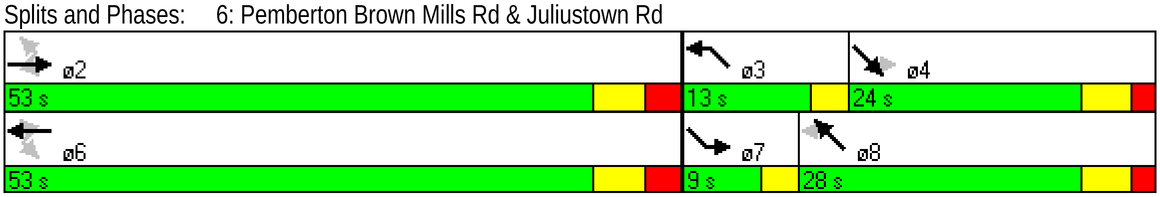
Splits and Phases: 6: Pemberton Brown Mills Rd & Juliustown Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	35	704	348	28	417	136	156	272	71	313	223	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		175	0		75	125		0	100		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Satd. Flow (prot)	0	1857	1583	0	1855	1583	1770	1796	0	1770	1779	0
Flt Permitted		0.950			0.469		0.344			0.190		
Satd. Flow (perm)	0	1770	1583	0	874	1583	641	1796	0	354	1779	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			302			109		16			23	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		938			529			737			1424	
Travel Time (s)		21.3			12.0			16.8			32.4	
Lane Group Flow (vph)	0	896	414	0	494	164	175	471	0	386	355	0
Turn Type	Perm		Perm	Perm		Perm	pm+pt			pm+pt		
Protected Phases		2			6		7	4		3	8	
Permitted Phases	2		2	6		6	4			8		
Total Split (s)	53.0	53.0	53.0	53.0	53.0	53.0	9.0	24.0	0.0	13.0	28.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	3.0	6.0	4.0	3.0	6.0	4.0
Act Effct Green (s)		46.0	46.0		46.0	46.0	27.0	18.0		34.0	22.0	
Actuated g/C Ratio		0.51	0.51		0.51	0.51	0.30	0.20		0.38	0.24	
v/c Ratio		0.99	0.43		1.11	0.19	0.65	1.27		1.33	0.79	
Control Delay		51.2	5.2		98.9	5.1	34.4	171.4		193.0	43.7	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		51.2	5.2		98.9	5.1	34.4	171.4		193.0	43.7	
LOS		D	A		F	A	C	F		F	D	
Approach Delay		36.6			75.5			134.3			121.5	
Approach LOS		D			E			F			F	

Intersection Summary	
Area Type: Other	
Cycle Length: 90	
Actuated Cycle Length: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.33	
Intersection Signal Delay: 81.8	Intersection LOS: F
Intersection Capacity Utilization 115.7%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 6: Pemberton Brown Mills Rd & Juliustown Rd

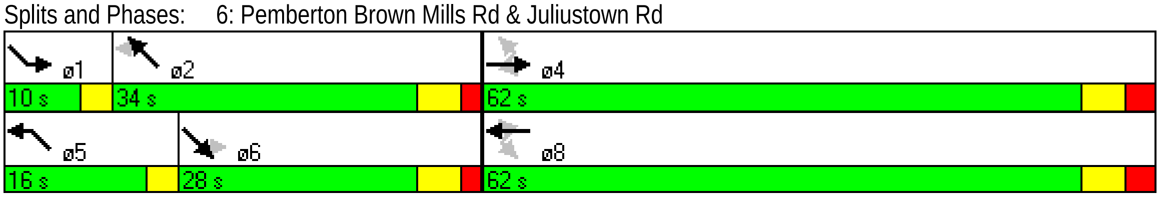


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	35	704	348	28	417	136	156	272	71	313	223	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		175	0		75	125		0	100		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Satd. Flow (prot)	0	1857	1583	0	1855	1583	1770	1796	0	1770	1779	0
Flt Permitted		0.943			0.460		0.370			0.160		
Satd. Flow (perm)	0	1757	1583	0	857	1583	689	1796	0	298	1779	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			261			94		14			20	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		938			529			737			1424	
Travel Time (s)		21.3			12.0			16.8			32.4	
Lane Group Flow (vph)	0	896	414	0	494	164	175	471	0	386	355	0
Turn Type	Perm		Perm	Perm		Perm	pm+pt			pm+pt		
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8	6			2		
Total Split (s)	62.0	62.0	62.0	62.0	62.0	62.0	10.0	28.0	0.0	16.0	34.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	3.0	6.0	4.0	3.0	6.0	4.0
Act Effct Green (s)		55.0	55.0		55.0	55.0	32.0	22.0		41.0	28.0	
Actuated g/C Ratio		0.52	0.52		0.52	0.52	0.30	0.21		0.39	0.26	
v/c Ratio		0.98	0.44		1.11	0.19	0.63	1.23		1.30	0.73	
Control Delay		52.1	6.9		84.8	2.1	35.5	159.2		184.8	43.7	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		52.1	6.9		84.8	2.1	35.5	159.2		184.8	43.7	
LOS		D	A		F	A	D	F		F	D	
Approach Delay		37.8			64.1			125.7			117.2	
Approach LOS		D			E			F			F	

Intersection Summary

Area Type: Other
Cycle Length: 106
Actuated Cycle Length: 106
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green, Master Intersection
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.30
Intersection Signal Delay: 77.4 Intersection LOS: E
Intersection Capacity Utilization 115.7% ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 6: Pemberton Brown Mills Rd & Juliustown Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	35	704	348	0	445	136	156	272	71	313	223	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		175	0		75	125		0	100		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Satd. Flow (prot)	0	1857	1583	0	1863	1583	1770	1796	0	1770	1779	0
Flt Permitted		0.905					0.449			0.154		
Satd. Flow (perm)	0	1686	1583	0	1863	1583	836	1796	0	287	1779	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			256			93		15			22	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		938			529			737			1424	
Travel Time (s)		21.3			12.0			16.8			32.4	
Lane Group Flow (vph)	0	896	414	0	489	164	175	471	0	386	355	0
Turn Type	Perm		Perm			Perm	pm+pt			pm+pt		
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4			8	6			2		
Total Split (s)	55.0	55.0	55.0	0.0	55.0	55.0	9.0	29.0	0.0	16.0	36.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	4.0	7.0	7.0	3.0	6.0	4.0	3.0	6.0	4.0
Act Effct Green (s)		48.0	48.0		48.0	48.0	32.0	23.0		42.0	30.0	
Actuated g/C Ratio		0.48	0.48		0.48	0.48	0.32	0.23		0.42	0.30	
v/c Ratio		1.11	0.46		0.55	0.20	0.54	1.11		1.23	0.65	
Control Delay		92.3	8.0		21.2	7.4	28.2	112.6		154.5	34.9	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		92.3	8.0		21.2	7.4	28.2	112.6		154.5	34.9	
LOS		F	A		C	A	C	F		F	C	
Approach Delay		65.7			17.8			89.8			97.2	
Approach LOS		E			B			F			F	

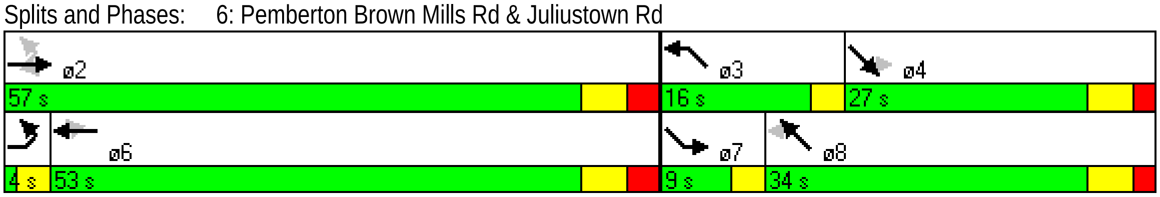
Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.23	
Intersection Signal Delay: 67.9	Intersection LOS: E
Intersection Capacity Utilization 115.7%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 6: Pemberton Brown Mills Rd & Juliustown Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	35	704	348	0	445	136	156	272	71	313	223	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		175	0		75	125		0	100		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Satd. Flow (prot)	0	1857	1583	0	1863	1583	1770	1796	0	1770	1779	0
Flt Permitted		0.935					0.426			0.167		
Satd. Flow (perm)	0	1742	1583	0	1863	1583	794	1796	0	311	1779	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			266			89		14			22	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		938			543			737			1439	
Travel Time (s)		21.3			12.3			16.8			32.7	
Lane Group Flow (vph)	0	896	414	0	489	164	175	471	0	386	355	0
Turn Type	pm+pt		Perm			Perm	pm+pt			pm+pt		
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2		2			6	4			8		
Total Split (s)	4.0	57.0	57.0	0.0	53.0	53.0	9.0	27.0	0.0	16.0	34.0	0.0
Total Lost Time (s)	3.0	7.0	7.0	4.0	7.0	7.0	3.0	6.0	4.0	3.0	6.0	4.0
Act Effct Green (s)		50.0	50.0		50.0	50.0	30.0	21.0		40.0	28.0	
Actuated g/C Ratio		0.50	0.50		0.50	0.50	0.30	0.21		0.40	0.28	
v/c Ratio		1.03	0.45		0.52	0.20	0.59	1.21		1.23	0.69	
Control Delay		64.4	7.0		19.5	7.2	31.9	152.7		152.8	38.2	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		64.4	7.0		19.5	7.2	31.9	152.7		152.8	38.2	
LOS		E	A		B	A	C	F		F	D	
Approach Delay		46.3			16.4			120.0			97.9	
Approach LOS		D			B			F			F	

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.23	
Intersection Signal Delay: 66.1	Intersection LOS: E
Intersection Capacity Utilization 115.7%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 6: Pemberton Brown Mills Rd & Juliustown Rd

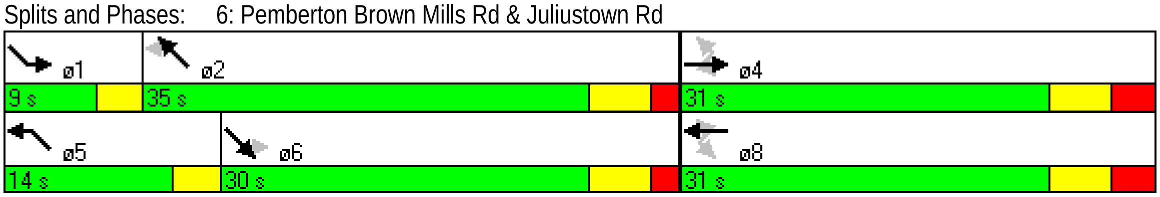


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	35	704	348	28	417	136	156	272	71	313	223	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		175	0		75	125		0	100		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Satd. Flow (prot)	0	3529	1583	0	3525	1583	1770	1796	0	1770	1779	0
Flt Permitted		0.889			0.737		0.549			0.194		
Satd. Flow (perm)	0	3146	1583	0	2608	1583	1023	1796	0	361	1779	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			414			164		22			34	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		938			543			737			1439	
Travel Time (s)		21.3			12.3			16.8			32.7	
Lane Group Flow (vph)	0	896	414	0	494	164	175	471	0	386	355	0
Turn Type	Perm		Perm	Perm		Perm	pm+pt			pm+pt		
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8	6			2		
Total Split (s)	31.0	31.0	31.0	31.0	31.0	31.0	9.0	30.0	0.0	14.0	35.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	3.0	6.0	4.0	3.0	6.0	4.0
Act Effct Green (s)		23.3	23.3		23.3	23.3	30.4	21.4		38.5	26.4	
Actuated g/C Ratio		0.32	0.32		0.32	0.32	0.42	0.30		0.54	0.37	
v/c Ratio		0.88	0.52		0.58	0.26	0.35	0.85		0.94	0.53	
Control Delay		35.3	4.9		24.1	4.7	11.5	39.5		48.3	19.2	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		35.3	4.9		24.1	4.7	11.5	39.5		48.3	19.2	
LOS		D	A		C	A	B	D		D	B	
Approach Delay		25.7			19.3			31.9			34.3	
Approach LOS		C			B			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 75
Actuated Cycle Length: 71.8
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 27.5 — Intersection LOS: C
Intersection Capacity Utilization 88.8% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 6: Pemberton Brown Mills Rd & Juliustown Rd



APPENDIX B

CAMDEN

SYNCHRO ANALYSIS

Source: DVRPC, 2007

NJ 42 Off-ramp/Church Street/Erial-Blenheim Road/State Street Vicinity
GLOUCESTER TOWNSHIP - CAMDEN COUNTY

Reportable and/or Non reportable crashes (2004 - 2006)

MAP ID	DATE	DAY/TIME	TOTAL KILLED	TOTAL INJURED	ROAD SYSTEM	WEATHER COND.	ROAD COND.	ROAD	CROSS ROAD	CRASH TYPE	AGE OF DRIVER 1	DRIVER 1 FACTOR	DRIVER 1 ACTION	AGE OF DRIVER 2	DRIVER 2 FACTOR	DRIVER 2 ACTION
1	2/12/2005	Sa/1632	0	0	County	Clear	Dry	Erial Blenheim Rd.	E. Church St.	Rear End	20		Right turn	54	None	Stopped in traffic
2	1/19/2004	Mo/0030	0	1	County			Erial Blenheim Rd.	Church St.		47		Straight ahead			
17	1/11/2004	Su/0224	0	0	County	Clear	Dry	Church St.	Erial Rd.		19			28		
18	2/29/2004	Su/1420	0	0	County	Clear	Dry	Church St.	St. Highway 42	Rear End	33	None	Starting in traffic	82	Driver Inattention	Starting in traffic
19	4/8/2004	Th/1857	0	0	Municipal	Rain	Wet	Church St.	Erial Blenheim Rd.	Angle	37		Left turn	23	Failed to yield right of way	Left turn
20	4/10/2004	Sa/2305	0	0	Municipal	Clear	Dry	Church St.	State St.	Rear End		None	Parked			Straight ahead
21	5/3/2004	Mo/1559	0	1	County	Rain	Wet	Church St.	State St.	Rear End	18		Left turn	19	Driver Inattention	Straight ahead
22	6/10/2004	Th/1635	0	0	County	Clear	Dry	Church St.	Erial Blenheim Rd.	Side Swipe	22	None	Straight ahead	57	Driver Inattention	Left turn
23	6/28/2004	Mo/1223	0	0	County	Clear	Dry	Church St.	Erial Blenheim Rd.	Left Turn	42		Left turn	23	None	Left turn
24	7/6/2004	Tu/1118	0	0				Church St.	Erial Blenheim Rd.	Rear End	36		Stopped in traffic	39	None	Starting in traffic
25	8/20/2004	Fr/1159	0	0	County	Clear	Dry	Church St.	Erial Blenheim Rd.	Rear End	80		Straight ahead	28	Other	Straight ahead
26	9/13/2004	Mo/1042	0	0	County	Clear	Dry	Church St.	Erial Blenheim Rd.	Left Turn	49		Straight ahead	43	Improper Lane Change	Left turn
27	10/21/2004	Th/1946	0	0	County			Church St.	Erial Blenheim Rd.	Rear End	25		Stopped in traffic	21	Driver Inattention	Straight ahead
28	10/19/2004	Tu/2030	0	0	County	Rain	Wet	Church St.	Erial Blenheim Rd.	Other	21		Right turn			Straight ahead
29	12/1/2004	W/0706	0	0	Municipal	Rain	Wet	Church St.	Erial Blenheim Rd.	Other	19	None	Straight ahead		Failed to yield right of way	Left turn
33	3/23/2004	Tu/0904	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Rt. 42 S/B Ramp	Rear End	53		Slowing or stopping	40	Driver Inattention	Starting in traffic
38	6/20/2004	Su/1832	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Rt. 42 on Ramp	Side Swipe	33	None	Straight ahead	48	Driver Inattention	Merging
42	8/18/2004	W/2022	0	1	County	Rain	Wet	Blackwood Clementon Rd.	At Ramp Rt. 42 NB	Other			Left turn		Improper Lane Change	
45	9/28/2004	Tu/0715	0	0	County	Rain	Wet	Blackwood Clementon Rd.	Rt. 42 on Ramp	Rear End	60		Slowing or stopping	28	Unsafe Speed	Straight ahead
48	10/24/2004	Su/2335	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Rt. 42 Ramp NB		18		Straight ahead			
49	11/1/2004	Mo/1555	0	0	Municipal			Davistown Rd.	Erial Blenheim Rd.	Rear End	18	Driver Inattention	Straight ahead	40	None	Slowing or stopping
50	11/8/2004	Mo/0741	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Rt. 42 on Ramp	Side Swipe	49	Driver Inattention	Merging	23	None	Straight ahead
52	9/10/2004	Fr/1545	0	1	Municipal	Clear	Dry	State Street	E. Church St.		41		Right turn		Unsafe Speed	
53	2/12/2005	Sa/1616	0	1	County	Clear	Dry	Erial Blenheim Rd.	Church St.		19					
55	6/22/2005	W/1028	0	0	County	Clear	Dry	Erial Blenheim Rd.	E. Church St.	Angle	21	None	Left turn	28	Failed to yield right of way	Left turn
56	10/12/2005	W/1352	0	0		Rain	Wet	Erial Blenheim Rd.	Church St.	Rear End	22	Driver Inattention	Backing	54	None	Stopped in traffic
68	1/13/2005	Th/1918	0	0	Municipal	Clear	Dry	Church St.	Erial Blenheim Rd.	Angle	42	None	Straight ahead	31	Driver Inattention	Left turn
69	3/23/2005	W/1129	0	0	County	Rain	Wet	Church St.	Erial Blenheim Rd.	Left Turn	32	None	Straight ahead	41	Failed to obey Traffic Control Device	Left turn
70	4/10/2005	Su/1547	0	1	Municipal	Clear	Dry	Church St.	Erial Blenheim Rd.	Angle	31	None	Straight ahead	61	Failed to yield right of way	Starting in traffic
71	6/16/2005	Th/1722	0	0	County	Rain	Wet	Church St.	Erial Blenheim Rd.	Rear End	68	None	Straight ahead	18	Driver Inattention	Straight ahead
72	7/5/2005	Tu/0815	0	0	County	Clear	Dry	Church St.	Erial Blenheim Rd.	Rear End	60		Slowing or stopping	31	Improper Lane Change	Slowing or stopping
73	7/7/2005	Th/1210	0	4	County	Clear	Dry	Church St.	Erial Blenheim Rd.	Left Turn	19	Driver Inattention	Left turn	31	None	Straight ahead
74	7/16/2005	Sa/1127	0	1	County	Clear	Dry	Church St.	Erial Blenheim Rd.	Angle	59	None	Straight ahead	50	Failed to yield right of way	Starting in traffic
75	9/6/2005	Tu/0757	0	0	Municipal	Clear	Dry	Church St.	Erial Blenheim Rd.	Left Turn	45		Left turn	24	None	Left turn
76	9/1/2005	Th/1657	0	0	County	Clear	Dry	Church St.	Erial Blenheim Rd.	Other	23	None	Left turn	40	Failed to yield right of way	Left turn
77	10/8/2005	Sa/1702	0	0	County			Church St.	Erial Blenheim Rd.	Left Turn	26	Unsafe Speed	Straight ahead	33	Failed to yield right of way	Stopped in traffic
78	10/14/2005	Fr/1222	0	0	Municipal	Rain	Wet	Church St.	Erial Blenheim Rd.	Rear End	32	Driver Inattention	Slowing or stopping	22	None	Stopped in traffic
79	11/2/2005	W/0805	0	0	Municipal	Clear	Dry	Church St.	Erial Blenheim Rd.	Angle	33	None	Left turn	23	Failed to yield right of way	Left turn
80	12/18/2005	Su/1702	0	0	Municipal	Clear	Dry	Church St.	Erial Blenheim Rd.	Rear End	49	None	Stopped in traffic	22	Driver Inattention	Slowing or stopping
84	2/10/2005	Th/1801	0	1	County			Blackwood Clementon Rd.	Rt. 42 on Ramp	Left Turn	20	None	Straight ahead	31	Failed to yield right of way	Left turn
86	5/8/2005	Su/1204	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Rt. 42 on Ramp	Left Turn	32	None	Straight ahead	40	Driver Inattention	Left turn
121	9/4/2006	Mo/1815	0	0	Municipal	Clear	Dry	State St.	Church St	Left Turn / U Turn	41	None	Straight ahead	25	Driver Inattention	U Turn
122	7/10/2006	Mo/1723	0	1	County	Clear	Dry	Erial Blenheim Rd.	Church St		38	Unsafe Speed	Driverless			
123	8/5/2006	Sa/0230	0	0	County	Clear	Dry	Erial Blenheim Rd.	Church St	Rear End	39	Driver Inattention	Straight ahead		Unsafe Speed	

Source: Gloucester Township Police Crash Records

NJ 42 Off-ramp/Church Street/Erial-Blenheim Road/State Street Vicinity
GLOUCESTER TOWNSHIP - CAMDEN COUNTY

Reportable and/or Non reportable crashes (2004 - 2006)

MAP ID	DATE	DAY/TIME	TOTAL KILLED	TOTAL INJURED	ROAD SYSTEM	WEATHER COND.	ROAD COND.	ROAD	CROSS ROAD	CRASH TYPE	AGE OF DRIVER 1	DRIVER 1 FACTOR	DRIVER 1 ACTION	AGE OF DRIVER 2	DRIVER 2 FACTOR	DRIVER 2 ACTION
124	10/4/2006	W/1438	0	0	County	Clear	Dry	Erial Blenheim Rd.	Erial Rd.	Encroachment	18	None	Straight ahead		Backing unsafely	Straight ahead
129	7/25/2006	Tu/1245	0	2	County	Clear	Dry	Erial Blenheim Rd.	Erial Rd.	Rear End	23	None	Slowing or stopping	18	Driver Inattention	Straight ahead
133	2/3/2006	Fr/1643	0	0	Municipal	Clear	Dry	E. Church St.	State St.	Rear End	20	None	Straight ahead	53	Improper Lane Change	Straight ahead
134	2/16/2006	Th/2251	0	0	Municipal	Clear	Dry	Church St.	Blackwood Clementon Rd	Struck Parked Vehicle	23	Driver Inattention	Straight ahead		None	Parked
135	3/16/2006	Th/0933	0	1	County	Clear	Dry	E. Church St.	Rt. 42 SB Off Ramp	Railcar -- vehicle	50	Other	Straight ahead			
136	4/21/2006	Fr/1241	0	0	County	Clear	Dry	Church St.	Erial Blenheim Rd.	Rear End	60	Other	Slowing or stopping	21	Driver Inattention	Slowing or stopping
137	5/15/2006	Mo/0822	0	0	County	Rain	Wet	Church St.	Rt. 42 (Off Ramp)	Rear End	71	Driver Inattention	Left turn	21		Straight ahead
138	5/22/2006	Mo/0930	0	1	Municipal	Clear	Dry	Church St.	Erial Blenheim Rd.	Right Angle	18	Driver Inattention	Straight ahead	23	None	Straight ahead
139	6/9/2006	Fr/1623	0	0	County	Rain	Wet	E. Church St.	State St.	Rear End	68	None	Stopped in traffic	19	Driver Inattention	Straight ahead
140	7/3/2006	Mo/2109	0	0	County	Clear	Dry	E. Church St.	State St.	Rear End	24	None	Left turn	20	Driver Inattention	Straight ahead
141	7/22/2006	Sa/2007	0	1	Municipal	Rain	Wet	E. Church St.	Erial Blenheim Rd.	Right Angle	18	None	Straight ahead	48	Failed to yield right of way	Left turn
142	8/5/2006	Sa/1802	0	1	Municipal	Clear	Dry	E. Church St.	Erial Blenheim Rd.	Right Angle	18	None	Straight ahead	37	Improper Lane Change	Left turn
143	8/19/2006	Sa/0543	0	0	County	Clear	Dry	Church St.	State St.	Side Swipe	48	Driver Inattention	Straight ahead		None	Parked
144	8/18/2006	Fr/1138	0	0	County	Clear	Dry	E. Church St.	Erial Blenheim Rd.	Right Angle		None	Straight ahead	21	Failed to yield right of way	Straight ahead
145	8/29/2006	Tu/0702	0	2	Municipal	Clear	Dry	E. Church St.	Rt. 42 Off Ramp	Right Angle	53	Failed to yield right of way	Starting in traffic	52	None	Straight ahead
146	9/27/2006	W/0823	0	0	Municipal	Clear	Dry	Church St.	Erial Blenheim Rd.	Rear End	21	Driver Inattention	Straight ahead	56	None	Straight ahead
147	10/18/2006	W/1636	0	0	Municipal	Clear	Dry	E. Church St.	Erial Blenheim Rd.	Side Swipe	24	Driver Inattention	Straight ahead	25	Improper Lane Change	Straight ahead
148	11/9/2006	Th/1057	0	1	County	Clear	Dry	Church St.	Erial Blenheim Rd.	Right Angle	48	None	Straight ahead	19	Driver Inattention	Right turn
149	11/23/2006	Th/1440	0	0	County	Other	Wet	E. Church St.	Erial Blenheim Rd.	Left Turn / U Turn	19	None	Straight ahead	17	Failed to yield right of way	Left turn
150	12/11/2006	Mo/0816	0	0	County	Clear	Dry	E. Church St.	Erial Blenheim Rd.	Rear End	46	None	Stopped in traffic	40	Driver Inattention	Slowing or stopping

Source: Gloucester Township Police Crash Records

Erial Road and Blackwood-Clementon Road Intersection
GLOUCESTER TOWNSHIP - CAMDEN COUNTY

Reportable and/or Non reportable crashes (2004 - 2006)

MAP ID	DATE	DAY/TIME	TOTAL KILLED	TOTAL INJURED	ROAD SYSTEM	WEATHER COND.	ROAD COND.	ROAD	CROSS ROAD	CRASH TYPE	AGE OF DRIVER 1	DRIVER 1 FACTOR	DRIVER 1 ACTION	AGE OF DRIVER 2	DRIVER 2 FACTOR	DRIVER 2 ACTION
3	1/18/2004	Su/0757	0	0	County	Rain	Snowy	Erial Rd.	Blackwood Clementon Rd.	Other	49		Changing lanes			
4	1/27/2004	Tu/1955	0	1	County	Other	Icy	Erial Rd.	Blackwood Clementon Rd.	Angle	28			22		
5	1/7/2004	W/1119	0	0	County	Clear	Dry	Erial Rd.	Blackwood Clementon Rd.	Rear End	38		Stopped in traffic	36	Driver Inattention	Slowing or stopping
6	1/10/2004	Sa/0945	0	0	County	Clear	Dry	Erial Rd.	Blackwood Clementon Rd.	Rear End	53		Slowing or stopping	21	Driver Inattention	Slowing or stopping
7	2/9/2004	Mo/2014	0	0	Municipal	Clear	Dry	Erial Rd.	Blackwood Clementon Rd.	Rear End	33	None	Stopped in traffic	19	None	Stopped in traffic
8	1/23/2004	Fr/1555	0	0	County	Clear	Dry	Erial Rd.	Blackwood Clementon Rd.	Rear End	28		Straight ahead	51	None	Stopped in traffic
9	2/28/2004	Sa/1841	0	0	Municipal	Clear	Dry	Erial Rd.	Blackwood Clementon Rd.	Rear End	19	Driver Inattention	Straight ahead	27		Stopped in traffic
10	4/24/2004	Sa/1530	0	0	County	Clear	Dry	Erial Rd.	Blackwood Clementon Rd.	Rear End	20		Slowing or stopping	17	Improper Lane Change	Slowing or stopping
11	5/18/2004	Tu/1414	0	2	County	Clear	Dry	Erial Rd.	Blackwood Clementon Rd.	Angle	18		Left turn	42		Straight ahead
12	9/24/2004	Fr/1830	0	1	County			Erial Rd.	Blackwood Clementon Rd.	Angle	21		Left turn	19	None	Straight ahead
13	10/10/2004	Su/0857	0	3	County	Clear	Dry	Erial Rd.	Blackwood Clementon Rd.	Angle	54	None	Straight ahead	79	Driver Inattention	
15	10/25/2004	Mo/0843	0	0	County	Clear	Dry	Erial Rd.	Blackwood Clementon Rd.	Rear End	52	None	Stopped in traffic	31	Other	Stopped in traffic
16	11/20/2004	Sa/0036	0	0	County	Clear	Dry	Erial Rd.	Blackwood Clementon Rd.	Rear End	19		Slowing or stopping	35	None	Stopped in traffic
30	1/13/2004	Tu/0843	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Side Swipe	50					Straight ahead
31	3/9/2004	Tu/1633	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Rear End	34	None	Stopped in traffic	51	Driver Inattention	Slowing or stopping
32	3/14/2004	Su/0659	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Rear End	20	None	Stopped in traffic	33	Driver Inattention	Slowing or stopping
34	3/20/2004	Sa/0203	0	1	County			Blackwood Clementon Rd.	Erial Rd.	Rear End	65		Stopped in traffic	21	Driver Inattention	Straight ahead
35	4/5/2004	Mo/2050	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Rear End	26		Straight ahead		Driver Inattention	Straight ahead
36	4/19/2004	Mo/2016	0	1	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Other	73	Backing unsafely	Backing	22	None	Stopped in traffic
37	4/23/2004	Fr/1326	0	3	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Angle	20	None	Straight ahead	38	Failed to obey Traffic Control Device	Straight ahead
39	7/9/2004	Fr/1240	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Side Swipe	31	Driver Inattention	Straight ahead	43	None	Straight ahead
40	6/26/2004	Sa/1335	0	0	County	Clear	Dry	Blackwood Clementon Rd.		Rear End	59		Slowing or stopping	37	Driver Inattention	Straight ahead
41	8/6/2004	Fr/2142	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Rear End	18	None	Starting in traffic	78	Driver Inattention	Starting in traffic
43	9/7/2004	Tu/1601	0	0	County	Clear	Dry	Blackwood Clementon Rd.		Rear End	32		Slowing or stopping	35	Driver Inattention	Slowing or stopping
44	9/10/2004	Fr/0652	0	1	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Rear End	43		Straight ahead	61	None	Stopped in traffic
46	10/3/2004	Su/1515	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Rear End	43	None	Stopped in traffic	29	Driver Inattention	Straight ahead
47	9/21/2004	Tu/1850	0	0	County			Blackwood Clementon Rd.	Erial Rd.	Rear End	50	None	Starting in traffic	33	Driver Inattention	Starting in traffic
51	12/22/2004	W/1829	0	1	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Left Turn	62	None	Straight ahead	20	Driver Inattention	Left turn
54	5/31/2005	Tu/1630	0	0	County			Erial Rd.	Blackwood Clementon Rd.	Rear End	57	None	Stopped in traffic		Driver Inattention	Starting in traffic
57	1/6/2005	Th/1601	0	1		Rain	Wet	Erial Rd.	Blackwood Clementon Rd.	Angle	41		Right turn	22	Improper Lane Change	Straight ahead
58	1/20/2005	Th/2023	0	0	County	Clear	Dry	Erial Rd.	Blackwood Clementon Rd.	Rear End	51		Stopped in traffic	70	Driver Inattention	Slowing or stopping
59	1/22/2005	Sa/1345	0	0	County	Snow	Snowy	Erial Rd.	Blackwood Clementon Rd.	Rear End	39		Stopped in traffic	69	Driver Inattention	Slowing or stopping
60	3/30/2005	W/0715	0	0	County	Clear	Dry	Erial Rd.	Blackwood Clementon Rd.	Rear End	52		Right turn	51	None	Straight ahead
61	4/10/2005	Su/1034	0	0	County	Clear	Dry	Erial Rd.	Blackwood Clementon Rd.	Left Turn	18	Driver Inattention	Left turn	29	Driver Inattention	Stopped in traffic
62	8/24/2005	W/1907	0	2	County	Clear	Dry	Erial Rd.	Blackwood Clementon Rd.	Side Swipe	74		Straight ahead	39	Failed to yield right of way	Left turn
63	9/6/2005	Tu/1759	0	0	County	Clear	Dry	Erial Rd.	Blackwood Clementon Rd.	Angle	31	Driver Inattention	Right turn	45	None	Starting in traffic
64	9/15/2005	Th/1356	0	0	County	Rain	Wet	Erial Rd.	Blackwood Clementon Rd.	Side Swipe	52	Driver Inattention	Straight ahead	18	None	Straight ahead
65	12/20/2005	Tu/1025	0	0	County	Clear	Dry	Erial Rd.	Blackwood Clementon Rd.	Rear End	56	None	Stopped in traffic	43	Driver Inattention	Starting in traffic
66	10/1/2005	Sa/1437	0	0	County	Clear	Dry	Erial Rd.	Blackwood Clementon Rd.	Rear End	18	Driver Inattention	Slowing or stopping	57	None	Starting in traffic
67	10/10/2005	Mo/1725	0	0	County	Clear	Dry	Erial Rd.	Blackwood Clementon Rd.	Side Swipe	43	None	Stopped in traffic	28	Driver Inattention	Straight ahead
81	1/19/2005	W/1418	0	0	County	Snow	Snowy	Blackwood Clementon Rd.	Erial Rd.	Rear End	45	None	Slowing or stopping	26	None	Slowing or stopping
82	1/28/2005	Fr/1230	0	0	Private Property	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Side Swipe			Right turn	18	None	Left turn
83	2/17/2005	Th/0902	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Rear End	20	Driver Inattention	Starting in traffic	30	None	Merging
85	3/26/2005	Sa/1531	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Rear End	46	None	Straight ahead	19	Driver Inattention	Straight ahead
87	5/27/2005	Fr/1910	0	0				Blackwood Clementon Rd.	Erial Rd.	Left Turn	30	Failed to yield right of way	Left turn	34	None	Straight ahead
88	6/3/2005	Fr/2240	0	2	County	Rain	Wet	Blackwood Clementon Rd.	Erial Rd.	Rear End	63	None	Stopped in traffic	33	Driver Inattention	Slowing or stopping

Source: Gloucester Township Police Crash Records

Erial Road and Blackwood-Clementon Road Intersection
GLOUCESTER TOWNSHIP - CAMDEN COUNTY

Reportable and/or Non reportable crashes (2004 - 2006)

MAP ID	DATE	DAY/TIME	TOTAL KILLED	TOTAL INJURED	ROAD SYSTEM	WEATHER COND.	ROAD COND.	ROAD	CROSS ROAD	CRASH TYPE	AGE OF DRIVER 1	DRIVER 1 FACTOR	DRIVER 1 ACTION	AGE OF DRIVER 2	DRIVER 2 FACTOR	DRIVER 2 ACTION
89	6/15/2005	W/1628	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Rear End	47	Driver Inattention	Straight ahead	36	None	Straight ahead
90	6/19/2005	Su/1933	0	0	Private Property	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Struck Parked Vehicle		None	Parked	81	Driver Inattention	Backing
91	7/14/2005	Th/2000	0	1	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Left Turn	29	None	Straight ahead	78	Failed to yield right of way	Left turn
92	8/1/2005	Mo/1732	0	0	County			Blackwood Clementon Rd.	Erial Rd.	Rear End	30	None	Stopped in traffic	43	Driver Inattention	Slowing or stopping
93	8/24/2005	W/1606	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Rear End	60	None	Merging	27	Driver Inattention	Straight ahead
94	9/28/2005	W/1932	0	1	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Angle	42	Failed to obey Traffic Control Device	Straight ahead	28	None	Left turn
95	10/4/2005	Tu/1054	0	1	County	Rain	Wet	Blackwood Clementon Rd.	Erial Rd.	Rear End	33	None	Stopped in traffic	48	None	Stopped in traffic
96	10/15/2005	Sa/0733	0	0	County	Rain	Wet	Blackwood Clementon Rd.	Erial Rd.		37	Other	Other			Other
97	11/17/2005	Th/1759	0	1	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Angle	55	None	Slowing or stopping	27	Driver Inattention	Straight ahead
98	11/22/2005	Tu/0653	0	0	County	Rain	Wet	Blackwood Clementon Rd.	Erial Rd.	Rear End	43	None	Stopped in traffic	28	Driver Inattention	Slowing or stopping
99	11/22/2005	Tu/0653	0	0	County	Rain	Wet	Blackwood Clementon Rd.	Erial Rd.	Rear End	24	Driver Inattention	Slowing or stopping	34	None	Stopped in traffic
100	11/28/2005	Mo/1750	0	1	County	Rain	Wet	Blackwood Clementon Rd.	Erial Rd.	Angle	23		Left turn	28	None	Straight ahead
101	12/17/2005	Sa/1432	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Rear End	23	None	Slowing or stopping	17	Improper Lane Change	Straight ahead
102	12/21/2005	W/1704	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Rear End	30	Driver Inattention	Slowing or stopping	31	None	Stopped in traffic
103	1/24/2006	Tu/1855	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Rear End	21	Improper Lane Change	Slowing or stopping	39	None	Stopped in traffic
104	2/7/2006	Tu/1459	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Rear End	81	None	Left turn	40		Straight ahead
105	2/11/2006	Sa/1434	0	0	County	Snow	Wet	Blackwood Clementon Rd.	Erial Rd.	Rear End	35	None	Pedestrian off road	63	Other	Slowing or stopping
106	2/17/2006	Fr/1416	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Rear End	45	None	Stopped in traffic	19	Other	Slowing or stopping
107	2/24/2006	Fr/1011	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Railcar -- vehicle	21	None	Changing lanes		Failed to yield right of way	Merging
108	2/28/2006	Tu/1359	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Rear End	56	None	Straight ahead		Driver Inattention	Straight ahead
109	3/21/2006	Tu/1639	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Rear End	28	None	Slowing or stopping	24	Driver Inattention	Straight ahead
110	4/22/2006	Sa/2146	0	0	County	Rain	Wet	Blackwood Clementon Rd.	Erial Rd.	Rear End	18	Unsafe Speed	Slowing or stopping	23	None	Stopped in traffic
111	6/25/2006	Su/1511	0	0	County	Rain	Wet	Blackwood Clementon Rd.	Erial Rd.	Side Swipe	36	Unsafe Speed	Straight ahead	29	Failed to yield right of way	Merging
112	7/10/2006	Mo/1254	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Rear End	21	Driver Inattention	Slowing or stopping	28	None	Stopped in traffic
113	7/27/2006	Th/1924	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Rear End	20	Driver Inattention	Starting in traffic	40	None	Stopped in traffic
114	8/8/2006	Tu/0114	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Side Swipe	21	None	Straight ahead		Improper Lane Change	Changing lanes
115	8/16/2006	W/2020	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Railcar -- vehicle	17	None	Straight ahead	50	Driver Inattention	Right turn
116	9/20/2006	W/0941	0	1	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Rear End	38	Driver Inattention	Straight ahead	21	None	Stopped in traffic
117	10/8/2006	Su/1505	0	2	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Right Angle	33	None	Straight ahead	73	Failed to yield right of way	Left turn
118	10/18/2006	W/0048	0	0	County	Rain	Wet	Blackwood Clementon Rd.	Erial Rd.	Right Angle	25	Driver Inattention	Straight ahead	28	None	Straight ahead
119	11/30/2006	Th/1112	0	0	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Rear End	33	Other	Slowing or stopping	36	None	Slowing or stopping
120	12/6/2006	W/2107	0	1	County	Clear	Dry	Blackwood Clementon Rd.	Erial Rd.	Head On	29	None	Right turn	21	Improper Lane Change	Left turn
125	2/22/2006	W/1009	0	0	County	Rain	Wet	Erial Rd.	Blackwood Clementon Rd	Rear End	22	None	Slowing or stopping	21	Driver Inattention	Slowing or stopping
126	3/28/2006	Tu/1624	0	0	County	Clear	Dry	Erial Rd.	Blackwood Clementon Rd	Right Angle	25	None	Right turn	18	Improper Lane Change	Straight ahead
127	6/15/2006	Th/0955	0	0	County	Clear	Dry	Erial Rd.	Blackwood Clementon Rd	Rear End	20	None	Stopped in traffic	57	Driver Inattention	Slowing or stopping
128	6/25/2006	Su/2153	0	0	County	Clear	Wet	Erial Rd.	CR 534	Encroachment	39	None	Straight ahead	49	Improper Lane Change	Changing lanes
130	8/3/2006	Th/1005	0	5	County	Rain	Dry	Erial Rd.	Blackwood Clementon Rd	Rear End		Driver Inattention	Straight ahead	29	None	Stopped in traffic
131	8/30/2006	W/1632	0	0	County	Clear	Dry	Erial Rd.	Blackwood Clementon Rd	Rear End	20	Driver Inattention	Straight ahead	31	None	Straight ahead
132	9/22/2006	Fr/1249	0	3	County	Clear	Dry	Erial Rd.	Blackwood Clementon Rd	Rear End	40	None	Stopped in traffic	23	None	Slowing or stopping
`	10/14/2004	Th/0714	0	3	County	Rain	Wet	Erial Rd.	Blackwood Clementon Rd.	Left Turn	27		Straight ahead	18	Improper Lane Change	Left turn

Source: Gloucester Township Police Crash Records

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	18	405	0	0	561	152	18	0	537	79	0	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.87	0.92	0.92	0.88	0.83	0.41	0.92	0.79	0.71	0.92	0.44
Hourly flow rate (vph)	24	466	0	0	638	183	44	0	680	111	0	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									4			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					785							
pX, platoon unblocked	0.75						0.75	0.75		0.75	0.75	0.75
vC, conflicting volume	821			466			1243	1334	466	1243	1243	729
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	594			466			1157	1279	466	1157	1157	471
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			64	100	0	0	100	96
cM capacity (veh/h)	736			1096			122	120	597	0	142	444

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	490	821	724	127
Volume Left	24	0	44	111
Volume Right	0	183	680	16
cSH	736	1700	636	0
Volume to Capacity	0.03	0.48	1.14	Err
Queue Length 95th (ft)	3	0	572	Err
Control Delay (s)	0.9	0.0	102.6	Err
Lane LOS	A		F	F
Approach Delay (s)	0.9	0.0	102.6	Err
Approach LOS			F	F

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		

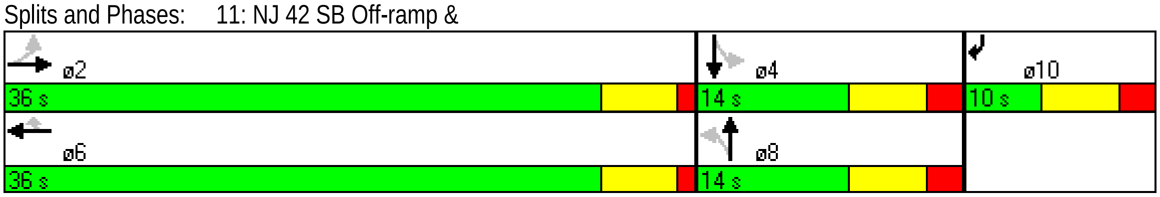
Lane Group	EBL		EBR	WBL			NBL	NBT		SBL	SBT	SBR
Lane Configurations												
Volume (vph)	18		0	0			18	0		79	0	7
Ideal Flow (vphpl)	1900		1900	1900			1900	1900		1900	1900	1900
Storage Length (ft)	0		0	0			0			0		0
Storage Lanes	0		0	0			0			0		0
Taper Length (ft)	25		25	25			25			25		25
Lane Util. Factor	1.00		1.00	1.00			1.00	1.00		1.00	1.00	1.00
Frt											0.983	
Flt Protected								0.950			0.958	
Satd. Flow (prot)	0		0	0			0	1770		0	1754	0
Flt Permitted								0.761			0.722	
Satd. Flow (perm)	0		0	0			0	1418		0	1322	0
Right Turn on Red			Yes									Yes
Satd. Flow (RTOR)											16	
Link Speed (mph)								25			30	
Link Distance (ft)								425			137	
Travel Time (s)								11.6			3.1	
Peak Hour Factor	0.75		0.92	0.92			0.41	0.92		0.71	0.92	0.44
Parking (#/hr)				0								
Adj. Flow (vph)	24		0	0			44	0		111	0	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0		0	0			0	44		0	127	0
Enter Blocked Intersection	No		No	No			No	No		No	No	No
Lane Alignment	Left		Right	Left			Left	Left		Left	Left	Right
Median Width(ft)								0			75	
Link Offset(ft)								10			-100	
Crosswalk Width(ft)								16			0	
Two way Left Turn Lane												
Headway Factor	1.00		1.00	1.00			1.00	1.00		1.00	1.00	1.00
Turning Speed (mph)	15		9	15			15			15		9
Number of Detectors	1						2	1		2	1	
Detector Template	Left											
Leading Detector (ft)	20						156	30		36	40	
Trailing Detector (ft)	0						150	0		30	0	
Detector 1 Position(ft)	0						0	0		0	0	
Detector 1 Size(ft)	20						6	30		6	40	
Detector 1 Type	Cl+Ex						Call	Cl+Ex		Call	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0						0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0						4.0	0.0		4.0	0.0	
Detector 1 Delay (s)	0.0						0.0	0.0		0.0	0.0	
Detector 2 Position(ft)							150			30		
Detector 2 Size(ft)							6			6		
Detector 2 Type							Cl+Ex			Cl+Ex		
Detector 2 Channel												
Detector 2 Extend (s)							0.0			0.0		
Turn Type	Perm					Perm	Perm		Free	Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2					6	8		Free	4		

Lane Group	EBL		EBR	WBL		WBR	NBL	NBT		SBL	SBT	SBR
Lane Configurations												
Volume (vph)	18		0	0		152	18	0		79	0	7
Satd. Flow (prot)	0		0	0		1583	0	1770		0	1770	1583
Flt Permitted								0.685			0.728	
Satd. Flow (perm)	0		0	0		1583	0	1276		0	1356	1583
Satd. Flow (RTOR)						183						16
Lane Group Flow (vph)	0		0	0		183	0	44		0	111	16
Turn Type	Perm					Perm	Perm		Free	Perm		custom
Protected Phases		2			6			8			4	10
Permitted Phases	2					6	8		Free	4		10
Total Split (s)	36.0	36.0	0.0	0.0	36.0	36.0	14.0	14.0	0.0	14.0	14.0	10.0
Total Lost Time (s)	5.0	5.0	4.0	4.0	5.0	5.0	6.0	6.0	4.0	6.0	6.0	6.0
Act Effct Green (s)		40.3			40.3	40.3		9.4	62.6		9.5	4.5
Actuated g/C Ratio		0.64			0.64	0.64		0.14	1.00		0.15	0.06
v/c Ratio		0.43			0.53	0.17		0.24	0.43		0.56	0.14
Control Delay		7.9			9.2	1.7		21.1	0.9		30.4	16.3
Queue Delay		0.0			0.0	0.0		0.0	0.0		0.0	0.0
Total Delay		7.9			9.2	1.7		21.1	0.9		30.4	16.3
LOS		A			A	A		C	A		C	B
Approach Delay		7.9			7.5			2.1			28.6	
Approach LOS		A			A			A			C	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 62.6
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.56
Intersection Signal Delay: 7.0 Intersection LOS: A
Intersection Capacity Utilization 56.1% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 11: NJ 42 SB Off-ramp &



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	770	0	0	991	102	57	0	1491	203	0	57
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.63	0.73	0.92	0.92	0.78	0.67	0.71	0.92	0.94	0.85	0.92	0.75
Hourly flow rate (vph)	16	1055	0	0	1271	152	80	0	1586	239	0	76
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									4			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					785							
pX, platoon unblocked	0.84						0.84	0.84		0.84	0.84	0.84
vC, conflicting volume	1423			1055			2433	2509	1055	2433	2433	1347
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1408			1055			2615	2706	1055	2615	2615	1317
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			100			0	100	0	0	100	53
cM capacity (veh/h)	406			660			7	17	274	0	19	161

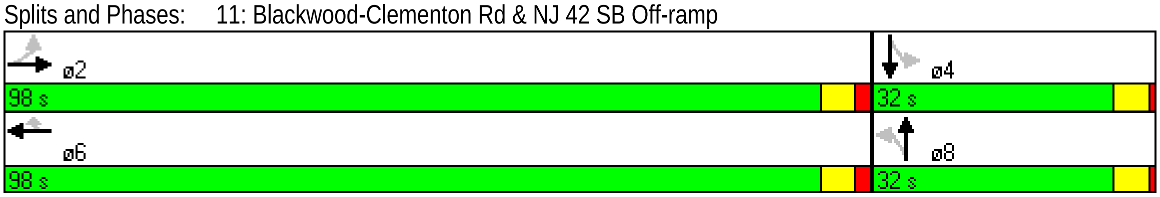
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	1071	1423	1666	315
Volume Left	16	0	80	239
Volume Right	0	152	1586	76
cSH	406	1700	97	0
Volume to Capacity	0.04	0.84	17.16	Err
Queue Length 95th (ft)	3	0	Err	Err
Control Delay (s)	1.7	0.0	Err	Err
Lane LOS	A		F	F
Approach Delay (s)	1.7	0.0	Err	Err
Approach LOS			F	F

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	158.1%	ICU Level of Service	H
Analysis Period (min)	15		

Lane Group	EBL		EBR	WBL			NBL	NBT		SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10		0	0			57	0		203	0	57
Satd. Flow (prot)	0		0	0			0	1770		0	1735	0
Flt Permitted								0.707			0.726	
Satd. Flow (perm)	0		0	0			0	1317		0	1308	0
Satd. Flow (RTOR)											11	
Lane Group Flow (vph)	0		0	0			0	80		0	315	0
Turn Type	Perm					Perm	Perm		Free	Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2					6	8		Free	4		
Total Split (s)	98.0	98.0	0.0	0.0	98.0	98.0	32.0	32.0	0.0	32.0	32.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	4.0	6.0	6.0	5.0	5.0	4.0	5.0	5.0	4.0
Act Effct Green (s)		92.0			92.0	92.0		27.0	130.0		27.0	
Actuated g/C Ratio		0.71			0.71	0.71		0.21	1.00		0.21	
v/c Ratio		1.06			0.78	0.13		0.29	1.00		1.12	
Control Delay		66.2			17.2	1.5		46.9	26.0		136.7	
Queue Delay		0.0			4.2	0.0		0.0	0.0		0.0	
Total Delay		66.2			21.4	1.5		46.9	26.0		136.7	
LOS		E			C	A		D	C		F	
Approach Delay		66.2			19.2			27.0			136.7	
Approach LOS		E			B			C			F	

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 130	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.13	
Intersection Signal Delay: 42.1	Intersection LOS: D
Intersection Capacity Utilization 79.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 11: Blackwood-Clementon Rd & NJ 42 SB Off-ramp



Lane Group	EBL		EBR	WBL			NBL	NBT		SBL	SBT	
Lane Configurations												
Volume (vph)	10		0	0			57	0		203	0	
Satd. Flow (prot)	0		0	0			0	1770		0	1770	
Flt Permitted								0.227			0.677	
Satd. Flow (perm)	0		0	0			0	423		0	1261	
Satd. Flow (RTOR)												
Lane Group Flow (vph)	0		0	0			0	80		0	239	
Turn Type	Perm					Perm	Perm		Free	Perm		custom
Protected Phases		2			6			8			4	
Permitted Phases	2					6	8		Free	4		10
Total Split (s)	112.0	112.0	0.0	0.0	112.0	112.0	28.0	28.0	0.0	28.0	28.0	10.0
Total Lost Time (s)	6.0	6.0	4.0	4.0	6.0	6.0	5.0	5.0	4.0	5.0	5.0	5.0
Act Effct Green (s)		106.0			106.0	106.0		23.0	150.0		23.0	5.0
Actuated g/C Ratio		0.71			0.71	0.71		0.15	1.00		0.15	0.03
v/c Ratio		1.11			0.78	0.13		1.23	1.00		1.24	0.60
Control Delay		87.2			19.3	2.2		236.5	25.8		193.8	34.0
Queue Delay		0.0			10.2	0.0		0.0	0.0		0.0	0.0
Total Delay		87.2			29.5	2.2		236.5	25.8		193.8	34.0
LOS		F			C	A		F	C		F	C
Approach Delay		87.2			26.3			35.9			155.2	
Approach LOS		F			C			D			F	

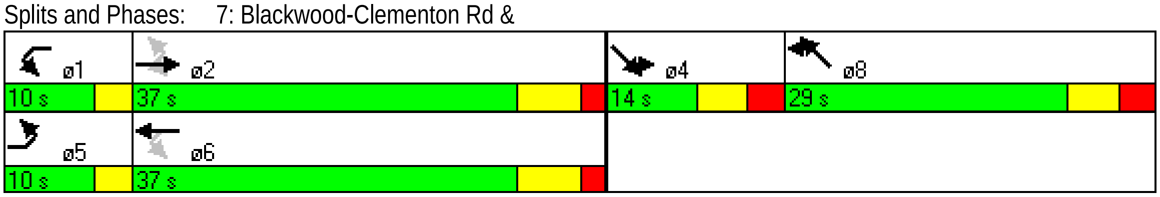
Intersection Summary	
Cycle Length: 150	
Actuated Cycle Length: 150	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.24	
Intersection Signal Delay: 54.2	Intersection LOS: D
Intersection Capacity Utilization 75.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 11: NJ 42 SB Off-ramp &

Lane Group	EBL			WBL		WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	11			31		4	3	4	34	638	2	27
Satd. Flow (prot)	1770			1770		0	1770	1626	0	1681	1665	0
Flt Permitted	0.131			0.141			0.950			0.950	0.959	
Satd. Flow (perm)	244			263		0	1770	1626	0	1681	1665	0
Satd. Flow (RTOR)								44			8	
Lane Group Flow (vph)	16			44		0	4	52	0	374	375	0
Turn Type	pm+pt		Perm	pm+pt			Split			Split		
Protected Phases	5	2		1	6		4	4		8	8	
Permitted Phases	2		2	6								
Total Split (s)	10.0	37.0	37.0	10.0	37.0	0.0	14.0	14.0	0.0	29.0	29.0	0.0
Total Lost Time (s)	3.0	7.0	7.0	3.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0
Act Effct Green (s)	38.6	31.0	31.0	39.4	34.5		7.1	7.1		20.8	20.8	
Actuated g/C Ratio	0.44	0.39	0.39	0.48	0.44		0.08	0.08		0.26	0.26	
v/c Ratio	0.07	0.73	0.53	0.17	0.73		0.03	0.30		0.85	0.84	
Control Delay	14.5	25.7	5.0	13.7	24.5		39.0	20.1		49.5	48.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.5	25.7	5.0	13.7	24.5		39.0	20.1		49.5	48.7	
LOS	B	C	A	B	C		D	C		D	D	
Approach Delay		19.2			24.1			21.5			49.1	
Approach LOS		B			C			C			D	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 78.9	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 27.5	Intersection LOS: C
Intersection Capacity Utilization 63.5%	ICU Level of Service B
Analysis Period (min) 15	

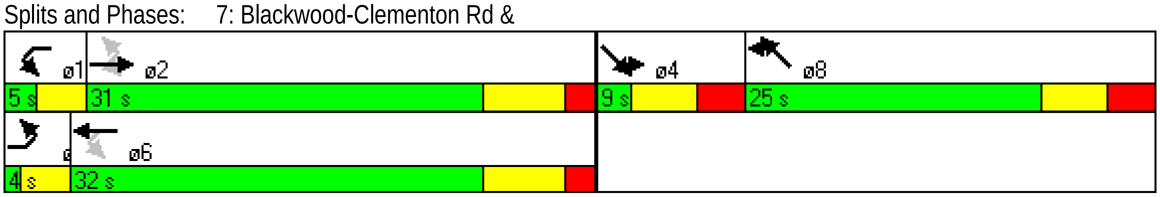
Splits and Phases: 7: Blackwood-Clementon Rd &



Lane Group	EBL			WBL		WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	11			31		4	3	4	34	638	2	27
Satd. Flow (prot)	1770			1770		0	1770	1626	0	1681	1665	0
Flt Permitted	0.175			0.155			0.950			0.950	0.959	
Satd. Flow (perm)	326			289		0	1770	1626	0	1681	1665	0
Satd. Flow (RTOR)								44			10	
Lane Group Flow (vph)	16			44		0	4	52	0	374	375	0
Turn Type	pm+pt		Perm	pm+pt			Split			Split		
Protected Phases	5	2		1	6		4	4		8	8	
Permitted Phases	2		2	6								
Total Split (s)	4.0	31.0	31.0	5.0	32.0	0.0	9.0	9.0	0.0	25.0	25.0	0.0
Total Lost Time (s)	3.0	7.0	7.0	3.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0
Act Effct Green (s)	27.4	22.8	22.8	29.0	24.8		2.0	2.0		16.9	16.9	
Actuated g/C Ratio	0.42	0.37	0.37	0.46	0.40		0.03	0.03		0.27	0.27	
v/c Ratio	0.10	0.77	0.54	0.24	0.80		0.07	0.56		0.81	0.81	
Control Delay	12.3	21.8	4.9	13.5	23.2		36.0	39.6		39.8	38.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	12.3	21.8	4.9	13.5	23.2		36.0	39.6		39.8	38.8	
LOS	B	C	A	B	C		D	D		D	D	
Approach Delay		16.5			22.8			39.3			39.3	
Approach LOS		B			C			D			D	

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 61.6	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 24.1	Intersection LOS: C
Intersection Capacity Utilization 63.5%	ICU Level of Service B
Analysis Period (min) 15	

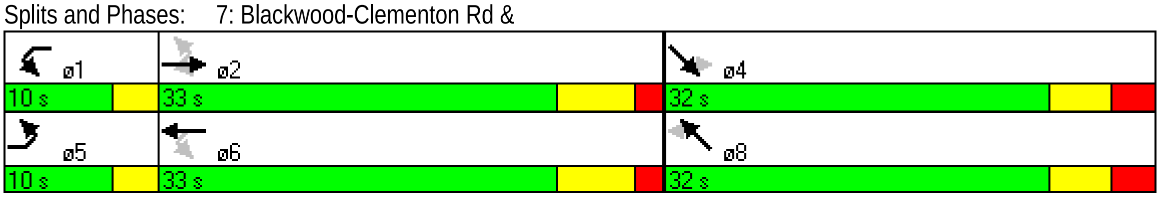
Splits and Phases: 7: Blackwood-Clementon Rd &



Lane Group	EBL			WBL		WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	11			31		4	3	4	34	638	2	27
Satd. Flow (prot)	1770			1770		0	1770	1626	0	1681	1665	0
Flt Permitted	0.150			0.152			0.377			0.723	0.721	
Satd. Flow (perm)	279			283		0	702	1626	0	1279	1252	0
Satd. Flow (RTOR)								44			11	
Lane Group Flow (vph)	16			44		0	4	52	0	374	375	0
Turn Type	pm+pt		Perm	pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2		2	6			4			8		
Total Split (s)	10.0	33.0	33.0	10.0	33.0	0.0	32.0	32.0	0.0	32.0	32.0	0.0
Total Lost Time (s)	3.0	7.0	7.0	3.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0
Act Effct Green (s)	34.2	26.4	26.4	35.3	30.0		22.9	22.9		22.9	22.9	
Actuated g/C Ratio	0.44	0.38	0.38	0.48	0.43		0.33	0.33		0.33	0.33	
v/c Ratio	0.06	0.75	0.53	0.16	0.74		0.02	0.09		0.88	0.88	
Control Delay	10.6	22.5	4.8	10.2	21.5		17.3	7.6		47.2	47.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	10.6	22.5	4.8	10.2	21.5		17.3	7.6		47.2	47.2	
LOS	B	C	A	B	C		B	A		D	D	
Approach Delay		16.9			21.1			8.3			47.2	
Approach LOS		B			C			A			D	

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 69	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 24.9	Intersection LOS: C
Intersection Capacity Utilization 63.5%	ICU Level of Service B
Analysis Period (min) 15	

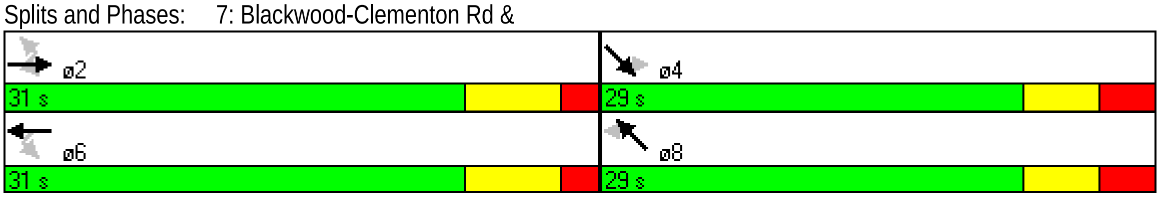
Splits and Phases: 7: Blackwood-Clementon Rd &



Lane Group	EBL			WBL		WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	11			31		4	3	4	34	638	2	27
Satd. Flow (prot)	1770			1770		0	1770	1626	0	1681	1665	0
Flt Permitted	0.166			0.200			0.429			0.723	0.721	
Satd. Flow (perm)	309			373		0	799	1626	0	1279	1252	0
Satd. Flow (RTOR)								24			14	
Lane Group Flow (vph)	16			44		0	4	52	0	374	375	0
Turn Type	Perm		Perm	Perm			Perm			Perm		
Protected Phases		2			6			4			8	
Permitted Phases	2		2	6			4			8		
Total Split (s)	31.0	31.0	31.0	31.0	31.0	0.0	29.0	29.0	0.0	29.0	29.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0
Act Effct Green (s)	24.1	24.1	24.1	24.1	24.1		19.6	19.6		19.6	19.6	
Actuated g/C Ratio	0.42	0.42	0.42	0.42	0.42		0.34	0.34		0.34	0.34	
v/c Ratio	0.12	0.68	0.51	0.28	0.77		0.01	0.09		0.86	0.86	
Control Delay	14.5	15.1	3.9	18.3	19.7		12.3	8.7		39.5	39.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.5	15.1	3.9	18.3	19.7		12.3	8.7		39.5	39.0	
LOS	B	B	A	B	B		B	A		D	D	
Approach Delay		11.7			19.7			8.9			39.2	
Approach LOS		B			B			A			D	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 57.8	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 20.5	Intersection LOS: C
Intersection Capacity Utilization 63.5%	ICU Level of Service B
Analysis Period (min) 15	

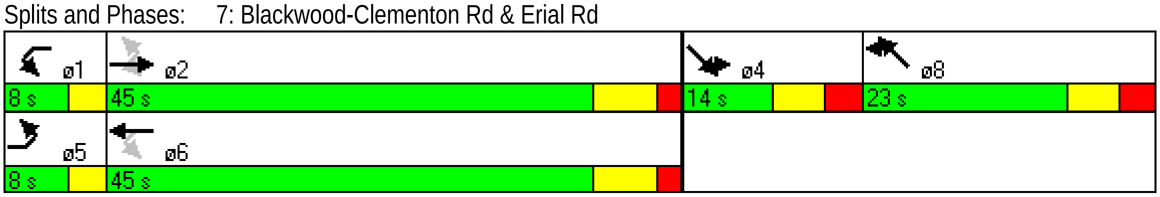
Splits and Phases: 7: Blackwood-Clementon Rd &



Lane Group	EBL			WBL		WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	25			37		3	5	7	41	444	3	32
Satd. Flow (prot)	1770			1770		0	1770	1621	0	1681	1661	0
Flt Permitted	0.227			0.104			0.950			0.950	0.959	
Satd. Flow (perm)	423			194		0	1770	1621	0	1681	1661	0
Satd. Flow (RTOR)								52			8	
Lane Group Flow (vph)	40			48		0	8	60	0	298	287	0
Turn Type	pm+pt		Perm	pm+pt			Split			Split		
Protected Phases	5	2		1	6		4	4		8	8	
Permitted Phases	2		2	6								
Total Split (s)	8.0	45.0	45.0	8.0	45.0	0.0	14.0	14.0	0.0	23.0	23.0	0.0
Total Lost Time (s)	3.0	7.0	7.0	3.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0
Act Effct Green (s)	45.1	38.5	38.5	45.1	38.5		7.0	7.0		16.2	16.2	
Actuated g/C Ratio	0.52	0.46	0.46	0.52	0.46		0.08	0.08		0.19	0.19	
v/c Ratio	0.14	0.89	0.61	0.25	0.56		0.06	0.34		0.92	0.88	
Control Delay	10.6	31.0	4.6	12.9	19.8		39.4	19.8		70.7	62.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	10.6	31.0	4.6	12.9	19.8		39.4	19.8		70.7	62.9	
LOS	B	C	A	B	B		D	B		E	E	
Approach Delay		22.6			19.4			22.1			66.9	
Approach LOS		C			B			C			E	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 84	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 28.9	Intersection LOS: C
Intersection Capacity Utilization 66.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 7: Blackwood-Clementon Rd & Erial Rd

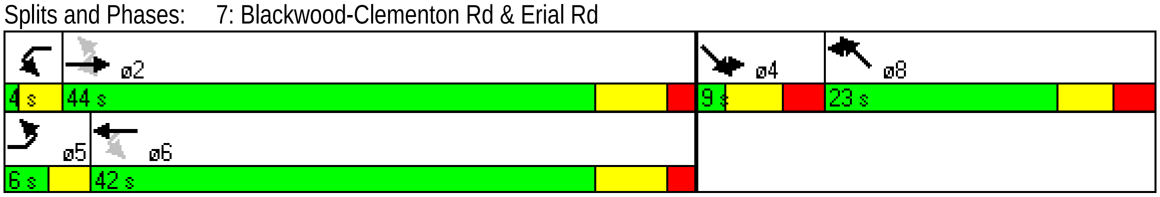


Lane Group	EBL			WBL		WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	25			37		3	5	7	41	444	3	32
Satd. Flow (prot)	1770			1770		0	1770	1621	0	1681	1661	0
Flt Permitted	0.226			0.118			0.950			0.950	0.959	
Satd. Flow (perm)	421			220		0	1770	1621	0	1681	1661	0
Satd. Flow (RTOR)								52			9	
Lane Group Flow (vph)	40			48		0	8	60	0	298	287	0
Turn Type	pm+pt		Perm	pm+pt			Split			Split		
Protected Phases	5	2		1	6		4	4		8	8	
Permitted Phases	2		2	6								
Total Split (s)	6.0	44.0	44.0	4.0	42.0	0.0	9.0	9.0	0.0	23.0	23.0	0.0
Total Lost Time (s)	3.0	7.0	7.0	3.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0
Act Effct Green (s)	40.6	35.0	35.0	38.3	33.9		2.0	2.0		15.5	15.5	
Actuated g/C Ratio	0.53	0.47	0.47	0.51	0.46		0.03	0.03		0.21	0.21	
v/c Ratio	0.14	0.86	0.60	0.36	0.56		0.17	0.64		0.84	0.81	
Control Delay	9.3	24.2	4.2	18.3	17.2		46.2	46.4		53.5	48.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	9.3	24.2	4.2	18.3	17.2		46.2	46.4		53.5	48.4	
LOS	A	C	A	B	B		D	D		D	D	
Approach Delay		17.8			17.2			46.4			51.0	
Approach LOS		B			B			D			D	

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 73.8
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 23.6 Intersection LOS: C
Intersection Capacity Utilization 66.3% ICU Level of Service C
Analysis Period (min) 15

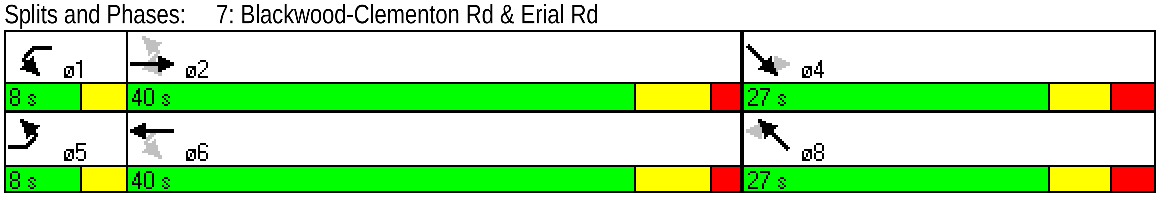
Splits and Phases: 7: Blackwood-Clementon Rd & Erial Rd



Lane Group	EBL			WBL		WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	25			37		3	5	7	41	444	3	32
Satd. Flow (prot)	1770			1770		0	1770	1621	0	1681	1663	0
Flt Permitted	0.247			0.120			0.451			0.718	0.716	
Satd. Flow (perm)	460			224		0	840	1621	0	1271	1242	0
Satd. Flow (RTOR)								52			10	
Lane Group Flow (vph)	40			48		0	8	60	0	292	293	0
Turn Type	pm+pt		Perm	pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2		2	6			4			8		
Total Split (s)	8.0	40.0	40.0	8.0	40.0	0.0	27.0	27.0	0.0	27.0	27.0	0.0
Total Lost Time (s)	3.0	7.0	7.0	3.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0
Act Effct Green (s)	40.0	33.2	33.2	40.0	33.2		18.7	18.7		18.7	18.7	
Actuated g/C Ratio	0.54	0.47	0.47	0.54	0.47		0.27	0.27		0.27	0.27	
v/c Ratio	0.12	0.86	0.61	0.21	0.55		0.04	0.13		0.87	0.87	
Control Delay	7.3	24.4	4.3	8.8	15.8		21.0	8.8		53.0	52.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.3	24.4	4.3	8.8	15.8		21.0	8.8		53.0	52.5	
LOS	A	C	A	A	B		C	A		D	D	
Approach Delay		18.0			15.4			10.3			52.8	
Approach LOS		B			B			B			D	

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 70.5	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 22.8	Intersection LOS: C
Intersection Capacity Utilization 66.3%	ICU Level of Service C
Analysis Period (min) 15	

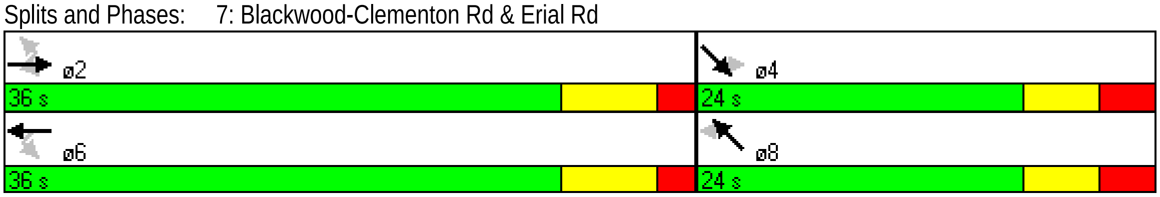
Splits and Phases: 7: Blackwood-Clementon Rd & Erial Rd



Lane Group	EBL	EBT		WBL		WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	25	932		37		3	5	7	41	444	3	32
Satd. Flow (prot)	1770	3251		1770		0	1770	1621	0	1681	1663	0
Flt Permitted	0.271			0.138			0.505			0.718	0.716	
Satd. Flow (perm)	505	3251		257		0	941	1621	0	1271	1242	0
Satd. Flow (RTOR)		115						52			13	
Lane Group Flow (vph)	40	1363		48		0	8	60	0	292	293	0
Turn Type	Perm		Perm	Perm			Perm			Perm		
Protected Phases		2			6			4			8	
Permitted Phases	2		2	6			4			8		
Total Split (s)	36.0	36.0	36.0	36.0	36.0	0.0	24.0	24.0	0.0	24.0	24.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0
Act Effct Green (s)	29.0	29.0	29.0	29.0	29.0		16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49		0.27	0.27		0.27	0.27	
v/c Ratio	0.16	0.82	0.60	0.38	0.52		0.03	0.13		0.85	0.85	
Control Delay	10.8	17.5	3.8	20.9	11.9		16.2	7.2		45.5	44.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	10.8	17.5	3.8	20.9	11.9		16.2	7.2		45.5	44.4	
LOS	B	B	A	C	B		B	A		D	D	
Approach Delay		13.3			12.3			8.3			44.9	
Approach LOS		B			B			A			D	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 59	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 18.0	Intersection LOS: B
Intersection Capacity Utilization 68.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 7: Blackwood-Clementon Rd & Erial Rd



HNTB					
	Made by	PA	Date	3/20/2007	Job Number 42357
	Checked by	AL	Date	4/4/2007	Sheet Number 1 of 1
For: Route 42 and College Drive	Backchecked by		Date		

Comparision bet. Year 2006 Base Year, Year 2030 No Build Alternate, and Year 2030 Build Alternate (Alternate 1)

Number	Link Roadway @ Location	Movements	Base Year 2006 ADT	Year 2030 ADT w/out Interchange	Year 2030 ADT w Interchange - Alt 1	% of Growth - 2006 Base Yr. vs. 2030 NoBuild	% of Growth - 2006 Base Yr vs. 2030 Build (Alt 1)	% Change Yr. 2030 Build vs. 2030 No Build Alternates
1	College Drive @ E. of NJ Rt 168	EB	5023	5853	4720	16.52%	-6.03%	-24.00%
		WB	6380	6505	5924	1.96%	-7.15%	-9.81%
2	Davistown Road @ NJ Route 42 Overpass	EB	4838	8380	7085	73.21%	46.44%	-18.28%
		WB	4151	8056	7327	94.07%	76.51%	-9.95%
3	Sicklerville Road @ East of NJ Route 168	WB	10645	10209	9786	-4.10%	-8.07%	-4.32%
		EB	7743	8687	8663	12.19%	11.88%	-0.28%
4	Blackwd./Clementon Rd (CR 534) @ E. of NJ 42 (west of E. Leg Erial	EB	14899	17366	16453	16.56%	10.43%	-5.55%
		WB	18333	20184	18738	10.10%	2.21%	-7.72%
5	Erial Road @ North of Davistown Road	NB	6508	7232	6610	11.12%	1.57%	-9.41%
		SB	5347	6960	6208	30.17%	16.10%	-12.11%
6	Peter Cheeseman Road @ betw. Erial Rd & College Dr.	NB	6814	7601	6821	11.55%	0.10%	-11.44%
		SB	6707	7574	6960	12.93%	3.77%	-8.82%
7	Erial Road @ betw. College Dr. and Peter Cheeseman Road	NB	7546	7044	6903	-6.65%	-8.52%	-2.04%
		SB	7275	7180	7064	-1.31%	-2.90%	-1.64%
8	NJ Route 168 @ South of Church St (CR 534)	NB	4076	9898	9484	142.84%	132.68%	-4.37%
		SB	5620	10518	9469	87.15%	68.49%	-11.08%
9	NJ Route 168 @ North of College Drive	NB	6636	4705	3737	-29.10%	-43.69%	-25.90%
		SB	8453	5946	4497	-29.66%	-46.80%	-32.22%
10	NJ Route 168 @ North of Sicklerville Road	NB	8634	11033	8741	27.79%	1.24%	-26.22%
		SB	11973	13064	10854	9.11%	-9.35%	-20.36%
11	Camden Cty. Coll. Exits to Peter Cheeseman Road (combined)	EB	1029	2781	2138	170.26%	107.77%	-30.07%
		WB	1355	2623	2085	93.58%	53.87%	-25.80%
12	NJ Route 42 NB/SB @ South of Blackwd./Clementon Rd (CR 534)	NB	43468	54653	56024	25.73%	28.89%	2.45%
		SB	41182	52849	55156	28.33%	33.93%	4.18%
13	NJ Route 42 NB/SB @ North of Blackwd./Clementon Rd (CR 534)	NB	50809	62531	62687	23.07%	23.38%	0.25%
		SB	47283	59667	60696	26.19%	28.37%	1.70%
14a	Exit from NJ Route 42 SB to Blackwd./Clementon Rd (CR 534)	SB	6101	6819	5540	11.77%	-9.20%	-23.09%
14b	Entry to NJ Route 42 NB from Blackwd./Clementon Rd (CR 534)	NB	7340	7878	6664	7.33%	-9.21%	-18.22%
15	RT 42 NB / SB @ South of College Drive	NB	43468	54653	57055	25.73%	31.26%	4.21%
		SB	41182	52849	54135	28.33%	31.45%	2.38%
16a	NJ Route 42 SB exit to NJ Route 168 NB S. of Sicklerville Rd.	SB to NB	4191	6932	4844	65.40%	15.58%	-43.10%
16b	NJ Route 42 NB Exit to Sicklerville Road	NB Exit	9293	8164	6730	-12.15%	-27.58%	-21.31%
16c	NJ Route 42 NB Entry from Sicklerville Road	NB Entry	5234	5902	5339	12.76%	2.01%	-10.55%

Note: A negative % change means, it is reduction in traffic due to the Build Alternative (Alternative 1)

APPENDIX C

GLOUCESTER

SYNCHRO ANALYSIS

Source: DVRPC, 2007

NJ 47 (Delsea Drive)/Coles Mill Road/Swedesboro Road/Porchtown Road Intersection
FRANKLIN TOWNSHIP - GLOUCESTER COUNTY

Reportable crashes (2003 - 2006)

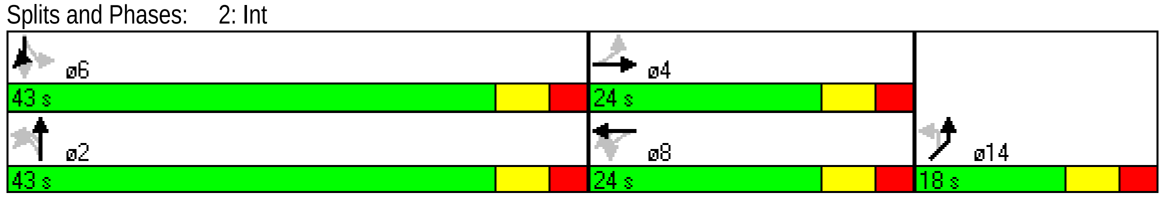
MAP ID	DATE	DAY/TIME	TOTAL KILLED	TOTAL INJURED	ROAD SYSTEM	WEATHER COND.	ROAD COND.	ROAD	CROSS ROAD	CRASH TYPE	AGE OF DRIVER 1	DRIVER 1 FACTOR	DRIVER 1 ACTION	AGE OF DRIVER 2	DRIVER 2 FACTOR	DRIVER 2 ACTION
1	3/20/2003	Th/1646	0	0	SHW	rain	wet	Delsea Dr	Porchtown Rd	SS	26		SB right	28		SB right
2	3/5/2003	W/2245	0	0	CO	clear	dry	Swedesboro Rd	Delsea Dr	Rear-end	22	DUI	EB thru	53		EB thru
3	5/23/2003	F/2209	0	0	SHW	rain	wet	Delsea Dr	Colls Mill Rd	Angle	49		SB left turn	42		NB thru
4	5/31/2003	Sa/0816	0	0	CO	clear	dry	Swedesboro Rd	Delsea Dr	Rear-end	26	Backing	EB waiting	29		EB waiting
5	6/13/2003	F/2207	0	0	SHW	rain	dry	Delsea Dr	Colls Mill Rd	Angle	20		NB left turn	20		SB thru
6	7/1/2003	Tu/1605	0	0	SHW	clear	dry	Delsea Dr	Swedesboro Rd	Angle	17		NB left turn	47		SB right
7	7/23/2003	W/1845	0	2	SHW	clear	dry	Delsea Dr	Colls Mill Rd	Left turn	26		SB left turn	21		NB thru
8	8/16/2003	Sa/2013	0	2	CO	rain	wet	Swedesboro Rd	Delsea Dr	Rear-end	18		WB thru	44	parked in rd	WB at light
9	8/16/2003	Sa/1953	0	0	CO	rain	wet	Swedesboro Rd	Delsea Dr	Rear-end	44		WB thru	36		WB thru
10	9/16/2003	Tu/1822	0	4	SHW	clear	dry	Delsea Dr	Swedesboro Rd	Angle	22	DWI, reckless, unlic.	SB THRU	20		NB left
11	11/12/2003	W/720	0	2	SHW	rain	wet	Delsea Dr	Colls Mill Rd	Head-on	17		SB left turn	51		NB thru
12	11/12/2004	F/1108	0	2	SHW	rain	wet	Delsea Dr	Colls Mill Rd	Angle	40		SB thru	27		WB thru
13	7/28/2004	W/1304	0	2	SHW	clear	dry	Delsea Dr	Swedesboro Rd	Angle	18		NB left turn	40		SB thru
14	7/25/2004	Su/1305	0	0	SHW	clear	dry	Delsea Dr	Porchtown Rd	HitFixObj	77	lost consciousness	SB thru			
15	7/9/2004	F/2246	0	0	CO	clear	dry	Colls Mill Rd	Delsea Dr	Angle	19		WB left	37		EB right
16	5/21/2004	F/2101	0	0	CO	clear	dry	Colls Mill Rd	Delsea Dr	Rear-end	48		WB thru	21		WB waiting
17	5/28/2004	F/0827	0	0	SHW	clear	dry	Delsea Dr	Swedesboro Rd	Rear-end	56		SB thru	34		SB waiting
18	5/6/2004	Th/1437	0	0	SHW	clear	dry	Delsea Dr	Colls Mill Rd	Rear-end	48		NB thru	51		NB thru
19	1/19/2004	M/811	0	0	CO	clear	icy	Swedesboro Rd	Delsea Dr	SS	21	Hit Parked Car	EB thru			
20	12/25/2005	Su/1100	0	0	CO	clear	dry	Porchtown Rd	Delsea Dr	Angle	21	high speed	SB - from NB	39		NB waiting
21	10/28/2005	F/1839	0	0	SHW	clear	dry	Delsea Dr	Swedesboro Rd	Angle	35		NB left turn	43		SB right
22	10/21/2005	F/1627	0	0	SHW	rain	wet	Delsea Dr	Swedesboro Rd	Left turn	27		NB left turn	24		Sb thru
23	9/20/2005	Tu/1534	0	0	SHW	clear	dry	Delsea Dr	Swedesboro Rd	Angle	76		SB thru	17		NB left
24	9/5/2005	M/1715	0	0	Co	clear	dry	Delsea Dr	Colls Mill Rd	Angle	31		NB right	47		WB thru
25	8/26/2005	F/1015	0	0	Co	clear	dry	Colls Mill Rd	Delsea Dr	Rear-end	22	Backing	WB waiting	67		WB waiting
26	6/1/2005	W/1900	0	0	SHW	clear	dry	Delsea Dr	Colls Mill Rd	Angle	41	pass on right	NB thru	36		NB right
27	6/3/2005	F/2032	0	0	SHW	rain	wet	Delsea Dr	Colls Mill Rd	Angle	38	inattention	NB thru	50	inattention	Nb right
28	5/27/2005	F/1741	0	0	SHW	rain	wet	Delsea Dr	Colls Mill Rd	Rear-end	41	inattention	Nb thru	62		NB waiting
29	4/23/2005	Sa/2247	0	0	SHW	rain	wet	Delsea Dr	Colls Mill Rd	Angle	57		SB left turn	32		NB thru
30	2/11/2006	Sa/1732	0	0	SHW	snow	wet	Delsea Dr	Swedesboro Rd	Rt Angle	19	inattention	NB - left turn	22	inattention	SB - thru
31	10/30/2006	M/1443	0	0	SHW	clear	dry	Delsea Dr	Colls Mill Rd	SS	86	inattention	SB - thru	29		SB - left turn
32	11/3/2006	F/2134	0	0	SHW	clear	dry	Delsea Dr	Colls Mill Rd	Angle	17	cellphone	SB - left turn	40		NB - thru
33	11/11/2006	Sa/0935	0	0	CO	clear	dry	Porchtown Rd	Delsea Dr	Rear-end	17	inattention	NB - straight	57		NB - waiting
34	12/11/2006	M/1805	0	4	SHW	clear	dry	Delsea Dr	Colls Mill Rd	Angle	17	cellphone	SB - left turn	29		NB - thru

Source: Franklin Township Police Records

Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations																				
Volume (vph)	6	120	32	2	11	19	131	40	4	61	151	5	37	152	20	2	15	61	60	9
Satd. Flow (prot)	0	2046	0	0	0	0	1738	0	0	0	2075	0	0	1844	1636	0	0	1927	0	0
Flt Permitted		0.982					0.892				0.850			0.903				0.960		
Satd. Flow (perm)	0	2013	0	0	0	0	1563	0	0	0	1789	0	0	1682	1636	0	0	1897	0	0
Satd. Flow (RTOR)											2									
Lane Group Flow (vph)	0	174	0	0	0	0	218	0	0	0	239	0	0	205	24	0	0	157	0	0
Turn Type	Perm				Perm	Perm			Perm	Perm			custom		custom		Perm			
Protected Phases		4					8				2				6			14		
Permitted Phases	4				8	8			2	2			6	6			14			
Total Split (s)	24.0	24.0	0.0	0.0	24.0	24.0	24.0	0.0	43.0	43.0	43.0	0.0	43.0	43.0	43.0	0.0	18.0	18.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	4.0
Act Effct Green (s)		14.3					14.3				36.1			36.1	36.1			9.8		
Actuated g/C Ratio		0.18					0.18				0.44			0.44	0.44			0.12		
v/c Ratio		0.49					0.79				0.30			0.27	0.03			0.69		
Control Delay		35.3					53.3				16.6			16.6	14.5			51.5		
Queue Delay		0.0					0.0				0.0			0.0	0.0			0.0		
Total Delay		35.3					53.3				16.6			16.6	14.5			51.5		
LOS		D					D				B			B	B			D		
Approach Delay		35.3					53.3				16.6			16.3				51.5		
Approach LOS		D					D				B			B				D		

Intersection Summary	
Cycle Length: 85	
Actuated Cycle Length: 81.3	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 33.0	Intersection LOS: C
Intersection Capacity Utilization 112.7%	ICU Level of Service H
Analysis Period (min) 15	

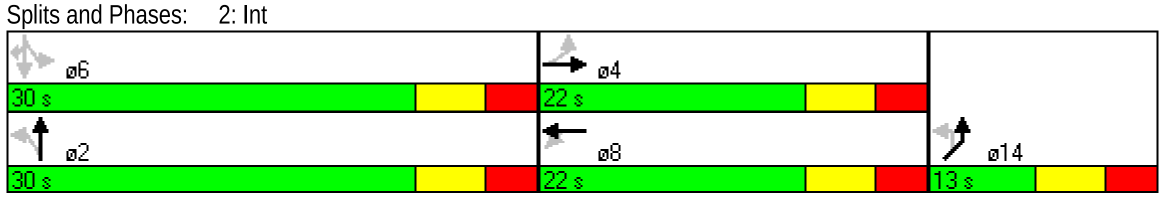
Splits and Phases: 2: Int



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR2	NEL2	NEL	NER
Lane Configurations															
Volume (vph)	12	124	63	31	37	179	30	312	19	82	355	11	16	49	27
Satd. Flow (prot)	0	2016	0	0	1614	0	2006	2092	0	0	1846	1636	0	1958	0
Flt Permitted		0.967			0.920		0.330				0.741			0.966	
Satd. Flow (perm)	0	1956	0	0	1494	0	697	2092	0	0	1380	1636	0	1958	0
Satd. Flow (RTOR)								5							
Lane Group Flow (vph)	0	216	0	0	269	0	33	360	0	0	475	12	0	99	0
Turn Type	Perm			Perm			Perm			custom		custom	Perm		
Protected Phases		4			8			2						14	
Permitted Phases	4			8			2			6	6	6	14		
Total Split (s)	22.0	22.0	0.0	22.0	22.0	0.0	30.0	30.0	0.0	30.0	30.0	30.0	13.0	13.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	7.0	7.0	7.0	4.0
Act Effct Green (s)		13.6			13.6		23.0	23.0			23.0	23.0		6.0	
Actuated g/C Ratio		0.21			0.21		0.36	0.36			0.36	0.36		0.09	
v/c Ratio		0.52			0.84		0.13	0.47			0.95	0.02		0.54	
Control Delay		26.9			48.7		16.0	18.4			54.2	13.9		40.2	
Queue Delay		0.0			0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay		26.9			48.7		16.0	18.4			54.2	13.9		40.2	
LOS		C			D		B	B			D	B		D	
Approach Delay		26.9			48.7			18.2			53.2			40.2	
Approach LOS		C			D			B			D			D	

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 63.7	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 38.2	Intersection LOS: D
Intersection Capacity Utilization 93.4%	ICU Level of Service F
Analysis Period (min) 15	

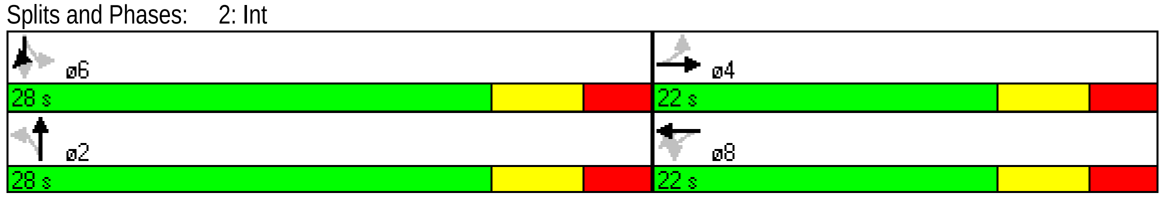
Splits and Phases: 2: Int



Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR			NBR	SBL			SBR2
Lane Configurations															
Volume (vph)	12	124	57	6	16	15	37	179			19	82			11
Satd. Flow (prot)	0	2014	0	0	0	0	1614	0			0	0			0
Flt Permitted		0.966					0.931								
Satd. Flow (perm)	0	1952	0	0	0	0	1512	0			0	0			0
Satd. Flow (RTOR)															
Lane Group Flow (vph)	0	217	0	0	0	0	268	0			0	0			0
Turn Type	Perm				Perm	Perm			Perm			custom		custom	
Protected Phases		4					8			2				6	
Permitted Phases	4				8	8			2			6	6		
Total Split (s)	22.0	22.0	0.0	0.0	22.0	22.0	22.0	0.0	28.0	28.0	0.0	28.0	28.0	28.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	7.0	4.0
Act Effct Green (s)		11.8					11.8		21.8	21.8			21.8	21.8	
Actuated g/C Ratio		0.25					0.25		0.46	0.46			0.46	0.46	
v/c Ratio		0.45					0.72		0.06	0.37			0.54	0.15	
Control Delay		17.8					27.5		8.9	10.5			13.8	9.3	
Queue Delay		0.0					0.0		0.0	0.0			0.0	0.0	
Total Delay		17.8					27.5		8.9	10.5			13.8	9.3	
LOS		B					C		A	B			B	A	
Approach Delay		17.8					27.5			10.4			12.8		
Approach LOS		B					C			B			B		

Intersection Summary	
Cycle Length: 50	
Actuated Cycle Length: 47.6	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 15.8	Intersection LOS: B
Intersection Capacity Utilization 77.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: Int

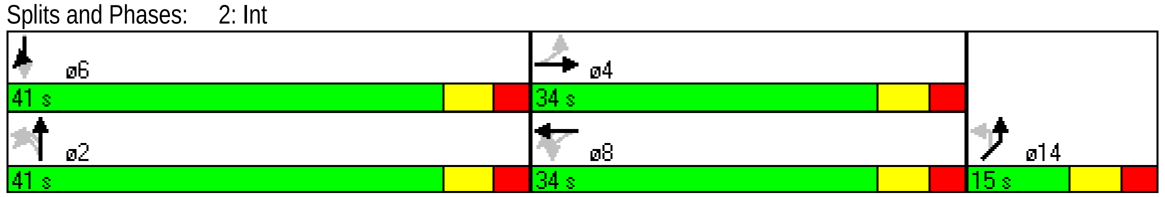


Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations																		
Volume (vph)	12	124	57	6	15	16	37	179	7	30	293	346	91	11	16	49	27	8
Satd. Flow (prot)	0	2014	0	0	0	0	1614	0	0	0	2098	1863	1636	0	0	1947	0	0
Flt Permitted		0.972					0.928				0.920					0.921		
Satd. Flow (perm)	0	1964	0	0	0	0	1507	0	0	0	1942	1863	1636	0	0	1851	0	0
Satd. Flow (RTOR)																		
Lane Group Flow (vph)	0	217	0	0	0	0	268	0	0	0	359	376	111	0	0	108	0	0
Turn Type	Perm				Perm	Perm			Perm	Perm			custom		Perm			
Protected Phases		4					8				2		6			14		
Permitted Phases	4				8	8			2	2		6			14			
Total Split (s)	34.0	34.0	0.0	0.0	34.0	34.0	34.0	0.0	41.0	41.0	41.0	41.0	41.0	0.0	15.0	15.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	4.0
Act Effct Green (s)		18.3					18.3				34.7	34.7	34.7			7.8		
Actuated g/C Ratio		0.23					0.23				0.44	0.44	0.44			0.10		
v/c Ratio		0.47					0.76				0.42	0.46	0.15			0.61		
Control Delay		30.1					43.6				19.6	20.3	17.3			53.4		
Queue Delay		0.0					0.0				0.0	0.0	0.0			0.0		
Total Delay		30.1					43.6				19.6	20.3	17.3			53.4		
LOS		C					D				B	C	B			D		
Approach Delay		30.1					43.6				19.6	19.6				53.4		
Approach LOS		C					D				B	B				D		

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 78.6
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 28.2 — Intersection LOS: C
Intersection Capacity Utilization 98.2% — ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 2: Int

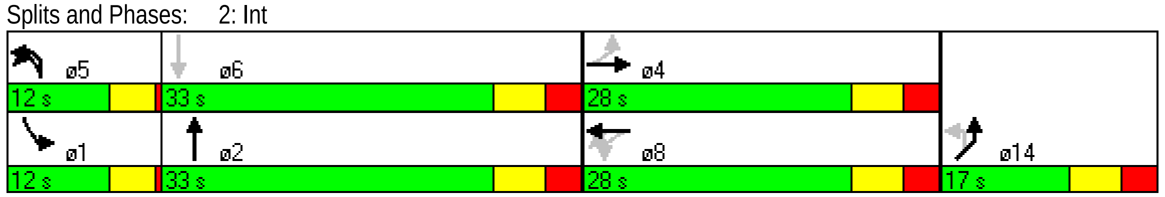


Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations																				
Volume (vph)	12	124	57	6	15	16	37	179	7	30	312	19	82	264	91	11	16	49	27	8
Satd. Flow (prot)	0	2014	0	0	0	0	1614	0	0	2006	2092	0	1770	1785	0	0	0	1947	0	0
Flt Permitted		0.967					0.912			0.950			0.950					0.969		
Satd. Flow (perm)	0	1954	0	0	0	0	1481	0	0	2006	2092	0	1770	1785	0	0	0	1947	0	0
Satd. Flow (RTOR)											3									
Lane Group Flow (vph)	0	217	0	0	0	0	268	0	0	41	360	0	89	398	0	0	0	108	0	0
Turn Type	Perm				Perm	Perm			Prot	Prot			Prot				Perm			
Protected Phases		4					8		5	5	2		1					14		
Permitted Phases	4				8	8								6			14			
Total Split (s)	28.0	28.0	0.0	0.0	28.0	28.0	28.0	0.0	12.0	12.0	33.0	0.0	12.0	33.0	0.0	0.0	17.0	17.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	4.0	7.0	7.0	7.0	4.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	7.0	4.0	4.0
Act Effct Green (s)		17.6					17.6			6.3	27.4		7.2	30.1				8.7		
Actuated g/C Ratio		0.22					0.22			0.08	0.34		0.09	0.38				0.10		
v/c Ratio		0.51					0.82			0.27	0.50		0.57	0.59				0.53		
Control Delay		33.9					53.4			43.9	28.0		54.4	29.8				47.5		
Queue Delay		0.0					0.0			0.0	0.0		0.0	0.0				0.0		
Total Delay		33.9					53.4			43.9	28.0		54.4	29.8				47.5		
LOS		C					D			D	C		D	C				D		
Approach Delay		33.9					53.4				29.6			34.3				47.5		
Approach LOS		C					D				C			C				D		

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 80.2
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 37.4 Intersection LOS: D
Intersection Capacity Utilization 76.9% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 2: Int

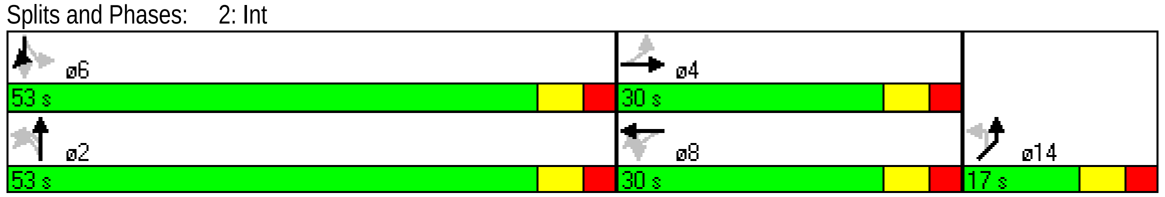


Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations																				
Volume (vph)	12	124	57	6	15	16	37	179	7	30	312	19	82	264	91	11	16	49	27	8
Satd. Flow (prot)	0	2014	0	0	0	0	1614	0	0	0	2086	0	0	1840	1636	0	0	1947	0	0
Flt Permitted		0.966					0.905				0.929			0.815				0.921		
Satd. Flow (perm)	0	1952	0	0	0	0	1470	0	0	0	1947	0	0	1518	1636	0	0	1851	0	0
Satd. Flow (RTOR)											4									
Lane Group Flow (vph)	0	217	0	0	0	0	268	0	0	0	401	0	0	376	111	0	0	108	0	0
Turn Type	Perm				Perm	Perm			Perm	Perm			custom		custom		Perm			
Protected Phases		4					8				2				6			14		
Permitted Phases	4				8	8			2	2			6	6			14			
Total Split (s)	30.0	30.0	0.0	0.0	30.0	30.0	30.0	0.0	53.0	53.0	53.0	0.0	53.0	53.0	53.0	0.0	17.0	17.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	4.0
Act Effct Green (s)		20.1					20.1				46.6			46.6	46.6			9.0		
Actuated g/C Ratio		0.21					0.21				0.50			0.50	0.50			0.09		
v/c Ratio		0.52					0.85				0.41			0.50	0.14			0.62		
Control Delay		38.1					60.6				18.2			20.6	15.7			59.4		
Queue Delay		0.0					0.0				0.0			0.0	0.0			0.0		
Total Delay		38.1					60.6				18.2			20.6	15.7			59.4		
LOS		D					E				B			C	B			E		
Approach Delay		38.1					60.6				18.2			19.5				59.4		
Approach LOS		D					E				B			B				E		

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 93.5
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 32.2 Intersection LOS: C
Intersection Capacity Utilization 116.6% ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 2: Int

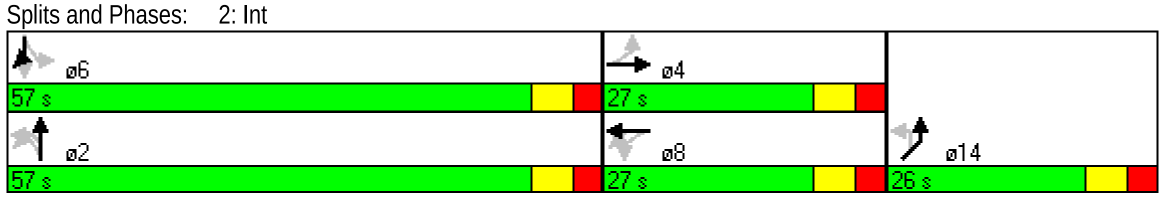


Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations																				
Volume (vph)	12	124	57	6	15	16	37	179	7	30	312	19	82	264	91	11	16	49	27	8
Satd. Flow (prot)	0	2014	0	0	0	0	1614	0	0	0	2086	0	0	1840	1636	0	0	1947	0	0
Flt Permitted		0.956					0.882				0.928			0.811				0.921		
Satd. Flow (perm)	0	1931	0	0	0	0	1433	0	0	0	1945	0	0	1511	1636	0	0	1851	0	0
Satd. Flow (RTOR)											3									
Lane Group Flow (vph)	0	217	0	0	0	0	268	0	0	0	401	0	0	376	111	0	0	108	0	0
Turn Type	Perm				Perm	Perm			Perm	Perm			custom		custom		Perm			
Protected Phases		4					8				2				6			14		
Permitted Phases	4				8	8			2	2			6	6			14			
Total Split (s)	27.0	27.0	0.0	0.0	27.0	27.0	27.0	0.0	57.0	57.0	57.0	0.0	57.0	57.0	57.0	0.0	26.0	26.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	4.0
Act Effct Green (s)		20.0					20.0				50.0			50.0	50.0			10.4		
Actuated g/C Ratio		0.20					0.20				0.49			0.49	0.49			0.10		
v/c Ratio		0.57					0.95				0.42			0.50	0.14			0.57		
Control Delay		44.1					84.0				18.4			20.8	15.2			55.5		
Queue Delay		0.0					0.0				0.0			0.0	0.0			0.0		
Total Delay		44.1					84.0				18.4			20.8	15.2			55.5		
LOS		D					F				B			C	B			E		
Approach Delay		44.1					84.0				18.4			19.5				55.5		
Approach LOS		D					F				B			B				E		

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 101.4
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 37.1 Intersection LOS: D
Intersection Capacity Utilization 124.9% ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 2: Int

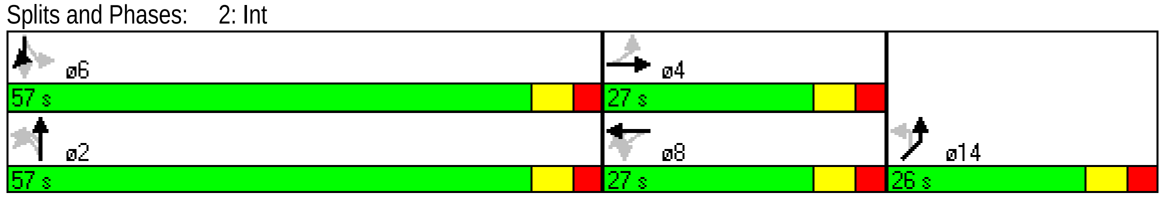


Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations																				
Volume (vph)	6	120	32	2	11	19	131	40	4	61	151	5	37	152	20	2	15	61	60	9
Satd. Flow (prot)	0	2046	0	0	0	0	1738	0	0	0	2075	0	0	1844	1636	0	0	1927	0	0
Flt Permitted		0.982					0.870				0.851			0.903				0.961		
Satd. Flow (perm)	0	2013	0	0	0	0	1524	0	0	0	1791	0	0	1682	1636	0	0	1899	0	0
Satd. Flow (RTOR)											1									
Lane Group Flow (vph)	0	174	0	0	0	0	218	0	0	0	239	0	0	205	24	0	0	157	0	0
Turn Type	Perm				Perm	Perm			Perm	Perm			custom		custom		Perm			
Protected Phases		4					8				2				6			14		
Permitted Phases	4				8	8			2	2			6	6			14			
Total Split (s)	27.0	27.0	0.0	0.0	27.0	27.0	27.0	0.0	57.0	57.0	57.0	0.0	57.0	57.0	57.0	0.0	26.0	26.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	4.0
Act Effct Green (s)		17.4					17.4				50.2			50.2	50.2			12.6		
Actuated g/C Ratio		0.17					0.17				0.50			0.50	0.50			0.12		
v/c Ratio		0.50					0.84				0.27			0.25	0.03			0.66		
Control Delay		44.1					67.8				17.2			17.1	15.5			56.6		
Queue Delay		0.0					0.0				0.0			0.0	0.0			0.0		
Total Delay		44.1					67.8				17.2			17.1	15.5			56.6		
LOS		D					E				B			B	B			E		
Approach Delay		44.1					67.8				17.2			16.9				56.6		
Approach LOS		D					E				B			B				E		

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 101.3
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 38.7 — Intersection LOS: D
Intersection Capacity Utilization 123.4% — ICU Level of Service H
Analysis Period (min) 15

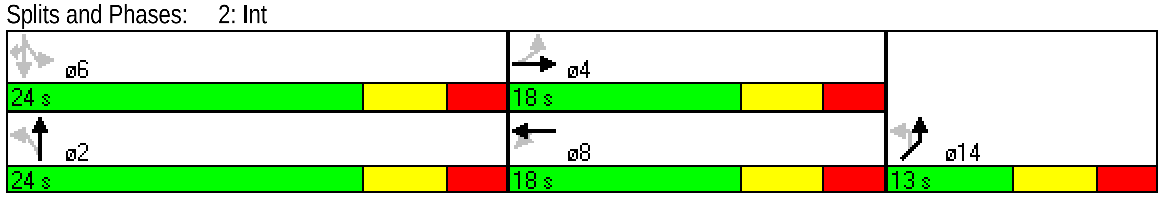
Splits and Phases: 2: Int



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR2	NEL2	NEL	NER
Lane Configurations															
Volume (vph)	5	102	29	25	111	34	52	128	4	31	146	2	13	52	51
Satd. Flow (prot)	0	2046	0	0	1740	0	0	2075	0	0	1846	1636	0	1933	0
Flt Permitted		0.984			0.931			0.847			0.910			0.973	
Satd. Flow (perm)	0	2017	0	0	1631	0	0	1783	0	0	1695	1636	0	1933	0
Satd. Flow (RTOR)								2							
Lane Group Flow (vph)	0	148	0	0	185	0	0	200	0	0	193	2	0	126	0
Turn Type	Perm			Perm			Perm			custom		custom	Perm		
Protected Phases		4			8			2						14	
Permitted Phases	4			8			2			6	6	6	14		
Total Split (s)	18.0	18.0	0.0	18.0	18.0	0.0	24.0	24.0	0.0	24.0	24.0	24.0	13.0	13.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	7.0	7.0	7.0	4.0
Act Effct Green (s)		9.5			9.5			17.4			17.4	17.4		6.1	
Actuated g/C Ratio		0.18			0.18			0.34			0.34	0.34		0.12	
v/c Ratio		0.41			0.64			0.33			0.33	0.00		0.54	
Control Delay		23.3			31.3			16.1			16.5	13.0		34.0	
Queue Delay		0.0			0.0			0.0			0.0	0.0		0.0	
Total Delay		23.3			31.3			16.1			16.5	13.0		34.0	
LOS		C			C			B			B	B		C	
Approach Delay		23.3			31.3			16.1			16.4			34.0	
Approach LOS		C			C			B			B			C	

Intersection Summary	
Cycle Length: 55	
Actuated Cycle Length: 50.7	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.64	
Intersection Signal Delay: 23.4	Intersection LOS: C
Intersection Capacity Utilization 75.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: Int

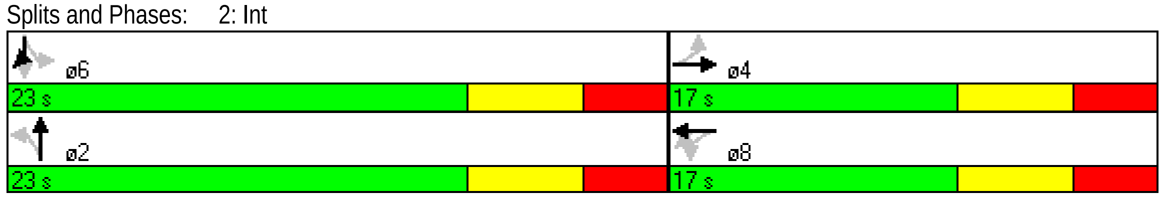


Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR			NBR	SBL			SBR2
Lane Configurations															
Volume (vph)	5	102	27	2	9	16	111	34			4	31			2
Satd. Flow (prot)	0	2048	0	0	0	0	1740	0			0	0			0
Flt Permitted		0.981					0.920								
Satd. Flow (perm)	0	2013	0	0	0	0	1612	0			0	0			0
Satd. Flow (RTOR)															
Lane Group Flow (vph)	0	147	0	0	0	0	185	0			0	0			0
Turn Type	Perm				Perm	Perm			Perm			custom		custom	
Protected Phases		4					8			2				6	
Permitted Phases	4				8	8			2			6	6		
Total Split (s)	17.0	17.0	0.0	0.0	17.0	17.0	17.0	0.0	23.0	23.0	0.0	23.0	23.0	23.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	7.0	4.0
Act Effct Green (s)		11.2					11.2		29.2	29.2			29.2	29.2	
Actuated g/C Ratio		0.19					0.19		0.53	0.53			0.53	0.53	
v/c Ratio		0.38					0.59		0.08	0.13			0.19	0.02	
Control Delay		15.6					21.7		7.8	7.2			7.9	7.4	
Queue Delay		0.0					0.0		0.0	0.0			0.0	0.0	
Total Delay		15.6					21.7		7.8	7.2			7.9	7.4	
LOS		B					C		A	A			A	A	
Approach Delay		15.6					21.7			7.4			7.8		
Approach LOS		B					C			A			A		

Intersection Summary

Cycle Length: 40
Actuated Cycle Length: 55.1
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.59
Intersection Signal Delay: 12.8 — Intersection LOS: B
Intersection Capacity Utilization 63.2% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: Int

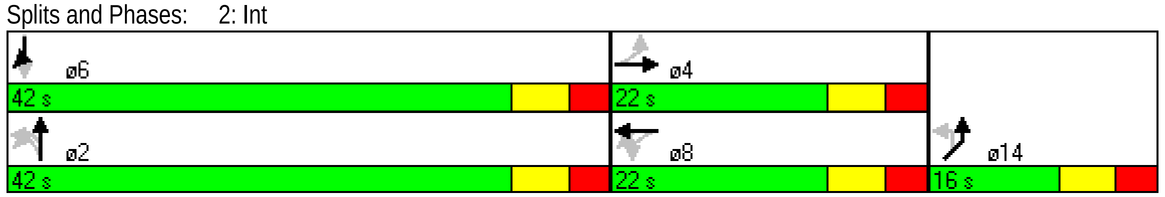


Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations																		
Volume (vph)	5	102	27	2	9	16	111	34	3	52	128	160	17	2	13	52	51	8
Satd. Flow (prot)	0	2048	0	0	0	0	1740	0	0	0	2079	1863	1636	0	0	1925	0	0
Flt Permitted		0.986					0.925				0.863					0.960		
Satd. Flow (perm)	0	2023	0	0	0	0	1621	0	0	0	1822	1863	1636	0	0	1897	0	0
Satd. Flow (RTOR)																		
Lane Group Flow (vph)	0	147	0	0	0	0	185	0	0	0	199	174	20	0	0	135	0	0
Turn Type	Perm				Perm	Perm			Perm	Perm			custom		Perm			
Protected Phases		4					8				2		6			14		
Permitted Phases	4				8	8			2	2		6			14			
Total Split (s)	22.0	22.0	0.0	0.0	22.0	22.0	22.0	0.0	42.0	42.0	42.0	42.0	42.0	0.0	16.0	16.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	4.0
Act Effct Green (s)		12.0					12.0				35.1	35.1	35.1			8.4		
Actuated g/C Ratio		0.16					0.16				0.46	0.46	0.46			0.11		
v/c Ratio		0.46					0.73				0.24	0.20	0.03			0.65		
Control Delay		34.3					47.7				14.4	14.0	12.8			49.2		
Queue Delay		0.0					0.0				0.0	0.0	0.0			0.0		
Total Delay		34.3					47.7				14.4	14.0	12.8			49.2		
LOS		C					D				B	B	B			D		
Approach Delay		34.3					47.7				14.4	13.9				49.2		
Approach LOS		C					D				B	B				D		

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 76.6
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 30.3 Intersection LOS: C
Intersection Capacity Utilization 99.0% ICU Level of Service F
Analysis Period (min) 15

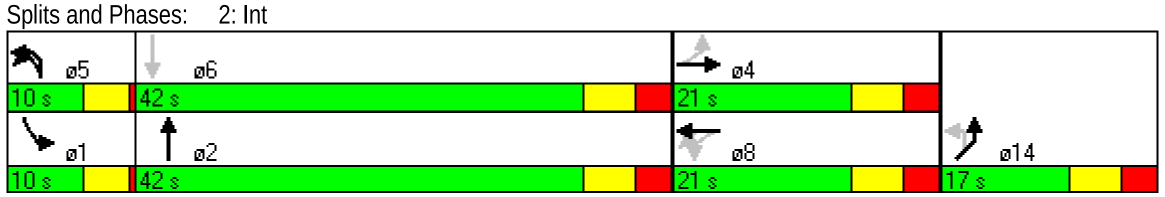
Splits and Phases: 2: Int



Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations																				
Volume (vph)	5	102	27	2	9	16	111	34	3	52	128	4	31	129	17	2	13	52	51	8
Satd. Flow (prot)	0	2048	0	0	0	0	1740	0	0	2006	2103	0	1770	1827	0	0	0	1925	0	0
Flt Permitted		0.984					0.904			0.950			0.950					0.974		
Satd. Flow (perm)	0	2019	0	0	0	0	1584	0	0	2006	2103	0	1770	1827	0	0	0	1925	0	0
Satd. Flow (RTOR)											2									
Lane Group Flow (vph)	0	147	0	0	0	0	185	0	0	60	143	0	34	160	0	0	0	135	0	0
Turn Type	Perm				Perm	Perm			Prot	Prot			Prot				Perm			
Protected Phases		4					8		5	5	2		1					14		
Permitted Phases	4				8	8								6			14			
Total Split (s)	21.0	21.0	0.0	0.0	21.0	21.0	21.0	0.0	10.0	10.0	42.0	0.0	10.0	42.0	0.0	0.0	17.0	17.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	4.0	7.0	7.0	7.0	4.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	7.0	4.0	4.0
Act Effct Green (s)		12.5					12.5			5.7	37.2		5.5	35.3				9.1		
Actuated g/C Ratio		0.15					0.15			0.07	0.43		0.06	0.41				0.11		
v/c Ratio		0.50					0.80			0.46	0.16		0.31	0.21				0.66		
Control Delay		41.0					62.6			52.2	17.1		48.0	18.8				54.4		
Queue Delay		0.0					0.0			0.0	0.0		0.0	0.0				0.0		
Total Delay		41.0					62.6			52.2	17.1		48.0	18.8				54.4		
LOS		D					E			D	B		D	B				D		
Approach Delay		41.0					62.6				27.5			23.9				54.4		
Approach LOS		D					E				C			C				D		

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 85.7	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 40.7	Intersection LOS: D
Intersection Capacity Utilization 79.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: Int

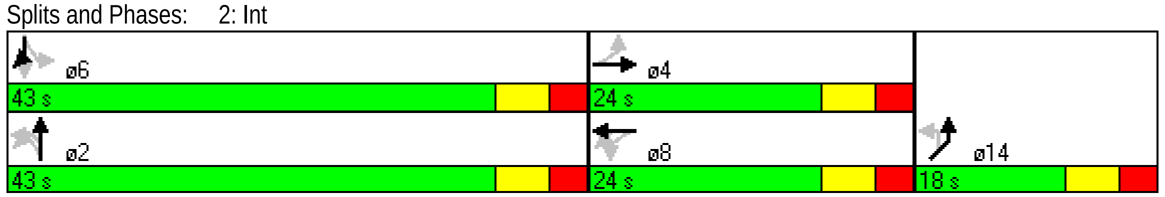


Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations																				
Volume (vph)	5	102	27	2	9	16	111	34	3	52	128	4	31	129	17	2	13	52	51	8
Satd. Flow (prot)	0	2048	0	0	0	0	1740	0	0	0	2073	0	0	1844	1636	0	0	1925	0	0
Flt Permitted		0.987					0.922				0.865			0.915				0.960		
Satd. Flow (perm)	0	2025	0	0	0	0	1615	0	0	0	1821	0	0	1704	1636	0	0	1897	0	0
Satd. Flow (RTOR)											1									
Lane Group Flow (vph)	0	147	0	0	0	0	185	0	0	0	203	0	0	174	20	0	0	135	0	0
Turn Type	Perm				Perm	Perm			Perm	Perm			custom		custom		Perm			
Protected Phases		4					8				2				6			14		
Permitted Phases	4				8	8			2	2			6	6			14			
Total Split (s)	24.0	24.0	0.0	0.0	24.0	24.0	24.0	0.0	43.0	43.0	43.0	0.0	43.0	43.0	43.0	0.0	18.0	18.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	4.0
Act Effct Green (s)		12.8					12.8				36.1			36.1	36.1			9.3		
Actuated g/C Ratio		0.16					0.16				0.46			0.46	0.46			0.12		
v/c Ratio		0.45					0.71				0.24			0.22	0.03			0.61		
Control Delay		34.8					47.3				15.3			15.3	13.9			46.1		
Queue Delay		0.0					0.0				0.0			0.0	0.0			0.0		
Total Delay		34.8					47.3				15.3			15.3	13.9			46.1		
LOS		C					D				B			B	B			D		
Approach Delay		34.8					47.3				15.3			15.2				46.1		
Approach LOS		C					D				B			B				D		

Intersection Summary

Cycle Length: 85
Actuated Cycle Length: 79.3
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 30.2 — Intersection LOS: C
Intersection Capacity Utilization 99.3% — ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 2: Int

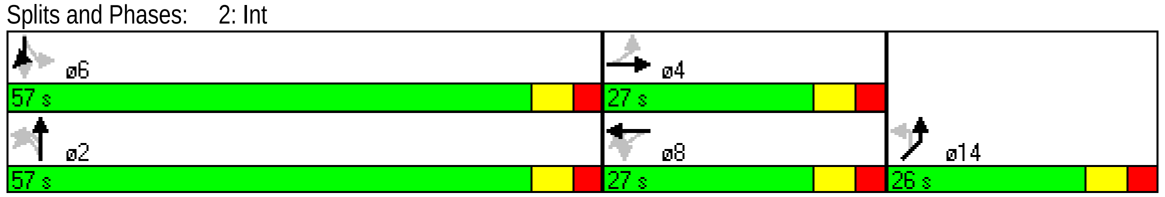


Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations																				
Volume (vph)	5	102	27	2	9	16	111	34	3	52	128	4	31	129	17	2	13	52	51	8
Satd. Flow (prot)	0	2048	0	0	0	0	1740	0	0	0	2073	0	0	1844	1636	0	0	1925	0	0
Flt Permitted		0.987					0.901				0.866			0.916				0.960		
Satd. Flow (perm)	0	2025	0	0	0	0	1579	0	0	0	1823	0	0	1706	1636	0	0	1897	0	0
Satd. Flow (RTOR)											1									
Lane Group Flow (vph)	0	147	0	0	0	0	185	0	0	0	203	0	0	174	20	0	0	135	0	0
Turn Type	Perm				Perm	Perm			Perm	Perm			custom		custom		Perm			
Protected Phases		4					8				2				6			14		
Permitted Phases	4				8	8			2	2			6	6			14			
Total Split (s)	27.0	27.0	0.0	0.0	27.0	27.0	27.0	0.0	57.0	57.0	57.0	0.0	57.0	57.0	57.0	0.0	26.0	26.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	4.0
Act Effct Green (s)		15.0					15.0				50.3			50.3	50.3			11.3		
Actuated g/C Ratio		0.15					0.15				0.51			0.51	0.51			0.12		
v/c Ratio		0.47					0.76				0.22			0.20	0.02			0.61		
Control Delay		43.4					60.6				15.2			15.2	14.4			54.1		
Queue Delay		0.0					0.0				0.0			0.0	0.0			0.0		
Total Delay		43.4					60.6				15.2			15.2	14.4			54.1		
LOS		D					E				B			B	B			D		
Approach Delay		43.4					60.6				15.2			15.1				54.1		
Approach LOS		D					E				B			B				D		

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 97.7
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 35.8 Intersection LOS: D
Intersection Capacity Utilization 119.9% ICU Level of Service H
Analysis Period (min) 15

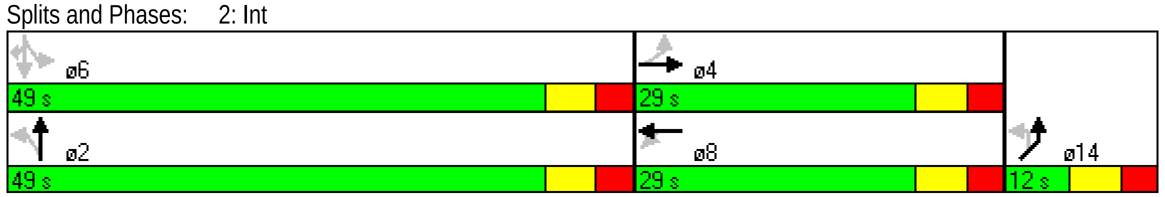
Splits and Phases: 2: Int



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR2	NEL2	NEL	NER
Lane Configurations															
Volume (vph)	14	146	74	37	44	211	35	368	22	97	419	13	19	58	32
Satd. Flow (prot)	0	2014	0	0	1614	0	2006	2094	0	0	1846	1636	0	1958	0
Flt Permitted		0.962			0.889		0.300				0.719			0.966	
Satd. Flow (perm)	0	1944	0	0	1444	0	633	2094	0	0	1339	1636	0	1958	0
Satd. Flow (RTOR)								4							
Lane Group Flow (vph)	0	254	0	0	317	0	38	424	0	0	560	14	0	119	0
Turn Type	Perm			Perm			Perm			custom		custom	Perm		
Protected Phases		4			8			2						14	
Permitted Phases	4			8			2			6	6	6	14		
Total Split (s)	29.0	29.0	0.0	29.0	29.0	0.0	49.0	49.0	0.0	49.0	49.0	49.0	12.0	12.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	7.0	7.0	7.0	4.0
Act Effct Green (s)		21.1			21.1		42.0	42.0			42.0	42.0		5.0	
Actuated g/C Ratio		0.24			0.24		0.47	0.47			0.47	0.47		0.06	
v/c Ratio		0.55			0.93		0.13	0.43			0.89	0.02		1.08	
Control Delay		35.0			68.8		15.1	17.3			40.3	13.1		152.2	
Queue Delay		0.0			0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay		35.0			68.8		15.1	17.3			40.3	13.1		152.2	
LOS		D			E		B	B			D	B		F	
Approach Delay		35.0			68.8			17.2			39.6			152.2	
Approach LOS		D			E			B			D			F	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 89.1	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.08	
Intersection Signal Delay: 46.1	Intersection LOS: D
Intersection Capacity Utilization 106.3%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 2: Int

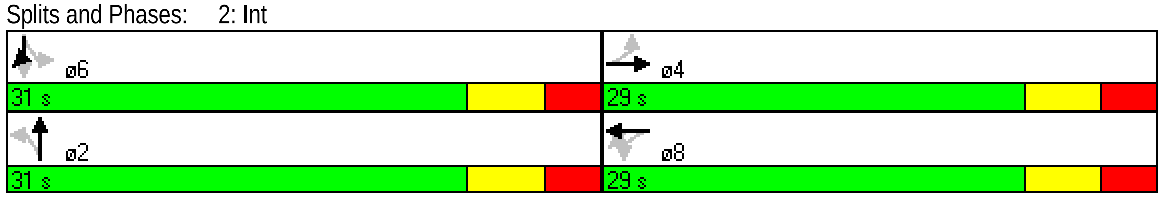


Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SBR2
Lane Configurations															
Volume (vph)	14	146	67	7	19	18	44	211	35	368	22	97	312	107	13
Satd. Flow (prot)	0	2014	0	0	0	0	1616	0	2006	2094	0	0	1840	1636	0
Flt Permitted		0.965					0.926		0.453				0.758		
Satd. Flow (perm)	0	1950	0	0	0	0	1506	0	956	2094	0	0	1412	1636	0
Satd. Flow (RTOR)										6					
Lane Group Flow (vph)	0	255	0	0	0	0	318	0	38	424	0	0	444	130	0
Turn Type	Perm				Perm	Perm			Perm			custom		custom	
Protected Phases		4					8			2				6	
Permitted Phases	4				8	8			2			6	6		
Total Split (s)	29.0	29.0	0.0	0.0	29.0	29.0	29.0	0.0	31.0	31.0	0.0	31.0	31.0	31.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	7.0	4.0
Act Effct Green (s)		15.0					15.0		24.2	24.2			24.2	24.2	
Actuated g/C Ratio		0.28					0.28		0.45	0.45			0.45	0.45	
v/c Ratio		0.46					0.75		0.09	0.44			0.69	0.18	
Control Delay		18.3					29.0		10.9	12.9			21.2	11.0	
Queue Delay		0.0					0.0		0.0	0.0			0.0	0.0	
Total Delay		18.3					29.0		10.9	12.9			21.2	11.0	
LOS		B					C		B	B			C	B	
Approach Delay		18.3					29.0			12.7			18.9		
Approach LOS		B					C			B			B		

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 53.3
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 19.0 Intersection LOS: B
Intersection Capacity Utilization 88.6% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 2: Int

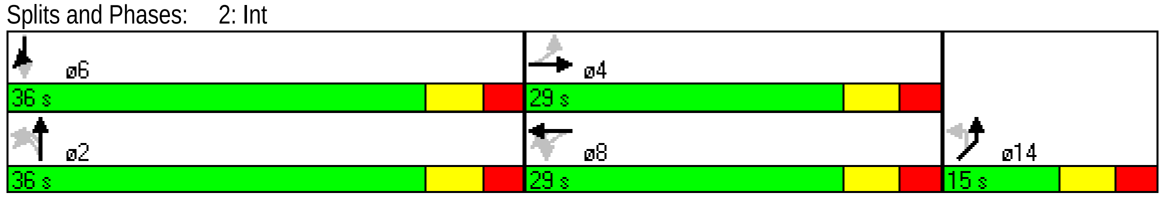


Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations																		
Volume (vph)	14	146	67	7	18	19	44	211	8	35	346	408	107	13	18	58	32	9
Satd. Flow (prot)	0	2014	0	0	0	0	1616	0	0	0	2098	1863	1636	0	0	1950	0	0
Flt Permitted		0.968					0.906				0.801					0.917		
Satd. Flow (perm)	0	1956	0	0	0	0	1473	0	0	0	1691	1863	1636	0	0	1845	0	0
Satd. Flow (RTOR)																		
Lane Group Flow (vph)	0	255	0	0	0	0	318	0	0	0	423	443	130	0	0	128	0	0
Turn Type	Perm				Perm	Perm			Perm	Perm			custom		Perm			
Protected Phases		4					8				2		6			14		
Permitted Phases	4				8	8			2	2		6			14			
Total Split (s)	29.0	29.0	0.0	0.0	29.0	29.0	29.0	0.0	36.0	36.0	36.0	36.0	36.0	0.0	15.0	15.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	4.0
Act Effct Green (s)		19.3					19.3				29.1	29.1	29.1			7.8		
Actuated g/C Ratio		0.25					0.25				0.38	0.38	0.38			0.10		
v/c Ratio		0.52					0.87				0.66	0.63	0.21			0.68		
Control Delay		29.1					51.9				27.0	25.4	18.5			54.9		
Queue Delay		0.0					0.0				0.0	0.0	0.0			0.0		
Total Delay		29.1					51.9				27.0	25.4	18.5			54.9		
LOS		C					D				C	C	B			D		
Approach Delay		29.1					51.9				27.0	23.8				54.9		
Approach LOS		C					D				C	C				D		

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 77.2
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 33.0 Intersection LOS: C
Intersection Capacity Utilization 107.0% ICU Level of Service G
Analysis Period (min) 15

Splits and Phases: 2: Int

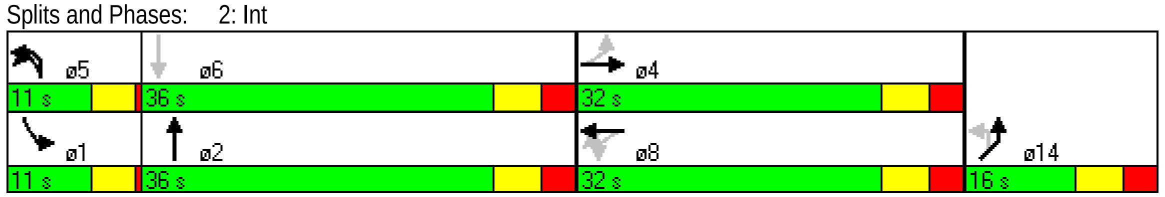


Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations																				
Volume (vph)	14	146	67	7	18	19	44	211	8	35	368	22	97	312	107	13	19	58	32	9
Satd. Flow (prot)	0	2014	0	0	0	0	1616	0	0	2006	2094	0	1770	1785	0	0	0	1948	0	0
Flt Permitted		0.963					0.884			0.950			0.950					0.968		
Satd. Flow (perm)	0	1946	0	0	0	0	1437	0	0	2006	2094	0	1770	1785	0	0	0	1948	0	0
Satd. Flow (RTOR)											3									
Lane Group Flow (vph)	0	255	0	0	0	0	318	0	0	47	424	0	105	469	0	0	0	129	0	0
Turn Type	Perm				Perm	Perm			Prot	Prot			Prot				Perm			
Protected Phases		4					8		5	5	2		1					14		
Permitted Phases	4				8	8								6			14			
Total Split (s)	32.0	32.0	0.0	0.0	32.0	32.0	32.0	0.0	11.0	11.0	36.0	0.0	11.0	36.0	0.0	0.0	16.0	16.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	4.0	7.0	7.0	7.0	4.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	7.0	4.0	4.0
Act Effct Green (s)		22.6					22.6			6.1	29.1		7.0	33.7				8.6		
Actuated g/C Ratio		0.24					0.24			0.06	0.32		0.08	0.37				0.09		
v/c Ratio		0.53					0.90			0.36	0.64		0.79	0.72				0.71		
Control Delay		34.8					63.7			50.7	32.9		81.7	35.6				63.6		
Queue Delay		0.0					0.0			0.0	0.0		0.0	0.0				0.0		
Total Delay		34.8					63.7			50.7	32.9		81.7	35.6				63.6		
LOS		C					E			D	C		F	D				E		
Approach Delay		34.8					63.7				34.7			44.0				63.6		
Approach LOS		C					E				C			D				E		

Intersection Summary

Cycle Length: 95
Actuated Cycle Length: 92.3
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 45.2 Intersection LOS: D
Intersection Capacity Utilization 83.3% ICU Level of Service E
Analysis Period (min) 15

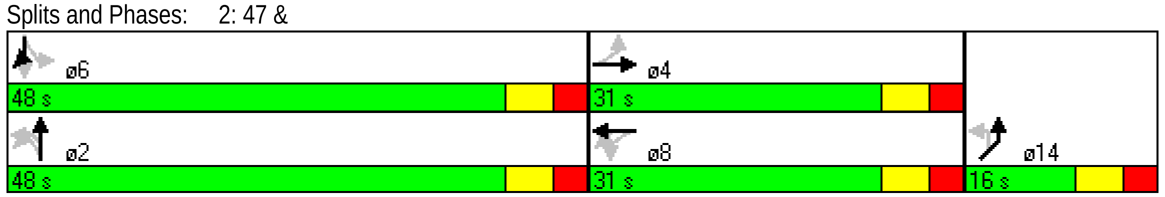
Splits and Phases: 2: Int



Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations																				
Volume (vph)	14	146	67	7	18	19	44	211	8	35	368	22	97	312	107	13	19	58	32	9
Satd. Flow (prot)	0	2014	0	0	0	0	1616	0	0	0	2086	0	0	1840	1636	0	0	1948	0	0
Flt Permitted		0.963					0.884				0.886			0.736				0.914		
Satd. Flow (perm)	0	1946	0	0	0	0	1437	0	0	0	1857	0	0	1371	1636	0	0	1839	0	0
Satd. Flow (RTOR)											4									
Lane Group Flow (vph)	0	255	0	0	0	0	318	0	0	0	471	0	0	444	130	0	0	129	0	0
Turn Type	Perm				Perm	Perm			Perm	Perm			custom		custom		Perm			
Protected Phases		4					8				2				6			14		
Permitted Phases	4				8	8			2	2			6	6			14			
Total Split (s)	31.0	31.0	0.0	0.0	31.0	31.0	31.0	0.0	48.0	48.0	48.0	0.0	48.0	48.0	48.0	0.0	16.0	16.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	4.0
Act Effct Green (s)		22.3					22.3				41.1			41.1	41.1			8.6		
Actuated g/C Ratio		0.24					0.24				0.44			0.44	0.44			0.09		
v/c Ratio		0.54					0.92				0.57			0.73	0.18			0.76		
Control Delay		35.8					68.0				23.2			30.9	17.3			70.2		
Queue Delay		0.0					0.0				0.0			0.0	0.0			0.0		
Total Delay		35.8					68.0				23.2			30.9	17.3			70.2		
LOS		D					E				C			C	B			E		
Approach Delay		35.8					68.0				23.2			27.8				70.2		
Approach LOS		D					E				C			C				E		

Intersection Summary	
Cycle Length: 95	
Actuated Cycle Length: 93	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 38.2	Intersection LOS: D
Intersection Capacity Utilization 112.8%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 2: 47 &

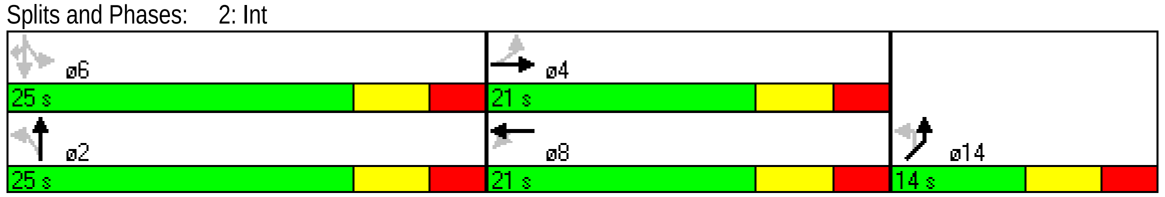


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR2	NEL2	NEL	NER
Lane Configurations															
Volume (vph)	5	102	29	30	131	40	61	151	5	37	172	6	15	61	60
Satd. Flow (prot)	0	2046	0	0	1738	0	2006	2103	0	0	1846	1636	0	1931	0
Flt Permitted		0.984			0.925		0.617				0.912			0.973	
Satd. Flow (perm)	0	2017	0	0	1621	0	1303	2103	0	0	1699	1636	0	1931	0
Satd. Flow (RTOR)								3							
Lane Group Flow (vph)	0	148	0	0	218	0	66	169	0	0	227	7	0	147	0
Turn Type	Perm			Perm			Perm			custom		custom	Perm		
Protected Phases		4			8			2						14	
Permitted Phases	4			8			2			6	6	6	14		
Total Split (s)	21.0	21.0	0.0	21.0	21.0	0.0	25.0	25.0	0.0	25.0	25.0	25.0	14.0	14.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	7.0	7.0	7.0	4.0
Act Effct Green (s)		11.2			11.2		18.0	18.0			18.0	18.0		7.0	
Actuated g/C Ratio		0.20			0.20		0.31	0.31			0.31	0.31		0.12	
v/c Ratio		0.38			0.69		0.16	0.25			0.42	0.01		0.62	
Control Delay		22.6			33.3		16.5	16.4			19.3	14.8		38.9	
Queue Delay		0.0			0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay		22.6			33.3		16.5	16.4			19.3	14.8		38.9	
LOS		C			C		B	B			B	B		D	
Approach Delay		22.6			33.3			16.4			19.2			38.9	
Approach LOS		C			C			B			B			D	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 57.3
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 25.1 Intersection LOS: C
Intersection Capacity Utilization 80.6% ICU Level of Service D
Analysis Period (min) 15

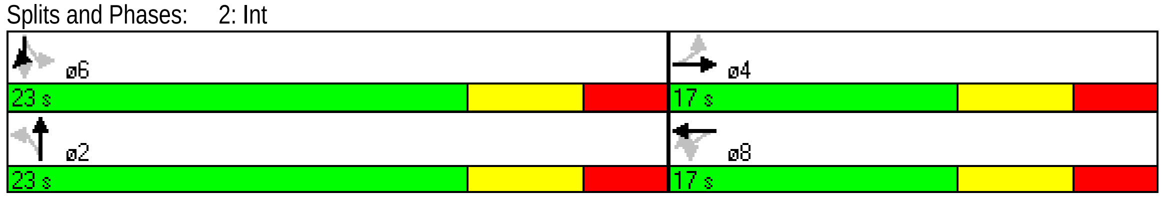
Splits and Phases: 2: Int



Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SBR2
Lane Configurations															
Volume (vph)	6	120	32	2	11	19	131	40	0	212	5	37	152	20	2
Satd. Flow (prot)	0	2046	0	0	0	0	1738	0	2111	2105	0	0	1844	1636	0
Flt Permitted		0.978					0.914						0.905		
Satd. Flow (perm)	0	2005	0	0	0	0	1601	0	2111	2105	0	0	1686	1636	0
Satd. Flow (RTOR)										3					
Lane Group Flow (vph)	0	174	0	0	0	0	218	0	0	235	0	0	205	24	0
Turn Type	Perm				Perm	Perm			Perm			custom		custom	
Protected Phases		4					8			2				6	
Permitted Phases	4				8	8			2			6	6		
Total Split (s)	17.0	17.0	0.0	0.0	17.0	17.0	17.0	0.0	23.0	23.0	0.0	23.0	23.0	23.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	7.0	4.0
Act Effct Green (s)		9.7					9.7			23.4			23.4	23.4	
Actuated g/C Ratio		0.21					0.21			0.53			0.53	0.53	
v/c Ratio		0.42					0.66			0.21			0.23	0.03	
Control Delay		16.1					23.9			8.0			8.5	7.5	
Queue Delay		0.0					0.0			0.0			0.0	0.0	
Total Delay		16.1					23.9			8.0			8.5	7.5	
LOS		B					C			A			A	A	
Approach Delay		16.1					23.9			8.0			8.4		
Approach LOS		B					C			A			A		

Intersection Summary	
Cycle Length: 40	
Actuated Cycle Length: 44.4	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.66	
Intersection Signal Delay: 13.8	Intersection LOS: B
Intersection Capacity Utilization 64.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Int

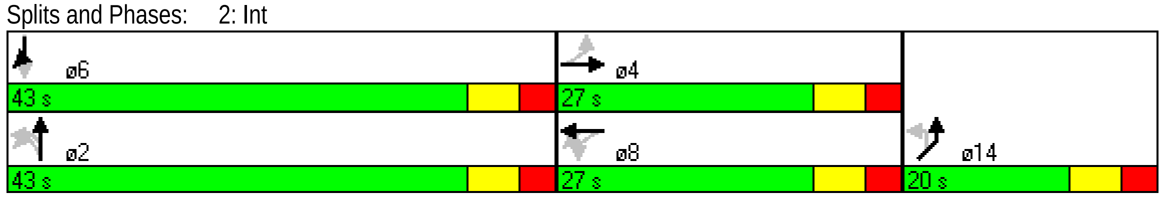


Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations																		
Volume (vph)	6	120	32	2	11	19	131	40	4	61	151	189	20	2	15	61	60	9
Satd. Flow (prot)	0	2046	0	0	0	0	1738	0	0	0	2079	1863	1636	0	0	1927	0	0
Flt Permitted		0.984					0.899				0.846					0.960		
Satd. Flow (perm)	0	2017	0	0	0	0	1575	0	0	0	1786	1863	1636	0	0	1897	0	0
Satd. Flow (RTOR)																		
Lane Group Flow (vph)	0	174	0	0	0	0	218	0	0	0	234	205	24	0	0	157	0	0
Turn Type	Perm				Perm	Perm			Perm	Perm			custom		Perm			
Protected Phases		4					8				2		6			14		
Permitted Phases	4				8	8			2	2		6			14			
Total Split (s)	27.0	27.0	0.0	0.0	27.0	27.0	27.0	0.0	43.0	43.0	43.0	43.0	43.0	0.0	20.0	20.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	4.0
Act Effct Green (s)		15.1					15.1				36.2	36.2	36.2			10.5		
Actuated g/C Ratio		0.18					0.18				0.44	0.44	0.44			0.13		
v/c Ratio		0.48					0.76				0.30	0.25	0.03			0.65		
Control Delay		35.0					50.2				18.0	17.3	16.0			48.7		
Queue Delay		0.0					0.0				0.0	0.0	0.0			0.0		
Total Delay		35.0					50.2				18.0	17.3	16.0			48.7		
LOS		D					D				B	B	B			D		
Approach Delay		35.0					50.2				18.0	17.2				48.7		
Approach LOS		D					D				B	B				D		

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 82.9
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 32.4 Intersection LOS: C
Intersection Capacity Utilization 112.7% ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 2: Int

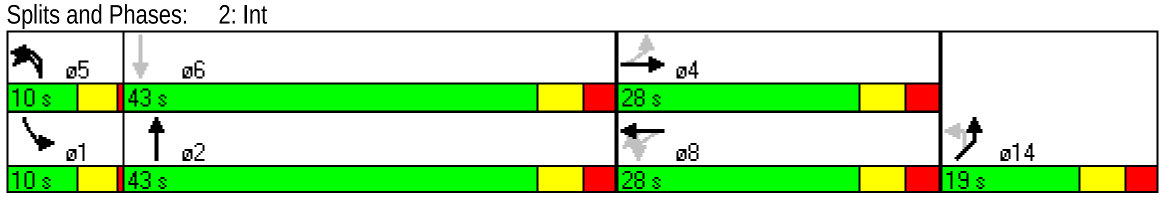


Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations																				
Volume (vph)	6	120	32	2	11	19	131	40	4	61	151	5	37	152	20	2	15	61	60	9
Satd. Flow (prot)	0	2046	0	0	0	0	1738	0	0	2006	2103	0	1770	1827	0	0	0	1927	0	0
Flt Permitted		0.983					0.881			0.950			0.950					0.975		
Satd. Flow (perm)	0	2015	0	0	0	0	1544	0	0	2006	2103	0	1770	1827	0	0	0	1927	0	0
Satd. Flow (RTOR)											2									
Lane Group Flow (vph)	0	174	0	0	0	0	218	0	0	70	169	0	40	189	0	0	0	157	0	0
Turn Type	Perm				Perm	Perm			Prot	Prot			Prot				Perm			
Protected Phases		4					8		5	5	2		1					14		
Permitted Phases	4				8	8								6			14			
Total Split (s)	28.0	28.0	0.0	0.0	28.0	28.0	28.0	0.0	10.0	10.0	43.0	0.0	10.0	43.0	0.0	0.0	19.0	19.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	4.0	7.0	7.0	7.0	4.0	4.0	4.0	7.0	4.0	4.0	7.0	4.0	4.0	7.0	7.0	4.0	4.0
Act Effct Green (s)		16.4					16.4			5.8	38.5		5.6	36.5				10.5		
Actuated g/C Ratio		0.18					0.18			0.06	0.42		0.06	0.40				0.11		
v/c Ratio		0.48					0.79			0.57	0.19		0.39	0.26				0.72		
Control Delay		39.6					58.1			64.0	20.4		56.3	22.4				60.0		
Queue Delay		0.0					0.0			0.0	0.0		0.0	0.0				0.0		
Total Delay		39.6					58.1			64.0	20.4		56.3	22.4				60.0		
LOS		D					E			E	C		E	C				E		
Approach Delay		39.6					58.1				33.2			28.4				60.0		
Approach LOS		D					E				C			C				E		

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 92.4
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 42.7 Intersection LOS: D
Intersection Capacity Utilization 84.6% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 2: Int

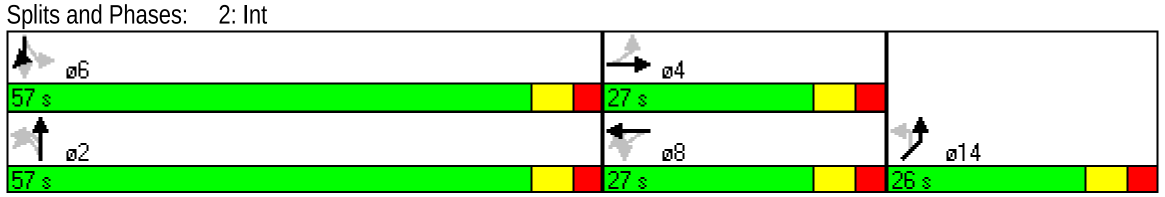


Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	NEL2	NEL	NER	NER2
Lane Configurations																				
Volume (vph)	14	146	67	7	18	19	44	211	8	35	368	22	97	312	107	13	19	58	32	9
Satd. Flow (prot)	0	2014	0	0	0	0	1616	0	0	0	2086	0	0	1840	1636	0	0	1948	0	0
Flt Permitted		0.926					0.802				0.918			0.757				0.914		
Satd. Flow (perm)	0	1871	0	0	0	0	1304	0	0	0	1924	0	0	1410	1636	0	0	1839	0	0
Satd. Flow (RTOR)											3									
Lane Group Flow (vph)	0	255	0	0	0	0	318	0	0	0	471	0	0	444	130	0	0	129	0	0
Turn Type	Perm				Perm	Perm			Perm	Perm			custom		custom		Perm			
Protected Phases		4					8				2				6			14		
Permitted Phases	4				8	8			2	2			6	6			14			
Total Split (s)	27.0	27.0	0.0	0.0	27.0	27.0	27.0	0.0	57.0	57.0	57.0	0.0	57.0	57.0	57.0	0.0	26.0	26.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	4.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	7.0	4.0	7.0	7.0	4.0	4.0
Act Effct Green (s)		20.0					20.0				50.0			50.0	50.0			11.4		
Actuated g/C Ratio		0.20					0.20				0.49			0.49	0.49			0.11		
v/c Ratio		0.70					1.25				0.50			0.65	0.16			0.63		
Control Delay		50.5					176.6				20.5			25.7	16.0			57.2		
Queue Delay		0.0					0.0				0.0			0.0	0.0			0.0		
Total Delay		50.5					176.6				20.5			25.7	16.0			57.2		
LOS		D					F				C			C	B			E		
Approach Delay		50.5					176.6				20.5			23.5				57.2		
Approach LOS		D					F				C			C				E		

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 102.5
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 1.25
Intersection Signal Delay: 57.0 — Intersection LOS: E
Intersection Capacity Utilization 129.4% — ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 2: Int



APPENDIX D

CHESTER

SYNCHRO ANALYSIS

Source: DVRPC, 2007

Newark Road and Baltimore Pike
NEW GARDEN TOWNSHIP - CHESTER COUNTY

Reportable Crashes (2003 - 2005)

Map ID	DATE	DAY/TIME	TOTAL KILLED	TOTAL INJURED	ROAD SYSTEM	WEATHER COND.	ROAD COND.	ROAD	CROSS ROAD	CRASH TYPE	AGE OF DRIVER 1	DRIVER 1 FACTOR	DRIVER 1 ACTION	AGE OF DRIVER 2	DRIVER 2 FACTOR	ACTION
1	1/17/2003	F/1628	0	0	SHW	no adverse	wet	Newark Rd	Baltimore Pk	Rear-end		too fast	SB - straight			SB - stopping
2	7/24/2003	Th/516	0	1	SHW	no adverse	dry	Baltimore Pk	Newark Rd	Angle			EB - left turn			WB - straight
3	8/4/2003	M/1025	0	2	SHW	no adverse	dry	Baltimore Pk	Newark Rd	Angle		ran red light	SB - straight			EB - straight
4	9/15/2003	M/1115	0	0	SHW	rain	sand/mud	Newark Rd	Baltimore Pk	SS			NB - stopping			SB - stopped
5	10/20/2003	M/1026	0	1	SHW	no adverse	dry	Baltimore Pk	Newark Rd	Angle		proceed w/o clear.	NB - straight			WB - straight
6	11/6/2003	H/1910	0	0	SHW	no adverse	sand/mud	Newark Rd	Baltimore Pk	HitFixObj		too fast	SB - curve			
7	12/15/2003	M/545	0	0	SHW	no adverse	icy	Newark Rd	Baltimore Pk	HitFixObj		too fast	SB - straight			
9	12/23/2003	T/1427	0	1	SHW	rain	dry	Baltimore Pk	Newark Rd	Rear-end		too fast	EB - straight			EB - stopped
10	3/11/2004	Th/940	0	1	SHW	no adverse	dry	Baltimore Pk	Newark Rd	Angle		ran red light	EB - straight			SB - straight
11	4/23/2004	F/1359	0	1	SHW	unknown	dry	Baltimore Pk	Newark Rd	Angle		driver distracted	EB - right turn			EB - straight
12	5/2/2004	Su/1000	0	1	SHW	no adverse	dry	Baltimore Pk	Newark Rd	Angle		careless turn	WB - right turn			EB - straight
13	6/9/2004	W/1915	0	1	SHW	no adverse	dry	Baltimore Pk	Newark Rd	Rear-end		too fast	EB - straight			EB - stopping
14	6/12/2004	Sa/1200	0	0	SHW	no adverse	dry	Baltimore Pk	Newark Rd	Angle		wrong side of road	EB - left turn			WB - stopped
15	6/25/2004	F/2216	0	2	SHW	no adverse	wet	Baltimore Pk	Newark Rd	Non collision		ran red light	SB - straight			EB - straight
16	8/4/2004	W/2000	0	2	SHW	rain	wet	Baltimore Pk	Newark Rd	Rear-end		too fast	EB - straight			EB - stopping
17	10/28/2004	Th/1631	0	1	SHW	no adverse	dry	Baltimore Pk	Newark Rd	Angle		driver distracted	NB - U turn			EB - straight
18	11/3/2004	W/626	0	1	SHW	no adverse	dry	Baltimore Pk	Newark Rd	Rear-end			EB - straight			EB - stopping
19	12/14/2004	T/1730	0	1	SHW	no adverse	dry	Baltimore Pk	Newark Rd	Rear-end		driver distracted	WB - straight			WB - stopping
20	3/8/2005	T/1535	0	0	SHW	no adverse	dry	Baltimore Pk	Newark Rd	Angle		careless turn	WB - left turn			EB - straight
21	5/15/2005	Su/1809	0	0	SHW	no adverse	dry	Baltimore Pk	Newark Rd	Angle		ran red light	SB - curve			WB - straight
22	7/27/2005	W/2043	0	1	SHW	rain	wet	Newark Rd	Baltimore Pk	HitFixObj			SB - straight			
23	8/14/2005	Su/323	0	0	SHW	no adverse	dry	Newark Rd	Baltimore Pk	HitFixObj			SB - curve			
24	8/16/2005	T/1125	0	1	SHW	rain	wet	Baltimore Pk	Newark Rd	Angle		too fast	SB - straight			SB - straight
25	11/13/2005	Su/1806	0	1	SHW	no adverse	dry	Baltimore Pk	Newark Rd	Head-on		careless turn	WB - left turn			EB - straight

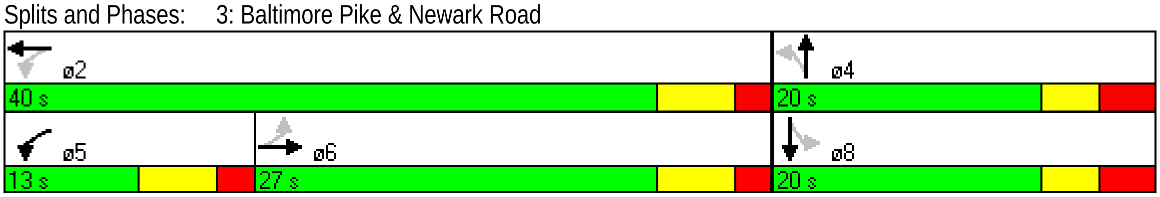
Source: Pennsylvania Department of Transportation Crash Database

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	350	45	78	145	47	28	202	89	86	217	44
Satd. Flow (prot)	0	1659	0	0	1709	0	0	1666	0	0	1819	0
Flt Permitted		0.951			0.723			0.911			0.692	
Satd. Flow (perm)	0	1584	0	0	1253	0	0	1524	0	0	1274	0
Satd. Flow (RTOR)					29							
Lane Group Flow (vph)	0	466	0	0	294	0	0	347	0	0	377	0
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		6		5	2			4			8	
Permitted Phases	6			2			4			8		
Total Split (s)	27.0	27.0	0.0	13.0	40.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)		21.0			34.0			14.0			14.0	
Actuated g/C Ratio		0.35			0.57			0.23			0.23	
v/c Ratio		0.84			0.38			0.97			1.27	
Control Delay		34.7			7.7			69.3			170.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		34.7			7.7			69.3			170.9	
LOS		C			A			E			F	
Approach Delay		34.7			7.7			69.3			170.9	
Approach LOS		C			A			E			F	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 1.27
Intersection Signal Delay: 72.1 Intersection LOS: E
Intersection Capacity Utilization 84.0% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 3: Baltimore Pike & Newark Road

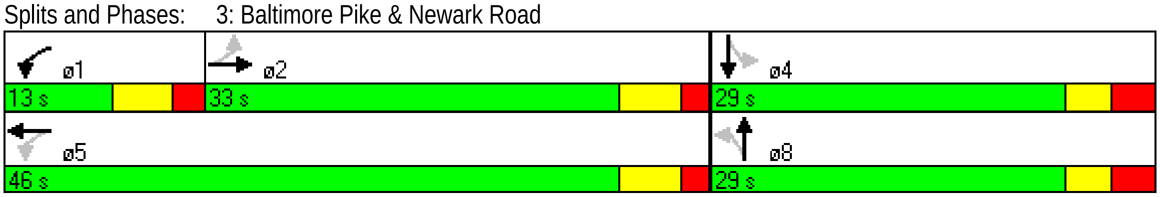


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	350	45	78	145	47	28	202	89	86	217	44
Satd. Flow (prot)	0	1659	0	0	1709	0	0	1666	0	0	1759	0
Flt Permitted		0.951			0.674			0.946			0.738	
Satd. Flow (perm)	0	1584	0	0	1169	0	0	1582	0	0	1314	0
Satd. Flow (RTOR)					22							
Lane Group Flow (vph)	0	466	0	0	294	0	0	347	0	0	377	0
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		2		1	5			8			4	
Permitted Phases	2			5			8			4		
Total Split (s)	33.0	33.0	0.0	13.0	46.0	0.0	29.0	29.0	0.0	29.0	29.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)		24.1			37.1			22.3			22.3	
Actuated g/C Ratio		0.34			0.52			0.31			0.31	
v/c Ratio		0.87			0.44			0.70			0.92	
Control Delay		41.7			11.5			31.8			56.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		41.7			11.5			31.8			56.1	
LOS		D			B			C			E	
Approach Delay		41.7			11.5			31.8			56.1	
Approach LOS		D			B			C			E	

Intersection Summary

Cycle Length: 75
Actuated Cycle Length: 71.5
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.92
Intersection Signal Delay: 37.1 — Intersection LOS: D
Intersection Capacity Utilization 84.0% — ICU Level of Service E
Analysis Period (min) 15

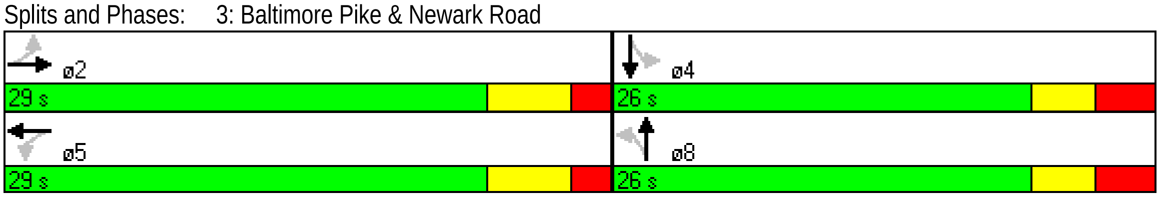
Splits and Phases: 3: Baltimore Pike & Newark Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	350	45	78	145	47	28	202	89	86	217	44
Satd. Flow (prot)	0	1659	0	0	1709	0	0	1666	0	0	1759	0
Flt Permitted		0.952			0.774			0.944			0.812	
Satd. Flow (perm)	0	1586	0	0	1342	0	0	1579	0	0	1445	0
Satd. Flow (RTOR)					24							
Lane Group Flow (vph)	0	466	0	0	294	0	0	347	0	0	377	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			5			8			4	
Permitted Phases	2			5			8			4		
Total Split (s)	29.0	29.0	0.0	29.0	29.0	0.0	26.0	26.0	0.0	26.0	26.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)		19.1			19.1			16.3			16.3	
Actuated g/C Ratio		0.40			0.40			0.34			0.34	
v/c Ratio		0.73			0.53			0.64			0.77	
Control Delay		21.2			14.8			20.1			27.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		21.2			14.8			20.1			27.0	
LOS		C			B			C			C	
Approach Delay		21.2			14.8			20.1			27.0	
Approach LOS		C			B			C			C	

Intersection Summary	
Cycle Length: 55	
Actuated Cycle Length: 47.7	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 21.1	Intersection LOS: C
Intersection Capacity Utilization 84.0%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: Baltimore Pike & Newark Road

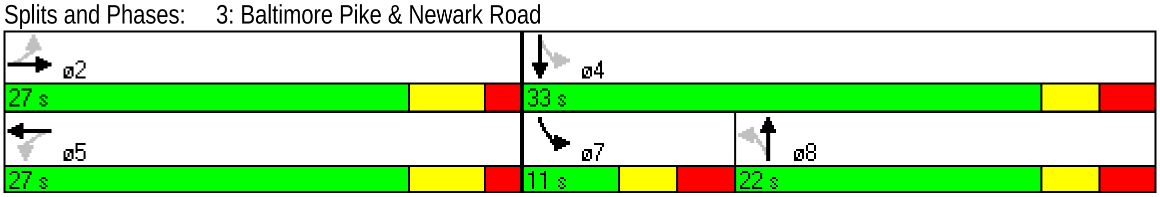


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	350	45	78	145	47	28	202	89	86	217	44
Satd. Flow (prot)	0	1659	0	0	1709	0	0	1666	0	0	1759	0
Flt Permitted		0.952			0.761			0.941			0.825	
Satd. Flow (perm)	0	1586	0	0	1319	0	0	1574	0	0	1468	0
Satd. Flow (RTOR)					19							
Lane Group Flow (vph)	0	466	0	0	294	0	0	347	0	0	377	0
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		2			5			8		7	4	
Permitted Phases	2			5			8			4		
Total Split (s)	27.0	27.0	0.0	27.0	27.0	0.0	22.0	22.0	0.0	11.0	33.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)		19.1			19.1			18.0			18.0	
Actuated g/C Ratio		0.39			0.39			0.36			0.36	
v/c Ratio		0.76			0.56			0.61			0.71	
Control Delay		25.6			17.7			17.8			21.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		25.6			17.7			17.8			21.5	
LOS		C			B			B			C	
Approach Delay		25.6			17.7			17.8			21.5	
Approach LOS		C			B			B			C	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 49.4
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 21.2 Intersection LOS: C
Intersection Capacity Utilization 84.0% ICU Level of Service E
Analysis Period (min) 15

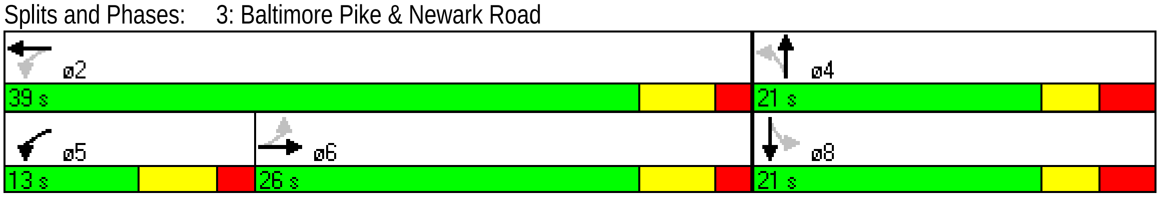
Splits and Phases: 3: Baltimore Pike & Newark Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	350	45	78	145	47	28	202	89	86	217	44
Satd. Flow (prot)	0	1659	0	0	1709	0	0	1666	0	1779	1826	0
Flt Permitted		0.950			0.702			0.943		0.416		
Satd. Flow (perm)	0	1583	0	0	1217	0	0	1577	0	779	1826	0
Satd. Flow (RTOR)					28							
Lane Group Flow (vph)	0	466	0	0	294	0	0	347	0	93	284	0
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		6		5	2			4			8	
Permitted Phases	6			2			4			8		
Total Split (s)	26.0	26.0	0.0	13.0	39.0	0.0	21.0	21.0	0.0	21.0	21.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)		19.1			32.2			14.6		14.6	14.6	
Actuated g/C Ratio		0.32			0.55			0.25		0.25	0.25	
v/c Ratio		0.90			0.40			0.89		0.48	0.63	
Control Delay		43.8			8.4			49.5		28.9	27.0	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		43.8			8.4			49.5		28.9	27.0	
LOS		D			A			D		C	C	
Approach Delay		43.8			8.4			49.5			27.5	
Approach LOS		D			A			D			C	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 58.8	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 34.0	Intersection LOS: C
Intersection Capacity Utilization 81.9%	ICU Level of Service D
Analysis Period (min) 15	

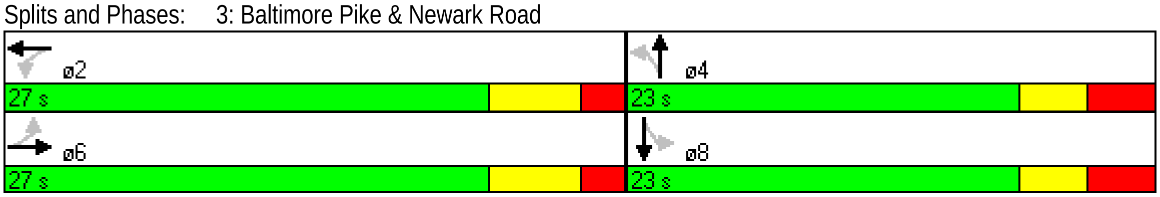
Splits and Phases: 3: Baltimore Pike & Newark Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	350	45	78	145	47	28	202	89	86	217	44
Satd. Flow (prot)	0	1659	0	0	1709	0	0	1666	0	1779	1826	0
Flt Permitted		0.952			0.785			0.945		0.546		
Satd. Flow (perm)	0	1586	0	0	1361	0	0	1581	0	1023	1826	0
Satd. Flow (RTOR)					26							
Lane Group Flow (vph)	0	466	0	0	294	0	0	347	0	93	284	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Total Split (s)	27.0	27.0	0.0	27.0	27.0	0.0	23.0	23.0	0.0	23.0	23.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)		18.1			18.1			13.6		13.6	13.6	
Actuated g/C Ratio		0.41			0.41			0.31		0.31	0.31	
v/c Ratio		0.71			0.51			0.71		0.29	0.50	
Control Delay		19.3			13.1			22.9		14.8	16.2	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		19.3			13.1			22.9		14.8	16.2	
LOS		B			B			C		B	B	
Approach Delay		19.3			13.1			22.9			15.8	
Approach LOS		B			B			C			B	

Intersection Summary	
Cycle Length: 50	
Actuated Cycle Length: 43.9	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 18.0	Intersection LOS: B
Intersection Capacity Utilization 81.9%	ICU Level of Service D
Analysis Period (min) 15	

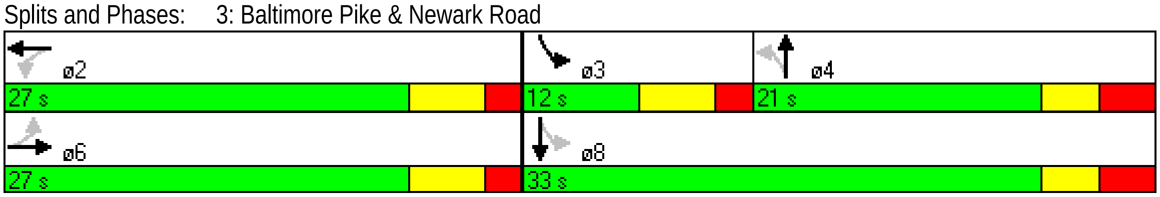
Splits and Phases: 3: Baltimore Pike & Newark Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	350	45	78	145	47	28	202	89	86	217	44
Satd. Flow (prot)	0	1659	0	0	1709	0	0	1666	0	1779	1826	0
Flt Permitted		0.951			0.703			0.943		0.319		
Satd. Flow (perm)	0	1584	0	0	1219	0	0	1577	0	598	1826	0
Satd. Flow (RTOR)					19							
Lane Group Flow (vph)	0	466	0	0	294	0	0	347	0	93	284	0
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		6			2			4		3	8	
Permitted Phases	6			2			4			8		
Total Split (s)	27.0	27.0	0.0	27.0	27.0	0.0	21.0	21.0	0.0	12.0	33.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)		19.9			19.9			14.4		23.5	23.4	
Actuated g/C Ratio		0.36			0.36			0.26		0.41	0.42	
v/c Ratio		0.82			0.66			0.85		0.25	0.37	
Control Delay		32.8			24.1			43.8		11.5	12.5	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		32.8			24.1			43.8		11.5	12.5	
LOS		C			C			D		B	B	
Approach Delay		32.8			24.1			43.8			12.3	
Approach LOS		C			C			D			B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 55.6	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 28.4	Intersection LOS: C
Intersection Capacity Utilization 81.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: Baltimore Pike & Newark Road

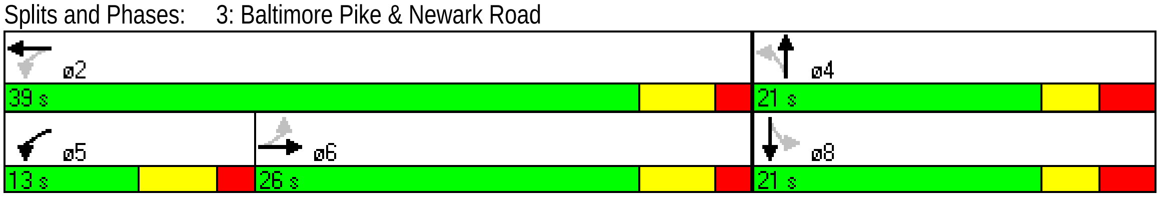


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	350	45	78	145	47	28	202	89	86	217	44
Satd. Flow (prot)	0	1659	0	1686	1709	0	0	1666	0	1779	1826	0
Flt Permitted		0.958		0.297				0.943		0.417		
Satd. Flow (perm)	0	1596	0	527	1709	0	0	1577	0	781	1826	0
Satd. Flow (RTOR)					43							
Lane Group Flow (vph)	0	466	0	85	209	0	0	347	0	93	284	0
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		6		5	2			4			8	
Permitted Phases	6			2			4			8		
Total Split (s)	26.0	26.0	0.0	13.0	39.0	0.0	21.0	21.0	0.0	21.0	21.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)		19.1		32.1	32.1			14.6		14.6	14.6	
Actuated g/C Ratio		0.33		0.55	0.55			0.25		0.25	0.25	
v/c Ratio		0.90		0.20	0.22			0.89		0.48	0.63	
Control Delay		42.9		7.6	6.1			49.4		28.9	26.9	
Queue Delay		0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay		42.9		7.6	6.1			49.4		28.9	26.9	
LOS		D		A	A			D		C	C	
Approach Delay		42.9			6.5			49.4			27.4	
Approach LOS		D			A			D			C	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 58.7
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 33.3 Intersection LOS: C
Intersection Capacity Utilization 85.2% ICU Level of Service E
Analysis Period (min) 15

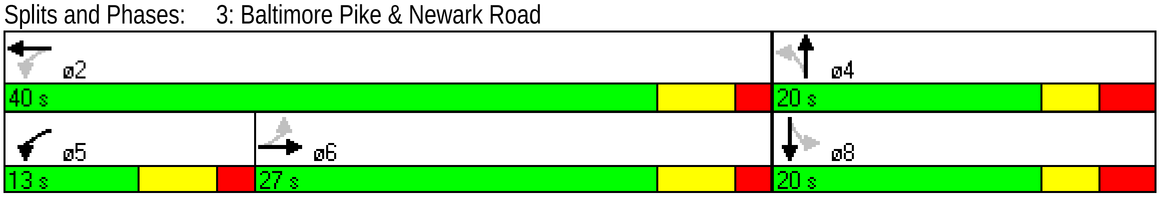
Splits and Phases: 3: Baltimore Pike & Newark Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	350	45	78	145	47	28	202	89	86	217	44
Satd. Flow (prot)	0	1659	0	1686	1709	0	0	1666	0	1779	1826	0
Flt Permitted		0.959		0.306				0.917		0.403		
Satd. Flow (perm)	0	1598	0	543	1709	0	0	1534	0	755	1826	0
Satd. Flow (RTOR)					45			30			16	
Lane Group Flow (vph)	0	466	0	85	209	0	0	347	0	93	284	0
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		6		5	2			4			8	
Permitted Phases	6			2			4			8		
Total Split (s)	27.0	27.0	0.0	13.0	40.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)		19.5		32.6	32.6			13.8		13.8	13.8	
Actuated g/C Ratio		0.33		0.56	0.56			0.24		0.24	0.24	
v/c Ratio		0.87		0.19	0.21			0.90		0.52	0.64	
Control Delay		38.0		7.1	5.6			50.6		32.9	27.2	
Queue Delay		0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay		38.0		7.1	5.6			50.6		32.9	27.2	
LOS		D		A	A			D		C	C	
Approach Delay		38.0			6.0			50.6			28.6	
Approach LOS		D			A			D			C	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 58.4	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 32.2	Intersection LOS: C
Intersection Capacity Utilization 85.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: Baltimore Pike & Newark Road

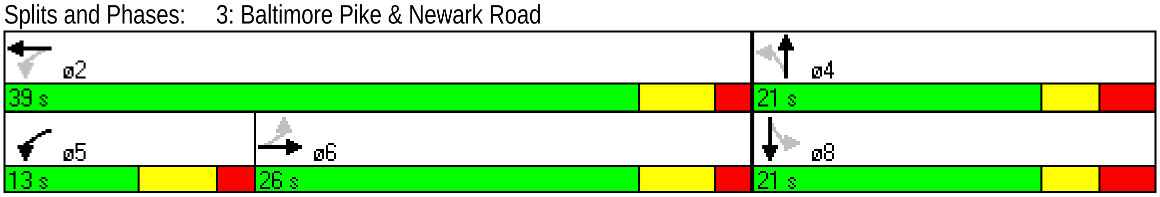


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	350	45	78	145	47	28	202	89	86	217	44
Satd. Flow (prot)	1720	1661	0	1686	1709	0	1652	1659	0	1779	1826	0
Flt Permitted	0.627			0.259			0.494			0.432		
Satd. Flow (perm)	1135	1661	0	460	1709	0	859	1659	0	809	1826	0
Satd. Flow (RTOR)					43							
Lane Group Flow (vph)	37	429	0	85	209	0	30	317	0	93	284	0
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		6		5	2			4			8	
Permitted Phases	6			2			4			8		
Total Split (s)	26.0	26.0	0.0	13.0	39.0	0.0	21.0	21.0	0.0	21.0	21.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)	18.4	18.4		31.5	31.5		13.8	13.8		13.8	13.8	
Actuated g/C Ratio	0.32	0.32		0.55	0.55		0.24	0.24		0.24	0.24	
v/c Ratio	0.10	0.80		0.21	0.22		0.15	0.79		0.48	0.65	
Control Delay	14.8	32.0		7.8	6.1		19.6	38.0		28.6	27.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.8	32.0		7.8	6.1		19.6	38.0		28.6	27.6	
LOS	B	C		A	A		B	D		C	C	
Approach Delay		30.6			6.6			36.4			27.9	
Approach LOS		C			A			D			C	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 57.3
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 26.5 Intersection LOS: C
Intersection Capacity Utilization 67.8% ICU Level of Service C
Analysis Period (min) 15

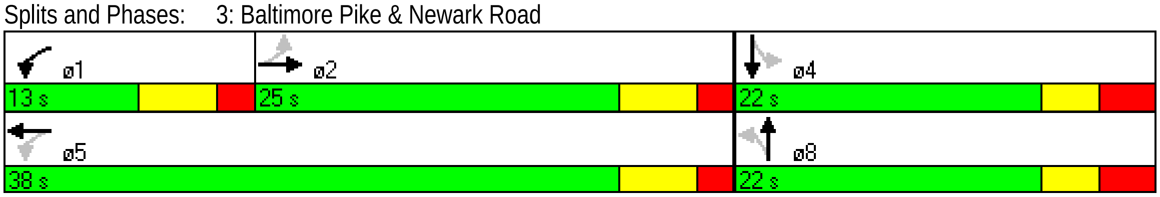
Splits and Phases: 3: Baltimore Pike & Newark Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	324	41	67	415	106	39	181	81	89	185	59
Satd. Flow (prot)	0	1652	0	0	1728	0	0	1672	0	0	1741	0
Flt Permitted		0.943			0.869			0.891			0.737	
Satd. Flow (perm)	0	1563	0	0	1510	0	0	1499	0	0	1300	0
Satd. Flow (RTOR)					28							
Lane Group Flow (vph)	0	420	0	0	639	0	0	327	0	0	362	0
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		2		1	5			8			4	
Permitted Phases	2			5			8			4		
Total Split (s)	25.0	25.0	0.0	13.0	38.0	0.0	22.0	22.0	0.0	22.0	22.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)		19.0			32.0			16.0			16.0	
Actuated g/C Ratio		0.32			0.53			0.27			0.27	
v/c Ratio		0.85			0.76			0.82			1.04	
Control Delay		38.3			17.7			40.2			86.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		38.3			17.7			40.2			86.9	
LOS		D			B			D			F	
Approach Delay		38.3			17.7			40.2			86.9	
Approach LOS		D			B			D			F	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.04	
Intersection Signal Delay: 41.2	Intersection LOS: D
Intersection Capacity Utilization 94.8%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 3: Baltimore Pike & Newark Road

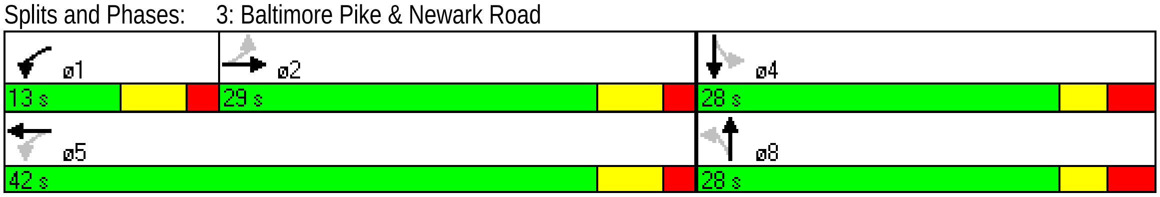


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	324	41	67	415	106	39	181	81	89	185	59
Satd. Flow (prot)	0	1652	0	0	1728	0	0	1672	0	0	1741	0
Flt Permitted		0.944			0.851			0.911			0.748	
Satd. Flow (perm)	0	1564	0	0	1479	0	0	1533	0	0	1320	0
Satd. Flow (RTOR)					23							
Lane Group Flow (vph)	0	420	0	0	639	0	0	327	0	0	362	0
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		2		1	5			8			4	
Permitted Phases	2			5			8			4		
Total Split (s)	29.0	29.0	0.0	13.0	42.0	0.0	28.0	28.0	0.0	28.0	28.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)		20.8			33.9			20.6			20.6	
Actuated g/C Ratio		0.31			0.51			0.31			0.31	
v/c Ratio		0.86			0.81			0.69			0.89	
Control Delay		41.1			23.2			29.6			48.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		41.1			23.2			29.6			48.9	
LOS		D			C			C			D	
Approach Delay		41.1			23.2			29.6			48.9	
Approach LOS		D			C			C			D	

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 66.6
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 34.0 Intersection LOS: C
Intersection Capacity Utilization 94.8% ICU Level of Service F
Analysis Period (min) 15

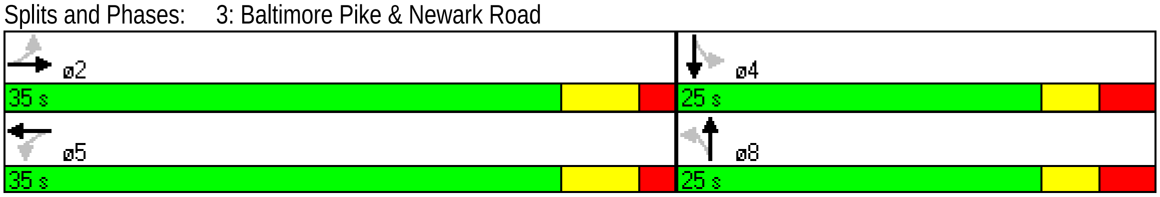
Splits and Phases: 3: Baltimore Pike & Newark Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	324	41	67	415	106	39	181	81	89	185	59
Satd. Flow (prot)	0	1652	0	0	1728	0	0	1672	0	0	1741	0
Flt Permitted		0.951			0.908			0.918			0.782	
Satd. Flow (perm)	0	1576	0	0	1578	0	0	1544	0	0	1380	0
Satd. Flow (RTOR)					25							
Lane Group Flow (vph)	0	420	0	0	639	0	0	327	0	0	362	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			5			8			4	
Permitted Phases	2			5			8			4		
Total Split (s)	35.0	35.0	0.0	35.0	35.0	0.0	25.0	25.0	0.0	25.0	25.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)		25.1			25.1			17.3			17.3	
Actuated g/C Ratio		0.46			0.46			0.32			0.32	
v/c Ratio		0.58			0.87			0.67			0.83	
Control Delay		14.9			27.7			25.6			37.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		14.9			27.7			25.6			37.9	
LOS		B			C			C			D	
Approach Delay		14.9			27.7			25.6			37.9	
Approach LOS		B			C			C			D	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 54.7	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 26.3	Intersection LOS: C
Intersection Capacity Utilization 94.8%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 3: Baltimore Pike & Newark Road

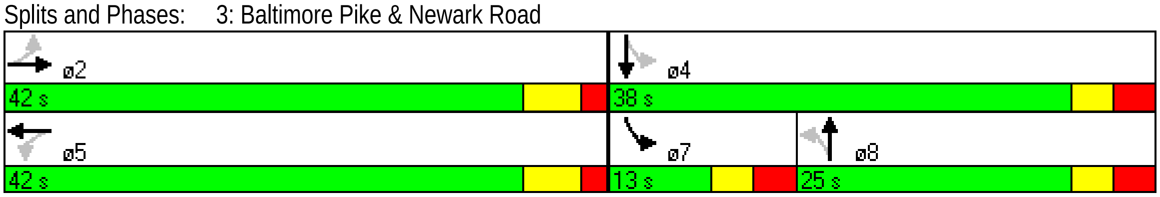


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	324	41	67	415	106	39	181	81	89	185	59
Satd. Flow (prot)	0	1652	0	0	1728	0	0	1672	0	0	1741	0
Flt Permitted		0.953			0.906			0.916			0.758	
Satd. Flow (perm)	0	1579	0	0	1575	0	0	1541	0	0	1337	0
Satd. Flow (RTOR)					18							
Lane Group Flow (vph)	0	420	0	0	639	0	0	327	0	0	362	0
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		2			5			8		7	4	
Permitted Phases	2			5			8			4		
Total Split (s)	42.0	42.0	0.0	42.0	42.0	0.0	25.0	25.0	0.0	13.0	38.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)		36.3			36.3			23.6			23.6	
Actuated g/C Ratio		0.50			0.50			0.33			0.33	
v/c Ratio		0.53			0.80			0.65			0.82	
Control Delay		16.7			25.8			26.7			38.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		16.7			25.8			26.7			38.4	
LOS		B			C			C			D	
Approach Delay		16.7			25.8			26.7			38.4	
Approach LOS		B			C			C			D	

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 72
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 26.4 Intersection LOS: C
Intersection Capacity Utilization 94.8% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 3: Baltimore Pike & Newark Road

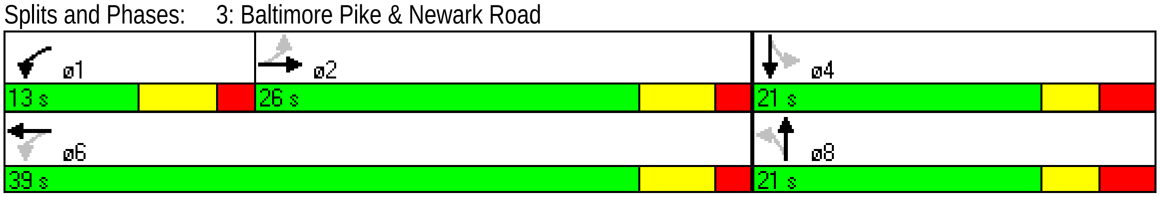


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	324	41	67	415	106	39	181	81	89	185	59
Satd. Flow (prot)	0	1652	0	0	1728	0	0	1672	0	1814	1789	0
Flt Permitted		0.943			0.878			0.901		0.453		
Satd. Flow (perm)	0	1563	0	0	1526	0	0	1516	0	865	1789	0
Satd. Flow (RTOR)					29							
Lane Group Flow (vph)	0	420	0	0	639	0	0	327	0	97	265	0
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	26.0	26.0	0.0	13.0	39.0	0.0	21.0	21.0	0.0	21.0	21.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)		18.6			31.7			14.4		14.4	14.4	
Actuated g/C Ratio		0.32			0.55			0.25		0.25	0.25	
v/c Ratio		0.84			0.74			0.87		0.45	0.60	
Control Delay		36.0			15.8			47.8		26.9	26.1	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		36.0			15.8			47.8		26.9	26.1	
LOS		D			B			D		C	C	
Approach Delay		36.0			15.8			47.8			26.3	
Approach LOS		D			B			D			C	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 58.1
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 28.8 Intersection LOS: C
Intersection Capacity Utilization 96.7% ICU Level of Service F
Analysis Period (min) 15

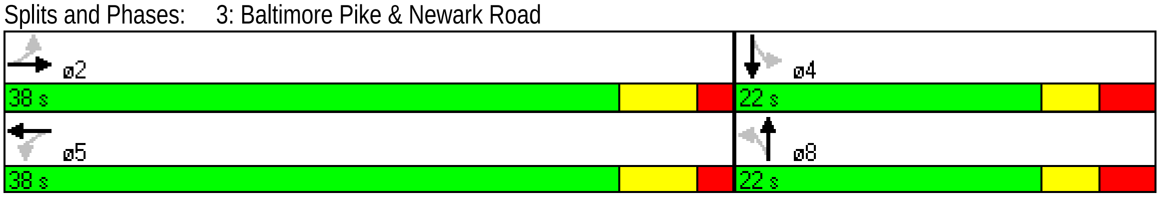
Splits and Phases: 3: Baltimore Pike & Newark Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	324	41	67	415	106	39	181	81	89	185	59
Satd. Flow (prot)	0	1652	0	0	1728	0	0	1672	0	1814	1789	0
Flt Permitted		0.952			0.906			0.916		0.510		
Satd. Flow (perm)	0	1578	0	0	1575	0	0	1541	0	974	1789	0
Satd. Flow (RTOR)					28							
Lane Group Flow (vph)	0	420	0	0	639	0	0	327	0	97	265	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			5			8			4	
Permitted Phases	2			5			8			4		
Total Split (s)	38.0	38.0	0.0	38.0	38.0	0.0	22.0	22.0	0.0	22.0	22.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)		25.1			25.1			14.3		14.3	14.3	
Actuated g/C Ratio		0.48			0.48			0.28		0.28	0.28	
v/c Ratio		0.55			0.82			0.77		0.36	0.54	
Control Delay		12.5			21.4			33.9		21.7	22.2	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		12.5			21.4			33.9		21.7	22.2	
LOS		B			C			C		C	C	
Approach Delay		12.5			21.4			33.9			22.1	
Approach LOS		B			C			C			C	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 51.9	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 21.7	Intersection LOS: C
Intersection Capacity Utilization 96.7%	ICU Level of Service F
Analysis Period (min) 15	

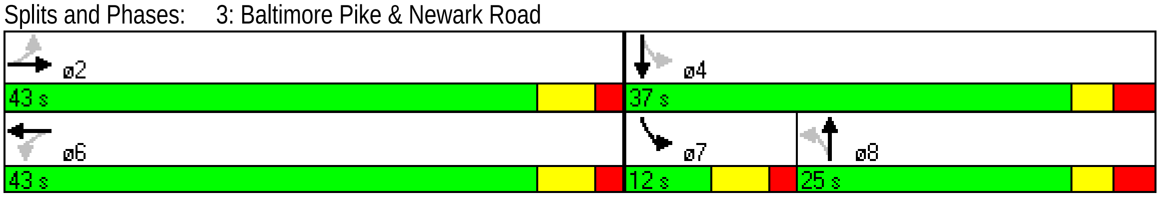
Splits and Phases: 3: Baltimore Pike & Newark Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	324	41	67	415	106	39	181	81	89	185	59
Satd. Flow (prot)	0	1652	0	0	1728	0	0	1672	0	1814	1789	0
Flt Permitted		0.951			0.909			0.918		0.330		
Satd. Flow (perm)	0	1576	0	0	1580	0	0	1544	0	630	1789	0
Satd. Flow (RTOR)					18							
Lane Group Flow (vph)	0	420	0	0	639	0	0	327	0	97	265	0
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		2			6			8		7	4	
Permitted Phases	2			6			8			4		
Total Split (s)	43.0	43.0	0.0	43.0	43.0	0.0	25.0	25.0	0.0	12.0	37.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)		32.3			32.3			18.2		26.9	26.9	
Actuated g/C Ratio		0.45			0.45			0.25		0.36	0.37	
v/c Ratio		0.59			0.89			0.84		0.30	0.40	
Control Delay		19.8			35.3			49.6		18.3	19.3	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		19.8			35.3			49.6		18.3	19.3	
LOS		B			D			D		B	B	
Approach Delay		19.8			35.3			49.6			19.0	
Approach LOS		B			D			D			B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 71.9	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 30.9	Intersection LOS: C
Intersection Capacity Utilization 96.7%	ICU Level of Service F
Analysis Period (min) 15	

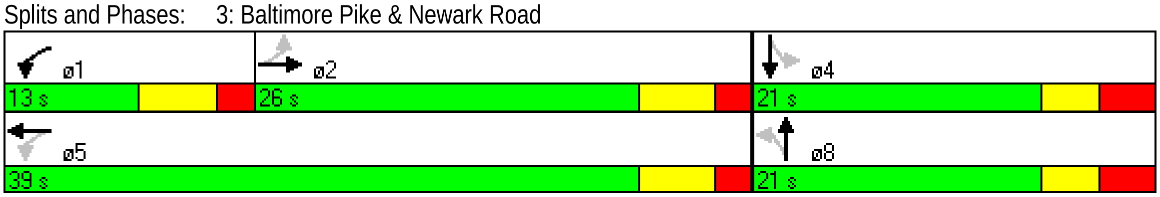
Splits and Phases: 3: Baltimore Pike & Newark Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	324	41	67	415	106	39	181	81	89	185	59
Satd. Flow (prot)	0	1652	0	1639	1735	0	0	1672	0	1814	1789	0
Flt Permitted		0.949		0.313				0.909		0.458		
Satd. Flow (perm)	0	1573	0	540	1735	0	0	1529	0	874	1789	0
Satd. Flow (RTOR)					34							
Lane Group Flow (vph)	0	420	0	73	566	0	0	327	0	97	265	0
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		2		1	5			8			4	
Permitted Phases	2			5			8			4		
Total Split (s)	26.0	26.0	0.0	13.0	39.0	0.0	21.0	21.0	0.0	21.0	21.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)		18.1		31.2	31.2			14.4		14.4	14.4	
Actuated g/C Ratio		0.31		0.54	0.54			0.25		0.25	0.25	
v/c Ratio		0.85		0.17	0.59			0.86		0.44	0.59	
Control Delay		37.0		7.4	11.5			46.0		26.6	26.0	
Queue Delay		0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay		37.0		7.4	11.5			46.0		26.6	26.0	
LOS		D		A	B			D		C	C	
Approach Delay		37.0			11.0			46.0			26.1	
Approach LOS		D			B			D			C	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 57.6	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 27.0	Intersection LOS: C
Intersection Capacity Utilization 81.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: Baltimore Pike & Newark Road

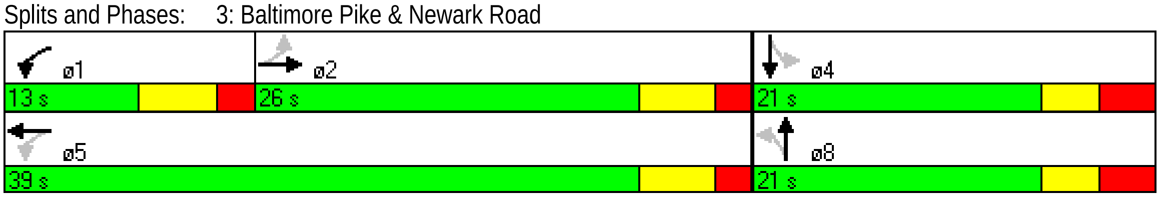


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	324	41	67	415	106	39	181	81	89	185	59
Satd. Flow (prot)	0	1652	0	1639	1735	0	0	1672	0	1814	1789	0
Flt Permitted		0.949		0.315				0.899		0.455		
Satd. Flow (perm)	0	1573	0	544	1735	0	0	1512	0	869	1789	0
Satd. Flow (RTOR)					34			29			25	
Lane Group Flow (vph)	0	420	0	73	566	0	0	327	0	97	265	0
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		2		1	5			8			4	
Permitted Phases	2			5			8			4		
Total Split (s)	26.0	26.0	0.0	13.0	39.0	0.0	21.0	21.0	0.0	21.0	21.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)		18.1		31.2	31.2			14.1		14.1	14.1	
Actuated g/C Ratio		0.32		0.54	0.54			0.25		0.25	0.25	
v/c Ratio		0.85		0.17	0.59			0.83		0.46	0.58	
Control Delay		36.7		7.4	11.4			40.1		27.1	23.4	
Queue Delay		0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay		36.7		7.4	11.4			40.1		27.1	23.4	
LOS		D		A	B			D		C	C	
Approach Delay		36.7			11.0			40.1			24.4	
Approach LOS		D			B			D			C	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 57.3
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 25.4 Intersection LOS: C
Intersection Capacity Utilization 81.9% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 3: Baltimore Pike & Newark Road

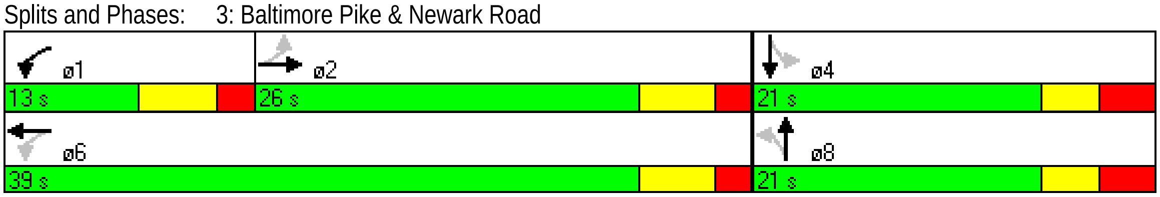


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	324	41	67	415	106	39	181	81	89	185	59
Satd. Flow (prot)	1657	1655	0	1639	1735	0	1667	1664	0	1814	1789	0
Flt Permitted	0.452			0.290			0.532			0.492		
Satd. Flow (perm)	789	1655	0	500	1735	0	934	1664	0	939	1789	0
Satd. Flow (RTOR)					34							
Lane Group Flow (vph)	23	397	0	73	566	0	42	285	0	97	265	0
Turn Type	Perm			pm+pt			Perm			Perm		
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	26.0	26.0	0.0	13.0	39.0	0.0	21.0	21.0	0.0	21.0	21.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Act Effct Green (s)	17.9	17.9		31.0	31.0		13.1	13.1		13.1	13.1	
Actuated g/C Ratio	0.32	0.32		0.55	0.55		0.23	0.23		0.23	0.23	
v/c Ratio	0.09	0.75		0.17	0.58		0.19	0.73		0.44	0.63	
Control Delay	15.0	28.4		7.4	11.1		20.2	33.2		26.1	27.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.0	28.4		7.4	11.1		20.2	33.2		26.1	27.3	
LOS	B	C		A	B		C	C		C	C	
Approach Delay		27.7			10.7			31.5			27.0	
Approach LOS		C			B			C			C	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 56.2
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 22.0 — Intersection LOS: C
Intersection Capacity Utilization 80.2% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 3: Baltimore Pike & Newark Road



APPENDIX E

MERCER

SYNCHRO ANALYSIS
Source: DVRPC, 2007

Chambers Street and Hamilton Avenue Intersection
CITY OF TRENTON - MERCER COUNTY

Reportable crashes (2002 - 2005)

MAP ID	DATE	DAY/TIME	TOTAL KILLED	TOTAL INJURED	ROAD SYSTEM	WEATHER COND.	ROAD COND.	ROAD	CROSS ROAD	CRASH TYPE	AGE OF DRIVER 1	DRIVER 1 FACTOR	DRIVER 1 ACTION	AGE OF DRIVER 2	DRIVER 2 FACTOR	DRIVER 2 ACTION
1	1/12/2002	SA/25	0	0	CO	clear	dry	Hamilton Ave		Angle		inattention	SB - straight			
2	1/25/2002	F/1405	0	0	CO	clear	dry	Chambers St	Hamilton Ave	Other			SB - stopped in traffic			
3	1/25/2002	F/1352	0	0	CO	clear	dry	Hamilton Ave		Rear-end			WB - straight			
4	2/7/2002	TH/945	0	0	CO	snow	wet	Hamilton Ave		Hit Parked Vehicle		inattention	EB - parking			
5	2/8/2002	F/1510	0	0	CO	clear	dry	Hamilton Ave		Other		inattention	WB - parking			
6	2/9/2002	SA/2250	0	1	CO	clear	dry	Hamilton Ave		Hit Parked Vehicle			EB - parked			
7	2/19/2002	TU/2230	0	0	CO	clear	dry	Hamilton Ave		Left Turn		other	EB - left turn			
8	3/5/2002	TU/1315	0	0	CO	clear	dry	Hamilton Ave		Other		Backing	SB - Backing			
9	3/11/2002	M/1750	0	0	CO	clear	dry	Hamilton Ave		SS			WB - straight			
10	4/12/2002	F/1816	0	0	CO	rain	wet	Chambers St		Rear-end		inattention	NB -			
11	4/16/2002	TU/850	0	0	CO	clear	dry	Hamilton Ave		Rear-end		other	WB - slowing or stopping			
12	4/24/2002	W/2340	0	0	CO	clear	dry	Hamilton Ave		Rear-end		inattention	NB - straight			
13	4/25/2002	TH/1540	0	0	CO	rain	wet	Chambers St		Left Turn			NB - straight			
14	6/6/2002	TH/731	0	0	CO	clear	dry	Hamilton Ave		Rear-end		following too closely	EB - stopped in traffic			
15	6/15/2002	SA/2007	0	0	CO	clear	dry	Chambers St		SS			SB - right turn			
16	6/15/2002	SA/2007	0	0	CO	clear	dry	Chambers St		SS			SB - right turn			
17	6/25/2002	TU/1300	0	0	CO	clear	dry	Hamilton Ave		Hit Parked Vehicle		inattention	EB -			
18	7/7/2002	S/1820	0	0	CO	clear	dry	Hamilton Ave		SS			WB - straight			
19	7/19/2002	F/1510	0	0	CO	rain	wet	Hamilton Ave		Head-On			NB - straight			
20	7/27/2002	SA/1110	0	0	CO	clear	dry	Hamilton Ave		Other			WB - right turn			
21	8/22/2002	TH/1230	0	0	CO	clear	dry	Hamilton Ave		Hit Parked Vehicle			WB - parked			
22	9/5/2002	TH/200	0	0	CO			Hamilton Ave	Chambers St							
23	9/7/2002	SA/2330	0	1	CO	clear	dry	Hamilton Ave	Franklin St	SS			WB - straight			
24	9/12/2002	TH/1450	0	0	CO	clear	dry	Hamilton Ave	Chambers St	Other		inattention	right turn			
25	9/14/2002	SA/1735	0	0	CO	rain	wet	Hamilton Ave	Chambers St	Rear-end			EB - stopped in traffic			
26	9/18/2002	W/1540	0	0	CO	clear	dry	Hamilton Ave	Franklin St	SS		inattention	WB - merging			
27	9/21/2002	SA/2100	0	0	CO	clear	dry	Chambers St	Hamilton Ave	Hit Parked Vehicle			NB - parked			
28	10/7/2002	M/2342	0	0	CO	clear	dry	Hamilton Ave	Franklin St	Other			EB - straight			
29	10/17/2002	TH/1955	0	0	CO	rain	wet	Chambers St	Hamilton Ave	Rear-end			NB - straight			
30	10/26/2002	SA/100	0	0	CO	rain	wet	Hamilton Ave	Franklin St	Rear-end		improper parking	EB - slowing or stopping			
31	12/9/2002	M/1450	0	0	CO	clear	dry	Hamilton Ave	Chambers St	Rear-end		inattention	WB - straight			
32	1/20/2003	M/1023	0	0	CO	snow	wet	Hamilton Ave	Chambers St	Left Turn			WB - straight			
33	1/30/2003	TH/925	0	0	CO	clear	snowy	Hamilton Ave	Franklin St	Rear-end			NB - stopped in traffic			
34	2/5/2003	W/1850	0	0	CO	clear	dry	Hamilton Ave	Chambers St	Hit Parked Vehicle			WB - parked			
35	2/23/2003	S/1819	0	0	CO	rain	icy	Hamilton Ave	Chambers St	Other			EB - left turn			
36	3/7/2003	F/1336	0	0	CO	clear	icy	Hamilton Ave	Chambers St	SS			EB - straight			
37	3/16/2003	S/1936	0	0	CO	clear	dry	Chambers St	Hamilton Ave	SS		failed to yield ROW	SB - starting from parking			
38	3/16/2003	S/1729	0	0	CO	clear	dry	Hamilton Ave	Chambers St	Hit Parked Vehicle			EB - right turn			
39	4/26/2003	SA/1622	0	0	CO	clear	dry	Hamilton Ave	Franklin St	Hit Parked Vehicle			parked			
40	5/9/2003	F/1920	0	0	CO	rain	wet	Hamilton Ave	Chambers St	Rear-end			SB - slowing or stopping			
41	5/25/2003	S/1350	0	0	CO	rain	wet	Hamilton Ave	Chambers St	SS			WB - right turn			
42	5/27/2003	TU/1430	0	0	CO	clear	dry	Chambers St	Hamilton Ave	Hit Parked Vehicle			SB - parked			

Source: New Jersey Department of Transportation Crash Database

Chambers Street and Hamilton Avenue Intersection
CITY OF TRENTON - MERCER COUNTY

Reportable crashes (2002 - 2005)

MAP ID	DATE	DAY/TIME	TOTAL KILLED	TOTAL INJURED	ROAD SYSTEM	WEATHER COND.	ROAD COND.	ROAD	CROSS ROAD	CRASH TYPE	AGE OF DRIVER 1	DRIVER 1 FACTOR	DRIVER 1 ACTION	AGE OF DRIVER 2	DRIVER 2 FACTOR	DRIVER 2 ACTION
43	6/1/2003	S/1715	0	0	CO	clear	dry	Hamilton Ave	Franklin St	Hit Parked Vehicle			parked			
44	6/3/2003	TU/1735	0	1	CO	rain	wet	Chambers St	Hamilton Ave	Other			NB - left turn			
45	6/6/2003	F/1757	0	0	CO	clear	dry	Hamilton Ave	Franklin St	Hit Parked Vehicle			EB - parked			
46	7/7/2003	M/1310	0	0	CO	clear	dry	Chambers St	Hamilton Ave	Rear-end			SB - stopped in traffic			
47	8/1/2003	F/2030	0	2	CO	rain	wet	Hamilton Ave	Chambers St	Rear-end			EB - stopped in traffic			
48	8/5/2003	TU/1537	0	2	CO	rain	wet	Hamilton Ave	Chambers St	Rear-end			WB - straight			
49	8/28/2003	TH/1700	0	0	CO	clear	dry	Hamilton Ave	Franklin St	Rear-end			EB - straight			
50	8/29/2003	F/1540	0	0	CO	clear	dry	Chambers St	Hamilton Ave.	Other			EB - straight			
51	9/2/2003	TU/148	0	0	CO	rain	wet	Hamilton Ave	Chambers St	Angle			WB - stopped in traffic			
52	9/13/2003	SA/1322	0	0	CO	rain	wet	Hamilton Ave	Chambers St	Angle		lane marking	NB - straight			
53	9/27/2003	SA/2058	0	1	CO	clear	dry	Chambers St	Hamilton Ave	Rear-end		inattention	WB - straight			
54	10/2/2003	TH/1540	0	0	CO	clear	dry	Hamilton Ave	Chambers St				WB - parked			
55	10/8/2003	W/1309	0	0	CO	clear	dry	Chambers St	Hamilton Ave	Rear-end			EB - slowing or stopping			
56	10/9/2003	TH/2335	0	0	CO	clear	dry	Hamilton Ave	Franklin St	Hit Parked Vehicle			parked			
57	10/26/2003	S/1600	0	1	CO	clear	dry	Chambers St	Hamilton Ave	Rear-end			NB - stopped in traffic			
58	11/4/2003	TU/1732	0	0	CO	rain	wet	Chambers St	Hamilton Ave	Angle		inattention	NB - left turn			
59	11/8/2003	SA/2240	0	0	CO	clear	dry	Chambers St	Hamilton Ave	SS			SB - straight			
60	11/19/2003	W/2358	0	0	CO	rain	wet	Hamilton Ave	Chambers St	Angle			NB - straight			
61	11/26/2003	W/1318	0	0	CO	clear	dry	Chambers St	Baldassari Ln	Angle			EB - left turn			
62	12/23/2003	TU/1120	0	0	CO	clear	dry	Hamilton Ave	Franklin St	SS			EB - straight			
63	1/5/2004	M/1700	0	2	CO	rain	wet	Chambers St	Hamilton Ave	Other			NB - straight			
64	1/7/2004	W/815	0	0	CO	clear	dry	Hamilton Ave	Chambers St	Other		Backing	EB - Backing			
65	1/23/2004	F/130	0	0	CO	clear	dry	Hamilton Ave	Franklin St	Other						
66	2/4/2004	W/1500	0	0	CO	clear	dry	Hamilton Ave	Chambers St	Hit Parked Vehicle			WB - parked			
67	2/23/2004	M/1215	0	0	CO	clear	dry	Hamilton Ave	Chambers St	Hit Parked Vehicle			EB - parked			
68	3/10/2004	W/1739	0	0	CO	clear	dry	Hamilton Ave	Chambers St	Hit Parked Vehicle			EB - parked			
69	3/26/2004	F/750	0	0	CO	clear	dry	Chambers St	Hamilton Ave	Angle			WB - left turn			
70	3/27/2004	SA/1315	0	0	CO	clear	dry	Hamilton Ave	Chambers St	Hit Parked Vehicle		Backing	Backing			
71	3/28/2004	S/2328	0	0	CO	clear	dry	Hamilton Ave	Franklin St	Other			EB - straight			
72	4/11/2004	S/1353	0	0	CO	rain	wet	Chambers St	Hamilton Ave	Rear-end			SB - slowing or stopping			
73	4/18/2004	S/219	0	1	CO	clear	dry	Hamilton Ave	Chambers St	Angle		failed to obey TCD	WB - straight			
74	5/11/2004	TU/1440	0	0	CO	clear	dry	Chambers St	Hamilton Ave	Angle			WB - merging			
75	5/20/2004	TH/1515	0	2	CO	clear	dry	Chambers St	Hamilton Ave	Rear-end		following too closely	WB - straight			
76	5/24/2004	M/1411	0	0	CO	clear	dry	Hamilton Ave	Chambers St	Rear-end			WB - slowing or stopping			
77	5/25/2004	TU/1	0	0	CO	clear	dry	Hamilton Ave	Chambers St	Left Turn			NB - straight			
78	6/13/2004	S/2205	0	0	CO	clear	dry	Hamilton Ave	Franklin St	Rear-end			EB - straight			
79	6/22/2004	TU/920	0	0	CO	clear	dry	Hamilton Ave	Chambers St	Rear-end		inattention	WB - stopped in traffic			
80	7/2/2004	F/830	0	1	CO	clear	dry	Hamilton Ave	Franklin St	Other			EB - driverless/moving			
81	7/2/2004	F/1156	0	1	CO	clear	dry	Hamilton Ave	Chambers St	Rear-end		inattention	WB - stopped in traffic			
82	7/11/2004	S/1422	0	0	CO	clear	dry	Hamilton Ave	Chambers St	SS		inattention	EB - straight			
83	8/19/2004	TH/1839	0	1	CO	clear	dry	Chambers St	Hamilton Ave	Angle		unsafe speed	WB - left turn			
84	8/28/2004	SA/1440	0	0	CO	clear	dry	Hamilton Ave	Chambers St	Rear-end			EB - stopped in traffic			

Source: New Jersey Department of Transportation Crash Database

Chambers Street and Hamilton Avenue Intersection
CITY OF TRENTON - MERCER COUNTY

Reportable crashes (2002 - 2005)

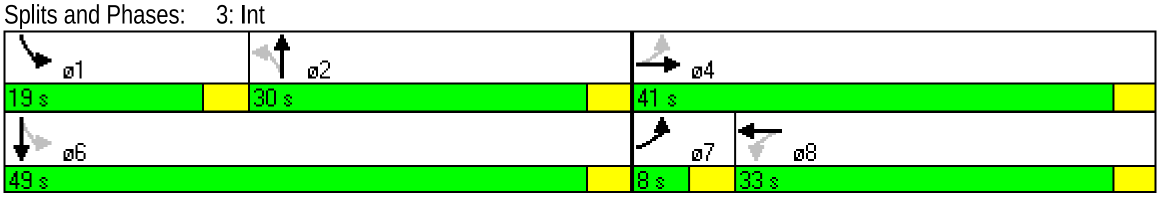
MAP ID	DATE	DAY/TIME	TOTAL KILLED	TOTAL INJURED	ROAD SYSTEM	WEATHER COND.	ROAD COND.	ROAD	CROSS ROAD	CRASH TYPE	AGE OF DRIVER 1	DRIVER 1 FACTOR	DRIVER 1 ACTION	AGE OF DRIVER 2	DRIVER 2 FACTOR	DRIVER 2 ACTION
85	10/9/2004	SA/2023	0	0	CO	clear	dry	Hamilton Ave	Chambers St	Left Turn			NB - left turn			
86	10/19/2004	TU/1140	0	0	CO	rain	wet	Hamilton Ave	Franklin St	SS		view obstructed	EB - right turn			
87	11/12/2004	F/723	0	1	CO	rain	wet	Chambers St	Hamilton Ave	Other		view obstructed	NB - left turn			
88	11/12/2004	F/1625	0	0	CO	rain	wet	Hamilton Ave	Anderson St	Other		inattention	EB - straight			
89	11/15/2004	M/810	0	0	CO	clear	dry	Chambers St	Hamilton Ave	Rear-end		other	NB - straight			
90	11/19/2004	F/1910	0	1	CO	clear	dry	Chambers St	Hamilton Ave	Rear-end		inattention	EB - slowing or stopping			
91	12/20/2004	M/1209	0	0	CO	clear	dry	Hamilton Ave	Chambers St	Hit Parked Vehicle			EB - parked			
92	1/11/2005	TU/2159	0	0	CO	rain	wet	Chambers St	Hamilton Ave	Other			SB - right turn			
93	1/19/2005	W/930	0	0	CO	clear	dry	Hamilton Ave	Chambers St	Angle			EB - straight			
94	1/22/2005	SA/1556	0	0	CO	snow	snowy	Chambers St	Hamilton Ave	Hit Parked Vehicle		view obstructed	SB - straight			
95	1/23/2005	S/1227	0	0	CO	clear	snowy	Hamilton Ave	Chambers St	Rear-end			NB - stopped in traffic			
96	1/25/2005	TU/1400	0	0	CO	clear	dry	Chambers St	Hamilton Ave	Rear-end		other	NB - straight			
97	1/28/2005	F/1453	0	2	CO	clear	dry	Hamilton Ave	Franklin St	Rear-end			EB - stopped in traffic			
98	2/21/2005	M/1630	0	2	CO	clear	wet	Chambers St	Hamilton Ave	Other		inattention	NB - U turn			
99	3/6/2005	S/1546	0	0	CO	clear	dry	Hamilton Ave	Chambers St	Angle		other	EB - straight			
100	3/21/2005	M/1316	0	0	CO	clear	dry	Hamilton Ave	Chambers St	SS			WB - stopped in traffic			
101	4/2/2005	SA/2042	0	0	CO	rain	wet	Hamilton Ave	Chambers St	Hit Parked Vehicle			WB - parked			
102	4/7/2005	TH/1240	0	0	CO	clear	dry	Hamilton Ave	Chambers St	SS		inattention	SB - starting from parking			
103	5/11/2005	W/0	0	1	CO	clear	dry	Chambers St	Hamilton Ave	Rear-end		inattention	NB - stopped in traffic			
104	5/15/2005	S/1725	0	0	CO	clear	dry	Hamilton Ave	Chambers St	SS						
105	6/4/2005	SA/843	0	0	CO	rain	wet	Hamilton Ave	Chambers St	Hit Parked Vehicle			parked			
106	7/1/2005	F/1944	0	0	CO	clear	dry	Hamilton Ave	Franklin St	Rear-end		other	EB - stopped in traffic			
107	7/5/2005	TU/114	0	1	CO	clear	dry	Hamilton Ave	Chambers St	Other			straight			
108	8/2/2005	TU/826	0	0	CO	clear	dry	Chambers St	Hamilton Ave	Rear-end		inattention	WB - stopped in traffic			
109	8/30/2005	TU/1145	0	0	CO	clear	dry	Hamilton Ave	Franklin St	Hit Parked Vehicle		inattention	NB - straight			
110	9/18/2005	S/1334	0	0	CO	clear	dry	Chambers St	Hamilton Ave	Angle			SB - straight			
111	10/8/2005	SA/1102	0	2	CO	rain	wet	Hamilton Ave	Franklin St	Rear-end			WB - straight			
112	10/27/2005	TH/1935	0	0	CO	clear	dry	Chambers St	Hamilton Ave	Angle			SB - straight			
113	11/3/2005	TH/1759	0	0	CO	clear	dry	Hamilton Ave	Chambers St	SS			NB - straight			
114	11/11/2005	F/2000	0	0	CO	clear	dry	Chambers St	Mifflin St	Hit Parked Vehicle			NB - parked			
115	12/19/2005	M/1631	0	0	CO	clear	dry	Hamilton Ave	Chambers St	Rear-end			WB - stopped in traffic			

Source: New Jersey Department of Transportation Crash Database

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	335	41	39	322	140	93	303	73	308	488	129
Satd. Flow (prot)	1593	1483	0	1593	1601	0	1593	1628	0	1593	1624	0
Flt Permitted	0.139			0.452			0.350			0.198		
Satd. Flow (perm)	233	1483	0	758	1601	0	587	1628	0	332	1624	0
Satd. Flow (RTOR)		8			26			14			21	
Lane Group Flow (vph)	71	409	0	42	502	0	101	408	0	335	670	0
Turn Type	pm+pt			Perm			Perm			pm+pt		
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8			2			6		
Total Split (s)	8.0	41.0	0.0	33.0	33.0	0.0	30.0	30.0	0.0	19.0	49.0	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0
Act Effct Green (s)	37.5	37.5		29.5	29.5		26.5	26.5		45.5	45.5	
Actuated g/C Ratio	0.42	0.42		0.33	0.33		0.29	0.29		0.51	0.51	
v/c Ratio	0.43	0.66		0.17	0.93		0.58	0.83		0.87	0.81	
Control Delay	24.4	26.8		23.8	53.6		43.0	45.4		41.1	27.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	24.4	26.8		23.8	53.6		43.0	45.4		41.1	27.3	
LOS	C	C		C	D		D	D		D	C	
Approach Delay		26.4			51.3			45.0			31.9	
Approach LOS		C			D			D			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 37.7	Intersection LOS: D
Intersection Capacity Utilization 110.3%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 3: Int

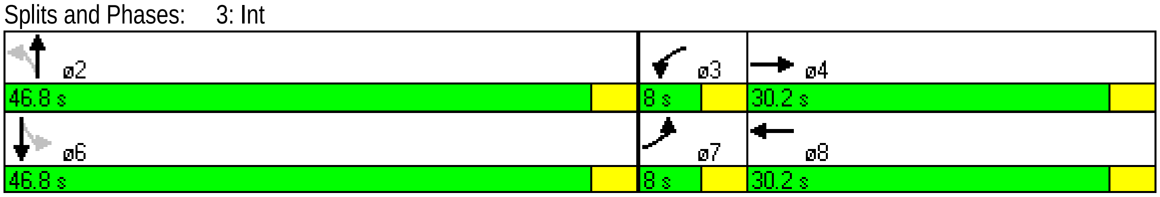


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	335	41	39	322	140	93	303	73	308	488	129
Satd. Flow (prot)	1593	1483	0	1593	1601	0	1593	1628	0	1593	1624	0
Flt Permitted	0.950			0.950			0.209			0.417		
Satd. Flow (perm)	1593	1483	0	1593	1601	0	350	1628	0	699	1624	0
Satd. Flow (RTOR)		8			27			21			23	
Lane Group Flow (vph)	71	409	0	42	502	0	101	408	0	335	670	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Total Split (s)	8.0	30.2	0.0	8.0	30.2	0.0	46.8	46.8	0.0	46.8	46.8	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0
Act Effct Green (s)	4.5	26.7		4.5	26.7		43.3	43.3		43.3	43.3	
Actuated g/C Ratio	0.05	0.31		0.05	0.31		0.51	0.51		0.51	0.51	
v/c Ratio	0.85	0.87		0.50	0.96		0.57	0.49		0.94	0.80	
Control Delay	106.0	47.9		60.5	60.7		30.0	15.3		58.1	25.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	106.0	47.9		60.5	60.7		30.0	15.3		58.1	25.6	
LOS	F	D		E	E		C	B		E	C	
Approach Delay		56.5			60.7			18.2			36.4	
Approach LOS		E			E			B			D	

Intersection Summary

Cycle Length: 85
Actuated Cycle Length: 85
Offset: 66.8 (79%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 41.8 — Intersection LOS: D
Intersection Capacity Utilization 98.6% — ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 3: Int

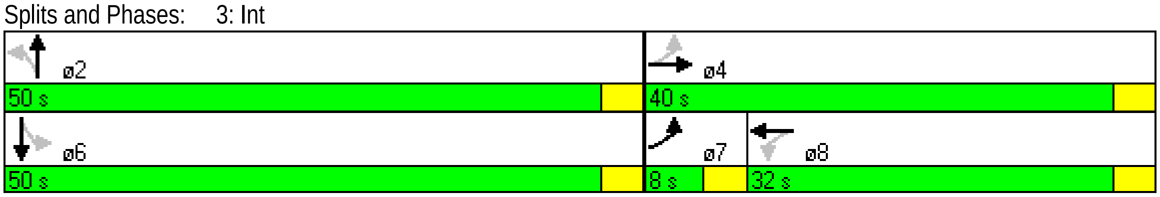


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	335	41	39	322	140	93	303	73	308	488	129
Satd. Flow (prot)	1593	1483	0	1593	1601	0	1593	1628	0	1593	1624	0
Flt Permitted	0.125			0.445			0.214			0.419		
Satd. Flow (perm)	210	1483	0	746	1601	0	359	1628	0	702	1624	0
Satd. Flow (RTOR)		8			25			20			22	
Lane Group Flow (vph)	71	409	0	42	502	0	101	408	0	335	670	0
Turn Type	pm+pt			Perm			Perm			Perm		
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	8.0	40.0	0.0	32.0	32.0	0.0	50.0	50.0	0.0	50.0	50.0	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0
Act Effct Green (s)	36.5	36.5		28.5	28.5		46.5	46.5		46.5	46.5	
Actuated g/C Ratio	0.41	0.41		0.32	0.32		0.52	0.52		0.52	0.52	
v/c Ratio	0.46	0.67		0.18	0.96		0.55	0.48		0.92	0.79	
Control Delay	26.8	28.2		24.8	60.7		28.3	15.6		54.6	25.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	26.8	28.2		24.8	60.7		28.3	15.6		54.6	25.5	
LOS	C	C		C	E		C	B		D	C	
Approach Delay		28.0			58.0			18.1			35.2	
Approach LOS		C			E			B			D	

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 35.3 Intersection LOS: D
Intersection Capacity Utilization 88.6% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 3: Int



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	335	41	39	322	140	93	303	73	308	488	129
Satd. Flow (prot)	1593	1483	0	1593	1601	0	1593	1628	0	1593	1624	0
Flt Permitted	0.150			0.255			0.950			0.950		
Satd. Flow (perm)	251	1483	0	428	1601	0	1593	1628	0	1593	1624	0
Satd. Flow (RTOR)		8			27			16			22	
Lane Group Flow (vph)	71	409	0	42	502	0	101	408	0	335	670	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Total Split (s)	30.2	30.2	0.0	30.2	30.2	0.0	9.0	32.8	0.0	22.0	45.8	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0
Act Effct Green (s)	26.7	26.7		26.7	26.7		5.5	29.3		18.5	42.3	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.06	0.34		0.22	0.50	
v/c Ratio	0.90	0.87		0.31	0.96		0.98	0.71		0.97	0.82	
Control Delay	111.4	47.9		30.0	60.7		127.6	31.5		75.8	27.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	111.4	47.9		30.0	60.7		127.6	31.5		75.8	27.7	
LOS	F	D		C	E		F	C		E	C	
Approach Delay		57.2			58.3			50.6			43.7	
Approach LOS		E			E			D			D	

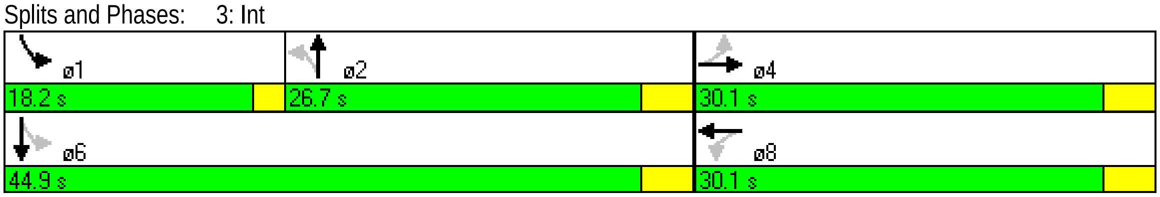
Intersection Summary	
Cycle Length: 85	
Actuated Cycle Length: 85	
Offset: 66.8 (79%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.98	
Intersection Signal Delay: 50.8	Intersection LOS: D
Intersection Capacity Utilization 106.8%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 3: Int

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	335	41	39	322	140	93	303	73	308	488	129
Satd. Flow (prot)	1593	1483	0	1593	1601	0	1593	1628	0	1593	1624	0
Flt Permitted	0.205			0.311			0.410			0.238		
Satd. Flow (perm)	344	1483	0	521	1601	0	687	1628	0	399	1624	0
Satd. Flow (RTOR)		9			32			17			28	
Lane Group Flow (vph)	71	409	0	42	502	0	101	408	0	335	670	0
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Total Split (s)	30.1	30.1	0.0	30.1	30.1	0.0	26.7	26.7	0.0	18.2	44.9	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	2.1	3.5	4.0
Act Effct Green (s)	26.6	26.6		26.6	26.6		23.2	23.2		42.8	41.4	
Actuated g/C Ratio	0.35	0.35		0.35	0.35		0.31	0.31		0.57	0.55	
v/c Ratio	0.58	0.77		0.23	0.85		0.47	0.79		0.69	0.74	
Control Delay	43.1	32.8		21.0	37.4		29.9	36.1		18.5	18.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	43.1	32.8		21.0	37.4		29.9	36.1		18.5	18.2	
LOS	D	C		C	D		C	D		B	B	
Approach Delay		34.3			36.1			34.9			18.3	
Approach LOS		C			D			C			B	

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 28.5	Intersection LOS: C
Intersection Capacity Utilization 116.2%	ICU Level of Service H
Analysis Period (min) 15	

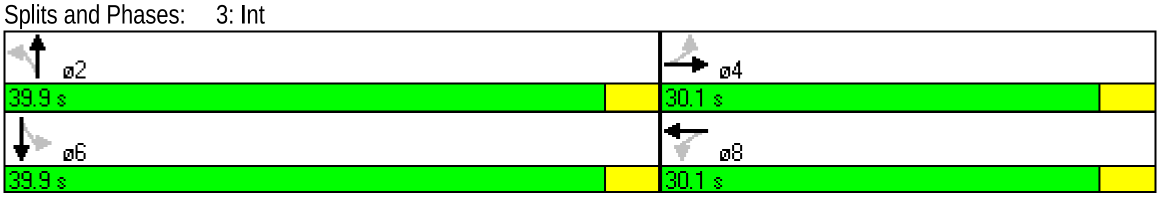
Splits and Phases: 3: Int



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	335	41	39	322	140	93	303	73	308	488	129
Satd. Flow (prot)	1593	1483	0	1593	1601	0	1593	1628	0	1593	1624	0
Flt Permitted	0.240			0.340			0.225			0.431		
Satd. Flow (perm)	402	1483	0	570	1601	0	377	1628	0	723	1624	0
Satd. Flow (RTOR)		10			36			26			28	
Lane Group Flow (vph)	71	409	0	42	502	0	101	408	0	335	670	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	30.1	30.1	0.0	30.1	30.1	0.0	39.9	39.9	0.0	39.9	39.9	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0
Act Effct Green (s)	26.6	26.6		26.6	26.6		36.4	36.4		36.4	36.4	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.52	0.52		0.52	0.52	
v/c Ratio	0.46	0.72		0.19	0.80		0.52	0.47		0.89	0.78	
Control Delay	28.5	26.8		17.5	29.5		22.7	12.2		44.8	21.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	28.5	26.8		17.5	29.5		22.7	12.2		44.8	21.2	
LOS	C	C		B	C		C	B		D	C	
Approach Delay		27.1			28.5			14.3			29.1	
Approach LOS		C			C			B			C	

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 25.6	Intersection LOS: C
Intersection Capacity Utilization 116.2%	ICU Level of Service H
Analysis Period (min) 15	

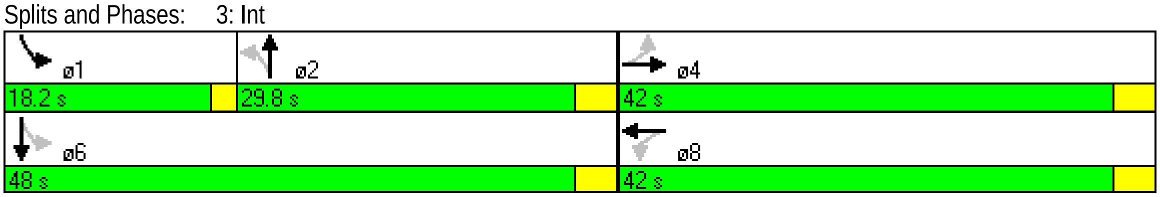
Splits and Phases: 3: Int



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	335	41	39	322	140	93	303	73	308	488	129
Satd. Flow (prot)	0	1479	0	0	1606	0	1593	1628	0	1593	1624	0
Flt Permitted		0.834			0.945		0.328			0.205		
Satd. Flow (perm)	0	1242	0	0	1524	0	550	1628	0	344	1624	0
Satd. Flow (RTOR)		7			27			14			21	
Lane Group Flow (vph)	0	480	0	0	544	0	101	408	0	335	670	0
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Total Split (s)	42.0	42.0	0.0	42.0	42.0	0.0	29.8	29.8	0.0	18.2	48.0	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	2.1	3.5	4.0
Act Effct Green (s)		38.5			38.5		26.3	26.3		45.9	44.5	
Actuated g/C Ratio		0.43			0.43		0.29	0.29		0.51	0.49	
v/c Ratio		0.90			0.82		0.63	0.84		0.84	0.82	
Control Delay		45.9			33.3		47.5	46.1		36.4	29.2	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		45.9			33.3		47.5	46.1		36.4	29.2	
LOS		D			C		D	D		D	C	
Approach Delay		45.9			33.3			46.4			31.6	
Approach LOS		D			C			D			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 37.7	Intersection LOS: D
Intersection Capacity Utilization 105.3%	ICU Level of Service G
Analysis Period (min) 15	

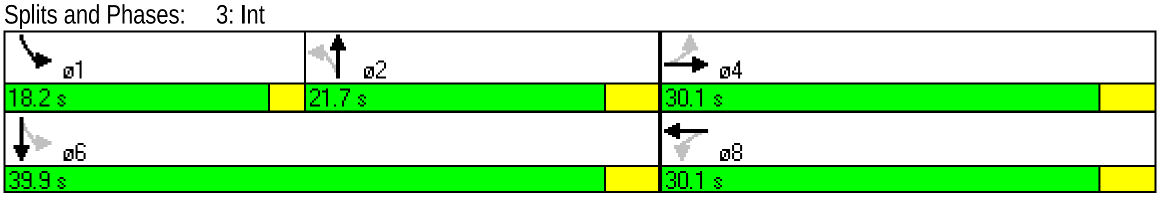
Splits and Phases: 3: Int



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	335	41	39	322	140	93	303	73	308	488	129
Satd. Flow (prot)	0	1479	0	0	1606	0	1593	1628	0	1593	1624	0
Flt Permitted		0.826			0.946		0.410			0.197		
Satd. Flow (perm)	0	1230	0	0	1526	0	687	1628	0	330	1624	0
Satd. Flow (RTOR)		9			32			17			28	
Lane Group Flow (vph)	0	480	0	0	544	0	101	408	0	335	670	0
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Total Split (s)	30.1	30.1	0.0	30.1	30.1	0.0	21.7	21.7	0.0	18.2	39.9	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	2.1	3.5	4.0
Act Effct Green (s)		26.6			26.6		18.2	18.2		37.8	36.4	
Actuated g/C Ratio		0.38			0.38		0.26	0.26		0.54	0.52	
v/c Ratio		1.01			0.91		0.56	0.94		0.71	0.78	
Control Delay		70.1			41.7		37.2	57.1		21.9	21.2	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		70.1			41.7		37.2	57.1		21.9	21.2	
LOS		E			D		D	E		C	C	
Approach Delay		70.1			41.7			53.2			21.5	
Approach LOS		E			D			D			C	

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 41.3	Intersection LOS: D
Intersection Capacity Utilization 105.3%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 3: Int

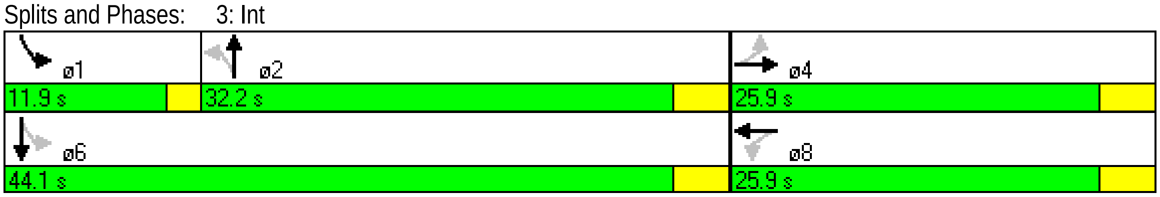


Lane Group	EBL		EBR	WBL		WBR			NBR			SBR
Lane Configurations												
Volume (vph)	140		31	49		308			61			88
Satd. Flow (prot)	0		0	0		0			0			0
Flt Permitted												
Satd. Flow (perm)	0		0	0		0			0			0
Satd. Flow (RTOR)												
Lane Group Flow (vph)	0		0	0		0			0			0
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Total Split (s)	25.9	25.9	0.0	25.9	25.9	0.0	32.2	32.2	0.0	11.9	44.1	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	2.1	3.5	4.0
Act Effct Green (s)		22.4			22.4		28.7	28.7		42.0	40.6	
Actuated g/C Ratio		0.32			0.32		0.41	0.41		0.60	0.58	
v/c Ratio		2.29			1.28		0.33	0.95		0.47	0.35	
Control Delay		617.9			161.4		17.2	46.6		12.2	7.7	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		617.9			161.4		17.2	46.6		12.2	7.7	
LOS		F			F		B	D		B	A	
Approach Delay		617.9			161.4			41.8			9.2	
Approach LOS		F			F			D			A	

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 2.29
Intersection Signal Delay: 168.0 | Intersection LOS: F
Intersection Capacity Utilization 136.1% | ICU Level of Service H
Analysis Period (min) 15

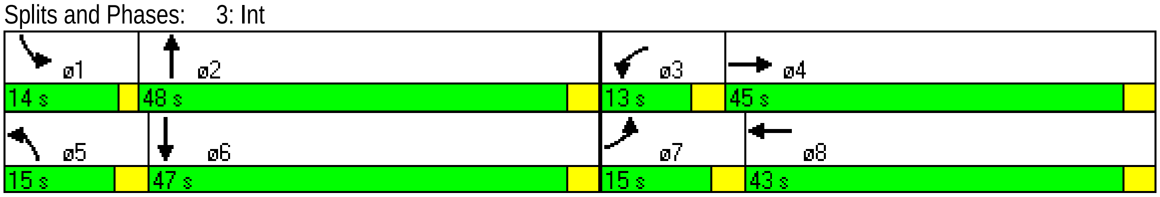
Splits and Phases: 3: Int



Lane Group	EBL		EBR	WBL		WBR			NBR			SBR
Lane Configurations												
Volume (vph)	125		28	44		274			54			78
Satd. Flow (prot)	1433		0	1593		0			0			0
Flt Permitted	0.950			0.950								
Satd. Flow (perm)	1433		0	1593		0			0			0
Satd. Flow (RTOR)												
Lane Group Flow (vph)	136		0	48		0			0			0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Total Split (s)	15.0	45.0	0.0	13.0	43.0	0.0	15.0	48.0	0.0	14.0	47.0	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	2.1	3.5	4.0
Act Effct Green (s)	11.5	41.5		9.5	39.5		11.5	44.5		11.9	43.5	
Actuated g/C Ratio	0.10	0.35		0.08	0.33		0.10	0.37		0.10	0.36	
v/c Ratio	0.99	0.37		0.38	1.01		0.73	0.94		0.89	0.50	
Control Delay	129.7	30.7		61.8	77.6		80.4	60.9		100.5	31.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	129.7	30.7		61.8	77.6		80.4	60.9		100.5	31.3	
LOS	F	C		E	E		F	E		F	C	
Approach Delay		69.0			76.4			64.1			53.5	
Approach LOS		E			E			E			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 66.6	Intersection LOS: E
Intersection Capacity Utilization 96.7%	ICU Level of Service F
Analysis Period (min) 15	

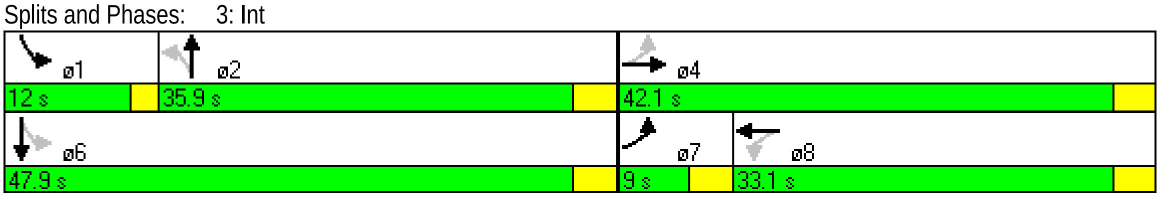
Splits and Phases: 3: Int



Lane Group	EBL		EBR	WBL		WBR			NBR			SBR
Lane Configurations												
Volume (vph)	125		28	44		274			54			78
Satd. Flow (prot)	1433		0	1593		0			0			0
Flt Permitted	0.121			0.624								
Satd. Flow (perm)	183		0	1046		0			0			0
Satd. Flow (RTOR)												
Lane Group Flow (vph)	136		0	48		0			0			0
Turn Type	pm+pt			Perm			Perm			pm+pt		
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8			2			6		
Total Split (s)	9.0	42.1	0.0	33.1	33.1	0.0	35.9	35.9	0.0	12.0	47.9	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	2.1	3.5	4.0
Act Effct Green (s)	38.6	38.6		29.6	29.6		32.4	32.4		45.8	44.4	
Actuated g/C Ratio	0.43	0.43		0.33	0.33		0.36	0.36		0.51	0.49	
v/c Ratio	0.88	0.30		0.14	1.00		0.32	0.96		0.53	0.37	
Control Delay	68.4	17.3		22.7	65.2		24.2	58.9		20.1	14.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	68.4	17.3		22.7	65.2		24.2	58.9		20.1	14.1	
LOS	E	B		C	E		C	E		C	B	
Approach Delay		37.1			62.1			53.2			16.0	
Approach LOS		D			E			D			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 45.7	Intersection LOS: D
Intersection Capacity Utilization 114.5%	ICU Level of Service H
Analysis Period (min) 15	

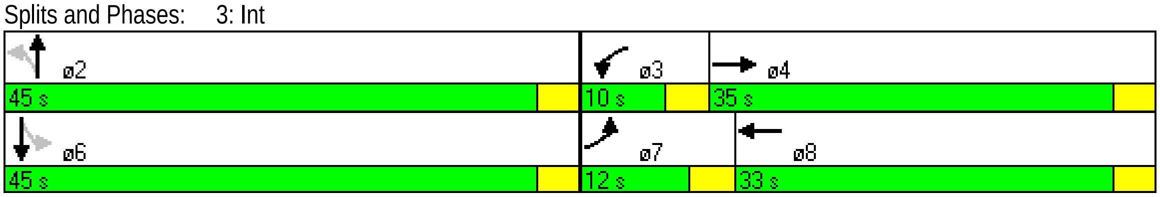
Splits and Phases: 3: Int



Lane Group	EBL		EBR	WBL		WBR			NBR			SBR
Lane Configurations												
Volume (vph)	125		28	44		274			54			78
Satd. Flow (prot)	1433		0	1593		0			0			0
Flt Permitted	0.950			0.950								
Satd. Flow (perm)	1433		0	1593		0			0			0
Satd. Flow (RTOR)												
Lane Group Flow (vph)	136		0	48		0			0			0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Total Split (s)	12.0	35.0	0.0	10.0	33.0	0.0	45.0	45.0	0.0	45.0	45.0	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0
Act Effct Green (s)	8.5	31.5		6.5	29.5		41.5	41.5		41.5	41.5	
Actuated g/C Ratio	0.09	0.35		0.07	0.33		0.46	0.46		0.46	0.46	
v/c Ratio	1.01	0.36		0.42	1.00		0.29	0.75		0.71	0.39	
Control Delay	123.4	22.9		51.4	66.1		17.9	27.6		42.7	16.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	123.4	22.9		51.4	66.1		17.9	27.6		42.7	16.1	
LOS	F	C		D	E		B	C		D	B	
Approach Delay		61.8			65.0			26.0			24.6	
Approach LOS		E			E			C			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 43.9	Intersection LOS: D
Intersection Capacity Utilization 121.0%	ICU Level of Service H
Analysis Period (min) 15	

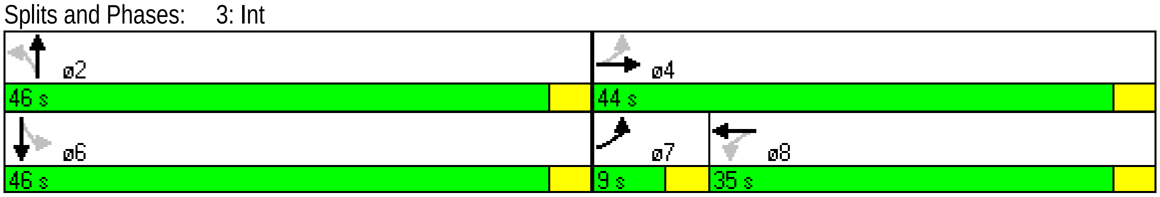
Splits and Phases: 3: Int



Lane Group	EBL		EBR	WBL		WBR			NBR			SBR
Lane Configurations												
Volume (vph)	125		28	44		274			54			78
Satd. Flow (prot)	1433		0	1593		0			0			0
Flt Permitted	0.114			0.624								
Satd. Flow (perm)	172		0	1046		0			0			0
Satd. Flow (RTOR)												
Lane Group Flow (vph)	136		0	48		0			0			0
Turn Type	pm+pt			Perm			Perm			Perm		
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	9.0	44.0	0.0	35.0	35.0	0.0	46.0	46.0	0.0	46.0	46.0	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0
Act Effct Green (s)	40.5	40.5		31.5	31.5		42.5	42.5		42.5	42.5	
Actuated g/C Ratio	0.45	0.45		0.35	0.35		0.47	0.47		0.47	0.47	
v/c Ratio	0.88	0.28		0.13	0.94		0.28	0.73		0.67	0.38	
Control Delay	68.5	15.9		21.2	50.8		17.1	26.0		37.1	15.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	68.5	15.9		21.2	50.8		17.1	26.0		37.1	15.4	
LOS	E	B		C	D		B	C		D	B	
Approach Delay		36.3			48.7			24.5			22.4	
Approach LOS		D			D			C			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 78 (87%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 33.6	Intersection LOS: C
Intersection Capacity Utilization 121.0%	ICU Level of Service H
Analysis Period (min) 15	

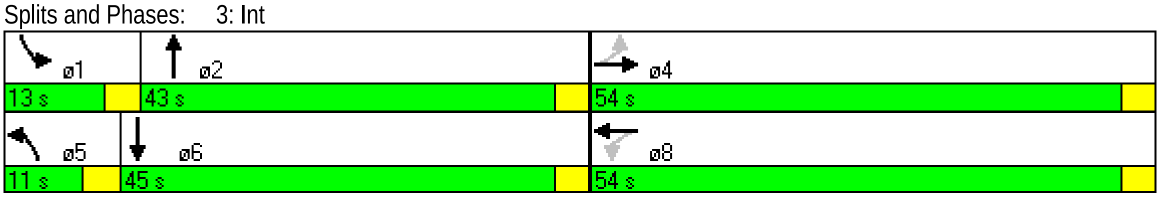
Splits and Phases: 3: Int



Lane Group	EBL		EBR	WBL		WBR			NBR			SBR
Lane Configurations												
Volume (vph)	125		28	44		274			54			78
Satd. Flow (prot)	1433		0	1593		0			0			0
Flt Permitted	0.197			0.567								
Satd. Flow (perm)	297		0	951		0			0			0
Satd. Flow (RTOR)												
Lane Group Flow (vph)	136		0	48		0			0			0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Total Split (s)	54.0	54.0	0.0	54.0	54.0	0.0	11.0	43.0	0.0	13.0	45.0	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0
Act Effct Green (s)	50.5	50.5		50.5	50.5		7.5	39.5		9.5	41.5	
Actuated g/C Ratio	0.46	0.46		0.46	0.46		0.07	0.36		0.09	0.38	
v/c Ratio	1.00	0.28		0.11	0.73		1.03	0.97		1.01	0.48	
Control Delay	110.7	18.7		17.9	28.2		147.1	65.1		131.4	27.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	110.7	18.7		17.9	28.2		147.1	65.1		131.4	27.3	
LOS	F	B		B	C		F	E		F	C	
Approach Delay		54.4			27.4			78.4			60.6	
Approach LOS		D			C			E			E	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.03	
Intersection Signal Delay: 54.8	Intersection LOS: D
Intersection Capacity Utilization 107.7%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 3: Int

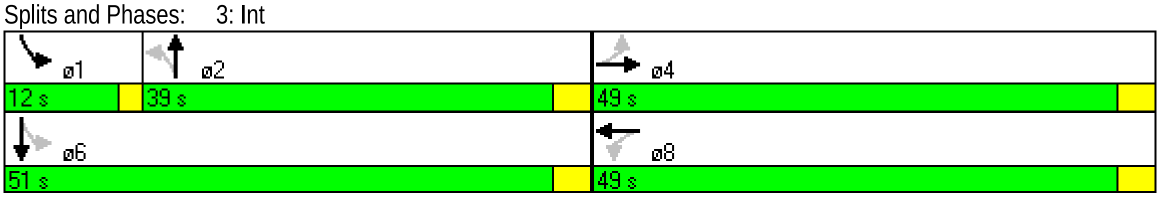


Lane Group	EBL		EBR	WBL		WBR			NBR			SBR
Lane Configurations												
Volume (vph)	125		28	44		274			54			78
Satd. Flow (prot)	1433		0	1593		0			0			0
Flt Permitted	0.196			0.570								
Satd. Flow (perm)	296		0	956		0			0			0
Satd. Flow (RTOR)												
Lane Group Flow (vph)	136		0	48		0			0			0
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Total Split (s)	49.0	49.0	0.0	49.0	49.0	0.0	39.0	39.0	0.0	12.0	51.0	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	2.1	3.5	4.0
Act Effct Green (s)	45.5	45.5		45.5	45.5		35.5	35.5		48.9	47.5	
Actuated g/C Ratio	0.46	0.46		0.46	0.46		0.36	0.36		0.49	0.48	
v/c Ratio	1.01	0.28		0.11	0.74		0.32	0.98		0.59	0.38	
Control Delay	111.4	17.3		16.6	26.4		27.0	65.0		26.0	17.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	111.4	17.3		16.6	26.4		27.0	65.0		26.0	17.0	
LOS	F	B		B	C		C	E		C	B	
Approach Delay		53.8			25.7			58.8			19.9	
Approach LOS		D			C			E			B	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 39.5 — Intersection LOS: D
Intersection Capacity Utilization 125.5% — ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 3: Int

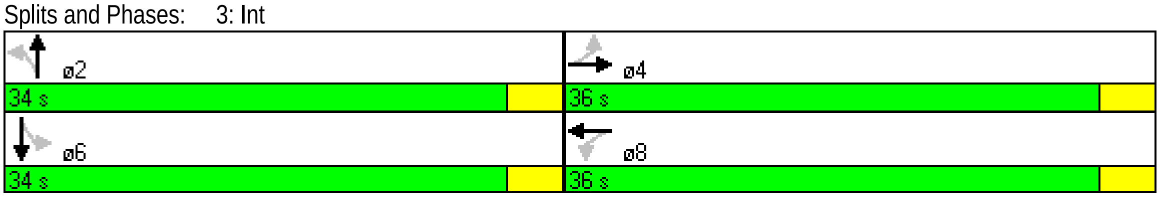


Lane Group	EBL		EBR	WBL		WBR			NBR			SBR
Lane Configurations												
Volume (vph)	125		28	44		274			54			78
Satd. Flow (prot)	1433		0	1593		0			0			0
Flt Permitted	0.219			0.593								
Satd. Flow (perm)	330		0	994		0			0			0
Satd. Flow (RTOR)												
Lane Group Flow (vph)	136		0	48		0			0			0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	36.0	36.0	0.0	36.0	36.0	0.0	34.0	34.0	0.0	34.0	34.0	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0
Act Effct Green (s)	32.5	32.5		32.5	32.5		30.5	30.5		30.5	30.5	
Actuated g/C Ratio	0.46	0.46		0.46	0.46		0.44	0.44		0.44	0.44	
v/c Ratio	0.89	0.27		0.10	0.71		0.31	0.79		0.79	0.41	
Control Delay	72.5	11.8		11.4	18.2		16.0	27.3		52.1	13.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	72.5	11.8		11.4	18.2		16.0	27.3		52.1	13.9	
LOS	E	B		B	B		B	C		D	B	
Approach Delay		35.3			17.7			25.5			26.1	
Approach LOS		D			B			C			C	

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 24.8 Intersection LOS: C
Intersection Capacity Utilization 122.1% ICU Level of Service H
Analysis Period (min) 15

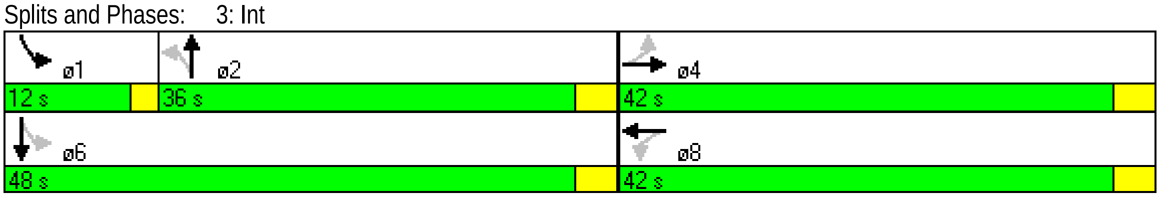
Splits and Phases: 3: Int



Lane Group	EBL		EBR	WBL		WBR			NBR			SBR
Lane Configurations												
Volume (vph)	125		28	44		274			54			78
Satd. Flow (prot)	0		0	0		0			0			0
Flt Permitted												
Satd. Flow (perm)	0		0	0		0			0			0
Satd. Flow (RTOR)												
Lane Group Flow (vph)	0		0	0		0			0			0
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Total Split (s)	42.0	42.0	0.0	42.0	42.0	0.0	36.0	36.0	0.0	12.0	48.0	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	2.1	3.5	4.0
Act Effct Green (s)		38.5			38.5		32.5	32.5		45.9	44.5	
Actuated g/C Ratio		0.43			0.43		0.36	0.36		0.51	0.49	
v/c Ratio		0.96			0.87		0.32	0.96		0.53	0.37	
Control Delay		65.8			36.1		24.1	58.4		19.8	14.0	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		65.8			36.1		24.1	58.4		19.8	14.0	
LOS		E			D		C	E		B	B	
Approach Delay		65.8			36.1			52.8			15.9	
Approach LOS		E			D			D			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 42.1	Intersection LOS: D
Intersection Capacity Utilization 128.6%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 3: Int

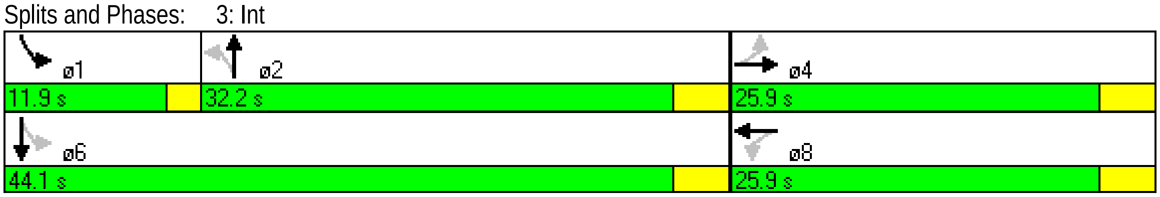


Lane Group	EBL		EBR	WBL		WBR			NBR			SBR
Lane Configurations												
Volume (vph)	125		28	44		274			54			78
Satd. Flow (prot)	0		0	0		0			0			0
Flt Permitted												
Satd. Flow (perm)	0		0	0		0			0			0
Satd. Flow (RTOR)												
Lane Group Flow (vph)	0		0	0		0			0			0
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Total Split (s)	25.9	25.9	0.0	25.9	25.9	0.0	32.2	32.2	0.0	11.9	44.1	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	2.1	3.5	4.0
Act Effct Green (s)		22.4			22.4		28.7	28.7		42.0	40.6	
Actuated g/C Ratio		0.32			0.32		0.41	0.41		0.60	0.58	
v/c Ratio		1.69			1.13		0.28	0.84		0.37	0.31	
Control Delay		352.2			102.3		16.3	32.7		9.1	7.2	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		352.2			102.3		16.3	32.7		9.1	7.2	
LOS		F			F		B	C		A	A	
Approach Delay		352.2			102.3			30.1			7.8	
Approach LOS		F			F			C			A	

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 1.69
Intersection Signal Delay: 101.5 Intersection LOS: F
Intersection Capacity Utilization 128.6% ICU Level of Service H
Analysis Period (min) 15

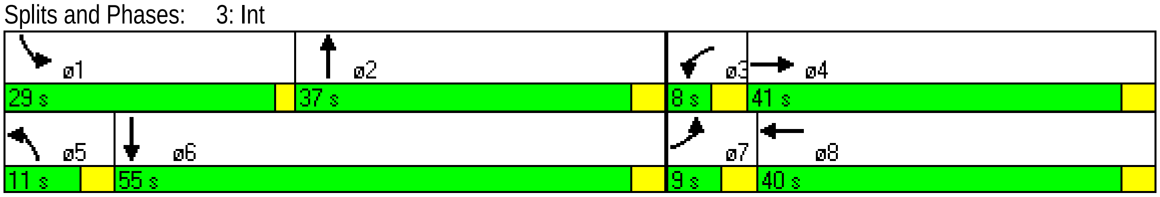
Splits and Phases: 3: Int



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	73	376	46	44	362	157	104	340	82	346	548	145
Satd. Flow (prot)	1593	1485	0	1593	1601	0	1593	1628	0	1593	1624	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1593	1485	0	1593	1601	0	1593	1628	0	1593	1624	0
Satd. Flow (RTOR)		6			20			11			15	
Lane Group Flow (vph)	79	459	0	48	564	0	113	459	0	376	754	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Total Split (s)	9.0	41.0	0.0	8.0	40.0	0.0	11.0	37.0	0.0	29.0	55.0	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	2.1	3.5	4.0
Act Effct Green (s)	5.5	37.5		4.5	36.5		7.5	33.5		26.9	51.5	
Actuated g/C Ratio	0.05	0.33		0.04	0.32		0.07	0.29		0.23	0.45	
v/c Ratio	1.04	0.94		0.77	1.08		1.09	0.95		1.01	1.02	
Control Delay	168.2	66.5		117.7	99.7		164.1	70.5		93.2	71.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	168.2	66.5		117.7	99.7		164.1	70.5		93.2	71.2	
LOS	F	E		F	F		F	E		F	E	
Approach Delay		81.4			101.1			89.0			78.5	
Approach LOS		F			F			F			E	

Intersection Summary	
Cycle Length: 115	
Actuated Cycle Length: 115	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.09	
Intersection Signal Delay: 86.0	Intersection LOS: F
Intersection Capacity Utilization 97.9%	ICU Level of Service F
Analysis Period (min) 15	

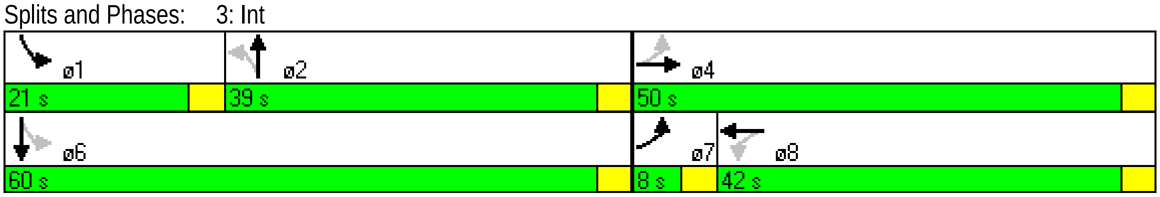
Splits and Phases: 3: Int



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	73	376	46	44	362	157	104	340	82	346	548	145
Satd. Flow (prot)	1593	1485	0	1593	1601	0	1593	1628	0	1593	1624	0
Flt Permitted	0.101			0.366			0.229			0.173		
Satd. Flow (perm)	169	1485	0	614	1601	0	384	1628	0	290	1624	0
Satd. Flow (RTOR)		7			22			12			18	
Lane Group Flow (vph)	79	459	0	48	564	0	113	459	0	376	754	0
Turn Type	pm+pt			Perm			Perm			pm+pt		
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8			2			6		
Total Split (s)	8.0	50.0	0.0	42.0	42.0	0.0	39.0	39.0	0.0	21.0	60.0	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0
Act Effct Green (s)	46.5	46.5		38.5	38.5		35.5	35.5		56.5	56.5	
Actuated g/C Ratio	0.42	0.42		0.35	0.35		0.32	0.32		0.51	0.51	
v/c Ratio	0.61	0.73		0.22	0.98		0.91	0.86		1.06	0.89	
Control Delay	41.1	34.1		28.8	68.2		98.9	51.4		88.1	38.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	41.1	34.1		28.8	68.2		98.9	51.4		88.1	38.6	
LOS	D	C		C	E		F	D		F	D	
Approach Delay		35.1			65.1			60.8			55.1	
Approach LOS		D			E			E			E	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.06	
Intersection Signal Delay: 54.6	Intersection LOS: D
Intersection Capacity Utilization 117.6%	ICU Level of Service H
Analysis Period (min) 15	

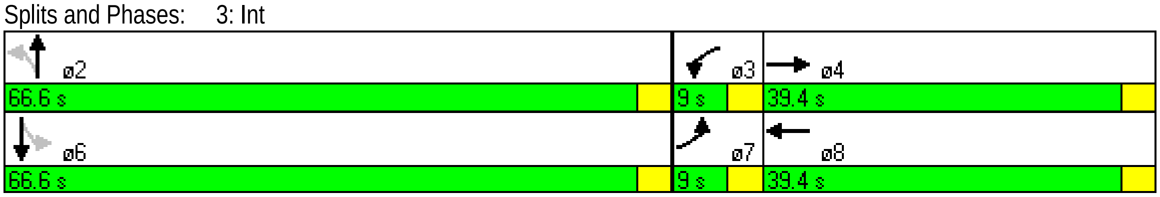
Splits and Phases: 3: Int



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	73	376	46	44	362	157	104	340	82	346	548	145
Satd. Flow (prot)	1593	1485	0	1593	1601	0	1593	1628	0	1593	1624	0
Flt Permitted	0.950			0.950			0.175			0.386		
Satd. Flow (perm)	1593	1485	0	1593	1601	0	293	1628	0	647	1624	0
Satd. Flow (RTOR)		6			20			17			18	
Lane Group Flow (vph)	79	459	0	48	564	0	113	459	0	376	754	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Total Split (s)	9.0	39.4	0.0	9.0	39.4	0.0	66.6	66.6	0.0	66.6	66.6	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0
Act Effct Green (s)	5.5	35.9		5.5	35.9		63.1	63.1		63.1	63.1	
Actuated g/C Ratio	0.05	0.31		0.05	0.31		0.55	0.55		0.55	0.55	
v/c Ratio	1.04	0.98		0.63	1.10		0.70	0.51		1.06	0.84	
Control Delay	168.2	76.7		88.5	105.6		45.8	18.0		91.8	31.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	168.2	76.7		88.5	105.6		45.8	18.0		91.8	31.5	
LOS	F	E		F	F		D	B		F	C	
Approach Delay		90.1			104.3			23.5			51.5	
Approach LOS		F			F			C			D	

Intersection Summary	
Cycle Length: 115	
Actuated Cycle Length: 115	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.10	
Intersection Signal Delay: 64.5	Intersection LOS: E
Intersection Capacity Utilization 106.6%	ICU Level of Service G
Analysis Period (min) 15	

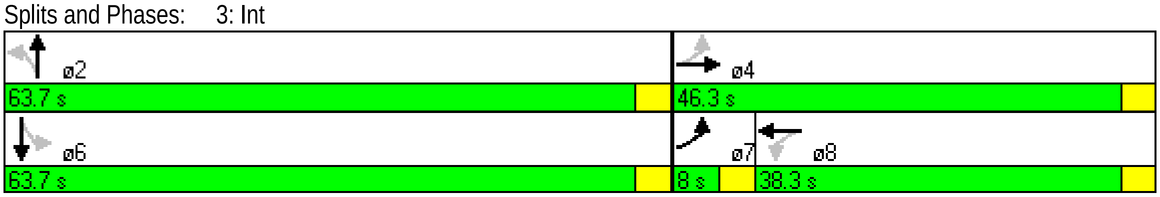
Splits and Phases: 3: Int



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	73	376	46	44	362	157	104	340	82	346	548	145
Satd. Flow (prot)	1593	1485	0	1593	1601	0	1593	1628	0	1593	1624	0
Flt Permitted	0.104			0.334			0.175			0.386		
Satd. Flow (perm)	174	1485	0	560	1601	0	293	1628	0	647	1624	0
Satd. Flow (RTOR)		7			21			17			19	
Lane Group Flow (vph)	79	459	0	48	564	0	113	459	0	376	754	0
Turn Type	pm+pt			Perm			Perm			Perm		
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	8.0	46.3	0.0	38.3	38.3	0.0	63.7	63.7	0.0	63.7	63.7	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0
Act Effct Green (s)	42.8	42.8		34.8	34.8		60.2	60.2		60.2	60.2	
Actuated g/C Ratio	0.39	0.39		0.32	0.32		0.55	0.55		0.55	0.55	
v/c Ratio	0.63	0.79		0.27	1.08		0.71	0.51		1.06	0.84	
Control Delay	45.7	40.6		33.3	99.1		45.8	17.5		92.0	30.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	45.7	40.6		33.3	99.1		45.8	17.5		92.0	30.8	
LOS	D	D		C	F		D	B		F	C	
Approach Delay		41.4			94.0			23.1			51.2	
Approach LOS		D			F			C			D	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.08	
Intersection Signal Delay: 52.9	Intersection LOS: D
Intersection Capacity Utilization 117.6%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 3: Int

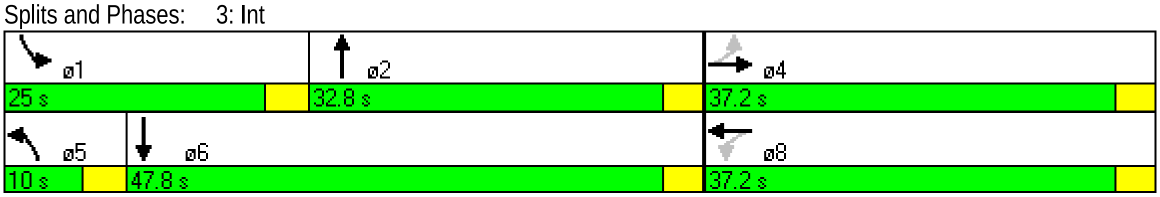


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	73	376	46	44	362	157	104	340	82	346	548	145
Satd. Flow (prot)	1593	1485	0	1593	1601	0	1593	1628	0	1593	1624	0
Flt Permitted	0.124			0.240			0.950			0.950		
Satd. Flow (perm)	208	1485	0	402	1601	0	1593	1628	0	1593	1624	0
Satd. Flow (RTOR)		7			26			13			19	
Lane Group Flow (vph)	79	459	0	48	564	0	113	459	0	376	754	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Total Split (s)	37.2	37.2	0.0	37.2	37.2	0.0	10.0	32.8	0.0	25.0	47.8	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0
Act Effct Green (s)	33.7	33.7		33.7	33.7		6.5	29.3		21.5	44.3	
Actuated g/C Ratio	0.35	0.35		0.35	0.35		0.07	0.31		0.23	0.47	
v/c Ratio	1.07	0.86		0.34	0.96		1.04	0.90		1.04	0.98	
Control Delay	160.3	46.5		30.7	59.7		142.4	53.3		96.3	54.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	160.3	46.5		30.7	59.7		142.4	53.3		96.3	54.6	
LOS	F	D		C	E		F	D		F	D	
Approach Delay		63.2			57.4			70.9			68.5	
Approach LOS		E			E			E			E	

Intersection Summary

Cycle Length: 95
Actuated Cycle Length: 95
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 1.07
Intersection Signal Delay: 65.6 Intersection LOS: E
Intersection Capacity Utilization 115.5% ICU Level of Service H
Analysis Period (min) 15

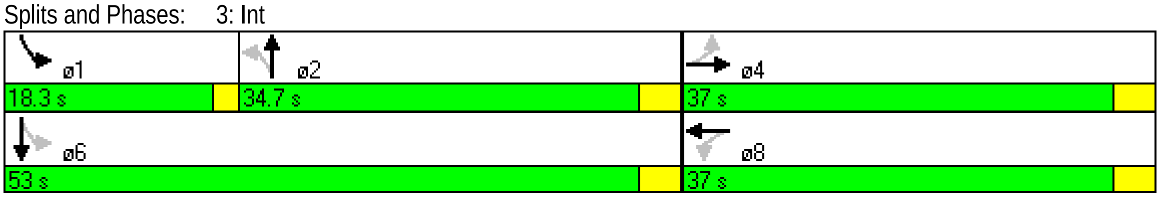
Splits and Phases: 3: Int



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	73	376	46	44	362	157	104	340	82	346	548	145
Satd. Flow (prot)	1593	1485	0	1593	1601	0	1593	1628	0	1593	1624	0
Flt Permitted	0.152			0.263			0.289			0.218		
Satd. Flow (perm)	255	1485	0	441	1601	0	485	1628	0	365	1624	0
Satd. Flow (RTOR)		8			28			15			24	
Lane Group Flow (vph)	79	459	0	48	564	0	113	459	0	376	754	0
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Total Split (s)	37.0	37.0	0.0	37.0	37.0	0.0	34.7	34.7	0.0	18.3	53.0	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	2.1	3.5	4.0
Act Effct Green (s)	33.5	33.5		33.5	33.5		31.2	31.2		50.9	49.5	
Actuated g/C Ratio	0.37	0.37		0.37	0.37		0.35	0.35		0.57	0.55	
v/c Ratio	0.83	0.82		0.29	0.92		0.67	0.80		0.88	0.83	
Control Delay	86.8	39.4		26.0	48.3		47.8	38.1		38.2	26.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	86.8	39.4		26.0	48.3		47.8	38.1		38.2	26.5	
LOS	F	D		C	D		D	D		D	C	
Approach Delay		46.4			46.6			40.0			30.4	
Approach LOS		D			D			D			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 38.8	Intersection LOS: D
Intersection Capacity Utilization 124.3%	ICU Level of Service H
Analysis Period (min) 15	

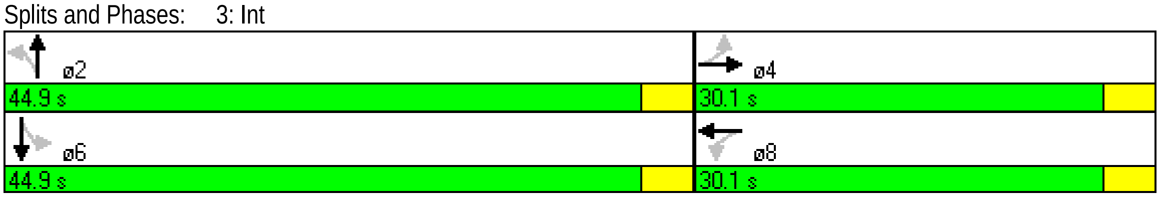
Splits and Phases: 3: Int



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	73	376	46	44	362	157	104	340	82	346	548	145
Satd. Flow (prot)	1593	1485	0	1593	1601	0	1593	1628	0	1593	1624	0
Flt Permitted	0.150			0.254			0.189			0.402		
Satd. Flow (perm)	251	1485	0	426	1601	0	317	1628	0	674	1624	0
Satd. Flow (RTOR)		9			32			26			28	
Lane Group Flow (vph)	79	459	0	48	564	0	113	459	0	376	754	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	30.1	30.1	0.0	30.1	30.1	0.0	44.9	44.9	0.0	44.9	44.9	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0
Act Effct Green (s)	26.6	26.6		26.6	26.6		41.4	41.4		41.4	41.4	
Actuated g/C Ratio	0.35	0.35		0.35	0.35		0.55	0.55		0.55	0.55	
v/c Ratio	0.89	0.86		0.32	0.96		0.65	0.50		1.01	0.83	
Control Delay	99.6	40.9		24.8	53.3		33.3	12.2		70.7	23.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	99.6	40.9		24.8	53.3		33.3	12.2		70.7	23.5	
LOS	F	D		C	D		C	B		E	C	
Approach Delay		49.5			51.0			16.3			39.2	
Approach LOS		D			D			B			D	

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 39.1	Intersection LOS: D
Intersection Capacity Utilization 124.3%	ICU Level of Service H
Analysis Period (min) 15	

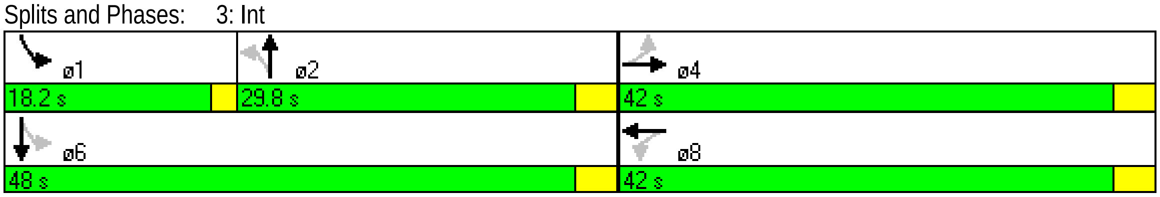
Splits and Phases: 3: Int



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	73	376	46	44	362	157	104	340	82	346	548	145
Satd. Flow (prot)	0	1479	0	0	1606	0	1593	1628	0	1593	1624	0
Flt Permitted		0.795			0.931		0.219			0.141		
Satd. Flow (perm)	0	1184	0	0	1501	0	367	1628	0	236	1624	0
Satd. Flow (RTOR)		7			27			14			21	
Lane Group Flow (vph)	0	538	0	0	612	0	113	459	0	376	754	0
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Total Split (s)	42.0	42.0	0.0	42.0	42.0	0.0	29.8	29.8	0.0	18.2	48.0	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	2.1	3.5	4.0
Act Effct Green (s)		38.5			38.5		26.3	26.3		45.9	44.5	
Actuated g/C Ratio		0.43			0.43		0.29	0.29		0.51	0.49	
v/c Ratio		1.05			0.93		1.06	0.94		1.04	0.93	
Control Delay		82.5			46.8		138.8	61.2		81.9	40.3	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		82.5			46.8		138.8	61.2		81.9	40.3	
LOS		F			D		F	E		F	D	
Approach Delay		82.5			46.8			76.5			54.2	
Approach LOS		F			D			E			D	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.06	
Intersection Signal Delay: 62.4	Intersection LOS: E
Intersection Capacity Utilization 115.1%	ICU Level of Service H
Analysis Period (min) 15	

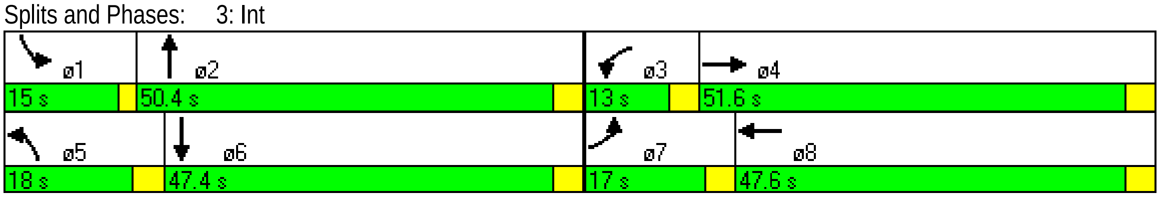
Splits and Phases: 3: Int



Lane Group	EBL		EBR	WBL		WBR			NBR			SBR
Lane Configurations												
Volume (vph)	140		31	49		308			61			78
Satd. Flow (prot)	1433		0	1593		0			0			0
Flt Permitted	0.950			0.950								
Satd. Flow (perm)	1433		0	1593		0			0			0
Satd. Flow (RTOR)												
Lane Group Flow (vph)	152		0	53		0			0			0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Total Split (s)	17.0	51.6	0.0	13.0	47.6	0.0	18.0	50.4	0.0	15.0	47.4	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	2.1	3.5	4.0
Act Effct Green (s)	13.5	48.1		9.5	44.1		14.5	46.9		12.9	43.9	
Actuated g/C Ratio	0.10	0.37		0.07	0.34		0.11	0.36		0.10	0.34	
v/c Ratio	1.02	0.39		0.46	1.11		0.70	1.08		1.00	0.58	
Control Delay	136.0	31.5		71.0	108.9		77.7	100.1		129.8	38.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	136.0	31.5		71.0	108.9		77.7	100.1		129.8	38.8	
LOS	F	C		E	F		E	F		F	D	
Approach Delay		71.8			106.2			96.5			68.7	
Approach LOS		E			F			F			E	

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.11	
Intersection Signal Delay: 89.8	Intersection LOS: F
Intersection Capacity Utilization 105.2%	ICU Level of Service G
Analysis Period (min) 15	

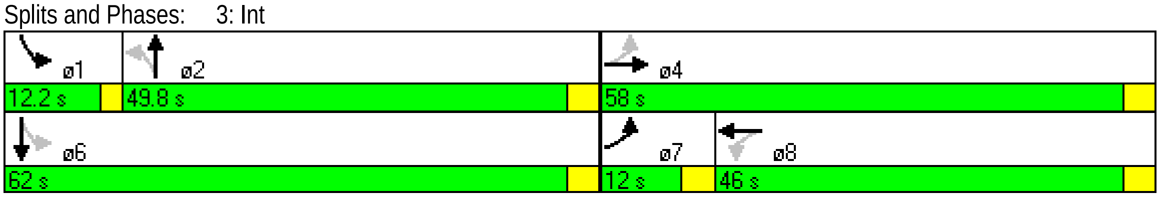
Splits and Phases: 3: Int



Lane Group	EBL		EBR	WBL		WBR			NBR			SBR
Lane Configurations												
Volume (vph)	140		31	49		308			61			88
Satd. Flow (prot)	1433		0	1593		0			0			0
Flt Permitted	0.087			0.608								
Satd. Flow (perm)	131		0	1019		0			0			0
Satd. Flow (RTOR)												
Lane Group Flow (vph)	152		0	53		0			0			0
Turn Type	pm+pt			Perm			Perm			pm+pt		
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8			2			6		
Total Split (s)	12.0	58.0	0.0	46.0	46.0	0.0	49.8	49.8	0.0	12.2	62.0	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	2.1	3.5	4.0
Act Effct Green (s)	54.5	54.5		42.5	42.5		46.3	46.3		59.9	58.5	
Actuated g/C Ratio	0.45	0.45		0.35	0.35		0.39	0.39		0.50	0.49	
v/c Ratio	1.00	0.32		0.15	1.06		0.35	1.01		0.79	0.42	
Control Delay	102.3	21.5		27.9	89.3		29.7	75.5		49.6	20.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	102.3	21.5		27.9	89.3		29.7	75.5		49.6	20.3	
LOS	F	C		C	F		C	E		D	C	
Approach Delay		52.7			84.9			68.1			29.7	
Approach LOS		D			F			E			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.06	
Intersection Signal Delay: 62.9	Intersection LOS: E
Intersection Capacity Utilization 119.9%	ICU Level of Service H
Analysis Period (min) 15	

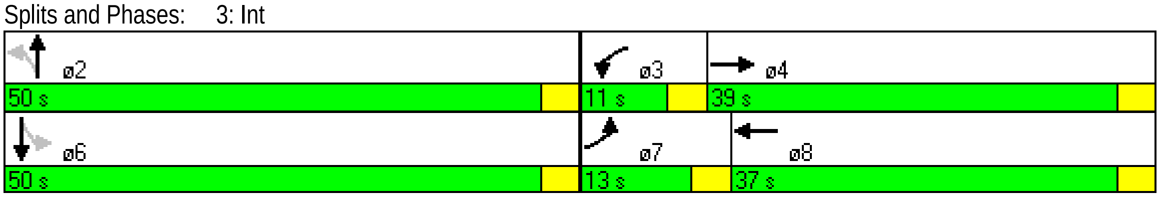
Splits and Phases: 3: Int



Lane Group	EBL		EBR	WBL		WBR			NBR			SBR
Lane Configurations												
Volume (vph)	140		31	49		308			61			78
Satd. Flow (prot)	1433		0	1593		0			0			0
Flt Permitted	0.950			0.950								
Satd. Flow (perm)	1433		0	1593		0			0			0
Satd. Flow (RTOR)												
Lane Group Flow (vph)	152		0	53		0			0			0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Total Split (s)	13.0	39.0	0.0	11.0	37.0	0.0	50.0	50.0	0.0	50.0	50.0	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0
Act Effct Green (s)	9.5	35.5		7.5	33.5		46.5	46.5		46.5	46.5	
Actuated g/C Ratio	0.10	0.36		0.08	0.34		0.46	0.46		0.46	0.46	
v/c Ratio	1.12	0.40		0.45	1.11		0.34	0.84		1.03	0.42	
Control Delay	155.6	25.8		56.6	101.0		20.6	35.2		110.3	18.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	155.6	25.8		56.6	101.0		20.6	35.2		110.3	18.5	
LOS	F	C		E	F		C	D		F	B	
Approach Delay		75.9			97.8			32.8			48.7	
Approach LOS		E			F			C			D	

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.12	
Intersection Signal Delay: 63.7	Intersection LOS: E
Intersection Capacity Utilization 130.1%	ICU Level of Service H
Analysis Period (min) 15	

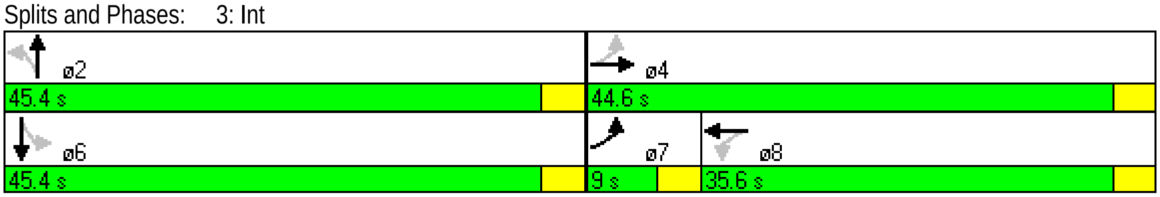
Splits and Phases: 3: Int



Lane Group	EBL		EBR	WBL		WBR			NBR			SBR
Lane Configurations												
Volume (vph)	140		31	49		308			61			88
Satd. Flow (prot)	1433		0	1593		0			0			0
Flt Permitted	0.112			0.608								
Satd. Flow (perm)	169		0	1019		0			0			0
Satd. Flow (RTOR)												
Lane Group Flow (vph)	152		0	53		0			0			0
Turn Type	pm+pt			Perm			Perm			Perm		
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	9.0	44.6	0.0	35.6	35.6	0.0	45.4	45.4	0.0	45.4	45.4	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0
Act Effct Green (s)	41.1	41.1		32.1	32.1		41.9	41.9		41.9	41.9	
Actuated g/C Ratio	0.46	0.46		0.36	0.36		0.47	0.47		0.47	0.47	
v/c Ratio	0.99	0.31		0.15	1.04		0.35	0.84		1.00	0.44	
Control Delay	92.4	16.1		21.1	74.4		19.0	32.9		100.9	16.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	92.4	16.1		21.1	74.4		19.0	32.9		100.9	16.8	
LOS	F	B		C	E		B	C		F	B	
Approach Delay		45.5			70.6			30.6			43.8	
Approach LOS		D			E			C			D	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 78 (87%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.04	
Intersection Signal Delay: 48.4	Intersection LOS: D
Intersection Capacity Utilization 130.1%	ICU Level of Service H
Analysis Period (min) 15	

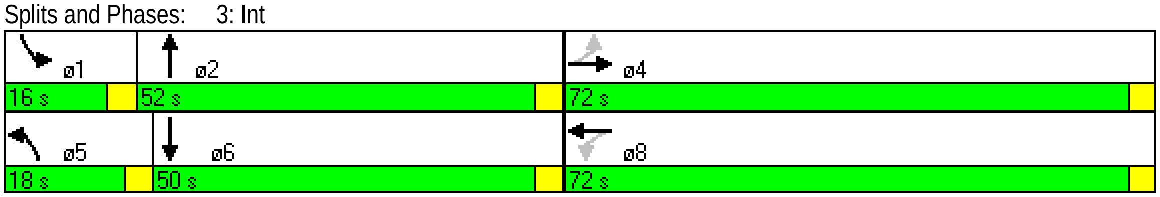
Splits and Phases: 3: Int



Lane Group	EBL		EBR	WBL		WBR			NBR			SBR
Lane Configurations												
Volume (vph)	140		31	49		308			61			78
Satd. Flow (prot)	1433		0	1593		0			0			0
Flt Permitted	0.160			0.541								
Satd. Flow (perm)	241		0	907		0			0			0
Satd. Flow (RTOR)												
Lane Group Flow (vph)	152		0	53		0			0			0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Total Split (s)	72.0	72.0	0.0	72.0	72.0	0.0	18.0	52.0	0.0	16.0	50.0	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0
Act Effct Green (s)	68.5	68.5		68.5	68.5		14.5	48.5		12.5	46.5	
Actuated g/C Ratio	0.49	0.49		0.49	0.49		0.10	0.35		0.09	0.33	
v/c Ratio	1.29	0.29		0.12	0.78		0.76	1.12		1.11	0.59	
Control Delay	211.4	21.8		20.4	35.0		89.2	118.8		165.2	42.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	211.4	21.8		20.4	35.0		89.2	118.8		165.2	42.5	
LOS	F	C		C	D		F	F		F	D	
Approach Delay		94.9			34.0			114.0			82.8	
Approach LOS		F			C			F			F	

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.29	
Intersection Signal Delay: 79.2	Intersection LOS: E
Intersection Capacity Utilization 115.3%	ICU Level of Service H
Analysis Period (min) 15	

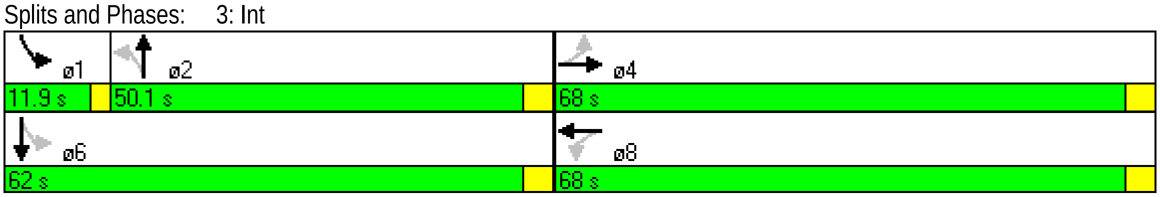
Splits and Phases: 3: Int



Lane Group	EBL		EBR	WBL		WBR			NBR			SBR
Lane Configurations												
Volume (vph)	140		31	49		308			61			88
Satd. Flow (prot)	1433		0	1593		0			0			0
Flt Permitted	0.168			0.545								
Satd. Flow (perm)	253		0	914		0			0			0
Satd. Flow (RTOR)												
Lane Group Flow (vph)	152		0	53		0			0			0
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Total Split (s)	68.0	68.0	0.0	68.0	68.0	0.0	50.1	50.1	0.0	11.9	62.0	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	2.1	3.5	4.0
Act Effct Green (s)	64.5	64.5		64.5	64.5		46.6	46.6		59.9	58.5	
Actuated g/C Ratio	0.50	0.50		0.50	0.50		0.36	0.36		0.46	0.45	
v/c Ratio	1.21	0.29		0.12	0.77		0.38	1.09		0.91	0.46	
Control Delay	178.0	19.7		18.5	31.7		35.4	102.8		78.8	25.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	178.0	19.7		18.5	31.7		35.4	102.8		78.8	25.6	
LOS	F	B		B	C		D	F		E	C	
Approach Delay		80.7			30.7			91.8			42.7	
Approach LOS		F			C			F			D	

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.21	
Intersection Signal Delay: 60.7	Intersection LOS: E
Intersection Capacity Utilization 129.9%	ICU Level of Service H
Analysis Period (min) 15	

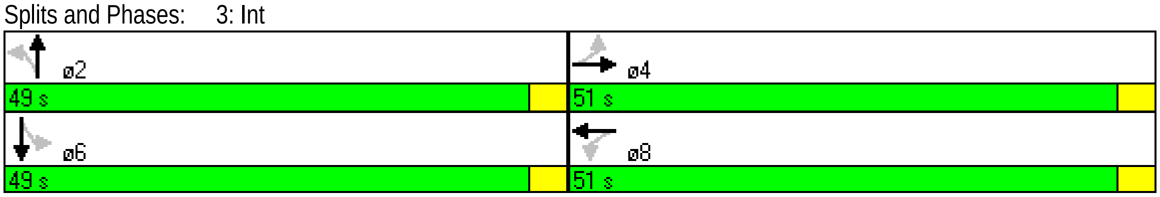
Splits and Phases: 3: Int



Lane Group	EBL		EBR	WBL		WBR			NBR			SBR
Lane Configurations												
Volume (vph)	140		31	49		308			61			88
Satd. Flow (prot)	1433		0	1593		0			0			0
Flt Permitted	0.153			0.549								
Satd. Flow (perm)	231		0	920		0			0			0
Satd. Flow (RTOR)												
Lane Group Flow (vph)	152		0	53		0			0			0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Total Split (s)	51.0	51.0	0.0	51.0	51.0	0.0	49.0	49.0	0.0	49.0	49.0	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0
Act Effct Green (s)	47.5	47.5		47.5	47.5		45.5	45.5		45.5	45.5	
Actuated g/C Ratio	0.48	0.48		0.48	0.48		0.46	0.46		0.46	0.46	
v/c Ratio	1.38	0.30		0.12	0.80		0.36	0.86		1.10	0.45	
Control Delay	245.4	16.6		15.7	28.3		21.9	37.6		136.5	19.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	245.4	16.6		15.7	28.3		21.9	37.6		136.5	19.4	
LOS	F	B		B	C		C	D		F	B	
Approach Delay		104.9			27.4			35.0			57.0	
Approach LOS		F			C			D			E	

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.38	
Intersection Signal Delay: 48.8	Intersection LOS: D
Intersection Capacity Utilization 140.2%	ICU Level of Service H
Analysis Period (min) 15	

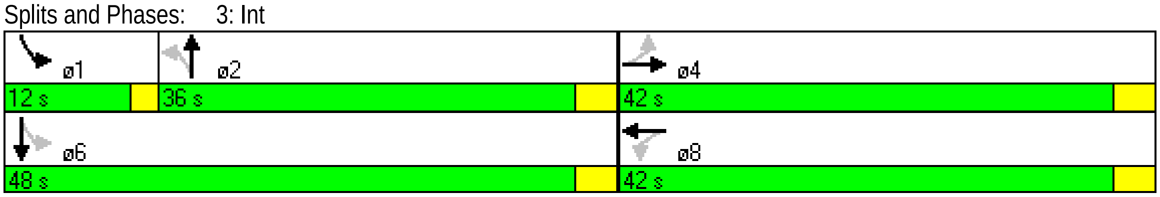
Splits and Phases: 3: Int



Lane Group	EBL		EBR	WBL		WBR			NBR			SBR
Lane Configurations												
Volume (vph)	140		31	49		308			61			88
Satd. Flow (prot)	0		0	0		0			0			0
Flt Permitted												
Satd. Flow (perm)	0		0	0		0			0			0
Satd. Flow (RTOR)												
Lane Group Flow (vph)	0		0	0		0			0			0
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Total Split (s)	42.0	42.0	0.0	42.0	42.0	0.0	36.0	36.0	0.0	12.0	48.0	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	2.1	3.5	4.0
Act Effct Green (s)		38.5			38.5		32.5	32.5		45.9	44.5	
Actuated g/C Ratio		0.43			0.43		0.36	0.36		0.51	0.49	
v/c Ratio		1.21			0.98		0.37	1.08		0.62	0.41	
Control Delay		147.3			54.0		25.4	89.6		26.1	14.9	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		147.3			54.0		25.4	89.6		26.1	14.9	
LOS		F			D		C	F		C	B	
Approach Delay		147.3			54.0			79.2			18.5	
Approach LOS		F			D			E			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.21	
Intersection Signal Delay: 70.0	Intersection LOS: E
Intersection Capacity Utilization 136.1%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 3: Int

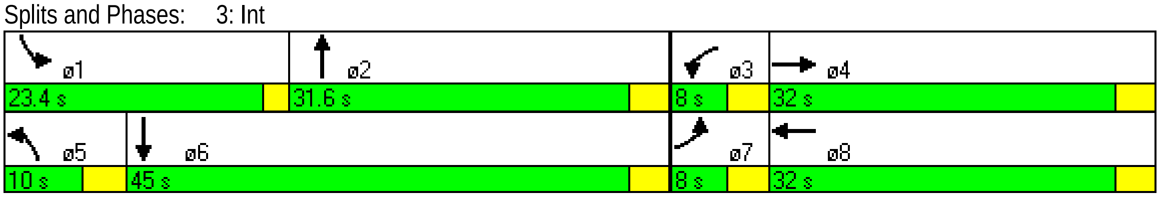


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	335	41	39	322	140	93	303	73	308	488	129
Satd. Flow (prot)	1593	1483	0	1593	1601	0	1593	1628	0	1593	1624	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1593	1483	0	1593	1601	0	1593	1628	0	1593	1624	0
Satd. Flow (RTOR)		7			24			13			18	
Lane Group Flow (vph)	71	409	0	42	502	0	101	408	0	335	670	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Total Split (s)	8.0	32.0	0.0	8.0	32.0	0.0	10.0	31.6	0.0	23.4	45.0	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	2.1	3.5	4.0
Act Effct Green (s)	4.5	28.5		4.5	28.5		6.5	28.1		21.3	41.5	
Actuated g/C Ratio	0.05	0.30		0.05	0.30		0.07	0.30		0.22	0.44	
v/c Ratio	0.95	0.91		0.56	1.01		0.93	0.83		0.94	0.93	
Control Delay	138.4	58.0		72.9	76.2		115.0	46.6		72.3	46.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	138.4	58.0		72.9	76.2		115.0	46.6		72.3	46.6	
LOS	F	E		E	E		F	D		E	D	
Approach Delay		69.9			75.9			60.1			55.2	
Approach LOS		E			E			E			E	

Intersection Summary

Cycle Length: 95
Actuated Cycle Length: 95
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 63.4 Intersection LOS: E
Intersection Capacity Utilization 88.6% ICU Level of Service E
Analysis Period (min) 15

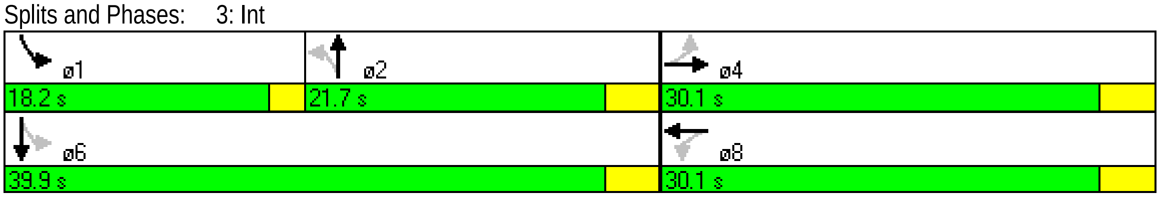
Splits and Phases: 3: Int



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	73	376	46	44	362	157	104	340	82	346	548	145
Satd. Flow (prot)	0	1479	0	0	1606	0	1593	1628	0	1593	1624	0
Flt Permitted		0.783			0.929		0.327			0.197		
Satd. Flow (perm)	0	1166	0	0	1498	0	548	1628	0	330	1624	0
Satd. Flow (RTOR)		8			32			17			28	
Lane Group Flow (vph)	0	538	0	0	612	0	113	459	0	376	754	0
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Total Split (s)	30.1	30.1	0.0	30.1	30.1	0.0	21.7	21.7	0.0	18.2	39.9	0.0
Total Lost Time (s)	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	2.1	3.5	4.0
Act Effct Green (s)		26.6			26.6		18.2	18.2		37.8	36.4	
Actuated g/C Ratio		0.38			0.38		0.26	0.26		0.54	0.52	
v/c Ratio		1.20			1.04		0.80	1.05		0.80	0.88	
Control Delay		134.4			71.4		65.3	85.7		28.4	28.6	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		134.4			71.4		65.3	85.7		28.4	28.6	
LOS		F			E		E	F		C	C	
Approach Delay		134.4			71.4			81.7			28.5	
Approach LOS		F			E			F			C	

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.20	
Intersection Signal Delay: 68.4	Intersection LOS: E
Intersection Capacity Utilization 115.1%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 3: Int



APPENDIX F

PHILADELPHIA

SYNCHRO ANALYSIS

Source: DVRPC, 2007

Cobbs Creek Parkway/Baltimore Avenue/58th Street Vicinity
PHILADELPHIA

Reportable and Non reportable crashes (2004-2006)

MAP ID	DATE	DAY/TIME	REPORTABLE CRASHES?	TOTAL KILLED	TOTAL INJURED	ROAD SYSTEM	WEATHER COND.	ROAD COND.	ROAD	CROSS ROAD	CRASH TYPE	AGE OF DRIVER 1	DRIVER 1 FACTOR	DRIVER 1 ACTION	AGE OF DRIVER 2	DRIVER 2 FACTOR	DRIVER 2 ACTION
1	1/5/2004	1530	No	0	0	Local			58th Street	Baltimore Ave.	SS				42		
2	1/16/2004	2000	Yes	0	0	Local	clear	dry	58th Street	Cobbs Creek Pkwy	Rear-end			East	37		East
3	1/17/2004	0520	No	0	0				58th Street	Baltimore Ave.	Rear-end			North	56		North
4	1/31/2004	0919	Yes	0	0		clear	ice	58th Street	Baltimore Ave.	SS	43	stole vehicle	North			North
5	2/7/2004	0930	No	0	0		clear	dry	Baltimore Ave.	58th Street	SS			East	13		North
6	2/7/2004	1540	No	0	0		clear	dry	Baltimore Ave.	58th Street	Rear-end			East	46		East
7	2/9/2004	1425	No	0	0		clear	dry	Baltimore Ave.	58th Street	SS	79			29		
8	2/13/2004	1700	No	0	0				Cobbs Creek Rd	58th Street	Rear-end				31		
9	2/21/2004	0009	No	0	0				Baltimore Ave.	56th Street	SS				43		
10	2/28/2004	1000	No	0	0				Baltimore Ave.	58th Street				Moving	53		Stopped
11	3/8/2004	1109	Unknown	0	1		clear	dry	58th Street	Baltimore Ave.	Pedestrian	31	SEPTA	Unknown	73		Pedestrian
12	3/23/2004	0800	Yes	0	0		clear	dry	Baltimore Ave.	58th Street	Rear-end	62		North	32		North
13	4/2/2004	1450	No	0	0				58th Street	Baltimore Ave.	Rear-end			West	37		West
14	4/6/2004	1815	No	0	0				58th Street	Baltimore Ave.	Rear-end				39		
15	4/7/2004	1750	No	0	0				58th Street	Baltimore Ave.	Rear-end	34		North	51		North
16	4/16/2004	2030	No	0	0				58th Street	Baltimore Ave.	SS			South	59		North
17	4/21/2004	1550	Yes	0	1		clear	dry	Baltimore Ave.	58th Street	Pedestrian		motorcycle		7		Pedestrian
18	4/29/2004	1237	No	0	0				Cobbs Creek Rd	Baltimore Ave.	Rear-end	33		South	27		South
19	5/7/2004	1000	No	0	0				Baltimore Ave.	58th Street	SS				45		
20	5/8/2004	1625	Unknown	0	0				58th Street	Baltimore Ave.	Rear-end			North	71		North
21	5/16/2004	1630	No	0	0				58th Street	Baltimore Ave.	SS				47		North
22	5/16/2004	1715	No	0	0				Baltimore Ave.	58th Street	Rear-end			East	65		East
23	6/7/2004	0710	No	0	0				Baltimore Ave.	58th Street	SS				25		
24	6/7/2004	1520	No	0	0				Baltimore Ave.	58th Street	SS			West	56		North
25	6/10/2004	2130	No	0	0		raining		Baltimore Ave.	58th Street	Front	57		West	43		East
26	6/11/2004	1340	Yes	0	0		raining	wet	Baltimore Ave.	58th Street	Rear-end			West	43		West
27	6/17/2004	0357	Unknown	0	0				58th Street	Baltimore Ave.	Parked				44		Parked
28	6/22/2004	1145	Yes	0	0				Baltimore Ave.	58th Street	Parked	75			41		Parked
29	8/2/2004		No	0	0				Baltimore Ave.	58th Street	SS	20		West	19		East
30	8/6/2004	2115	No	0	0				58th Street	Baltimore Ave.	Angle				49		South
31	8/13/2004	2014	No	0	0				58th Street	Baltimore Ave.	Bicyclist				26		South
32	8/18/2004	1520	No	0	2				58th Street	Baltimore Ave.	Head on	20	careless turning	West	45		North
33	8/22/2004		No	0	0				58th Street	Baltimore Ave.	Angle				34		North
34	8/29/2004	0205	No	0	0				58th Street	Baltimore Ave.	Angle			East	73		North
35	8/29/2004	0205	Yes	0	0				58th Street	Baltimore Ave.	Angle		did not stop at light	East	73		North
36	9/2/2004	2310	No	0	0				58th Street	Baltimore Ave.	SS		illegal u-turn		19		South
37	9/4/2004	1600	No	0	0				58th Street	Baltimore Ave.	Angle	47		North	30		South
38	9/17/2004	1500	No	0	0				58th Street	Baltimore Ave.	Parked				66		Parked
39	9/19/2004	1245	Unknown	0	2		clear	dry	58th Street	Baltimore Ave.	Angle	18	inexperienced	North	36	careless turning	South
40	9/27/2004	2000	No	0	0				58th Street	Baltimore Ave.	Angle				25		
41	10/24/2004	1700	No	0	0				58th Street	Baltimore Ave.	Parked				28		Parked
42	10/30/2004	2030	No	0	0				58th Street	Baltimore Ave.	Parking lot				27		East
43	10/31/2004	1445	No	0	0				58th Street	Baltimore Ave.	Angle				38		Stopped
44	11/4/2004	1530	Unknown	0	0				58th Street	Baltimore Ave.	Parked				51		Parked
45	11/13/2004	1100	No	0	0				58th Street	Baltimore Ave.	Rear-end				46		

Source: Philadelphia Streets Department Crash Reports

Cobbs Creek Parkway/Baltimore Avenue/58th Street Vicinity
PHILADELPHIA

Reportable and Non reportable crashes (2004-2006)

MAP ID	DATE	DAY/TIME	REPORTABLE CRASHES?	TOTAL KILLED	TOTAL INJURED	ROAD SYSTEM	WEATHER COND.	ROAD COND.	ROAD	CROSS ROAD	CRASH TYPE	AGE OF DRIVER 1	DRIVER 1 FACTOR	DRIVER 1 ACTION	AGE OF DRIVER 2	DRIVER 2 FACTOR	DRIVER 2 ACTION
46	11/24/2004	1200	Unknown	0	0				Baltimore Ave.	58th Street	Angle				22		East
47	12/14/2004	1430	No	0	0				Baltimore Ave.	58th Street	SS			South	22		South
48	12/17/2004	0830	No	0	0				Baltimore Ave.	58th Street	Rear-end			West			West
49	12/27/2004	1330	No	0	0				Baltimore Ave.	58th Street	Rear-end			West		trolley tracks	West
50	1/5/2005		Yes	0	1		glare	ice	58th Street	Midblock	Pedestrian	23		South	70		West
51	1/6/2005	1640	No	0	0				58th Street	Baltimore Ave.	Angle			South	44		West
52	1/7/2005	1430	Unknown	0	0				Baltimore Ave.	58th Street	SS		careless passing	West	51		West
53	1/20/2005	1057	No	0	0				Baltimore Ave.	58th Street	Rear-end	26		West	47		West
54	1/29/2005	1105	No	0	0				Baltimore Ave.	58th Street	SS	24			51		
55	2/26/2005	1715	No	0	0				58th Street	Baltimore Ave.	Angle	51		North	54		North
56	3/16/2005	1822	No	0	0				Baltimore Ave.	58th Street	SS	34		West	24		West
57	3/17/2005	1530	Yes	0	0				Baltimore Ave.	58th Street	Rear-end	35		East	29		East
58	3/27/2005	1900	No	0	0				Baltimore Ave.	58th Street	Front			East	54		West
59	4/3/2005	1530	No	0	0				Baltimore Ave.	58th Street	Angle	40		West	40		West
60	4/7/2005	1300	No	0	0				Baltimore Ave.	58th Street	Angle	27		West	49		West
61	4/10/2005	1815	No	0	0				Baltimore Ave.	58th Street	Rear-end			East	42		East
62	4/13/2005	1120	No	0	0				Baltimore Ave.	58th Street	Rear-end			East	23		East
63	4/19/2005	1000	No	0	0				Baltimore Ave.	58th Street	Rear-end			East	32		East
64	4/22/2005	1400	Unknown	0	1			wet	Baltimore Ave.	58th Street	Angle	34	careless turning	East	29		West
65	4/28/2005	1815	No	0	0				58th Street	Baltimore Ave.	SS	41		North	50		South
66	4/28/2005	1550	No	0	0				Baltimore Ave.	58th Street	Angle	33		East	35		North
67	5/2/2005	1530	No	0	0				58th Street	Baltimore Ave.							
68	5/18/2005	1245	No	0	0				58th Street	Baltimore Ave.	Rear-end	55		South	58		South
69	5/20/2005	0955	No	0	0				58th Street	Baltimore Ave.	Angle	48		North	21		East
70	6/8/2005	1050	Yes	0	0				Baltimore Ave.	58th Street	Rear-end	35		East	28		East
71	6/13/2005	1700	No	0	0				58th Street	Baltimore Ave.	Rear-end	35		North	51		North
72	6/14/2005	1430	No	0	0				Baltimore Ave.	58th Street	Rear-end			East	41		East
73	6/17/2005	1200	No	0	0				Baltimore Ave.	58th Street	Rear-end	70		West	44		West
74	6/20/2005	0305	No	0	0				Baltimore Ave.	58th Street	Angle	37		North			East
75	6/20/2005	0730	Unknown	0	1				58th Street	Baltimore Ave.	Angle	22		North	37		West
76	6/20/2005	1557	No	0	0				58th Street	Baltimore Ave.	Parked	26			44		
77	6/22/2005	0810	No	0	0				Baltimore Ave.	58th Street	Rear-end	27		West	28		West
78	6/24/2005	0700	Yes	0	0				Baltimore Ave.	58th Street	Angle	47		East	22		West
79	6/25/2005	1950	No	0	0				58th Street	Baltimore Ave.	Rear-end	36		South	52		South
80	7/12/2005	0000	No	0	0				58th Street	Baltimore Ave.	SS			North	43		North
81	7/19/2005	0130	No	0	0				Baltimore Ave.	58th Street	Angle	23		East	29		South
82	7/25/2005	0945	No	0	0				58th Street	Baltimore Ave.	Rear-end	52		South	25		South
83	7/26/2005	2330	No	0	0				Baltimore Ave.	58th Street	Angle	47		South			East
84	8/10/2005	1235	Unknown	0	1				Baltimore Ave.	58th Street	Pedestrian	0	careless turning	West	91		Pedestrian
85	8/21/2005	1330	No	0	0				Baltimore Ave.	58th Street	Rear-end	58		East	62		East
86	8/28/2005		No	0	0				58th Street	Baltimore Ave.	Rear-end	46			19		
87	9/26/2005	1924	No	0	0				58th Street	Baltimore Ave.	Rear-end			North	22		North
88	10/16/2005	1720	No	0	0				58th Street	Baltimore Ave.	Rear-end	35		North	49		North
89	10/28/2005	1456	Yes	0	1				58th Street	Baltimore Ave.	Angle	74		North	63		East
90	10/28/2005	1630	No	0	0				58th Street	Baltimore Ave.	Rear-end	33		South	23		South

Source: Philadelphia Streets Department Crash Reports

Cobbs Creek Parkway/Baltimore Avenue/58th Street Vicinity
PHILADELPHIA

Reportable and Non reportable crashes (2004-2006)

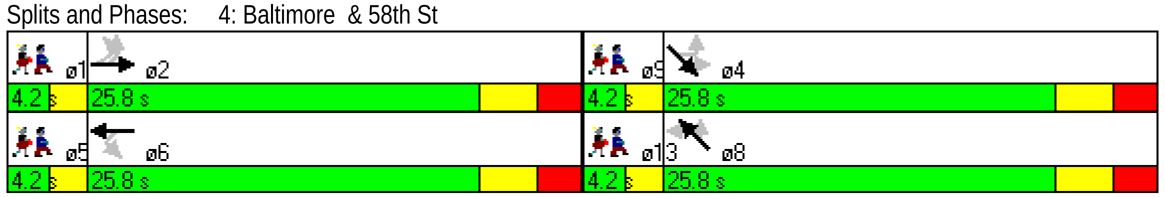
MAP ID	DATE	DAY/TIME	REPORTABLE CRASHES?	TOTAL KILLED	TOTAL INJURED	ROAD SYSTEM	WEATHER COND.	ROAD COND.	ROAD	CROSS ROAD	CRASH TYPE	AGE OF DRIVER 1	DRIVER 1 FACTOR	DRIVER 1 ACTION	AGE OF DRIVER 2	DRIVER 2 FACTOR	DRIVER 2 ACTION
91	11/23/2005	1400	No	0	0				58th Street	Baltimore Ave.	Rear-end	19			59		
92	12/2/2005	0825	Yes	0	0				Baltimore Ave.	58th Street	Rear-end	36	trolley	West			
93	12/5/2005	1640	Unknown	0	0				58th Street	Baltimore Ave.	Rear-end	54		North	49		North
94	12/7/2005	1750	No	0	1				58th Street	Baltimore Ave.	Rear-end				57		
95	12/16/2005	2000	Unknown	0	2				58th Street	Baltimore Ave.	Angle	17	careless turning	North	76		Exiting
96	12/17/2005	1700	No	0	0				58th Street	Baltimore Ave.	Pedestrian	45		North	51		Pedestrian
97	12/23/2005	0830	No	0	0				58th Street	Baltimore Ave.	Angle	21		South	40		North
98	1/21/2006	0835	No	0	0				58th Street	Baltimore Ave.	Angle	44		North	49		South
99	1/28/2006	1641	No	0	0				58th Street	Baltimore Ave.	Angle	33		West	75	exiting	North
100	2/5/2006	1100	No	0	0				58th Street	Baltimore Ave.	Rear-end	43		West	58		West
101	2/24/2006	1845	No	0	0				58th Street	Baltimore Ave.	Angle	30		North	29		East
102	2/26/2006	2100	No	0	0				58th Street	Baltimore Ave.							
103	3/4/2006	1945	No	0	0				Baltimore Ave.	58th Street							
104	3/20/2006	2000	No	0	0				Baltimore Ave.	58th Street	Poll			Cut off	26		East
105	3/31/2006	2140	Unknown	0	0				58th Street	Baltimore Ave.	Angle	36		Exiting	24		North
106	4/7/2006		No	0	0				58th Street	Baltimore Ave.	Angle	28		West	37		North
107	4/9/2006	1700	No	0	0				58th Street	Baltimore Ave.	Rear-end	18		South	20		South
108	6/7/2006	1500	No	0	0				58th Street	Baltimore Ave.	Rear-end	55			30		
109	6/18/2006	1800	No	0	0				58th Street	Baltimore Ave.							
110	6/19/2006	2000	Yes	0	1				58th Street	Baltimore Ave.	Angle		motorcycle on sidewalk	North	16		South
111	6/27/2006	1200	Yes	0	1				58th Street	Baltimore Ave.	Angle	35	fleeing police	South	63		North
112	7/5/2006	0810	No	0	0				58th Street	Baltimore Ave.	Rear-end	29	SEPTA	North	41		North
113	7/15/2006	1000	No	0	0				Baltimore Ave.	58th Street	SS				25		East
114	7/18/2006	1820	Unknown	0	0				58th Street	Baltimore Ave.	Angle	40		North	40		North
115	7/29/2006	1900	No	0	0				Baltimore Ave.	58th Street	Rear-end	22		East	44		East
116	8/14/2006	1050	Yes	0	0				Baltimore Ave.	58th Street	Rear-end	28		East	36		East
117	8/19/2006		Yes	0	0				Baltimore Ave.	58th Street	Parking lot	62				bike	
118	9/6/2006	1147	No	0	0				58th Street	Baltimore Ave.	Angle	55	trash truck	South	20		South
119	9/15/2006	1550	No	0	0				Baltimore Ave.	58th Street	Parked						
120	9/23/2006	1800	No	0	0				58th Street	Baltimore Ave.	Rear-end	30		North	24		Parked
121	10/4/2006	0810	Yes	0	1				58th Street	Baltimore Ave.	Rear-end	51		North	50		Stopped
122	10/27/2006	1500	No	0	0				58th Street	Baltimore Ave.	Parking lot				39		
123	10/28/2006	1055	Yes	0	0				58th Street	Baltimore Ave.	Pedestrian	14	pedestrian	South			West
124	11/1/2006	0900	No	0	0				58th Street	Baltimore Ave.	Rear-end	45		North	33		North
125	11/21/2006	0800	No	0	0				58th Street	Baltimore Ave.	Rear-end			South	50		South
126	11/22/2006	1900	No	0	0				Baltimore Ave.	58th Street	Rear-end			East	42		East
127	12/23/2006	1330	No	0	0				Baltimore Ave.	58th Street	Parking lot	22		Parking	44		Parking
128	12/27/2006	1950	Unknown	0	1				Baltimore Ave.	58th Street	Angle	26		West	44		East
129	12/30/2006	1154	No	0	0				Baltimore Ave.	58th Street	Angle			East			North

Source: Philadelphia Streets Department Crash Reports

Lane Group	EBL2	EBL		EBR	WBL		WBR	WBR2	SEL2			SER				NWR2	ø1	ø5	ø9	ø13
Lane Configurations																				
Volume (vph)	2	4		47	50		10	37	19			3				14				
Satd. Flow (prot)	0	0		0	0		0	0	0			0				0				
Flt Permitted																				
Satd. Flow (perm)	0	0		0	0		0	0	0			0				0				
Satd. Flow (RTOR)																				
Lane Group Flow (vph)	0	0		0	0		0	0	0			0				0				
Turn Type	Perm	Perm			Perm				Perm	Perm			Perm		Perm					
Protected Phases			2			6					4			8			1	5	9	13
Permitted Phases	2	2			6				4	4	4		8		8					
Total Split (s)	25.8	25.8	25.8	0.0	25.8	25.8	0.0	0.0	25.8	25.8	25.8	0.0	25.8	25.8	25.8	0.0	4.2	4.2	4.2	4.2
Total Lost Time (s)	5.4	5.4	5.4	4.0	5.4	5.4	4.0	4.0	5.4	5.4	5.4	4.0	5.4	5.4	5.4	4.0				
Act Effct Green (s)			20.4			20.4				20.4	20.4		20.4	20.4	20.4					
Actuated g/C Ratio			0.34			0.34				0.34	0.34		0.34	0.34	0.34					
v/c Ratio			0.75			0.72				0.67	1.03		0.41	0.99	0.45					
Control Delay			28.2			27.2				49.0	69.9		27.5	56.4	18.4					
Queue Delay			0.0			0.0				0.0	0.0		0.0	0.0	0.0					
Total Delay			28.2			27.2				49.0	69.9		27.5	56.4	18.4					
LOS			C			C				D	E		C	E	B					
Approach Delay			28.2			27.2					67.3			45.0						
Approach LOS			C			C					E			D						

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.03	
Intersection Signal Delay: 45.4	Intersection LOS: D
Intersection Capacity Utilization 89.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 4: Baltimore & 58th St



Cobbs Creek Parkway/Baltimore Avenue/58th Street Vicinity
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MAP ID	DATE	DAY/TIME	REPORTABLE CRASHES?	TOTAL KILLED	TOTAL INJURED	ROAD SYSTEM	WEATHER COND.	ROAD COND.	ROAD	CROSS ROAD	CRASH TYPE	AGE OF DRIVER 1	DRIVER 1 FACTOR	DRIVER 1 ACTION	AGE OF DRIVER 2	DRIVER 2 FACTOR	DRIVER 2 ACTION
1	1/5/2004	1530	No	0	0	Local			58th Street	Baltimore Ave.	SS				42		
2	1/16/2004	2000	Yes	0	0	Local	clear	dry	58th Street	Cobbs Creek Pkwy	Rear-end			East	37		East
3	1/17/2004	0520	No	0	0				58th Street	Baltimore Ave.	Rear-end			North	56		North
4	1/31/2004	0919	Yes	0	0		clear	ice	58th Street	Baltimore Ave.	SS	43	stole vehicle	North			North
5	2/7/2004	0930	No	0	0		clear	dry	Baltimore Ave.	58th Street	SS			East	13		North
6	2/7/2004	1540	No	0	0		clear	dry	Baltimore Ave.	58th Street	Rear-end			East	46		East
7	2/9/2004	1425	No	0	0		clear	dry	Baltimore Ave.	58th Street	SS	79			29		
8	2/13/2004	1700	No	0	0				Cobbs Creek Rd	58th Street	Rear-end				31		
9	2/21/2004	0009	No	0	0				Baltimore Ave.	56th Street	SS				43		
10	2/28/2004	1000	No	0	0				Baltimore Ave.	58th Street				Moving	53		Stopped
11	3/8/2004	1109	Unknown	0	1		clear	dry	58th Street	Baltimore Ave.	Pedestrian	31	SEPTA	Unknown	73		Pedestrian
12	3/23/2004	0800	Yes	0	0		clear	dry	Baltimore Ave.	58th Street	Rear-end	62		North	32		North
13	4/2/2004	1450	No	0	0				58th Street	Baltimore Ave.	Rear-end			West	37		West
14	4/6/2004	1815	No	0	0				58th Street	Baltimore Ave.	Rear-end				39		
15	4/7/2004	1750	No	0	0				58th Street	Baltimore Ave.	Rear-end	34		North	51		North
16	4/16/2004	2030	No	0	0				58th Street	Baltimore Ave.	SS			South	59		North
17	4/21/2004	1550	Yes	0	1		clear	dry	Baltimore Ave.	58th Street	Pedestrian		motorcycle		7		Pedestrian
18	4/29/2004	1237	No	0	0				Cobbs Creek Rd	Baltimore Ave.	Rear-end	33		South	27		South
19	5/7/2004	1000	No	0	0				Baltimore Ave.	58th Street	SS				45		
20	5/8/2004	1625	Unknown	0	0				58th Street	Baltimore Ave.	Rear-end			North	71		North
21	5/16/2004	1630	No	0	0				58th Street	Baltimore Ave.	SS				47		North
22	5/16/2004	1715	No	0	0				Baltimore Ave.	58th Street	Rear-end			East	65		East
23	6/7/2004	0710	No	0	0				Baltimore Ave.	58th Street	SS				25		
24	6/7/2004	1520	No	0	0				Baltimore Ave.	58th Street	SS			West	56		North
25	6/10/2004	2130	No	0	0		raining		Baltimore Ave.	58th Street	Front	57		West	43		East
26	6/11/2004	1340	Yes	0	0		raining	wet	Baltimore Ave.	58th Street	Rear-end			West	43		West
27	6/17/2004	0357	Unknown	0	0				58th Street	Baltimore Ave.	Parked				44		Parked
28	6/22/2004	1145	Yes	0	0				Baltimore Ave.	58th Street	Parked	75			41		Parked
29	8/2/2004		No	0	0				Baltimore Ave.	58th Street	SS	20		West	19		East
30	8/6/2004	2115	No	0	0				58th Street	Baltimore Ave.	Angle				49		South
31	8/13/2004	2014	No	0	0				58th Street	Baltimore Ave.	Bicyclist				26		South
32	8/18/2004	1520	No	0	2				58th Street	Baltimore Ave.	Head on	20	careless turning	West	45		North
33	8/22/2004		No	0	0				58th Street	Baltimore Ave.	Angle				34		North
34	8/29/2004	0205	No	0	0				58th Street	Baltimore Ave.	Angle			East	73		North
35	8/29/2004	0205	Yes	0	0				58th Street	Baltimore Ave.	Angle		did not stop at light	East	73		North
36	9/2/2004	2310	No	0	0				58th Street	Baltimore Ave.	SS		illegal u-turn		19		South
37	9/4/2004	1600	No	0	0				58th Street	Baltimore Ave.	Angle	47		North	30		South
38	9/17/2004	1500	No	0	0				58th Street	Baltimore Ave.	Parked				66		Parked
39	9/19/2004	1245	Unknown	0	2		clear	dry	58th Street	Baltimore Ave.	Angle	18	inexperienced	North	36	careless turning	South
40	9/27/2004	2000	No	0	0				58th Street	Baltimore Ave.	Angle				25		
41	10/24/2004	1700	No	0	0				58th Street	Baltimore Ave.	Parked				28		Parked
42	10/30/2004	2030	No	0	0				58th Street	Baltimore Ave.	Parking lot				27		East
43	10/31/2004	1445	No	0	0				58th Street	Baltimore Ave.	Angle				38		Stopped
44	11/4/2004	1530	Unknown	0	0				58th Street	Baltimore Ave.	Parked				51		Parked
45	11/13/2004	1100	No	0	0				58th Street	Baltimore Ave.	Rear-end				46		

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46	11/24/2004	1200	Unknown	0	0				Baltimore Ave.	58th Street	Angle				22		East
47	12/14/2004	1430	No	0	0				Baltimore Ave.	58th Street	SS			South	22		South
48	12/17/2004	0830	No	0	0				Baltimore Ave.	58th Street	Rear-end			West			West
49	12/27/2004	1330	No	0	0				Baltimore Ave.	58th Street	Rear-end			West		trolley tracks	West
50	1/5/2005		Yes	0	1		glare	ice	58th Street	Midblock	Pedestrian	23		South	70		West
51	1/6/2005	1640	No	0	0				58th Street	Baltimore Ave.	Angle			South	44		West
52	1/7/2005	1430	Unknown	0	0				Baltimore Ave.	58th Street	SS		careless passing	West	51		West
53	1/20/2005	1057	No	0	0				Baltimore Ave.	58th Street	Rear-end	26		West	47		West
54	1/29/2005	1105	No	0	0				Baltimore Ave.	58th Street	SS	24			51		
55	2/26/2005	1715	No	0	0				58th Street	Baltimore Ave.	Angle	51		North	54		North
56	3/16/2005	1822	No	0	0				Baltimore Ave.	58th Street	SS	34		West	24		West
57	3/17/2005	1530	Yes	0	0				Baltimore Ave.	58th Street	Rear-end	35		East	29		East
58	3/27/2005	1900	No	0	0				Baltimore Ave.	58th Street	Front			East	54		West
59	4/3/2005	1530	No	0	0				Baltimore Ave.	58th Street	Angle	40		West	40		West
60	4/7/2005	1300	No	0	0				Baltimore Ave.	58th Street	Angle	27		West	49		West
61	4/10/2005	1815	No	0	0				Baltimore Ave.	58th Street	Rear-end			East	42		East
62	4/13/2005	1120	No	0	0				Baltimore Ave.	58th Street	Rear-end			East	23		East
63	4/19/2005	1000	No	0	0				Baltimore Ave.	58th Street	Rear-end			East	32		East
64	4/22/2005	1400	Unknown	0	1			wet	Baltimore Ave.	58th Street	Angle	34	careless turning	East	29		West
65	4/28/2005	1815	No	0	0				58th Street	Baltimore Ave.	SS	41		North	50		South
66	4/28/2005	1550	No	0	0				Baltimore Ave.	58th Street	Angle	33		East	35		North
67	5/2/2005	1530	No	0	0				58th Street	Baltimore Ave.							
68	5/18/2005	1245	No	0	0				58th Street	Baltimore Ave.	Rear-end	55		South	58		South
69	5/20/2005	0955	No	0	0				58th Street	Baltimore Ave.	Angle	48		North	21		East
70	6/8/2005	1050	Yes	0	0				Baltimore Ave.	58th Street	Rear-end	35		East	28		East
71	6/13/2005	1700	No	0	0				58th Street	Baltimore Ave.	Rear-end	35		North	51		North
72	6/14/2005	1430	No	0	0				Baltimore Ave.	58th Street	Rear-end			East	41		East
73	6/17/2005	1200	No	0	0				Baltimore Ave.	58th Street	Rear-end	70		West	44		West
74	6/20/2005	0305	No	0	0				Baltimore Ave.	58th Street	Angle	37		North			East
75	6/20/2005	0730	Unknown	0	1				58th Street	Baltimore Ave.	Angle	22		North	37		West
76	6/20/2005	1557	No	0	0				58th Street	Baltimore Ave.	Parked	26			44		
77	6/22/2005	0810	No	0	0				Baltimore Ave.	58th Street	Rear-end	27		West	28		West
78	6/24/2005	0700	Yes	0	0				Baltimore Ave.	58th Street	Angle	47		East	22		West
79	6/25/2005	1950	No	0	0				58th Street	Baltimore Ave.	Rear-end	36		South	52		South
80	7/12/2005	0000	No	0	0				58th Street	Baltimore Ave.	SS			North	43		North
81	7/19/2005	0130	No	0	0				Baltimore Ave.	58th Street	Angle	23		East	29		South
82	7/25/2005	0945	No	0	0				58th Street	Baltimore Ave.	Rear-end	52		South	25		South
83	7/26/2005	2330	No	0	0				Baltimore Ave.	58th Street	Angle	47		South			East
84	8/10/2005	1235	Unknown	0	1				Baltimore Ave.	58th Street	Pedestrian	0	careless turning	West	91		Pedestrian
85	8/21/2005	1330	No	0	0				Baltimore Ave.	58th Street	Rear-end	58		East	62		East
86	8/28/2005		No	0	0				58th Street	Baltimore Ave.	Rear-end	46			19		
87	9/26/2005	1924	No	0	0				58th Street	Baltimore Ave.	Rear-end			North	22		North
88	10/16/2005	1720	No	0	0				58th Street	Baltimore Ave.	Rear-end	35		North	49		North
89	10/28/2005	1456	Yes	0	1				58th Street	Baltimore Ave.	Angle	74		North	63		East
90	10/28/2005	1630	No	0	0				58th Street	Baltimore Ave.	Rear-end	33		South	23		South

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PHILADELPHIA

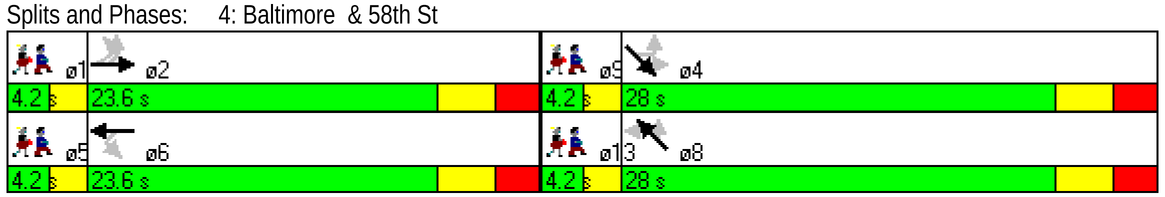
Reportable and Non reportable crashes (2004-2006)

MAP ID	DATE	DAY/TIME	REPORTABLE CRASHES?	TOTAL KILLED	TOTAL INJURED	ROAD SYSTEM	WEATHER COND.	ROAD COND.	ROAD	CROSS ROAD	CRASH TYPE	AGE OF DRIVER 1	DRIVER 1 FACTOR	DRIVER 1 ACTION	AGE OF DRIVER 2	DRIVER 2 FACTOR	DRIVER 2 ACTION
91	11/23/2005	1400	No	0	0				58th Street	Baltimore Ave.	Rear-end	19			59		
92	12/2/2005	0825	Yes	0	0				Baltimore Ave.	58th Street	Rear-end	36	trolley	West			
93	12/5/2005	1640	Unknown	0	0				58th Street	Baltimore Ave.	Rear-end	54		North	49		North
94	12/7/2005	1750	No	0	1				58th Street	Baltimore Ave.	Rear-end				57		
95	12/16/2005	2000	Unknown	0	2				58th Street	Baltimore Ave.	Angle	17	careless turning	North	76		Exiting
96	12/17/2005	1700	No	0	0				58th Street	Baltimore Ave.	Pedestrian	45		North	51		Pedestrian
97	12/23/2005	0830	No	0	0				58th Street	Baltimore Ave.	Angle	21		South	40		North
98	1/21/2006	0835	No	0	0				58th Street	Baltimore Ave.	Angle	44		North	49		South
99	1/28/2006	1641	No	0	0				58th Street	Baltimore Ave.	Angle	33		West	75	exiting	North
100	2/5/2006	1100	No	0	0				58th Street	Baltimore Ave.	Rear-end	43		West	58		West
101	2/24/2006	1845	No	0	0				58th Street	Baltimore Ave.	Angle	30		North	29		East
102	2/26/2006	2100	No	0	0				58th Street	Baltimore Ave.							
103	3/4/2006	1945	No	0	0				Baltimore Ave.	58th Street							
104	3/20/2006	2000	No	0	0				Baltimore Ave.	58th Street	Poll			Cut off	26		East
105	3/31/2006	2140	Unknown	0	0				58th Street	Baltimore Ave.	Angle	36		Exiting	24		North
106	4/7/2006		No	0	0				58th Street	Baltimore Ave.	Angle	28		West	37		North
107	4/9/2006	1700	No	0	0				58th Street	Baltimore Ave.	Rear-end	18		South	20		South
108	6/7/2006	1500	No	0	0				58th Street	Baltimore Ave.	Rear-end	55			30		
109	6/18/2006	1800	No	0	0				58th Street	Baltimore Ave.							
110	6/19/2006	2000	Yes	0	1				58th Street	Baltimore Ave.	Angle		motorcycle on sidewalk	North	16		South
111	6/27/2006	1200	Yes	0	1				58th Street	Baltimore Ave.	Angle	35	fleeing police	South	63		North
112	7/5/2006	0810	No	0	0				58th Street	Baltimore Ave.	Rear-end	29	SEPTA	North	41		North
113	7/15/2006	1000	No	0	0				Baltimore Ave.	58th Street	SS				25		East
114	7/18/2006	1820	Unknown	0	0				58th Street	Baltimore Ave.	Angle	40		North	40		North
115	7/29/2006	1900	No	0	0				Baltimore Ave.	58th Street	Rear-end	22		East	44		East
116	8/14/2006	1050	Yes	0	0				Baltimore Ave.	58th Street	Rear-end	28		East	36		East
117	8/19/2006		Yes	0	0				Baltimore Ave.	58th Street	Parking lot	62				bike	
118	9/6/2006	1147	No	0	0				58th Street	Baltimore Ave.	Angle	55	trash truck	South	20		South
119	9/15/2006	1550	No	0	0				Baltimore Ave.	58th Street	Parked						
120	9/23/2006	1800	No	0	0				58th Street	Baltimore Ave.	Rear-end	30		North	24		Parked
121	10/4/2006	0810	Yes	0	1				58th Street	Baltimore Ave.	Rear-end	51		North	50		Stopped
122	10/27/2006	1500	No	0	0				58th Street	Baltimore Ave.	Parking lot				39		
123	10/28/2006	1055	Yes	0	0				58th Street	Baltimore Ave.	Pedestrian	14	pedestrian	South			West
124	11/1/2006	0900	No	0	0				58th Street	Baltimore Ave.	Rear-end	45		North	33		North
125	11/21/2006	0800	No	0	0				58th Street	Baltimore Ave.	Rear-end			South	50		South
126	11/22/2006	1900	No	0	0				Baltimore Ave.	58th Street	Rear-end			East	42		East
127	12/23/2006	1330	No	0	0				Baltimore Ave.	58th Street	Parking lot	22		Parking	44		Parking
128	12/27/2006	1950	Unknown	0	1				Baltimore Ave.	58th Street	Angle	26		West	44		East
129	12/30/2006	1154	No	0	0				Baltimore Ave.	58th Street	Angle			East			North

Lane Group	EBL2	EBL	EBT	EBR	WBL		WBR	WBR2	SEL2			SER				NWR2	ø1	ø5	ø9	ø13
Lane Configurations																				
Volume (vph)	2	4	326	47	50		10	37	19			3				14				
Satd. Flow (prot)	0	0	1587	0	0		0	0	0			0				0				
Flt Permitted			0.993																	
Satd. Flow (perm)	0	0	1578	0	0		0	0	0			0				0				
Satd. Flow (RTOR)			12																	
Lane Group Flow (vph)	0	0	411	0	0		0	0	0			0				0				
Turn Type	Perm	Perm			Perm				Perm	Perm			Perm		Perm					
Protected Phases			2			6					4			8			1	5	9	13
Permitted Phases	2	2			6				4	4	4		8		8					
Total Split (s)	23.6	23.6	23.6	0.0	23.6	23.6	0.0	0.0	28.0	28.0	28.0	0.0	28.0	28.0	28.0	0.0	4.2	4.2	4.2	4.2
Total Lost Time (s)	5.4	5.4	5.4	4.0	5.4	5.4	4.0	4.0	5.4	5.4	5.4	4.0	5.4	5.4	5.4	4.0				
Act Effct Green (s)			18.2			18.2				22.6	22.6		22.6	22.6	22.6					
Actuated g/C Ratio			0.30			0.30				0.38	0.38		0.38	0.38	0.38					
v/c Ratio			0.84			0.84				0.67	0.93		0.33	0.89	0.40					
Control Delay			37.9			39.6				48.0	43.7		21.1	36.3	16.0					
Queue Delay			0.0			0.0				0.0	0.0		0.0	0.0	0.0					
Total Delay			37.9			39.6				48.0	43.7		21.1	36.3	16.0					
LOS			D			D				D	D		C	D	B					
Approach Delay			37.9			39.6					44.2			30.3						
Approach LOS			D			D					D			C						

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 37.0	Intersection LOS: D
Intersection Capacity Utilization 89.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 4: Baltimore & 58th St

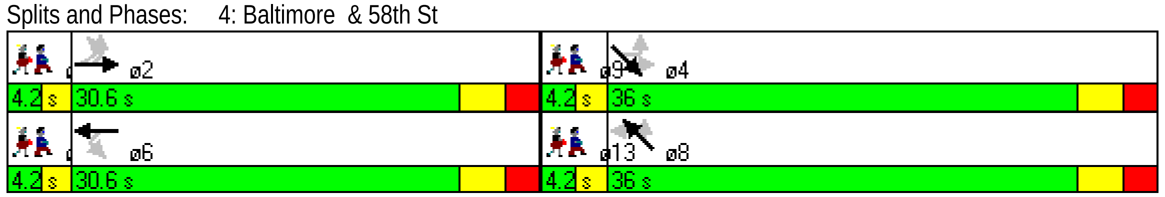


Lane Group	EBL2	EBL		EBR	WBL		WBR	WBR2	SEL2			SER				NWR2	ø1	ø5	ø9	ø13
Lane Configurations																				
Volume (vph)	2	4		47	50		10	37	19			3				14				
Satd. Flow (prot)	0	0		0	0		0	0	0			0				0				
Flt Permitted																				
Satd. Flow (perm)	0	0		0	0		0	0	0			0				0				
Satd. Flow (RTOR)																				
Lane Group Flow (vph)	0	0		0	0		0	0	0			0				0				
Turn Type	Perm	Perm			Perm				Perm	Perm			Perm		Perm					
Protected Phases			2			6					4			8			1	5	9	13
Permitted Phases	2	2			6				4	4	4		8		8					
Total Split (s)	30.6	30.6	30.6	0.0	30.6	30.6	0.0	0.0	36.0	36.0	36.0	0.0	36.0	36.0	36.0	0.0	4.2	4.2	4.2	4.2
Total Lost Time (s)	5.4	5.4	5.4	4.0	5.4	5.4	4.0	4.0	5.4	5.4	5.4	4.0	5.4	5.4	5.4	4.0				
Act Effct Green (s)			25.2			25.2				30.6	30.6		30.6	30.6	30.6					
Actuated g/C Ratio			0.34			0.34				0.41	0.41		0.41	0.41	0.41					
v/c Ratio			0.76			0.75				0.56	0.86		0.29	0.82	0.37					
Control Delay			33.1			33.3				36.3	35.5		20.6	31.2	17.3					
Queue Delay			0.0			0.0				0.0	0.0		0.0	0.0	0.0					
Total Delay			33.1			33.3				36.3	35.5		20.6	31.2	17.3					
LOS			C			C				D	D		C	C	B					
Approach Delay			33.1			33.3					35.6			27.1						
Approach LOS			C			C					D			C						

Intersection Summary

Cycle Length: 75
Actuated Cycle Length: 75
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 31.5 Intersection LOS: C
Intersection Capacity Utilization 89.9% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 4: Baltimore & 58th St

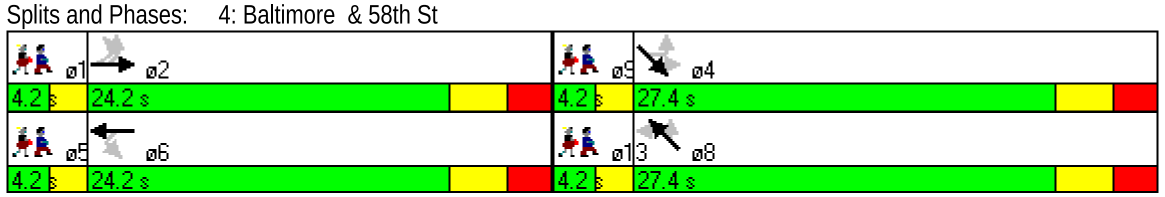


Lane Group	EBL2	EBL		EBR			WBR	WBR2	SEL2			SER				NWR2	ø1	ø5	ø9	ø13
Lane Configurations																				
Volume (vph)	2	4		47			10	37	19			3				14				
Satd. Flow (prot)	0	0		0			0	0	0			0				0				
Flt Permitted																				
Satd. Flow (perm)	0	0		0			0	0	0			0				0				
Satd. Flow (RTOR)																				
Lane Group Flow (vph)	0	0		0			0	0	0			0				0				
Turn Type	Perm	Perm			Perm				Perm	Perm			Perm		Perm					
Protected Phases			2			6					4			8			1	5	9	13
Permitted Phases	2	2			6				4	4	4		8		8					
Total Split (s)	24.2	24.2	24.2	0.0	24.2	24.2	0.0	0.0	27.4	27.4	27.4	0.0	27.4	27.4	27.4	0.0	4.2	4.2	4.2	4.2
Total Lost Time (s)	5.4	5.4	5.4	4.0	5.4	5.4	4.0	4.0	5.4	5.4	5.4	4.0	5.4	5.4	5.4	4.0				
Act Effct Green (s)			18.8		18.8	18.8				22.0	22.0		22.0	22.0	22.0					
Actuated g/C Ratio			0.31		0.31	0.31				0.37	0.37		0.37	0.37	0.37					
v/c Ratio			0.82		0.28	0.63				0.67	0.95		0.36	0.91	0.41					
Control Delay			34.5		20.4	23.6				48.2	49.0		23.3	40.4	16.6					
Queue Delay			0.0		0.0	0.0				0.0	0.0		0.0	0.0	0.0					
Total Delay			34.5		20.4	23.6				48.2	49.0		23.3	40.4	16.6					
LOS			C		C	C				D	D		C	D	B					
Approach Delay			34.5			23.1					48.9			33.3						
Approach LOS			C			C					D			C						

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 36.3 Intersection LOS: D
Intersection Capacity Utilization 80.3% ICU Level of Service D
Analysis Period (min) 15

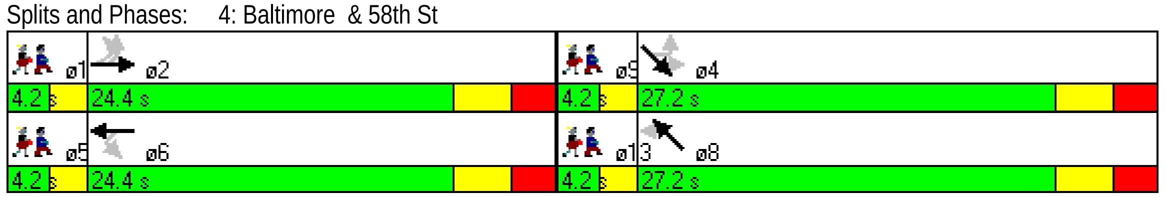
Splits and Phases: 4: Baltimore & 58th St



Lane Group	EBL2	EBL		EBR	WBL		WBR	WBR2	SEL2			SER				NWR2	ø1	ø5	ø9	ø13
Lane Configurations																				
Volume (vph)	2	4		47	50		10	37	19			3				14				
Satd. Flow (prot)	0	0		0	0		0	0	0			0				0				
Flt Permitted																				
Satd. Flow (perm)	0	0		0	0		0	0	0			0				0				
Satd. Flow (RTOR)																				
Lane Group Flow (vph)	0	0		0	0		0	0	0			0				0				
Turn Type	Perm	Perm			Perm				Perm	Perm			Perm							
Protected Phases			2			6					4			8			1	5	9	13
Permitted Phases	2	2			6				4	4	4		8							
Total Split (s)	24.4	24.4	24.4	0.0	24.4	24.4	0.0	0.0	27.2	27.2	27.2	0.0	27.2	27.2	0.0	0.0	4.2	4.2	4.2	4.2
Total Lost Time (s)	5.4	5.4	5.4	4.0	5.4	5.4	4.0	4.0	5.4	5.4	5.4	4.0	5.4	5.4	4.0	4.0				
Act Effct Green (s)			19.0			19.0				21.8	21.8		21.8	21.8						
Actuated g/C Ratio			0.32			0.32				0.36	0.36		0.36	0.36						
v/c Ratio			0.81			0.79				0.52	0.96		0.37	0.69						
Control Delay			33.6			33.8				30.8	51.0		24.0	19.9						
Queue Delay			0.0			0.0				0.0	0.0		0.0	0.0						
Total Delay			33.6			33.8				30.8	51.0		24.0	19.9						
LOS			C			C				C	D		C	B						
Approach Delay			33.6			33.8					48.5			20.1						
Approach LOS			C			C					D			C						

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 32.7	Intersection LOS: C
Intersection Capacity Utilization 87.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 4: Baltimore & 58th St

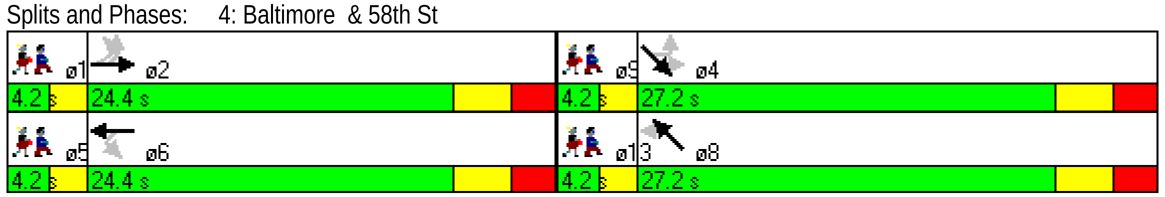


Lane Group	EBL2	EBL		EBR			WBR	WBR2	SEL2			SER				NWR2	ø1	ø5	ø9	ø13
Lane Configurations																				
Volume (vph)	2	4		47			10	37	19			3				14				
Satd. Flow (prot)	0	0		0			0	0	0			0				0				
Flt Permitted																				
Satd. Flow (perm)	0	0		0			0	0	0			0				0				
Satd. Flow (RTOR)																				
Lane Group Flow (vph)	0	0		0			0	0	0			0				0				
Turn Type	Perm	Perm			Perm				Perm	Perm			Perm							
Protected Phases			2			6					4			8			1	5	9	13
Permitted Phases	2	2			6				4	4	4		8							
Total Split (s)	24.4	24.4	24.4	0.0	24.4	24.4	0.0	0.0	27.2	27.2	27.2	0.0	27.2	27.2	0.0	0.0	4.2	4.2	4.2	4.2
Total Lost Time (s)	5.4	5.4	5.4	4.0	5.4	5.4	4.0	4.0	5.4	5.4	5.4	4.0	5.4	5.4	4.0	4.0				
Act Effct Green (s)			19.0		19.0	19.0				21.8	21.8		21.8	21.8						
Actuated g/C Ratio			0.32		0.32	0.32				0.36	0.36		0.36	0.36						
v/c Ratio			0.81		0.28	0.62				0.52	0.96		0.37	0.69						
Control Delay			33.5		20.1	23.2				30.8	51.0		24.0	19.9						
Queue Delay			0.0		0.0	0.0				0.0	0.0		0.0	0.0						
Total Delay			33.5		20.1	23.2				30.8	51.0		24.0	19.9						
LOS			C		C	C				C	D		C	B						
Approach Delay			33.5			22.7					48.5			20.1						
Approach LOS			C			C					D			C						

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 30.9 Intersection LOS: C
Intersection Capacity Utilization 77.9% ICU Level of Service D
Analysis Period (min) 15

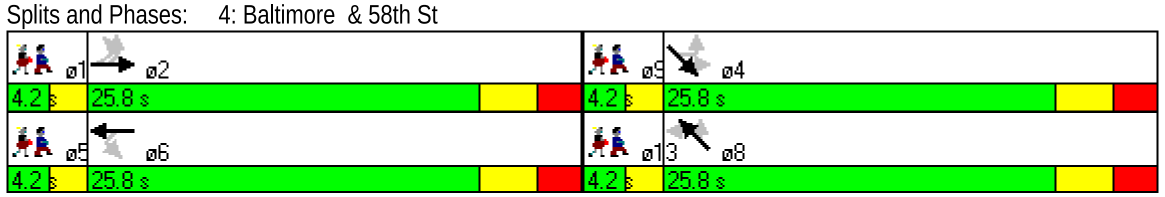
Splits and Phases: 4: Baltimore & 58th St



Lane Group	EBL2	EBL		EBR	WBL		WBR	WBR2	SEL2			SER				NWR2	ø1	ø5	ø9	ø13
Lane Configurations																				
Volume (vph)	4	2		73	107		2	46	6			6				16				
Satd. Flow (prot)	0	0		0	0		0	0	0			0				0				
Flt Permitted																				
Satd. Flow (perm)	0	0		0	0		0	0	0			0				0				
Satd. Flow (RTOR)																				
Lane Group Flow (vph)	0	0		0	0		0	0	0			0				0				
Turn Type	Perm	Perm			Perm				Perm	Perm			Perm		Perm					
Protected Phases			2			6					4			8			1	5	9	13
Permitted Phases	2	2			6				4	4	4		8		8					
Total Split (s)	25.8	25.8	25.8	0.0	25.8	25.8	0.0	0.0	25.8	25.8	25.8	0.0	25.8	25.8	25.8	0.0	4.2	4.2	4.2	4.2
Total Lost Time (s)	5.4	5.4	5.4	4.0	5.4	5.4	4.0	4.0	5.4	5.4	5.4	4.0	5.4	5.4	5.4	4.0				
Act Effct Green (s)			20.4			20.4				20.4	20.4		20.4	20.4	20.4					
Actuated g/C Ratio			0.34			0.34				0.34	0.34		0.34	0.34	0.34					
v/c Ratio			0.60			1.66				0.69	1.02		0.58	1.62	0.45					
Control Delay			20.4			328.2				51.8	66.9		40.9	307.2	18.5					
Queue Delay			0.0			0.0				0.0	0.0		0.0	0.0	0.0					
Total Delay			20.4			328.2				51.8	66.9		40.9	307.2	18.5					
LOS			C			F				D	E		D	F	B					
Approach Delay			20.4			328.2					64.9			241.6						
Approach LOS			C			F					E			F						

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.66	
Intersection Signal Delay: 200.2	Intersection LOS: F
Intersection Capacity Utilization 124.3%	ICU Level of Service H
Analysis Period (min) 15	

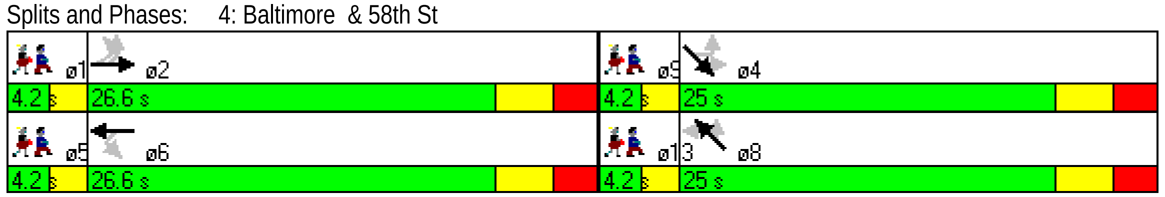
Splits and Phases: 4: Baltimore & 58th St



Lane Group	EBL2	EBL		EBR	WBL		WBR	WBR2	SEL2			SER				NWR2	ø1	ø5	ø9	ø13
Lane Configurations																				
Volume (vph)	4	2		73	107		2	46	6			6				16				
Satd. Flow (prot)	0	0		0	0		0	0	0			0				0				
Flt Permitted																				
Satd. Flow (perm)	0	0		0	0		0	0	0			0				0				
Satd. Flow (RTOR)																				
Lane Group Flow (vph)	0	0		0	0		0	0	0			0				0				
Turn Type	Perm	Perm			Perm				Perm	Perm			Perm		Perm					
Protected Phases			2			6					4			8			1	5	9	13
Permitted Phases	2	2			6				4	4	4		8		8					
Total Split (s)	26.6	26.6	26.6	0.0	26.6	26.6	0.0	0.0	25.0	25.0	25.0	0.0	25.0	25.0	25.0	0.0	4.2	4.2	4.2	4.2
Total Lost Time (s)	5.4	5.4	5.4	4.0	5.4	5.4	4.0	4.0	5.4	5.4	5.4	4.0	5.4	5.4	5.4	4.0				
Act Effct Green (s)			21.2			21.2				19.6	19.6		19.6	19.6	19.6					
Actuated g/C Ratio			0.35			0.35				0.33	0.33		0.33	0.33	0.33					
v/c Ratio			0.58			1.58				0.69	1.06		0.58	1.68	0.47					
Control Delay			19.2			290.8				52.2	79.8		41.4	336.6	19.5					
Queue Delay			0.0			0.0				0.0	0.0		0.0	0.0	0.0					
Total Delay			19.2			290.8				52.2	79.8		41.4	336.6	19.5					
LOS			B			F				D	E		D	F	B					
Approach Delay			19.2			290.8					76.2			264.4						
Approach LOS			B			F					E			F						

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green	
Control Type: Pretimed	
Maximum v/c Ratio: 1.68	
Intersection Signal Delay: 203.0	Intersection LOS: F
Intersection Capacity Utilization 124.3%	ICU Level of Service H
Analysis Period (min) 15	

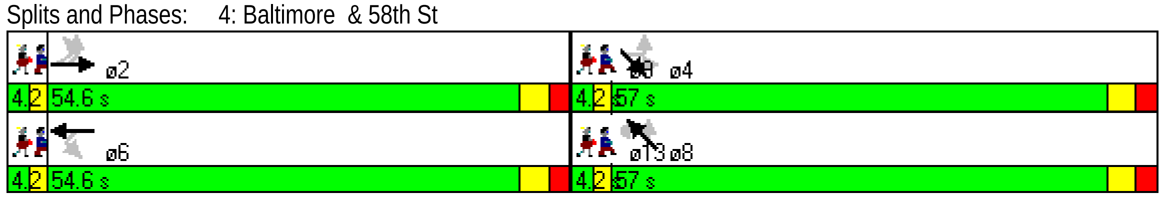
Splits and Phases: 4: Baltimore & 58th St



Lane Group	EBL2	EBL		EBR	WBL		WBR	WBR2	SEL2			SER				NWR2	ø1	ø5	ø9	ø13
Lane Configurations																				
Volume (vph)	4	2		73	107		2	46	6			6				16				
Satd. Flow (prot)	0	0		0	0		0	0	0			0				0				
Flt Permitted																				
Satd. Flow (perm)	0	0		0	0		0	0	0			0				0				
Satd. Flow (RTOR)																				
Lane Group Flow (vph)	0	0		0	0		0	0	0			0				0				
Turn Type	Perm	Perm			Perm				Perm	Perm			Perm		Perm					
Protected Phases			2			6					4			8			1	5	9	13
Permitted Phases	2	2			6				4	4	4		8		8					
Total Split (s)	54.6	54.6	54.6	0.0	54.6	54.6	0.0	0.0	57.0	57.0	57.0	0.0	57.0	57.0	57.0	0.0	4.2	4.2	4.2	4.2
Total Lost Time (s)	5.4	5.4	5.4	4.0	5.4	5.4	4.0	4.0	5.4	5.4	5.4	4.0	5.4	5.4	5.4	4.0				
Act Effct Green (s)			49.2			49.2				51.6	51.6		51.6	51.6	51.6					
Actuated g/C Ratio			0.41			0.41				0.43	0.43		0.43	0.43	0.43					
v/c Ratio			0.51			1.34				1.38	0.80		0.39	1.28	0.36					
Control Delay			28.4			195.2				279.2	40.3		31.8	166.6	24.7					
Queue Delay			0.0			0.0				0.0	0.0		0.0	0.0	0.0					
Total Delay			28.4			195.2				279.2	40.3		31.8	166.6	24.7					
LOS			C			F				F	D		C	F	C					
Approach Delay			28.4			195.2					71.2			134.1						
Approach LOS			C			F					E			F						

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 1.38
Intersection Signal Delay: 123.8 Intersection LOS: F
Intersection Capacity Utilization 124.3% ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 4: Baltimore & 58th St

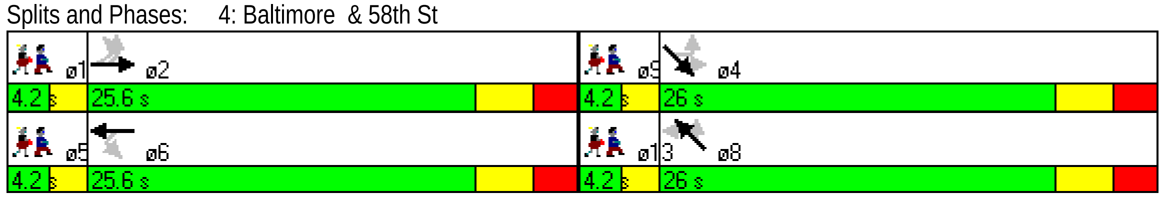


Lane Group	EBL2	EBL		EBR			WBR	WBR2	SEL2			SER				NWR2	ø1	ø5	ø9	ø13
Lane Configurations																				
Volume (vph)	4	2		73			2	46	6			6				16				
Satd. Flow (prot)	0	0		0			0	0	0			0				0				
Flt Permitted																				
Satd. Flow (perm)	0	0		0			0	0	0			0				0				
Satd. Flow (RTOR)																				
Lane Group Flow (vph)	0	0		0			0	0	0			0				0				
Turn Type	Perm	Perm			Perm				Perm	Perm			Perm		Perm					
Protected Phases			2			6					4			8			1	5	9	13
Permitted Phases	2	2			6				4	4	4		8		8					
Total Split (s)	25.6	25.6	25.6	0.0	25.6	25.6	0.0	0.0	26.0	26.0	26.0	0.0	26.0	26.0	26.0	0.0	4.2	4.2	4.2	4.2
Total Lost Time (s)	5.4	5.4	5.4	4.0	5.4	5.4	4.0	4.0	5.4	5.4	5.4	4.0	5.4	5.4	5.4	4.0				
Act Effct Green (s)			20.2		20.2	20.2				20.6	20.6		20.6	20.6	20.6					
Actuated g/C Ratio			0.34		0.34	0.34				0.34	0.34		0.34	0.34	0.34					
v/c Ratio			0.80		0.46	1.18				0.69	1.01		0.58	1.60	0.45					
Control Delay			33.4		22.9	123.0				51.7	63.7		40.9	300.2	18.3					
Queue Delay			0.0		0.0	0.0				0.0	0.0		0.0	0.0	0.0					
Total Delay			33.4		22.9	123.0				51.7	63.7		40.9	300.2	18.3					
LOS			C		C	F				D	E		D	F	B					
Approach Delay			33.4			107.4					62.2			236.2						
Approach LOS			C			F					E			F						

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 1.60
Intersection Signal Delay: 144.2 — Intersection LOS: F
Intersection Capacity Utilization 118.4% — ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 4: Baltimore & 58th St



Lane Group	EBL2	EBL		EBR	WBL		WBR	WBR2	SEL2			SER				NWR2	ø1	ø5	ø9	ø13
Lane Configurations																				
Volume (vph)	4	2		73	107		2	46	6			6				16				
Satd. Flow (prot)	0	0		0	0		0	0	0			0				0				
Flt Permitted																				
Satd. Flow (perm)	0	0		0	0		0	0	0			0				0				
Satd. Flow (RTOR)																				
Lane Group Flow (vph)	0	0		0	0		0	0	0			0				0				
Turn Type	Perm	Perm			Perm				Perm	Perm			Perm							
Protected Phases			2			6					4			8			1	5	9	13
Permitted Phases	2	2			6				4	4	4		8							
Total Split (s)	29.6	29.6	29.6	0.0	29.6	29.6	0.0	0.0	22.0	22.0	22.0	0.0	22.0	22.0	0.0	0.0	4.2	4.2	4.2	4.2
Total Lost Time (s)	5.4	5.4	5.4	4.0	5.4	5.4	4.0	4.0	5.4	5.4	5.4	4.0	5.4	5.4	4.0	4.0				
Act Effct Green (s)			24.2			24.2				16.6	16.6		16.6	16.6						
Actuated g/C Ratio			0.40			0.40				0.28	0.28		0.28	0.28						
v/c Ratio			0.51			1.25				0.69	1.25		0.58	1.32						
Control Delay			15.5			149.2				53.6	154.5		42.9	176.3						
Queue Delay			0.0			0.0				0.0	0.0		0.0	0.0						
Total Delay			15.5			149.2				53.6	154.5		42.9	176.3						
LOS			B			F				D	F		D	F						
Approach Delay			15.5			149.2					141.5			169.1						
Approach LOS			B			F					F			F						

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 1.32
Intersection Signal Delay: 140.8 Intersection LOS: F
Intersection Capacity Utilization 108.3% ICU Level of Service G
Analysis Period (min) 15

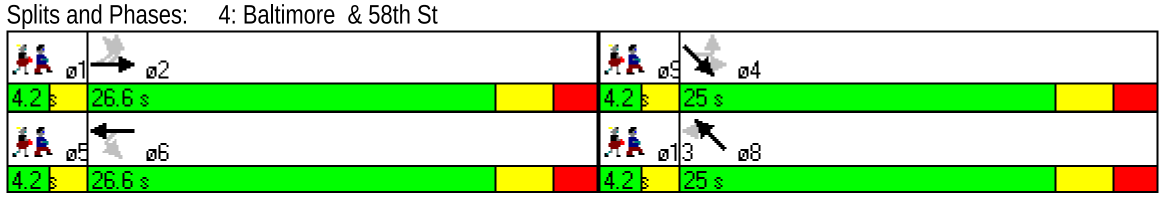
Splits and Phases: 19: Baltimore & 58th St

Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	SEL2	SEL	SET	SER	NWL	NWT	NWR	NWR2	ø1	ø5	ø9	ø13
Lane Configurations																				
Volume (vph)	4	2		73			2	46	6			6				16				
Satd. Flow (prot)	0	0		0			0	0	0			0				0				
Flt Permitted																				
Satd. Flow (perm)	0	0		0			0	0	0			0				0				
Satd. Flow (RTOR)																				
Lane Group Flow (vph)	0	0		0			0	0	0			0				0				
Turn Type	Perm	Perm			Perm				Perm	Perm			Perm							
Protected Phases			2			6					4			8			1	5	9	13
Permitted Phases	2	2			6				4	4	4		8							
Total Split (s)	26.6	26.6	26.6	0.0	26.6	26.6	0.0	0.0	25.0	25.0	25.0	0.0	25.0	25.0	0.0	0.0	4.2	4.2	4.2	4.2
Total Lost Time (s)	5.4	5.4	5.4	4.0	5.4	5.4	4.0	4.0	5.4	5.4	5.4	4.0	5.4	5.4	4.0	4.0				
Act Effct Green (s)			21.2		21.2	21.2				19.6	19.6		19.6	19.6						
Actuated g/C Ratio			0.35		0.35	0.35				0.33	0.33		0.33	0.33						
v/c Ratio			0.69		0.43	1.13				0.69	1.06		0.58	1.12						
Control Delay			24.5		20.8	101.0				52.2	79.8		41.4	89.2						
Queue Delay			0.0		0.0	0.0				0.0	0.0		0.0	0.0						
Total Delay			24.5		20.8	101.0				52.2	79.8		41.4	89.2						
LOS			C		C	F				D	E		D	F						
Approach Delay			24.5			88.6					76.2			86.6						
Approach LOS			C			F					E			F						

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
Control Type: Pretimed
Maximum v/c Ratio: 1.13
Intersection Signal Delay: 77.8 Intersection LOS: E
Intersection Capacity Utilization 102.4% ICU Level of Service G
Analysis Period (min) 15

Splits and Phases: 4: Baltimore & 58th St



Title of Report: **2007 *Congestion and Crash Site Analysis Program***

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Date Published: October 2007

Geographic Area Covered:
Pemberton, Burlington County; Gloucester Township, Camden County; New Garden Township, Chester County, Franklin Township, Gloucester County; City of Trenton, Mercer County and the City of Philadelphia.

Key Words:
Congestion, level of service, intersection, safety, fatalities, injuries, crashes, crash types, statewide, strategies, signalized, traffic signal, pedestrian, actions, roadway, goal, objectives, potential, deficiency, scenario, bicycle, turning movements, average annual daily traffic volumes, peak hour, exclusive, approach, skew.

ABSTRACT: This document is the result of effort to improve the mobility and safety of the roadways in the DVRPC region. The goal of the program is to identify cost effective improvements strategies which will reduce congestion and crashes and improve mobility and safety of all road users. Working with the counties, six locations were chosen which had been identified as having congestion and/or safety issues. An in-depth crash and level of service analysis of each location was performed to quantify and gain an understanding of the issues. Improvement strategies were identified to address the issues. These vary from signal timing adjustments to intersection geometry changes. As appropriate, proposed improvement strategies were tested for level of effectiveness.

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CONGESTION AND CRASH SITE ANALYSIS PROGRAM

IMPROVING THE DESIGN AND OPERATIONS OF INTERSECTIONS

DELAWARE VALLEY REGIONAL PLANNING COMMISSION

OCTOBER 2007