



**US 301 PROJECT**  
Maryland / Delaware Line to SR1  
South of the C&D Canal  
New Castle County, Delaware

# US 301 SPUR ROAD 2015 MONITORING REPORT



April 2016



DELAWARE DEPARTMENT  
OF TRANSPORTATION

**WILMAPCO**



## EXECUTIVE SUMMARY

The US 301 Spur Road, the subject of this traffic monitoring report, is part of Delaware Department of Transportation's (DelDOT's) US 301 Project (see Figure 1). In November 2007, after nearly four decades of study, a preferred alternative was selected, as described in the US 301 Final Environmental Impact Statement. The Federal Highway Administration subsequently approved the Record of Decision on April 30, 2008 which authorized DelDOT to begin final design on the preferred alternative, known as the "Green North + Spur" alternative. In January 2010, the 145<sup>th</sup> General Assembly of Delaware passed House Resolution No. 35 directing DelDOT to *"sit down over the next 6 weeks to develop and negotiate to final resolution a bill to amend the existing epilogue language, with such bill mandating certain trigger mechanisms for the Spur Road."* As a result of that coordination, the US 301 Spur Road Monitoring Program was developed to monitor growth in traffic and land use development, and to evaluate the operational characteristics of key roads and intersections. This monitoring program will provide decision makers with data to make an informed decision on the appropriate timing for the construction of the US 301 Spur Road.

The monitoring program consists of the annual collection and analysis of daily traffic volumes on select roadways, peak period intersection volumes, vehicular delay at unsignalized intersections, crash data, and land use development data. Each year, the data will be analyzed and compared with data and results from prior years. This report represents a summary of the sixth year of the monitoring program based on data collected in 2015. This report compares the newly collected data with the data collected and summarized previously in 2010, 2011, 2012, 2013, and 2014, representing the first five years of the monitoring program. The key findings and data in the report are summarized below:

### Land Development:

- As of December 2014, a total of seventy (70) ongoing commercial and residential developments were in various stages of the planning or building process within the study areas of southern New Castle and Cecil Counties. Fifty-eight (58) of these developments are located in southern New Castle County and twelve (12) developments are located in Cecil County, Maryland. At the time of the publication for this 2015 Spur Monitoring Report, the 2015 residential development data for New Castle County and Cecil County were not available. As a result, 2015 residential development data for New Castle County and Cecil County were left blank and will be updated in the future when the data becomes available. The 2015 residential development data within the Town of Middletown was available and the data was included in the report as Appendix B.
- Of the fifty-eight (58) developments located in southern New Castle County, seventeen (17) of the residential developments are located within the Town of Middletown. Of the 17 developments, fifteen (15) developments have been in various stages of development since the monitoring program began. It should be noted that the development originally listed as Westown (Levels) has been divided into smaller developments named Preserve at Deep Creek, Legary at Deep Creek, Habitat and Promenade / Middletown Condominiums in 2015. Seven (7) of these 17 developments were completed by the end of 2007, with an eighth (Middletown Village) completed by the end of 2010 and then a ninth (Willow Grove Mill) completed by the end of 2012. A tenth (townhouse portion of Spring Arbor at South Ridge) development was completed in 2015. More recently, there were 171 new housing units completed between 2014 and 2015. The 17 developments include a total of 6,707 housing units, including approximately 3,600 single-family detached homes, 240 duplexes, 1,600 townhouses, and 1,270 apartments / condos.



- A total of 2,179 of the proposed 7,728 housing units within the Town of Middletown were constructed by the end of 2007, 2,951 were constructed by the end of 2010, 3,008 had been constructed by the end of 2011. 3,132 of the proposed 7,728 housing units were constructed by the end of 2012, 3,221 of the proposed 7,728 were constructed by the end of 2013, and 3,351 of the proposed 7,728 housing units were constructed by the end of 2014. Additionally, 3,522 housing units were constructed by the end of 2015. This represents an increase of 1,343 housing units over the seven (7) year period between 2007 and 2015 and includes 171 new units completed between 2014 and 2015.
- The ongoing commercial development within the study area consists of various uses, including office space, retail, and light industrial development (including warehouse space). The commercial developments were divided into Approved and Pending (Exploratory) categories. By the end of 2015, developers had submitted plans that are currently either approved or pending for over 12 million square feet (SF) of non-residential space in southern New Castle County, which included a new 228,000 SF Technology Center (Auto Park Parcel) and a new 160,000 SF Delaware Sport Complex. This represents an increase of 156,500 SF (+1%) of approved or pending commercial development, compared to 2014. Physically, 12 million SF of non-residential space represents approximately 11.3 million SF of approved development (compared to 11 million SF in 2014) with another 0.7 million SF in pending approval (compared to 0.8 million SF in 2014). Of the 11.3 million SF of development approved as of 2015, at least 4.3 million SF (38%) had been constructed by the end of 2015. It should be noted that the 2013 non-residential development data for New Castle County was unavailable.

#### Traffic:

- Roadway volumes at seven (7) locations are being monitored and recorded annually.
- Five (5) signalized intersections along the existing US 301 Corridor between the Summit Bridge and SR 299 are counted and analyzed annually to monitor the change (degradation or improvement) in operation of each intersection. The following trends were observed between 2010 and 2015:
  - US 301 at Old Summit Bridge Road: The intersection operated at LOS A during both the AM and the PM peak hours each year between 2010 and 2015.
  - US 301 at SR 896: The intersection operated at LOS C during both the AM and the PM peak hours each year between 2010 and 2015.
  - US 301 at Armstrong Corner Road / Marl Pit Road: The intersection operated at LOS C during both the AM and the PM peak hours in 2010, 2012, and 2013; however, the intersection operated at LOS D during both the AM and the PM peak hours in 2011, 2014, and 2015. The increase in delay in 2014 and 2015 may be attributable to new housing developments east of the intersection on Marl Pit Road.
  - US 301 at SR 71: The intersection operated at LOS C during the AM peak hour each year between 2010 and 2015. The intersection operated at LOS D during the PM peak hour in 2010, 2011, 2012, and 2013; however, the intersection operated at LOS C during the PM peak hour in 2014 and 2015. The recent reduction (improvement) in delay may be attributable to modifications to the traffic signal timing.
  - US 301 at SR 299: The intersection operated at LOS D during the AM peak hour in 2010, 2011, 2012, and 2013; however, the intersection operated at LOS C during the AM peak hour in 2014 and 2015. The intersection operated at LOS D during the PM peak hour in 2010, 2011, 2012, 2013 and 2014; however, the intersection operated at



LOS C during the PM peak hour in 2015. The recent reduction (improvement) in delay may be attributable to modification to the traffic signal timing.

- Three (3) unsignalized intersections have been counted and analyzed annually to monitor the change (degradation or improvement) in operation of each intersection. The following trends were observed between 2010 and 2015:
  - In 2015, the average control delay was 22 seconds per vehicle (LOS C) at the intersection of US 301 and Old School House Road, 19 seconds per vehicle (LOS C) at the intersection of US 301 at Keenan Auto Body and 13 seconds per vehicle (LOS B) at the intersection of Choptank Road and Clayton Manor Drive.
  - The delay at the Keenan Autobody access has fluctuated over the six years of monitoring from a high of 58 seconds in 2011, to a low of 16 seconds in 2013. The increased delay in 2011 may have been attributable to the Cedar Lane Road closure which was necessary to repair the bridge just north of the Marl Pit Road intersection. The delay in 2015 (19 seconds) was much lower than the delay in 2010 (37 seconds).
  - The delay at the intersection of Choptank Road and Clayton Manor Drive was approximately the same in 2015 as it was in 2010.
  - There was a decrease in delay (improvement) at the intersection of US 301 and Old School House Road in 2015 (by 17 seconds per vehicle) compared to 2010 data.

#### **Highway Safety:**

- Average Crash Rates were calculated for eight (8) roadway segments in the vicinity of the US301 Corridor to provide a relative measure of comparison to the Statewide and New Castle County average crash rates. The comparison revealed that five (5) of the eight roadway segments being monitored had higher crash rates than the Statewide and New Castle County Average Crash Rate in 2015.
- Between 2010 and 2012, the number of crashes decreased at most of the locations being monitored. Only two locations experienced an increase of crashes between 2010 and 2012. However, the number of crashes increased at most (6 of 8) of the locations being monitored between 2012 and 2015. This included US 301 between Summit Bridge and SR 896 (Boyds Corner Road), where the number of crashes increased from 21 in 2012 to 27 in 2015, US 301 between SR 896 (Boyds Corner Road) and Peterson Road, where the number of crashes increased from 42 in 2012 to 77 in 2015, US 301 between Peterson Road and Levels Road, where the number of crashes increased from 22 in 2012 to 39 in 2015, Bethel Church Road between Choptank Road and US 301, where the number of crashes increased from 3 in 2012 to 5 in 2015, Choptank Road between Bethel Church Road and Bunker Hill Road, where the number of crashes increased from 10 in 2012 to 16 in 2015, and SR 1 between Roth Bridge and US 13/ SR 1 Split (Tybouts Corner), where the number of crashes increased from 47 in 2012 to 115 in 2015.
- Roadway segments in the project area that are reported within DeIDOT's Hazard Elimination Program (HEP) will be identified each year during the construction of US 301. DeIDOT's High Risk Rural Roads Program (HRRRP) locations between 2007 and 2012 also have been identified; however, it should be noted that HRRRP was discontinued at the end of 2012. These programs seek improvements focused on reducing the number of crashes at each location. A list of the HEP and HRRRP locations between 2007 and 2015 can be found in Tables 5 and 6 in the main body of the report.



**Incident Management:**

- DeIDOT has been tracking the number of significant incidents that occur each year on several key roads in the Middletown region south of the C&D Canal, and on SR 1 between the Roth Bridge and I-95. Specifically, the monitoring program identifies any incidents that resulted in detours that could have been accommodated more safely and efficiently on the Spur Road rather than on the local road network.
- Since 2004, there have been 99 incidents that have resulted in 240 or more hours of detours that could have utilized the Spur Road as an alternate detour route.

**Construction Projects:**

- DeIDOT and the Town of Middletown have had, and will likely continue to have several other active maintenance and construction projects occurring at various times during the duration of the US 301 Spur Monitoring Program that could affect the traffic data being collected. DeIDOT identified one (1) active construction project in the US 301 project area in 2015. Although the SR 1 northbound auxiliary lane project is not located in the vicinity of the US301 project area, it is being mentioned due to the significant traffic impacts it could have had on other roads throughout New Castle County. DeIDOT will continue to monitor all active roadway construction projects in the US 301 project area from south of Middletown to approximately the Chesapeake and Delaware Canal.



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- Appendix C US 301 Corridor Crash Reports*
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- Appendix E Peak Hour Traffic Volume and SYNCHRO Capacity Reports*



## INTRODUCTION

The US301 Spur Road, the subject of this traffic monitoring report, is part of Delaware Department of Transportation's (DelDOT's) US 301 Project (see Figure 1). US 301 is a 1,100 mile interstate route stretching between Sarasota, Florida and New Castle County, Delaware. The tolls and congestion on I-95 combined with the comparatively low traffic volumes on US 301, have made US 301 an attractive alternative route for vehicles, including trucks, traveling between Washington D.C. and Wilmington, Delaware. DelDOT has been studying the US 301 corridor since the 1960's. The need for improved capacity and safety has been heightened over the past two decades by the rapid pace of development throughout the Middletown-Odessa-Townsend (MOT) area and the resulting transformation of southern New Castle County from rural farmland to growing suburbia.

In November 2007, after nearly four decades of study, a preferred alternative was selected, as described in the US 301 Final Environmental Impact Statement. The Federal Highway Administration subsequently approved the Record of Decision on April 30, 2008 which authorized DelDOT to begin final design on the preferred alternative, known as the "Green North + Spur" alternative. In January 2010, the 145<sup>th</sup> General Assembly of Delaware passed House Resolution No. 35 directing DelDOT to *"sit down over the next 6 weeks to develop and negotiate to final resolution a bill to amend the existing epilogue language, with such bill mandating certain trigger mechanisms for the Spur Road."* As a result of that coordination the US 301 Spur Road Monitoring Program was developed to monitor growth in traffic and land use development, and to evaluate the operational characteristics of key roads and intersections. This monitoring program will provide decision makers with data to make an informed decision on the appropriate timing for the construction of the US 301 Spur Road.

This report represents a summary of the sixth year of the monitoring program based on data collected in 2015. This report compares the newly collected data with the data collected and summarized previously in 2010, 2011, 2012, 2013, and 2014, representing the first five years of the monitoring program. The reports from 2010 through 2015 serve as a basis for comparison with data collected in future years.

## US 301 Project History

In the mid-1960's, recognition of the regional significance of the US 301 corridor led DelDOT to investigate opportunities to improve mobility in the corridor. An earlier study resulted in the location selection and subsequent construction of the existing Summit Bridge by the US Army Corps of Engineers (ACOE) in the 1950's. Since that time, southern New Castle County has been transformed from a rural and largely agricultural area to a suburban residential area for commuters employed in Newark, Wilmington, Philadelphia, and throughout the I-95 corridor in Delaware, northern Maryland, southern Pennsylvania, and Southern New Jersey. The Levels, southwest of Middletown, once known as Delaware's most productive agricultural area, is currently evolving into the Westown community of Middletown, and job growth is expanding with a full range of commercial and professional employers supporting the influx of new residents in southern New Castle County. As southern New Castle County continued to develop, the solution to improving mobility in the growing region remained elusive.





In 2004, a new phase of the US 301 project planning effort was initiated, which was focused on addressing the safety and mobility needs of the region with consideration of the findings of a prior study conducted in 2000, the *Greater Route 301 Major Investment Study*. A traffic survey conducted in October 2004 showed that approximately sixty-five percent (65%) of all northbound traffic originating south of the C&D Canal is destined for the northeast to Wilmington, Philadelphia, New Jersey, and points beyond. Thirty-Five percent (35%) of the traffic has destinations to the north towards Newark and Pennsylvania. However, the traffic survey, which asked motorists to document their actual travel routes, showed that despite the majority of northbound destinations being to the northeast, approximately sixty percent (60%) of motorists currently continue north on US 301/SR 896 and then east on I-95, rather than using a more direct east-west route south of the canal.

With careful consideration of the local and regional travel patterns, projected land use growth of the region, a wide range of other social and environmental resources, and significant public input (5 rounds of public workshops and more than 100 community meetings with concerned parties), DelDOT performed a detailed evaluation of several alternatives, including a no-build option and a variety of capacity improvement options. Those efforts resulted in the publication of a Draft Environmental Impact Statement (DEIS) and a recommended alternative in November 2006. One year later, in November 2007, after nearly four decades of study, a preferred alternative was selected, as described in the *US 301 Project Development Final Environmental Impact Statement* (FEIS). The Federal Highway Administration subsequently approved the Record of Decision on April 30, 2008 which authorized DelDOT to begin final design on the preferred alternative, known as the “Green North + Spur” alternative.

## **Monitoring Program**

In January 2010, the 145<sup>th</sup> General Assembly of Delaware passed House Resolution No. 35 directing DelDOT to “sit down over the next 6 weeks to develop and negotiate to final resolution a bill to amend the existing epilogue language, with such bill mandating certain trigger mechanisms for the Spur Road.” As a result of that coordination the US 301 Spur Road Monitoring Program was developed to monitor growth in traffic and land use development, and to evaluate the operational characteristics of key roads and intersections. This monitoring program will provide decision makers with data to make an informed decision on the appropriate timing for the construction of the US 301 Spur Road.

The US 301 Spur Road Monitoring Program consists of three (3) primary components: an Annual Monitoring Program, Public Involvement and the publication of an Annual Summary Report.

### **Annual Monitoring Program**

The US 301 Monitoring Program was created to monitor transportation and land use growth patterns before, during and after construction of the US 301 Mainline Project, as applicable. The monitoring program consists of the annual collection and analysis of daily traffic volumes on select roadways, peak period intersection volumes, vehicular delay at unsignalized intersections, crash data, and land use development data. Each year, the data will be analyzed and compared with data and results from prior years.



## **Public Involvement**

Public involvement has been and continues to be an important part of the US 301 Project. For the US 301 Spur Road Monitoring Program, the annual report will be made publicly available each year on the US 301 project website at [www.us301.deldot.gov](http://www.us301.deldot.gov). Public Involvement will also be solicited at key decision making points, such as the Secretary of Transportation's decision to recommend that construction of the US 301 Spur Road should begin.

The US 301 Spur Road Monitoring Program was presented at the FY2012 – FY2015 Transportation Improvement Program (TIP) Public Workshop on February 28, 2011 at WILMAPCO, attended by DeIDOT staff. The Spur Monitoring Program information was summarized on a large display board that provided an overview of the program including the goals and purpose, and details on the initial data collected on Land Development, Safety, and Traffic.

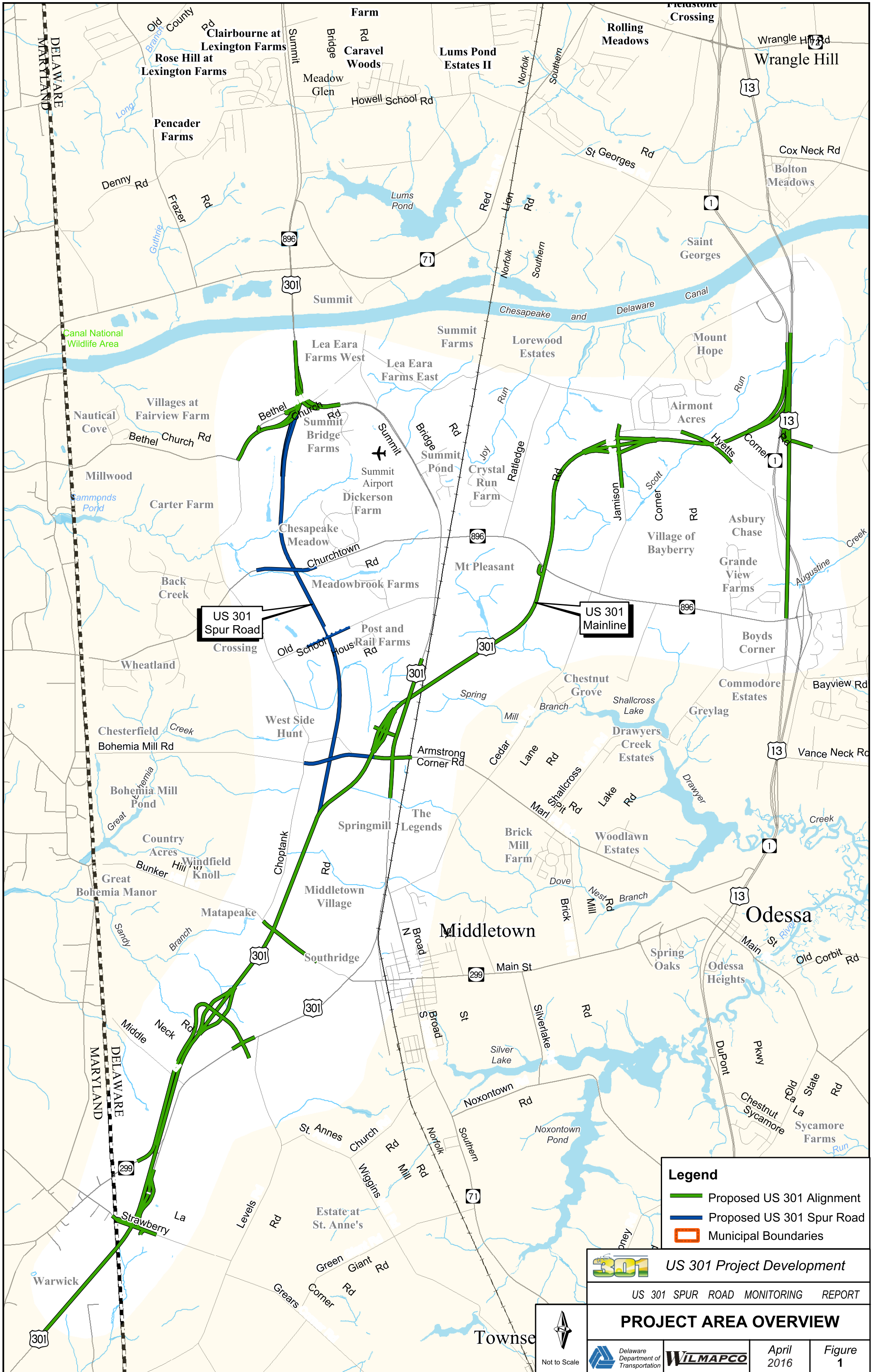
A subsequent WILMAPCO Public Workshop was held on February 23, 2015. It should be noted that there was very little change in the data and findings between 2010 and 2014.

The most recent US 301 Public Workshop, a Construction Information Meeting (CIM), was held in December 2015 to update the public about potential impacts as construction commences for the US 301 Project. Information on the workshop can be found on the project web site: [www.us301.deldot.gov](http://www.us301.deldot.gov).

Determination of public involvement in the future years of the monitoring program will be made on a year to year basis, based upon the magnitude of changes found in each area of the monitoring program.

## **Annual Report**

This report contains a summary of the most recent data collected and analyzed as part of the US 301 Spur Road Monitoring Program. These reports will continue to be developed on an annual basis before, during and after the construction of the US 301 mainline. DeIDOT will present these reports to the General Assembly in April of each year. The reports will provide decision makers, including the Secretary of Transportation, data to make an informed decision on the appropriate timing for the construction of the Spur Road.



**Legend**

- Proposed US 301 Alignment
- Proposed US 301 Spur Road
- Municipal Boundaries

**301** US 301 Project Development

US 301 SPUR ROAD MONITORING REPORT

**PROJECT AREA OVERVIEW**

		April 2016	Figure 1
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 Not to Scale



## MONITORING PROGRAM

### Land Development

The explosive growth in housing and retail in southern New Castle County over the past 10 to 15 years has led to increasing congestion on the local road network, including US 301, SR 299, and SR 896. A number of new residential and retail developments have been completed and many others are in varying stages of construction or planning. As these other planned developments come on line, additional demands will be placed on the transportation infrastructure in the Middletown area.

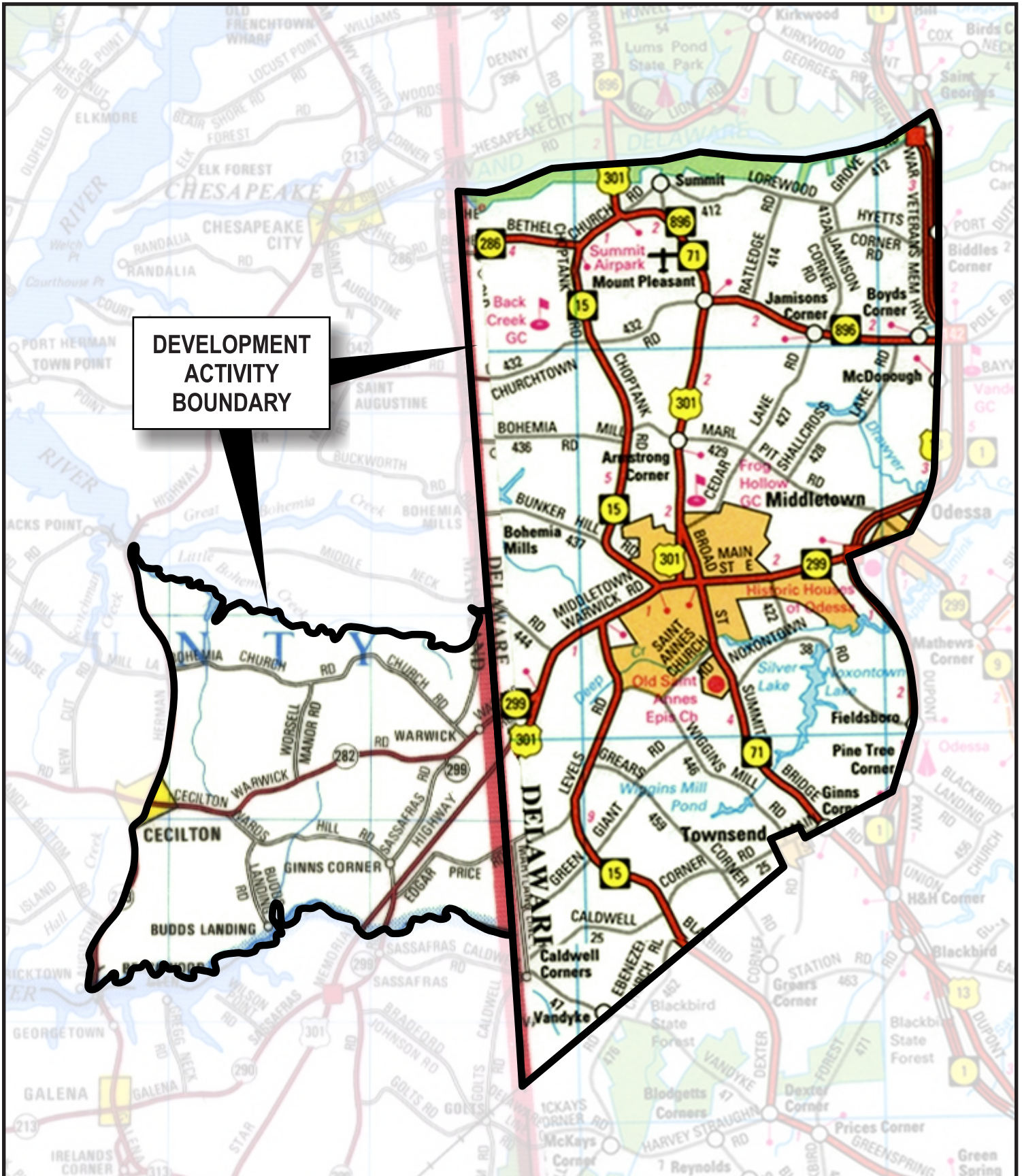
Development activity in New Castle County is monitored by the New Castle County Department of Land Use, the Wilmington Area Planning Council (WILMAPCO), and DeIDOT. Development activity in Middletown is monitored by the Town of Middletown, WILMAPCO, and DeIDOT. WILMAPCO is also tasked with developing short and long-term land-use projections for New Castle County. These projections are constrained on a statewide and countywide basis by the population and employment forecasts provided by the Delaware Population Consortium. WILMAPCO is responsible for projecting how much of that growth will occur in different parts of the county. The primary geographic unit for these projections is the Traffic Analysis Zone (TAZ).

DeIDOT and WILMAPCO have committed to tracking the land development activities in a portion of southern New Castle County and an adjoining portion of Cecil County, Maryland as part of this Monitoring Report. The specific area where development will be tracked annually is depicted in Figure 2. This area represents a total of 34 TAZs in Southern New Castle County and two (2) TAZs in Cecil County, Maryland. Development activity will be monitored in these areas for the length of the project to determine when the surrounding roadway infrastructure may need to be improved based on past, present and near-term development trends.

### **Summary of Development Activity in Southern New Castle (DE) and Cecil (MD) Counties**

WILMAPCO took the lead in coordinating with the various jurisdictions and compiling the land use data for this report. The data in the following sections represents a cumulative total of development since the point when this Spur Monitoring Program commenced. As of December 2014, a total of seventy (70) ongoing commercial and residential developments were in various stages of the planning or building process within the study areas of southern New Castle and Cecil Counties. Fifty-eight (58) of these developments are located in southern New Castle County and twelve (12) developments are located in Cecil County, Maryland. At the time of the publication for this 2015 Spur Monitoring Report, the 2015 residential development data for New Castle County and Cecil County were not available. As a result, 2015 residential development data for New Castle County and Cecil County were left blank and will be updated in the future when the data becomes available. The 2015 residential development data within the Town of Middletown was available and the data was included in the report as Appendix B.

The proposed commercial developments range from smaller properties with 5,000 to 25,000 SF to the major commercial centers, such as the 1.7 million SF Scott Run Business Park and recently completed 1.25 million SF Amazon.com Fulfillment Center. A number of proposals call for mixed-use development, combining residential and commercial activities at one site.



**DEVELOPMENT  
ACTIVITY  
BOUNDARY**



US 301 Project Development

US 301 SPUR ROAD 2015 MONITORING REPORT

**MAJOR DEVELOPMENT LOCATION MAP**



**SCALE IN MILES**



As Shown



Delaware  
Department of  
Transportation

April 2016

Figure  
2



### Residential Development Summary

The ongoing residential development within the study area consists of a variety of housing types, including single-family detached dwellings, townhomes, and apartments. The various residential developments were classified in differing stages of completion: Built, Approved but Unbuilt, or Pending (includes Exploratory and Expired Proposals). The 2015 residential development data for New Castle County and Cecil County were not available; therefore, the 2015 data in Figure 3 was left blank. It will be updated in future when the data becomes available.

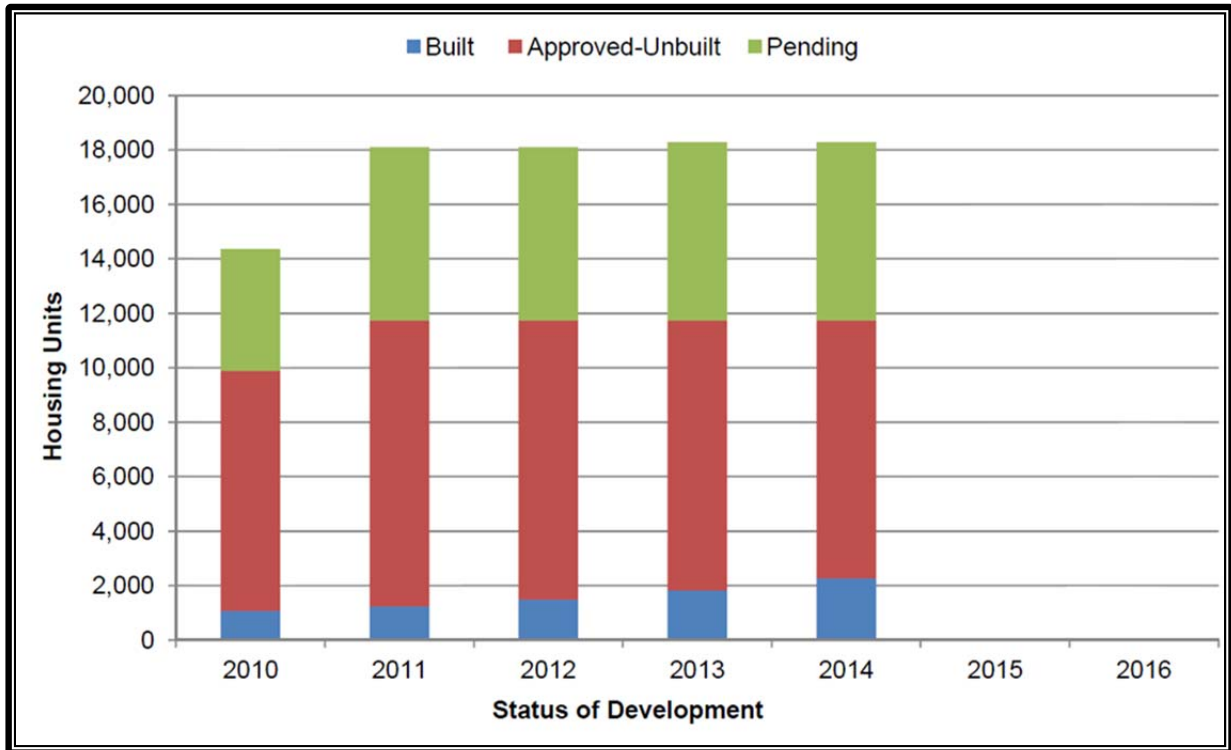


Figure 3: Residential Development in Study Area

**Snapshot - Residential Construction in the Town of Middletown:** Of the developments described above, seventeen (17) of the residential developments are located within the Town of Middletown. Of the 17 developments, fifteen (15) developments have been in various stages of development since the monitoring program began. It should be noted that the development originally listed as Westtown (Levels) has been divided into smaller developments named Preserve at Deep Creek, Legary at Deep Creek, Habitat and Promenade / Middletown Condominiums in 2015. Seven (7) of these 17 developments were completed by the end of 2007, with an eighth (Middletown Village) completed by the end of 2010 and then a ninth (Willow Grove Mill) completed by the end of 2012. A tenth (townhouse portion of Spring Arbor at South Ridge) development was completed in 2015. More recently, there were 171 new housing units completed between 2014 and 2015. The 17 developments include a total of 6,707 housing units, including approximately 3,600 single-family detached homes, 240 duplexes, 1,600 townhomes, and 1,270 apartments / condos. WILMAPCO was able to provide data on the number of units built within each of these residential developments between 2007 and 2015:



- By the end of 2007, a total of 2,179 (28%) of the proposed 7,728 housing units within the Town of Middletown had been constructed.
- By the end of 2009, a total of 2,735 (35%) of the proposed 7,728 housing units within the Town of Middletown had been constructed.
- By the end of 2010, a total of 2,951 (38%) of the proposed 7,728 housing units within the Town of Middletown had been constructed.
- By the end of 2011, a total of 3,008 (39%) of the proposed 7,728 housing units within the Town of Middletown had been constructed.
- By the end of 2012, a total of 3,132 (41%) of the proposed 7,728 housing units within the Town of Middletown had been constructed.
- By the end of 2013, a total of 3,221 (42%) of the proposed 7,728 housing units within the Town of Middletown had been constructed.
- By the end of 2014, a total of 3,351 (43%) of the proposed 7,728 housing units within the Town of Middletown had been constructed.
- By the end of 2015, a total of 3,522 (53%) of the proposed 6,707 housing units within the Town of Middletown had been constructed. It should be noted that the total number of proposed housing units decreased from 2014 due to changes to the Westown (Levels) development.
- This represents an increase of 1,343 housing units completed over the seven (7) year period between 2007 and 2015 and includes 171 new units completed between 2014 and 2015.

Appendix B respectively lists the number of apartments, duplexes, townhouses, and single family homes that have been built and remain to be built in the Town of Middletown.

### **Commercial (Non-Residential) Development**

The ongoing commercial development within the study area consists of various uses, including office space, retail, and light industrial development (including warehouse space). The commercial developments were divided into Approved and Pending (Exploratory) categories.

By the end of 2015, developers had submitted plans that are currently either approved or pending for over 12 million square feet (SF) of non-residential space in southern New Castle County, which included a new 228,000 SF Technology Center (Auto Park Parcel) and a new 160,000 SF Delaware Sport Complex. This represents an increase of 156,500 SF (+1%) of approved or pending commercial development, compared to 2014. Physically, 12 million SF of non-residential space represents approximately 11.3 million SF of approved development (compared to 11 million SF in 2014) with another 0.7 million SF in pending approval (compared to 0.8 million SF in 2014). Of the 11.3 million SF of development approved as of 2015, at least 4.3 million SF (38%) had been constructed by the end of 2015.

Currently, no non-residential developments are proposed in the two (2) TAZs in Cecil County that are included in the study area. Figure 4 depicts the cumulative approved and pending commercial development in the study area since the Spur Monitoring Program commenced.

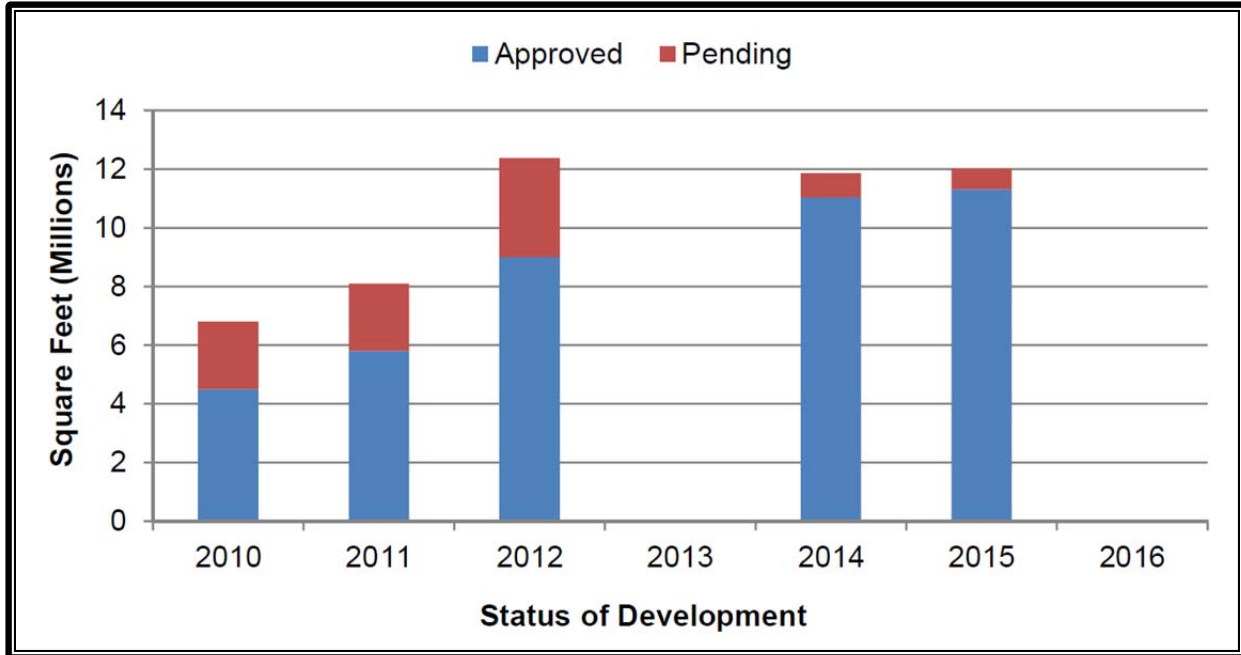


Figure 4: Non-Residential Development in Study Area

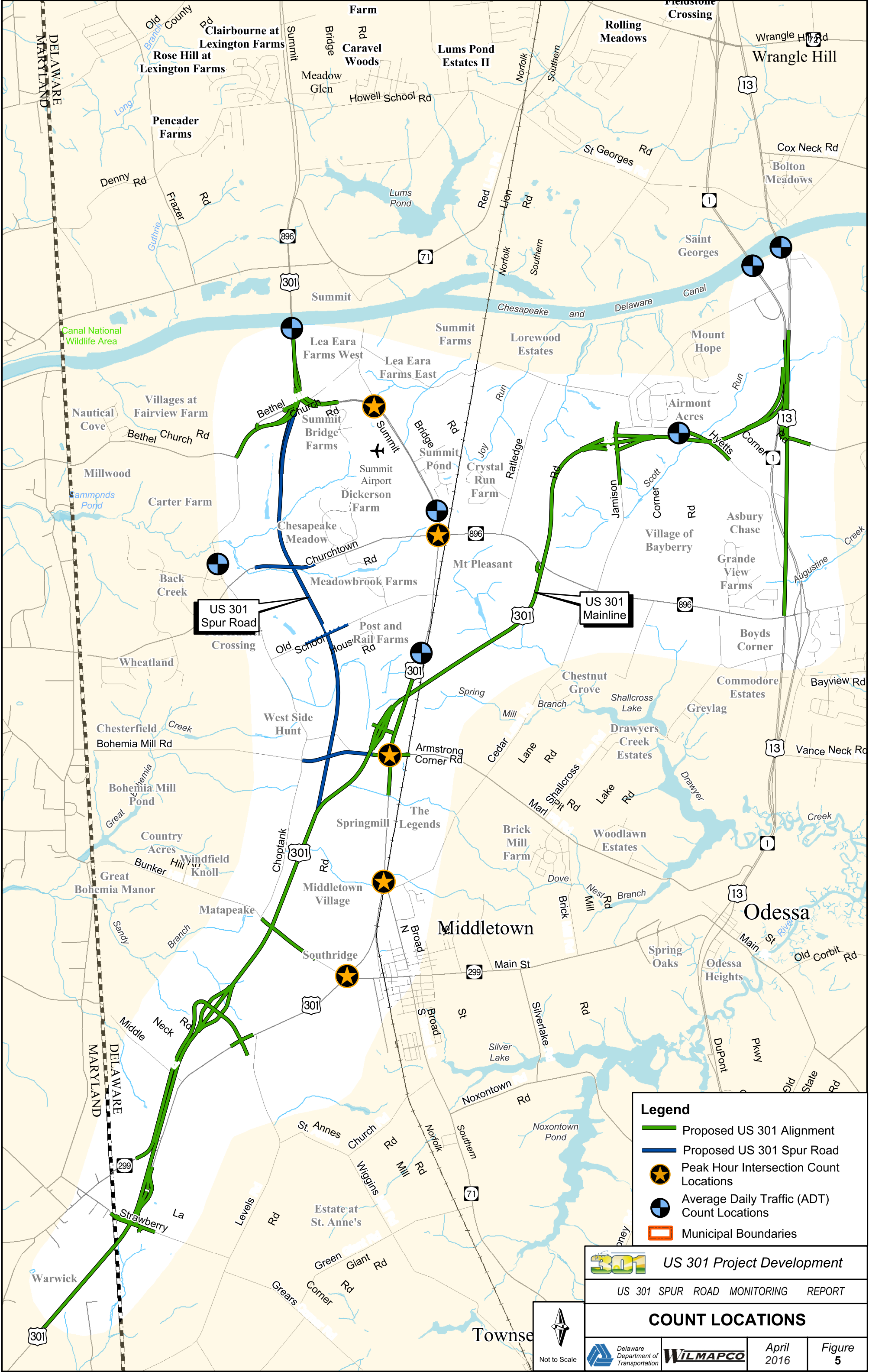
## Traffic

Traffic is an important part of the US 301 Spur Road Monitoring Program. The US 301 project team has been gathering a variety of traffic data annually on key roads within the project corridor to determine the current level of traffic on these roads and to track growth trends throughout the region. Specifically, the following traffic data is being collected each year: mainline roadway volume counts, intersection turning movement counts, and vehicular delays at unsignalized intersections. The data collected in 2010 serves as the base year data for the US 301 Spur Road Monitoring Program. Intersection turning movement counts and mainline volume counts have been performed at each location shown in Figure 5 each year since 2010, and will continue to be collected every year during the construction of the new US 301 alignment from the MD/DE state line to SR 1. This annual traffic monitoring will show how traffic volumes change over time as new development continues to occur.

## Roadway Volumes

Mainline volume counts were collected along six (6) key roadways within the US 301 project area during each October between 2010 and 2015 (see Figure 5). Automatic traffic recording equipment, commonly called “tube counters”, were used to record the volume and classification of vehicles that pass over the equipment in each direction. This data is used to determine the Average Daily Traffic (ADT) and percentage of trucks travelling on each roadway segment (see Tables 1 and 2). Daily traffic volumes have increased at all of the locations studied between 2010 and 2015. This included Choptank Road where the volume increased by 38% between 2010 and 2015, US 13 at St. Georges Bridge where volumes increased by 23%, the Summit Bridge (US 301) where volumes increased by 14%, and SR 1 at the Roth Bridge which experienced an increase of 12% between 2010 and 2015.





**Legend**

- Proposed US 301 Alignment
- Proposed US 301 Spur Road
- Peak Hour Intersection Count Locations
- Average Daily Traffic (ADT) Count Locations
- Municipal Boundaries

**US 301 Project Development**

US 301 SPUR ROAD MONITORING REPORT

**COUNT LOCATIONS**

		April 2016	Figure 5
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Not to Scale

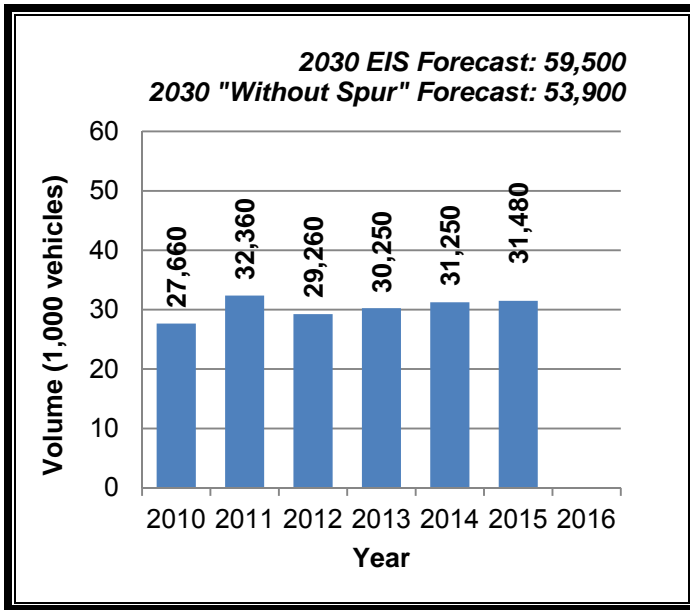


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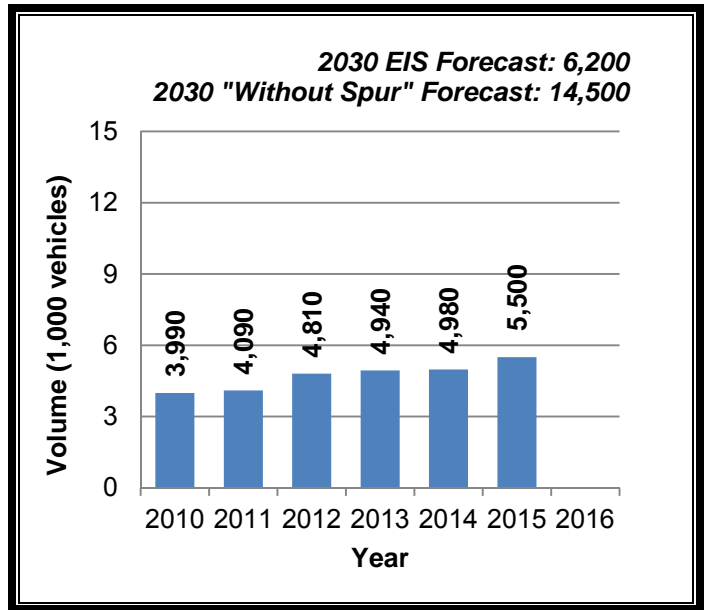
**Table 1:  
Average Daily Traffic for Select Roadway Segments along US 301**

Roadway Link	2010 ADT*	2011 ADT	2012 ADT	2013 ADT	2014 ADT	2015 ADT	2016 ADT
Summit Bridge (US 301)	27,660	32,360	29,260	30,250	31,250	31,473	
Choptank Rd, North of Churchtown Rd	3,990	4,090	4,810	4,940	4,980	5,500	
SR 1 at Roth Bridge	73,690	78,740	74,900	76,940	77,280	81,943	
US 13 at St. Georges Bridge	10,600	9,070	12,190	12,270	13,520	12,999	
US 301/SR 896, North of Mt. Pleasant	23,450	23,810	24,760	24,980	24,490	25,176	
US 301, between Armstrong Corner Rd and Mt. Pleasant	21,830	22,460	22,710	22,360	22,860	23,846	
US 301 Bypass	-	-	-	-	-	-	

\*Data was collected for a seven (7) day period in October / November from 2010 through 2015. Seasonal Adjustments were not made to these volumes because: a) October/November volumes are typically representative of the annual average volumes, and b) because volumes will be collected during the same months in subsequent years.



**Figure 6: Average Daily Traffic (ADT) for Summit Bridge (US 301)**



**Figure 7: Average Daily Traffic (ADT) for Choptank Rd, North of Churchtown Rd**

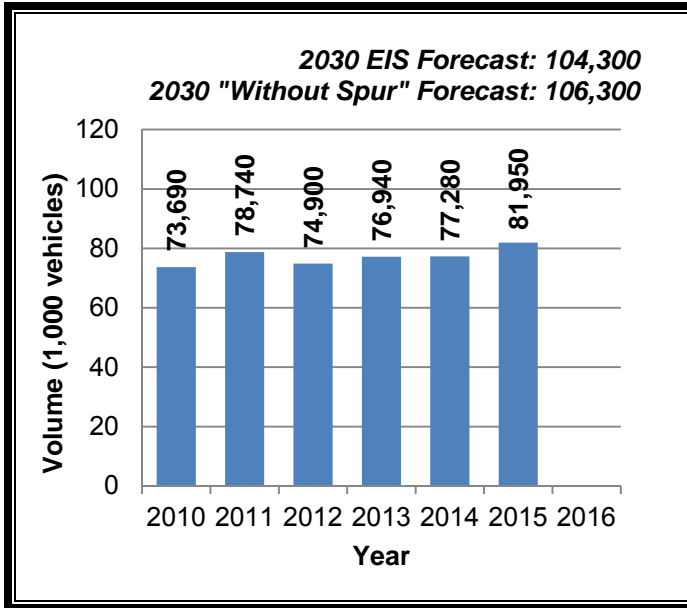


Figure 8: Average Daily Traffic (ADT) for Roth Bridge (SR 1)

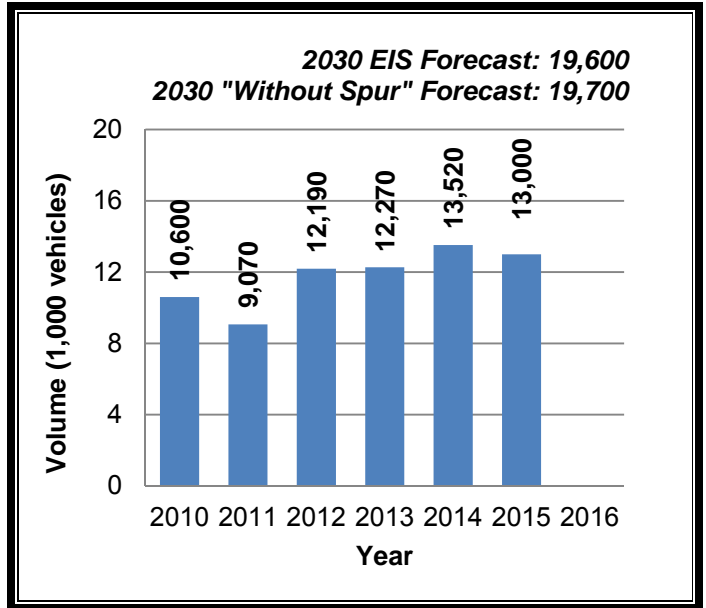


Figure 9: Average Daily Traffic (ADT) for St. George's Bridge (US 13)

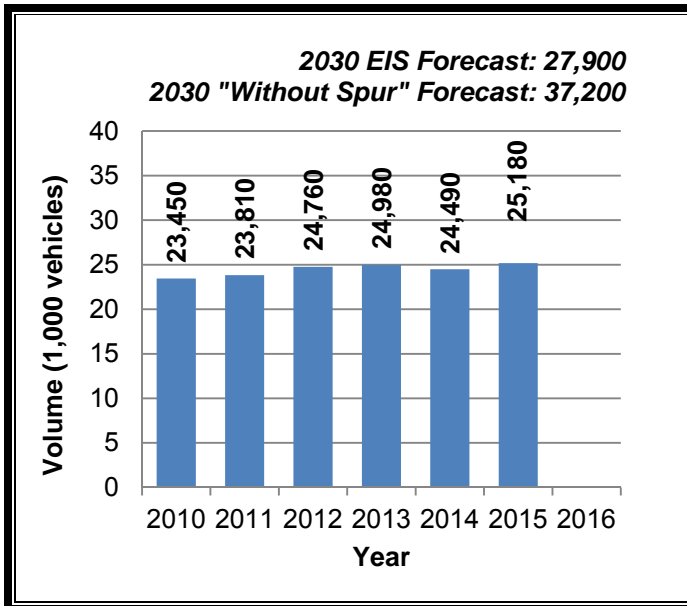


Figure 10: Average Daily Traffic (ADT) for Existing US 301 North of Mt. Pleasant

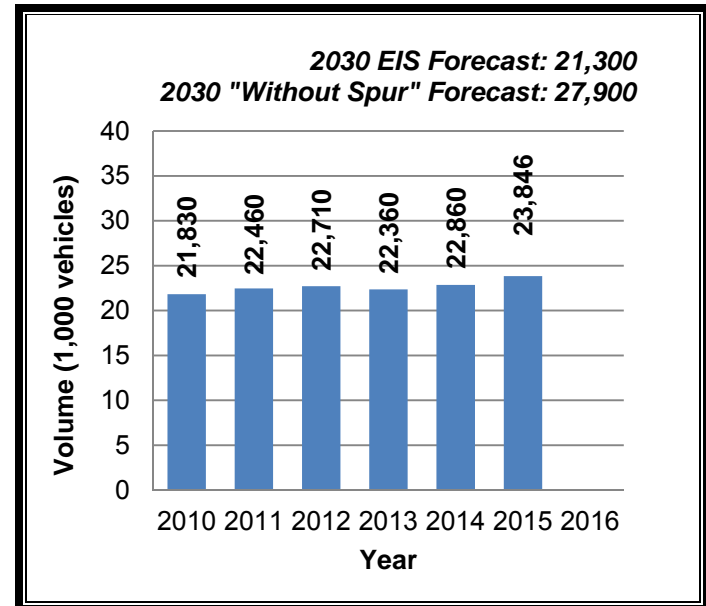


Figure 11: Average Daily Traffic (ADT) For existing US 301 between Armstrong Corner Rd and Mt. Pleasant



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**Table 2: Average Daily Truck Volume and Average Daily Truck Percentage\*  
on Select Roadway Segments along US 301**

Roadway Link	2010		2011		2012		2013		2014		2015		2016	
	Volume	% Trucks	Volume	% Trucks	Volume	% Trucks	Volume	% Trucks	Volume	% Trucks	Volume	% Trucks	Volume	% Trucks
US 301 at Summit Bridge	2,210	8	3,100	10	2,370	8	2,480	8	2,650	8	2,360	7		
Choptank Rd, North of Churchtown Rd	490	12	560	14	370	8	170	3	220	4	280	5		
SR 1 at Roth Bridge	7,860	11	9,020	11	7,840	11	6,620	9	8,330	11	9,670	12		
US 13 at St. Georges Bridge	570	5	440	5	1,165	10	585	5	680	5	730	6		
US 301 / SR 896, North of Mt. Pleasant	1,970	8	1,840	8	2,300	9	1,840	7	1,670	7	2,250	9		
US 301, between Armstrong Corner Rd and Mt. Pleasant	2,910	13	3,000	13	3,075	14	2,990	13	2,930	13	2,900	12		
US 301 Bypass	-	-	-	-	-	-	-	-	-	-	-	-	-	-

\*Trucks include FHWA Class 5-13, representing all trucks larger than and including two-axle single unit trucks, such as UPS delivery trucks and DART Paratransit buses.

### Signalized Intersections

Peak period turning movement counts are being collected on an annual basis at five (5) key signalized intersections in the project area. These five (5) locations, which are all located along the existing US 301 Corridor between Middletown (SR 299) and the Summit Bridge, are being analyzed annually to monitor the change (degradation or improvement) in operation of each intersection. The five (5) locations, summarized in Figure 5, and Table 3, are the signalized intersections of existing US 301 / SR 896 at Old Summit Bridge Road, Boyds Corner Road, Armstrong Corner Road, North Broad Street, and Bunker Hill Road. Peak hour turning movement counts were performed at these intersections during October 2015. This data was used to create a model of the corridor using Synchro (Version 9), a macroscopic traffic analysis software application used to evaluate the operational performance characteristics of signalized and unsignalized intersections. The results of these analyses are summarized in Table 3 and Figures 12 and 13.

For this monitoring report, the operational performance of signalized intersections is presented in terms of average delay per vehicle and a corresponding letter grade, typically referred to as "Level of Service" (LOS). Level of Service "A" (delay ≤ 10 sec/vehicle) represents the best possible operating conditions, whereas LOS "F" (delay > 80 sec/veh) represents congested conditions corresponding with traffic that has reached or exceeded available intersection capacity, resulting in relatively high average delay per vehicle and higher likelihood that vehicles will take more than one signal cycle to clear the intersection.



The intersection capacity analyses results from 2010 through 2015 are summarized in Table 3 and the following trends were observed:

- US 301 at Old Summit Bridge Road: The intersection operated at LOS A during both the AM and the PM peak hours each year between 2010 and 2015.
- US 301 at SR 896: The intersection operated at LOS C during both the AM and the PM peak hours each year between 2010 and 2015.
- US 301 at Armstrong Corner Road / Marl Pit Road: The intersection operated at LOS C during both the AM and the PM peak hours in 2010, 2012, and 2013; however, the intersection operated at LOS D during both the AM and the PM peak hours in 2011, 2014, and 2015. The increase in delay in 2014 and 2015 may be attributable to new housing developments east of the intersection on Marl Pit Road.
- US 301 at SR 71: The intersection operated at LOS C during the AM peak hour each year between 2010 and 2015. The intersection operated at LOS D during the PM peak hour in 2010, 2011, 2012, and 2013; however, the intersection operated at LOS C during the PM peak hour in 2014 and 2015. The recent reduction (improvement) in delay may be attributable to modifications to the traffic signal timing.
- US 301 at SR 299: The intersection operated at LOS D during the AM peak hour in 2010, 2011, 2012, and 2013; however, the intersection operated at LOS C during the AM peak hour in 2014 and 2015. The intersection operated at LOS D during the PM peak hour in 2010, 2011, 2012, 2013 and 2014; however, the intersection operated at LOS C during the PM peak hour in 2015. The recent reduction (improvement) in delay may be attributable to modification to the traffic signal timing.

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Table 3: Peak Hour LOS at Selected Signalized Intersections along US 301															
Site	2010		2011		2012		2013		2014		2015		2016		
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
US 301 at Old Summit Bridge Rd	A	A	A	A	A	A	A	A	A	A	A	A			
US 301 at SR 896	C	C	C	C	C	C	C	C	C	C	C	C			
US 301 at Armstrong Corner Rd	C	C	D	D	C	C	C	C	D	D	D	D			
Existing US 301 at SR 71	C	D	C	D	C	D	C	D	C	C	C	C			
Existing US 301 at SR 299	D	D	D	D	D	D	D	D	C	D	C	C			

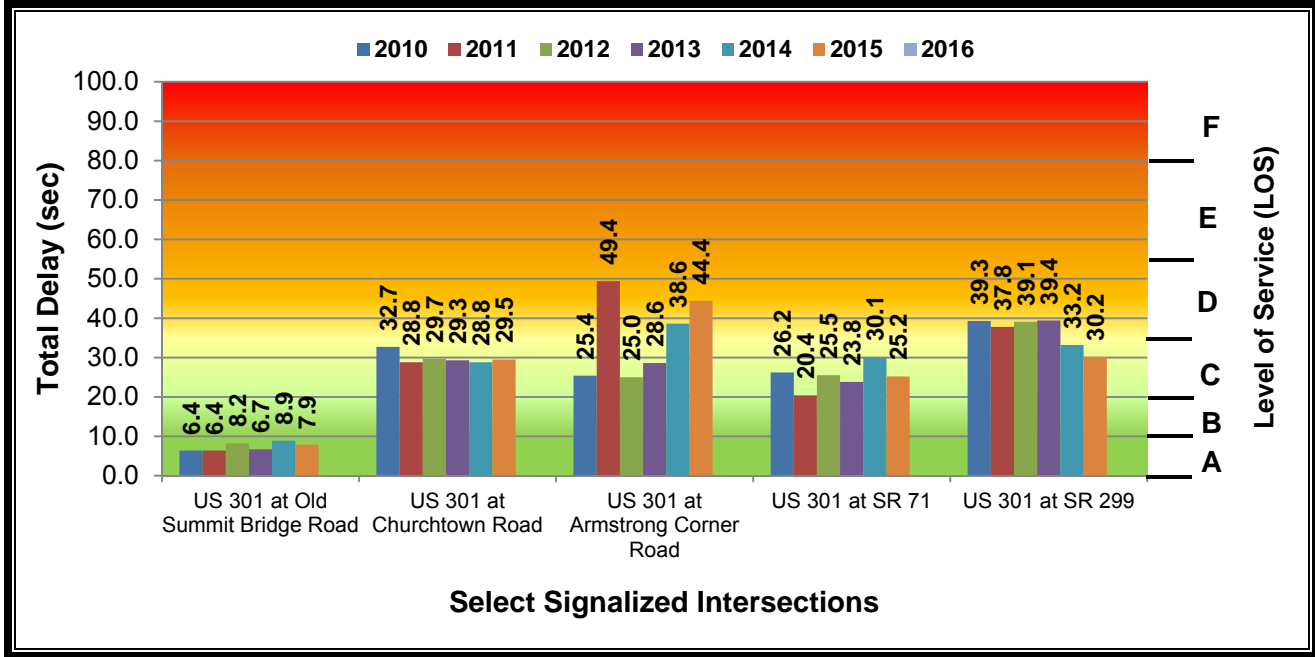


Figure 12: Total Delay and Corresponding Level of Service (LOS) at Select Signalized Intersections along US 301 during the AM Peak Hour

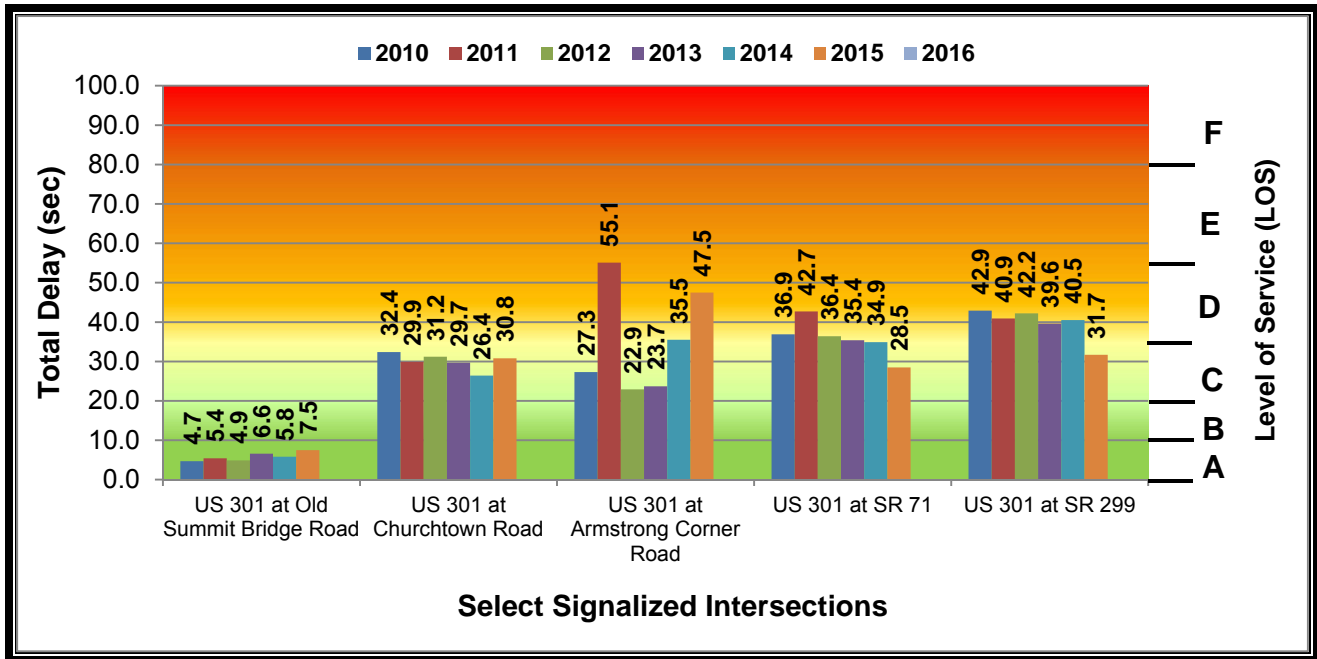


Figure 13: Total Delay and Corresponding Level of Service (LOS) at Select Signalized Intersections along US 301 during the PM Peak Hour



## Unsignalized Intersections

Delay studies were performed at the following three (3) unsignalized intersections along the existing US 301 and Choptank Road corridor:

- US 301 at Old School House Road
- US 301 at Keenan Auto Body
- Choptank Road at Clayton Manor Drive

The locations were selected to represent the typical operation of unsignalized access points along the US 301 and Choptank Road corridors, both of which are likely to be impacted by construction of the Spur Road. Similar to the signalized intersections, the operational performance of unsignalized intersections is presented in terms of average delay per vehicle and a corresponding Level of Service (LOS). For unsignalized intersections, the Level of Service thresholds are somewhat lower than the thresholds for signalized intersections, with LOS F representing conditions where vehicles experience 50 or more seconds of delay.

The number of vehicles stopping at the stop sign and the length of each stop was recorded at each of the three study intersections during the PM peak hour. The PM peak hour was selected since it represents the period that vehicles typically experience the highest level of delay making turns from minor street approaches onto US 301 and Choptank Road. The average delay per stopped vehicle was determined for each location (see Figure 14). In 2015, the average control delay was 22 seconds per vehicle (LOS C) at the intersection of US 301 and Old School House Road, 19 seconds per vehicle (LOS C) at the intersection of US 301 at Keenan Auto Body and 13 seconds per vehicle (LOS B) at the intersection of Choptank Road and Clayton Manor Drive. The results of the delay studies from 2010 through 2015 are shown in Figure 14.

The delay at the Keenan Autobody access has fluctuated over the six years of monitoring from a high of 58 seconds in 2011, to a low of 16 seconds in 2013. The increased delay in 2011 may have been attributable to the Cedar Lane Road closure which was necessary to repair the bridge just north of the Marl Pit Road intersection. The delay in 2015 (19 seconds) was much lower than the delay in 2010 (37 seconds).

The delay at the intersection of Choptank Road and Clayton Manor Drive in 2015 is approximately the same as it was in 2010. Lastly, the intersection of US 301 and Old School House Road now operates with 17 fewer seconds of delay per vehicle than it did in 2010.

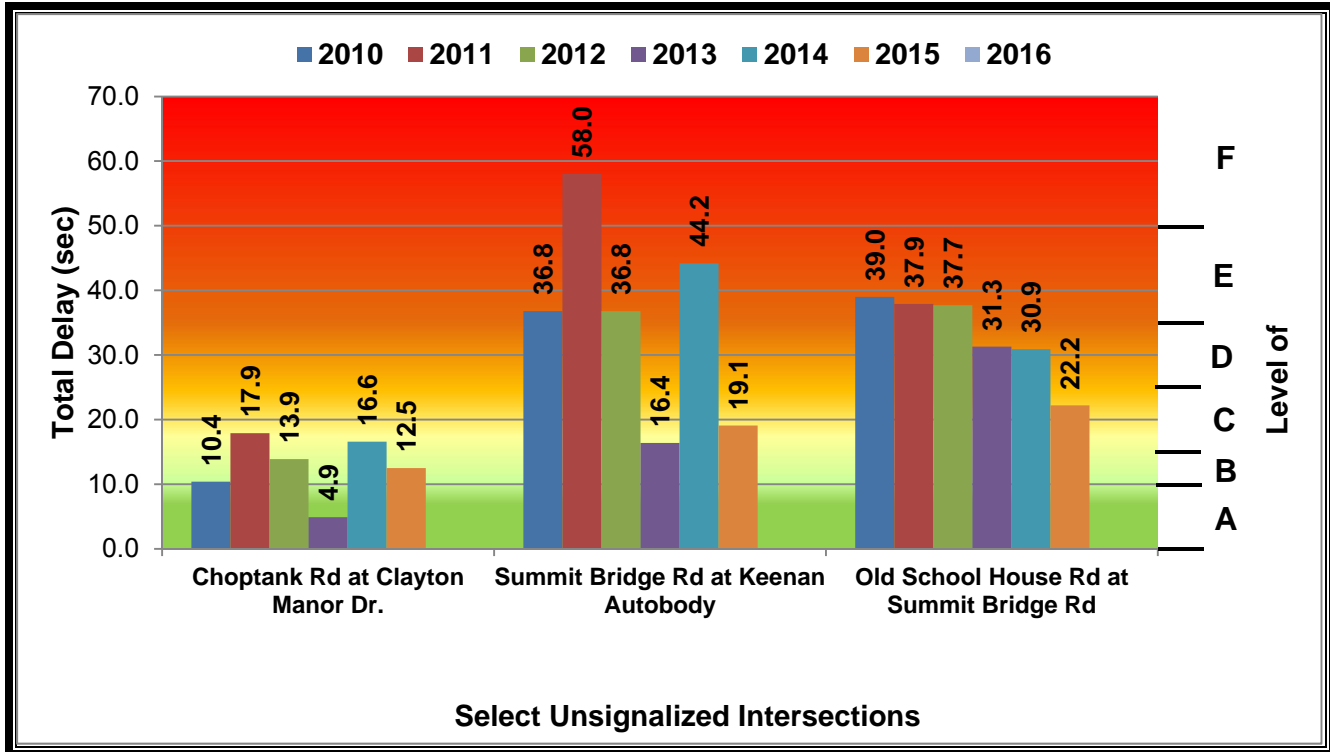


Figure 14: Total Delay and Corresponding Level of Service (LOS) at Select Unsignalized Intersections along US 301 during the PM Peak Hour

## Highway Safety

The goal of this annual monitoring report with respect to safety is to monitor the number of crashes occurring on local roads throughout the US 301 Project Area. The number of crashes is being documented each year to determine if any road segments experience a significant increase in crashes.

The number of reported crashes occurring within each key roadway segment in 2010 through 2015 is shown in Table 4 and on Figure 15. Crash data for prior years, while available, was not included in this summary for two reasons: First, there was a considerable amount of roadway construction activity ongoing during 2007 and 2008 throughout the project area that would likely skew the crash data for those years, including long-term lane reductions and temporary closures of US 301, construction along Choptank Road, etc. Second, data will be collected each year for several years into the future, providing a basis for comparison of several years' worth of crash data, including the identification of crash trends over time.

Average Crash Rates were calculated for eight (8) roadway segments in the vicinity of the US301 Corridor to provide a relative measure of comparison to the Statewide and New Castle County average crash rates (see Table 4). The calculated Average Crash Rates were compared to the Statewide and New Castle County crash rates for similar roadway segments of the same functional classifications. The DelDOT Safety Section provided the Statewide and New Castle County Average Crash Rates each year between 2010 and 2015. According to the comparison, five (5) of the eight roadway segments being monitored had higher crash rates than the Statewide and New Castle County Average Crash Rate in 2015.





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Table 4A: Average Crash Rate for Roadway Type (ACRT) (Accidents/ Million Vehicle Miles Traveled)																
Site	2010				2011				2012				2013			
	Number of Crashes	Crash Rate	Delaware Crash Rate	NCC Crash Rate	Number of Crashes	Crash Rate	Delaware Crash Rate	NCC Crash Rate	Number of Crashes	Crash Rate	Delaware Crash Rate	NCC Crash Rate	Number of Crashes	Crash Rate	Delaware Crash Rate	NCC Crash Rate
US 301 between Summit Bridge and SR 896 (Boyd's Corner Rd)	32	1.44	0.75	0.55	21	0.93	0.74	0.53	21	0.95	0.47	0.55	23	0.98	0.73	0.51
The "curve" between Summit Bridge and Bethel Church Rd	2				5				4				5			
The intersection of US 301 and Bethel Church Rd	3				3				3				6			
US 301 between SR 896 and Peterson Rd	50	1.78	1.27	1.35	27	0.94	1.40	1.42	42	1.40	1.30	1.42	50	1.72	1.38	1.39
US 301 between Peterson Rd and Levels Rd	22	3.06	3.43	3.78	16	2.18	3.41	3.81	22	2.86	3.04	3.79	19	2.12	3.40	3.81
US 301 between Levels Rd and DE / MD State Line	19	1.42	1.27	1.35	13	0.95	1.40	1.42	10	0.65	1.30	1.42	11	0.73	1.38	1.39
Bethel Church Rd between US 301 and Choptank Rd	6	6.05	2.10	2.91	2	1.30	2.08	2.80	3	2.02	0.65	2.85	1	0.65	2.06	2.78
Choptank Rd between Bethel Church Rd and Bunker Hill Rd	8	3.32	2.10	2.91	5	0.86	2.08	2.80	10	1.76	0.65	2.85	12	1.51	2.06	2.78
Bunker Hill Rd between Choptank Rd and US 301	5	8.83	2.10	2.91	7	12.97	2.08	2.80	4	4.07	0.65	2.85	6	5.88	2.06	2.78
SR 1 between the Roth Bridge and the US 13 / SR 1 Split (Tybouts Corner)	53	0.41	1.09	1.09	69	0.52	1.12	1.12	47	0.34	1.09	1.09	71	0.51	1.10	1.10



US 301 Spur Road 2015 Monitoring Report														April 2016			
Table 4B: Average Crash Rate for Roadway Type (ACRT) (Accidents/ Million Vehicle Miles Traveled)																	
Site	2014				2015				2016				2017				
	Number of Crashes	Crash Rate	Delaware Crash Rate	NCC Crash Rate	Number of Crashes	Crash Rate	Delaware Crash Rate	NCC Crash Rate	Number of Crashes	Crash Rate	Delaware Crash Rate	NCC Crash Rate	Number of Crashes	Crash Rate	Delaware Crash Rate	NCC Crash Rate	
US 301 between Summit Bridge and SR 896 (Boyd's Corner Rd)	32	1.31	0.69	0.44	27	1.17	0.59	0.35									
The "curve" between Summit Bridge and Bethel Church Rd	5				4												
The intersection of US 301 and Bethel Church Rd	10				12												
US 301 between SR 896 and Peterson Rd	56	1.81	1.43	1.50	77	2.36	1.53	1.50									
US 301 between Peterson Rd and Levels Rd	38	4.28	3.50	3.98	39	4.17	3.20	3.86									
US 301 between Levels Rd and DE / MD State Line	9	0.58	1.43	1.50	10	0.68	1.53	1.50									
Bethel Church Rd between US 301 and Choptank Rd	4	2.47	2.07	2.65	5	2.63	1.99	2.24									
Choptank Rd between Bethel Church Rd and Bunker Hill Rd	16	1.91	2.07	2.65	16	1.85	1.99	2.24									
Bunker Hill Rd between Choptank Rd and US 301	5	4.67	2.07	2.65	4	3.61	1.99	2.24									
SR 1 between the Roth Bridge and the US 13 / SR 1 Split (Tybouts Corner)	77	0.52	1.09	1.09	115	0.74	1.09	1.09									

Between 2010 and 2012, the number of crashes decreased at most of the locations being monitored. Only two locations experienced an increase of crashes between 2010 and 2012. However, the number of crashes increased at most (6 of 8) of the locations being monitored between 2012 and 2015. This included US 301 between Summit Bridge and SR 896 (Boyd's Corner Road), where the number of crashes increased from 21 in 2012 to 27 in 2015, US 301 between SR 896 (Boyd's Corner Road) and Peterson Road, where the number of crashes increased from 42 in 2012 to 77 in 2015, US 301 between Peterson Road and Levels Road, where the number of crashes increased from 22 in 2012 to 39 in 2015, Bethel Church Road between Choptank Road and US 301, where the number of crashes increased from 3 in 2012 to 5 in 2015, Choptank Road between Bethel Church Road and Bunker Hill Road, where the number of crashes increased from 10 in 2012 to 16 in 2015, and SR 1 between Roth Bridge and US 13/ SR 1 Split (Tybouts Corner), where the number of crashes increased from 47 in 2012 to 115 in 2015.

The number of crashes remained the same from 2012 to 2015 for the section of US 301 between Levels Road and the DE / MD state line, where there were 10 crashes.

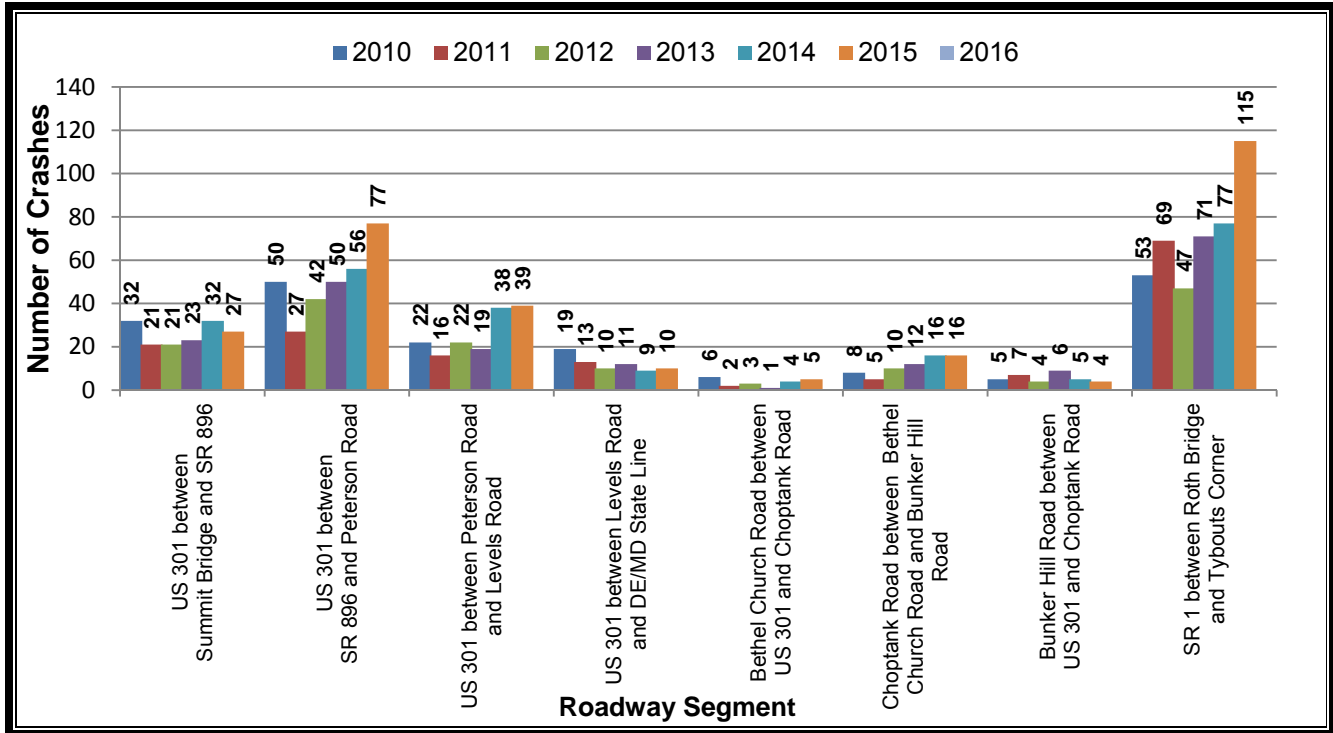


Figure 15: Comparison of Crashes for Select Roadways in the US 301 Corridor

### Hazard Elimination Program

Roadway segments in the project area that are reported within DeIDOT's Hazard Elimination Program (HEP) will be identified each year during the construction of US 301. DeIDOT's High Risk Rural Roads Program (HRRRP) locations between 2007 and 2012 also have been identified; however, it should be noted that HRRRP was discontinued at the end of 2012. These programs seek improvements focused on reducing the number of crashes at each location. A list of the HEP and HRRRP locations between 2007 and 2015 can be found in Tables 5 and 6.



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Table 5: Hazard Elimination Program Locations – From 2006 to 2015			
Site	Start Milepost	End Milepost	Year Studied
US 13	0.19 miles South of Greylag Road	0.24 miles North of Boyds Corner Road	2006
US 301/SR 896 Summit Bridge Rd	0.44 miles North of Beaston Rd	0.56 miles South of Bethel Church Rd	2007
SR 299/Main Street	0.25 miles West of Brick Mill Road	0.24 miles East of Brick Mill Road	2007
SR 299/Main Street	0.35 miles East of Brick Mill Road	0.23 miles West of Brick Mill Road	2009
SR 1	1.36 miles South of SR 299	0.97 miles south of SR 299	2009
SR 299/Main Street	US 301	0.11 miles East of Silver Lake Road	2010
US 301/SR 896 Summit Bridge Rd	0.21 miles North of Springmill Drive	0.25 miles North of Marl Pit Road	2011
SR 299	0.1 mile west of Park Alley	Northbound US 13	2012
US 301 / SR 896	Churchtown Road	0.29 mile north of Churchtown Road	2012
US 301 / SR 896	0.44 miles north of Beaston Road	0.46 miles south of Bethel Church Road	2013
US 13	0.33 miles south of SR 1 ‘Free Ramp’	0.26 miles north of SR 1 ‘Free Ramp’	2014
Bunker Hill Road	0.04 miles west of Sandhill Drive	US 301	2014
US 301	0.07 miles west of Ash Boulevard	0.04 miles east of US 301	2015

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Table 6: High Risk Rural Roads Program Locations – from 2007 to 2012			
Site	Start Milepost	End Milepost	Year Studied
Churchtown Rd	0.11 miles East of Dickerson Lane	0.33 miles West of SR 896/ Summit Bridge Rd	2009
Cedar Lane Road	0.33 mile south of SR 896	0.04 mile south of SR 896	2012

**Incident Management**

One of the regional benefits identified with the Spur Road is that it will provide an alternative north-south route for traffic should there be an incident that occurs on the following road segments:

- Existing US 301 between SR 299 and Bethel Church Road



- SR 896 (Boyds Corner Road) between US 301 and US 13
- Bethel Church Road between US 301 and Choptank Road
- SR 1 between Roth Bridge and I-95

For this monitoring program, DeIDOT is tracking the number of significant incidents that occur each year on these roads which result in detours that could have been accommodated more safely and efficiently on the Spur Road rather than on the local road network. Since 2004, there have been 99 incidents, including 15 in 2015, that have resulted in 240 or more hours of detour-related delay. These incidents occurred in locations that could have utilized the Spur Road as an alternate detour route if it existed, thereby reducing impacts to the local roadway network. Additional detail for each of these incidents that has occurred since 2004 are summarized in Appendix D.

### Construction Projects

DeIDOT and the Town of Middletown will likely have several other active maintenance and construction projects occurring at various times during the duration of the US 301 Spur Monitoring Program that could affect the traffic data being collected. DeIDOT identified one (1) active construction project in the US 301 project area in 2015, as shown in Table 7. Although the SR 1 northbound auxiliary lane project is not located in the vicinity of the US301 project area, it should be mentioned due to its significant traffic impacts to SR 1 in New Castle County. As part of the program, DeIDOT will continue to monitor all active roadway construction projects in the US 301 project area from south of Middletown to approximately the Chesapeake and Delaware Canal.

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Table 7: Construction Activity in the US 301 Project Area in 2015			
Contract Number	Project Title	Start/End	Project Description
T201511001	SR 1 Northbound Auxiliary Lane, US 40 to SR 273	September 2015 / November 2015	Widening of existing shoulder and overlay of existing pavement between US 40 and SR 273
T201206109	Pavement & Rehabilitation, North IX, 2012	December 2013 / 2015	Milling, overlay and ADA improvements along SR 71 between Townsend and Middletown.



**Appendix A**  
**Proposed Development for Southern New Castle County**

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Data to be added in the future as it becomes available.



**Appendix B**  
**Residential Construction in the Town of Middletown**

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**Appendix B:  
Apartment Complex Construction in the Town of Middletown**

Site	Proposed	2010		2011		2012		2013		2014		2015		2016	
		Built	Unbuilt	Built	Unbuilt	Built	Unbuilt	Built	Unbuilt	Built	Unbuilt	Built	Unbuilt	Built	Unbuilt
Highlands	336	0	336	0	336	0	336	0	336	0	336	0	336		
Middletown Village	300	300	0	300	0	300	0	300	0	300	0	300	0		
Parkway at South Ridge*	360	0	204	0	204	0	204	0	204	0	204	0	360		
Promenade / Middletown Condos	273	0	273	0	273	0	273	0	273	0	273	0	273		
Westtown (Levels)^	108	0	108	0	108	0	108	0	108	0	108	N/A	N/A		
<b>Total</b>	1,269	300	921	300	921	300	921	300	921	300	921	300	969		

\*The total proposed units for Parkway at South Ridge increased from 204 in 2014 to 360 in 2015.

^Westtown (Levels) dropped off the in 2015.

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**Appendix B:  
Duplex construction in the Town of Middletown**

Site	Proposed	2010		2011		2012		2013		2014		2015		2016	
		Built	Unbuilt	Built	Unbuilt	Built	Unbuilt	Built	Unbuilt	Built	Unbuilt	Built	Unbuilt	Built	Unbuilt
Highlands	206	0	206	0	206	0	206	0	206	0	206	0	206		
Spring Arbor at South Ridge	12	8	4	8	4	8	4	8	4	12	0	12	0		
Parkway at South Ridge	16	0	16	0	16	0	16	0	16	0	16	0	16		
Habitat*	4	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	4		
<b>Total</b>	494	8	486	8	486	8	486	8	486	12	482	12	226		

\*New on the list for 2015 – may have replaced Westtown (Levels).

**Appendix B:  
Townhouse construction in the Town of Middletown**

Site	Proposed	2010		2011		2012		2013		2014		2015		2016	
		Built	Unbuilt	Built	Unbuilt	Built	Unbuilt	Built	Unbuilt	Built	Unbuilt	Built	Unbuilt	Built	Unbuilt
Highlands	700	0	700	0	700	0	700	0	700	0	700	0	700		
Spring Arbor at South Ridge	123	48	75	55	68	74	49	87	36	110	13	123	0		
Parkway at South Ridge*	162	33	193	39	187	39	187	45	181	53	173	84	78		
Preserve at Deep Creek^	172	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	172		
Willow Grove Mill	248	202	46	202	46	248	0	248	0	248	0	248	0		
Willow Grove Mill II	192	105	87	115	77	115	77	122	70	140	52	171	21		
<b>Total</b>	1,892	388	1,504	411	1,481	476	1,416	502	1,390	551	1,341	626	971		

\*Total number of proposed units for Parkway at South Ridge decreased from 226 in 2014 to 162 in 2015.

^New on the list for 2015 – may have replaced Westtown (Levels)

**Appendix B:  
Single Family House Construction in the Town of Middletown**

Site	Proposed	2010		2011		2012		2013		2014		2015		2016	
		Built	Unbuilt	Built	Unbuilt	Built	Unbuilt	Built	Unbuilt	Built	Unbuilt	Built	Unbuilt	Built	Unbuilt
Estate at St. Andrews	465	157	309	177	289	217	249	261	205	303	163	337	128		
Lakeside	185	184	1	184	1	184	1	184	1	184	1	184	1		
Legends	378	377	1	377	1	377	1	377	1	377	1	377	1		
Longmeadow	243	239	4	239	4	239	4	239	4	239	4	239	4		
Merrimac Commons	78	0	78	0	78	0	78	0	78	0	78	0	78		
Middletown Crossing	134	125	9	125	9	125	9	125	9	125	9	125	9		
Middletown Village	262	253	9	253	9	254	8	255	7	255	7	255	7		
Parkside	492	166	326	174	318	179	313	184	308	188	304	219	272		
Springmill	362	361	1	362	0	362	0	362	0	362	0	362	0		
Spring Arbor at South Ridge	182	55	127	59	123	72	110	85	97	116	66	147	35		
Preserve @ Deep Creek and Legacy @ Deep Creek*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	484		
Willow Grove Mill	339	338	1	339	0	339	0	339	0	339	0	339	0		
<b>Total</b>	4,121	2,255	1,866	2,289	1,832	2,347	1,774	2,411	1,710	2,488	1,633	2,584	1,019		

\* New on the list for 2015 – may have replaced Westown (Levels)



**Appendix C**  
**US 301 Corridor Crash Reports**

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	Date	Time	MP	Type	Severity	Weather	Surface	Direction
1	01/06/2015	06:04	1.95	ROR/HFO	PDO	Snow	Snow	SB
2	01/16/2015	18:35	1.97	Rear-end	PDO	Clear	Dry	SB/SB
3	04/16/2015	16:23	0.01	ROR/HFO	PDO	Cloudy	Dry	N/A
4	05/03/2015	22:46	1.98	ROR/HFO	PDO	Clear	Dry	SB
5	07/03/2015	14:56	1.98	Rear-end	PDO	Clear	Dry	SB/SB
6	08/20/2015	15:53	3.59	ROR/HFO	PDO	Rain	Wet	SB
7	09/18/2015	20:28	3.79	Rear-end	PDO	Clear	Dry	SB/SB
8	09/18/2015	20:29	3.78	Rear-end	PDO	Clear	Dry	SB/SB/SB
9	09/26/2015	19:10	2.16	ROR/HFO	PDO	Clear	Dry	EBLT
10	09/30/2015	20:27	0.28	Angle	Injury	Other	Wet	EBLT/SB
11	10/03/2015	14:39	2.69	Rear-end	PDO	Rain	Wet	SB/SB
12	10/10/2015	20:59	0.31	Rear-end	PDO	Cloudy	Dry	NB/NB
13	10/16/2015	00:00	0.30	Left-turn	PDO	Clear	Dry	SB/NBLT
14	10/21/2015	23:32	1.40	ROR/HFO	PDO	Clear	Dry	SB
15	10/30/2015	13:02	0.00	Rear-end	PDO	Clear	Dry	SB/SB/SB
16	10/30/2015	21:48	1.96	Rear-end	PDO	Clear	Dry	SB/SB/SB
17	11/03/2015	16:54	2.04	Rear-end	PDO	Clear	Dry	SB/SB
18	11/07/2015	21:39	0.00	Rollover	Injury	Clear	Dry	NB
19	11/08/2015	13:59	2.12	Rear-end	Injury	Clear	Dry	NB/NB
20	11/15/2015	19:15	0.07	Sideswipe-same	PDO	Clear	Dry	NB/NB
21	11/22/2015	03:37	0.00	ROR/HFO	PDO	Clear	Dry	SB
22	11/26/2015	17:02	3.78	Hit-deer	PDO	Clear	Dry	SB
23	12/02/2015	06:09	1.96	ROR/HFO	Injury	Rain	Wet	SB
24	12/02/2015	15:33	0.15	SB/NBLT	Injury	Rain	Wet	NBLT/SB
25	12/05/2015	03:34	3.21	ROR/HFO	PDO	Clear	Dry	SB
26	12/08/2015	17:43	0.53	Head-on	PDO	Other	Dry	NB/SB
27	12/10/2015	19:10	3.83	Rear-end	PDO	Cloudy	Dry	SB/SB
<b>2015 Total Number of Crashes</b>								<b>27</b>

HFO: Hit-fixed-object

ROR: Run-off the Road

PDO: Property Damage Only

Note: \* are crashes that occurred v

## **US 301 between Summit Bridge and SR896**

A total of twenty-seven (27) crashes were reported in 2015, and the following trends were identified:

- Five (19 percent) of the twenty-seven reported crashes resulted in personal injury.
- Twenty-two (81 percent) of the reported crashes resulted in property damage only.
- Eleven (41 percent) of the reported crashes were rear-end crashes.
- Nine (33 percent) of the reported crashes were Run-off-the-road / Hit-fixed-object crashes.
- Two (7 percent) of the reported crashes were left-turn crashes.
- There was one reported crash of each of the following type: angle, head-on, hit-deer, rollover, and sideswipe-same direction crash.

## Crash Reports Summary

US 301 between  
SR 896 and Peterson Road

4/13/2016

	Date	Time	MP	Type	Severity	Weather	Surface	Direction
1	01/03/2015	02:22	3.74	Sideswipe-opposite	Injury	Clear	Dry	NB/SB
2	01/06/2015	08:47	0.00	ROR/HFO	PDO	Blowing Snow	Slush	NB/SB
3	01/10/2015	12:41	4.06	Rear-end	Injury	Clear	Dry	NB/NB
4	01/12/2015	07:26	3.69	ROR/HFO	PDO	Clear	Wet	SB
5	01/14/2015	06:45	1.02	Rear-end	Injury	Cloudy	Dry	SB/SB
6	01/24/2015	11:11	3.43	Rear-end	PDO	Rain	Wet	SB/SB
7	02/11/2015	03:39	1.10	ROR/HFO	PDO	Clear	Dry	SB
8	02/15/2015	05:00	4.01	ROR/HFO	PDO	Blowing Snow	Ice	NB
9	02/16/2015	08:15	2.14	Rear-end	PDO	Clear	Dry	NB/NB
10	03/01/2015	12:27	2.14	Angle	PDO	Other	Ice	WB/NB
11	03/04/2015	16:19	2.68	Rear-end	PDO	Rain	Wet	SB/SB
12	03/06/2015	06:40	2.43	ROR/HFO	PDO	Clear	Ice	NB
13	03/13/2015	01:07	2.07	Rear-end	Injury	Clear	Dry	SB/SB
14	03/18/2015	14:20	2.76	Rear-end	Injury	Clear	Dry	SB/SB
15	03/18/2015	17:40	2.97	Rear-end	PDO	Clear	Dry	SB/SB
16	03/22/2015	15:18	4.07	Hit-deer	PDO	Clear	Dry	NB
17	04/11/2015	06:44	0.99	Rear-end	Injury	Clear	Dry	SB/SB
18	04/14/2015	14:58	3.78	Rear-end	PDO	Rain	Wet	SB/SB
19	04/19/2015	20:00	0.00	Rear-end	PDO	Clear	Dry	SB/SB
20	04/22/2015	18:18	0.00	Rear-end	PDO	Other	Wet	SB/SB
21	04/25/2015	10:48	1.59	Rear-end	PDO	Cloudy	Dry	SB/SB
22	04/30/2015	17:47	3.68	Head-on	PDO	Clear	Dry	SB/SB/NB
23	05/02/2015	13:07	1.60	Rear-end	PDO	Clear	Dry	NB/NB
24	05/11/2015	16:04	2.55	Rear-end	PDO	Other	Dry	SB/SB
25	05/13/2015	14:55	3.87	Left-turn	Injury	Clear	Dry	SB/NBLT
26	05/14/2015	17:12	4.20	Rear-end	PDO	Clear	Dry	NB/NB
27	05/21/2015	18:34	1.61	Rear-end	PDO	Cloudy	Wet	NB/NB
28	05/22/2015	13:16	0.00	Rear-end	PDO	Clear	Dry	SB/SB
29	05/24/2015	18:34	1.92	Rear-end	PDO	Clear	Dry	NB/NB/NB
30	05/26/2015	12:39	1.57	Rear-end	PDO	Clear	Dry	NB/NB
31	05/26/2015	19:10	3.49	Left-turn	PDO	Cloudy	Dry	NB/SBLT
32	06/03/2015	14:55	0.98	Rear-end	Injury	Cloudy	Dry	SB/SB
33	06/05/2015	14:06	2.27	ROR/HFO	PDO	Clear	Dry	SB
34	06/12/2015	21:54	2.17	Rear-end	PDO	Clear	Dry	SB/SB
35	06/24/2015	13:44	1.59	Rear-end	PDO	Clear	Dry	NB/NB
36	06/27/2015	12:26	1.74	Rear-end	PDO	Other	Wet	SB/SB
37	07/04/2015	07:26	3.73	Head-on	Injury	Clear	Dry	SB
38	07/11/2015	14:54	2.16	Head-on	Fatal Crash	Clear	Dry	SB/NB
39	07/29/2015	15:41	3.72	Rear-end	PDO	Clear	Dry	SB/SB
40	08/06/2015	13:38	3.87	Rear-end	PDO	Clear	Dry	NB/NB
41	08/13/2015	06:14	4.28	ROR/HFO	PDO	Clear	Dry	SB
42	08/19/2015	07:47	1.71	Rear-end	Injury	Cloudy	Dry	SB/SB
43	08/24/2015	00:00	0.98	ROR/HFO	PDO	Other	Other	NBRT
44	08/29/2015	02:28	1.74	Rear-end	PDO	Clear	Dry	NB/NB

	Date	Time	MP	Type	Severity	Weather	Surface	Direction
45	09/03/2015	20:42	4.07	Rear-end	PDO	Cloudy	Dry	NB/NB
46	09/08/2015	13:06	2.01	Rear-end	PDO	Clear	Dry	NB/NB
47	09/15/2015	21:04	2.14	Rear-end	PDO	Clear	Dry	SB/SB
48	09/17/2015	08:31	2.14	Angle	PDO	Clear	Dry	NB/WB
49	09/17/2015	17:37	1.58	Rear-end	PDO	Clear	Dry	NB/NB
50	09/18/2015	18:46	3.49	Sideswipe-opposite	Injury	Clear	Dry	SB/NB
51	09/20/2015	15:44	2.10	Motorcycle	PDO	Clear	Dry	NB
52	09/21/2015	22:32	2.69	ROR/HFO	PDO	Clear	Dry	SB
53	09/22/2015	16:25	2.26	Rear-end	PDO	Clear	Dry	SB/SB
54	09/26/2015	20:38	2.04	Rear-end	PDO	Clear	Dry	NB/NB
55	09/30/2015	08:22	0.00	Rear-end	Injury	Rain	Wet	NB/NB
56	10/01/2015	09:45	1.10	Angle	Injury	Cloudy	Wet	SB/EBLT
57	10/13/2015	09:50	1.00	Rear-end	PDO	Cloudy	Dry	SB/SB
58	10/17/2015	07:55	3.80	ROR/HFO	Injury	Clear	Dry	NB
59	10/20/2015	06:49	2.11	Rear-end	PDO	Cloudy	Dry	NB/NB
60	10/29/2015	07:44	1.98	Rear-end	PDO	Clear	Wet	NB/NB
61	11/03/2015	07:07	2.05	Rear-end	PDO	Clear	Dry	NB/NB
62	11/04/2015	13:21	3.74	Left-turn	Fatal Crash	Clear	Dry	SB/NBLT
63	11/14/2015	12:26	2.67	Rear-end	PDO	Clear	Dry	SB/SB
64	11/14/2015	20:05	2.03	Rear-end	Injury	Clear	Dry	SB/SB
65	11/18/2015	14:24	1.60	Rear-end	PDO	Cloudy	Dry	NB/NB
66	11/19/2015	18:20	3.9	Rear-end	Injury	Rain	Wet	NB/NB
67	11/20/2015	18:18	1.50	Rear-end	PDO	Clear	Dry	NB/NB
68	11/21/2015	11:44	0.00	Hit-deer	PDO	Clear	Dry	NB/SB
69	11/21/2015	13:41	1.60	Rear-end	PDO	Clear	Dry	NB/NB
70	12/03/2015	14:53	2.50	Rear-end	PDO	Clear	Dry	NB/NB/NB
71	12/05/2015	18:18	1.73	Rear-end	PDO	Clear	Dry	SB/SB
72	12/10/2015	17:46	1.98	Rear-end	PDO	Cloudy	Dry	SB/SB
73	12/16/2015	18:12	1.1	ROR/HFO	Injury	Clear	Dry	NB
74	12/17/2015	12:46	1.95	Rear-end	PDO	Rain	Wet	NB/NB
75	12/20/2015	16:20	1.0	Rear-end	Injury	Clear	Dry	SB/SB
76	12/23/2015	19:53	3.68	ROR/HFO	PDO	Rain	Wet	SB
77	12/28/2015	19:47	2.13	Rear-end	PDO	Rain	Wet	NB/NB
<b>2015 Total Number of Crashes</b>								<b>77</b>

HFO: Hit-fixed-object

ROR: Run-off the Road

PDO: Property Damage Only



## **US 301 between SR896 and Peterson Road**

A total of seventy-seven (77) crashes were reported in 2015, and the following trends were identified:

- Two (3 percent) of the seventy-seven reported crashes resulted in a fatality.
- Eighteen (23 percent) of the reported crashes resulted in personal injury.
- Fifty-seven (74 percent) of the seventy-seven crashes resulted in property-damage-only.
- Fifty-one (66 percent) of the reported crashes were rear-end crashes.
- Twelve (16 percent) of the reported crashes were run-off-the-road/hit-fixed-object crashes.
- Three (4 percent) of the reported crashes were angle crashes.
- Three (4 percent) of the crashes were head-on crashes.
- Three (4 percent) of the reported crashes were left-turn crashes.
- Two (2.5 percent) of the reported crashes involved a motor vehicle and a deer.
- Two (2.5 percent) of the reported crashes were sideswipe-opposite direction crashes.
- One (1 percent) of the crashes involved a motorcycle.

	Date	Time	MP	Type	Severity	Weather	Surface	Direction
1	01/08/2015	18:00	2.48	Sideswipe-same	PDO	Clear	Dry	NB/NB
2	01/09/2015	08:44	2.48	Rear-end	PDO	Clear	Dry	NB/NB
3	02/10/2015	21:48	2.93	Rear-end	Injury	Clear	Dry	NB/NB
4	02/12/2015	20:35	3.15	Right-turn	Injury	Blowing Snow	Dry	NB/WBRT
5	03/22/2015	08:46	2.92	Angle	PDO	Clear	Dry	WB/LT/NB
6	03/27/2015	15:50	3.33	Left-turn	Injury	Cloudy	Dry	SB/NBLT
7	04/15/2015	16:55	2.92	Right-turn	Injury	Cloudy	Dry	SB/EBRT
8	04/20/2015	07:00	2.91	Rear-end	PDO	Rain	Wet	NB/NB
9	05/11/2015	08:40	2.48	Sideswipe-same	PDO	Cloudy	Dry	NBLT/NBLT
10	05/15/2015	11:15	0.00	Rear-end	PDO	Clear	Dry	SB/SB
11	05/31/2015	12:35	2.48	Sideswipe-same	PDO	Clear	Dry	SB/SB
12	06/04/2015	16:50	2.92	Rear-end	PDO	Cloudy	Dry	NB/NB
13	07/01/2015	23:12	2.48	Left-turn	Injury	Clear	Dry	NBLT/SB
14	07/11/2015	18:16	3.18	Left-turn	PDO	Clear	Dry	NB/SBLT
15	08/03/2015	19:00	2.48	Angle	Injury	Clear	Dry	NB/WB
16	08/06/2015	10:23	2.48	Rear-end	PDO	Clear	Dry	NB/NB
17	08/06/2015	14:55	0.00	Angle	Injury	Clear	Dry	NB/WB
18	08/11/2015	18:00	3.13	Bicycle	Injury	Cloudy	Dry	SB/WB
19	08/18/2015	13:10	2.48	Rear-end	PDO	Cloudy	Dry	NBUT/NB
20	08/18/2015	19:01	3.33	Rear-end	Injury	Clear	Dry	SB/SB
21	08/19/2015	15:40	2.92	Angle	Injury	Rain	Wet	WB/SB
22	08/25/2015	16:43	2.48	Rear-end	PDO	Clear	Dry	SB/SB
23	08/26/2015	23:45	2.68	Sideswipe-same	PDO	Clear	Dry	NB/NB
24	09/03/2015	18:34	2.49	Rear-end	PDO	Clear	Dry	SB/SB
25	09/09/2015	23:25	2.48	Left-turn	PDO	Clear	Dry	NB/SBLT
26	09/11/2015	23:32	3.13	Left-turn	Injury	Clear	Dry	SB/NBLT
27	09/12/2015	16:40	2.90	Rear-end	PDO	Rain	Wet	NB/NB
28	10/08/2015	13:03	2.92	Angle	Injury	Clear	Dry	EB/SB
29	10/11/2015	21:35	2.48	Left-turn	Injury	Clear	Dry	SB/NBLT
30	10/28/2015	06:51	2.48	Rear-end	Injury	Rain	Wet	SB/SB
31	11/27/2015	18:26	2.46	Rear-end	Injury	Clear	Dry	NB/NB
32	11/29/2015	09:02	0.00	ROR/HFO	PDO	Rain	Wet	SB
33	12/02/2015	17:45	2.48	Rear-end	PDO	Rain	Wet	NBRT/NBRT
34	12/03/2015	11:01	3.13	Rear-end	PDO	Clear	Dry	NB/NB
35	12/03/2015	18:41	2.88	Rear-end	PDO	Clear	Dry	NB/NB/NB
36	12/11/2015	08:42	2.92	Rear-end	Injury	Clear	Dry	NB/NB
37	12/11/2015	23:27	2.48	Left-turn	PDO	Clear	Dry	NB/SBLT
38	12/19/2015	06:06	0.00	Sideswipe-same	PDO	Clear	Dry	NB/NB
39	12/22/2015	10:15	2.48	Right-turn	PDO	Rain	Wet	NB/WBRT
<b>2015 Total Number of Crashes</b>								<b>39</b>

HFO: Hit-fixed-object

ROR: Run-off the Road

PDO: Property Damage Only

### **US 301 between Peterson Road and Levels Road**

A total of thirty-nine (39) crashes were reported in 2015, and the following trends were identified:

- Sixteen (41 percent) of the thirty-nine reported crashes resulted in personal injury.
- Twenty-three (59 percent) of the reported crashes resulted in property-damage-only.
- Seventeen (44 percent) of the reported crashes were rear-end crashes.
- Seven (18 percent) of the reported crashes were left-turn crashes.
- Five (13 percent) of the reported crashes were angle crashes.
- Five (13 percent) of the reported crashes were sideswipe-same direction crashes.
- Three (8 percent) of the reported crashes were right-turn crashes.
- One (2 percent) of the reported crashes involved a motor vehicle and a bicycle.
- One (2 percent) of the reported crashes was a Run-off-the-road / Hit-fixed-object type crash.

	Date	Time	MP	Type	Severity	Weather	Surface	Direction
1	02/20/2015	20:49	1.35	Sideswipe-opposite	PDO	Clear	Dry	NB/SB
2	02/25/2015	16:30	1.33	Sideswipe-opposite	PDO	Clear	Dry	NB/NB
3	05/28/2015	13:41	0.13	Sideswipe-same	PDO	Clear	Dry	SB/SB
4	06/18/2015	10:54	1.26	Angle	PDO	Rain	Wet	SB/EBLT
5	06/25/2015	15:03	1.44	Sideswipe-same	PDO	Clear	Dry	NB/NB
6	07/28/2015	17:17	1.05	Sideswipe-same	PDO	Clear	Dry	NB/NB
7	09/20/2015	11:50	1.86	Angle	Injury	Clear	Dry	SB/EBLT
8	11/09/2015	07:25	1.28	Head-on	PDO	Clear	Dry	SB/NB
9	11/11/2015	14:30	1.02	Rear-end	PDO	Cloudy	Dry	SB/SB
10	12/29/2015	20:34	0.52	Angle	Injury	Clear	Wet	SB/EBLT
<b>2015 Total Number of Crashes</b>								<b>10</b>

HFO: Hit-fixed-object

ROR: Run-off the Road

PDO: Property Damage Only

### **US 301 between Levels Road and DE / MD State Line**

A total of ten (10) crashes were reported in 2015, and the following trends were identified:

- Two (20 percent) of the ten reported crashes resulted in personal injury.
- Eight (80 percent) of the reported crashes resulted in property-damage-only.
- Three (30 percent) of the reported crashes were angle crashes.
- Three (30 percent) of the reported crashes were sideswipe-same direction crashes.
- Two (20 percent) of the reported crashes were sideswipe-opposite direction crashes.
- One (10 percent) of the reported crashes was a head-on crash.
- One (10 percent) of the reported crashes was a rear-end crash.

	Date	Time	MP	Type	Severity	Weather	Surface	Direction
1	1/24/2015	7:00 AM	1.9	ROR/HFO	Injury	Rain	Wet	WB
2	7/31/2015	10:47 PM	2.53	ROR/HFO	PDO	Clear	Dry	WB
3	8/12/2015	8:15 AM	2.12	Sideswipe-oppostie	PDO	Clear	Dry	WB/EB
4	10/3/2015	9:22 AM	2.06	ROR/HFO	PDO	Rain	Wet	WB
5	11/20/2015	2:02 AM	2.09	ROR/HFO	PDO	Rain	Wet	WB
<b>2015 Total Number of Crashes</b>								<b>5</b>

HFO: Hit-fixed-object

ROR: Run-off the Road

PDO: Property Damage Only

### **Bethel Church Road between US 301 and Choptank Road**

Five (5) crashes were reported in 2015, and the following trends were identified:

- One (20 percent) of the reported crashes resulted in personal injury.
- Four (80 percent) of the reported crashes resulted in property-damage-only.
- Four (80 percent) of the reported crashes were Run-off-the-road / Hit-fixed-object crashes.
- One (20 percent) of the reported crashes was a sideswipe-opposite direction crash.

	Date	Time	MP	Type	Severity	Weather	Surface	Direction
1	1/6/2015	07:41	3.47	Rear-end	PDO	Other	Snow	NB/NB
2	1/6/2015	12:02	3.58	Angle	PDO	Snow	Snow	SB/EB
3	1/6/2015	15:15	0.00	ROR/HFO	PDO	Snow	Snow	NB
4	1/6/2015	23:07	0.00	ROR/HFO	PDO	Clear	Ice	NB/NB
5	1/14/2015	20:41	4.02	Sideswipe-opposite	Injury	Clear	Dry	NB/SB
6	1/24/2015	13:16	0.00	Rear-end	Injury	Rain	Wet	SB/SB
7	3/1/2015	15:43	2.19	ROR/HFO	PDO	Sleet	Ice	NB
8	3/1/2015	18:46	1.72	ROR/HFO	PDO	Sleet	Slush	NB
9	4/3/2015	00:00	2.83	Sideswipe-same	PDO	Rain	Wet	NB/NB
10	5/7/2015	16:08	1.78	Left-turn	Injury	Cloudy	Dry	NB/SBLT
11	7/7/2015	07:16	0.69	ROR/HFO	Injury	Cloudy	Dry	SB
12	10/19/2015	08:22	1.68	Angle	PDO	Clear	Dry	SB/EB
13	10/21/2015	19:51	1.30	Hit-deer	PDO	Clear	Dry	SB
14	11/1/2015	18:06	1.78	Rear-end	Injury	Cloudy	Dry	SB/SB/SB
15	11/21/2015	14:21	2.16	Rear-end	PDO	Clear	Dry	SB/SB
16	12/2/2015	07:14	4.83	Rear-end	PDO	Rain	Dry	NB/NB
<b>2015 Total Number of Crashes</b>								<b>16</b>

HFO: Hit-fixed-object

ROR: Run-off the Road

PDO: Property Damage Only



### **Choptank Rd between Bethel Church Road and Bunker Hill Road**

A total of sixteen (16) crashes were reported in 2015, and the following trends were identified:

- Five (31 percent) of the sixteen reported crashes resulted in personal injury.
- Eleven (69 percent) of the reported crashes resulted in property-damage-only.
- Five (31 percent) of the reported crashes were run-off-the-road type crashes.
- Five (31 percent) of the reported crashes were rear-end crashes.
- Two (13 percent) of the reported crashes were angle crashes.
- There was one reported crash of each of the following type: Hit-deer, left-turn, sideswipe-same direction, and sideswipe-opposite crash.

**Crash Report Summary****Bunker Hill Road between  
Choptank Road and US 301****4/13/2016**

#	Date	Time	MP	Type	Severity	Weather	Surface	Direction
1	1/27/2015	7:50 AM	2.64	Sideswipe-same	Injury	Cloudy	Dry	WB/WB
2	2/5/2015	5:15 AM	2.27	Angle	PDO	Clear	Dry	EB/NB
3	5/5/2015	3:20 PM	2.54	Angle	Injury	Clear	Dry	EB/SB/NB
4	11/4/2015	5:50 PM	2.54	Left-turn	Injury	Clear	Dry	EB/WBLT
<b>2015 Total Number of Crashes</b>								<b>4</b>

HFO: Hit-fixed-object

ROR: Run-off the Road

PDO: Property Damage Only

### **Bunker Hill Road between Choptank Road and US 301**

A total of four (4) crashes were reported in 2015, and the following trends were identified:

- Three (75 percent) of the reported crashes resulted in personal injury.
- One (25 percent) of the reported crashes resulted in property-damage-only.
- Two (50 percent) of the reported crashes were angle crashes.
- One (25 percent) of the reported crashes was a left-turn crash.
- One (25 percent) of the reported crashes was a sideswipe-same direction crash.

	Date	Time	MP	Type	Severity	Weather	Surface	Direction
91	10/26/2015	11:26	4.29	Hit-debris	PDO	Other	Dry	SB
92	11/02/2015	03:41	3.01	Hit-deer	PDO	Clear	Dry	NB
93	11/02/2015	18:22	6.58	Rear-end	PDO	Clear	Dry	SB/SB
94	11/02/2015	18:48	0.00	ROR/HFO	PDO	Clear	Dry	NB
95	11/06/2015	16:25	3.60	Sideswipe-same	PDO	Clear	Dry	NB/NB
96	11/12/2015	06:19	0.00	ROR/HFO	PDO	Clear	Dry	SB
97	11/12/2015	21:29	0.00	Hit-deer	PDO	Clear	Dry	NB
98	11/15/2015	02:43	0.00	Rear-end	PDO	Clear	Dry	NB/NB
99	11/18/2015	07:02	5.54	Rear-end	PDO	Clear	Dry	NB/NB
100	11/19/2015	00:30	7.62	Hit-debris	PDO	Clear	Dry	SB
101	11/21/2015	05:20	5.27	Hit-deer	Injury	Clear	Dry	SB
102	11/26/2015	20:29	3.73	Sideswipe-same	PDO	Clear	Dry	NB/NB/NB
103	11/26/2015	20:41	4.18	Rear-end	PDO	Clear	Dry	NB/NB
104	12/03/2015	06:43	5.45	Rear-end	PDO	Clear	Dry	NB/NB
105	12/08/2015	15:42	4.40	Hit-debris	PDO	Clear	Dry	NB/NB
106	12/08/2015	20:04	7.91	Hit-debris	PDO	Clear	Dry	SB
107	12/08/2015	20:04	1.08	Hit-debris	PDO	Clear	Dry	SB
108	12/09/2015	09:01	1.76	Sideswipe-same	PDO	Clear	Dry	SB/SB
109	12/10/2015	07:16	5.48	Sideswipe-same	PDO	Clear	Dry	NB/NB
110	12/11/2015	04:48	7.91	Rollover	Injury	Fog	Dry	SB
111	12/12/2015	01:17	2.29	Sideswipe-same	PDO	Clear	Dry	NB/NB
112	12/13/2015	05:25	0.00	Rear-end	Injury	Clear	Dry	SB/SB
113	12/14/2015	06:58	8.58	ROR/HFO	PDO	Clear	Dry	SB
114	12/15/2015	06:50	5.48	Sideswipe-same	PDO	Clear	Dry	SB/SB
115	12/18/2015	08:34	5.48	Rear-end	PDO	Cloudy	Dry	NB/NB
<b>2015 Total Number of Crashes</b>								<b>115</b>

HFO: Hit-fixed-object

ROR: Run-off the Road

PDO: Property Damage Only

	Date	Time	MP	Type	Severity	Weather	Surface	Direction
1	01/04/2015	13:27	0.25	Rear-end	PDO	Rain	Wet	NB/NB/NB
2	01/06/2015	08:43	7.48	Head-on	PDO	Snow	Snow	SB/SB
3	01/09/2015	18:27	0.00	ROR/HFO	Injury	Cloudy	Dry	NB
4	01/30/2015	15:50	1.84	Sideswipe-same	PDO	Clear	Dry	NB/NB/NB
5	02/05/2015	04:30	2.58	Tire blowout	PDO	Clear	Dry	NB
6	02/05/2015	04:39	2.57	Hit-debris	PDO	Clear	Dry	NB
7	02/10/2015	03:36	7.91	ROR/HFO	PDO	Sleet	Ice	SB
8	02/11/2015	08:13	0.00	Sideswipe-same	PDO	Clear	Dry	NB/NB
9	02/14/2015	20:25	5.80	Other	Injury	Snow	Ice	SB/SB
10	02/14/2015	20:34	0.00	ROR/HFO	PDO	Snow	Snow	SB
11	02/15/2015	00:45	5.72	ROR/HFO	PDO	Clear	Wet	SB
12	02/15/2015	00:45	5.78	ROR/HFO	PDO	Snow	Ice	SB
13	02/17/2015	02:09	2.43	ROR/HFO	PDO	Snow	Snow	NB
14	02/19/2015	05:07	4.70	Animal	PDO	Clear	Dry	NB
15	02/26/2015	08:28	5.47	Sideswipe-same	Injury	Snow	Snow	SB/SB
16	03/01/2015	11:45	2.80	ROR/HFO	PDO	Sleet	Ice	SB
17	03/01/2015	12:35	3.02	ROR/HFO	Injury	Sleet	Ice	NB
18	03/01/2015	15:55	5.68	ROR/HFO	PDO	Sleet	Ice	SB
19	03/01/2015	17:00	4.56	ROR/HFO	PDO	Sleet	Ice	NB
20	03/01/2015	17:44	4.40	ROR/HFO	PDO	Sleet	Ice	NB
21	03/01/2015	18:24	6.21	ROR/HFO	PDO	Sleet	Ice	SB
22	03/01/2015	18:54	4.95	ROR/HFO	PDO	Sleet	Ice	NB
23	03/01/2015	19:00	3.92	Rear-end	PDO	Sleet	Ice	NB/NB/NB
24	03/01/2015	19:34	5.57	Rear-end	PDO	Sleet	Ice	SB/SB
25	03/01/2015	20:17	5.82	Sideswipe-same	PDO	Sleet	Slush	SB/SB
26	03/01/2015	20:42	5.80	ROR/HFO	PDO	Sleet	Ice	SB
27	03/05/2015	11:36	5.53	ROR/HFO	PDO	Snow	Slush	SB/SB
28	03/10/2015	23:25	0.00	ROR/HFO	PDO	Rain	Wet	SB
29	03/15/2015	15:56	1.18	Hit-deer	PDO	Clear	Dry	NB
30	03/17/2015	22:09	0.00	ROR/HFO	PDO	Clear	Dry	SB
31	03/20/2015	01:57	5.06	ROR/HFO	PDO	Clear	Dry	NB
32	03/27/2015	19:40	0.00	ROR/HFO	PDO	Clear	Dry	SB
33	04/03/2015	17:56	7.91	Sideswipe-same	PDO	Clear	Dry	SB/SB
34	04/16/2015	22:13	4.31	Rear-end	PDO	Clear	Dry	SB/SB
35	04/20/2015	10:50	5.84	Rear-end	PDO	Cloudy	Wet	SB/SB
36	05/02/2015	11:40	0.00	ROR/HFO	Injury	Clear	Dry	SB
37	05/05/2015	09:22	4.39	Hit-debris	PDO	Clear	Dry	NB
38	05/10/2015	15:08	4.98	ROR/HFO	PDO	Rain	Wet	SB
39	05/11/2015	00:00	3.70	Hit-deer	PDO	Clear	Dry	SB
40	05/13/2015	07:40	5.24	Rear-end	PDO	Clear	Dry	NB/NB
41	05/14/2015	13:34	5.78	Vehicle fire	PDO	Clear	Dry	SB
42	05/17/2015	15:37	5.56	Sideswipe-same	PDO	Clear	Dry	NB/NB
43	05/17/2015	17:38	3.08	Rear-end	PDO	Clear	Dry	NB/NB
44	05/23/2015	21:43	4.63	Rear-end	PDO	Clear	Dry	NB/NB
45	05/25/2015	13:00	3.88	ROR/HFO	PDO	Clear	Dry	SB

	Date	Time	MP	Type	Severity	Weather	Surface	Direction
46	05/26/2015	22:11	7.50	Sideswipe-same	PDO	Clear	Dry	SB/SB
47	05/30/2015	15:09	2.44	Sideswipe-same	Injury	Clear	Dry	NB/NB
48	06/08/2015	07:16	3.90	Rear-end	PDO	Clear	Dry	NB/NB
49	06/14/2015	21:59	3.81	Sideswipe-same	Injury	Cloudy	Wet	NB/NB
50	06/20/2015	07:00	0.00	Rollover	Injury	Clear	Dry	NB
51	06/21/2015	00:00	1.10	ROR/HFO	PDO	Rain	Wet	NB
52	06/21/2015	06:24	3.65	ROR/HFO	Injury	Rain	Wet	SB
53	06/24/2015	06:15	0.32	Sideswipe-same	PDO	Clear	Dry	NB/NB
54	06/25/2015	12:01	5.67	Sideswipe-same	PDO	Clear	Dry	SB/SB
55	06/26/2015	20:31	5.67	Rear-end	PDO	Clear	Dry	SB/SB
56	07/03/2015	13:12	4.00	Sideswipe-same	PDO	Other	Dry	SB/SB
57	07/06/2015	07:52	7.36	Sideswipe-same	PDO	Clear	Dry	SB/SB
58	07/06/2015	13:24	7.72	Sideswipe-same	PDO	Cloudy	Dry	SB/SB
59	07/06/2015	14:31	6.12	Rollover	Injury	Cloudy	Dry	SB
60	07/06/2015	15:14	1.27	Sideswipe-same	PDO	Clear	Dry	SB/SB
61	07/09/2015	19:55	4.87	Sideswipe-same	PDO	Rain	Wet	SB/SB
62	07/22/2015	17:15	8.56	Rear-end	Injury	Clear	Dry	SB/SB
63	07/30/2015	16:34	3.81	ROR/HFO	Injury	Rain	Wet	SB
64	08/04/2015	09:46	5.97	Sideswipe-same	PDO	Clear	Dry	SB/SB
65	08/10/2015	17:58	7.93	Rear-end	PDO	Cloudy	Dry	SB/SB
66	08/15/2015	22:06	1.07	Rear-end	PDO	Clear	Dry	NB/NB
67	08/20/2015	15:13	1.10	Sideswipe-same	PDO	Rain	Wet	NB/NB
68	08/23/2015	03:19	0.00	ROR/HFO	PDO	Clear	Dry	NB
69	08/24/2015	14:29	3.75	ROR/HFO	Injury	Clear	Dry	SB
70	08/25/2015	10:09	6.90	Sideswipe-same	PDO	Clear	Dry	SB/SB
71	08/28/2015	19:32	5.45	ROR/HFO	Injury	Clear	Dry	SB
72	09/08/2015	06:47	5.03	Rear-end	PDO	Clear	Dry	NB/NB
73	09/08/2015	16:10	5.24	Hit-debris	PDO	Clear	Dry	SB
74	09/10/2015	14:44	6.01	ROR/HFO	Injury	Cloudy	Dry	SB
75	09/10/2015	15:09	2.91	Hit-debris	PDO	Rain	Wet	SB
76	09/13/2015	06:36	2.14	Rear-end	PDO	Clear	Dry	NB/NB/NB
77	09/15/2015	10:28	1.30	Sideswipe-same	PDO	Clear	Dry	NB/NB
78	09/15/2015	17:41	7.93	Rear-end	PDO	Clear	Dry	SB/SB
79	09/16/2015	06:44	5.26	Rear-end	PDO	Clear	Dry	NB/NB
80	09/19/2015	20:34	6.54	Multiple vehicle	PDO	Cloudy	Dry	SB/SB/SB
81	09/25/2015	20:56	8.17	Sideswipe-same	PDO	Clear	Dry	SB/SB
82	09/29/2015	02:16	3.56	Rear-end	Injury	Clear	Dry	SB
83	09/29/2015	22:24	5.17	ROR/HFO	PDO	Other	Wet	SB
84	10/04/2015	12:18	2.51	Sideswipe-same	PDO	Cloudy	Dry	NB/NB
85	10/06/2015	10:40	0.99	ROR/HFO	PDO	Clear	Dry	NB
86	10/06/2015	17:49	8.23	Rear-end	PDO	Clear	Dry	SB/SB
87	10/09/2015	21:45	2.90	Sideswipe-same	Injury	Clear	Dry	NB/NB
88	10/18/2015	06:50	5.39	Rear-end	PDO	Clear	Dry	NB/NB
89	10/19/2015	16:12	4.7	Rear-end	PDO	Clear	Dry	SB/SB
90	10/24/2015	10:24	6.3	Sideswipe-same	PDO	Clear	Dry	SB/SB

### **SR1 between Roth Bridge and Tybouts Corner**

A total of one hundred and fifteen (115) crashes were reported in 2015, and the following trends were identified:

- Twenty (17 percent) of the reported crashes resulted in personal injury.
- Ninety-five (83 percent) of the reported crashes resulted in property damage only.
- Thirty-four (29 percent) of the reported crashes were run-off-the-road / hit-fixed-object crashes.
- Thirty (26 percent) of the reported crashes were sideswipe-same direction crashes.
- Twenty-eight (24 percent) of the reported crashes were rear-end crashes.
- Nine (8 percent) of the reported crashes involved a motor vehicle and debris on the roadway.
- Five (4 percent) of the reported crashes involved a motor vehicle and a deer.
- Three (3 percent) of the reported crashes resulted in a vehicle rollover.
- There was one reported crash of each of the following type: hit-animal, head-on, multiple vehicle crash, tire blowout, vehicle fire and one unclassified crash.

	Date	Time	MP	Type	Severity	Weather	Surface	Direction
1	01/06/2015	06:04	1.95	ROR/HFO	PDO	Snow	Snow	SB
2	01/16/2015	18:35	1.97	Rear-end	PDO	Clear	Dry	SB/SB
3	03/05/2015	8:53 AM	N/A	Angle	Injury	Snow	Slush	EB/SB
4	05/03/2015	22:46	1.98	ROR/HFO	PDO	Clear	Dry	SB
5	07/03/2015	14:56	1.98	Rear-end	PDO	Clear	Dry	SB/SB
6	09/26/2015	19:10	2.16	ROR/HFO	PDO	Clear	Dry	EBLT
7	10/20/2015	5:35 AM	2.53	Sideswipe-opp	PDO	Clear	Dry	EB/SBRT
8	10/30/2015	21:48	1.96	Rear-end	PDO	Clear	Dry	SB/SB/SB
9	11/03/2015	16:54	2.04	Rear-end	PDO	Clear	Dry	SB/SB
10	11/07/2015	21:39	0.00	Rollover	Injury	Clear	Dry	NB
11	11/08/2015	13:59	2.12	Rear-end	Injury	Clear	Dry	NB/NB
12	12/02/2015	06:09	1.96	ROR/HFO	Injury	Rain	Wet	SB
<b>2015 Total Number of Crashes</b>								<b>12</b>

HFO: Hit-fixed-object

ROR: Run-off the Road

PDO: Property Damage Only



### **US 301 at Bethel Church Road**

A total of twelve (12) crashes were reported in 2015, and the following trends were identified:

- Four (33 percent) of the reported crashes resulted in personal injury.
- Eight (67 percent) of the reported crashes resulted in property-damage-only.
- Five (42 percent) of the crashes were rear-end crashes.
- Four (33 percent) of the crashes were run-off-the-road / hit-fixed object crashes.
- There was one reported crash of each of the following type: angle crash, rollover, and one sideswipe-same direction crash.



**Appendix D**

**Significant Incidents on SR 1 and  
Other Roadways in the Middletown Region**

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**Significant Incidents on SR 1 that Could have Utilized the Spur Road  
to Accommodate Detoured Traffic – 2004 through present**

<b>Date</b>	<b>Location</b>	<b>Event</b>	<b>Duration</b>	<b>Roads used for Detour</b>
5/14/2004	SR 1 at SR 273	Property Damage Crash - SB SR 1 Left Lane Closed	1.5 Hours	Unknown
9/24/2004	SR 1 South of SR 273	Personal Injury Crash - SB SR 1 Closed	1 Hours	Unknown
4/3/2005	SR 1 at SR 72	Personal Injury Crash - Right and Center Lane Closed on SB SR 1	0.5 Hour	Unknown
4/14/2005	SR 1 South of US 40	Dump Truck Rolled Over – SB SR 1 Closed	3 Hours	Unknown
5/16/2005	NB SR 1 at Christiana Mall Ramp	Vehicle Fire - NB SR 1 Closed	1 Hour	Unknown
7/1/2005	SB SR 1 South of SR 273	Possible Fatal Crash / Entrapment - SB SR 1 Closed	2 Hours	Unknown
8/7/2006	SB SR 1 at Christiana Mall Ramp	Tractor Trailer Rolled Over - SB SR 1 Closed	7.5 Hours	Unknown
11/30/2006	NB SR 1 at Tybouts Corner	Personal Injury Crash - NB SR 1 Closed	1 Hour	Unknown
1/31/2007	SB SR 1 North of School House Road	Property Damage Crash – SB Left and Center Lane and NB Left Lane on SR 1 Closed	1.5 Hours	Unknown
2/14/2007	NB SR 1 South of SR 72	Tractor Trailer Rolled Over - NB SR 1 Closed at SR 896	6.5 Hours	Unknown
3/7/2007	NB SR 1 at Christiana Mall	Multiple (6) Vehicle Personal Injury Crash - NB SR 1 Closed	1.5 Hours	US 13, SR 72, SR 273 and I-95
5/14/2007	SB SR 1 on Roth Bridge	Personal Injury Crash - SB SR 1 Closed	1 Hour	Unknown
6/27/2007	SB SR 1 North of Roth Bridge	Tractor Trailer Rolled Over – SB SR 1 Closed	3 Hours	US 13 and SR 72
9/2/2007	NB SR 1 near Hyetts Corner Road	Personal Injury Crash - NB SR 1 Closed	2 Hours	Unknown
9/7/2007	SR 1 at SR 72	Vehicle Fire & Clean-up – SR 1 Closed at SR 72	3 Hours	SR 72
11/29/2007	SB SR 1 North of Roth Bridge	Fluid Spilled on Road - SB SR 1 Right Lane and Shoulder Closed	1 Hour	Unknown
1/29/2008	SB SR 1, South of SR 273	Property Damage Crash/ Rollover – SB SR 1 Left Lane Closed	1.5 Hours	Unknown
2/10/2008	SB SR 1 at Christiana Mall Ramp	Personal Injury Crash - Left Lanes Closed on NB & SB SR 1 s/o I-95	3 Hours	Unknown
2/12/2008	SR 1 near I-95	DSP Fatal Accident Reconstruction – Partial Closure	9.5 Hours	Unknown
2/12/2008	SR 1 between US 40 and SR 273	DSP Fatal Accident Reconstruction - Partial Closure	12 Hours	Unknown
4/2/2008	SR 1 at SR 273	Possible Fatal Crash involving 3 vehicles - NB SR 1 and SB SR 1 Ramp to SR 273 Closed	3 Hours	US 13
6/17/2008	NB SR 1 at SR 273	Possible Fatal Crash / damaged bridge – NB SR 1 Closed	3 Hours	Unknown
3/30/2009	NB SR 1 North of SR 72	Personal Injury Crash involving 4 vehicles – Partial closure	2 Hours	US 13
4/5/2009	SB SR 1 Ramp at Lorewood Grove Road	Tractor Trailer Rolled Over - SB SR 1 Closed	9 Hours	SR 9, US13 and SR 72

**Significant Incidents on SR 1 that Could have Utilized the Spur Road  
to Accommodate Detoured Traffic – 2004 through present (Continued)**

<b>Date</b>	<b>Location</b>	<b>Event</b>	<b>Duration</b>	<b>Roads used for Detour</b>
6/29/2009	SR 1 at SR 273	Truck Rolled Over - SB SR 1 Closed	2.5 Hours	Unknown
8/2/2009	SR 1 at SR 273	Personal Injury Crash - SB SR 1 Closed at SR 273	2.5 Hours	Unknown
8/6/2009	SR 1 on Roth Bridge	Fatal Crash/ Vehicle Fire – SB SR 1 Closed	Unknown	Unknown
4/5/2010	SB SR 1, South of SR 71	Personal Injury Crash - SB SR 1 Closed	Unknown	Unknown
4/5/2010	NB SR 1 at Christiana Mall	Personal Injury Crash – Partial Closure on NB SR 1	Unknown	Unknown
5/27/2010	NB SR 1, North of US 40	Personal Injury Crash – NB SR 1 at US 40 Closed	Unknown	Unknown
3/17/2011	NB SR 1 at Biddles Toll Plaza	EZ Pass Lane Closure	7.5 Hours	US 13 / Others
4/8/2011	NB SR 1 at Christiana Mall Ramp	Jack-Knifed Tractor-Trailer	1 Hour	SR 273
6/2/2011	SB SR 1 at Biddles Toll Plaza	EZ Pass Lane Closure	7.5 Hours	US 13 / Others
7/17/2011	SR 1 near Christiana Mall	Fatal Crash in the work zone - Both NB & SB SR 1 Closed	3 Hours	SR 273
9/29/2011	NB SR 1 near SR 72 Ramps	Truck Fire - NB SR 1 Closed	1.5 Hours	Unknown
10/27/2011	SB SR 1 over Drawyers Creek Overpass	Personal Injury / Possible Fatal Crash – NB & SB SR 1 Closed	3 Hours	Unknown
10/27/2011	NB SR 1 at Christiana Mall Ramp	Personal Injury Crash – NB SR 1 On-Ramp to I-95 Closed	12.5 Hours	SR 273
12/12/2011	NB SR 1 at Tybouts Corner	Vehicle Crash – NB SR 1 Closed	1 Hour	US 13
11/8/2011	NB SR 1 on Roth Bridge	Vehicle Crash – NB SR 1 Closed	1.5 Hours	US 13 / Others
1/15/2012	SB SR 1 at SR 273	Vehicle Crash – SB SR 1 Closed	1.0 Hour	SR 273 / US 40
4/11/2012	NB SR 1 South of I-95 Ramps	Vehicle Crash – NB SR 1 Closed	2 Hours	SR 273
4/16/2012	SR 1 between SR 273 and AAA Blvd	Maintenance of Traffic	3 Hours	I-95 / SR 273
4/18/2012	SB SR 1 North of SR 72	Vehicle Crash – SB SR 1 Closed	1.5 Hours	US 13 / SR 72
4/30/2012	SB SR 1 at SR 7	Vehicle Crash – SB SR 1 Closed	3 Hours	I-95 / SR 273
6/15/2012	NB SR 1 near SR 71	Maintenance of Traffic – Partial Closure on NB SR 1	3.5 Hours	US 13 / SR 273
9/28/2012	NB SR 1 near SR 273	Vehicle Crash – NB SR Closed	1 Hour	SR 72/ SR 7 / US 13
11/8/2012	SB SR 1 At Christiana Mall Exit	Vehicle Crash – SB SR 1 Closed	1 Hour	SR 273 / US 13
11/9/2012	NB SR 1 At Christiana Mall Exit	Vehicle Crash – NB SR 1 Closed	1 Hour	SR 273 / I-95
12/8/2012	SB SR 1 near Exit 148	Vehicle Crash – SB SR 1 Closed	0.5 Hours	US 13
12/27/2012	NB SR 1 at Roth Bridge	Unknown	0.5 Hours	US 13
1/30/2013	NB SR 1 near Christiana Mall Exit	Vehicle Crash within the Construction Zone	1 Hour	SR 273 / I-95

**Significant Incidents on SR 1 that Could have Utilized the Spur Road  
to Accommodate Detoured Traffic – 2004 through present (Continued)**

<b>Date</b>	<b>Location</b>	<b>Event</b>	<b>Duration</b>	<b>Roads used for Detour</b>
3/8/2013	NB SR 1 work zone near I-95 Interchange	Construction equipment malfunction – NB SR 1 Closed	2 Hours	SR 273 / I-95
5/25/2013	SB I-95 s/o I-95 Ramps	Vehicle Rollover Crash – Ramp Closed	0.5 Hours	SR 273 / I-95
6/14/2013	NB SR 1 near I-95 Ramps	Unknown	1 Hour	SR 273 / I-95
6/29/2013	SB I-95 Ramp to SB SR 1	Vehicle crash – Maintenance of Traffic	1 Hour	SR 273 / I-95
10/15/2013	NB SR 1 n/o Biddles Plaza	Disabled Vehicle – Maintenance of Traffic	1 Hour	US 13 / SR 896
12/12/2013	SB SR 1 n/o SR 273	Vehicle Crash – Maintenance of Traffic	1 Hour	SR 273
2/16/2014	Cedar Lane Road at Marl Pit Road	Vehicle Crash	3 Hours	Unknown
3/1/2014	I-95 / SR 7	Unknown	1 Hour	Unknown
4/9/2014	I-95 NB exit 7	TMC – Maintenance Dispatch	1 Hour	Unknown
6/2/2014	US 13 at Scott Run	Vehicle Crash – Maintenance of Traffic	1 Hour	SR 1
6/25/2014	US 301 at N. Broad Street (SR 71)	Vehicle Crash – Maintenance of Traffic	2 Hours	SR 1 / Others
8/18/2014	US 301 (4861 Summit Bridge Rd)	Vehicle Crash – Maintenance of Traffic	1 Hour	Unknown
12/23/2014	NB I-95 Ramp near SR 1 SB Ramps	Unknown	1 hour	Unknown
12/24/2014	SR 1 NB b/t SR 299 and exit 119	Unknown	1 Hour	Unknown
1/24/2015	SR 1 SB at Christiana Mall	Vehicle Crash – Maintenance of Traffic	1 Hour	Unknown
6/18/2015	SR 1 Biddles Toll Plaza	Vehicle Crash – Maintenance of Traffic	2 Hours	Unknown
7/8/2015	SR 1 SB at SR 72	Vehicle Crash – Maintenance of Traffic	3 Hours	Unknown
9/22/2015	Rt. 13 NB crossover to SR 1 NB	Vehicle Crash – Maintenance of Traffic	2 Hours	Unknown
10/6/2015	SR 1 NB on the Roth Bridge	Vehicle Crash – Maintenance of Traffic	1 Hour	Unknown
10/28/2015	SR 1 NB on the Roth Bridge	Vehicle Crash – Maintenance of Traffic	2 Hours	Unknown
11/5/2015	SR 1 NB north of SR 72	Vehicle Crash – Maintenance of Traffic	2 Hours	Unknown
11/12/2015	SR 1 NB at SR 72	Vehicle Crash – Maintenance of Traffic	1 Hour	Unknown
11/29/2015	SR 1 SB south of Tybouts Corner	Vehicle Crash – Maintenance of Traffic	4 Hours	Unknown
<b>Total</b>			<b>178 Hours</b>	

**Significant Incidents in the Middletown Region that Could have Utilized  
the Spur Road to Accommodate Detoured Traffic – 2004 through present**

<b>Date</b>	<b>Location</b>	<b>Event</b>	<b>Duration</b>	<b>Roads used for Detour</b>
11/29/2004	Bethel Church Road	Personal Injury Crash - SB US 301 Left Lane and Left-turn Lane Closed	1 Hour	Right lane and shoulder on US 301
9/3/2005	US 301 at SR 71	Property Damage Crash - US 301 SB and SR 71 NB Left-turn Lane Closed	1 Hour	Access to Middletown Village back on to US 301
1/30/2006	SB US 301 at Bethel Church Road	Property Damage Crash & Fuel Spill - SB US 301 Closed	7 Hours	Bethel Church Road, Choptank Road and Churchtown Road
8/24/2006	US 301 North of Churchtown Road	Property Damage Crash – US 301 Closed	1 Hour	Unknown
12/25/2006	SB US 301 South of Summit Bridge	Personal Injury Crash - SB US 301 Closed	1 Hour	Shoulder Lane on SB US 301
7/26/2007	US 301 South of Summit Bridge	Fatal Crash – US 301 Closed	3 Hours	SR 1 and US 13
10/20/2007	Bethel Church Road	Fatal Crash – Bethel Church Road Closed at US 301	3.5 Hours	Unknown
11/2/2007	US 301 at Bethel Church Road	Damaged Pole - Bethel Church Road Closed	7 Hours	Unknown
1/5/2008	US 301 at Bethel Church Road	Damaged Pole - Bethel Church Road Closed	5 Hours	Unknown
5/30/2008	SB US 301 at SR 71	Personal Injury Crash - SB US 301 Closed	1 Hour	SR 71
6/16/2008	SR 896 East of Jamisons Corner Road	Barn Fire – SR 896 Closed	3.5 Hours	Unknown
9/30/2008	Old School House Road and US 301	Personal Injury Crash – Old School House Road Closed at US 301	1.5 Hours	Unknown
12/1/2009	US 301 and Churchtown Road	Personal Injury Crash – Details Unknown	1 Hour	Unknown
12/3/2009	US 301 at SR 71	Roadway Flooding - Details Unknown	Unknown	Unknown
12/11/2009	SB US 301 near Summit Bridge	Fatal Crash - Full Closure	3 Hours	Unknown
12/28/2009	US 301 North of SR 299	Property Damage Crash – US 301 Closed between SR 299 & SR 71	5 Hours	Unknown
9/26/2011	SR 299 near Cleaver Farms Road	Vehicle Crash – SR 299 Closed (Direction Unknown)	2.5 Hours	Unknown
11/9/2012	Marl Pit Road / Cedar Lane Road	Lane Closure – Direction & cause unknown	1 Hour	US 301 / US 13 / SR 896
3/17/2013	US 301 north of Armstrong Corner Road	Utility pole blocking travel lanes following a motor vehicle crash	4 Hours	Armstrong Corner Road / Choptank Road
1/2/2015	US 301 at Doc Levinson Drive	Vehicle Crash – Maintenance of Traffic	1 Hour	Unknown
5/22/2015	US 301 at Marl Pit Road	Vehicle Crash – Maintenance of Traffic	1 Hour	Unknown
8/27/2015	SR 299 at SR 71	Fatal Crash	3.5 Hours	Unknown
11/3/2015	US 301 at Doc Levinson Drive	Vehicle Crash – Maintenance of Traffic	2 Hours	Unknown
11/4/2015	US 301 at Old School House Road	Vehicle Crash – Maintenance of Traffic	3 Hours	Unknown

**Significant Incidents in the Middletown Region that Could have Utilized  
the Spur Road to Accommodate Detoured Traffic – 2004 through present (Continued)**

<b>Date</b>	<b>Location</b>	<b>Event</b>	<b>Duration</b>	<b>Roads used for Detour</b>
12/23/2015	US 301 south of Old School House Road	Vehicle Crash – Maintenance of Traffic	4 Hours	Unknown
<b>Total</b>			<b>67 Hours</b>	



**Appendix E**  
**Peak Hour Traffic Volumes,**  
**SYNCHRO Capacity Reports and**  
**Delay Study Results**

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110 South Poplar Street  
Wilmington, DE

File Name : US 301 at Summit Bridge Rd  
Site Code :  
Start Date : 10/7/2015  
Page No : 3

Start Time	US 301 Southbound						US 301 Northbound						Old Summit Bridge Rd Westbound						Old Summit Bridge Rd Eastbound											
	Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total							
	Peak Hour Analysis From 06:30 AM to 11:45 AM - Peak 1 of 1																													
Peak Hour for Entire Intersection Begins at 07:00 AM																														
07:00 AM	10	255	0	0	265		0	306	9	0	315		11	0	0	0	11		0	0	0	0	0		0	0	0	0	0	
07:15 AM	16	192	0	0	208		0	318	2	0	320		11	0	4	0	15		0	0	0	0	0		0	0	0	0	0	
07:30 AM	13	161	0	0	174		0	347	3	0	350		8	0	6	0	14		0	0	0	0	0		0	0	0	0	0	
07:45 AM	11	200	0	0	211		0	312	5	0	317		8	0	2	0	10		0	0	0	0	0		0	0	0	0	0	
Total Volume	50	808	0	0	858		0	1283	19	0	1302		38	0	12	0	50		0	0	0	0	0		0	0	0	0	0	
% App. Total	5.8	94.2	0	0			0	98.5	1.5	0			76	0	24	0			0	0	0	0	0		0	0	0	0	0	
PHF	.781	.792	.000	.000	.809		.000	.924	.528	.000	.930		.864	.000	.500	.000	.833		.000	.000	.000	.000	.000		.000	.000	.000	.000	.935	
CARS & PEDS	40	685	0	0	725		0	1135	18	0	1153		36	0	6	0	42		0	0	0	0	0		0	0	0	0	0	
% CARS & PEDS	80.0	84.8	0	0	84.5		0	88.5	94.7	0	88.6		94.7	0	50.0	0	84.0		0	0	0	0	0		0	0	0	0	0	
U TURNS & BIKES	1	0	0	0	1		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	
% U TURNS & BIKES	2.0	0	0	0	0.1		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	
TRUCKS	9	123	0	0	132		0	148	1	0	149		2	0	6	0	8		0	0	0	0	0		0	0	0	0	0	
% TRUCKS	18.0	15.2	0	0	15.4		0	11.5	5.3	0	11.4		5.3	0	50.0	0	16.0		0	0	0	0	0		0	0	0	0	0	



110 South Poplar Street  
Wilmington, DE

File Name : US 301 at Summit Bridge Rd  
Site Code :  
Start Date : 10/7/2015  
Page No : 5

Start Time	US 301 Southbound						US 301 Northbound						Old Summit Bridge Rd Westbound						Old Summit Bridge Rd Eastbound											
	Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total							
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																														
Peak Hour for Entire Intersection Begins at 05:00 PM																														
05:00 PM	14	284	0	0	298		0	218	10	0	228		12	0	5	0	17		0	0	0	0	0		0	0	0	0	0	
05:15 PM	15	297	0	0	312		0	237	13	0	250		7	0	3	0	10		0	0	0	0	0		0	0	0	0	0	
05:30 PM	23	290	0	0	313		1	228	8	0	237		11	0	6	0	17		0	0	0	0	0		0	0	0	0	0	
05:45 PM	19	308	0	0	327		0	253	13	0	266		9	0	7	1	17		0	0	0	0	0		0	0	0	0	0	
Total Volume	71	1179	0	0	1250		1	936	44	0	981		39	0	21	1	61		0	0	0	0	0		0	0	0	0	0	
% App. Total	5.7	94.3	0	0			0.1	95.4	4.5	0			63.9	0	34.4	1.6			0	0	0	0	0		0	0	0	0	0	
PHF	.772	.957	.000	.000	.956		.250	.925	.846	.000	.922		.813	.000	.750	.250	.897		.000	.000	.000	.000	.000		.000	.000	.000	.000	.939	
CARS & PEDS	64	1088	0	0	1152		0	833	40	0	873		38	0	17	1	56		0	0	0	0	0		0	0	0	0	0	
% CARS & PEDS	90.1	92.3	0	0	92.2		0	89.0	90.9	0	89.0		97.4	0	81.0	100	91.8		0	0	0	0	0		0	0	0	0	0	
U TURNS & BIKES	1	0	0	0	1		1	0	0	0	1		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	
% U TURNS & BIKES	1.4	0	0	0	0.1		100	0	0	0	0.1		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	
TRUCKS	6	91	0	0	97		0	103	4	0	107		1	0	4	0	5		0	0	0	0	0		0	0	0	0	0	
% TRUCKS	8.5	7.7	0	0	7.8		0	11.0	9.1	0	10.9		2.6	0	19.0	0	8.2		0	0	0	0	0		0	0	0	0	0	



110 South Poplar Street  
Wilmington, DE

File Name : US 301 at SR 896 (Boyd's Corner Rd)  
Site Code :  
Start Date : 10/7/2015  
Page No : 3

Start Time	US 301 Southbound				US 301 Northbound				SR 896 Westbound				SR 896 Eastbound								
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total					
Peak Hour Analysis From 06:30 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	77	170	4	0	251	2	142	46	0	190	45	11	84	0	140	41	3	0	58	639	
07:15 AM	57	138	2	0	197	2	157	41	0	200	54	9	114	0	177	12	27	1	0	40	614
07:30 AM	60	123	4	0	187	2	156	46	0	204	50	4	112	0	166	18	37	3	0	58	615
07:45 AM	64	128	4	0	196	3	170	32	0	205	42	10	112	0	164	8	30	1	0	39	604
Total Volume	258	559	14	0	831	9	625	165	0	799	191	34	422	0	647	52	135	8	0	195	2472
% App. Total	31	67.3	1.7	0	828	1.1	78.2	20.7	0	774	29.5	5.3	65.2	0	914	26.7	69.2	4.1	0	841	967
PHF	.838	.822	.875	.000	.828	.750	.919	.897	.000	.974	.884	.773	.925	.000	.914	.722	.823	.667	.000	.841	967
CARS & PEDS	234	529	14	0	777	5	550	111	0	666	137	32	411	0	580	46	131	7	0	184	2207
% CARS & PEDS	90.7	94.6	100	0	93.5	55.6	88.0	67.3	0	83.4	71.7	94.1	97.4	0	89.6	88.5	97.0	87.5	0	94.4	89.3
U TURNS & BIKES	0	0	0	0	0	0	0	0	0	0	12	0	0	0	12	0	0	0	0	0	12
% U TURNS & BIKES	0	0	0	0	0	0	0	0	0	0	6.3	0	0	0	1.9	0	0	0	0	0	0.5
TRUCKS	24	30	0	0	54	4	75	54	0	133	42	2	11	0	55	6	4	1	0	11	253
% TRUCKS	9.3	5.4	0	0	6.5	44.4	12.0	32.7	0	16.6	22.0	5.9	2.6	0	8.5	11.5	3.0	12.5	0	5.6	10.2



110 South Poplar Street  
Wilmington, DE

File Name : US 301 at SR 896 (Boyd's Corner Rd)  
Site Code :  
Start Date : 10/7/2015  
Page No : 5

Start Time	US 301 Southbound						US 301 Northbound						SR 896 Westbound						SR 896 Eastbound					
	Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total	
	Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1						Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	89	171	15	0	275		6	148	25	0	179		65	33	52	0	150		8	17	1	0	26	
05:15 PM	91	184	16	0	291		1	154	48	0	203		72	42	68	0	182		8	17	1	0	26	
05:30 PM	84	178	22	0	284		4	150	38	0	192		67	31	55	0	153		4	24	2	0	30	
05:45 PM	102	199	15	0	316		1	169	42	0	212		62	44	60	0	166		12	24	6	0	42	
Total Volume	366	732	68	0	1166		12	621	153	0	786		266	150	235	0	651		32	82	10	0	124	
% App. Total	31.4	62.8	5.8	0			1.5	79	19.5	0	40.9		40.9	23	36.1	0	25.8		25.8	66.1	8.1	0		
PHF	.897	.920	.773	.000	.922		.500	.919	.797	.000	.927		.924	.852	.864	.000	.894		.667	.854	.417	.000	.738	
CARS & PEDS	358	686	68	0	1112		12	575	118	0	705		211	146	220	0	577		30	78	10	0	118	
% CARS & PEDS	97.8	93.7	100	0	95.4		100	92.6	77.1	0	89.7		79.3	97.3	93.6	0	88.6		93.8	95.1	100	0	95.2	
U TURNS & BIKES	0	0	0	0	0		0	0	0	0	0		7	0	0	0	7		0	0	0	0	0	
% U TURNS & BIKES	0	0	0	0	0		0	0	0	0	0		2.6	0	0	0	1.1		0	0	0	0	0	
TRUCKS	8	46	0	0	54		0	46	35	0	81		48	4	15	0	67		2	4	0	0	6	
% TRUCKS	2.2	6.3	0	0	4.6		0	7.4	22.9	0	10.3		18.0	2.7	6.4	0	10.3		6.3	4.9	0	0	4.8	
Int. Total																								



110 South Poplar Street  
Wilmington, DE

File Name : US 301 at Armstrong Corner Rd  
Site Code :  
Start Date : 10/6/2015  
Page No : 2

Start Time	US 301 Southbound					US 301 Northbound					Marl Pit Rd Westbound					Armstrong Corner Rd Eastbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	20	209	3	0	232	9	168	19	0	196	14	16	40	0	70	4	9	11	0	24	522
07:00 AM	18	174	5	0	197	9	190	11	0	210	17	12	33	0	62	3	21	5	0	29	498
07:15 AM	12	175	2	0	189	9	207	15	0	231	33	15	26	0	74	0	21	14	0	35	529
07:30 AM	19	147	4	0	170	5	180	10	0	195	13	8	32	0	53	1	15	11	0	27	445
Total Volume	69	705	14	0	788	32	745	55	0	832	77	51	131	0	259	8	66	41	0	115	1994
% App. Total	8.8	89.5	1.8	0		3.8	89.5	6.6	0		29.7	19.7	50.6	0		7	57.4	35.7	0		1994
PHF	.863	.843	.700	.000	.849	.889	.900	.724	.000	.900	.583	.797	.819	.000	.875	.500	.786	.732	.000	.821	.942
CARS & PEDS	55	562	10	0	627	29	613	41	0	683	61	40	113	0	214	7	58	38	0	103	1627
% CARS & PEDS	79.7	79.7	71.4	0	79.6	90.6	82.3	74.5	0	82.1	79.2	78.4	86.3	0	82.6	87.5	87.9	92.7	0	89.6	81.6
U TURNS & BIKES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% U TURNS & BIKES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRUCKS	14	143	4	0	161	3	132	14	0	149	16	11	18	0	45	1	8	3	0	12	367
% TRUCKS	20.3	20.3	28.6	0	20.4	9.4	17.7	25.5	0	17.9	20.8	21.6	13.7	0	17.4	12.5	12.1	7.3	0	10.4	18.4



110 South Poplar Street  
Wilmington, DE

File Name : US 301 at Armstrong Corner Rd  
Site Code :  
Start Date : 10/6/2015  
Page No : 4

Start Time	US 301 Southbound					US 301 Northbound					Mari Pit Rd Westbound					Armstrong Corner Rd Eastbound						
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total	
	Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	45	208	2	0	255	17	186	16	1	220	38	17	20	1	76	2	14	23	0	39	590	
05:15 PM	42	185	7	0	234	11	188	20	0	219	35	15	18	0	68	0	25	21	0	46	567	
05:30 PM	25	220	2	2	249	10	179	20	0	209	29	15	11	0	55	2	19	15	0	36	549	
05:45 PM	34	203	4	0	241	7	172	13	0	192	43	20	17	0	80	0	24	14	0	38	551	
Total Volume	146	816	15	2	979	45	725	69	1	840	145	67	66	1	279	4	82	73	0	159	2257	
% App. Total	14.9	83.4	1.5	0.2	.960	.662	.964	.863	0.1	.955	.843	.838	.825	.250	.872	.500	.820	.793	.000	.864	.956	
CARS & PEDS	140	723	13	0	876	43	604	68	0	715	138	63	62	0	263	3	80	68	0	151	2005	
% CARS & PEDS	95.9	88.6	86.7	0	89.5	95.6	83.3	98.6	0	85.1	95.2	94.0	93.9	0	94.3	75.0	97.6	93.2	0	95.0	88.8	
U TURNS & BIKES	0	0	0	2	2	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	4	
% U TURNS & BIKES	0	0	0	100	0.2	0	0	0	100	0.1	0	0	0	100	0.4	0	0	0	0	0	0.2	
TRUCKS	6	93	2	0	101	2	121	1	0	124	7	4	4	0	15	1	2	5	0	8	248	
% TRUCKS	4.1	11.4	13.3	0	10.3	4.4	16.7	1.4	0	14.8	4.8	6.0	6.1	0	5.4	25.0	2.4	6.8	0	5.0	11.0	



110 South Poplar Street  
Wilmington, DE

File Name : US 301 at SR 71 (Broad St)  
Site Code : 00000000  
Start Date : 10/6/2015  
Page No : 2

Start Time	US 301 Southbound						US 301 Northbound						SR 71 Westbound						SR 71 Eastbound											
	Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total							
	From 06:30 AM to 11:45 AM - Peak 1 of 1						Peak Hour for Entire Intersection Begins at 06:45 AM																							
06:45 AM	0	175	86	0	261		22	114	0	0	136		51	0	37	0	88		0	0	0	0	0		0	0	0	0	0	
07:00 AM	0	178	52	0	230		30	166	0	0	196		77	0	40	0	117		0	0	0	0	0		0	0	0	0	0	
07:15 AM	0	184	41	0	225		40	114	0	0	154		90	0	30	0	120		0	0	0	0	0		0	0	0	0	0	
07:30 AM	0	123	42	0	165		39	106	0	0	145		85	0	33	0	118		0	0	0	0	0		0	0	0	0	0	
Total Volume	0	660	221	0	881		131	500	0	0	631		303	0	140	0	443		0	0	0	0	0		0	0	0	0	0	
% App. Total	0	74.9	25.1	0			20.8	79.2	0	0			68.4	0	31.6	0			0	0	0	0	0		0	0	0	0	0	
PHF	.000	.897	.642	.000	.844		.819	.753	.000	.000	.805		.842	.000	.875	.000	.923		.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	
CARS & PEDS	0	558	200	0	758		124	427	0	0	551		282	0	138	0	420		0	0	0	0	0		0	0	0	0	0	
% CARS & PEDS	0	84.5	90.5	0	86.0		94.7	85.4	0	0	87.3		93.1	0	98.6	0	94.8		0	0	0	0	0		0	0	0	0	0	
U TURNS & BIKES	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	
% U TURNS & BIKES	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	
TRUCKS	0	102	21	0	123		7	73	0	0	80		21	0	2	0	23		0	0	0	0	0		0	0	0	0	0	
% TRUCKS	0	15.5	9.5	0	14.0		5.3	14.6	0	0	12.7		6.9	0	1.4	0	5.2		0	0	0	0	0		0	0	0	0	0	



110 South Poplar Street  
Wilmington, DE

File Name : US 301 at SR 71 (Broad St)  
Site Code : 00000000  
Start Date : 10/6/2015  
Page No : 4

Start Time	US 301 Southbound						US 301 Northbound						SR 71 Westbound						SR 71 Eastbound											
	Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total							
	Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																													
Peak Hour for Entire Intersection Begins at 05:00 PM																														
05:00 PM	0	187	83	0	270		60	123	0	0	183		74	0	45	0	119		0	0	0	0	0		0	0	0	0	0	
05:15 PM	0	153	85	0	238		55	139	0	0	194		51	0	48	0	99		0	0	0	0	0		0	0	0	0	0	
05:30 PM	0	189	87	0	276		56	143	0	0	199		51	0	55	0	106		0	0	0	0	0		0	0	0	0	0	
05:45 PM	0	195	68	0	263		67	135	0	0	202		47	0	51	0	98		0	0	0	0	0		0	0	0	0	0	
Total Volume	0	724	323	0	1047		238	540	0	0	778		223	0	199	0	422		0	0	0	0	0		0	0	0	0	0	
% App. Total	0	69.1	30.9	0			30.6	69.4	0	0			52.8	0	47.2	0			0	0	0	0	0		0	0	0	0	0	
PHF	.000	.928	.928	.000	.948		.888	.944	.000	.000	.963		.753	.000	.905	.000	.887		.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	
CARS & PEDS	0	644	313	0	957		235	475	0	0	710		216	0	198	0	414		0	0	0	0	0		0	0	0	0	0	
% CARS & PEDS	0	89.0	96.9	0	91.4		98.7	88.0	0	0	91.3		96.9	0	99.5	0	98.1		0	0	0	0	0		0	0	0	0	0	
U TURNS & BIKES	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	
% U TURNS & BIKES	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	
TRUCKS	0	80	10	0	90		3	65	0	0	68		7	0	1	0	8		0	0	0	0	0		0	0	0	0	0	
% TRUCKS	0	11.0	3.1	0	8.6		1.3	12.0	0	0	8.7		3.1	0	0.5	0	1.9		0	0	0	0	0		0	0	0	0	0	





110 South Poplar Street  
Wilmington, DE

File Name : US 301 at SR 299  
Site Code : 00000000  
Start Date : 10/6/2015  
Page No : 3

Start Time	US 301 Southbound						US 301 Northbound						SR 299 Westbound						SR 299 Eastbound					
	Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total	
	Peak Hour for Entire Intersection Begins at 06:45 AM							Peak Hour for Entire Intersection Begins at 06:45 AM							Peak Hour for Entire Intersection Begins at 06:45 AM									
06:45 AM	19	137	34	0	190		34	108	15	0	157		7	48	57	0	112		16	44	11	0	71	
07:00 AM	63	152	25	0	240		38	144	21	0	203		12	76	49	0	137		9	38	15	0	62	
07:15 AM	17	140	30	0	187		21	93	11	0	125		10	37	55	0	102		24	61	26	0	111	
07:30 AM	9	92	22	0	123		24	111	11	0	146		16	37	43	0	96		12	40	9	0	61	
Total Volume	108	521	111	0	740		117	456	58	0	631		45	198	204	0	447		61	183	61	0	305	
% App. Total	14.6	70.4	15	0			18.5	72.3	9.2	0			10.1	44.3	45.6	0			20	60	20	0		
PHF	.429	.857	.816	.000	.771		.770	.792	.690	.000	.777		.703	.651	.895	.000	.816		.635	.750	.587	.000	.687	
CARS & PEDS	103	469	92	0	664		107	350	53	0	510		37	184	195	0	416		55	161	49	0	265	
% CARS & PEDS	95.4	90.0	82.9	0	89.7		91.5	76.8	91.4	0	80.8		82.2	92.9	95.6	0	93.1		90.2	88.0	80.3	0	86.9	
U TURNS & BIKES	0	0	9	0	9		0	0	1	0	1		0	0	1	0	1		0	0	0	0	0	
% U TURNS & BIKES	0	0	8.1	0	1.2		0	0	1.7	0	0.2		0	0	0.5	0	0.2		0	0	0	0	0	
TRUCKS	5	52	10	0	67		10	106	4	0	120		8	14	8	0	30		6	22	12	0	40	
% TRUCKS	4.6	10.0	9.0	0	9.1		8.5	23.2	6.9	0	19.0		17.8	7.1	3.9	0	6.7		9.8	12.0	19.7	0	13.1	



110 South Poplar Street  
Wilmington, DE

File Name : US 301 at SR 299  
Site Code : 00000000  
Start Date : 10/6/2015  
Page No : 5

Start Time	US 301 Southbound						US 301 Northbound						SR 299 Westbound						SR 299 Eastbound					
	Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1	2	114	45	1	162		54	157	18	0	229		7	59	78	1	145		16	49	33	0	98	
Peak Hour for Entire Intersection Begins at 05:00 PM	3	120	34	1	158		60	155	17	0	232		17	39	63	0	119		24	57	23	0	104	
05:00 PM	6	153	43	0	202		70	167	24	0	261		8	39	105	0	152		34	51	14	0	99	
05:15 PM	5	149	42	0	196		70	171	15	0	256		9	38	88	0	135		25	36	17	0	78	
05:30 PM	16	536	164	2	718		254	650	74	0	978		41	175	334	1	551		99	193	87	0	379	
05:45 PM	2.2	74.7	22.8	0.3			26	66.5	7.6	0			7.4	31.8	60.6	0.2			26.1	50.9	23	0		
Total Volume	.667	.876	.911	.500	.889		.907	.950	.771	.000	.937		.603	.742	.795	.250	.906		.728	.846	.659	.000	.911	
% App. Total	16	484	134	0	634		249	576	72	0	897		39	174	331	1	545		94	188	79	0	361	
CARS & PEDS	100	90.3	81.7	0	88.3		98.0	88.6	97.3	0	91.7		95.1	99.4	99.1	100	98.9		94.9	97.4	90.8	0	95.3	
% CARS & PEDS	0	0	21	2	23		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	
U TURNS & BIKES	0	0	12.8	100	3.2		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	
% U TURNS & BIKES	0	52	9	0	61		5	74	2	0	81		2	1	3	0	6		5	5	8	0	18	
TRUCKS	0	9.7	5.5	0	8.5		2.0	11.4	2.7	0	8.3		4.9	0.6	0.9	0	1.1		5.1	2.6	9.2	0	4.7	
% TRUCKS																								

Lanes, Volumes, Timings  
 10: US 301 & Old Summit Bridge Road

2015 Volumes  
 AM Peak

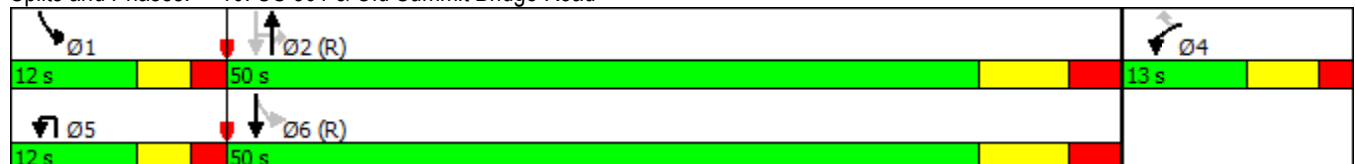


Lane Group	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Protected Phases	4		5	2		1	6
Permitted Phases		4	2		2	6	2
Detector Phase	4	4	5	2	2	1	6
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	15.0	15.0	5.0	15.0
Minimum Split (s)	12.0	12.0	11.0	25.0	25.0	11.0	25.0
Total Split (s)	13.0	13.0	12.0	50.0	50.0	12.0	50.0
Total Split (%)	17.3%	17.3%	16.0%	66.7%	66.7%	16.0%	66.7%
Maximum Green (s)	7.0	7.0	7.0	42.0	42.0	7.0	42.0
Yellow Time (s)	4.0	4.0	3.0	5.0	5.0	3.0	5.0
All-Red Time (s)	2.0	2.0	2.0	3.0	3.0	2.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	5.0	8.0	8.0	5.0	8.0
Lead/Lag			Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	4.0	4.0	3.0	5.0	5.0	3.0	5.0
Recall Mode	None	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	7.0	7.0		55.5	55.5	62.2	62.4
Actuated g/C Ratio	0.09	0.09		0.74	0.74	0.83	0.83
v/c Ratio	0.29	0.14		0.58	0.02	0.19	0.38
Control Delay	36.8	19.5		10.2	3.5	3.5	3.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	36.8	19.5		10.2	3.5	3.5	3.6
LOS	D	B		B	A	A	A
Approach Delay	32.8			10.1			3.6
Approach LOS	C			B			A

Intersection Summary

Area Type: Other  
 Cycle Length: 75  
 Actuated Cycle Length: 75  
 Offset: 10 (13%), Referenced to phase 2:NBSB and 6:SBTL, Start of Green  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.58  
 Intersection Signal Delay: 7.9  
 Intersection Capacity Utilization 57.4%  
 Analysis Period (min) 15  
 Intersection LOS: A  
 ICU Level of Service B

Splits and Phases: 10: US 301 & Old Summit Bridge Road



Lanes, Volumes, Timings  
8: US 301 & Churchtown Rd/SR 896

2015 Volumes  
AM Peak

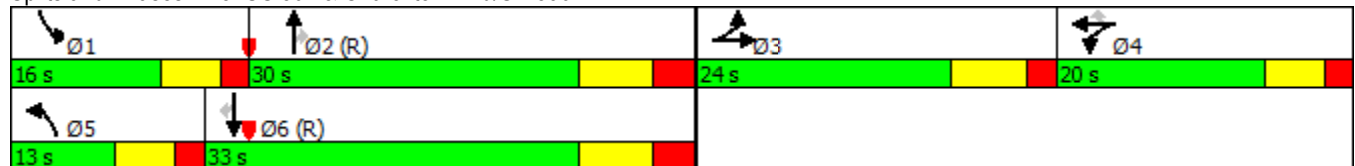


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						4			2			6
Detector Phase	3	3		4	4	4	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		10.0	10.0	10.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	13.0	13.0		17.0	17.0	17.0	12.0	29.0	29.0	12.0	29.0	29.0
Total Split (s)	24.0	24.0		20.0	20.0	20.0	13.0	30.0	30.0	16.0	33.0	33.0
Total Split (%)	26.7%	26.7%		22.2%	22.2%	22.2%	14.4%	33.3%	33.3%	17.8%	36.7%	36.7%
Maximum Green (s)	17.0	17.0		14.0	14.0	14.0	7.0	22.0	22.0	10.0	25.0	25.0
Yellow Time (s)	5.0	5.0		4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	3.0	3.0	2.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		6.0	6.0	6.0	6.0	8.0	8.0	6.0	8.0	8.0
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes						
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Recall Mode	None	None		None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	13.9	13.9		13.7	13.7	13.7	6.8	24.1	24.1	11.3	38.8	38.8
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.15	0.08	0.27	0.27	0.13	0.43	0.43
v/c Ratio	0.25	0.60		0.48	0.14	0.75	0.10	0.75	0.36	0.77	0.46	0.02
Control Delay	34.8	43.5		38.7	33.8	13.2	41.0	37.4	5.5	53.4	21.4	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.8	43.5		38.7	33.8	13.2	41.0	37.4	5.5	53.4	21.4	0.1
LOS	C	D		D	C	B	D	D	A	D	C	A
Approach Delay		41.2			21.8			30.9			31.0	
Approach LOS		D			C			C			C	

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 2 (2%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 75  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.77  
 Intersection Signal Delay: 29.5  
 Intersection LOS: C  
 Intersection Capacity Utilization 65.1%  
 ICU Level of Service C  
 Analysis Period (min) 15

Splits and Phases: 8: US 301 & Churchtown Rd/SR 896



Lanes, Volumes, Timings  
7: US 301 & Armstrong Corner Rd

2015 Volumes  
AM Peak

	↖	→	↘	↙	←	↖	↙	↑	↘	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	12.0	12.0		12.0	12.0		11.0	23.0	23.0	11.0	23.0	23.0
Total Split (s)	35.0	35.0		35.0	35.0		12.0	69.0	69.0	16.0	73.0	73.0
Total Split (%)	29.2%	29.2%		29.2%	29.2%		10.0%	57.5%	57.5%	13.3%	60.8%	60.8%
Maximum Green (s)	29.0	29.0		29.0	29.0		7.0	62.0	62.0	11.0	66.0	66.0
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0			6.0		5.0	7.0	7.0	5.0	7.0	7.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	8.0	8.0	3.0	8.0	8.0
Recall Mode	None	None		None	None		None	C-Min	C-Min	Min	C-Min	C-Min
Act Effct Green (s)		27.8			27.8		74.7	66.4	66.4	79.3	72.2	72.2
Actuated g/C Ratio		0.23			0.23		0.62	0.55	0.55	0.66	0.60	0.60
v/c Ratio		0.36			0.95		0.13	0.93	0.08	0.35	0.87	0.02
Control Delay		34.9			78.8		14.5	52.2	11.9	11.4	33.9	0.1
Queue Delay		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		34.9			78.8		14.5	52.2	11.9	11.4	33.9	0.1
LOS		C			E		B	D	B	B	C	A
Approach Delay		34.9			78.8			48.0			31.3	
Approach LOS		C			E			D			C	

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	45 (38%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.95
Intersection Signal Delay:	44.4
Intersection LOS:	D
Intersection Capacity Utilization:	80.0%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 7: US 301 & Armstrong Corner Rd



Lanes, Volumes, Timings  
30: US 301 & SR 71

2015 Volumes  
AM Peak

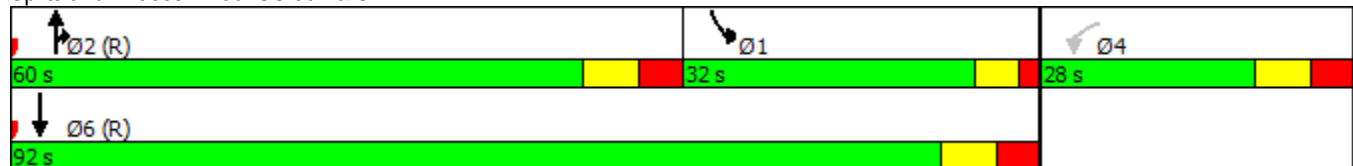


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	4	Free				
Detector Phase	4		2	2	1	6
Switch Phase						
Minimum Initial (s)	6.0		15.0	15.0	8.0	15.0
Minimum Split (s)	16.0		25.0	25.0	15.0	25.0
Total Split (s)	28.0		60.0	60.0	32.0	92.0
Total Split (%)	23.3%		50.0%	50.0%	26.7%	76.7%
Maximum Green (s)	19.0		51.0	51.0	26.0	83.0
Yellow Time (s)	5.0		5.0	5.0	4.0	5.0
All-Red Time (s)	4.0		4.0	4.0	2.0	4.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	9.0		9.0	9.0	6.0	9.0
Lead/Lag			Lead	Lead	Lag	
Lead-Lag Optimize?			Yes	Yes		
Vehicle Extension (s)	4.0		7.0	7.0	4.0	7.0
Recall Mode	None		C-Min	C-Min	None	C-Min
Act Effct Green (s)	15.8	120.0	56.8	56.8	23.4	86.2
Actuated g/C Ratio	0.13	1.00	0.47	0.47	0.20	0.72
v/c Ratio	0.66	0.22	0.79	0.22	0.82	0.67
Control Delay	62.6	0.3	37.1	21.3	59.9	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.6	0.3	37.1	21.3	59.9	8.4
LOS	E	A	D	C	E	A
Approach Delay	20.0		33.8			21.3
Approach LOS	C		C			C

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 16 (13%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 80  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.82  
 Intersection Signal Delay: 25.2  
 Intersection LOS: C  
 Intersection Capacity Utilization 66.3%  
 ICU Level of Service C  
 Analysis Period (min) 15

Splits and Phases: 30: US 301 & SR 71



Lanes, Volumes, Timings  
2: US 301 & Bunker Hill Rd

2015 Volumes  
AM Peak

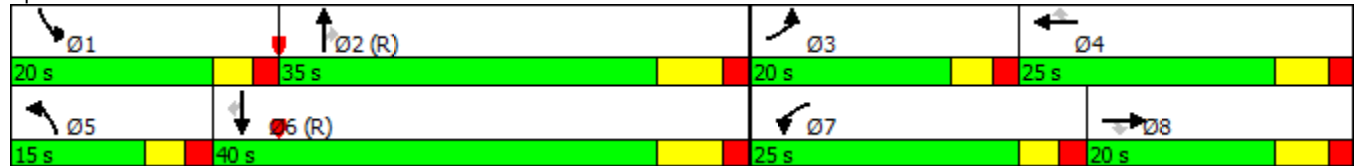


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			8			4			2			6
Detector Phase	3	8	8	7	4	4	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	11.0	12.0	12.0	11.0	12.0	12.0	11.0	23.0	23.0	11.0	23.0	23.0
Total Split (s)	20.0	20.0	20.0	25.0	25.0	25.0	15.0	35.0	35.0	20.0	40.0	40.0
Total Split (%)	20.0%	20.0%	20.0%	25.0%	25.0%	25.0%	15.0%	35.0%	35.0%	20.0%	40.0%	40.0%
Maximum Green (s)	15.0	14.0	14.0	20.0	19.0	19.0	10.0	28.0	28.0	15.0	33.0	33.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	7.0	7.0	5.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	8.4	14.4	14.4	12.7	20.9	20.9	9.0	36.8	36.8	13.0	43.0	43.0
Actuated g/C Ratio	0.08	0.14	0.14	0.13	0.21	0.21	0.09	0.37	0.37	0.13	0.43	0.43
v/c Ratio	0.36	0.57	0.26	0.58	0.34	0.14	0.49	0.54	0.23	0.67	0.47	0.19
Control Delay	46.9	44.5	2.3	46.5	35.3	0.7	53.9	29.1	5.7	56.5	24.1	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.9	44.5	2.3	46.5	35.3	0.7	53.9	29.1	5.7	56.5	24.1	4.7
LOS	D	D	A	D	D	A	D	C	A	E	C	A
Approach Delay		36.5			36.9			27.0			26.1	
Approach LOS		D			D			C			C	

Intersection Summary

Area Type: Other  
 Cycle Length: 100  
 Actuated Cycle Length: 100  
 Offset: 76 (76%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.67  
 Intersection Signal Delay: 30.2  
 Intersection LOS: C  
 Intersection Capacity Utilization 48.8%  
 ICU Level of Service A  
 Analysis Period (min) 15

Splits and Phases: 2: US 301 & Bunker Hill Rd



Lanes, Volumes, Timings  
 10: US 301 & Old Summit Bridge Rd

2015 Volumes  
 PM Peak



Lane Group	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Permitted Phases		4	2		6	6	2
Detector Phase	4	4	5	2	6	1	6
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	15.0	15.0	5.0	15.0
Minimum Split (s)	12.0	12.0	11.0	25.0	25.0	11.0	25.0
Total Split (s)	13.0	13.0	12.0	50.0	50.0	12.0	50.0
Total Split (%)	17.3%	17.3%	16.0%	66.7%	66.7%	16.0%	66.7%
Maximum Green (s)	7.0	7.0	7.0	43.0	42.0	7.0	42.0
Yellow Time (s)	4.0	4.0	3.0	5.0	5.0	3.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0	2.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	5.0	7.0	8.0	5.0	8.0
Lead/Lag			Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	4.0	4.0	3.0	5.0	5.0	3.0	5.0
Recall Mode	None	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	7.5	7.5	56.9	51.9	59.7	60.9	59.7
Actuated g/C Ratio	0.10	0.10	0.76	0.69	0.80	0.81	0.80
v/c Ratio	0.25	0.15	0.00	0.45	0.04	0.17	0.46
Control Delay	34.9	15.9	3.0	8.6	2.1	3.2	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.9	15.9	3.0	8.6	2.1	3.2	6.0
LOS	C	B	A	A	A	A	A
Approach Delay	28.3			8.3			5.8
Approach LOS	C			A			A

Intersection Summary

Area Type: Other  
 Cycle Length: 75  
 Actuated Cycle Length: 75  
 Offset: 58 (77%), Referenced to phase 2:NBSB and 6:SBTL, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.46  
 Intersection Signal Delay: 7.5  
 Intersection LOS: A  
 Intersection Capacity Utilization 56.8%  
 ICU Level of Service B  
 Analysis Period (min) 15

Splits and Phases: 10: US 301 & Old Summit Bridge Rd





Lanes, Volumes, Timings  
8: US 301 & Churchtown Rd/SR 896

2015 Volumes  
PM Peak

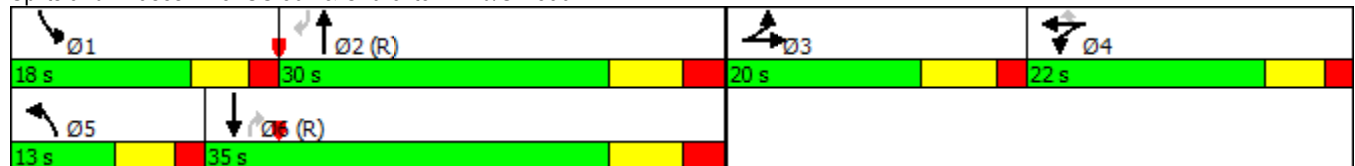


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						4			6			2
Detector Phase	3	3		4	4	4	5	2	6	1	6	2
Switch Phase												
Minimum Initial (s)	5.0	5.0		10.0	10.0	10.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	13.0	13.0		17.0	17.0	17.0	12.0	29.0	29.0	12.0	29.0	29.0
Total Split (s)	20.0	20.0		22.0	22.0	22.0	13.0	30.0	35.0	18.0	35.0	30.0
Total Split (%)	22.2%	22.2%		24.4%	24.4%	24.4%	14.4%	33.3%	38.9%	20.0%	38.9%	33.3%
Maximum Green (s)	13.0	13.0		16.0	16.0	16.0	7.0	22.0	27.0	12.0	27.0	22.0
Yellow Time (s)	5.0	5.0		4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	3.0	3.0	2.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		6.0	6.0	6.0	6.0	8.0	8.0	6.0	8.0	8.0
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes						
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Recall Mode	None	None		None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	11.3	11.3		15.0	15.0	15.0	6.8	23.8	40.1	12.9	40.1	23.8
Actuated g/C Ratio	0.13	0.13		0.17	0.17	0.17	0.08	0.26	0.45	0.14	0.45	0.26
v/c Ratio	0.20	0.55		0.60	0.55	0.56	0.10	0.76	0.24	0.81	0.53	0.13
Control Delay	36.8	44.0		40.0	41.3	9.4	40.3	37.8	3.2	52.1	21.5	0.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.8	44.0		40.0	41.3	9.4	40.3	37.8	3.2	52.1	21.5	0.5
LOS	D	D		D	D	A	D	D	A	D	C	A
Approach Delay		42.2			29.3			31.1			29.9	
Approach LOS		D			C			C			C	

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 44 (49%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 75  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.81  
 Intersection Signal Delay: 30.8  
 Intersection LOS: C  
 Intersection Capacity Utilization 63.4%  
 ICU Level of Service B  
 Analysis Period (min) 15

Splits and Phases: 8: US 301 & Churchtown Rd/SR 896



Lanes, Volumes, Timings  
7: US 301 & Armstrong Corner Rd/Marl Pit Road

2015 Volumes  
PM Peak

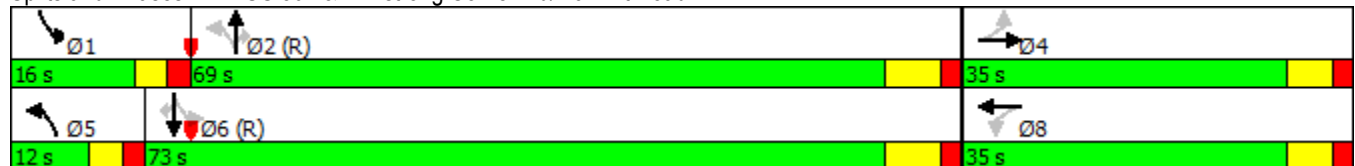


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	12.0	12.0		12.0	12.0		11.0	23.0	23.0	11.0	23.0	23.0
Total Split (s)	35.0	35.0		35.0	35.0		12.0	69.0	69.0	16.0	73.0	73.0
Total Split (%)	29.2%	29.2%		29.2%	29.2%		10.0%	57.5%	57.5%	13.3%	60.8%	60.8%
Maximum Green (s)	29.0	29.0		29.0	29.0		7.0	62.0	62.0	11.0	66.0	66.0
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0			6.0		5.0	7.0	7.0	5.0	7.0	7.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	8.0	8.0	3.0	8.0	8.0
Recall Mode	None	None		None	None		None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)		30.6			30.6		70.6	62.2	62.2	76.9	67.1	67.1
Actuated g/C Ratio		0.26			0.26		0.59	0.52	0.52	0.64	0.56	0.56
v/c Ratio		0.41			1.09		0.21	0.90	0.08	0.52	0.90	0.02
Control Delay		34.1			120.1		14.5	44.4	11.0	14.0	37.7	0.1
Queue Delay		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		34.1			120.1		14.5	44.4	11.0	14.0	37.7	0.1
LOS		C			F		B	D	B	B	D	A
Approach Delay		34.1			120.1			40.0			33.6	
Approach LOS		C			F			D			C	

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 5 (4%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 100  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.09  
 Intersection Signal Delay: 47.5  
 Intersection LOS: D  
 Intersection Capacity Utilization 91.7%  
 ICU Level of Service F  
 Analysis Period (min) 15

Splits and Phases: 7: US 301 & Armstrong Corner Rd/Marl Pit Road



Lanes, Volumes, Timings  
30: US 301 & SR 71

2015 Volumes  
PM Peak

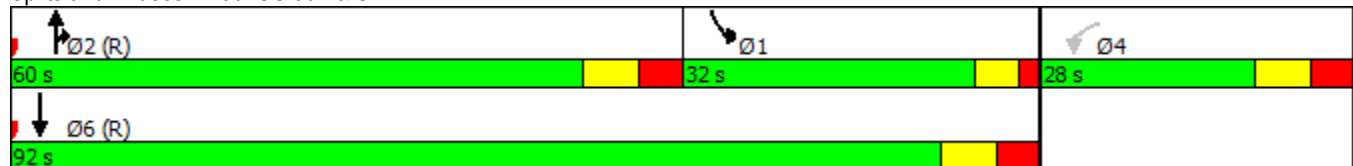


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	4	Free				
Detector Phase	4		2	2	1	6
Switch Phase						
Minimum Initial (s)	6.0		15.0	15.0	8.0	15.0
Minimum Split (s)	16.0		25.0	25.0	15.0	25.0
Total Split (s)	28.0		60.0	60.0	32.0	92.0
Total Split (%)	23.3%		50.0%	50.0%	26.7%	76.7%
Maximum Green (s)	19.0		51.0	51.0	26.0	83.0
Yellow Time (s)	5.0		5.0	5.0	4.0	5.0
All-Red Time (s)	4.0		4.0	4.0	2.0	4.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	9.0		9.0	9.0	6.0	9.0
Lead/Lag			Lead	Lead	Lag	
Lead-Lag Optimize?			Yes	Yes		
Vehicle Extension (s)	4.0		7.0	7.0	4.0	7.0
Recall Mode	None		C-Min	C-Min	None	C-Min
Act Effct Green (s)	18.2	120.0	52.1	52.1	25.7	83.8
Actuated g/C Ratio	0.15	1.00	0.43	0.43	0.21	0.70
v/c Ratio	0.83	0.16	0.77	0.36	0.91	0.64
Control Delay	74.2	0.2	37.6	25.1	56.9	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.2	0.2	37.6	25.1	56.9	6.0
LOS	E	A	D	C	E	A
Approach Delay	35.1		33.8			21.7
Approach LOS	D		C			C

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 86 (72%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.91  
 Intersection Signal Delay: 28.5  
 Intersection Capacity Utilization 77.3%  
 Analysis Period (min) 15  
 Intersection LOS: C  
 ICU Level of Service D

Splits and Phases: 30: US 301 & SR 71



Lanes, Volumes, Timings  
2: US 301 & Bunker Hill Rd/SR 299

2015 Volumes  
PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			8			4			2			6
Detector Phase	3	8	8	7	4	4	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	11.0	12.0	12.0	11.0	12.0	12.0	11.0	23.0	23.0	11.0	23.0	23.0
Total Split (s)	20.0	20.0	20.0	25.0	25.0	25.0	15.0	35.0	35.0	20.0	40.0	40.0
Total Split (%)	20.0%	20.0%	20.0%	25.0%	25.0%	25.0%	15.0%	35.0%	35.0%	20.0%	40.0%	40.0%
Maximum Green (s)	15.0	14.0	14.0	20.0	19.0	19.0	10.0	28.0	28.0	15.0	33.0	33.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	7.0	7.0	5.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	8.4	12.0	12.0	15.8	21.7	21.7	9.1	34.4	34.4	14.8	42.3	42.3
Actuated g/C Ratio	0.08	0.12	0.12	0.16	0.22	0.22	0.09	0.34	0.34	0.15	0.42	0.42
v/c Ratio	0.36	0.50	0.34	0.67	0.25	0.10	0.50	0.62	0.37	0.73	0.43	0.02
Control Delay	46.6	45.1	5.4	45.8	33.5	0.4	53.7	32.0	5.2	58.3	23.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.6	45.1	5.4	45.8	33.5	0.4	53.7	32.0	5.2	58.3	23.8	0.1
LOS	D	D	A	D	C	A	D	C	A	E	C	A
Approach Delay		35.1			38.5			26.7			31.2	
Approach LOS		D			D			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 62 (62%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 31.7

Intersection LOS: C

Intersection Capacity Utilization 61.1%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 2: US 301 & Bunker Hill Rd/SR 299



**Intersection Delay Study - Field Sheet**

<b>Request No.:</b>										
<b>Job No.:</b>										
-----										
<b>Location:</b> Choptank Rd at Clayton Manor Dr				<b>Weather:</b> Clear						
<b>Date:</b> 10/14/2015				<b>Recorder:</b> RJM						
<b>Direction:</b> EB				<b>Start Time:</b> 16:30						
<b>Location Characteristics:</b>										
Number Of Lanes :			1		Turning Lanes			1LT, 1RT		
Number Of Pedestrians:			0		Parking			N		
Traffic Control Devices :			Stop Sign		Transit Stop (Y/N)			N		
Type of Delay ( Fixed/ Operational):			Fixed							
-----										
<b>Time Interval (hh:mm):</b>			0:01							
-----										
				<b>Total Number of Vehicles</b>				<b>Approach Volume:</b>		
				<b>Stopped In Approach At Time:</b>				<b>Number</b> <b>Number not</b>		
<b>No</b>	<b>Begin</b>	<b>End</b>	<b>0 SEC+</b>	<b>15 SEC +</b>	<b>30 SEC+</b>	<b>45 SEC+</b>	<b>Stopped</b>	<b>Stopped</b>		
1	16:30	16:31	0	2	0	0	2	2		
2	16:31	16:32	0	0	1	0	2	0		
3	16:32	16:33	1	2	1	0	2	0		
4	16:33	16:34	1	0	0	0	1	0		
5	16:34	16:35	1	0	0	0	1	1		
6	16:35	16:36	1	0	0	0	1	0		
7	16:36	16:37	1	1	0	0	0	0		
8	16:37	16:38	0	0	0	0	1	0		
9	16:38	16:39	1	0	1	0	1	0		
10	16:39	16:40	0	0	0	1	2	1		
11	16:40	16:41	1	0	0	0	0	0		
12	16:41	16:42	0	0	0	0	0	0		
13	16:42	16:43	0	1	0	0	1	0		
14	16:43	16:44	0	0	0	0	0	2		
15	16:44	16:45	0	0	0	0	0	0		
<b>SUBTOTAL</b>			7	6	3	1	14	6		
<b>TOTAL</b>			17				20			
-----										
<b>Comments:</b>										
(Cell C50)										
-----										
Total Delay = Total Number Stopped X Sampling Interval										
			=	17	X	15	=	255 Veh-Sec/ 3600 =	0.070833 Veh - Hr	
-----										
Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles										
			=	255	/	14	=	18.21429	Sec	
-----										
Average Delay Per Approach Vehicle = Total Delay / Approach Volume										
			=	255	/	20	=	12.75	Sec	
-----										
Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume										
			=	14	/	20	=	0.7		

Intersection Delay Study - Field Sheet									
<b>Request No.:</b>									
<b>Job No.:</b>									
-----									
<b>Location:</b>	Choptank Rd at Clayton Manor Dr					<b>Weather:</b>	Clear		
<b>Date:</b>	10/14/2015					<b>Recorder:</b>	RJM		
<b>Direction:</b>	EB					<b>Start Time:</b>	16:45		
<b>Location Characteristics:</b>									
Number Of Lanes :	1				Turning Lanes	1LT, 1RT			
Number Of Pedestrians:	0				Parking	N			
Traffic Control Devices :	Stop Sign				Transit Stop (Y/N)	N			
Type of Delay ( Fixed/ Operational):					Fixed				
<b>Time Interval (hh:mm):</b>	0:01								
-----									
		<b>Total Number of Vehicles</b>				<b>Approach Volume:</b>			
		<b>Stopped In Approach At Time:</b>				<b>Number</b>		<b>Number not</b>	
<b>No</b>	<b>Begin</b>	<b>End</b>	<b>0 SEC+</b>	<b>15 SEC +</b>	<b>30 SEC+</b>	<b>45 SEC+</b>	<b>Stopped</b>	<b>Stopped</b>	
1	16:45	16:46	0	2	2	0	2	0	
2	16:46	16:47	0	1	0	0	1	0	
3	16:47	16:48	0	0	0	0	0	0	
4	16:48	16:49	0	0	0	0	0	2	
5	16:49	16:50	0	0	0	0	0	0	
6	16:50	16:51	0	0	0	0	0	0	
7	16:51	16:52	0	0	0	0	0	1	
8	16:52	16:53	0	0	0	0	0	0	
9	16:53	16:54	0	1	0	0	1	2	
10	16:54	16:55	0	0	0	1	2	0	
11	16:55	16:56	1	0	0	0	0	0	
12	16:56	16:57	0	0	0	0	0	1	
13	16:57	16:58	0	0	0	0	0	2	
14	16:58	16:59	0	0	0	0	0	0	
15	16:59	17:00	0	0	0	2	2	0	
<b>SUBTOTAL</b>			1	4	2	3	8	8	
<b>TOTAL</b>				10			16		
Comments:									
(Cell C50)									
Total Delay = Total Number Stopped X Sampling Interval									
	=	10	X	15	=	150 Veh-Sec/ 3600 =	0.041667	Veh - Hr	
Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles									
	=	150	/	8	=	18.75	Sec		
Average Delay Per Approach Vehicle = Total Delay / Approach Volume									
	=	150	/	16	=	9.375	Sec		
Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume									
	=	8	/	16	=	0.5			

Intersection Delay Study - Field Sheet									
<b>Request No.:</b>									
<b>Job No.:</b>									
-----									
<b>Location:</b>	Choptank Rd at Clayton Manor Dr					<b>Weather:</b>	Clear		
<b>Date:</b>	10/14/2015					<b>Recorder:</b>	RJM		
<b>Direction:</b>	EB					<b>Start Time:</b>	17:00		
						(Military)			
<b>Location Characteristics:</b>									
Number Of Lanes :	1				Turning Lanes	1LT, 1RT			
Number Of Pedestrians:	0				Parking	N			
Traffic Control Devices :	Stop Sign				Transit Stop (Y/N)	N			
Type of Delay ( Fixed/ Operational):	Fixed								
-----									
<b>Time Interval (hh:mm):</b>	0:01								
-----									
			<b>Total Number of Vehicles</b>				<b>Approach Volume:</b>		
			<b>Stopped In Approach At Time:</b>				<b>Number</b>	<b>Number not</b>	
<b>No</b>	<b>Begin</b>	<b>End</b>	<b>0 SEC+</b>	<b>15 SEC +</b>	<b>30 SEC+</b>	<b>45 SEC+</b>	<b>Stopped</b>	<b>Stopped</b>	
1	17:00	17:01	0	0	1	0	1	0	
2	17:01	17:02	0	0	0	0	0	1	
3	17:02	17:03	0	0	0	0	0	0	
4	17:03	17:04	0	0	0	0	0	1	
5	17:04	17:05	0	0	1	0	1	0	
6	17:05	17:06	0	0	0	0	2	1	
7	17:06	17:07	2	1	0	0	1	0	
8	17:07	17:08	0	0	0	0	2	0	
9	17:08	17:09	2	2	0	0	1	0	
10	17:09	17:10	0	0	0	0	0	0	
11	17:10	17:11	0	1	0	0	1	1	
12	17:11	17:12	0	0	1	2	3	0	
13	17:12	17:13	1	0	1	1	2	0	
14	17:13	17:14	0	1	0	0	1	0	
15	17:14	17:15	0	1	1	1	2	0	
<b>SUBTOTAL</b>			5	6	5	4	17	4	
<b>TOTAL</b>			20				21		
-----									
Comments:									
(Cell C50)									
-----									
Total Delay = Total Number Stopped X Sampling Interval									
	=	20	X	15	=	300 Veh-Sec/ 3600 =	0.083333	Veh - Hr	
-----									
Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles									
	=	300	/	17	=	17.64706	Sec		
-----									
Average Delay Per Approach Vehicle = Total Delay / Approach Volume									
	=	300	/	21	=	14.28571	Sec		
-----									
Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume									
	=	17	/	21	=	0.809524			

Intersection Delay Study - Field Sheet									
Request No.:									
Job No.:									
-----									
Location:	Choptank Rd at Clayton Manor Dr				Weather:	Clear			
Date:	10/14/2015				Recorder:	RJM			
Direction:	EB				Start Time:	17:15			
(Military)									
<b>Location Characteristics:</b>									
Number Of Lanes :	1			Turning Lanes	1LT, 1RT				
Number Of Pedestrians:	0			Parking	N				
Traffic Control Devices :	Stop Sign			Transit Stop (Y/N)	N				
Type of Delay ( Fixed/ Operational):	Fixed								
-----									
Time Interval (hh:mm):	0:01								
-----									
		<b>Total Number of Vehicles</b>				<b>Approach Volume:</b>			
		<b>Stopped In Approach At Time:</b>				<b>Number</b>		<b>Number not</b>	
<b>No</b>	<b>Begin</b>	<b>End</b>	<b>0 SEC+</b>	<b>15 SEC +</b>	<b>30 SEC+</b>	<b>45 SEC+</b>	<b>Stopped</b>	<b>Stopped</b>	
1	17:15	17:16	1	0	0	0	0	0	
2	17:16	17:17	0	0	0	0	0	0	
3	17:17	17:18	0	0	0	0	0	0	
4	17:18	17:19	0	0	1	0	1	0	
5	17:19	17:20	0	0	2	0	3	0	
6	17:20	17:21	1	0	0	0	0	0	
7	17:21	17:22	0	0	0	0	0	0	
8	17:22	17:23	0	0	0	0	0	0	
9	17:23	17:24	0	0	0	0	0	0	
10	17:24	17:25	0	0	0	0	0	0	
11	17:25	17:26	0	0	0	1	1	1	
12	17:26	17:27	0	0	2	0	2	0	
13	17:27	17:28	0	0	0	0	0	0	
14	17:28	17:29	0	0	0	0	0	1	
15	17:29	17:30	0	0	0	0	0	0	
<b>SUBTOTAL</b>			2	0	5	1	7	2	
<b>TOTAL</b>			8				9		
-----									
Comments:									
(Cell C50)									
-----									
Total Delay = Total Number Stopped X Sampling Interval									
	=	8	X	15	=	120	Veh-Sec/ 3600 =	0.033333	Veh - Hr
-----									
Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles									
	=	120	/	7	=	17.14286	Sec		
-----									
Average Delay Per Approach Vehicle = Total Delay / Approach Volume									
	=	120	/	9	=	13.33333	Sec		
-----									
Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume									
	=	7	/	9	=	0.777778			



Intersection Delay Study - Field Sheet									
Request No.:									
Job No.:									
-----									
Location:	US 301 at Keenan Auto Body					Weather:	Clear		
Date:	10/14/2015					Recorder:	RJM		
Direction:	WB					Start Time:	16:30		
(Military)									
<b>Location Characteristics:</b>									
Number Of Lanes :	1					Turning Lanes	1LT, 1RT		
Number Of Pedestrians:	0					Parking	N		
Traffic Control Devices :	Stop Sign					Transit Stop (Y/N)	N		
Type of Delay ( Fixed/ Operational):	Fixed								
Time Interval (hh:mm):	0:01								
-----									
		<b>Total Number of Vehicles</b>				<b>Approach Volume:</b>			
		<b>Stopped In Approach At Time:</b>				<b>Number</b>	<b>Number not</b>		
<b>No</b>	<b>Begin</b>	<b>End</b>	<b>0 SEC+</b>	<b>15 SEC +</b>	<b>30 SEC+</b>	<b>45 SEC+</b>	<b>Stopped</b>	<b>Stopped</b>	
1	16:30	16:31	0	0	0	0	0	0	
2	16:31	16:32	0	0	0	0	0	0	
3	16:32	16:33	0	0	0	0	0	0	
4	16:33	16:34	0	0	0	0	0	0	
5	16:34	16:35	0	0	0	0	0	0	
6	16:35	16:36	0	0	0	0	0	0	
7	16:36	16:37	0	0	0	0	0	0	
8	16:37	16:38	0	2	1	0	2	0	
9	16:38	16:39	0	0	0	0	0	0	
10	16:39	16:40	0	0	0	0	0	0	
11	16:40	16:41	0	0	0	0	0	0	
12	16:41	16:42	0	0	0	0	0	0	
13	16:42	16:43	0	0	0	0	0	0	
14	16:43	16:44	0	0	0	0	0	0	
15	16:44	16:45	0	0	0	0	0	0	
<b>SUBTOTAL</b>			0	2	1	0	2	0	
<b>TOTAL</b>			3				2		
Comments:									
(Cell C50)									
Total Delay = Total Number Stopped X Sampling Interval									
	=	3	X	15	=	45	Veh-Sec/ 3600 =	0.0125	Veh - Hr
Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles									
	=	45	/	2	=	22.5	Sec		
Average Delay Per Approach Vehicle = Total Delay / Approach Volume									
	=	45	/	2	=	22.5	Sec		
Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume									
	=	2	/	2	=	1			

Intersection Delay Study - Field Sheet									
<b>Request No.:</b>									
<b>Job No.:</b>									
-----									
<b>Location:</b>	US 301 at Keenan Auto Body					<b>Weather:</b>	Clear		
<b>Date:</b>	10/14/2015					<b>Recorder:</b>	RJM		
<b>Direction:</b>	WB					<b>Start Time:</b>	16:45		
<b>Location Characteristics:</b>									
Number Of Lanes :		1			Turning Lanes		1LT, 1RT		
Number Of Pedestrians:		0			Parking		N		
Traffic Control Devices :		Stop Sign			Transit Stop (Y/N)		N		
Type of Delay ( Fixed/ Operational):		Fixed							
-----									
<b>Time Interval (hh:mm):</b>	0:01								
-----									
		<b>Total Number of Vehicles</b>				<b>Approach Volume:</b>			
		<b>Stopped In Approach At Time:</b>				<b>Number</b>		<b>Number not</b>	
<b>No</b>	<b>Begin</b>	<b>End</b>	<b>0 SEC+</b>	<b>15 SEC +</b>	<b>30 SEC+</b>	<b>45 SEC+</b>	<b>Stopped</b>	<b>Stopped</b>	
1	16:45	16:46	0	0	0	0	0	0	
2	16:46	16:47	0	0	0	0	0	0	
3	16:47	16:48	0	0	0	0	0	0	
4	16:48	16:49	0	0	0	0	0	0	
5	16:49	16:50	0	0	0	0	0	0	
6	16:50	16:51	0	0	1	1	1	0	
7	16:51	16:52	0	0	0	0	0	0	
8	16:52	16:53	0	0	0	0	0	0	
9	16:53	16:54	0	0	0	0	0	0	
10	16:54	16:55	0	0	0	0	0	0	
11	16:55	16:56	0	0	0	0	0	0	
12	16:56	16:57	0	0	0	0	0	0	
13	16:57	16:58	0	0	0	0	0	0	
14	16:58	16:59	0	0	0	0	0	1	
15	16:59	17:00	0	0	0	0	0	0	
<b>SUBTOTAL</b>			0	0	1	1	1	1	
<b>TOTAL</b>			2				2		
-----									
<b>Comments:</b>									
(Cell C50)									
-----									
Total Delay = Total Number Stopped X Sampling Interval									
	=	2	X	15	=	30	Veh-Sec/ 3600 =	0.008333	Veh - Hr
-----									
Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles									
	=	30	/	1	=	30	Sec		
-----									
Average Delay Per Approach Vehicle = Total Delay / Approach Volume									
	=	30	/	2	=	15	Sec		
-----									
Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume									
	=	1	/	2	=	0.5			

Intersection Delay Study - Field Sheet

Request No.:											
Job No.:											
-----											
Location:				US 301 at Keenan Auto Body				Weather:		Clear	
Date:		10/14/2015			Recorder:		RJM				
Direction:		WB			Start Time:		17:00				
(Military)											
<b>Location Characteristics:</b>											
Number Of Lanes :				1			Turning Lanes		1LT, 1RT		
Number Of Pedestrians:				0			Parking		N		
Traffic Control Devices :				Stop Sign			Transit Stop (Y/N)		N		
Type of Delay ( Fixed/ Operational):				Fixed							
-----											
Time Interval (hh:mm):		0:01									
-----											
				Total Number of Vehicles				Approach Volume:			
				Stopped In Approach At Time:				Number		Number not	
No		Begin		End		0 SEC+	15 SEC +	30 SEC+	45 SEC+	Stopped	Stopped
1	17:00	17:01	0	0	1	0	0	0	1	0	
2	17:01	17:02	0	0	0	0	0	0	0	0	
3	17:02	17:03	0	0	1	0	0	0	1	0	
4	17:03	17:04	0	0	0	0	0	0	0	0	
5	17:04	17:05	0	0	0	0	0	0	0	1	
6	17:05	17:06	0	0	0	0	0	0	0	0	
7	17:06	17:07	0	0	0	0	0	0	0	0	
8	17:07	17:08	0	1	0	0	0	0	1	0	
9	17:08	17:09	0	0	0	0	0	0	0	0	
10	17:09	17:10	0	0	0	0	0	0	1	0	
11	17:10	17:11	1	1	0	0	0	0	0	0	
12	17:11	17:12	0	0	0	0	0	0	0	0	
13	17:12	17:13	0	1	1	0	0	0	1	0	
14	17:13	17:14	0	0	0	0	0	0	0	0	
15	17:14	17:15	0	0	0	0	0	0	0	0	
SUBTOTAL				1	3	3	0	5	1		
TOTAL				7			6				
Comments:											
(Cell C50)											
Total Delay = Total Number Stopped X Sampling Interval											
		=	7	X	15	=	105	Veh-Sec/ 3600 =	0.029167	Veh - Hr	
Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles											
		=	105	/	5	=	21	Sec			
Average Delay Per Approach Vehicle = Total Delay / Approach Volume											
		=	105	/	6	=	17.5	Sec			

Intersection Delay Study - Field Sheet									
<b>Request No.:</b>									
<b>Job No.:</b>									
-----									
<b>Location:</b>	US 301 at Keenan Auto Body					<b>Weather:</b>	Clear		
<b>Date:</b>	10/14/2015					<b>Recorder:</b>	RJM		
<b>Direction:</b>	WB					<b>Start Time:</b>	17:15		
<b>Location Characteristics:</b>									
Number Of Lanes :	1				Turning Lanes	1LT, 1RT			
Number Of Pedestrians:	0				Parking	N			
Traffic Control Devices :	Stop Sign				Transit Stop (Y/N)	N			
Type of Delay ( Fixed/ Operational):	Fixed								
-----									
<b>Time Interval (hh:mm):</b>	0:01								
-----									
		<b>Total Number of Vehicles</b>				<b>Approach Volume:</b>			
		<b>Stopped In Approach At Time:</b>				<b>Number</b>		<b>Number not</b>	
<b>No</b>	<b>Begin</b>	<b>End</b>	<b>0 SEC+</b>	<b>15 SEC +</b>	<b>30 SEC+</b>	<b>45 SEC+</b>	<b>Stopped</b>	<b>Stopped</b>	
1	17:15	17:16	0	0	0	0	0	0	
2	17:16	17:17	0	0	0	0	0	0	
3	17:17	17:18	0	0	0	0	0	0	
4	17:18	17:19	0	0	0	0	0	0	
5	17:19	17:20	0	0	0	0	0	0	
6	17:20	17:21	0	0	0	0	0	0	
7	17:21	17:22	0	0	0	0	0	0	
8	17:22	17:23	0	0	0	0	0	0	
9	17:23	17:24	0	0	0	0	0	0	
10	17:24	17:25	0	0	0	0	0	0	
11	17:25	17:26	0	0	0	0	0	0	
12	17:26	17:27	0	0	0	0	0	0	
13	17:27	17:28	0	0	0	0	0	0	
14	17:28	17:29	0	0	0	0	0	0	
15	17:29	17:30	0	1	1	0	1	0	
<b>SUBTOTAL</b>			0	1	1	0	1	0	
<b>TOTAL</b>			2				1		
-----									
<b>Comments:</b>									
(Cell C50)									
-----									
Total Delay = Total Number Stopped X Sampling Interval									
	=	2	X	15	=	30	Veh-Sec/ 3600 =	0.008333	Veh - Hr
-----									
Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles									
	=	30	/	1	=	30	Sec		
-----									
Average Delay Per Approach Vehicle = Total Delay / Approach Volume									
	=	30	/	1	=	30	Sec		
-----									
Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume									
	=	1	/	1	=	1			

Intersection Delay Study - Field Sheet										
<b>Request No.:</b>										
<b>Job No.:</b>										
-----										
<b>Location:</b>	Existing US 301 at Old Schoolhouse Rd				<b>Weather:</b>	Clear				
<b>Date:</b>	10/14/2015				<b>Recorder:</b>	RJM				
<b>Direction:</b>	EB				<b>Start Time:</b>	16:30				
<b>Location Characteristics:</b>										
Number Of Lanes :		1			Turning Lanes		1LT, 1RT			
Number Of Pedestrians:		0			Parking		N			
Traffic Control Devices :		Stop Sign			Transit Stop (Y/N)		N			
Type of Delay ( Fixed/ Operational):		Fixed								
-----										
<b>Time Interval (hh:mm):</b>	0:01									
-----										
		<b>Total Number of Vehicles</b>				<b>Approach Volume:</b>				
		<b>Stopped In Approach At Time:</b>				<b>Number</b>		<b>Number not</b>		
<b>No</b>	<b>Begin</b>	<b>End</b>	<b>0 SEC+</b>	<b>15 SEC +</b>	<b>30 SEC+</b>	<b>45 SEC+</b>	<b>Stopped</b>	<b>Stopped</b>		
1	16:30	16:31	0	0	0	0	0	1		
2	16:31	16:32	0	0	0	0	0	0		
3	16:32	16:33	0	0	0	0	0	0		
4	16:33	16:34	0	0	0	0	0	0		
5	16:34	16:35	0	0	0	0	0	0		
6	16:35	16:36	0	0	0	0	0	0		
7	16:36	16:37	0	0	1	1	1	0		
8	16:37	16:38	0	0	0	0	0	0		
9	16:38	16:39	0	0	0	0	0	1		
10	16:39	16:40	0	0	0	0	0	0		
11	16:40	16:41	0	0	1	1	1	0		
12	16:41	16:42	1	0	0	0	0	0		
13	16:42	16:43	0	0	0	0	0	1		
14	16:43	16:44	0	1	1	0	1	0		
15	16:44	16:45	0	0	0	0	0	1		
<b>SUBTOTAL</b>			1	1	3	2	3	4		
<b>TOTAL</b>			7				7			
-----										
<b>Comments:</b>										
(Cell C50)										
-----										
Total Delay = Total Number Stopped X Sampling Interval										
		=	7	X	15	=	105 Veh-Sec/ 3600 =	0.029167	Veh - Hr	
-----										
Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles										
		=	105	/	3	=	35	Sec		
-----										
Average Delay Per Approach Vehicle = Total Delay / Approach Volume										
		=	105	/	7	=	15	Sec		
-----										
Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume										
		=	3	/	7	=	0.428571			

Intersection Delay Study - Field Sheet									
<b>Request No.:</b>									
<b>Job No.:</b>									
-----									
<b>Location:</b>	Existing US 301 at Old Schoolhouse Rd				<b>Weather:</b>	Clear			
<b>Date:</b>	10/14/2015				<b>Recorder:</b>	RJM			
<b>Direction:</b>	EB				<b>Start Time:</b>	16:45			
<b>Location Characteristics:</b>									
Number Of Lanes :		1			Turning Lanes		1LT, 1RT		
Number Of Pedestrians:		0			Parking		N		
Traffic Control Devices :		Stop Sign			Transit Stop (Y/N)		N		
Type of Delay ( Fixed/ Operational):		Fixed							
-----									
<b>Time Interval (hh:mm):</b>		0:01							
-----									
		<b>Total Number of Vehicles</b>				<b>Approach Volume:</b>			
		<b>Stopped In Approach At Time:</b>				<b>Number</b>		<b>Number not</b>	
<b>No</b>	<b>Begin</b>	<b>End</b>	<b>0 SEC+</b>	<b>15 SEC +</b>	<b>30 SEC+</b>	<b>45 SEC+</b>	<b>Stopped</b>	<b>Stopped</b>	
1	16:45	16:46	0	0	0	0	0	1	
2	16:46	16:47	0	0	0	0	0	0	
3	16:47	16:48	0	0	0	0	0	0	
4	16:48	16:49	0	0	0	0	0	0	
5	16:49	16:50	0	0	0	0	0	0	
6	16:50	16:51	0	0	0	0	0	0	
7	16:51	16:52	0	0	0	0	0	0	
8	16:52	16:53	0	0	0	0	0	0	
9	16:53	16:54	0	0	0	0	0	0	
10	16:54	16:55	0	0	0	0	0	0	
11	16:55	16:56	0	1	0	0	1	0	
12	16:56	16:57	0	0	0	0	0	0	
13	16:57	16:58	0	0	1	1	1	0	
14	16:58	16:59	1	1	1	1	0	0	
15	16:59	17:00	1	0	0	1	1	0	
<b>SUBTOTAL</b>			2	2	2	3	3	1	
<b>TOTAL</b>			9				4		
-----									
Comments:									
(Cell C50)									
-----									
Total Delay = Total Number Stopped X Sampling Interval									
		=	9	X	15	=	135 Veh-Sec/ 3600 =	0.0375	Veh - Hr
-----									
Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles									
		=	135	/	3	=	45	Sec	
-----									
Average Delay Per Approach Vehicle = Total Delay / Approach Volume									
		=	135	/	4	=	33.75	Sec	
-----									
Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume									
		=	3	/	4	=	0.75		

Intersection Delay Study - Field Sheet									
Request No.:									
Job No.:									
-----									
Location:	Existing US 301 at Old Schoolhouse Rd				Weather:	Clear			
Date:	10/14/2015				Recorder:	RJM			
Direction:	EB				Start Time:	17:00			
(Military)									
<b>Location Characteristics:</b>									
Number Of Lanes :	1				Turning Lanes	1LT, 1RT			
Number Of Pedestrians:	0				Parking	N			
Traffic Control Devices :	Stop Sign				Transit Stop (Y/N)	N			
Type of Delay ( Fixed/ Operational):	Fixed								
Time Interval (hh:mm):	0:01								
-----									
		<b>Total Number of Vehicles</b>				<b>Approach Volume:</b>			
		<b>Stopped In Approach At Time:</b>				<b>Number</b>		<b>Number not</b>	
<b>No</b>	<b>Begin</b>	<b>End</b>	<b>0 SEC+</b>	<b>15 SEC +</b>	<b>30 SEC+</b>	<b>45 SEC+</b>	<b>Stopped</b>	<b>Stopped</b>	
1	17:00	17:01	1	1	1	1	0	0	
2	17:01	17:02	1	1	1	0	0	0	
3	17:02	17:03	0	0	0	0	0	1	
4	17:03	17:04	0	0	0	0	0	0	
5	17:04	17:05	0	0	0	0	0	0	
6	17:05	17:06	0	0	0	0	0	0	
7	17:06	17:07	0	0	0	0	1	1	
8	17:07	17:08	1	1	1	0	0	0	
9	17:08	17:09	0	0	0	0	0	1	
10	17:09	17:10	0	0	0	0	0	0	
11	17:10	17:11	0	0	0	0	0	0	
12	17:11	17:12	0	1	1	0	1	0	
13	17:12	17:13	0	0	0	0	0	0	
14	17:13	17:14	0	0	0	0	0	0	
15	17:14	17:15	0	0	0	0	0	0	
<b>SUBTOTAL</b>			3	4	4	1	2	3	
<b>TOTAL</b>				12			5		
Comments:									
(Cell C50)									
Total Delay = Total Number Stopped X Sampling Interval									
	=	12	X	15	=	180	Veh-Sec/ 3600 =	0.05	Veh - Hr
Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles									
	=	180	/	2	=	90	Sec		
Average Delay Per Approach Vehicle = Total Delay / Approach Volume									
	=	180	/	5	=	36	Sec		
Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume									
	=	2	/	5	=	0.4			

**Intersection Delay Study - Field Sheet**

<b>Request No.:</b>										
<b>Job No.:</b>										
<hr/>										
<b>Location:</b> Existing US 301 at Old Schoolhouse Rd					<b>Weather:</b> Clear					
<b>Date:</b> 10/14/2015					<b>Recorder:</b> RJM					
<b>Direction:</b> EB					<b>Start Time:</b> 17:15					
<b>Location Characteristics:</b>										
Number Of Lanes :					1		Turning Lanes		1LT, 1RT	
Number Of Pedestrians:					0		Parking		N	
Traffic Control Devices :					Stop Sign		Transit Stop (Y/N)		N	
Type of Delay ( Fixed/ Operational):					Fixed					
<hr/>										
<b>Time Interval (hh:mm):</b>					0:01					
<hr/>										
				<b>Total Number of Vehicles</b>				<b>Approach Volume:</b>		
				<b>Stopped In Approach At Time:</b>				<b>Number</b>		<b>Number not</b>
<b>No</b>	<b>Begin</b>	<b>End</b>	<b>0 SEC+</b>	<b>15 SEC +</b>	<b>30 SEC+</b>	<b>45 SEC+</b>	<b>Stopped</b>	<b>Stopped</b>		
1	17:15	17:16	0	0	0	0	0	0		
2	17:16	17:17	0	0	0	0	0	0		
3	17:17	17:18	0	0	0	0	0	0		
4	17:18	17:19	0	1	1	0	1	0		
5	17:19	17:20	0	0	0	0	0	0		
6	17:20	17:21	0	0	0	0	0	1		
7	17:21	17:22	0	0	0	0	0	1		
8	17:22	17:23	0	0	0	0	0	1		
9	17:23	17:24	0	1	2	1	2	0		
10	17:24	17:25	0	0	0	0	0	0		
11	17:25	17:26	0	0	0	0	0	0		
12	17:26	17:27	0	0	0	0	0	1		
13	17:27	17:28	0	0	0	0	0	0		
14	17:28	17:29	0	0	0	0	0	0		
15	17:29	17:30	0	0	0	0	0	0		
<b>SUBTOTAL</b>			0	2	3	1	3	4		
<b>TOTAL</b>				6			7			
<hr/>										
Comments:										
(Cell C50)										
<hr/>										
Total Delay = Total Number Stopped X Sampling Interval										
	=	6	X	15	=	90 Veh-Sec/ 3600 =	0.025	Veh - Hr		
<hr/>										
Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles										
	=	90	/	3	=	30	Sec			
<hr/>										
Average Delay Per Approach Vehicle = Total Delay / Approach Volume										
	=	90	/	7	=	12.85714	Sec			
<hr/>										
Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume										
	=	3	/	7	=	0.428571				



