



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

US 301 SPUR ROAD 2019 MONITORING REPORT



June 2021



DELAWARE DEPARTMENT
 OF TRANSPORTATION





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 145th General Assembly of Delaware passed House Resolution No. 35 directing DelDOT 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 is intended to 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, peak period intersection volumes, vehicular delay at unsignalized intersections, crash data, and land use development data. The traffic and safety data summarized in this report is focused on the roads that would likely be impacted by the construction of the Spur Road. Each year, since the monitoring program began, the data has been analyzed and compared with data and results from prior years. This report represents a summary of the seventh year of the monitoring program based on data collected in 2019. This report compares the newly collected data with the data collected and summarized previously in 2010, 2011, 2012, 2013, 2014, and 2015, which represents the first six years of the monitoring program. It should be noted that no traffic data was collected between the years of 2016 through 2018 since the new US 301 Mainline Toll Road was under construction, potentially changing travel patterns throughout the region. Therefore, Spur Monitoring Reports for the years of 2016 through 2018 are not available.

The new US 301 Mainline Toll Road opened to traffic on January 10, 2019. The current study reflects the transportation conditions after the new toll road opened and provides a comparison of that data with the conditions prior to the road opening. The key findings are summarized below:

- Land Development from 2015 to 2019
 - Residential growth has been steady. There were approximately 18,000 new housing units in various stages of planning, which was consistent with data from 2015
 - Commercial growth has continued to be substantial
- Traffic from 2015 to 2019
 - Traffic volumes on 4 of the 6 studied roadways north of Middletown have either increased or remained relatively unchanged compared to 2015. The two exceptions were Summit Bridge Road south of Mt. Pleasant and the St. George's Bridge.
 - Truck volumes on 5 of the 6 studied roadways increased, except for Summit Bridge Road south of Mt. Pleasant
 - Level of Service (LOS) at 3 of the 5 studied intersections decreased in the AM and/or PM Peak Hours. No intersections were below LOS D.



- Highway Safety from 2015 to 2019
 - The number of crashes increased at 3 of the 8 studied roadways
 - 3 of the 8 studied roadways had a crash rate higher than the Statewide Average Crash Rate, while 1 roadway segment also had a crash rate higher than the New Castle County Average Crash Rate
- Incident Management - Since 2004, there have been 115 incidents that have resulted in 320 or more hours of detours that could have utilized the Spur Road as an alternate detour route.

Now that the US 301 Mainline is open, and based upon the data summarized in this report, it is recommended that:

- The US 301 Spur Road should continue to be included in WILMAPCO's Regional Transportation Plan (RTP) because it is a key component of the overall US 301 Project, as noted in the approved environmental documents.
- Funding should be maintained in the 6 Year Capital Transportation Program (CTP) for the SR896/Bethel Church Road Interchange.
- Funding in the CTP for the US 301 Spur should be delayed, pending future Spur Monitoring data (see below).
- Monitoring activities should continue for the Spur Road, to 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 does not need to occur annually, but should be timed to reflect the need for data for future decisions, and should be primarily focused on transportation data (e.g., traffic volumes and crash data). It is recommended that the next round of data collection be conducted in the Spring of 2021.



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INTRODUCTION

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). 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, which generally runs parallel to US 301, combined with the comparatively low traffic volumes on US 301, have made US 301 an attractive alternative regional travel 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 was heightened during the late 1990's and early 2000's 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 145th General Assembly of Delaware passed House Resolution No. 35 directing DelDOT 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 is intended to 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 seventh year of the monitoring program based on data collected in the fall of 2019, almost a year after the new US 301 Toll Road opened to traffic on January 10, 2019. This report compares the newly collected data from 2019 with the data collected and summarized previously in 2010 through 2015, representing the first six years of the monitoring program. It should be noted that no traffic data was collected between the years of 2016 through 2018 since the new US 301 Mainline Toll Road was under construction, potentially changing travel patterns throughout the region. Therefore, Spur Monitoring Reports for the years of 2016 through 2018 are not available.

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 was found to have 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 continued 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 145th General Assembly of Delaware passed House Resolution No. 35 directing DelDOT 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 was intended to 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 was 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 was made publicly available each year on the US 301 project website at www.us301.deldot.gov. Public Involvement will continue to 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 to begin.

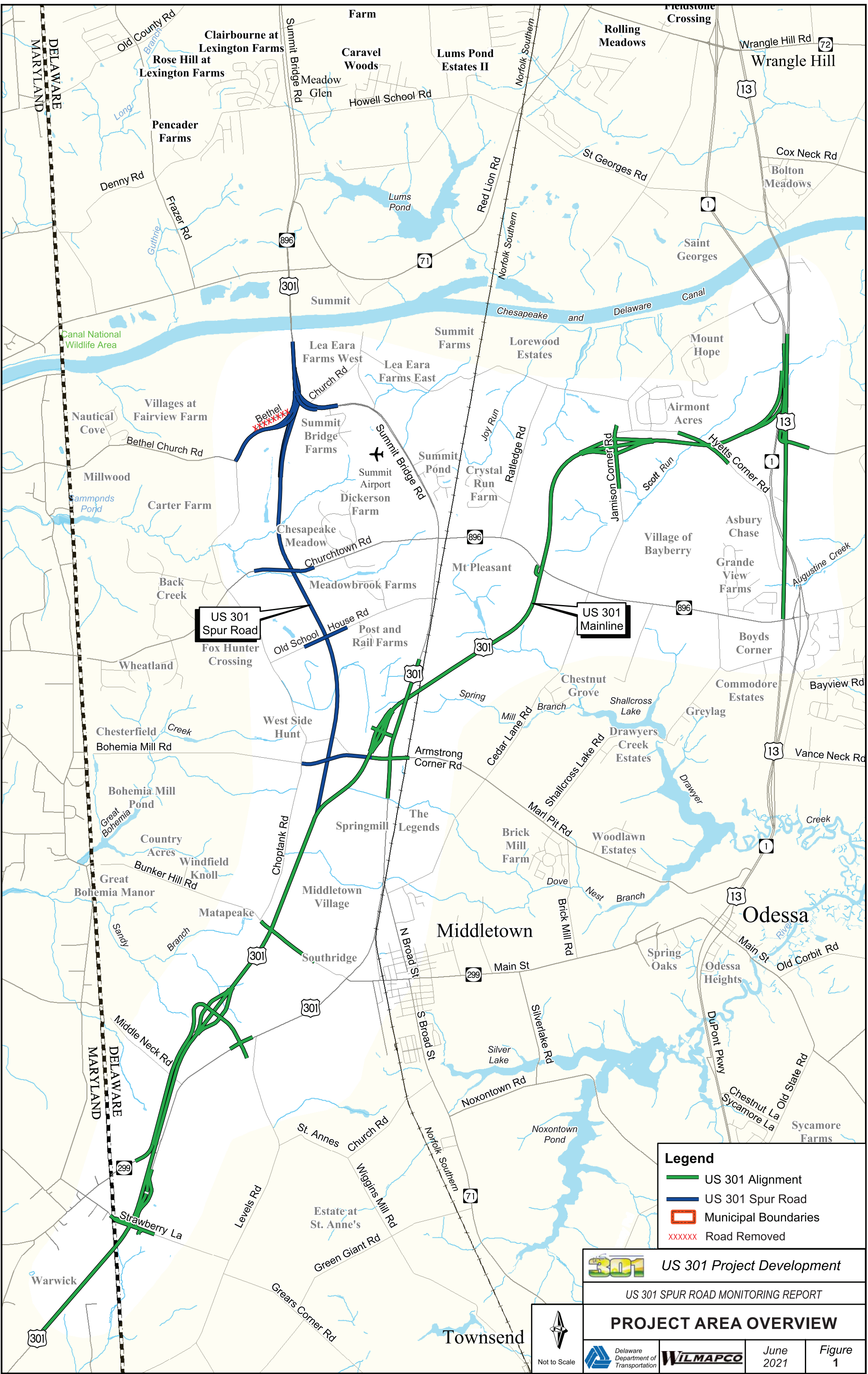
The US 301 Spur Road Monitoring Program was presented at the FY2012 – FY2015 Transportation Improvement Program (TIP) Public Workshop on February 28, 2011 at WILMAPCO, attended by DeIDOT staff. The Spur Monitoring Program information was summarized on a large display board that provided an overview of 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.

A public workshop and Construction Information Meeting (CIM) was held in December 2015 to update the public about potential impacts as construction commences for the US 301 Project. DeIDOT subsequently held ongoing Construction Information Meetings and press releases during the construction of the US 301 Toll Road. Information presented to the public can be found on the project web site: www.us301.deldot.gov.

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. This report represents the seventh report of this Spur Monitoring Program. DeIDOT has presented these reports to the General Assembly each year that they were completed. The reports are intended to 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.



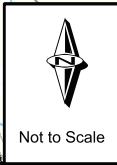
Legend

- US 301 Alignment
- US 301 Spur Road
- Municipal Boundaries
- xxxxxx Road Removed

301 US 301 Project Development

US 301 SPUR ROAD MONITORING REPORT

PROJECT AREA OVERVIEW





MONITORING PROGRAM

Land Development

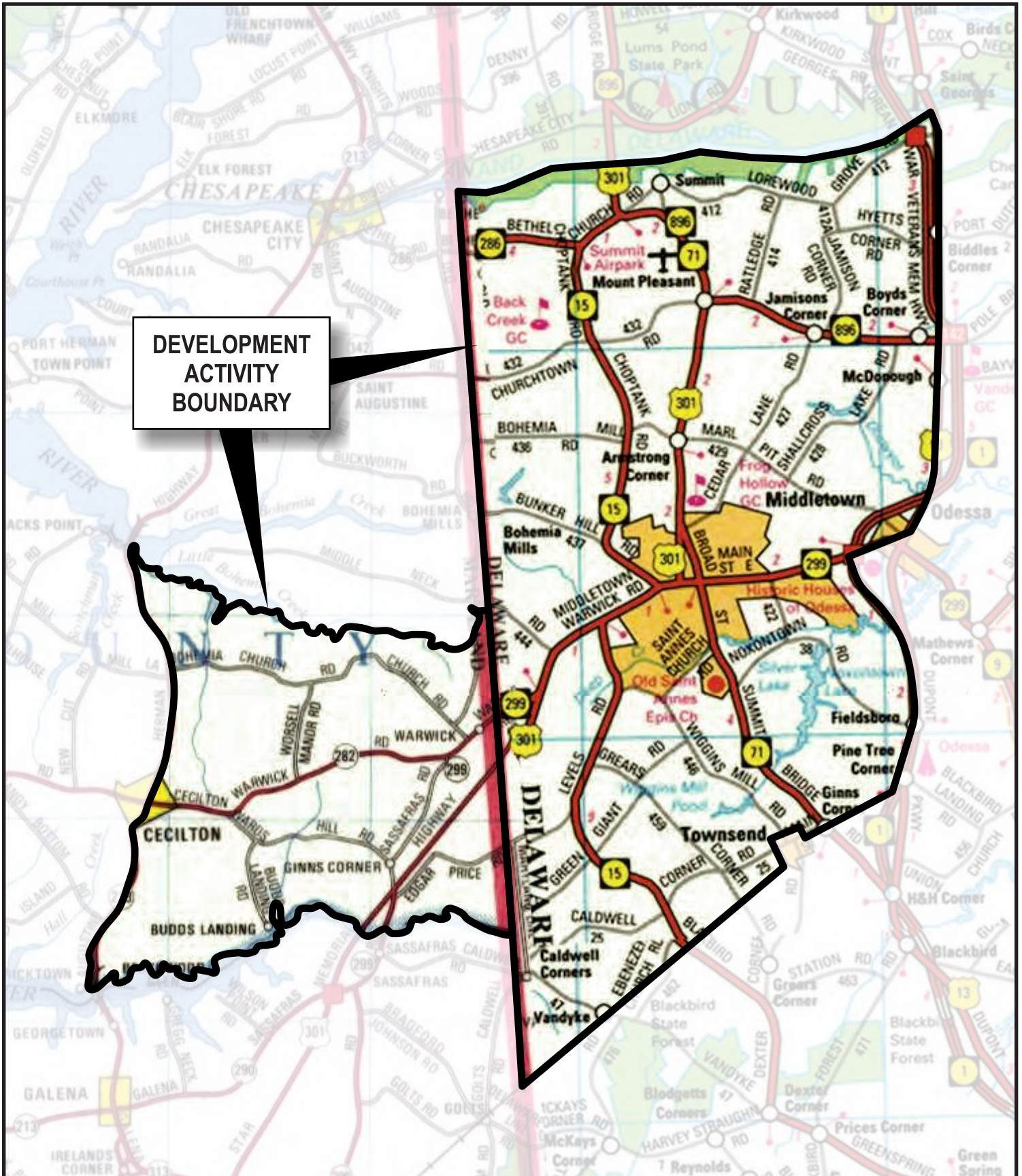
The explosive growth in housing and retail in southern New Castle County over the past 20+ years led to increasing congestion on the local road network, including US 301, SR 299, and SR 896. This growth was one of the contributing factors to the need for the US 301 project. During the ten year span of this Spur Monitoring Program, 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 continue to 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 tracked 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 developments were 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 was monitored in these areas 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 2019, a total of seventy-eight (78) 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. Sixty-six (66) of these developments are located in southern New Castle County and twelve (12) developments are located in Cecil County, Maryland. For each development, a description of the development proposal, the current status of the development in the planning process and what portions (if any) were constructed by the end of 2019 were provided. A full list of the developments can be found in Appendix A. The residential developments range from small subdivision developments with less than 10 homes to major developments with over 1,800 household units planned. The proposed commercial developments range from smaller properties with 5,000 to 25,000 SF to the major commercial centers, such as the 1.8 million SF Scott Run Business Park and completed 1.25 million SF Amazon 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 2019 MONITORING REPORT

MAJOR DEVELOPMENT LOCATION MAP



SCALE IN MILES



As Shown



June 2021

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). Figure 3 depicts the number of housing units built, approved but unbuilt, and pending at the end of 2010 to 2015 and 2019.

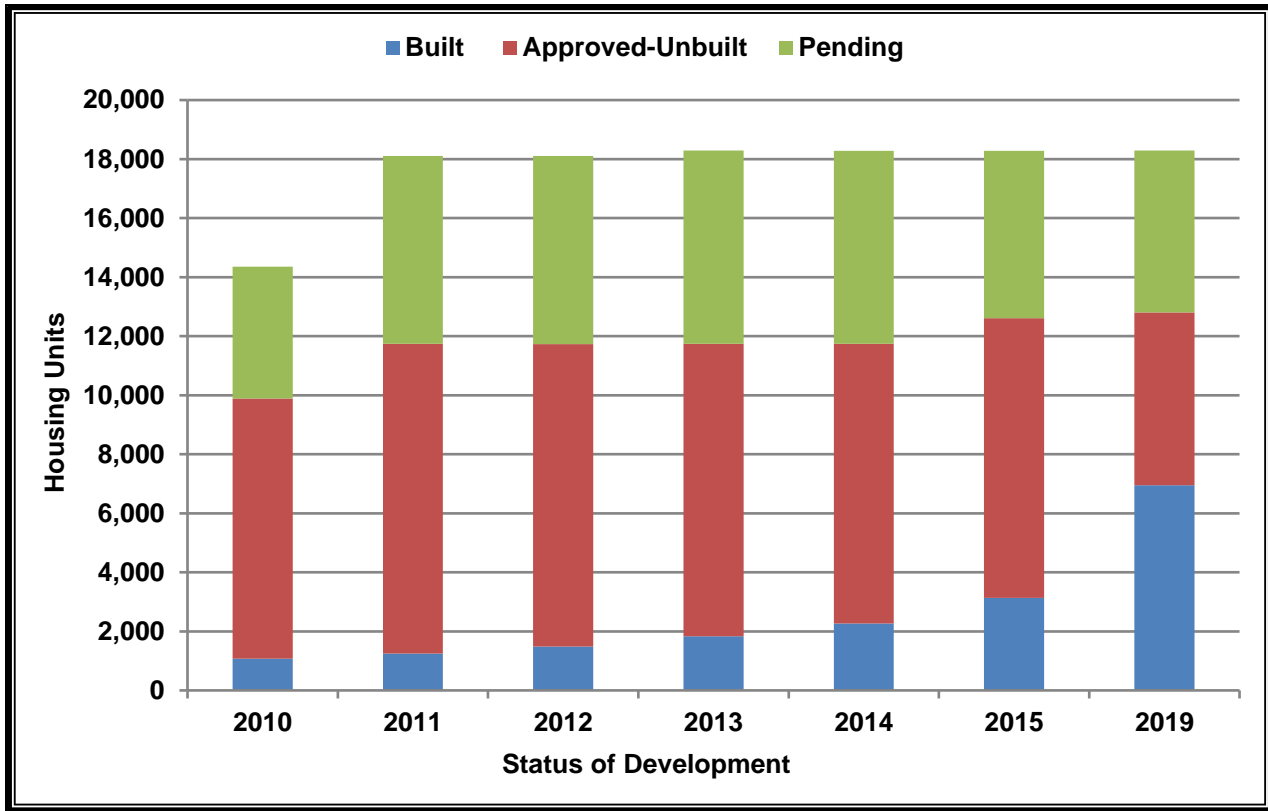


Figure 3: Residential Development in Study Area

Snapshot - Residential Construction in the Town of Middletown: Of the developments described above, twenty-three (23) of the residential developments are located within the Town of Middletown. The 23 developments include a total of 7,330 housing units, including approximately 3,740 single-family detached homes, 240 duplexes, 1,600 townhomes, and 1,750 apartments / condos. WILMAPCO was able to provide data on the number of units built within each of these residential developments between 2007 and 2019:



- 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.
- By the end of 2019, a total of 4,490 (61%) of the proposed 7,330 housing units within the Town of Middletown had been constructed. It should be noted that the total number of proposed housing units increased from 2015 due to additional communities planned in the Town of Middletown.

The data described above represents an increase of 2,311 housing units completed over the twelve (12) year period between 2007 and 2019, of which 968 new housing units were completed between 2015 and 2019 in the town of Middletown.

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 2019, 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 66,000 SF YMCA and a new 40,000 SF New Castle County Library. This represents an increase of 630,000 SF (+5%) of approved or pending commercial development, compared to 2015. Physically, 12.8 million SF of non-residential space represents approximately 12.1 million SF of approved development (compared to 11.3 million SF in 2015) with another 0.7 million SF in pending approval (compared to 0.7 million SF in 2015). Of the 12.1 million SF of development approved as of 2019, at least 5.1 million SF (42%) had been constructed by the end of 2019.

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.

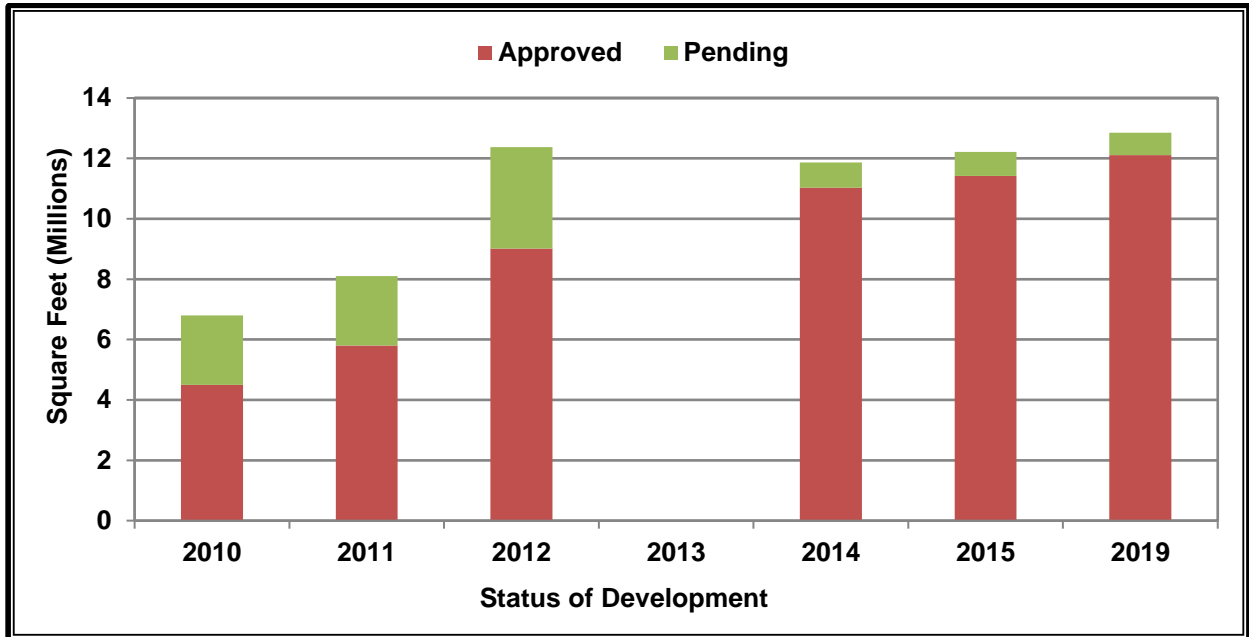


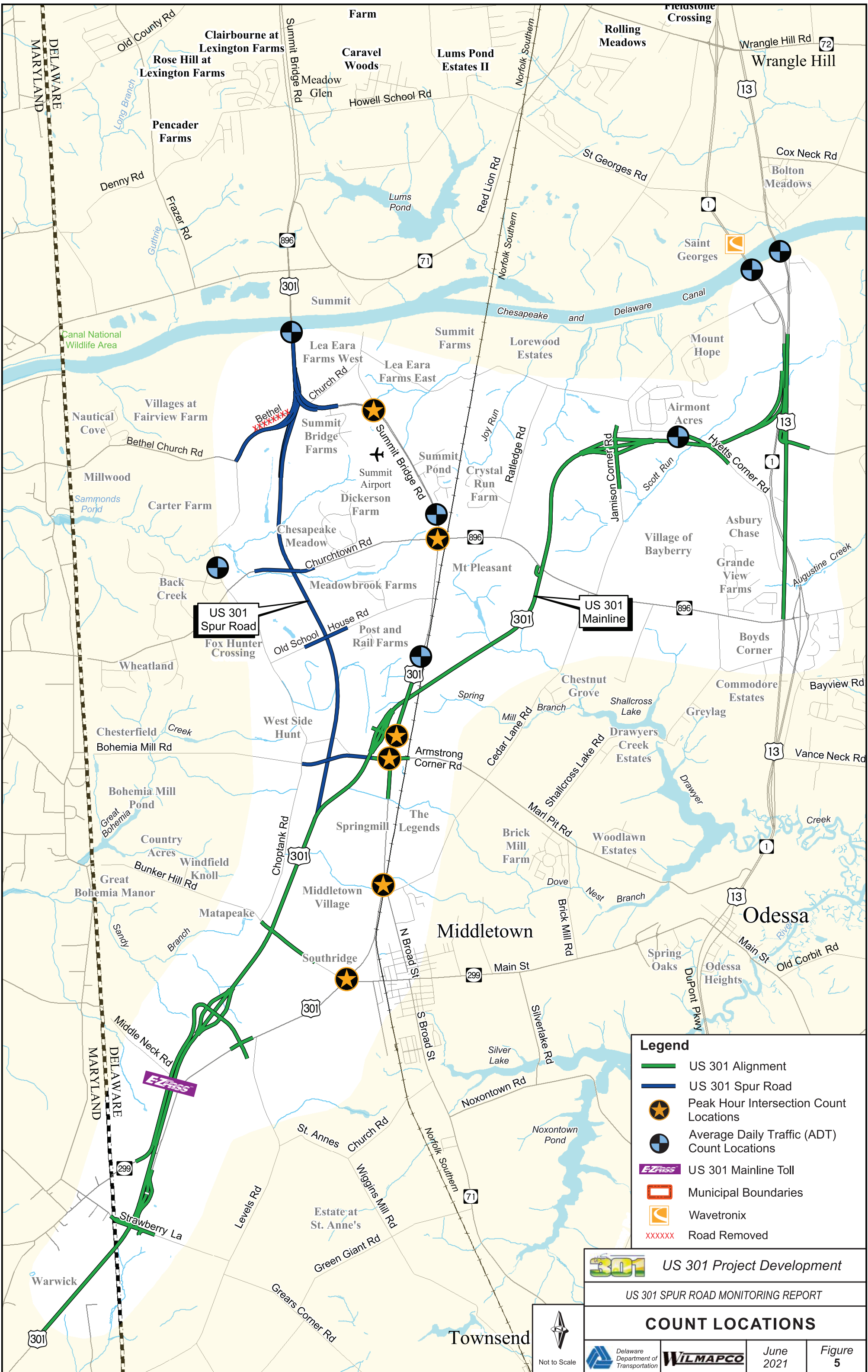
Figure 4: Non-Residential Development in Study Area

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 has been 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 between 2010 and 2015, as well as 2019. This annual traffic monitoring is meant to show how traffic volumes have changed over time as the area surrounding US 301 has developed. The data collected in 2019 (Fall 2019) was anticipated to be significantly different than data collected between 2010 and 2015 at many of the locations being monitored because of the regional impact of the opening of new US 301 on January 10, 2019.

Roadway Volumes

Mainline volume counts were collected along six (6) key roadways within the US 301 project area that are likely to be influenced by the construction of the Spur Road each October between 2010 and 2015, and again in October 2019 (see Figure 5). It should be noted that in 2019, volumes were recorded after it was open for nearly a year. 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 increased on all of the roadways studied between 2010 and 2015. This included Choptank Road where the volume increased by 38%, US 13 at St. Georges Bridge where volumes increased by 23%, The Summit Bridge where volumes increased by 14%, Summit Bridge Road between Mt. Pleasant and Armstrong Corner Road where volumes increased by 9%, Summit Bridge Road north of Mt. Pleasant where volumes increased by 7%, and SR 1 at Roth Bridge which experienced an increase of 10% between 2010 and 2015.

Between 2015 and 2019, which reflects the traffic shifts resulting from the opening of the US 301 Toll Road in January 2019 as well as four years of regional traffic growth, the traffic volumes on the key roads north of Middletown that are likely to be influenced by the construction of the Spur Road have either increased or remained relatively unchanged compared to 2015. This includes SR 1 where volumes increased by 13%, Choptank Road where volumes increased by 7%, the Summit Bridge (SR 896) where volumes increased by approximately 2%, and Summit Bridge Road north of Mt. Pleasant where volumes are within 1% of traffic volumes from 2015. However, traffic volumes on Summit Bridge Road south of Mt. Pleasant (between Mt. Pleasant and Armstrong Corner Road) decreased by approximately 11% and traffic volumes on US 13 at St. George's Bridge decreased by approximately 10% from 2015 to 2019.

Between 2010 and 2015, truck volumes increased on four (4) of the six (6) monitored roadways that are likely to be impacted by the construction of the Spur Road (See Table 2). This included SR 1 at the Roth Bridge where truck volumes increased by 37%, US 13 at St. Georges Bridge where truck volumes increased by 28%, Summit Bridge Road north of Mt. Pleasant where truck volumes increased by 14%, and Summit Bridge Road at the Summit Bridge where volumes increased by 7%. However, Truck volumes remained relatively unchanged (+/- 1%) on Summit Bridge Road south of Mt. Pleasant (between Mt. Pleasant and Armstrong Corner Road) and truck volumes on Choptank Road decreased by approximately 43%.

Between 2015 and 2019, which reflects traffic shifts resulting from the opening of the US 301 Toll road in January 2019 as well as four years of regional traffic growth, truck volumes increased on five (5) of the six (6) monitored roadways being monitored. This included US 13 at St. Georges Bridge where truck volumes increased by approximately 44%, SR 1 at the Roth Bridge where truck volumes increased by 40%, Choptank Road where truck volumes increased by 18%, Summit Bridge Road at the Summit Bridge where truck volumes increased by 6%, and Summit Bridge Road north of Mt. Pleasant where truck volumes increased by approximately 5%. However, truck volumes on Summit Bridge Road south of Mt. Pleasant (between Mt. Pleasant and Armstrong Corner Road) decreased by approximately 5%. It should be noted that the 2019 truck volume for SR 1 was calculated using Wavetronix data and trucks represent vehicles greater than 25 feet in length. Therefore, the truck volumes between 2015 and 2019 may be higher since trucks represent FHWA class 4-13, which are included in Wavetronix data.

The US 301 Before / After Traffic Study documents how the opening of the US 301 Toll Road in Delaware has impacted travel patterns on local roadways in the Middletown-Odessa-Townsend (MOT) area after nearly a full year of operation. Based on the US 301 Before/ After Traffic Study, between 2018 and 2019, which reflects traffic shifts resulting from the opening of the US 301 Toll Road in January 2019, daily traffic volumes have decreased for many of the local roads around Middletown. This included Middletown Warwick Road, south of Levels Road where volumes decreased by 85%, Summit Bridge Road, north of Armstrong Corner Road where volumes decreased by 10%, and Boyd's Corner Road where volumes decreased by 20%. Truck volumes for many local roads around Middletown have also decreased. This included, Middletown Warwick Road, south of Levels Road where tuck volumes decreased by 95%, Summit Bridge Road, north



of Armstrong Corner road where truck volumes decreased by 55%, and Boyd's Corner Road where truck volumes have decreased by 55%.

US 301 Spur Road 2019 Monitoring Report							June 2021
Table 1: Average Daily Traffic for Select Roadway Segments within US 301 Project Area							
Roadway Link	2010 ADT*	2011 ADT	2012 ADT	2013 ADT	2014 ADT	2015 ADT	2019 ADT
Summit Bridge Rd at the Summit Bridge	27,660	32,360	29,260	30,250	31,250	31,500	32,000
Choptank Rd, North of Churchtown Rd	3,990	4,090	4,810	4,940	4,980	5,500	5,900
SR 1 at Roth Bridge	73,690	78,740	74,900	76,940	77,280	80,800	91,200
US 13 at St. Georges Bridge	10,600	9,070	12,190	12,270	13,520	13,000	11,700
Summit Bridge Rd, North of Mt. Pleasant	23,450	23,810	24,760	24,980	24,490	25,200	25,300
Summit Bridge Rd between Mt. Pleasant and Armstrong Corner Rd	21,830	22,460	22,710	22,360	22,860	23,850	21,300
US 301 Bypass	N/A						8,100

*Data was collected for a seven (7) day period in October / November from 2010 through 2015 and 2019. 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 were collected during the same months in subsequent years.

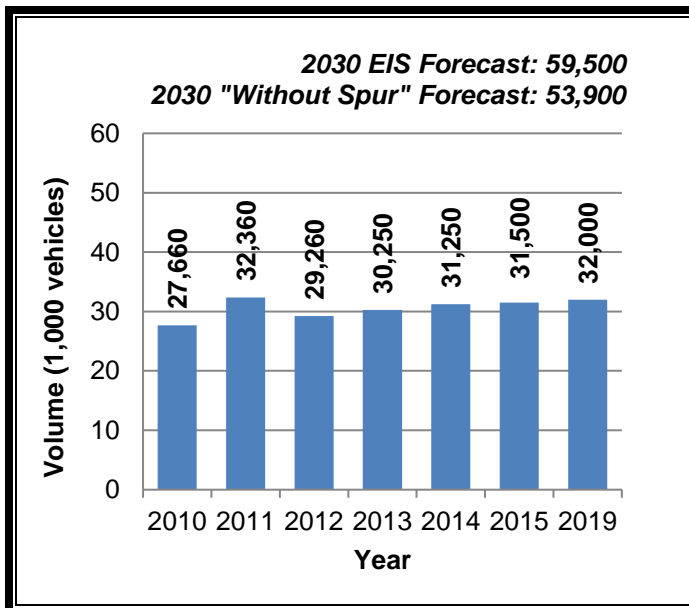


Figure 6: Average Daily Traffic (ADT) for Summit Bridge Rd at the Summit Bridge

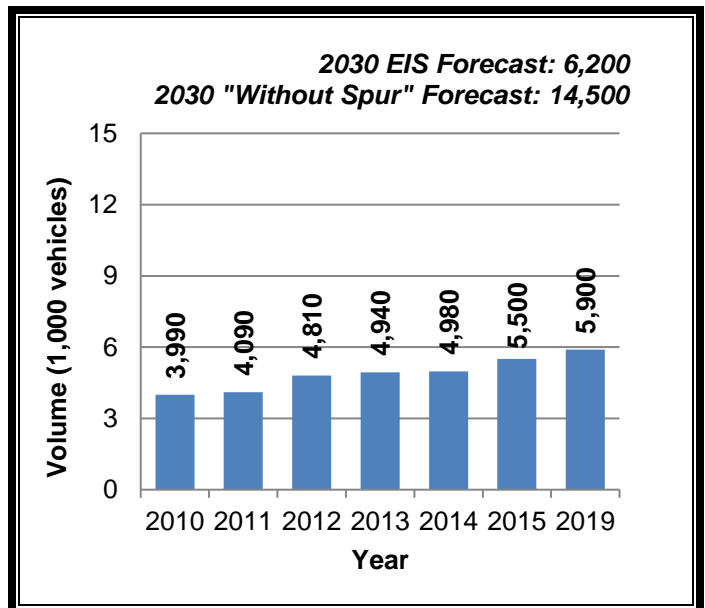


Figure 7: Average Daily Traffic (ADT) for Choptank Rd, North of Churchtown Rd

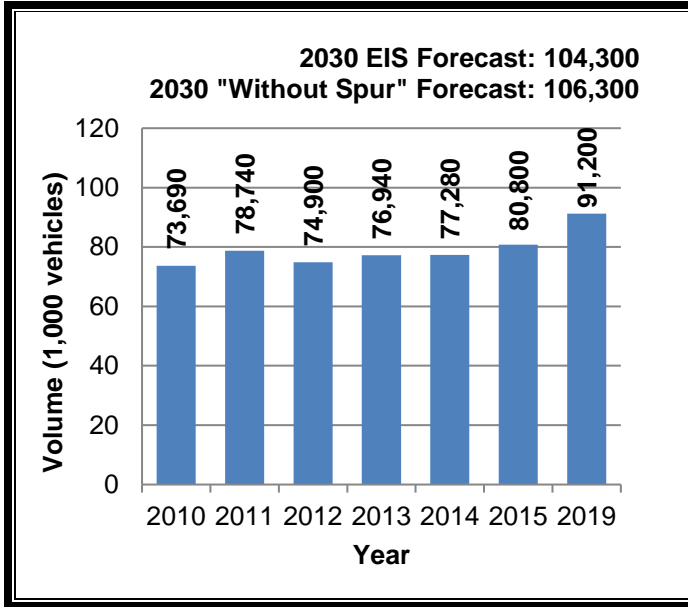


Figure 8: Average Daily Traffic (ADT) for Roth Bridge (SR 1)

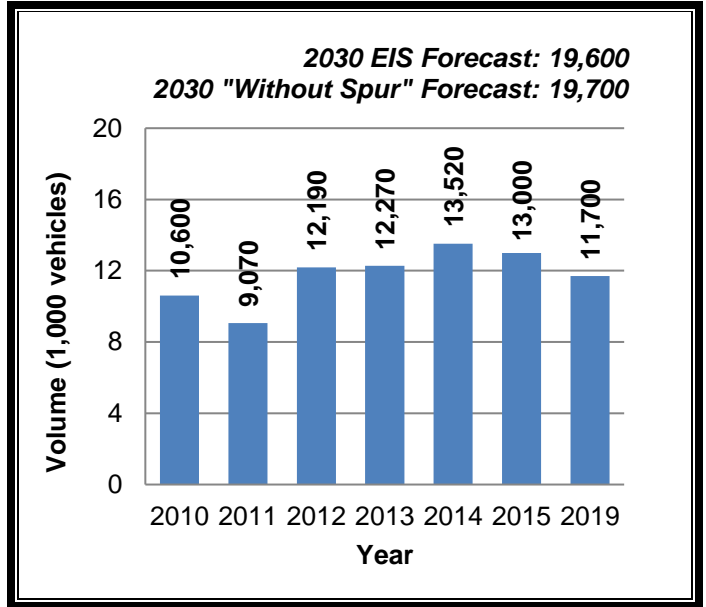


Figure 9: Average Daily Traffic (ADT) for St. George's Bridge (US 13)

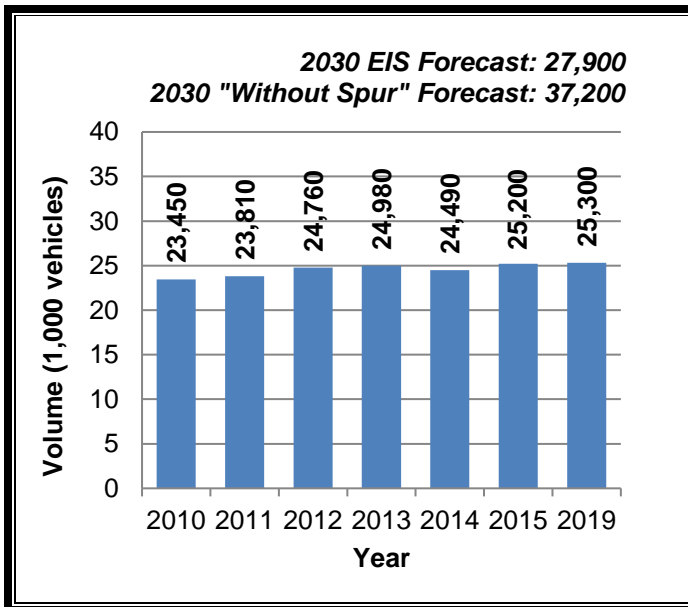


Figure 10: Average Daily Traffic (ADT) for Summit Bridge Rd North of Mt. Pleasant

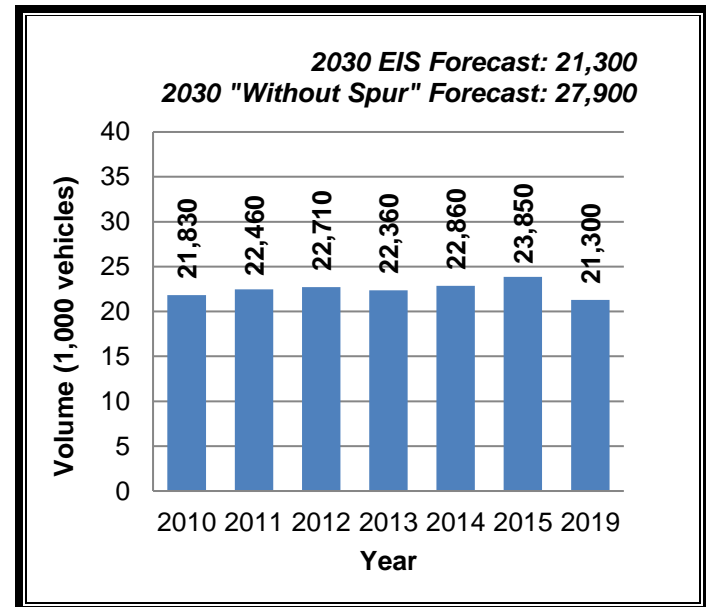


Figure 11: Average Daily Traffic (ADT) Summit Bridge Rd between Mt. Pleasant and Armstrong Corner Rd



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**Table 2: Average Daily Truck Volume and Average Daily Truck Percentage*
on Select Roadway Segments within US 301 Project Area**

Roadway Link	2010		2011		2012		2013		2014		2015		2019	
	Volume	% Trucks	Volume	% Trucks	Volume	% Trucks	Volume	% Trucks	Volume	% Trucks	Volume	% Trucks	Volume	% Trucks
Summit Bridge Rd at the Summit Bridge	2,210	8	3,100	10	2,370	8	2,480	8	2,650	8	2,360	7	2,490	8
Choptank Rd, North of Churchtown Rd	490	12	560	14	370	8	170	3	220	4	280	5	330	6
SR 1 at Roth Bridge**	7,860	11	9,020	11	7,840	11	6,620	9	8,330	11	10,800	13	15,150	17
US 13 at St. Georges Bridge	570	5	440	5	1,165	10	585	5	680	5	730	6	1,050	9
Summit Bridge Rd, North of Mt. Pleasant	1,970	8	1,840	8	2,300	9	1,840	7	1,670	7	2,250	9	2,360	9
Summit Bridge Rd, between Mt. Pleasant and Armstrong Corner Rd	2,910	13	3,000	13	3,075	14	2,990	13	2,930	13	2,900	12	2,760	13
US 301 Bypass	N/A												1,850	23

*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.

**The 2015 and 2019 volumes for SR 1 on the Roth Bridge were calculated using Wavetronix. Trucks represent vehicles greater than 25 feet in length.



Travel Times

Travel time runs were conducted along the I-95 and US 301 corridors as well as several local roadways throughout the US 301 project area. Specifically, vehicles equipped with GPS hardware and software made travel timed trips along two (2) regional routes and five (5) local routes on either Tuesday, Wednesday, or Thursday during AM, PM, and off peak periods in November 2010 and November 2019 (See Figures 12 & 13).

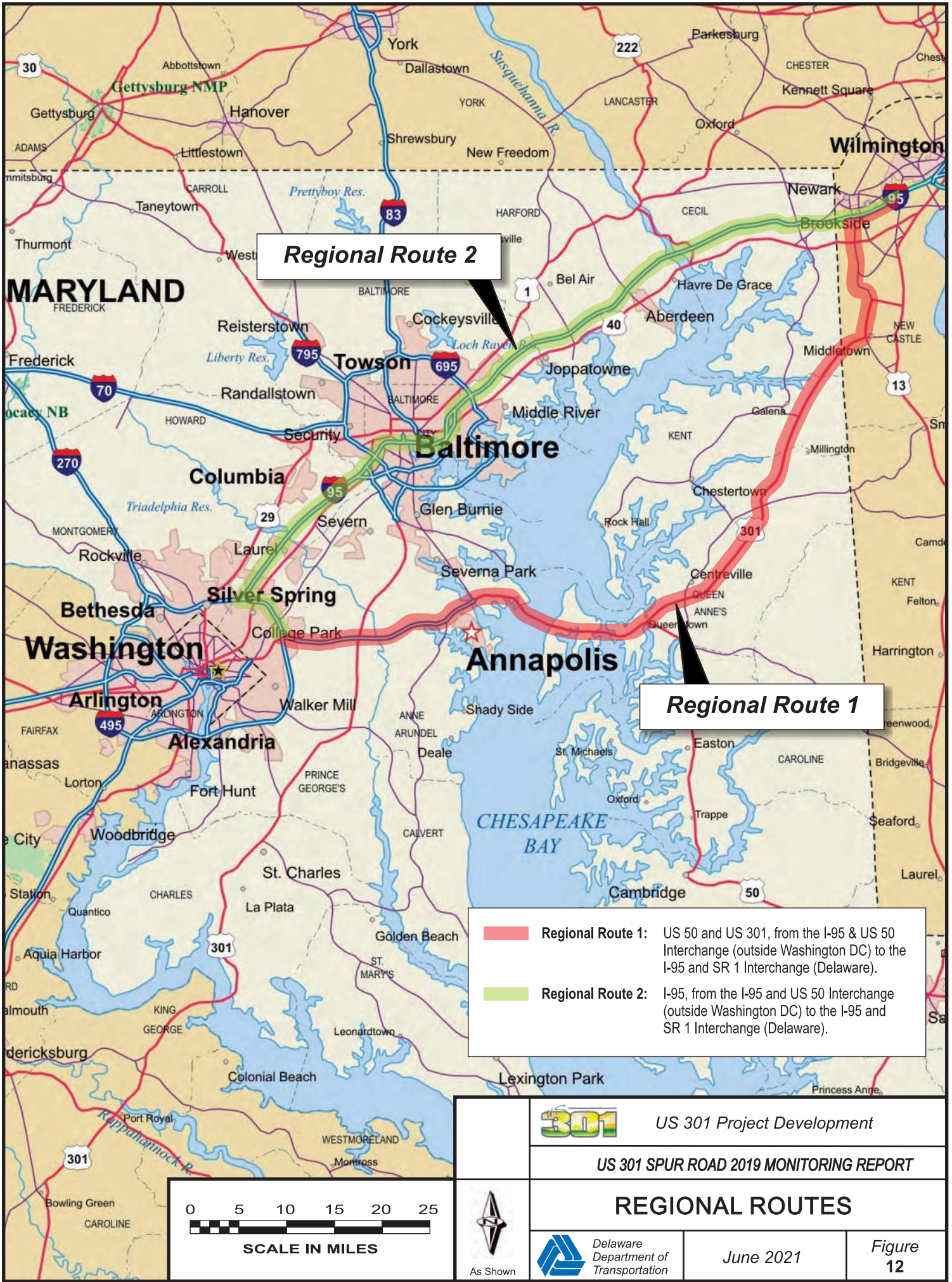
I-95 and US 301 are major north/south corridors between Washington D.C. and Northern Delaware. Travel times were collected along both routes between the I-95/US 50 Interchange outside of D.C. and the I-95/SR 1 interchange in Delaware to see the impacts of US 301 Toll Road to determine the viability of US 301 as an alternate route to I-95. In 2010, the average travel time for US 301 (Regional Route 1) was longer than I-95 (Regional Route 2) for the AM (26 minutes), Midday (16 minutes), and PM (8 minutes) peak hours for the northbound direction and the Midday (23 minutes) and PM (19 minutes) peak hours in the southbound direction.

The opening of the US 301 Toll Road has significantly reduced travel times along the US 301 corridor. In 2019, the difference in travel time in the northbound direction for US 301 and I-95 was negligible (+/- 5 minutes). More significantly, US 301 had a shorter travel time than I-95 for the southbound routes during the AM (-14 minutes) and PM (-21 minutes) peak hours.

Travel times were also monitored along five (5) local routes to determine the impact the US 301 Toll Road has had on local roadways in Delaware and Maryland in the vicinity of US 301. The local routes are listed below and the average travel time along each route in November 2010 and November 2019 are summarized in Table 3.

- **Local Route 1:** US 301, from MD/DE State line to Summit Bridge
- **Local Route 2:** SR 896 (Boyd's Corner Road) and US 13, from Summit Bridge Road to the US 13 NB Slip Ramp to SR 1
- **Local Route 3:** SR 299, from Middletown Warwick Road to SR 1 Interchange
- **Local Route 4:** SR 15 (Choptank Road), from SR 299 to Summit Bridge Road at the Summit Bridge
- **Local Route 5:** MD 213/MD 313, from US 301 (Maryland) to US 40 (Elkton, Maryland)

The travel times on the five (5) local routes in 2019 remained unchanged or had slightly lower travel times (1 to 5 minutes) compared to 2010, with the exception of westbound SR 299. During the Midday and PM peak hours, westbound SR 299 had a one (1) to two (2) minute longer travel time in 2019.



US 301 Project Development

US 301 SPUR ROAD 2019 MONITORING REPORT

REGIONAL ROUTES

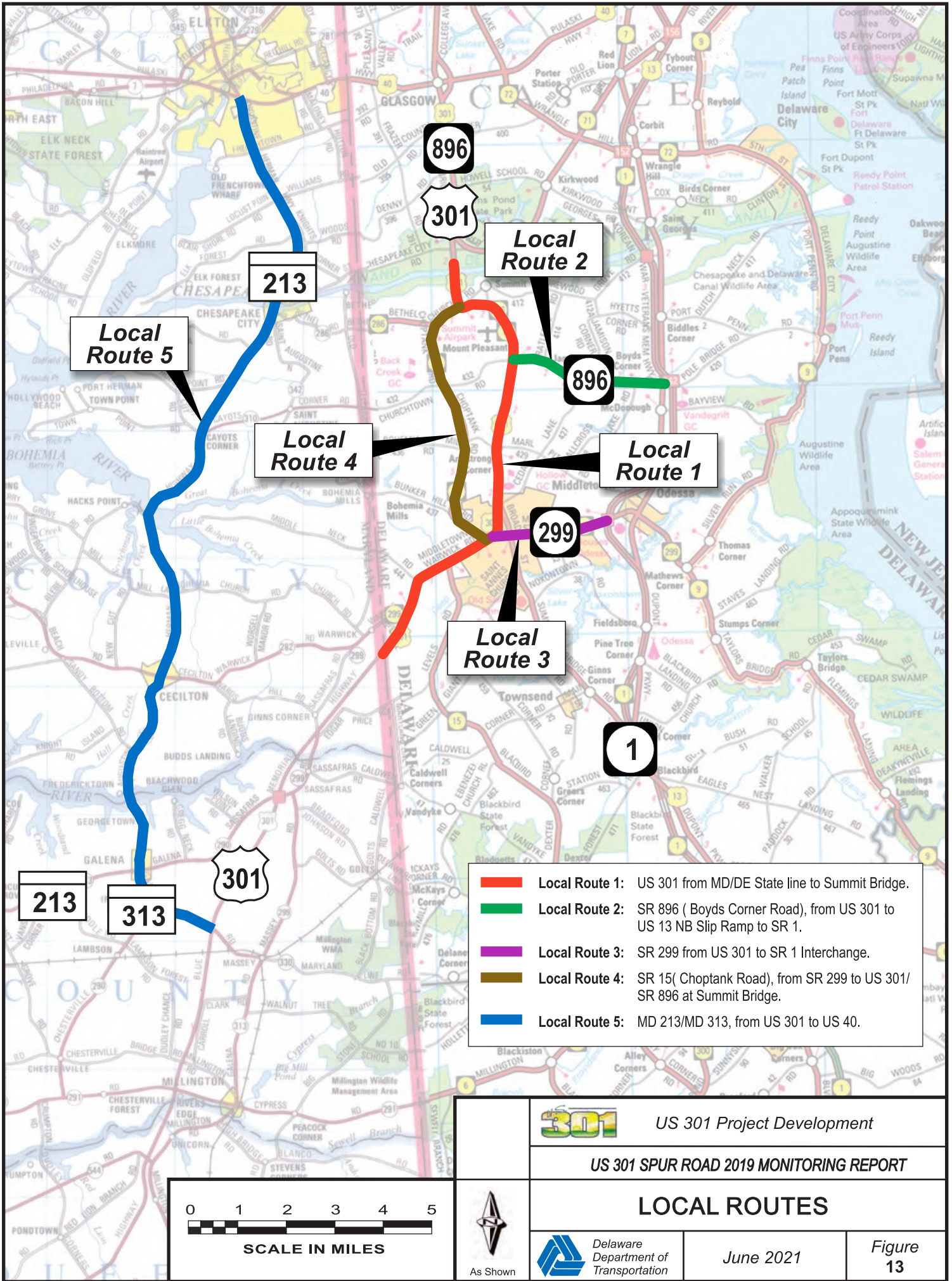


June 2021

Figure 12



As Shown





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**Table 3:
Weekday Average Travel Times for Regional Routes and Local Routes**

Route Description	Distance (miles)	2010 Average Travel Time (minutes)			2019 Average Travel Time (minutes)			Change (minutes)		
		AM PH	Mid-day PH	PM PH	AM PH	Mid-day PH	PM PH	AM PH	Mid-day PH	PM PH
Regional Routes										
RR 1 (US 301) - Northbound	104	119	109	115	101	95	114	-18	-14	-1
RR 1 (US 301) - Southbound	104	114	116	127	114	94	103	0	-22	-24
RR 2 (I-95) - Northbound	98	93	93	107	98	93	116	5	0	9
RR 2 (I-95) - Southbound	98	119	93	108	128	90	124	9	-3	16
Local Routes										
LR 1 (US 301) - Northbound	11	15	16	15	13	12	13	-2	-4	-2
LR 1 (US 301) - Southbound	11	14	14	14	12	12	12	-2	-2	-2
LR 2 (SR 896/US 13) – Eastbound	6	9	8	10	6	6	7	-3	-2	-3
LR 2 (SR 896/US 13) - Westbound	6	8	8	8	8	7	6	0	-1	-2
LR 3 (SR 299) – Eastbound	3	6	7	7	6	7	7	0	0	0
LR 3 (SR 299) - Westbound	3	8	6	7	7	8	8	-1	2	1
LR 4 (SR 15) - Northbound	9	15	15	17	15	12	12	0	-3	-5
LR 4 (SR 15) - Southbound	9	13	13	13	12	12	12	-1	-1	-1
LR 5 (MD 213/313)- Northbound	22	30	31	30	30	31	30	0	0	0
LR 5 (MD 213/313)- Southbound	22	30	30	31	29	30	30	-1	0	-1

Note: Regional Route (RR) and Local Route (LR), Colors correspond to Figures 12 & 13



Signalized Intersections

Peak period turning movement counts were collected on Tuesday, Wednesday, or Thursday on an annual basis at five (5) key signalized intersections in the project area. It should be noted that the connector road at the North Middletown Interchange (US 301 Toll Road) was added as an additional location in 2019. These six (6) locations, which are located along Summit Bridge Road (SR 71 and SR 896) and Middletown Warwick Road between Middletown (SR 299) and the Summit Bridge, were analyzed annually to monitor the change (degradation or improvement) in operation of each intersection. The six (6) locations, summarized in Figure 5, and Table 4, are the signalized intersections of Summit Bridge Road at Old Summit Bridge Road, Boyd's Corner Road, Connector Road, Armstrong Corner Road, North Broad Street, and Middletown Warwick Road at Bunker Hill Road. Peak hour turning movement counts were performed at these intersections during October and November 2019. This data was used to create a model of the corridor using Synchro (Version 10), 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 4 and Figures 14 and 15.

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 \leq 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 result between and 2010 to 2015, and 2019 are summarized in Table 4 and the following trends were observed:

- Summit Bridge Road at Old Summit Bridge Road: The intersection operated at LOS A during both the AM and the PM peak hours from 2010 to 2015, and remained at LOS A during both peak hours in 2019.
- Summit Bridge Road at Boyd's Corner Road: The intersection operated at LOS C during both the AM and the PM peak hours between 2010 and 2015. In 2019, the intersection operated at LOS C during the PM peak hour; however, the intersection operated at LOS D during the AM peak hour.
- Summit Bridge Road at the North Middletown Interchange Connector Road: The connector road opened to traffic in 2019 along with the US 301 Toll Road, and the intersection operated at LOS C during the AM and the PM peak hours in November 2019.
- Summit Bridge Road at Armstrong Corner Road / Marl Pit Road: The intersection operated at LOS C during the AM and the PM peak hours in 2010, and LOS D during the AM and PM peak hours in 2015. There were lower traffic volumes on Summit Bridge Road at Armstrong Corner Road in November 2019, which resulted in a reduction in delay and the intersection operated at LOS C during both the AM and PM peak hours.



- Summit Bridge Road at Broad Street: The intersection operated at LOS C during the AM peak hour each year between 2010 and 2019. The intersection operated at LOS D during the PM peak hour in 2010 and LOS C during the PM peak hour in 2015. The 2019 results showed an increase in delay during the PM peak hour and the intersection operated at LOS D.
- Middletown Warwick Road at SR 299: The intersection operated at LOS D during the AM and PM peak hour in 2010 and LOS C during the AM and PM peak hour in 2015. However, the intersection operated at LOS D during the AM and PM peak hour in 2019.

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Table 4: Weekday Peak Hour LOS at Selected Signalized Intersections within US 301 Project Area														
Site	2010		2011		2012		2013		2014		2015		2019	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Summit Bridge Rd at Old Summit Bridge Rd	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Summit Bridge Rd at Boyd's Corner Rd	C	C	C	C	C	C	C	C	C	C	C	C	D	C
Summit Bridge Rd at Connector Rd	N/A												C	C
Summit Bridge Rd at Armstrong Corner Rd	C	C	D	D	C	C	C	C	D	D	D	D	C	C
Summit Bridge Rd at Broad St	C	D	C	D	C	D	C	D	C	C	C	C	C	D
Middletown Warwick Rd at Bunker Hill Rd	D	D	D	D	D	D	D	D	C	D	C	C	D	D

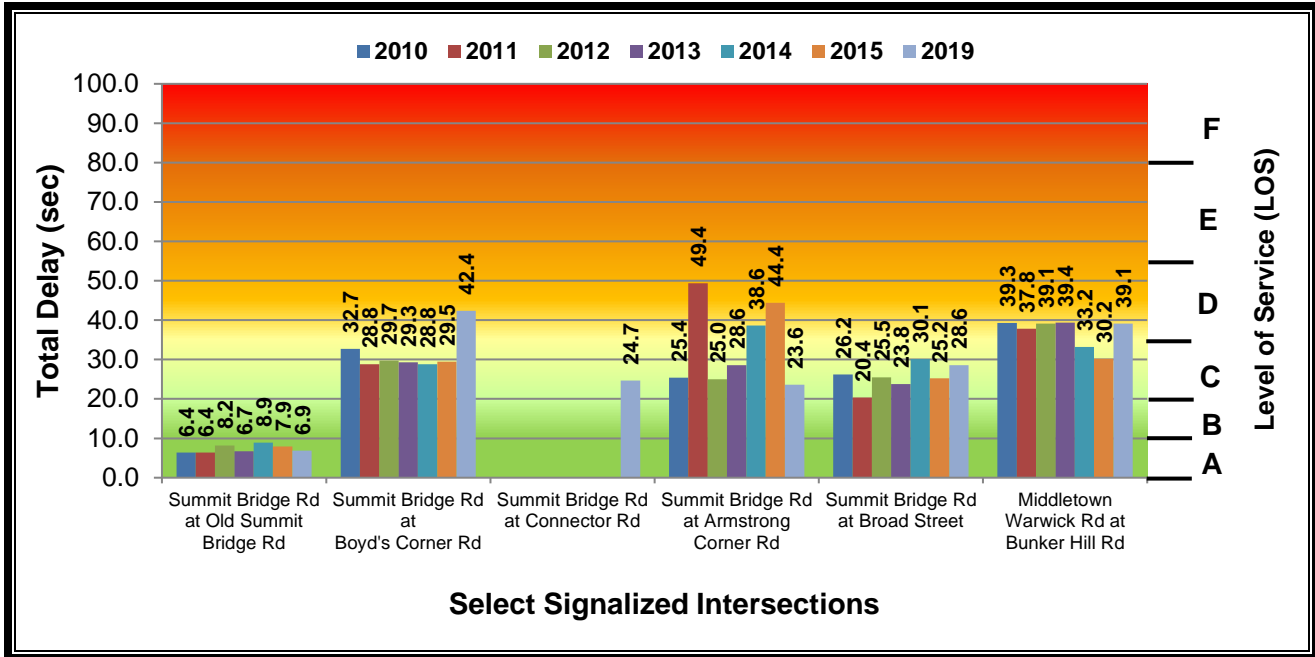


Figure 14: Total Delay and Corresponding Level of Service (LOS) at Select Signalized Intersections within US 301 Project Area during the AM Peak Hour

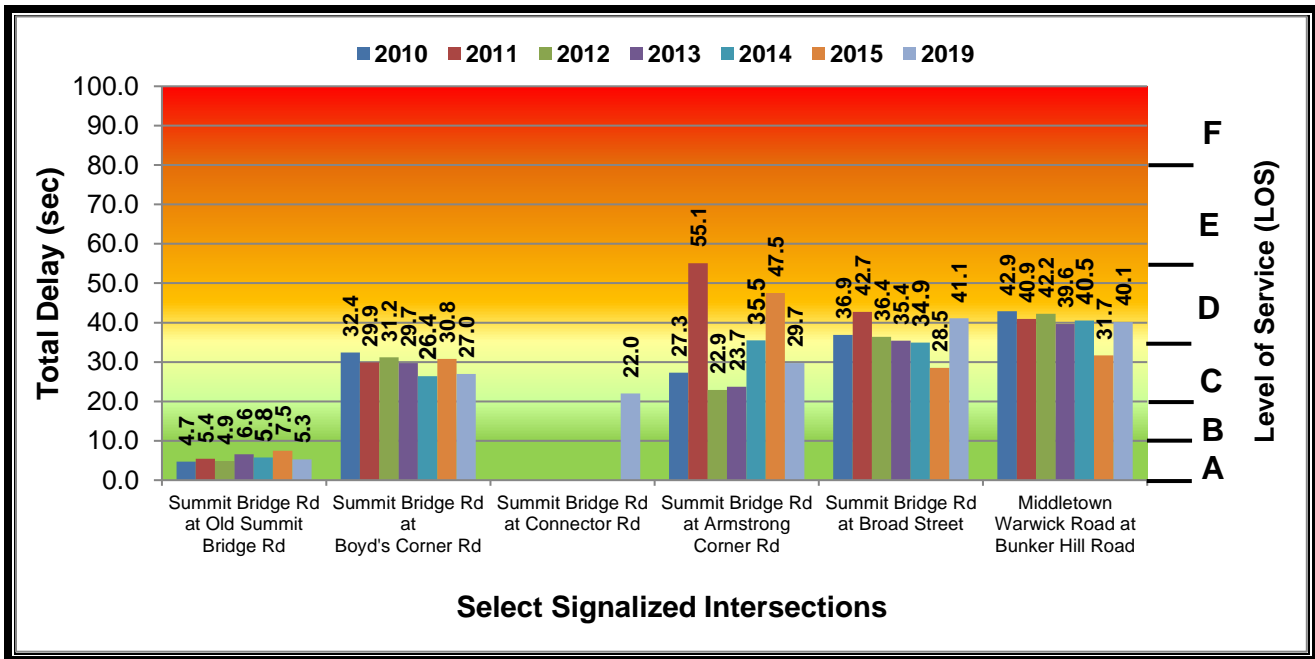


Figure 15: Total Delay and Corresponding Level of Service (LOS) at Select Signalized Intersections within US 301 Project Area during the PM Peak Hour



Unsignalized Intersections

Delay studies were performed at the following three (3) unsignalized intersections along Summit Bridge Road and Choptank Road:

- Summit Bridge Road at Old School House Road
- Summit Bridge Road at Keenan Autobody (Current tenant is Caliber Collision)
- Choptank Road at Clayton Manor Drive

The locations were selected to represent the typical operation of unsignalized access points along the Summit Bridge Road and Choptank Road corridors, both of which would 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 Summit Bridge Road and Choptank Road. The average delay per stopped vehicle was determined for each location (see Figure 16).

The delay at the intersection of Choptank Road and Clayton Manor Drive was approximately 10 seconds per vehicle in 2010. Motorists experienced an increase in delay in 2015 (13 sec/veh) and a decrease in delay in 2019 (7 sec/veh). Since US 301 opened to traffic in January 2019, the traffic volumes on Choptank Road have remained relatively unchanged from 2015. The relatively small change in delay at these unsignalized intersections is consistent with those volume trends.

The delay at the Keenan Autobody access along Summit Bridge Road was approximately 37 sec/veh in 2010. The delay decreased significantly in 2015 (19 sec/veh) and returned to 2010 levels in 2019 (40 sec/veh).

In 2010, vehicles experienced approximately 39 sec/veh of delay at the intersection of Summit Bridge Road and Old School House Road. This decreased significantly in 2015 (22 sec/veh), but returned to 2010 levels in 2019 (45 sec/veh).

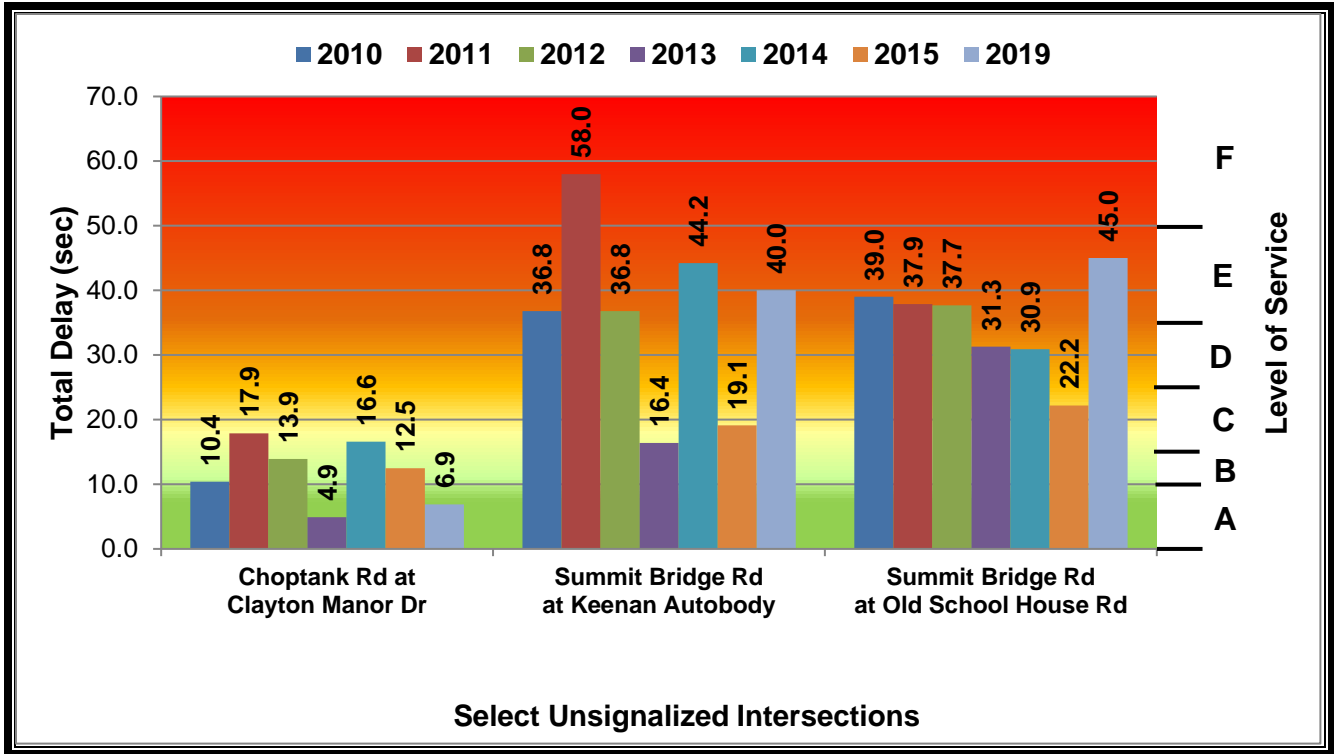


Figure 16: Total Delay and Corresponding Level of Service (LOS) at Select Unsignalized Intersections within US 301 Project Area during the PM Peak Hour



Highway Safety

The goal of this annual monitoring report with respect to safety was to monitor the number of crashes occurring on several of the local roads throughout the US 301 Project Area that would likely be impacted by the construction of the Spur Road. The number of crashes was documented each year to determine if any road segments experienced a significant increase in crashes.

The number of reported crashes occurring within each key roadway segment in 2010 through 2015, as well as 2019 is shown in Table 5 and on Figure 17. 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 was collected each year for several years prior to the opening of the US 301 Toll Road, 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 US 301 Corridor that would likely be impacted by the construction of the Spur Road. These crash rates were used to provide a relative measure of comparison of the crashes on each road to the Statewide and New Castle County average crash rates (see Table 5). 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 DeIDOT Safety Section provided the Statewide and New Castle County Average Crash Rates between 2010 to 2015 and 2019.

Between 2010 and 2015, the number of crashes increased considerably along four (4) of the roadways being monitored. This included Summit Bridge Road between Boyd's Corner Road and Peterson Road (increased from 50 to 77 crashes), Middletown Warwick Road between Peterson Road and Levels Road (increased from 22 to 39 crashes), Choptank Road (increased from 8 to 16 crashes), and SR 1 (increased from 53 to 115 crashes). There were also substantial increases in crashes at the intersection of Summit Bridge Road and Bethel Church Road (increased from 3 to 12 crashes).

Between 2015 and 2019, the number of crashes increased at only three (3) of the roadways being monitored. This included Summit Bridge Road between the Summit Bridge and Boyd's Corner Road (increased from 27 to 33 crashes), Bunker Hill Road (increased from 4 to 7 crashes) and SR 1 (increased from 115 to 136 crashes). Notably, the number of crashes at the intersection of Summit Bridge Road and Bethel Church Road decreased by 50% (from 12 to 6 crashes) and all of the other roadways being monitored experienced a decrease in the frequency of crashes between 2015 and 2019.

Looking at the crash rates, in 2010, six (6) of the eight (8) roadway segments had a higher crash rate than the Statewide and New Castle County Average Crash Rates. In 2015, five (5) of the eight roadway segments had higher crash rates than the Statewide Average Crash Rate and New Castle County Average Crash Rate. However, in 2019 only three (3) of the roadway segments had a crash rate higher than the Statewide Average Crash Rate and only one (1) roadway segment had a crash rate higher than the New Castle County Average Crash Rate. It should be noted that the Statewide and New Castle County Crash Rates were not shown for the section of Middletown Warwick Road between Levels Road and the DE/MD State Line due to the new realignment of that section. It should also be noted that in 2019, the Statewide and New Castle County Average Crash Rates went up considerably.



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**Table 5A:
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
Summit Bridge Rd between Summit Bridge and 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 Summit Bridge Rd and Bethel Church Rd	3				3				3				6			
Summit Bridge Rd between Boyd's Corner Rd 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
Middletown Warwick Rd 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
Middletown Warwick Rd 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 Summit Bridge Rd 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 Middletown Warwick Road	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



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**Table 5B:
Average Crash Rate for Roadway Type (ACRT)
(Accidents/ Million Vehicle Miles Traveled)**

Site	2014				2015				2019			
	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
Summit Bridge Rd between Summit Bridge and Boyd's Corner Rd	32	1.31	0.69	0.44	27	1.17	0.59	0.35	33	1.33	0.93	1.79
The "curve" between Summit Bridge and Bethel Church Rd	5				4				4			
The intersection of Summit Bridge Rd and Bethel Church Rd	10				12				6			
Summit Bridge Rd between Boyd's Corner Rd and Peterson Rd	56	1.81	1.43	1.50	77	2.36	1.53	1.50	57	1.72	1.78	2.24
Middletown Warwick Rd between Peterson Rd and Levels Rd	38	4.28	3.50	3.98	39	4.17	3.20	3.86	37	4.28	3.77	4.41
Middletown Warwick Rd between Levels Rd and the DE/MD State Line	9	0.58	1.43	1.50	10	0.68	1.53	1.50	2	0.13	--	--
Bethel Church Rd between Summit Bridge Rd and Choptank Rd	4	2.47	2.07	2.65	5	2.63	1.99	2.24	3	1.37	2.88	3.05
Choptank Rd between Bethel Church Rd and Bunker Hill Rd	16	1.91	2.07	2.65	16	1.85	1.99	2.24	10	0.82	2.88	3.05
Bunker Hill Rd between Choptank Rd and Middletown Warwick Road	5	4.67	2.07	2.65	4	3.61	1.99	2.24	7	8.52	2.88	3.05
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	136	0.87	1.29	1.29

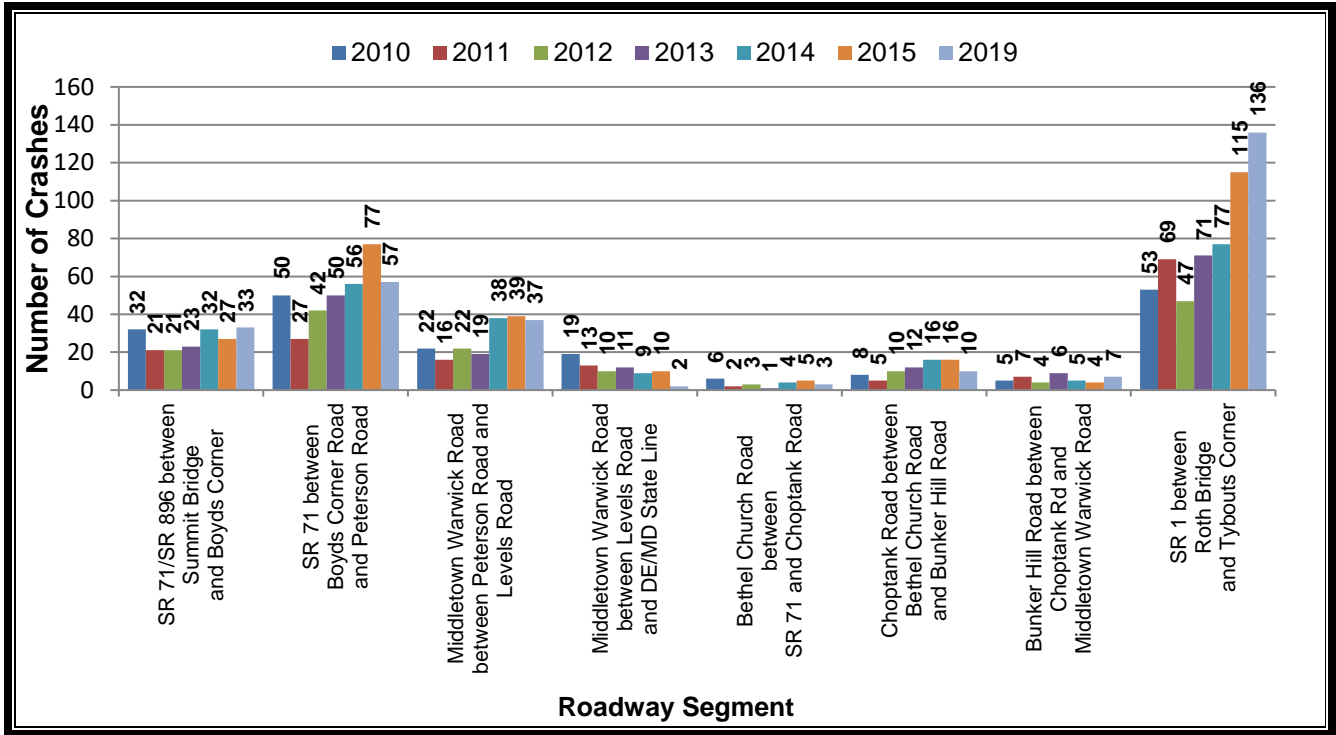


Figure 17: Comparison of Crashes for Select Roadways in the vicinity of US 301 Project Area



Hazard Elimination Program

Roadway segments in the project area that have been reported within DeIDOT’s Hazard Elimination Program (HEP) were identified each year during the construction of US 301. Additionally, roadway segments that were identified between 2007 and 2012 within DeIDOT’s High Risk Rural Roads Program (HRRRP) have also 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 2006 and 2019 can be found in Tables 6 and 7.

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Table 6: Hazard Elimination Program Locations – From 2006 to 2019			
Site	Start Milepost	End Milepost	Year Studied
US 13	0.19 miles South of Greylag Road	0.24 miles North of Boyd’s 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 7: 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 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:

- Summit Bridge Road/Middletown Warwick Road between SR 299 and Bethel Church Road
- Boyd’s Corner Road (SR 896) between Summit Bridge Road and US 13
- Bethel Church Road between Summit Bridge Road and Choptank Road
- SR 1 between Roth Bridge and I-95

For this monitoring program, DeIDOT tracked the number of significant incidents that occurred 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 115 incidents, including 16 in 2019, that have resulted in 320 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 had active maintenance and construction projects occurring at various times during the US 301 Spur Monitoring Program that may have affected the traffic data being collected. In 2019, DeIDOT identified only one (1) active construction project in the US 301 project area, as shown in Table 8.

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Table 8: Construction Activity in the US 301 Project Area in 2019			
Contract Number	Project Title	Start/End	Project Description
T201612001	Cedar Lane and Marl Pit Road Intersection Improvements	October 2019 / March 2020	Reconfigure the existing 4-Way Stop controlled intersection to a roundabout.



Recommendations

Now that the US 301 Mainline is open, and based upon the data summarized in this report, it is recommended that:

- The US 301 Spur Road should continue to be included in WILMAPCO's Regional Transportation Plan (RTP) because it is a key component of the overall US 301 Project, as noted in the approved environmental documents.
- Funding should be maintained in the 6 Year Capital Transportation Program (CTP) for the SR896/Bethel Church Road Interchange.
- Funding in the CTP for the US 301 Spur should be delayed, pending future Spur Monitoring data (see below).
- Monitoring activities should continue for the Spur Road, to 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 does not need to occur annually, but should be timed to reflect the need for data for future decisions, and should be primarily focused on transportation data (e.g., traffic volumes and crash data). It is recommended that the next round of data collection be conducted in the Spring of 2021.



Appendix A
Proposed Development for Southern New Castle County

Southern New Caste County - 2019 Land Use Data (Units built and remaining to be built)															
Subdivision	Plan Status	Total Units to be Built	Units remaining to be built (Based on December 2019 Data)						Units built (Based on December 2019 Data)						
			2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019	
ASBURY CHASE	Approved	77	0	0	0	0	0	0	77	77	77	77	77	77	
ASBURY CHASE II	Approved	43	4	4	4	4	4	4	39	39	39	39	39	39	
ASHBY'S PLACE	Approved	53	53	46	38	22	3	0	0	7	15	31	50	53	
BIGGS FARM	Approved	20	2	2	0	0	0	0	18	18	20	20	20	20	
BOHEMIA MILL POND	Approved	50	25	25	24	24	24	23	25	25	26	26	26	27	
BOYD'S CORNER FARM	Approved	116	116	116	116	116	116	116	0	0	0	0	0	0	
CANAL VIEW AT CROSSLAND	Approved	432	219	132	84	60	60	52	213	300	348	372	372	380	
CEDAR LANE	Approved	77	72	58	43	29	7	1	5	19	34	48	70	76	
COUNTRY ACRES	Approved	9	9	9	9	9	9	9	0	0	0	0	0	0	
COUNTRY ACRES II	Approved	7	1	1	1	1	1	1	6	6	6	6	6	6	
FAIRWAYS AT ODESSA NATIONAL	Approved	80	25	25	25	19	8	8	55	55	55	61	72	72	
GANDER HILL	Approved	80	49	49	49	49	49	49	31	31	31	31	31	31	
HIGH HOOK FARMS	Approved	387	379	323	236	158	85	42	8	64	151	229	302	345	
LOREWOOD ESTATES	Approved	10	4	4	4	4	4	4	6	6	6	6	6	6	
ODESSA NATIONAL	Approved	761	153	99	82	48	29	15	608	662	679	713	732	746	
PRESERVE AT ROBINSON FARMS	Approved	476	458	422	392	354	314	220	18	54	84	122	162	256	
ROTHWELL ESTATES	Approved	150	150	150	150	134	111	95	0	0	0	16	39	55	
SPRING OAKS	Approved	247	247	247	247	220	175	132	0	0	0	27	72	115	
SUMMIT BRIDGE ESTATES	Approved	36	36	36	36	36	36	35	0	0	0	0	0	1	
SUMMIT CROSSING PHASE 1	Approved	N/A	0	0	0	0	0	0	0	0	0	0	0	0	
TOWN OF WHITEHALL (VILLAGE 1)	Approved	501	501	501	495	483	457	434	0	0	6	18	44	67	
TRADITIONS AT WHITEHALL	Approved	229	229	229	229	229	229	228	0	0	0	0	0	1	
VILLAGE OF BAYBERRY NORTH	Approved	951	683	570	481	367	262	156	268	381	470	584	689	795	
VILLAGE OF BAYBERRY SOUTH	Approved	1,190	1,187	1,165	1,118	1,045	971	896	3	25	72	145	219	294	
WHISPERING WOODS	Approved	178	178	178	178	178	178	149	0	0	0	0	0	29	
WINCHELSEA	Approved	N/A	0	0	0	0	0	0	0	0	0	0	0	0	
WINDSOR AT HYETT'S CORNER	Approved	149	120	105	74	49	48	48	29	44	75	100	101	101	
WINDSOR COMMONS AT HYETT'S CORNER	Approved	316	313	289	252	200	146	82	3	27	64	116	170	234	
ENCLAVE AT ODESSA	Approved	205	52	51	51	51	41	26	153	154	154	154	164	179	
ESTATES AT ST ANNES	Approved	466	178	129	115	99	70	43	288	337	351	367	396	423	
HYETTS CORNER	Approved	143	120	105	74	49	48	48	29	44	75	100	101	101	
Merrimack Commons	Approved	78	78	78	78	78	78	78	0	0	0	0	0	0	
PARKSIDE	Approved	491	305	272	217	176	148	108	186	219	274	315	343	383	
Promenade at Middletown	Approved	273	273	273	273	273	273		0	0	0	0	0	0	
SHANNON COVE	Approved	446	234					0	212					446	
SPRING ARBOR AT South Ridge	Approved	317	79	35	14	2	1	0	238	282	303	315	316	317	
The Highlands	Approved	1242	1242	1242	1242	1242	1242	1242	0	0	0	0	0	0	
The Highlands at Backcreek	Approved	42	42	42	42	42	42	42	0	0	0	0	0	0	
THE PARKWAY AT SOUTH RIDGE	Approved	538	486	454	436	218	48	11	52	84	102	320	490	527	
TOWNSEND VILLAGE	Approved	242	116					0	126					242	
TOWNSEND VILLAGE	Approved	336	121					0	215					336	
WILLOW GROVE MILL Phase II	Approved	192	53	21	21	21	21	21	139	171	171	171	171	171	
		11,636	8,592	7,487	6,930	6,089	5,338	4,418	0	3,050	3,131	3,688	4,529	5,280	6,951

Southern New Caste County - 2019 Land Use Data (Active Permits)														
Subdivision	Plan Status	Total Units to be Built	Units remaining to be built (Based on December 2019 Data)						Units built (Based on December 2019 Data)					
			2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
587 UNION CHURCH ROAD	Active	3	3	N/A	N/A	N/A	N/A	3	N/A	N/A	N/A	N/A	N/A	0
BAYBERRY TOWN CENTER	Active	145	N/A	N/A	N/A	N/A	N/A	145	N/A	N/A	N/A	N/A	N/A	0
BLACKSTON COVE	Active	14	N/A	N/A	N/A	N/A	N/A	14	N/A	N/A	N/A	N/A	N/A	0
CARTER FARM	Active	578	N/A	N/A	N/A	N/A	N/A	578	N/A	N/A	N/A	N/A	N/A	0
COPPERLEAF AT BACKCREEK	Active	153	N/A	N/A	N/A	N/A	N/A	153	N/A	N/A	N/A	N/A	N/A	0
HYETTS LANDING	Active	82	N/A	N/A	N/A	N/A	N/A	82	N/A	N/A	N/A	N/A	N/A	0
ISAACS PROPERTY	Active	5	N/A	N/A	N/A	N/A	N/A	5	N/A	N/A	N/A	N/A	N/A	0
SHANNON COVE II	Active	15	N/A	N/A	N/A	N/A	N/A	15	N/A	N/A	N/A	N/A	N/A	0
VILLAGE OF BAYBERRY NORTH	Active	4	N/A	N/A	N/A	N/A	N/A	4	N/A	N/A	N/A	N/A	N/A	0
WARREN TRACT	Active	125	N/A	N/A	N/A	N/A	N/A	125	N/A	N/A	N/A	N/A	N/A	0
WINCHELSEA	Active	306	N/A	N/A	N/A	N/A	N/A	306	N/A	N/A	N/A	N/A	N/A	0
		1,430						1,430						0



Appendix B

Residential Construction in the Town of Middletown

**US 301 Spur Road
2019 Monitoring Report**

June 2021

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

Site	Proposed	2010		2011		2012		2013		2014		2015		2019	
		Built	Unbuilt	Built	Unbuilt	Built	Unbuilt	Built	Unbuilt	Built	Unbuilt	Built	Unbuilt	Built	Unbuilt
Casapulla Plan*	240	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	240
Highlands	336	0	336	0	336	0	336	0	336	0	336	0	336	0	336
Middletown Crossing*	225	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	225
Middletown Village	300	300	0	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	360	0
Promenade/ Middletown Condos^	0	0	273	0	273	0	273	0	273	0	273	0	273	N/A	N/A
Summertown Place*	28	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	28	0
Westtown Apartments*	264	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	264
Westtown (Levels)^	0	0	108	0	108	0	108	0	108	0	108	N/A	N/A	N/A	N/A
Total	1,753	300	921	300	921	300	921	300	921	300	921	300	969	688	1,065

*New on the list for 2019.

**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, and Promenade/Middletown Condos dropped off in 2019.

**US 301 Spur Road
2019 Monitoring Report**

June 2021

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

Site	Proposed	2010		2011		2012		2013		2014		2015		2019	
		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	0	206
Spring Arbor at South Ridge	12	8	4	8	4	8	4	8	4	12	0	12	0	12	0
Parkway at South Ridge	16	0	16	0	16	0	16	0	16	0	16	0	16	13	3
Habitat*	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	4	0	4
Total	238	8	226	8	226	8	226	8	226	12	222	12	226	25	213

*Added to the list in 2015 – may have replaced Westtown (Levels).

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

Site	Proposed	2010		2011		2012		2013		2014		2015		2019	
		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	0	700
Spring Arbor at South Ridge	123	48	75	55	68	74	49	87	36	110	13	123	0	123	0
Parkway at South Ridge**	162	33	193	39	187	39	187	45	181	53	173	84	78	154	8
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	42	130
Willow Grove Mill	248	202	46	202	46	248	0	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	171	21
Total	1,597	388	1,101	411	1,078	476	1,013	502	987	551	938	626	971	738	859

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

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

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

Site	Proposed	2010		2011		2012		2013		2014		2015		2019	
		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	423	42
Lakeside	185	184	1	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	377	1
Longmeadow	243	239	4	239	4	239	4	239	4	239	4	239	4	239	4
Middletown Crossing	134	125	9	125	9	125	9	125	9	125	9	125	9	125	9
Middletown Village***	289	253	9	253	9	254	8	255	7	255	7	255	7	255	34
Parkside****	491	166	326	174	318	179	313	184	308	188	304	219	272	383	108
Springmill	362	361	1	362	0	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	182	0
Preserve at Deep Creek*	279	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	484	93	186
Legacy at Deep Creek**	205	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	75	130
Willow Grove Mill	339	338	1	339	0	339	0	339	0	339	0	339	0	339	0
Village at Middle Neck**	185	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	185
Total	3,737	2,255	788	2,289	754	2,348	695	2,411	632	2,488	555	2,584	941	3,037	700

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

**New on the list for 2019.

***Number of proposed units at Middletown Village increased in 2019 (289 units from 262 units).

****Slight adjustment to the number of total units from 2010-2014 to 2015-2019.



Appendix C

US 301 Corridor Crash Reports

Summit Bridge Road between Summit Bridge and Boyd's Corner Road

A total of thirty-three (33) crashes were reported in 2019, and the following trends were identified:

- One (3 percent) of the thirty-three reported crashes resulted in a fatality.
- Seven (21 percent) of the thirty-three reported crashes resulted in personal injury.
- Twenty-five (76 percent) of the reported crashes resulted in property damage only.
- Fifteen (46 percent) of the reported crashes were rear-end crashes.
- Six (18 percent) of the reported crashes were Run-off-the-road / Hit-fixed-object crashes.
- Three (9 percent) of the reported crashes were angle crashes.
- Three (9 percent) of the reported crashes involved a motor vehicle and a deer.
- Two (6 percent) of the reported crashes were Hit-fixed-object crashes.
- There was one reported crash of each of the following type: head-on, hit pedestrian, left-turn, and vehicle rollover.

	Date	Time	MP	Type	Severity	Weather	Surface	Direction
1	02/11/2019	0:37	0.21	ROR/HFO	Injury	Sleet, hail	Slush	NB
2	02/12/2019	15:53	3.73	Rear-end	PDO	Rain	Wet	SB/SB
3	02/17/2019	5:58	0.82	ROR/HFO	PDO	Clear	Dry	NB
4*	03/15/2019	23:47	1.94	ROR/HFO	PDO	Clear	Dry	SB
5*	03/18/2019	17:15	1.84	Rear-end	Injury	Clear	Dry	SB/SB/SB/SB
6	04/03/2019	20:33	N/A	Rear-end	Injury	Clear	Dry	NB/NB
7	04/06/2019	16:01	0.27	Rear-end	PDO	Clear	Dry	SB/SB
8	04/15/2019	7:43	2.01	Rear-end	PDO	Clear	Wet	NB/NB
9	04/21/2019	20:30	0.34	Rear-end	PDO	Clear	Dry	SB/SB
10	05/25/2019	11:45	0.18	Rear-end	PDO	Clear	Dry	SB/SB
11	05/29/2019	17:28	1.42	Angle	PDO	Clear	Dry	WB/LT/NB
12	05/31/2019	1:29	N/A	Head-on	Injury	Clear	Dry	NB/SB
13	06/03/2019	0:44	1.01	Hit deer	PDO	Clear	Dry	NB
14	06/15/2019	22:37	N/A	ROR/HFO	PDO		Dry	SB
15	06/16/2019	12:40	0.38	Angle	PDO	Cloudy	Dry	SB/LT/WB/LT
16	07/14/2019	9:17	2.14	Rear-end	PDO	Clear	Dry	NB/NB
17	07/20/2019	1:05	0.38	Hit pedestrian	Fatal	Clear	Dry	EB/NB
18	07/23/2019	9:49	2.55	Angle	Injury	Rain	Wet	EB/SB
19	08/01/2019	22:00	1.97	Rear-end	PDO	Cloudy	Dry	SB/SB
20	08/16/2019	10:08	2.57	Rear-end	PDO	Cloudy	Dry	NB/NB
21*	08/18/2019	14:18	2.29	HFO	PDO	Rain	Wet	NB
22	09/04/2019	15:39	0.14	Rear-end	PDO	Clear	Dry	SB/SB
23	09/16/2019	0:00	3.83	Left-turn	Injury	Clear	Dry	SB/NB/LT
24	10/01/2019		2.07	HFO	PDO	Clear	Dry	NB/LT
25	10/21/2019	10:20	0.29	Rear-end	PDO	Clear	Dry	SB/SB
26	11/14/2019	22:33	1.40	ROR/HFO	PDO	Clear	Dry	NB
27	11/17/2019	0:34	0.22	Hit deer	PDO	Clear	Dry	NB
28	11/24/2019	16:16	1.98	Rear-end	PDO	Cloudy	Dry	SB/SB
29*	11/26/2019	5:18	2.15	Vehicle overturned	PDO	Clear	Ice/Frost	NB
30	11/26/2019	21:29	2.71	Rear-end	Injury	Clear	Dry	SB/SB
31	12/07/2019	12:43	2.79	Hit deer	PDO	Clear	Dry	NB
32	12/07/2019	12:45	1.31	Rear-end	PDO	Clear	Dry	NB/NB
33	12/17/2019	18:41	2.93	ROR/HFO	PDO	Rain	Wet	SB
2019 Total Number of Crashes								33

HFO: Hit-fixed-object

ROR: Run-off the Road

PDO: Property Damage Only

Note: * are crashes that occurred within the curve between the Summit Bridge and Bethel Church Road

Summit Bridge Road between Boyd's Corner Road and Peterson Road

A total of fifty-seven (57) crashes were reported in 2019, and the following trends were identified:

- Twelve (21 percent) of the fifty-seven reported crashes resulted in personal injury.
- Forty-five (79 percent) of the reported crashes resulted in property-damage-only.
- Thirty (53 percent) of the reported crashes were rear-end crashes.
- Eleven (19 percent) of the reported crashes were sideswipe crashes.
- Five (9 percent) of the reported crashes were angle crashes.
- Three (5 percent) of the reported crashes were Hit-fixed-object crashes.
- Two (3.5 percent) of the reported crashes were Run-off-the-road / Hit-fixed-object crashes.
- Two (3.5 percent) of the reported crashes involved a vehicle backing into another vehicle.
- Two (3.5 percent) of the reported crashed involved a motor vehicle and a deer.
- There was one reported crash of each of the following type: left-turn crash and a crash which involved a motor vehicle and debris on the roadway.

	Date	Time	MP	Type	Severity	Weather	Surface	Direction
1	01/02/2019	18:25	3.95	Rear-end	PDO	Clear	Dry	NB/NB
2	01/09/2019	11:51	1.61	Rear-end	PDO	Cloudy	Dry	SB/SB
3	01/15/2019	19:12	0.98	HFO	PDO	Clear	Dry	SB
4	01/17/2019	8:59	1.60	Rear-end	PDO	Clear	Dry	NB/NB
5	01/22/2019	14:36	1.56	Hit debris	PDO	Clear	Dry	SB/NBLT
6	01/24/2019	6:28	3.86	Sideswipe, same	PDO	Rain	Wet	NB/NB
7	01/28/2019	13:31	3.57	Sideswipe, same	PDO	Clear	Dry	SB/SB
8	02/05/2019	0:00	2.10	Rear-end	PDO	Clear	Dry	SB/SB
9	02/08/2019	8:56	2.59	Sideswipe, same	PDO	Cloudy	Wet	NB/NB
10	02/11/2019	13:53	2.35	Backing maneuver	PDO	Snow	Wet	NB/SB
11	02/11/2019	7:20	1.00	Angle	PDO	Snow	Snow	SB/EBRT
12	02/19/2019	18:30	2.05	Rear-end	Injury	Clear	Dry	NB/NB/NB
13	02/26/2019	18:10	4.34	Sideswipe, same	PDO	Clear	Dry	NB/NB
14	03/02/2019	16:49	1.11	Left-turn	Injury		Dry	SB/NBLT
15	03/21/2019	6:25	3.87	Angle	PDO	Rain	Wet	NB/EBLT
16	03/29/2019	14:44	3.74	Angle	PDO	Cloudy	Dry	SB/EBLT
17	03/30/2019	14:30	1.59	Rear-end	PDO	Clear	Dry	SB/SB
18	04/06/2019	20:17	3.87	Sideswipe, same	PDO	Clear	Dry	SB/EBRT
19	04/15/2019	16:49	1.58	Rear-end	PDO	Cloudy	Dry	NB/NB
20	04/24/2019	15:30	N/A	Angle	PDO	Clear	Dry	NB/WBRT
21	04/25/2019	0:00	1.57	Rear-end	PDO	Clear	Dry	NB/NB
22	04/28/2019	0:19	0.98	Rear-end	Injury	Clear	Dry	SB/SB
23	05/02/2019	21:10	2.39	Sideswipe, same	PDO	Clear	Dry	NB/NB
24	05/10/2019		1.99	Sideswipe, same	PDO	Clear	Dry	SBUT/SBUT
25	06/17/2019	16:06	2.14	HFO	PDO	Clear	Dry	NBLT
26	06/21/2019	11:26	2.14	Rear-end	PDO	Cloudy	Dry	NB/NB
27	06/30/2019	10:36	0.99	Rear-end	Injury	Clear	Dry	SB/SB
28	06/30/2019	16:50	0.98	Rear-end	Injury	Clear	Dry	SB/SB
29	07/09/2019	18:50	3.56	Sideswipe, same	PDO	Clear	Dry	NB/NB
30	07/10/2019	19:24	2.13	Rear-end	PDO	Clear	Dry	SB/SB
31	07/10/2019	15:40	3.57	Rear-end	Injury	Clear	Dry	SB/SB/SB
32	07/19/2019	19:40	4.06	Sideswipe, same	PDO	Clear	Dry	NB/NB
33	08/02/2019	16:25	1.02	Rear-end	PDO	Clear	Dry	SB/SB
34	08/07/2019	12:25	2.11	Rear-end	PDO	Clear	Dry	NB/NB/NB
35	08/16/2019	16:29	3.90	Backing maneuver	PDO	Clear	Dry	SB/NB
36	08/16/2019	23:12	2.22	Rear-end	PDO	Clear	Dry	SB/SB
37	08/19/2019	16:00	3.78	Sideswipe, same	PDO	Clear	Dry	NB/NB
38	08/26/2019	8:06	4.23	Rear-end	PDO	Clear	Dry	NB/NB
39	09/19/2019	6:50	1.00	Rear-end	Injury	Clear	Dry	SB/SB
40	09/20/2019	17:58	1.04	Rear-end	PDO	Cloudy	Dry	SB/SB
41	10/17/2019	18:44	1.95	Rear-end	Injury	Clear	Dry	SB/SB
42	10/17/2019	16:52	1.00	Rear-end	PDO	Clear	Dry	SB/SB/SB
43	10/18/2019	13:11	3.87	Angle	Injury	Clear	Dry	SB/EBLT
44	10/20/2019	5:42	3.59	ROR/HFO	PDO	Clear	Dry	NB
45	10/24/2019	17:32	3.61	Rear-end	Injury	Clear	Dry	NB/NB
46	10/25/2019	23:49	2.28	Rear-end	PDO	Cloudy	Dry	SB/SB
47	10/28/2019	13:27	1.60	Rear-end	PDO	Clear	Dry	NB/NB

	Date	Time	MP	Type	Severity	Weather	Surface	Direction
48	11/01/2019	15:00	0.99	Rear-end	PDO	Clear	Dry	SB/SB
49	11/09/2019	23:50	3.68	Hit deer	PDO	Clear	Dry	SB
50	11/11/2019	17:12	4.31	ROR/HFO	PDO	Clear	Dry	SB
51	11/13/2019	18:30	4.03	Rear-end	PDO	Clear	Dry	NB/NB
52	11/15/2019	17:52	2.03	Rear-end	Injury	Clear	Dry	SB/SB/SB/SB
53	11/27/2019	17:52	3.60	Rear-end	Injury	Clear	Dry	NB/NB/NB
54	11/29/2019	0:53	2.96	Hit deer	PDO	Clear	Dry	SB
55	12/10/2019	6:00	2.65	HFO	PDO	Unknown	Wet	NB
56	12/12/2019	15:44	1.03	Sideswipe, same	PDO	Dry	Dry	NB/NB
57	12/22/2019	12:23	1.03	Rear-end	PDO	Dry	Dry	SB/SB
2019 Total Number of Crashes								57

HFO: Hit-fixed-object

ROR: Run-off the Road

PDO: Property Damage Only

Middletown Warwick Road between Peterson Road and Levels Road

A total of thirty-seven (37) crashes were reported in 2019, and the following trends were identified:

- Thirteen (35 percent) of the thirty-seven reported crashes resulted in personal injury.
- Twenty-four (65 percent) of the reported crashes resulted in property-damage-only.
- Twenty (54 percent) of the reported crashes were rear-end crashes.
- Eight (22 percent) of the reported crashes were sideswipe-same direction crashes.
- Three (8 percent) of the reported crashes were angle crashes.
- Two (5 percent) of the reported crashes were left-turn crashes.
- There was one reported crash of each of the following type: a crash which involved a vehicle backing into another vehicle, hit deer, hit dog, and sideswipe-opposite direction crash.

	Date	Time	MP	Type	Severity	Weather	Surface	Direction
1	01/01/2019	10:05	2.89	Rear-end	PDO	Clear	Dry	SB/SB
2	01/06/2019	13:50	2.95	Rear-end	PDO	Clear	Dry	SB/SB
3	01/11/2019	7:44	2.09	Sideswipe, same	PDO	Clear	Dry	SB/SB
4	01/28/2019	18:14	2.09	Sideswipe, same	PDO	Clear	Dry	SB/SB
5	02/07/2019	4:53	2.48	Sideswipe, same	PDO	Cloudy	Wet	NBLT/NBLT
6	02/10/2019	11:20	2.74	Rear-end	Injury	Clear	Dry	SB/SB
7	02/12/2019	18:08	2.66	Rear-end	PDO	Rain	Wet	SB/SB
8	03/30/2019	18:45	2.52	Rear-end	PDO	Clear	Dry	SB/SB
9	04/18/2019	12:45	2.92	Angle	PDO	Clear	Dry	EB/SB
10	05/08/2019	17:01	2.48	Sideswipe, opposite	PDO	Cloudy	Dry	SBLT/NBLT
11	05/09/2019	13:29	2.95	Rear-end	Injury	Clear	Dry	SB/SB
12	05/19/2019	11:08	2.48	Sideswipe, same	PDO	Clear	Dry	SBLT/SBLT
13	05/19/2019	13:51	0.74	Rear-end	Injury	Clear	Dry	NB/NB
14	05/30/2019	4:58	2.29	Hit dog	PDO		Dry	NB
15	06/07/2019	21:30	2.47	Rear-end	PDO	Clear	Dry	NB/NB
16	06/10/2019	7:53	2.92	Sideswipe, same	Injury	Rain	Wet	SB/SB
17	07/07/2019	14:59	2.92	Rear-end	PDO	Cloudy	Dry	SB/SB
18	07/14/2019	18:08	3.13	Rear-end	PDO	Clear	Dry	SB/SB
19	08/10/2019	8:53	2.92	Angle	Injury	Clear	Dry	WB/SB
20	08/23/2019	17:33	0.00	Rear-end	PDO	Clear	Wet	NB/NB/NB
21	09/10/2019	19:28	N/A	Rear-end	Injury	Cloudy	Dry	SB/SB
22	09/23/2019	18:25	2.48	Left-turn	Injury	Clear	Dry	NB/SBLT
23	10/07/2019	18:30	0.00	Angle	Injury	Clear	Dry	SB/EB
24	10/18/2019		2.93	Rear-end	PDO	Clear	Dry	SB/SB
25	10/27/2019	19:37	2.92	Rear-end	Injury	Cloudy	Wet	SB/SB
26	11/02/2019	19:13	0.00	Rear-end	PDO	Clear	Dry	NBRT/NBRT
27	11/09/2019	13:50	2.48	Rear-end	PDO	Clear	Dry	NB/NB
28	11/20/2019	4:09	2.17	Hit deer	PDO	Clear	Dry	SB
29	11/29/2019	18:00	2.48	Rear-end	Injury	Clear	Dry	SB/SB
30	12/03/2019	9:33	2.94	Rear-end	PDO	Clear	Dry	NB/NB/NB
31	12/08/2019	20:41	0.73	Sideswipe, same	PDO	Cloudy	Dry	NB/WBRT
32	12/09/2019	18:38	2.92	Backing maneuver	PDO	Rain	Wet	NB/SB
33	12/17/2019	7:31	2.48	Left-turn	PDO	Rain	Wet	NB/SBLT
34	12/17/2019	17:50	2.22	Rear-end	Injury	Rain	Wet	SB/SB
35	12/21/2019	12:13	2.08	Rear-end	Injury	Clear	Dry	SB/SB
36	12/23/2019	18:55	2.67	Sideswipe, same	PDO	Clear	Dry	SB/EBRT
37	12/28/2019	20:05	3.14	Sideswipe, same	Injury	Clear	Dry	SB/SB
2019 Total Number of Crashes								37

HFO: Hit-fixed-object

ROR: Run-off the Road

PDO: Property Damage Only

Middletown Warwick Road between Levels Road and Strawberry Lane

A total of two (2) crashes were reported in 2019, and the following trends were identified:

- All of the reported crashes resulted in property-damage-only.
- One (50 percent) of the reported crashes was a Hit-fixed-object crash.
- One (50 percent) of the reported crashes was a Run-off-the-road / Hit-fixed-object crash.

	Date	Time	MP	Type	Severity	Weather	Surface	Direction
1	03/03/2019	22:04	0.72	ROR/HFO	PDO	Sleet, hail	Slush	SB
2	04/21/2019	1:16	N/A	HFO	PDO	Cloudy	Dry	SB
2019 Total Number of Crashes								2

HFO: Hit-fixed-object

ROR: Run-off the Road

PDO: Property Damage Only

Bethel Church Road between Summit Bridge Road and Choptank Road

Three (3) crashes were reported in 2019, and the following trends were identified:

- All of the reported crashes resulted in property-damage-only.
- One (33.33 percent) of the reported crashes was a Run-off-the-road / Hit-fixed-object crash.
- One (33.33 percent) of the reported crashes was a rear-end crash.
- One (33.33 percent) of the reported crashes involved a motor vehicle and a deer.

	Date	Time	MP	Type	Severity	Weather	Surface	Direction
1	1/16/2019	13:54	1.83	Rear-end	PDO	Cloudy	Dry	EB/EB
2	1/29/2019	6:09	2.17	Hit deer	PDO	Cloudy	Dry	EB
3	10/29/2019	23:53	2.07	ROR/HFO	PDO	Clear	Dry	WB
2019 Total Number of Crashes								3

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 ten (10) crashes were reported in 2019, and the following trends were identified:

- Three (30 percent) of the reported crashes resulted in personal injury.
- Seven (70 percent) of the reported crashes resulted in property-damage-only.
- Three (30 percent) of the reported crashes were head on crashes.
- Three (30 percent) of the reported crashes involved a motor vehicle and a deer.
- Two (20 percent) of the reported crashes were rear end crashes.
- Two (20 percent) of the reported crashes were Run-off-the-road / Hit-fixed-object crashes.

	Date	Time	MP	Type	Severity	Weather	Surface	Direction
1	1/30/2019	6:36	3.94	Head on	Injury	Clear	Ice	SB/NB
2	2/1/2019	17:00	1.79	Head on	PDO	Snow	Wet	NB/SB
3	2/20/2019	7:00	0.78	Hit deer	PDO	Cloudy	Dry	SB
4	2/23/2019	22:24	3.96	Head on	Injury	Rain	Wet	SB/NB
5	5/8/2019	1:19	3.15	ROR/HFO	Injury	Clear	Dry	NB
6	6/19/2019	3:10	N/A	ROR/HFO	PDO	Rain	Wet	NB
7	10/21/2019	8:09	1.35	Rear end	PDO	Clear	Dry	SBLT/SB
8	11/16/2019	21:22	2.32	Hit deer	PDO	Clear	Dry	SB
9	12/10/2019	17:00	1.75	Hit deer	PDO	Rain	Wet	NB
10	12/24/2019	13:26	0.42	Rear end	PDO	Clear	Dry	SB/SB
2019 Total Number of Crashes								10

HFO: Hit-fixed-object

ROR: Run-off the Road

PDO: Property Damage Only

Bunker Hill Road between Choptank Road and Middletown Warwick Road

A total of seven (7) crashes were reported in 2019, and the following trends were identified:

- Three (43 percent) of the reported crashes resulted in personal injury.
- Four (57 percent) of the reported crashes resulted in property-damage-only.
- Five (72 percent) of the reported crashes were angle crashes.
- One (14 percent) of the reported crashes was a head on crash.
- One (14 percent) of the reported crashes involved a motor vehicle and a pedestrian.

	Date	Time	MP	Type	Severity	Weather	Surface	Direction
1	1/5/2019	11:35	0.00	Angle	Injury	Rain	Wet	EB/NBLT
2	1/19/2019	14:19	2.54	Angle	PDO	Clear	Dry	EB/SB
3	2/20/2019	12:10	0.00	Angle	Injury	Snow	Snow	SB/WBRT
4	3/2/2019	14:21	2.55	Head-on	PDO	Cloudy	Wet	EB/WB
5	3/7/2019	14:45	2.54	Angle	PDO	Clear	Dry	WB/SB
6	8/5/2019	17:20	0.00	Angle	PDO	Clear	Dry	EB/NB
7	8/17/2019	15:44	2.54	Hit pedestrian	Injury	Clear	Dry	EB/WBLT
2019 Total Number of Crashes								7

HFO: Hit-fixed-object

ROR: Run-off the Road

PDO: Property Damage Only

SR1 between Roth Bridge and Tybouts Corner

A total of one hundred and thirty-six (136) crashes were reported in 2019, and the following trends were identified:

- Twenty-three (17 percent) of the reported crashes resulted in personal injury.
- One hundred and thirteen (83 percent) of the reported crashes resulted in property-damage-only.
- Fifty-seven (42 percent) of the reported crashes were rear-end crashes.
- Twenty-nine (21 percent) of the reported crashes were sideswipe-same direction crashes.
- Twenty-one (15 percent) of the reported crashes were Hit-fixed-object crashes.
- Twelve (9 percent) of the reported crashes involved a motor vehicle and debris on the roadway.
- Eleven (8 percent) of the reported crashes were Run-off-the-road / Hit-fixed-object crashes.
- Six (5 percent) of the reported crashes involved a motor vehicle and a deer.

	Date	Time	MP	Type	Severity	Weather	Surface	Direction
1	01/04/2019	10:13	5.41	Hit debris	PDO	Cloudy	Dry	SB
2	01/09/2019	15:14	3.80	HFO	PDO	Cloudy	Dry	SB
3	01/10/2019	6:25	4.00	Sideswipe, same	PDO	Clear	Dry	SB
4	01/10/2019	17:35	5.34	Rear-end	Injury	Clear	Dry	SB
5	01/11/2019	16:39	0.76	Rear-end	PDO	Clear	Dry	NB
6	01/13/2019	1:25	N/A	HFO	PDO	Snow	Ice/Frost	N/A
7	01/13/2019	7:13	N/A	HFO	PDO	Cloudy	Snow	N/A
8	01/18/2019	14:19	3.42	Sideswipe, same	PDO	Cloudy	Dry	NB
9	01/20/2019	9:43	3.68	ROR/HFO	PDO	Rain	Wet	SB
10	01/21/2019	7:54	1.65	Sideswipe, same	PDO	Severe Crosswinds	Dry	NB
11	01/28/2019	17:32	7.32	Rear-end	PDO	Clear	Dry	DB
12	02/01/2019	18:45	3.51	HFO	PDO	Snow	Wet	NB
13	02/01/2019	9:57	N/A	HFO	Injury	Snow	Snow	N/A
14	02/06/2019	22:58	3.67	ROR/HFO	PDO		Wet	SB
15	02/07/2019	7:21	5.11	Rear-end	PDO	Cloudy	Dry	NB
16	02/08/2019	18:53	0.64	Hit deer	PDO	Clear	Dry	NB
17	02/13/2019	6:20	5.41	Rear-end	PDO	Clear	Wet	NB
18	02/19/2019	6:54	1.83	Hit debris	PDO	Clear	Dry	NB
19	02/25/2019	14:42	1.85	Hit debris	PDO	Clear	Dry	NB
20	02/26/2019	6:42	5.28	Rear-end	PDO	Clear	Dry	NB
21	02/27/2019	19:23	6.89	Hit debris	PDO	Clear	Dry	SB
22	03/03/2019	22:31	3.67	ROR/HFO	PDO	Rain	Water (standing; moving)	SB
23	03/06/2019	3:10	N/A	HFO	PDO	Clear	Dry	N/A
24	03/06/2019		5.72	Hit debris	PDO	Clear	Dry	SB
25	03/06/2019	15:44	4.45	Rear-end	PDO	Clear	Dry	NB
26	03/07/2019	5:30	1.06	HFO	Injury	Cloudy	Dry	NB
27	03/18/2019	6:40	5.28	Rear-end	PDO	Clear	Dry	NB
28	03/22/2019	21:12	5.67	Rear-end	Injury	Clear	Dry	SB
29	03/22/2019	18:55	8.63	Sideswipe, same	PDO	Clear	Dry	SB
30	03/25/2019	6:55	4.67	Rear-end	PDO	Cloudy	Dry	NB
31	03/27/2019	20:29	8.04	Rear-end	PDO	Clear	Dry	SB
32	03/28/2019	7:40	7.09	Sideswipe, same	PDO	Clear	Dry	SB
33	03/28/2019	8:47	3.81	HFO	Injury	Clear	Dry	NB
34	03/31/2019	12:28	6.89	Rear-end	Injury	Cloudy	Dry	SB
35	04/01/2019	7:46	4.97	Rear-end	PDO	Clear	Dry	NB
36	04/07/2019	16:41	7.99	Rear-end	PDO	Cloudy	Dry	SB
37	04/13/2019	18:11	8.60	Sideswipe, same	Injury	Clear	Dry	SB
38	04/15/2019	14:32	8.43	Sideswipe, same	PDO	Cloudy	Dry	SB
39	04/16/2019	12:29	N/A	HFO	Injury	Clear	Dry	N/A
40	04/17/2019	15:35	3.98	Hit debris	PDO	Clear	Dry	NB
41	04/19/2019	5:44	N/A	HFO	PDO	Clear	Dry	N/A
42	04/19/2019	12:02	7.91	Rear-end	PDO	Cloudy	Dry	SB
43	04/20/2019	10:44	6.92	HFO	PDO	Rain	Wet	SB
44	04/21/2019	21:00	0.01	Sideswipe, same	PDO	Clear	Dry	NB
45	04/22/2019	18:08	0.02	Sideswipe, same	Injury	Clear	Dry	NB
46	04/25/2019	18:25	8.23	HFO	PDO	Clear	Dry	SB
47	04/30/2019	16:38	4.66	ROR/HFO	PDO	Clear	Dry	SB
48	05/01/2019	14:22	0.87	HFO	Injury	Clear	Dry	NB
49	05/06/2019	6:32	1.03	Sideswipe, same	PDO	Cloudy	Dry	NB
50	05/08/2019	4:32	7.68	Rear-end	Injury	Cloudy	Dry	SB
51	05/08/2019	6:32	2.16	Rear-end	PDO	Clear	Dry	NB
52	05/13/2019	16:09	3.92	Sideswipe, same	PDO	Cloudy	Dry	NB
53	05/16/2019	18:01	3.06	Sideswipe, same	PDO	Clear	Dry	NB
54	05/16/2019	8:12	8.56	Rear-end	PDO	Rain	Wet	SB

	Date	Time	MP	Type	Severity	Weather	Surface	Direction
55	05/16/2019	19:26	1.67	Rear-end	PDO	Clear	Dry	NB
56	05/18/2019	18:58	N/A	HFO	PDO	Clear	Dry	N/A
57	05/19/2019	14:30	4.54	Rear-end	Injury	Clear	Dry	NB
58	05/21/2019	6:50	4.99	Rear-end	Injury	Clear	Dry	NB
59	05/21/2019	14:34	1.55	Rear-end	Injury	Clear	Dry	NB
60	05/23/2019	6:15	N/A	Sideswipe, same	PDO	Clear	Dry	N/A
61	05/23/2019	6:35	4.77	Rear-end	Injury	Clear	Dry	NB
62	05/23/2019	9:24	5.48	Rear-end	PDO	Clear	Dry	NB
63	05/27/2019	12:30	8.53	Sideswipe, same	Injury	Clear	Dry	SB
64	06/04/2019	10:13	5.42	Rear-end	PDO	Clear	Dry	NB
65	06/10/2019	11:03	5.54	Rear-end	PDO	Rain	Wet	NB
66	06/13/2019	20:13	5.23	HFO	PDO	Rain	Wet	NB
67	06/25/2019	22:25	N/A	HFO	PDO	Cloudy	Dry	N/A
68	07/01/2019	3:39	N/A	Sideswipe, same	PDO	Clear	Dry	N/A
69	07/01/2019	11:49	0.25	Sideswipe, same	PDO	Clear	Dry	NB
70	07/01/2019	10:29	7.56	ROR/HFO	PDO	Clear	Dry	SB
71	07/03/2019	11:50	4.06	Sideswipe, same	PDO	Clear	Dry	SB
72	07/05/2019	13:28	N/A	ROR/HFO	PDO	Clear	Dry	N/S
73	07/05/2019	13:42	5.12	Rear-end	PDO	Clear	Dry	NB
74	07/07/2019	18:07	5.28	Rear-end	PDO	Clear	Dry	NB
75	07/17/2019	12:55	3.07	Sideswipe, same	Injury	Clear	Dry	NB
76	07/22/2019	11:19	5.64	Rear-end	PDO	Clear	Dry	SB
77	07/22/2019	15:57	N/A	ROR/HFO	Injury	Clear	Dry	N/A
78	07/25/2019	12:21	7.92	Rear-end	Injury	Clear	Dry	SB
79	07/29/2019	12:36	5.29	Rear-end	PDO	Clear	Dry	NB
80	08/01/2019	9:24	2.99	Hit debris	PDO	Clear	Dry	NB
81	08/04/2019	20:57	5.44	Rear-end	PDO	Clear	Dry	NB
82	08/11/2019	14:56	5.20	Rear-end	PDO	Clear	Dry	NB
83	08/12/2019	12:58	7.92	Hit debris	PDO	Cloudy	Dry	SB
84	08/15/2019	15:45	4.30	Rear-end	PDO	Clear	Dry	NB
85	08/19/2019	17:21	7.51	Rear-end	PDO	Clear	Dry	SB
86	08/21/2019	3:05	2.62	Rear-end	PDO	Clear	Dry	NB
87	08/22/2019	15:13	0.75	Sideswipe, same	PDO	Clear	Dry	NB
88	08/26/2019	18:15	5.37	Hit debris	PDO	Clear	Dry	NB
89	08/27/2019	7:00	5.27	Rear-end	PDO	Clear	Dry	NB
90	08/27/2019	6:54	5.37	Rear-end	PDO	Cloudy	Dry	NB
91	08/31/2019	16:11	2.44	Sideswipe, same	PDO	Clear	Dry	NB
92	09/06/2019	13:03	5.42	Rear-end	Injury	Rain	Wet	SB
93	09/06/2019	18:29	0.01	ROR/HFO	PDO	Rain	Wet	NB
94	09/09/2019	12:30	5.05	ROR/HFO	PDO	Clear	Dry	NB
95	09/10/2019	17:40	8.31	HFO	PDO	Clear	Dry	SB
96	09/18/2019	7:57	3.04	Rear-end	Injury	Clear	Dry	NB
97	09/25/2019	6:44	3.95	Rear-end	PDO	Clear	Dry	SB
98	09/29/2019	16:45	5.25	Rear-end	PDO	Clear	Dry	NB
99	10/01/2019	19:30	5.47	Hit debris	PDO	Cloudy	Dry	SB
100	10/02/2019	6:38	5.18	Sideswipe, same	PDO	Clear	Dry	NB
101	10/04/2019	8:20	2.17	Rear-end	Injury	Clear	Dry	NB
102	10/05/2019	0:54	0.22	HFO	PDO	Clear	Dry	NB
103	10/08/2019	14:13	4.12	Sideswipe, same	PDO	Cloudy	Dry	SB
104	10/09/2019	8:14	8.39	Rear-end	PDO	Rain	Wet	SB
105	10/10/2019	6:35	5.42	Rear-end	PDO	Clear	Dry	NB
106	10/13/2019	4:41	N/A	HFO	PDO	Clear	Dry	N/A
107	10/14/2019	22:50	8.50	HFO	PDO	Clear	Dry	SB
108	10/16/2019	22:10	8.01	Rear-end	PDO	Clear	Dry	SB

	Date	Time	MP	Type	Severity	Weather	Surface	Direction
109	10/18/2019	12:50	6.79	Rear-end	PDO	Clear	Dry	SB
110	10/27/2019	1:43	N/A	HFO	PDO	Clear	Dry	N/A
111	10/30/2019	7:09	4.76	Rear-end	Injury	Cloudy	Dry	NB
112	10/30/2019	7:09	5.11	Rear-end	PDO	Cloudy	Dry	NB
113	11/02/2019	1:57	4.42	Hit deer	PDO	Clear	Dry	SB
114	11/03/2019	5:52	8.25	Hit deer	PDO	Cloudy	Dry	SB
115	11/06/2019	22:55	7.72	Hit deer	PDO	Clear	Dry	SB
116	11/07/2019	12:01	8.56	Hit debris	PDO	Cloudy	Dry	SB
117	11/12/2019	18:41	N/A	Hit deer	PDO	Clear	Dry	N/A
118	11/12/2019	22:49	3.29	Rear-end	PDO	Clear	Dry	NB
119	11/22/2019	18:09	7.90	Rear-end	PDO	Cloudy	Dry	SB
120	11/23/2019	23:05	3.71	ROR/HFO	PDO	Rain	Wet	SB
121	11/25/2019	6:43	5.25	Rear-end	PDO	Clear	Dry	NB
122	11/25/2019	9:18	0.97	Sideswipe, same	PDO	Clear	Dry	NB
123	11/25/2019	3:35	5.71	Hit deer	PDO	Clear	Dry	SB
124	11/26/2019	18:30	5.30	Sideswipe, same	PDO	Clear	Dry	SB
125	12/04/2019	6:47	4.67	Rear-end	PDO	Rain	Wet	NB
126	12/05/2019	15:28	0.78	Sideswipe, same	PDO	Clear	Dry	NB
127	12/05/2019	22:28	0.72	Rear-end	PDO	Clear	Dry	NB
128	12/06/2019	21:32	3.66	Rear-end	PDO	Clear	Dry	SB
129	12/08/2019	20:54	5.05	Sideswipe, same	PDO	Clear	Dry	NB
130	12/12/2019	5:40	0.04	Rear-end	PDO	Clear	Dry	NB
131	12/13/2019	23:01	5.24	Sideswipe, same	PDO	Rain	Wet	NB
132	12/13/2019	22:51	N/A	ROR/HFO	PDO	Rain	Wet	N/A
133	12/17/2019	21:56	0.88	Hit debris	PDO	Clear	Dry	NB
134	12/18/2019	9:36	0.27	Rear-end	PDO	Clear	Dry	NB
135	12/18/2019	9:59	0.34	Sideswipe, same	PDO	Clear	Dry	NB
136	12/23/2019	11:11	0.05	Sideswipe, same	PDO	Clear	Dry	NB
2019 Total Number of Crashes								136

HFO: Hit-fixed-object

ROR: Run-off the Road

PDO: Property Damage Only

Summit Bridge Road at Bethel Church Road

A total of six (6) crashes were reported in 2019, and the following trends were identified:

- Two (33 percent) of the reported crashes resulted in personal injury.
- Four (67 percent) of the reported crashes resulted in property-damage-only.
- Three (50 percent) of the reported crashes were rear-end crashes.
- One (16.67 percent) of the reported crashes resulted in a vehicle rollover.
- One (16.67 percent) of the reported crashes was a Hit-fixed-object crash.
- One (16.67 percent) of the reported crashes was an angle crash.

	Date	Time	MP	Type	Severity	Weather	Surface	Direction
1	07/14/2019	9:17	2.14	Rear-end	PDO	Clear	Dry	NB/NB
2	07/23/2019	9:49	2.55	Angle	Injury	Rain	Wet	EB/SB
3	08/16/2019	10:08	2.57	Rear-end	PDO	Cloudy	Dry	NB/NB
4	09/14/2019	7:47	3.53	Overtuned vehicle	Injury	Cloudy	Dry	SBRT
5	10/01/2019	13:34	2.07	HFO	PDO	Clear	Dry	NBLT
6	11/24/2019	16:16	1.98	Rear-end	PDO	Cloudy	Dry	SB/SB
2019 Total Number of Crashes								6

HFO: Hit-fixed-object

ROR: Run-off the Road

PDO: Property Damage Only



Appendix D

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

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

Date	Location	Event	Duration	Roads used for Detour
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)**

Date	Location	Event	Duration	Roads used for Detour
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)**

Date	Location	Event	Duration	Roads used for Detour
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
1/4/2019	SR 1 SB / Christiana Bypass Underpass	Vehicle Crash – Maintenance of Traffic	8 Hours	Unknown
2/18/2019	SR 1 NB at Red Lion	Vehicle Crash – Maintenance of Traffic	1 Hour	Unknown
4/17/2019	SR 1 NB at Christiana Mall	Vehicle Crash – Maintenance of Traffic	1 Hour	Unknown

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

Date	Location	Event	Duration	Roads used for Detour
5/21/2019	SR 1 SB S/O SR 72	Vehicle Crash – Incident Report	1 Hour	Unknown
6/13/2019	SR 1 SB at Red Lion Creek	TMC – Traffic Control Dispatch	1 Hour	Unknown
8/5/2019	SR 1 NB at SR 273	Vehicle Crash – Incident Response	1 Hour	Unknown
10/10/2019	SR 1 SB at Exit 165	Vehicle Crash – Incident Response	1 Hour	Unknown
11/1/2019	SR 1 NB at SR 72	Vehicle Crash – Incident Response	3 Hours	Unknown
11/21/2019	SR 1 NB and SR 273	Incident Response	1 Hour	Unknown
12/21/2019	SR 1 NB / Christiana Bypass	TMC – Traffic Control Dispatch	1 Hour	Unknown
Total			197 Hours	

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

Date	Location	Event	Duration	Roads used for Detour
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)**

Date	Location	Event	Duration	Roads used for Detour
12/23/2015	US 301 south of Old School House Road	Vehicle Crash – Maintenance of Traffic	4 Hours	Unknown
1/25/2019	Summit Bridge Road at Marl Pit Road	Vehicle Crash – Maintenance of Traffic	15 Hours	Unknown
4/9/2019	Summit Bridge Road	TMC – Traffic Control Dispatch	1 Hour	Unknown
6/13/2019	Boyd's Corner Road / Cedar Lane Road	Vehicle Crash – Maintenance of Traffic	23 Hours	Unknown
7/1/2019	Boyd's Corner Road / US 13	Vehicle Crash – Maintenance of Traffic	2 Hours	Unknown
12/5/2019	Middletown Warwick Road	Vehicle Crash – Maintenance of Traffic	8 Hours	Unknown
12/14/2019	Summit Bridge Road / Bethel Church Road	Vehicle Crash – Maintenance of Traffic	8 Hours	Unknown
Total			124 Hours	



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



110 South Poplar Street
Wilmington, DE 19801

Loc: US 301 At Old Summit Bridge Rd
County: New Castle
Weather: Clear
Counter: RJM

File Name : (1) US 301 at Old Summit Bridge Road
Site Code : 00000001
Start Date : 10/8/2019
Page No : 2

Start Time	US-301 Summit Bridge Rd From North					Old Summit Bridge Rd From East					US-301 Summit Bridge Rd From South					From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 06:30 AM to 09:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	7	251	0	0	258	26	0	5	0	31	0	252	6	0	258	0	0	0	0	0	547
07:00 AM	7	205	0	1	213	17	0	2	0	19	0	334	7	0	341	0	0	0	0	0	573
07:15 AM	14	158	0	0	172	10	0	10	0	20	0	369	12	0	381	0	0	0	0	0	573
07:30 AM	16	200	0	0	216	7	0	3	0	10	0	353	10	0	363	0	0	0	0	0	589
Total Volume	44	814	0	1	859	60	0	20	0	80	0	1308	35	0	1343	0	0	0	0	0	2282
% App. Total	5.1	94.8	0	0.1		75	0	25	0		0	97.4	2.6	0		0	0	0	0		
PHF	.688	.811	.000	.250	.832	.577	.000	.500	.000	.645	.000	.886	.729	.000	.881	.000	.000	.000	.000	.000	.969
Vehicles	39	741	0	1	781	57	0	19	0	76	0	1267	34	0	1301	0	0	0	0	0	2158
% Vehicles	88.6	91.0	0	100	90.9	95.0	0	95.0	0	95.0	0	96.9	97.1	0	96.9	0	0	0	0	0	94.6
Heavy Vehicles	5	73	0	0	78	3	0	1	0	4	0	41	1	0	42	0	0	0	0	0	124
% Heavy Vehicles	11.4	9.0	0	0	9.1	5.0	0	5.0	0	5.0	0	3.1	2.9	0	3.1	0	0	0	0	0	5.4
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	21	296	0	0	317	11	0	8	0	19	0	210	16	0	226	0	0	0	0	0	562
05:15 PM	24	304	0	1	329	5	0	1	0	6	0	236	16	1	253	0	0	0	0	0	588
05:30 PM	17	318	0	0	335	5	0	5	0	10	0	236	16	0	252	0	0	0	0	0	597
05:45 PM	29	298	0	0	327	6	0	6	0	12	0	204	15	0	219	0	0	0	0	0	558
Total Volume	91	1216	0	1	1308	27	0	20	0	47	0	886	63	1	950	0	0	0	0	0	2305
% App. Total	7	93	0	0.1		57.4	0	42.6	0		0	93.3	6.6	0.1		0	0	0	0		
PHF	.784	.956	.000	.250	.976	.614	.000	.625	.000	.618	.000	.939	.984	.250	.939	.000	.000	.000	.000	.000	.965
Vehicles	91	1192	0	1	1284	27	0	20	0	47	0	860	61	1	922	0	0	0	0	0	2253
% Vehicles	100	98.0	0	100	98.2	100	0	100	0	100	0	97.1	96.8	100	97.1	0	0	0	0	0	97.7
Heavy Vehicles	0	24	0	0	24	0	0	0	0	0	0	26	2	0	28	0	0	0	0	0	52
% Heavy Vehicles	0	2.0	0	0	1.8	0	0	0	0	0	0	2.9	3.2	0	2.9	0	0	0	0	0	2.3



110 South Poplar Street
Wilmington, DE 19801

Loc: US 301 at Boyds Corner Rd
County: New Castle
Weather: Clear
Counter: RJM

File Name : (2) US 301 at SR 896 (Boyds Corner Rd)
Site Code : 00000006
Start Date : 10/8/2019
Page No : 2

Start Time	US-301 (Summit Bridge Rd) From North					SR 896 (Boyds Corner Rd) From East					US-301 (Summit Bridge Rd) From South					Churchtown Rd From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 06:30 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	100	129	4	0	233	27	21	98	6	152	1	213	24	0	238	25	36	3	0	64	687
07:15 AM	63	104	0	0	167	28	1	123	5	157	0	230	27	0	257	16	35	1	0	52	633
07:30 AM	52	128	0	0	180	31	11	128	5	175	1	218	20	0	239	19	36	12	0	67	661
07:45 AM	79	145	5	0	229	28	6	106	2	142	1	200	30	0	231	9	24	6	0	39	641
Total Volume	294	506	9	0	809	114	39	455	18	626	3	861	101	0	965	69	131	22	0	222	2622
% App. Total	36.3	62.5	1.1	0		18.2	6.2	72.7	2.9		0.3	89.2	10.5	0		31.1	59	9.9	0		
PHF	.735	.872	.450	.000	.868	.919	.464	.889	.750	.894	.750	.936	.842	.000	.939	.690	.910	.458	.000	.828	.954
Vehicles	268	457	6	0	731	107	38	427	18	590	2	823	87	0	912	66	121	20	0	207	2440
% Vehicles	91.2	90.3	66.7	0	90.4	93.9	97.4	93.8	100	94.2	66.7	95.6	86.1	0	94.5	95.7	92.4	90.9	0	93.2	93.1
Heavy Vehicles	26	49	3	0	78	7	1	28	0	36	1	38	14	0	53	3	10	2	0	15	182
% Heavy Vehicles	8.8	9.7	33.3	0	9.6	6.1	2.6	6.2	0	5.8	33.3	4.4	13.9	0	5.5	4.3	7.6	9.1	0	6.8	6.9
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	135	191	19	0	345	30	18	91	3	142	3	171	33	1	208	11	18	5	0	34	729
04:45 PM	121	180	16	0	317	51	25	71	4	151	5	156	27	0	188	17	17	5	0	39	695
05:00 PM	126	221	7	0	354	46	32	73	0	151	11	170	22	0	203	20	13	6	0	39	747
05:15 PM	119	207	17	0	343	42	38	86	2	168	4	136	31	0	171	13	8	5	0	26	708
Total Volume	501	799	59	0	1359	169	113	321	9	612	23	633	113	1	770	61	56	21	0	138	2879
% App. Total	36.9	58.8	4.3	0		27.6	18.5	52.5	1.5		3	82.2	14.7	0.1		44.2	40.6	15.2	0		
PHF	.928	.904	.776	.000	.960	.828	.743	.882	.563	.911	.523	.925	.856	.250	.925	.763	.778	.875	.000	.885	.964
Vehicles	490	776	58	0	1324	158	109	302	9	578	22	593	102	1	718	59	51	21	0	131	2751
% Vehicles	97.8	97.1	98.3	0	97.4	93.5	96.5	94.1	100	94.4	95.7	93.7	90.3	100	93.2	96.7	91.1	100	0	94.9	95.6
Heavy Vehicles	11	23	1	0	35	11	4	19	0	34	1	40	11	0	52	2	5	0	0	7	128
% Heavy Vehicles	2.2	2.9	1.7	0	2.6	6.5	3.5	5.9	0	5.6	4.3	6.3	9.7	0	6.8	3.3	8.9	0	0	5.1	4.4



110 South Poplar Street
Wilmington, DE 19801

Location: Summit Bridge Rd at Connector
County: New Castle
Weather: Clear
Counter: RMF

File Name : Summit Bridge Rd@Connector Rd
Site Code : 08013.22
Start Date : 10/17/2019
Page No : 2

Start Time	Summit Bridge Road From North					Cooper Wilbur Vault Entrance From East					Summit Bridge Road From South					Connector Road From West					Int. Total
	Left	Thru	Right	U-turn	App. Total	Left	Thru	Right	U-turn	App. Total	Left	Thru	Right	U-turn	App. Total	Left	Thru	Right	U-turn	App. Total	
Peak Hour Analysis From 06:30 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	1	229	8	0	238	0	1	0	0	1	65	218	0	0	283	3	0	28	0	31	553
07:00 AM	0	160	10	0	170	0	0	0	0	0	66	280	1	0	347	9	0	26	0	35	552
07:15 AM	0	196	16	0	212	0	0	0	0	0	88	331	0	0	419	8	0	23	0	31	662
07:30 AM	0	162	9	0	171	0	0	1	0	1	66	287	0	0	353	7	0	29	1	37	562
Total Volume	1	747	43	0	791	0	1	1	0	2	285	1116	1	0	1402	27	0	106	1	134	2329
% App. Total	0.1	94.4	5.4	0		0	50	50	0		20.3	79.6	0.1	0		20.1	0	79.1	0.7		
PHF	.250	.816	.672	.000	.831	.000	.250	.250	.000	.500	.810	.843	.250	.000	.837	.750	.000	.914	.250	.905	.880
Vehicles	1	702	39	0	742	0	0	1	0	1	282	1051	1	0	1334	19	0	93	1	113	2190
% Vehicles	100	94.0	90.7	0	93.8	0	0	100	0	50.0	98.9	94.2	100	0	95.1	70.4	0	87.7	100	84.3	94.0
Heavy Vehicles	0	45	4	0	49	0	1	0	0	1	3	65	0	0	68	8	0	13	0	21	139
% Heavy Vehicles	0	6.0	9.3	0	6.2	0	100	0	0	50.0	1.1	5.8	0	0	4.9	29.6	0	12.3	0	15.7	6.0
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	0	262	11	0	273	0	0	0	0	0	32	200	1	1	234	3	0	80	0	83	590
05:00 PM	1	239	12	0	252	1	0	0	0	1	26	225	0	0	251	10	0	78	0	88	592
05:15 PM	0	251	7	0	258	1	0	1	0	2	32	199	1	0	232	10	0	75	0	85	577
05:30 PM	0	290	15	1	306	0	0	0	0	0	28	191	0	1	220	7	0	46	0	53	579
Total Volume	1	1042	45	1	1089	2	0	1	0	3	118	815	2	2	937	30	0	279	0	309	2338
% App. Total	0.1	95.7	4.1	0.1		66.7	0	33.3	0		12.6	87	0.2	0.2		9.7	0	90.3	0		
PHF	.250	.898	.750	.250	.890	.500	.000	.250	.000	.375	.922	.906	.500	.500	.933	.750	.000	.872	.000	.878	.987
Vehicles	1	1012	43	1	1057	2	0	1	0	3	112	787	2	2	903	24	0	277	0	301	2264
% Vehicles	100	97.1	95.6	100	97.1	100	0	100	0	100	94.9	96.6	100	100	96.4	80.0	0	99.3	0	97.4	96.8
Heavy Vehicles	0	30	2	0	32	0	0	0	0	0	6	28	0	0	34	6	0	2	0	8	74
% Heavy Vehicles	0	2.9	4.4	0	2.9	0	0	0	0	0	5.1	3.4	0	0	3.6	20.0	0	0.7	0	2.6	3.2



110 South Poplar Street
Wilmington, DE 19801

Loc: Summit Bridge Rd at Marl Pit/Armstr
County: New Castle
Weather: Clear
Counters: RJM

File Name : (3) Existing US 301 at Armstrong Corner Rd
Site Code : 00003002
Start Date : 10/8/2019
Page No : 2

Start Time	US 301 (Summit Bridge Rd) From North					Marl Pit Rd From East					US 301 (Summit Bridge Rd) From South					Armstrong Corner Rd From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 06:30 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	4	206	18	0	228	6	10	13	0	29	20	207	12	0	239	23	14	62	0	99	595
07:00 AM	5	232	10	0	247	9	17	18	0	44	27	150	8	0	185	28	15	65	0	108	584
07:15 AM	4	248	10	1	263	6	12	16	0	34	24	152	1	0	177	15	10	84	0	109	583
07:30 AM	24	151	4	0	179	15	10	64	0	89	5	229	2	2	238	5	17	6	0	28	534
Total Volume	37	837	42	1	917	36	49	111	0	196	76	738	23	2	839	71	56	217	0	344	2296
% App. Total	4	91.3	4.6	0.1		18.4	25	56.6	0		9.1	88	2.7	0.2		20.6	16.3	63.1	0		
PHF	.385	.844	.583	.250	.872	.600	.721	.434	.000	.551	.704	.806	.479	.250	.878	.634	.824	.646	.000	.789	.965
Light Vehicles	33	800	37	1	871	34	46	107	0	187	68	692	22	2	784	67	51	213	0	331	2173
% Light Vehicles	89.2	95.6	88.1	100	95.0	94.4	93.9	96.4	0	95.4	89.5	93.8	95.7	100	93.4	94.4	91.1	98.2	0	96.2	94.6
Heavy Vehicles	4	37	5	0	46	2	3	4	0	9	8	46	1	0	55	4	5	4	0	13	123
% Heavy Vehicles	10.8	4.4	11.9	0	5.0	5.6	6.1	3.6	0	4.6	10.5	6.2	4.3	0	6.6	5.6	8.9	1.8	0	3.8	5.4
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	46	253	9	0	308	26	20	21	0	67	11	155	29	1	196	6	20	16	0	42	613
05:15 PM	57	285	7	0	349	23	14	24	0	61	13	169	20	0	202	5	18	10	0	33	645
05:30 PM	51	260	7	0	318	27	16	33	0	76	9	182	25	0	216	4	20	13	0	37	647
05:45 PM	63	294	8	0	365	30	9	14	1	54	9	184	12	0	205	3	10	14	0	27	651
Total Volume	217	1092	31	0	1340	106	59	92	1	258	42	690	86	1	819	18	68	53	0	139	2556
% App. Total	16.2	81.5	2.3	0		41.1	22.9	35.7	0.4		5.1	84.2	10.5	0.1		12.9	48.9	38.1	0		
PHF	.861	.929	.861	.000	.918	.883	.738	.697	.250	.849	.808	.938	.741	.250	.948	.750	.850	.828	.000	.827	.982
Light Vehicles	217	1073	28	0	1318	102	59	92	1	254	41	665	83	1	790	17	66	53	0	136	2498
% Light Vehicles	100	98.3	90.3	0	98.4	96.2	100	100	100	98.4	97.6	96.4	96.5	100	96.5	94.4	97.1	100	0	97.8	97.7
Heavy Vehicles	0	19	3	0	22	4	0	0	0	4	1	25	3	0	29	1	2	0	0	3	58
% Heavy Vehicles	0	1.7	9.7	0	1.6	3.8	0	0	0	1.6	2.4	3.6	3.5	0	3.5	5.6	2.9	0	0	2.2	2.3



110 South Poplar Street
Wilmington, DE 19801

Loc: US 301 at SR 71 (Broad St)
County: New Castle
Weather: Clear
Counter: RJM

File Name : (4) Existing US 301 at SR 71
Site Code : 10151901
Start Date : 10/15/2019
Page No : 2

Start Time	US 301 (Summit Bridge Rd) From North					SR 71 (Broad St) From East					US 301 (Middletown Warwick Rd) From South					From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 06:30 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	65	131	0	0	196	78	0	98	0	176	0	137	27	0	164	0	0	0	0	0	536
07:00 AM	62	135	0	0	197	51	0	111	0	162	0	171	32	0	203	0	0	0	0	0	562
07:15 AM	46	119	0	0	165	40	0	141	0	181	0	164	34	0	198	0	0	0	0	0	544
07:30 AM	48	105	0	0	153	30	0	84	0	114	0	155	21	0	176	0	0	0	0	0	443
Total Volume	221	490	0	0	711	199	0	434	0	633	0	627	114	0	741	0	0	0	0	0	2085
% App. Total	31.1	68.9	0	0		31.4	0	68.6	0		0	84.6	15.4	0		0	0	0	0	0	
PHF	.850	.907	.000	.000	.902	.638	.000	.770	.000	.874	.000	.917	.838	.000	.913	.000	.000	.000	.000	.000	.927
Vehicles	209	449	0	0	658	188	0	420	0	608	0	593	109	0	702	0	0	0	0	0	1968
% Vehicles	94.6	91.6	0	0	92.5	94.5	0	96.8	0	96.1	0	94.6	95.6	0	94.7	0	0	0	0	0	94.4
Heavy Vehicles	12	41	0	0	53	11	0	14	0	25	0	34	5	0	39	0	0	0	0	0	117
% Heavy Vehicles	5.4	8.4	0	0	7.5	5.5	0	3.2	0	3.9	0	5.4	4.4	0	5.3	0	0	0	0	0	5.6
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	88	183	0	0	271	66	0	79	0	145	0	144	65	0	209	0	0	0	0	0	625
04:30 PM	124	171	0	0	295	55	0	81	0	136	0	132	62	0	194	0	0	0	0	0	625
04:45 PM	90	175	0	0	265	68	0	67	0	135	0	133	80	0	213	0	0	0	0	0	613
05:00 PM	94	158	0	0	252	66	0	69	0	135	0	142	85	0	227	0	0	0	0	0	614
Total Volume	396	687	0	0	1083	255	0	296	0	551	0	551	292	0	843	0	0	0	0	0	2477
% App. Total	36.6	63.4	0	0		46.3	0	53.7	0		0	65.4	34.6	0		0	0	0	0	0	
PHF	.798	.939	.000	.000	.918	.938	.000	.914	.000	.950	.000	.957	.859	.000	.928	.000	.000	.000	.000	.000	.991
Vehicles	384	658	0	0	1042	247	0	275	0	522	0	509	289	0	798	0	0	0	0	0	2362
% Vehicles	97.0	95.8	0	0	96.2	96.9	0	92.9	0	94.7	0	92.4	99.0	0	94.7	0	0	0	0	0	95.4
Heavy Vehicles	12	29	0	0	41	8	0	21	0	29	0	42	3	0	45	0	0	0	0	0	115
% Heavy Vehicles	3.0	4.2	0	0	3.8	3.1	0	7.1	0	5.3	0	7.6	1.0	0	5.3	0	0	0	0	0	4.6



110 South Poplar Street
Wilmington, DE 19801

Loc: US 301 at SR 299
County: New Castle
Weather: Clear
Counter: RJM

File Name : (5) Existing US 301 at SR 299
Site Code : 10151920
Start Date : 10/15/2019
Page No : 2

Start Time	US 301 (Middletown Warwick Rd) From North					W Main St From East					US 301 (Middletown Warwick Rd) From South					Bunker Hill Rd From West					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
Peak Hour Analysis From 06:30 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	33	112	29	0	174	44	55	24	0	123	30	64	21	1	116	11	52	3	1	67	480
07:00 AM	44	81	61	6	192	29	64	18	0	111	38	81	36	0	155	32	58	2	0	92	550
07:15 AM	19	77	18	4	118	46	45	22	0	113	17	59	14	0	90	37	74	14	0	125	446
07:30 AM	33	74	21	4	132	35	38	19	0	92	13	83	15	0	111	26	62	12	0	100	435
Total Volume	129	344	129	14	616	154	202	83	0	439	98	287	86	1	472	106	246	31	1	384	1911
% App. Total	20.9	55.8	20.9	2.3		35.1	46	18.9	0		20.8	60.8	18.2	0.2		27.6	64.1	8.1	0.3		
PHF	.733	.768	.529	.583	.802	.837	.789	.865	.000	.892	.645	.864	.597	.250	.761	.716	.831	.554	.250	.768	.869
Vehicles	116	317	118	14	565	143	197	75	0	415	96	264	81	1	442	100	233	30	1	364	1786
% Vehicles	89.9	92.2	91.5	100	91.7	92.9	97.5	90.4	0	94.5	98.0	92.0	94.2	100	93.6	94.3	94.7	96.8	100	94.8	93.5
Heavy Vehicles	13	27	11	0	51	11	5	8	0	24	2	23	5	0	30	6	13	1	0	20	125
% Heavy Vehicles	10.1	7.8	8.5	0	8.3	7.1	2.5	9.6	0	5.5	2.0	8.0	5.8	0	6.4	5.7	5.3	3.2	0	5.2	6.5
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	30	132	19	5	186	69	45	26	0	140	25	101	68	0	194	43	88	10	0	141	661
04:30 PM	48	116	18	9	191	99	68	14	0	181	19	146	61	0	226	37	64	14	1	116	714
04:45 PM	45	129	26	3	203	87	53	20	0	160	31	117	39	0	187	32	74	11	0	117	667
05:00 PM	41	110	18	7	176	66	47	16	0	129	23	150	47	1	221	45	65	7	0	117	643
Total Volume	164	487	81	24	756	321	213	76	0	610	98	514	215	1	828	157	291	42	1	491	2685
% App. Total	21.7	64.4	10.7	3.2		52.6	34.9	12.5	0		11.8	62.1	26	0.1		32	59.3	8.6	0.2		
PHF	.854	.922	.779	.667	.931	.811	.783	.731	.000	.843	.790	.857	.790	.250	.916	.872	.827	.750	.250	.871	.940
Vehicles	155	458	80	24	717	319	209	72	0	600	97	483	210	1	791	153	289	42	1	485	2593
% Vehicles	94.5	94.0	98.8	100	94.8	99.4	98.1	94.7	0	98.4	99.0	94.0	97.7	100	95.5	97.5	99.3	100	100	98.8	96.6
Heavy Vehicles	9	29	1	0	39	2	4	4	0	10	1	31	5	0	37	4	2	0	0	6	92
% Heavy Vehicles	5.5	6.0	1.2	0	5.2	0.6	1.9	5.3	0	1.6	1.0	6.0	2.3	0	4.5	2.5	0.7	0	0	1.2	3.4

Lanes, Volumes, Timings
 2: US 301 & Bunker Hill Rd/West Main St

04/08/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Permitted Phases			8			4			2			
Detector Phase	3	8	8	7	4	4	5	2	2	1	1	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	5.0	15.0
Minimum Split (s)	10.0	11.0	11.0	10.0	11.0	11.0	10.0	22.0	22.0	10.0	10.0	22.0
Total Split (s)	24.0	32.0	32.0	20.0	28.0	28.0	20.0	43.0	43.0	25.0	25.0	48.0
Total Split (%)	20.0%	26.7%	26.7%	16.7%	23.3%	23.3%	16.7%	35.8%	35.8%	20.8%	20.8%	40.0%
Maximum Green (s)	19.0	26.0	26.0	15.0	22.0	22.0	15.0	36.0	36.0	20.0	20.0	41.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0	5.0	3.0	3.0	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
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
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	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	3.0	4.0
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	None	C-Min
Act Effct Green (s)	12.8	17.6	17.6	11.7	16.5	16.5	14.1	44.1	44.1		23.6	53.6
Actuated g/C Ratio	0.11	0.15	0.15	0.10	0.14	0.14	0.12	0.37	0.37		0.20	0.45
v/c Ratio	0.59	0.63	0.12	0.55	0.47	0.45	0.64	0.47	0.18		0.77	0.41
Control Delay	57.7	53.5	0.7	57.8	50.4	11.6	63.9	32.4	5.7		60.6	33.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	57.7	53.5	0.7	57.8	50.4	11.6	63.9	32.4	5.7		60.6	33.7
LOS	E	D	A	E	D	B	E	C	A		E	C
Approach Delay		51.4			42.4			33.8				35.0
Approach LOS		D			D			C				C

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 117 (98%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 39.1
 Intersection LOS: D
 Intersection Capacity Utilization 55.4%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 2: US 301 & Bunker Hill Rd/West Main St





Lane Group	SBR
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	15.0
Minimum Split (s)	22.0
Total Split (s)	48.0
Total Split (%)	40.0%
Maximum Green (s)	41.0
Yellow Time (s)	5.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	7.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	4.0
Recall Mode	C-Min
Act Effct Green (s)	53.6
Actuated g/C Ratio	0.45
v/c Ratio	0.29
Control Delay	10.8
Queue Delay	0.0
Total Delay	10.8
LOS	B
Approach Delay	
Approach LOS	
Intersection Summary	

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

04/08/2020

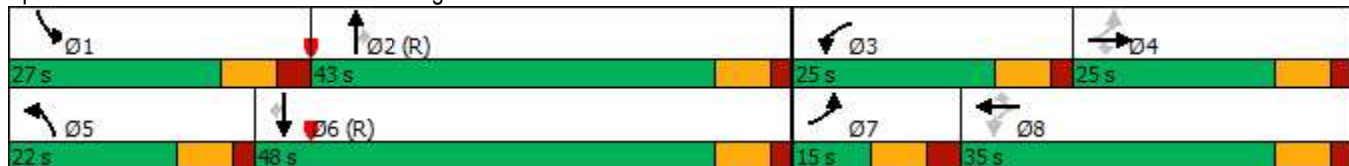


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	13.0	12.0	12.0	12.0	12.0	12.0	12.0	22.0	22.0	13.0	22.0	22.0
Total Split (s)	15.0	25.0	25.0	25.0	35.0	35.0	22.0	43.0	43.0	27.0	48.0	48.0
Total Split (%)	12.5%	20.8%	20.8%	20.8%	29.2%	29.2%	18.3%	35.8%	35.8%	22.5%	40.0%	40.0%
Maximum Green (s)	7.0	18.0	18.0	18.0	28.0	28.0	15.0	36.0	36.0	19.0	41.0	41.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0	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)	8.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	8.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	6.0	6.0	3.0	6.0	6.0
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	19.7	15.1	15.1	22.5	13.5	13.5	11.6	67.1	67.1	8.0	61.7	61.7
Actuated g/C Ratio	0.16	0.13	0.13	0.19	0.11	0.11	0.10	0.56	0.56	0.07	0.51	0.51
v/c Ratio	0.50	0.32	0.62	0.24	0.45	0.65	0.54	0.58	0.03	0.31	0.46	0.05
Control Delay	46.7	53.0	12.4	36.9	55.6	13.2	44.0	34.1	0.0	74.9	4.3	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	46.7	53.0	12.4	36.9	55.6	13.2	44.0	34.1	0.0	74.9	4.3	0.1
LOS	D	D	B	D	E	B	D	C	A	E	A	A
Approach Delay		27.2			26.0			34.0			6.8	
Approach LOS		C			C			C			A	

Intersection Summary

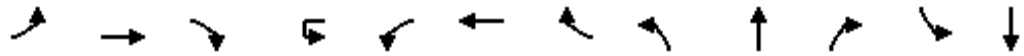
Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 107 (89%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 23.6
 Intersection LOS: C
 Intersection Capacity Utilization 61.0%
 ICU Level of Service B
 Analysis Period (min) 15

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



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

04/08/2020

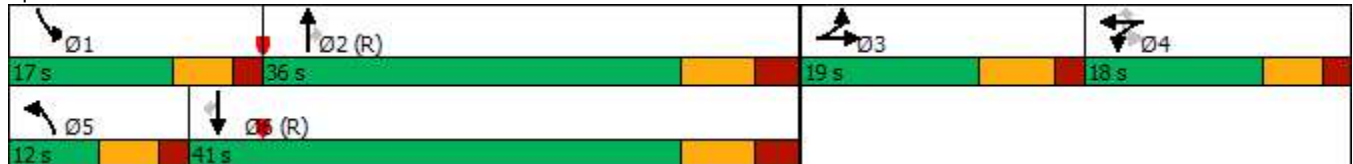


Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Permitted Phases				4			4			2		
Detector Phase	3	3		4	4	4	4	5	2	2	1	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		10.0	10.0	10.0	10.0	5.0	20.0	20.0	5.0	20.0
Minimum Split (s)	12.0	12.0		16.0	16.0	16.0	16.0	11.0	28.0	28.0	11.0	28.0
Total Split (s)	19.0	19.0		18.0	18.0	18.0	18.0	12.0	36.0	36.0	17.0	41.0
Total Split (%)	21.1%	21.1%		20.0%	20.0%	20.0%	20.0%	13.3%	40.0%	40.0%	18.9%	45.6%
Maximum Green (s)	12.0	12.0		12.0	12.0	12.0	12.0	6.0	28.0	28.0	11.0	33.0
Yellow Time (s)	5.0	5.0		4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	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	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
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes					
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0
Recall Mode	None	None		None	None	None	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	11.7	11.7			12.6	12.6	12.6	6.0	27.7	27.7	11.0	42.3
Actuated g/C Ratio	0.13	0.13			0.14	0.14	0.14	0.07	0.31	0.31	0.12	0.47
v/c Ratio	0.37	0.79			0.55	0.22	1.05	0.06	0.85	0.16	0.88	0.42
Control Delay	40.9	61.4			43.9	37.3	74.9	40.8	38.0	0.6	63.7	14.6
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.9	61.4			43.9	37.3	74.9	40.8	38.0	0.6	63.7	14.6
LOS	D	E			D	D	E	D	D	A	E	B
Approach Delay		54.9				64.3			34.6			31.3
Approach LOS		D				E			C			C

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 9 (10%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.05
 Intersection Signal Delay: 42.4 Intersection LOS: D
 Intersection Capacity Utilization 71.5% ICU Level of Service C
 Analysis Period (min) 15

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





Lane Group	SBR
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	20.0
Minimum Split (s)	28.0
Total Split (s)	41.0
Total Split (%)	45.6%
Maximum Green (s)	33.0
Yellow Time (s)	5.0
All-Red Time (s)	3.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	8.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	5.0
Recall Mode	C-Min
Act Effct Green (s)	42.3
Actuated g/C Ratio	0.47
v/c Ratio	0.02
Control Delay	0.0
Queue Delay	0.0
Total Delay	0.0
LOS	A
Approach Delay	
Approach LOS	
Intersection Summary	

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

04/08/2020

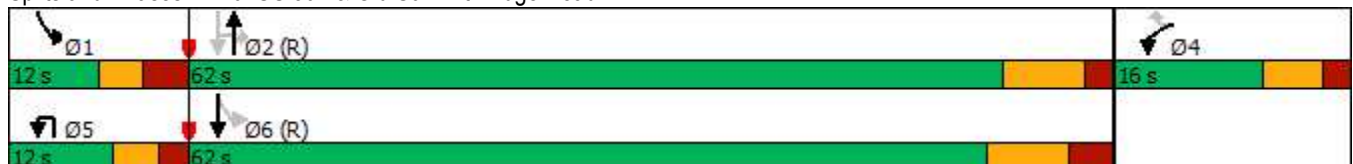


Lane Group	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Protected Phases	4		5	2		1	6
Permitted Phases		4	2		2	6	2
Detector Phase	4	4	5	2	2	1	6
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	15.0	15.0	5.0	15.0
Minimum Split (s)	11.0	11.0	10.0	23.5	23.5	11.0	23.5
Total Split (s)	16.0	16.0	12.0	62.0	62.0	12.0	62.0
Total Split (%)	17.8%	17.8%	13.3%	68.9%	68.9%	13.3%	68.9%
Maximum Green (s)	10.0	10.0	7.0	54.5	54.5	6.0	53.5
Yellow Time (s)	4.0	4.0	3.0	5.5	5.5	3.0	5.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	5.0	7.5	7.5	6.0	8.5
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)	9.3	9.3		61.7	61.7	71.3	70.5
Actuated g/C Ratio	0.10	0.10		0.69	0.69	0.79	0.78
v/c Ratio	0.52	0.18		0.62	0.04	0.22	0.38
Control Delay	48.7	15.9		6.0	0.9	4.9	4.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	48.7	15.9		6.0	0.9	4.9	4.6
LOS	D	B		A	A	A	A
Approach Delay	40.5			5.8			4.6
Approach LOS	D			A			A

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 4 (4%), Referenced to phase 2:NBSB and 6:SBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.62
 Intersection Signal Delay: 6.9
 Intersection LOS: A
 Intersection Capacity Utilization 53.6%
 ICU Level of Service A
 Analysis Period (min) 15

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



Lanes, Volumes, Timings

26: US 301 & Connector Road/Cooper Wilbur Vault Entrance

04/08/2020

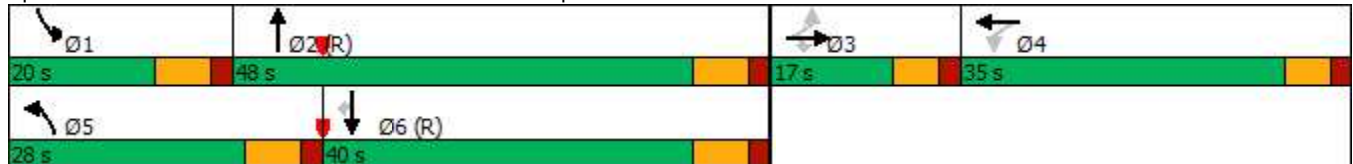


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	3		3	4								6
Detector Phase	3	3	3	4	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	15.0		5.0	15.0	15.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		12.0	22.0		12.0	22.0	22.0
Total Split (s)	17.0	17.0	17.0	35.0	35.0		28.0	48.0		20.0	40.0	40.0
Total Split (%)	14.2%	14.2%	14.2%	29.2%	29.2%		23.3%	40.0%		16.7%	33.3%	33.3%
Maximum Green (s)	11.0	11.0	11.0	29.0	29.0		21.0	41.0		13.0	33.0	33.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		5.0	5.0		5.0	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	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0		7.0	7.0		7.0	7.0	7.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	5.0		3.0	5.0	5.0
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	C-Min
Act Effct Green (s)	9.0	9.0	9.0		8.6		33.5	85.6		6.0	47.9	47.9
Actuated g/C Ratio	0.08	0.08	0.08		0.07		0.28	0.71		0.05	0.40	0.40
v/c Ratio	0.28	0.25	0.37		0.32		0.68	0.45		0.07	0.60	0.07
Control Delay	67.1	61.8	3.4		47.2		54.8	10.9		55.6	32.8	0.2
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	67.1	61.8	3.4		47.2		54.8	10.9		55.6	32.8	0.2
LOS	E	E	A		D		D	B		E	C	A
Approach Delay		15.0			47.2			21.3			31.2	
Approach LOS		B			D			C			C	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 97 (81%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 24.7
 Intersection LOS: C
 Intersection Capacity Utilization 56.3%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 26: US 301 & Connector Road/Cooper Wilbur Vault Entrance



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

04/08/2020

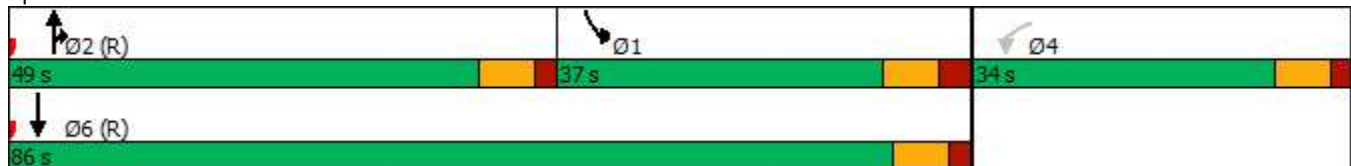


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	4	Free				
Detector Phase	4		2	2	1	6
Switch Phase						
Minimum Initial (s)	6.0		15.0	15.0	8.0	15.0
Minimum Split (s)	13.0		25.0	25.0	19.0	25.0
Total Split (s)	34.0		49.0	49.0	37.0	86.0
Total Split (%)	28.3%		40.8%	40.8%	30.8%	71.7%
Maximum Green (s)	27.0		42.0	42.0	29.0	79.0
Yellow Time (s)	5.0		5.0	5.0	5.0	5.0
All-Red Time (s)	2.0		2.0	2.0	3.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0		7.0	7.0	8.0	7.0
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)	21.7	120.0	49.4	49.4	26.9	84.3
Actuated g/C Ratio	0.18	1.00	0.41	0.41	0.22	0.70
v/c Ratio	0.75	0.32	0.93	0.20	0.86	0.60
Control Delay	61.2	0.5	47.4	18.5	62.3	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.2	0.5	47.4	18.5	62.3	6.9
LOS	E	A	D	B	E	A
Approach Delay	19.5		42.9			24.0
Approach LOS	B		D			C

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 66 (55%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 28.6
 Intersection LOS: C
 Intersection Capacity Utilization 79.2%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 30: US 301 & SR 71



Lanes, Volumes, Timings
 2: US 301 & Bunker Hill Rd/West Main St

04/08/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Permitted Phases			8			4			2			
Detector Phase	3	8	8	7	4	4	5	2	2	1	1	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	5.0	15.0
Minimum Split (s)	10.0	11.0	11.0	10.0	11.0	11.0	10.0	22.0	22.0	10.0	10.0	22.0
Total Split (s)	24.0	32.0	32.0	20.0	28.0	28.0	20.0	43.0	43.0	25.0	25.0	48.0
Total Split (%)	20.0%	26.7%	26.7%	16.7%	23.3%	23.3%	16.7%	35.8%	35.8%	20.8%	20.8%	40.0%
Maximum Green (s)	19.0	26.0	26.0	15.0	22.0	22.0	15.0	36.0	36.0	20.0	20.0	41.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0	5.0	3.0	3.0	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
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
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead	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	3.0	4.0
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	None	C-Min
Act Effct Green (s)	12.4	16.6	16.6	13.8	18.1	18.1	11.9	43.4	43.4		23.2	54.7
Actuated g/C Ratio	0.10	0.14	0.14	0.12	0.15	0.15	0.10	0.36	0.36		0.19	0.46
v/c Ratio	0.57	0.61	0.16	0.70	0.38	0.18	0.56	0.62	0.32		0.77	0.48
Control Delay	57.6	53.6	1.0	60.9	47.6	1.1	62.9	35.9	5.3		63.1	33.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	57.6	53.6	1.0	60.9	47.6	1.1	62.9	35.9	5.3		63.1	33.7
LOS	E	D	A	E	D	A	E	D	A		E	C
Approach Delay		50.1			49.3			31.9				38.5
Approach LOS		D			D			C				D

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 117 (98%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 40.1
 Intersection LOS: D
 Intersection Capacity Utilization 65.6%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 2: US 301 & Bunker Hill Rd/West Main St





Lane Group	SBR
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	15.0
Minimum Split (s)	22.0
Total Split (s)	48.0
Total Split (%)	40.0%
Maximum Green (s)	41.0
Yellow Time (s)	5.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	7.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	4.0
Recall Mode	C-Min
Act Effct Green (s)	54.7
Actuated g/C Ratio	0.46
v/c Ratio	0.10
Control Delay	6.0
Queue Delay	0.0
Total Delay	6.0
LOS	A
Approach Delay	
Approach LOS	
Intersection Summary	

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

04/08/2020

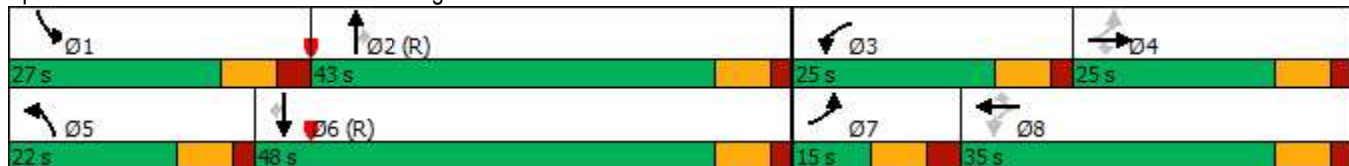


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	13.0	12.0	12.0	12.0	12.0	12.0	12.0	22.0	22.0	13.0	22.0	22.0
Total Split (s)	15.0	25.0	25.0	25.0	35.0	35.0	22.0	43.0	43.0	27.0	48.0	48.0
Total Split (%)	12.5%	20.8%	20.8%	20.8%	29.2%	29.2%	18.3%	35.8%	35.8%	22.5%	40.0%	40.0%
Maximum Green (s)	7.0	18.0	18.0	18.0	28.0	28.0	15.0	36.0	36.0	19.0	41.0	41.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0	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)	8.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	8.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	6.0	6.0	3.0	6.0	6.0
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	17.2	11.7	11.7	30.2	22.0	22.0	8.3	48.1	48.1	19.0	62.3	62.3
Actuated g/C Ratio	0.14	0.10	0.10	0.25	0.18	0.18	0.07	0.40	0.40	0.16	0.52	0.52
v/c Ratio	0.12	0.47	0.18	0.40	0.20	0.26	0.34	0.55	0.12	0.74	0.58	0.04
Control Delay	33.5	58.9	1.1	38.1	43.8	2.3	33.7	48.0	4.4	79.4	10.1	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	33.5	58.9	1.1	38.1	43.8	2.3	33.7	48.0	4.4	79.4	10.1	0.1
LOS	C	E	A	D	D	A	C	D	A	E	B	A
Approach Delay		33.4			26.4			43.0			21.0	
Approach LOS		C			C			D			C	

Intersection Summary

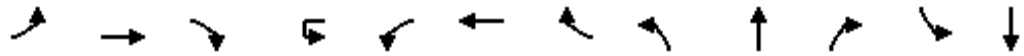
Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 107 (89%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 29.7
 Intersection LOS: C
 Intersection Capacity Utilization 61.5%
 ICU Level of Service B
 Analysis Period (min) 15

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



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

04/08/2020

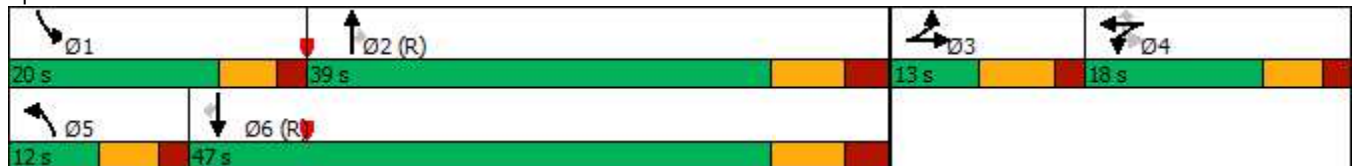


Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Permitted Phases				4			4			2		
Detector Phase	3	3		4	4	4	4	5	2	2	1	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		10.0	10.0	10.0	10.0	5.0	20.0	20.0	5.0	20.0
Minimum Split (s)	12.0	12.0		16.0	16.0	16.0	16.0	11.0	28.0	28.0	11.0	28.0
Total Split (s)	13.0	13.0		18.0	18.0	18.0	18.0	12.0	39.0	39.0	20.0	47.0
Total Split (%)	14.4%	14.4%		20.0%	20.0%	20.0%	20.0%	13.3%	43.3%	43.3%	22.2%	52.2%
Maximum Green (s)	6.0	6.0		12.0	12.0	12.0	12.0	6.0	31.0	31.0	14.0	39.0
Yellow Time (s)	5.0	5.0		4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	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	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
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes					
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0
Recall Mode	None	None		None	None	None	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	7.4	7.4			12.0	12.0	12.0	6.3	32.0	32.0	14.3	45.1
Actuated g/C Ratio	0.08	0.08			0.13	0.13	0.13	0.07	0.36	0.36	0.16	0.50
v/c Ratio	0.43	0.46			0.62	0.56	0.70	0.26	0.53	0.19	0.79	0.47
Control Delay	49.9	42.1			45.8	46.1	15.1	45.7	26.1	0.6	50.6	13.9
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.9	42.1			45.8	46.1	15.1	45.7	26.1	0.6	50.6	13.9
LOS	D	D			D	D	B	D	C	A	D	B
Approach Delay		45.7				30.9			22.8			25.7
Approach LOS		D				C			C			C

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 47 (52%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 27.0
 Intersection LOS: C
 Intersection Capacity Utilization 63.5%
 ICU Level of Service B
 Analysis Period (min) 15

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





Lane Group	SBR
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	20.0
Minimum Split (s)	28.0
Total Split (s)	47.0
Total Split (%)	52.2%
Maximum Green (s)	39.0
Yellow Time (s)	5.0
All-Red Time (s)	3.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	8.0
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	5.0
Recall Mode	C-Min
Act Effct Green (s)	45.1
Actuated g/C Ratio	0.50
v/c Ratio	0.05
Control Delay	0.1
Queue Delay	0.0
Total Delay	0.1
LOS	A
Approach Delay	
Approach LOS	
Intersection Summary	

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

04/08/2020

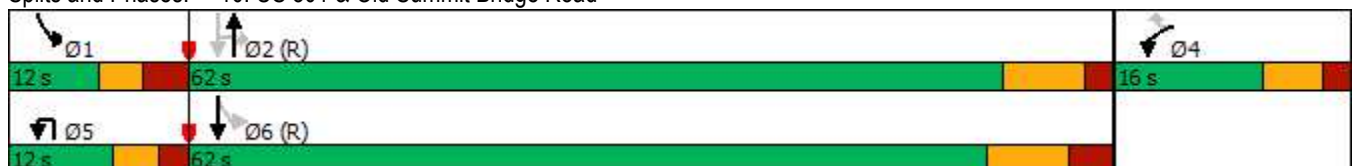


Lane Group	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Protected Phases	4		5	2		1	6
Permitted Phases		4	2		2	6	2
Detector Phase	4	4	5	2	2	1	6
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	15.0	15.0	5.0	15.0
Minimum Split (s)	11.0	11.0	10.0	23.5	23.5	11.0	23.5
Total Split (s)	16.0	16.0	12.0	62.0	62.0	12.0	62.0
Total Split (%)	17.8%	17.8%	13.3%	68.9%	68.9%	13.3%	68.9%
Maximum Green (s)	10.0	10.0	7.0	54.5	54.5	6.0	53.5
Yellow Time (s)	4.0	4.0	3.0	5.5	5.5	3.0	5.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	5.0	7.5	7.5	6.0	8.5
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)	8.5	8.5		61.7	61.7	72.0	71.2
Actuated g/C Ratio	0.09	0.09		0.69	0.69	0.80	0.79
v/c Ratio	0.24	0.19		0.39	0.06	0.19	0.44
Control Delay	40.4	16.1		4.5	0.5	3.6	4.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	40.4	16.1		4.5	0.5	3.6	4.8
LOS	D	B		A	A	A	A
Approach Delay	29.6			4.3			4.7
Approach LOS	C			A			A

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 56 (62%), Referenced to phase 2:NBSB and 6:SBTL, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.44
 Intersection Signal Delay: 5.3
 Intersection LOS: A
 Intersection Capacity Utilization 58.2%
 ICU Level of Service B
 Analysis Period (min) 15

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



Lanes, Volumes, Timings

26: US 301 & Connector Road/Cooper Wilbur Vault Entrance

04/08/2020

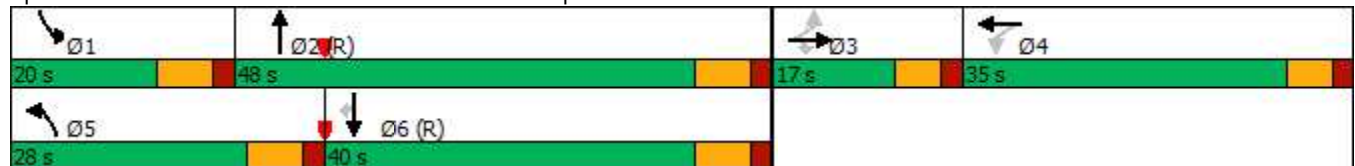


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	3		3	4								6
Detector Phase	3	3	3	4	4		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	15.0		5.0	15.0	15.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		12.0	22.0		12.0	22.0	22.0
Total Split (s)	17.0	17.0	17.0	35.0	35.0		28.0	48.0		20.0	40.0	40.0
Total Split (%)	14.2%	14.2%	14.2%	29.2%	29.2%		23.3%	40.0%		16.7%	33.3%	33.3%
Maximum Green (s)	11.0	11.0	11.0	29.0	29.0		21.0	41.0		13.0	33.0	33.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		5.0	5.0		5.0	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	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0		7.0	7.0		7.0	7.0	7.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	5.0		3.0	5.0	5.0
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	C-Min
Act Effct Green (s)	9.4	9.4	9.4		8.5		13.9	85.4		6.0	67.3	67.3
Actuated g/C Ratio	0.08	0.08	0.08		0.07		0.12	0.71		0.05	0.56	0.56
v/c Ratio	0.40	0.34	0.75		0.31		0.62	0.31		0.07	0.54	0.05
Control Delay	75.4	67.3	18.2		44.9		55.3	17.4		55.6	20.4	0.1
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	75.4	67.3	18.2		44.9		55.3	17.4		55.6	20.4	0.1
LOS	E	E	B		D		E	B		E	C	A
Approach Delay		24.4			44.9			22.7			19.8	
Approach LOS		C			D			C			B	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 97 (81%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 22.0
 Intersection LOS: C
 Intersection Capacity Utilization 62.4%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 26: US 301 & Connector Road/Cooper Wilbur Vault Entrance



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

04/08/2020

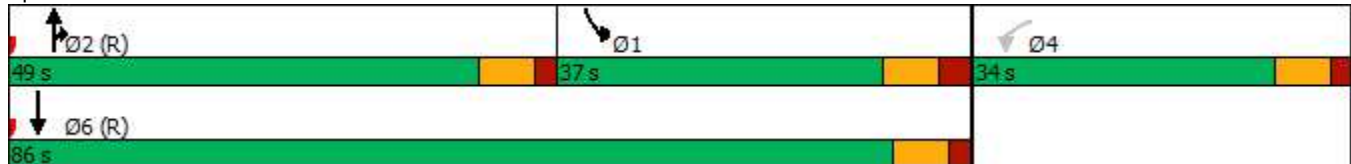


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	4	Free				
Detector Phase	4		2	2	1	6
Switch Phase						
Minimum Initial (s)	6.0		15.0	15.0	8.0	15.0
Minimum Split (s)	13.0		25.0	25.0	19.0	25.0
Total Split (s)	34.0		49.0	49.0	37.0	86.0
Total Split (%)	28.3%		40.8%	40.8%	30.8%	71.7%
Maximum Green (s)	27.0		42.0	42.0	29.0	79.0
Yellow Time (s)	5.0		5.0	5.0	5.0	5.0
All-Red Time (s)	2.0		2.0	2.0	3.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0		7.0	7.0	8.0	7.0
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)	23.6	120.0	45.4	45.4	29.0	82.4
Actuated g/C Ratio	0.20	1.00	0.38	0.38	0.24	0.69
v/c Ratio	0.81	0.16	0.99	0.61	1.04	0.64
Control Delay	64.0	0.2	54.8	20.9	97.9	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.0	0.2	54.8	20.9	97.9	12.8
LOS	E	A	D	C	F	B
Approach Delay	34.1		42.6			42.9
Approach LOS	C		D			D

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 66 (55%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.04
 Intersection Signal Delay: 41.1
 Intersection LOS: D
 Intersection Capacity Utilization 87.6%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 30: US 301 & SR 71



Intersection Delay Study - Field Sheet									
Request No.:									
Job No.:									

Location:	Summit Bridge Rd at Old Schoolhouse Rd				Weather:	Clear			
Date:	10/15/2019				Recorder:	HD			
Direction:	EB				Start Time:	17:00			
(Military)									
Location Characteristics:									
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					1	0	
2	17:01	17:02	1	1			1	0	
3	17:02	17:03	1	1	1	1	0	0	
4	17:03	17:04					0	0	
5	17:04	17:05					0	0	
6	17:05	17:06					0	0	
7	17:06	17:07					0	0	
8	17:07	17:08					0	0	
9	17:08	17:09					0	0	
10	17:09	17:10				1	1	0	
11	17:10	17:11	1	1	1	1	0	0	
12	17:11	17:12	1				0	0	
13	17:12	17:13		1	1	1	1	0	
14	17:13	17:14					0	0	
15	17:14	17:15					0	0	
SUBTOTAL			4	4	3	4	4	0	
TOTAL			15			4			
Comments:									
(Cell C50)									
Total Delay = Total Number Stopped X Sampling Interval									
	=	15	X	15	=	225	Veh-Sec/ 3600 =	0.0625	Veh - Hr
Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles									
	=	225	/	4	=	56.25	Sec		
Average Delay Per Approach Vehicle = Total Delay / Approach Volume									
	=	225	/	4	=	56.25	Sec		
Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume									
	=	4	/	4	=	1			

Intersection Delay Study - Field Sheet										
Request No.:										
Job No.:										

Location:	Summit Bridge Rd at Old Schoolhouse Rd				Weather:	Clear				
Date:	10/15/2019				Recorder:	SL				
Direction:	EB				Start Time:	17:15				
Location Characteristics:										
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	17:15	17:16					1	0		
2	17:16	17:17	1				0	0		
3	17:17	17:18					0	0		
4	17:18	17:19					0	0		
5	17:19	17:20					0	0		
6	17:20	17:21					0	0		
7	17:21	17:22				1	1	0		
8	17:22	17:23	1	1	2	2	1	0		
9	17:23	17:24	1	1	1	1	0	0		
10	17:24	17:25					1	0		
11	17:25	17:26					1	0		
12	17:26	17:27					1	0		
13	17:27	17:28					1	0		
14	17:28	17:29	1				0	0		
15	17:29	17:30					0	0		
SUBTOTAL			4	2	3	4	7	0		
TOTAL			13				7			
Comments:										
(Cell C50)										
Total Delay = Total Number Stopped X Sampling Interval										
	=	13	X	15	=	195	Veh-Sec/ 3600 =	0.054167	Veh - Hr	
Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles										
	=	195	/	7	=	27.85714	Sec			
Average Delay Per Approach Vehicle = Total Delay / Approach Volume										
	=	195	/	7	=	27.85714	Sec			
Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume										
	=	7	/	7	=	1				

Intersection Delay Study - Field Sheet									
Request No.:									
Job No.:									

Location:	Summit Bridge Rd at Old Schoolhouse Rd				Weather:	Clear			
Date:	10/15/2019				Recorder:	SL			
Direction:	EB				Start Time:	17:30			
(Military)									
Location Characteristics:									
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	17:30	17:31					0	0	
2	17:31	17:32			1	1	1	0	
3	17:32	17:33	1				0	0	
4	17:33	17:34					0	0	
5	17:34	17:35					0	0	
6	17:35	17:36			1	1	1	0	
7	17:36	17:37	1	1	1	1	0	0	
8	17:37	17:38	1	1		1	2	0	
9	17:38	17:39					0	0	
10	17:39	17:40					0	0	
11	17:40	17:41					0	0	
12	17:41	17:42					0	0	
13	17:42	17:43					2	0	
14	17:43	17:44	1	1	1	1	0	0	
15	17:44	17:45	1	1	1	1	0	0	
SUBTOTAL			5	4	5	6	6	0	
TOTAL			20				6		
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	/	6	=	50	Sec		
Average Delay Per Approach Vehicle = Total Delay / Approach Volume									
	=	300	/	6	=	50	Sec		
Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume									
	=	6	/	6	=	1			

Intersection Delay Study - Field Sheet									
Request No.:									
Job No.:									

Location:		Summit Bridge Rd at Old Schoolhouse Rd			Weather:		Clear		
Date:		10/15/2019			Recorder:		SL		
Direction:		EB			Start Time:		17:45		
(Military)									
Location Characteristics:									
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	17:45	17:46	1	1	1	1	0	0	
2	17:46	17:47	1	1	1	1	0	0	
3	17:47	17:48		1			1	0	
4	17:48	17:49					0	0	
5	17:49	17:50					0	0	
6	17:50	17:51				1	1	0	
7	17:51	17:52	1				0	0	
8	17:52	17:53					0	0	
9	17:53	17:54					0	0	
10	17:54	17:55					0	0	
11	17:55	17:56			1		1	0	
12	17:56	17:57					0	0	
13	17:57	17:58					0	0	
14	17:58	17:59					0	0	
15	17:59	18:00					0	0	
SUBTOTAL			3	3	3	3	3	0	
TOTAL				12			3		
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	/	3	=	60	Sec		
Average Delay Per Approach Vehicle = Total Delay / Approach Volume									
	=	180	/	3	=	60	Sec		
Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume									
	=	3	/	3	=	1			

Intersection Delay Study - Field Sheet										
Request No.:										
Job No.:										

Location:	Summit Bridge Rd at Keenan Auto Body					Weather:	Clear			
Date:	11/6/2019					Recorder:	HD			
Direction:	WB					Start Time:	17:00			
Location Characteristics:										
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		
2	17:01	17:02					0	0		
3	17:02	17:03					0	0		
4	17:03	17:04					0	0		
5	17:04	17:05					0	0		
6	17:05	17:06					0	0		
7	17:06	17:07					0	0		
8	17:07	17:08	1				1	0		
9	17:08	17:09					0	0		
10	17:09	17:10					0	0		
11	17:10	17:11					1	0		
12	17:11	17:12					0	0		
13	17:12	17:13	1	1	1		1	0		
14	17:13	17:14					0	0		
15	17:14	17:15					0	0		
SUBTOTAL			2	1	1	0	3	0		
TOTAL							3			

Comments:										
(Cell C50)										

Total Delay = Total Number Stopped X Sampling Interval										
	=	4	X	15	=	60	Veh-Sec/ 3600 =	0.016667	Veh - Hr	

Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles										
	=	60	/	3	=	20	Sec			

Average Delay Per Approach Vehicle = Total Delay / Approach Volume										
	=	60	/	3	=	20	Sec			

Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume										
	=	3	/	3	=	1				

Intersection Delay Study - Field Sheet										
Request No.:										
Job No.:										
Location:		Summit Bridge Rd at Keenan Auto Body				Weather:		Clear		
Date:		11/6/2019				Recorder:		SL		
Direction:		WB				Start Time:		17:15		
Location Characteristics:										
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	17:15	17:16					0	0		
2	17:16	17:17					0	0		
3	17:17	17:18					0	0		
4	17:18	17:19					0	0		
5	17:19	17:20		1	1	1	2	0		
6	17:20	17:21	1	1	1		0	0		
7	17:21	17:22					0	0		
8	17:22	17:23			1	1	1	0		
9	17:23	17:24	1				0	0		
10	17:24	17:25					0	0		
11	17:25	17:26					0	0		
12	17:26	17:27					0	0		
13	17:27	17:28					0	0		
14	17:28	17:29					1	0		
15	17:29	17:30	1				1	0		
SUBTOTAL			3	2	3	2	5	0		
TOTAL			10				5			
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	/	5	=	30	Sec		
Average Delay Per Approach Vehicle = Total Delay / Approach Volume										
		=	150	/	5	=	30	Sec		
Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume										
		=	5	/	5	=	1			

Intersection Delay Study - Field Sheet										
Request No.:										
Job No.:										

Location:	Summit Bridge Rd at Keenan Auto Body				Weather:	Clear				
Date:	11/6/2019				Recorder:	SL				
Direction:	WB				Start Time:	17:30				
Location Characteristics:										
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	17:30	17:31	1	1	1	2	1	0		
2	17:31	17:32	2	2	1	2	1	0		
3	17:32	17:33	2	1			0	0		
4	17:33	17:34					0	0		
5	17:34	17:35					0	0		
6	17:35	17:36					0	0		
7	17:36	17:37					0	0		
8	17:37	17:38					0	0		
9	17:38	17:39				1	1	0		
10	17:39	17:40					0	0		
11	17:40	17:41					0	0		
12	17:41	17:42					0	0		
13	17:42	17:43					0	0		
14	17:43	17:44					0	0		
15	17:44	17:45					0	0		
SUBTOTAL			5	4	2	5	3	0		
TOTAL			16				3			
Comments:										
(Cell C50)										
Total Delay = Total Number Stopped X Sampling Interval										
	=	16	X	15	=	240 Veh-Sec/ 3600 =	0.066667	Veh - Hr		
Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles										
	=	240	/	3	=	80	Sec			
Average Delay Per Approach Vehicle = Total Delay / Approach Volume										
	=	240	/	3	=	80	Sec			
Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume										
	=	3	/	3	=	1				

Intersection Delay Study - Field Sheet										
Request No.:										
Job No.:										

Location:	Summit Bridge Rd at Keenan Auto Body				Weather:	Clear				
Date:	11/6/2019				Recorder:	SL				
Direction:	WB				Start Time:	17:45				
(Military)										
Location Characteristics:										
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	17:45	17:46					0	0		
2	17:46	17:47					0	0		
3	17:47	17:48					0	0		
4	17:48	17:49					1	0		
5	17:49	17:50	1	1			0	0		
6	17:50	17:51					0	0		
7	17:51	17:52					0	0		
8	17:52	17:53					0	0		
9	17:53	17:54					0	0		
10	17:54	17:55					0	0		
11	17:55	17:56					0	0		
12	17:56	17:57					0	0		
13	17:57	17:58					0	0		
14	17:58	17:59					0	0		
15	17:59	18:00					0	0		
SUBTOTAL			1	1	0	0	1	0		
TOTAL							1			

Comments:										
(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									
Request No.:									
Job No.:									

Location:	Choptank Rd at Clayton Manor Dr					Weather:	Clear		
Date:	10/15/2019					Recorder:	HD		
Direction:	EB					Start Time:	17:00		
(Military)									
Location Characteristics:									
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	1	1			2	1	
2	17:01	17:02	1				1	0	
3	17:02	17:03					0	1	
4	17:03	17:04					1	0	
5	17:04	17:05					0	0	
6	17:05	17:06					0	0	
7	17:06	17:07					0	1	
8	17:07	17:08					0	1	
9	17:08	17:09					2	0	
10	17:09	17:10		1	1		1	1	
11	17:10	17:11					1	0	
12	17:11	17:12	1				0	0	
13	17:12	17:13					0	0	
14	17:13	17:14					0	0	
15	17:14	17:15					1	0	
SUBTOTAL			3	2	1	0	9	5	
TOTAL							6	14	
Comments:									
(Cell C50)									
Total Delay = Total Number Stopped X Sampling Interval									
	=	6	X	15	=	90	Veh-Sec/ 3600 =	0.025	Veh - Hr
Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles									
	=	90	/	9	=	10	Sec		
Average Delay Per Approach Vehicle = Total Delay / Approach Volume									
	=	90	/	14	=	6.428571	Sec		
Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume									
	=	9	/	14	=	0.642857			

Intersection Delay Study - Field Sheet									
Request No.:									
Job No.:									

Location:	Choptank Rd at Clayton Manor Dr					Weather:	Clear		
Date:	10/15/2019					Recorder:	SL		
Direction:	EB					Start Time:	17:15		
(Military)									
Location Characteristics:									
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	17:15	17:16					0	0	
2	17:16	17:17					1	0	
3	17:17	17:18	1				1	1	
4	17:18	17:19					1	1	
5	17:19	17:20	1				1	0	
6	17:20	17:21	1				1	0	
7	17:21	17:22				1	3	0	
8	17:22	17:23					1	0	
9	17:23	17:24	1				1	0	
10	17:24	17:25					0	1	
11	17:25	17:26					0	0	
12	17:26	17:27				1	1	0	
13	17:27	17:28		1			2	0	
14	17:28	17:29					0	0	
15	17:29	17:30					0	0	
SUBTOTAL			4	1		1	13	3	
TOTAL			7				16		
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	/	13	=	8.076923	Sec		
Average Delay Per Approach Vehicle = Total Delay / Approach Volume									
	=	105	/	16	=	6.5625	Sec		
Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume									
	=	13	/	16	=	0.8125			

Intersection Delay Study - Field Sheet									
Request No.:									
Job No.:									

Location:	Choptank Rd at Clayton Manor Dr				Weather:	Clear			
Date:	10/15/2019				Recorder:	SL			
Direction:	EB				Start Time:	17:30			
Location Characteristics:									
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	17:30	17:31					0	1	
2	17:31	17:32					0	0	
3	17:32	17:33					1	0	
4	17:33	17:34					3	0	
5	17:34	17:35					0	0	
6	17:35	17:36					0	0	
7	17:36	17:37					0	0	
8	17:37	17:38					0	0	
9	17:38	17:39					0	0	
10	17:39	17:40				1	1	0	
11	17:40	17:41	1	1			1	0	
12	17:41	17:42					0	0	
13	17:42	17:43					0	0	
14	17:43	17:44					0	0	
15	17:44	17:45	1				1	0	
SUBTOTAL			2	1	0	1	7	1	
TOTAL			4				8		
Comments:									
(Cell C50)									
Total Delay = Total Number Stopped X Sampling Interval									
			=	4	X	15	=	60 Veh-Sec/ 3600 =	0.016667 Veh - Hr
Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles									
			=	60	/	7	=	8.571429 Sec	
Average Delay Per Approach Vehicle = Total Delay / Approach Volume									
			=	60	/	8	=	7.5 Sec	
Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume									
			=	7	/	8	=	0.875	

Intersection Delay Study - Field Sheet									
Request No.:									
Job No.:									

Location:	Choptank Rd at Clayton Manor Dr				Weather:	Clear			
Date:	10/15/2019				Recorder:	HD			
Direction:	EB				Start Time:	17:45			
(Military)									
Location Characteristics:									
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	17:45	17:46					1	0	
2	17:46	17:47					0	0	
3	17:47	17:48					1	0	
4	17:48	17:49			1		1	0	
5	17:49	17:50					2	0	
6	17:50	17:51					0	0	
7	17:51	17:52				1	1	1	
8	17:52	17:53					0	0	
9	17:53	17:54				1	1	1	
10	17:54	17:55	1	1			1	0	
11	17:55	17:56					0	0	
12	17:56	17:57					2	0	
13	17:57	17:58	1				0	0	
14	17:58	17:59					0	0	
15	17:59	18:00					0	0	
SUBTOTAL			2	1	1	2	10	2	
TOTAL			6				12		

Comments:									
(Cell C50)									

Total Delay = Total Number Stopped X Sampling Interval									
	=	6	X	15	=	90 Veh-Sec/ 3600 =	0.025 Veh - Hr		

Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles									
	=	90	/	10	=	9 Sec			

Average Delay Per Approach Vehicle = Total Delay / Approach Volume									
	=	90	/	12	=	7.5 Sec			

Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume									
	=	10	/	12	=	0.833333			

