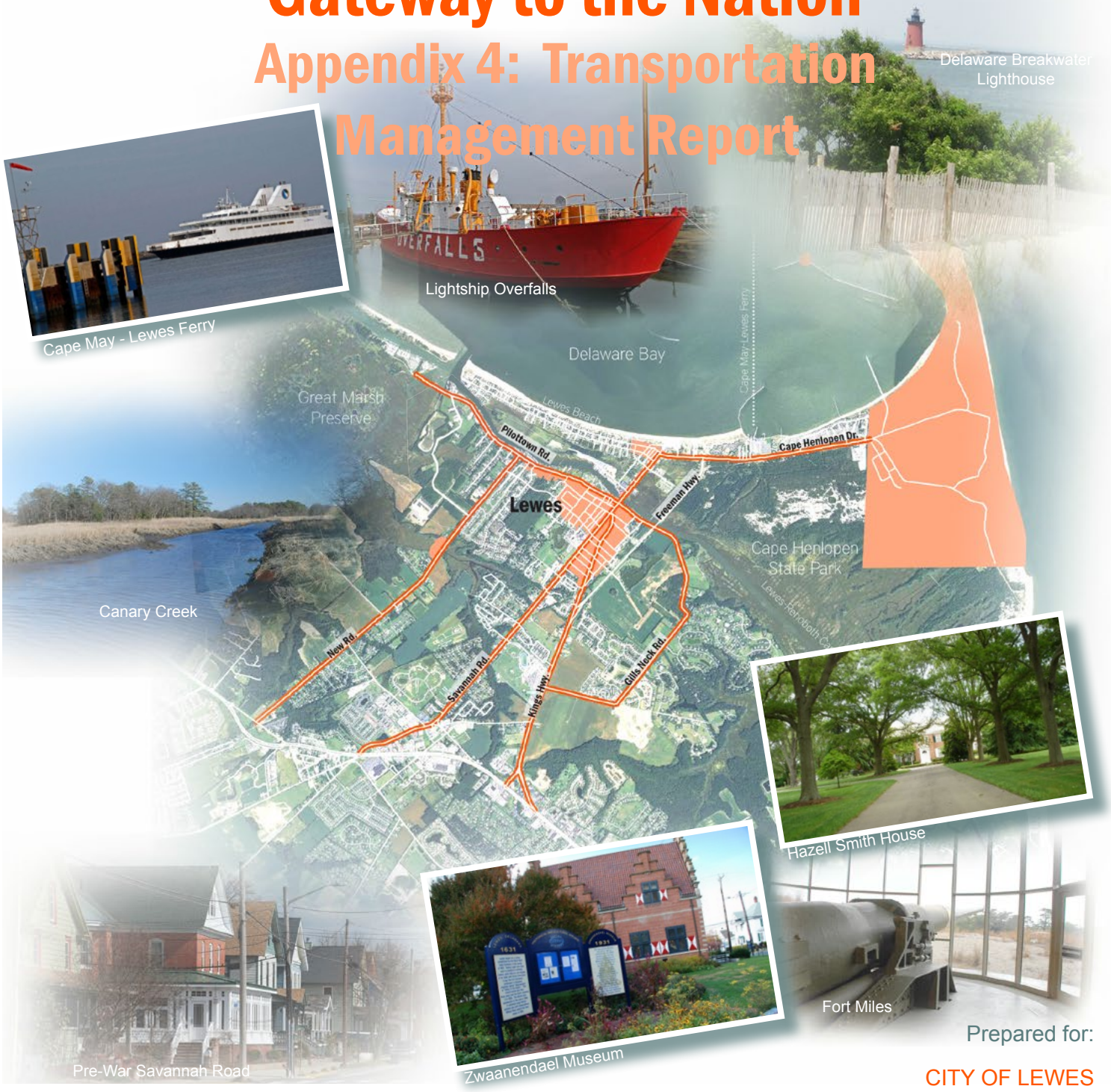
Lewes
Scenic and Historic Byway
Gateway to the Nation
Appendix 4: Transportation Management Report

Cape May - Lewes Ferry



Prepared for:

CITY OF LEWES
SUSSEX COUNTY
DELAWARE DEPARTMENT OF TRANSPORTATION

OCTOBER 2015

Prepared by:
DELAWARE GREENWAYS

PREFACE

This report is designed to inform the Corridor Management Plan regarding traffic and transportation issues affecting the Lewes Historic Byway. It represents a collective effort of members of the Lewes Historic Byway Ad Hoc Committee who volunteered countless hours collecting traffic data and attending meetings guiding the planning effort supporting the Corridor Management Plan. This analysis also was supported by the Delaware Department of Transportation, DNREC, The Delaware River and Bay Authority, the City of Lewes and Sussex County, whose advice and guidance were invaluable in developing the recommendations brought forward by this effort.

While the analysis contained herein is related to the Byway which is located both inside the City Limits and in the County, the conclusions reached and the recommendations have general utility to the entire City and its surroundings and should be accepted as such.

The analysis identifies challenges that require the cooperation of all levels of government and the residents and businesses of the area to address and solve. The authors hope that this report provides the basis for the entire community and their leaders to act.

ACKNOWLEDGEMENTS

This report was funded by a grant from a grant from the Federal Highway Administration's National Scenic Byway Program. Additional funding was provided by Senators Ernesto Lopez and Gary Simpson, Representatives Peter Schwartzkopf and Ruth Briggs and Joseph Booth. In addition, many hours of volunteered time was provided by members of the Lewes Scenic and Historic Byways Committee and many other civic minded residents of the City of Lewes and the surrounding area of Sussex County. Members of the Lewes Scenic and Historic Byways Committee are:

- Gail vanGilder - Chairperson
- Michael DiPaolo - Lewes Historic Society
- Dan Parsons - Historic Preservation Planner, Sussex County
- David Ennis
- Diane Wilson
- Ronal Smith
- Barbara Vaughan – City Planning Commission
- Bonnie Osler – Councilperson (former liaison)
- Dennis Reardon – Councilperson (current liaison)
- Mike Tyler - Pedestrian and Bicycle Advisory Committee
- Helen Waite

Additionally, the Committee would also like to thank Mayor Ted Becker, former Mayor James Ford and City Manager Paul Eckrich.

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INTRODUCTION

Lewes was the site of the first European settlement in Delaware, a whaling and trading post that Dutch settlers founded on June 3, 1631 and named Zwaanendael. The colony had a short existence, as a local tribe of Lenni Lenape Indians wiped out the 32 settlers in 1632. But the settlement was re-established as Lewes in 1662 by a group of Mennonites. To this day, Lewes proudly calls itself the first town in the first state.

The Public Outreach Program for the Lewes Historic Byway: Gateway to the Nation has identified significant concerns related to traffic mobility, particularly during the summer months. Residents and visitors alike are finding congestion affects their enjoyment of the City and its attributes and, as time goes on, there is real concern that the situation will worsen detrimentally affecting the City and the Byway.

The historic nature of the City makes it a special place. A tight grid system of streets, closely spaced historic buildings, and unique neighborhoods along with its beaches and scenery make the city and its surroundings special. As a result, it is very unlikely that major transportation improvements that increase the capacity of the current street system are feasible or acceptable in this community with a year-around population of 2,800 that swells to almost 50,000 in the summer.

Accordingly, the demands for mobility must be managed by mode, time and route of travel. This report examines the magnitude and patterns of existing travel, how travel demand in Lewes might change in the future and the potential strategies and management techniques that might be employed to make getting around the City easier.

This analysis accompanies and supplements the Corridor Management Plan (CMP) for the Byway. The recommendations of this analysis were developed in conjunction with the CMP.

ANALYSIS PROCESS

The study process involved four distinct steps with the final product being suggested strategies and recommendations that can be adopted by implementing agencies such as the City of Lewes, Sussex County and DelDOT. The steps are:

- Data Collection and Compilation: This step involves collection of transportation data so that a picture of the existing transportation situation can be compiled.
- Data Analysis and Estimation of Carrying Capacity: An understanding of the capacity of the transportation network is needed to determine where the system is operating in relation to its capacity to function as a system. This step also includes identification of the categories of users of the transportation system both today and into the future.
- Identification and Evaluation of Potential Recommendations: the outcome of the two previous steps will lead to a series of recommendations that will be evaluated in this step. Conducted in conjunction with the development of the CMP, the potential recommendations will also be aligned with the recommendations of the CMP.

- Development of a Transportation Management Plan: This step is the formalization of the recommendations into a cohesive plan. It is likely that components of this step will be completed in subsequent efforts.

The Lewes Historic Byway: Gateway to the Nation Study Area

There are two geographic areas that affect the management of transportation in the City of Lewes: The City and its Byway and the larger region, including the region's transportation spine, State Route 1 and the surrounding areas of Sussex County. Figure 1 shows the regional setting for the City of Lewes.

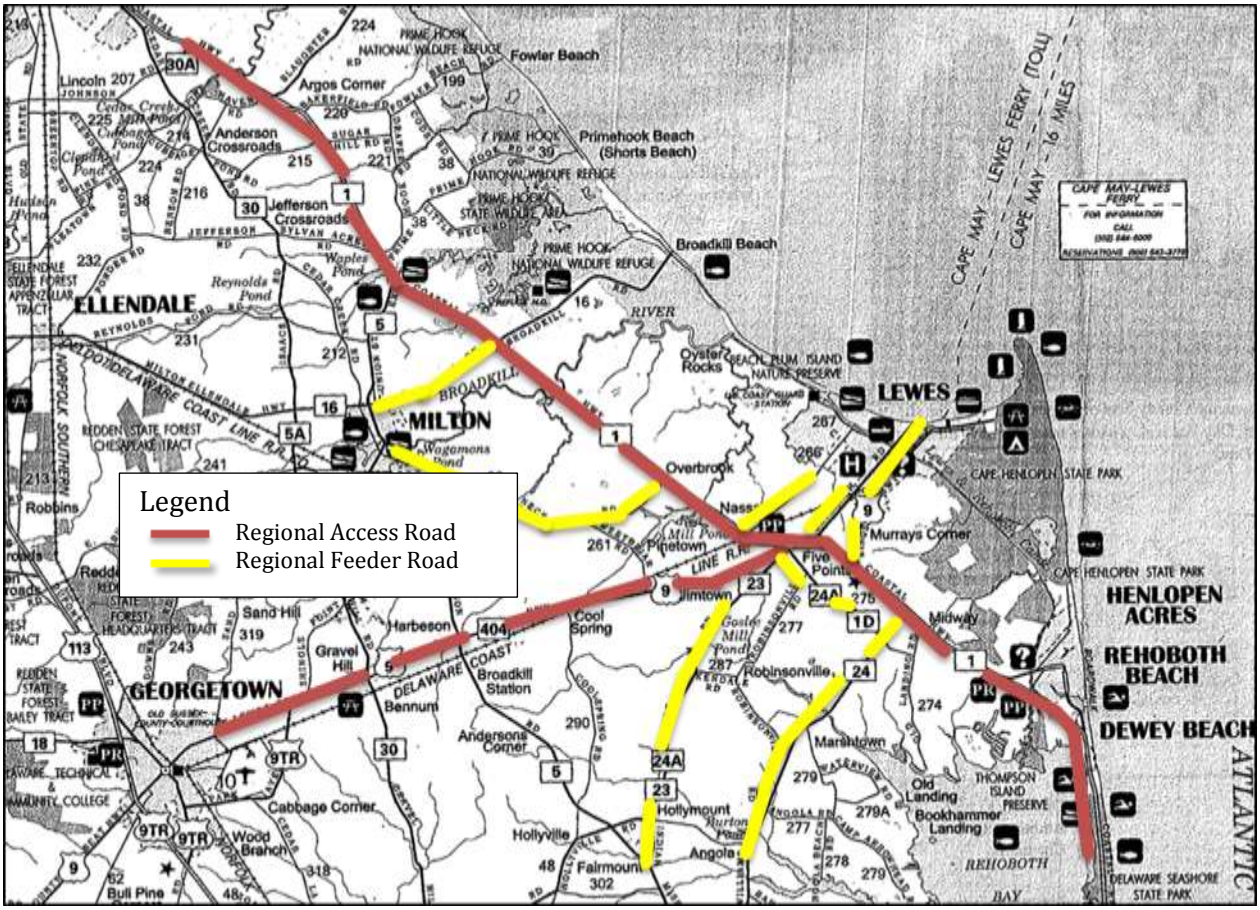


Figure 1: Regional Context Map

Most of the regional and tourist traffic into Lewes arrives via State Route 1 and US Route 9 which are shown in red in the figure. In yellow are the feeder roads that bring traffic from the developed areas outside Lewes into the City.

Figure 2 shows the roadways and trails within the City and its immediate vicinity as well as the Lewes Historic Byway.

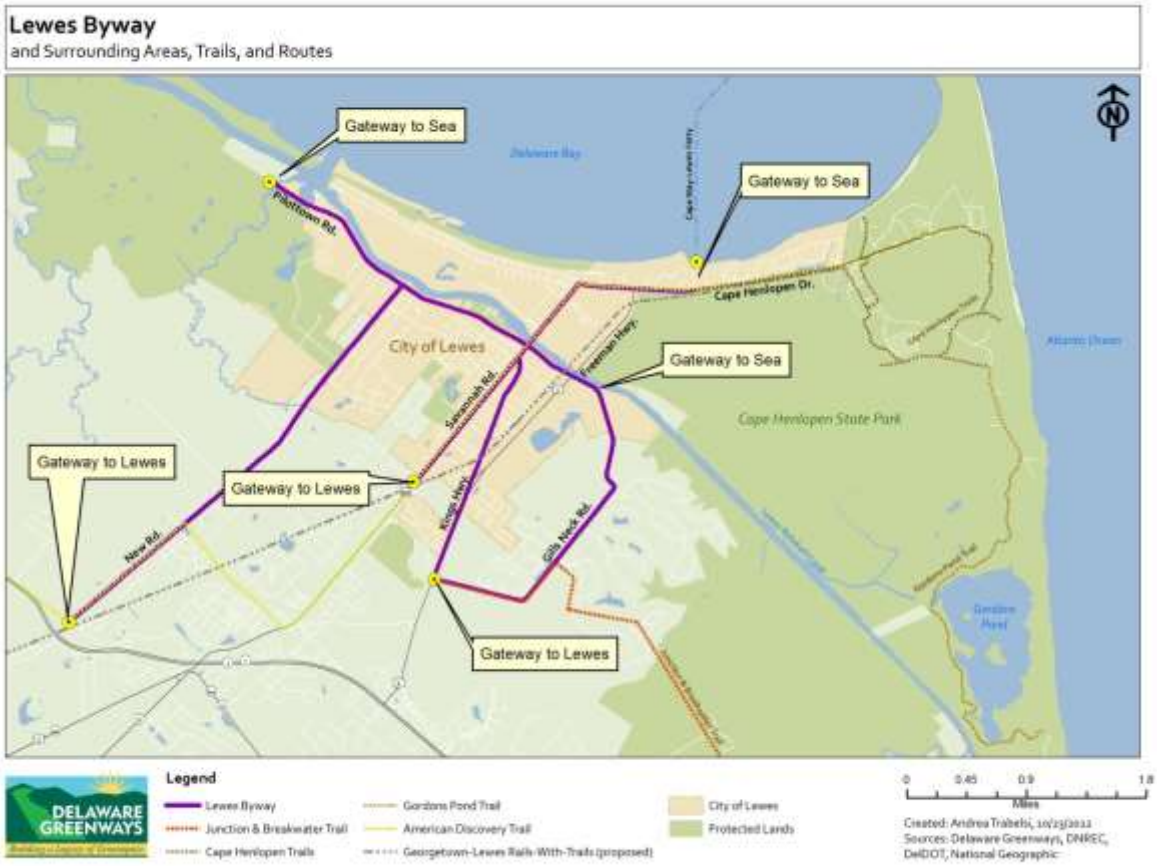


Figure 2: Immediate Study Area Map

In the figure, the Byway is shown in purple. Trails are shown in red. In addition, the map shows the 'Gateways' from the land and from the sea. These gateways will play a key role in managing the Byway roadways. As shown on the figure, the Lewes Historic Byway consists of the following roadways:

- Pilottown Road/Front Street between the Great Marsh at Roosevelt Inlet and Savannah Road
- New Road between Nassau Road and Pilottown Road
- Savannah Road between the Lewes City Line and Lewes Beach
- Kings Highway between Gills Neck Road and Savannah Road
- Gills Neck Road between Kings Highway and Savannah Road
- Cape Henlopen Drive between Savannah Road and Cape Henlopen State Park

Pilottown Road, Gills Neck Road and Cape Henlopen Drive are considered Gateways from the Sea and New Road, Savannah Road and Kings Highway are considered Gateways from the land to Lewes. These gateways will prove significant when considering the Cape May Lewes Ferry and how it connects to Lewes and beyond. The Cape May Lewes Ferry connects to the Bayshore Heritage Byway which extends along the New Jersey Delaware River Bayshore. New Road, Savannah Road and Kings Highway gateways are the main entrances to the City of Lewes and to the Scenic Byway from State Route 1. In the future, the gateways will connect to the trails in the area, including the Lewes Georgetown Rail Trail, the Gordon's Pond Trail in Cape Henlopen State Park, the Junction and Breakwater Trail, and the American Discovery Trail.

TRANSPORTATION DATA COLLECTION

Data was collected to determine the traffic patterns within the City of Lewes. The data was supplemented with data provided by other primary sources.

TRAFFIC VOLUME COUNTS

On Saturday, August 7, 2013, twenty-six volunteers gathered at the Net House in Canal Front Park in an unprecedented effort to 'count vehicles'.

Figure 3: Some of the Volunteers gathering to compare notes from a successful day. Councilwoman Bonnie Osler, front left, hosted the volunteers at the City's Net House in Canal Front Park.

The volunteers counted autos and trucks, towed boats, bicycles and pedestrians at nine intersections strategically selected based upon observation of traffic conditions during the summer by Ad Hoc Committee members and consultation with the members of the City's Traffic Committee. Traffic count data was collected between the hours of 4:00 PM to 6:00 PM on Saturday, August 17, 2013 at the following intersections:

1. Pilottown Road (Front Street) and New Road
2. New Road and University Connector
3. New Road and Old Orchard Road
4. Savannah Road and Cape Henlopen Drive
5. Savannah Road, Front Street and Gills Neck Road
6. Savannah Road and Third Street
7. Kings Highway and Third Street
8. Cape Henlopen Drive and Freeman Highway
9. Kings Highway, Gills Neck Road and Cape Henlopen High School Driveway

Figure 4 illustrates the intersections counted.

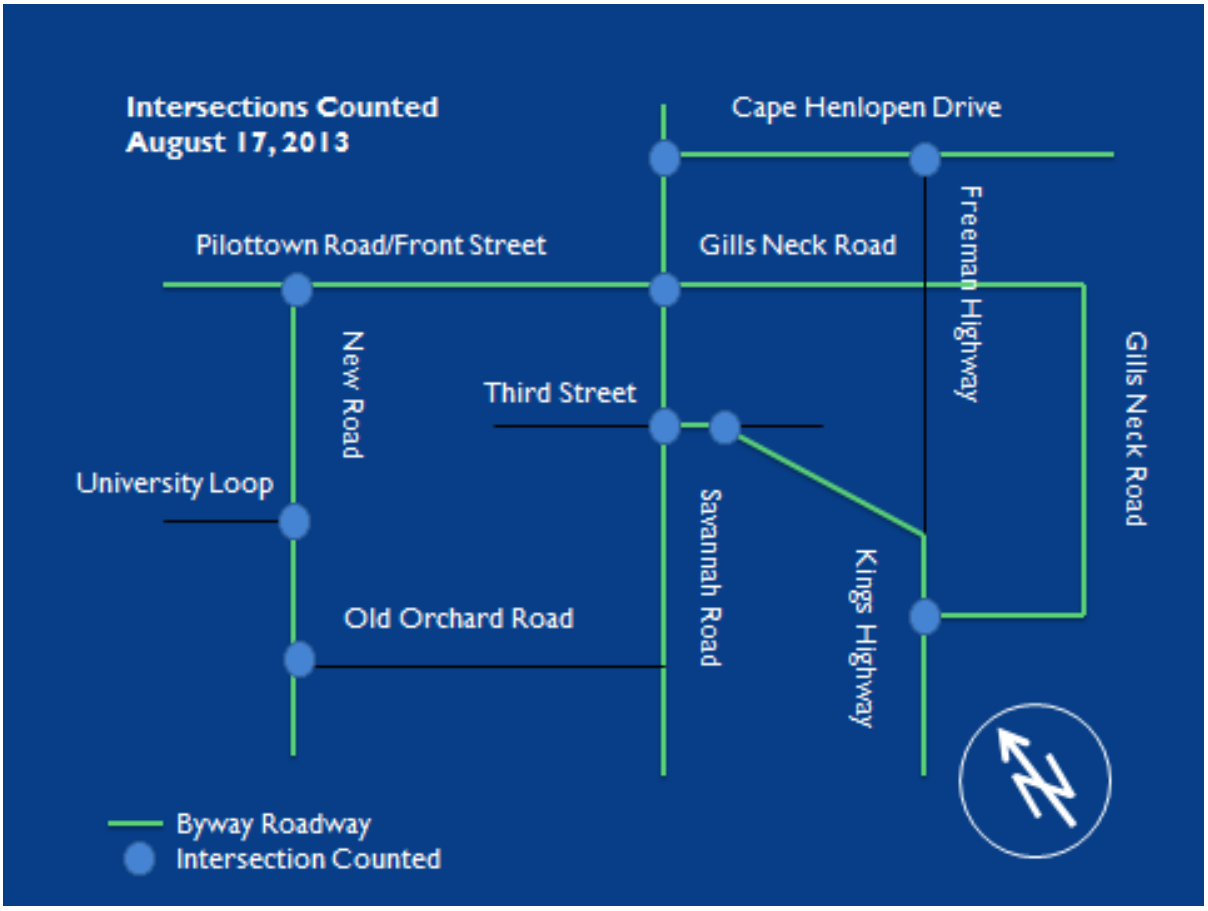


Figure 4: Intersections Counted

The City of Lewes periodically places a radar based traffic counter around the City. Data collected by the City during the summer of 2013 was used to factor the two hour counts collected by the volunteers and develop estimates of daily traffic volumes as well as hourly traffic counts for an average summer day.

Figures 5 illustrates the data collected by the City for Savannah Road. Similar data was collected by the City for New Road as well and is shown in Figure 6.

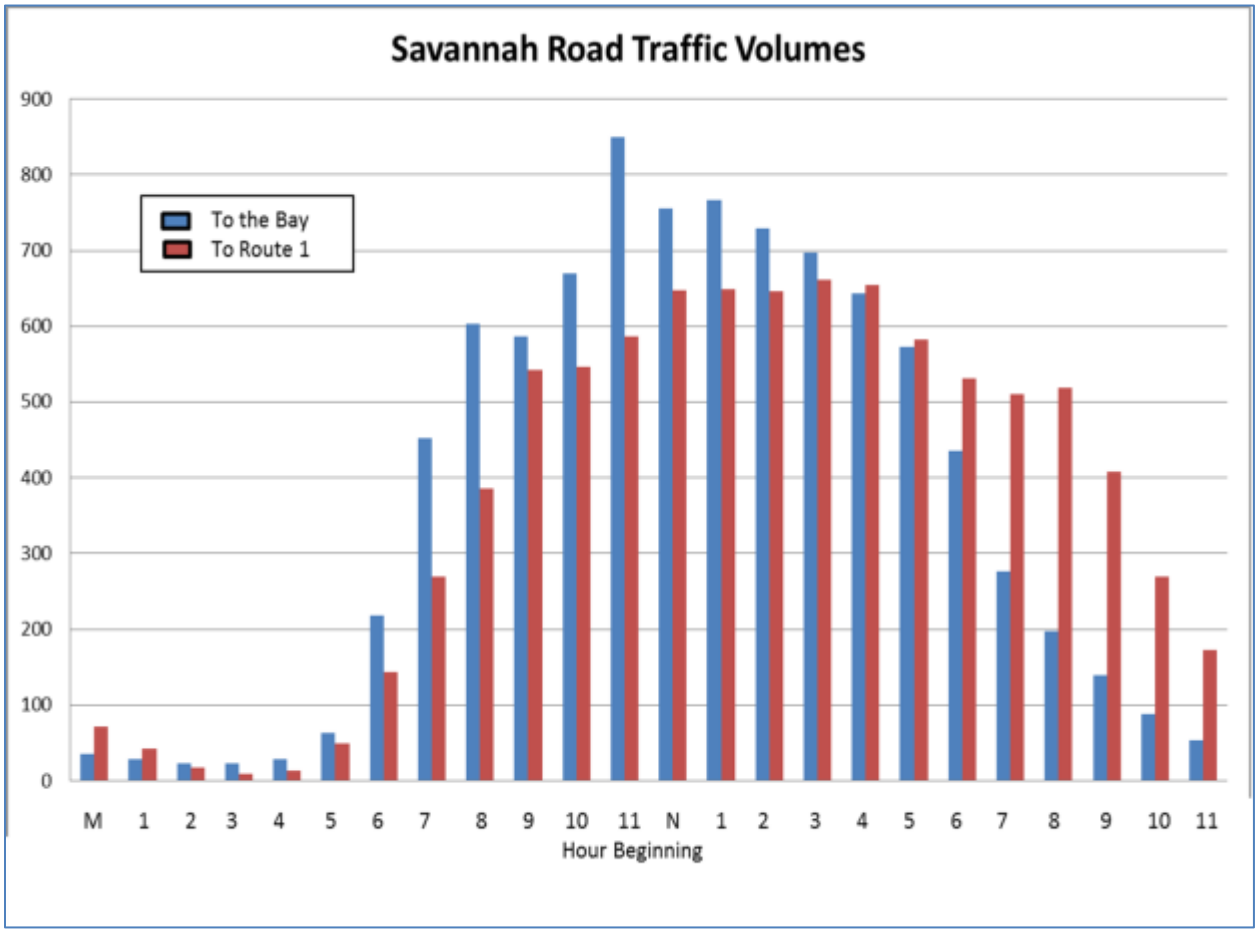


Figure 5: Savannah Road Daily Traffic Volumes distributed across an average summer weekday.

As shown in Figure 5, there is a significant peak flow to the beaches and to downtown Lewes. The return flows occurring later in the day are spread over more hours and extend into the evening.

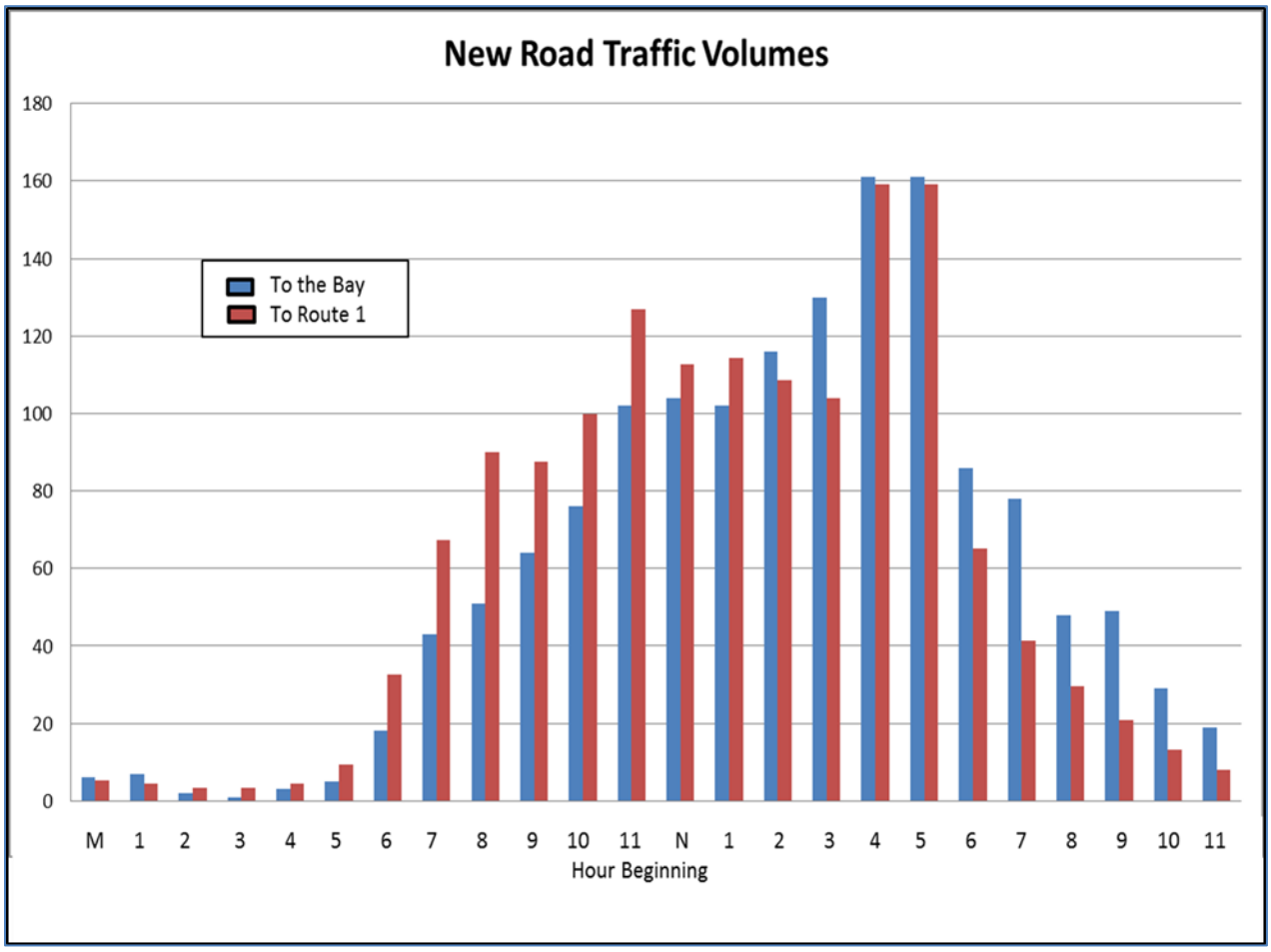


Figure 6: Savannah Road Daily Traffic Volumes distributed across an average summer weekday.

New Road traffic patterns seem to peak in the late afternoon. Interestingly, New Road is the alternative route when Savannah Road begins to congest. In fact, when the volunteers were collecting traffic data, Savannah Road was congested at times and may explain the high traffic volumes noted in the graph.

The hourly volumes noted in Figures 5 and 6 were used in two ways. First, each direction and each hour was summed to develop estimates of daily traffic volumes for a summer day. Second, the relationship of each hour and each direction to the total daily volume for that direction was used to factor the remaining hours of the day that were not counted by the volunteers.

Figure 7 illustrates the daily summertime volumes for each of the links of the byway roadways.

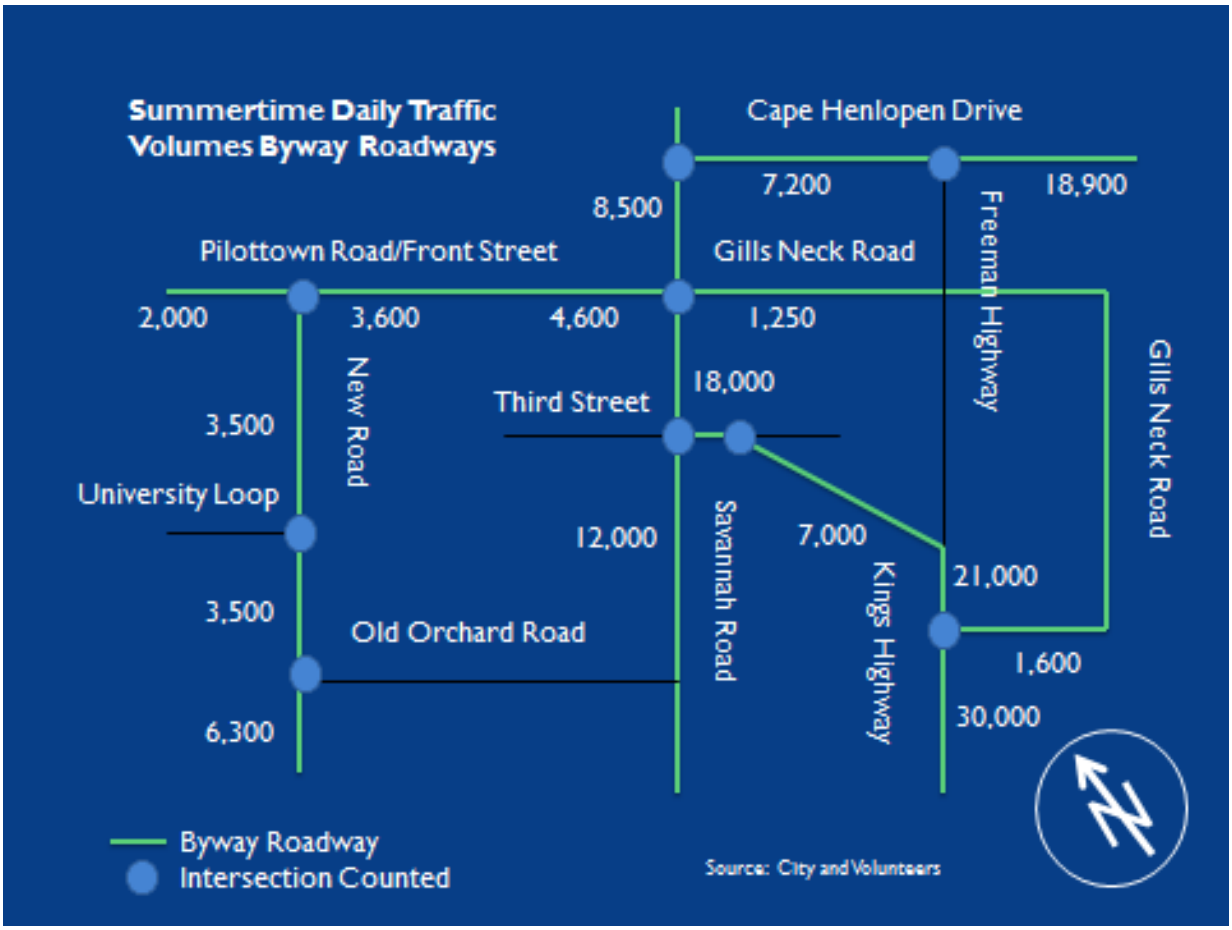


Figure 7: Average summertime daily traffic for the Byway roadways.

As shown in the figure, the highest daily volumes are along the Kings Highway corridor and along Savannah Road. Kings Highway volumes reach 30,000 vehicles per day near the High School, which was not in session and during the count day, there were no events held. On Savannah Road, daily volumes range up to 18,000 vehicles per day. August 17 was a sunny day and many vehicles were observed to be originating from the beach parking lots. New Road carried 6,300 vehicles per day between Nassau and Old Orchard Road.

It is revealing to compare summertime traffic volumes in the winter to summertime traffic volumes. As previously noted, traffic volume data is often collected by the City of Lewes for a number of purposes. On Savannah Road, data was collected in August 2013 and this past winter in February 2013. Figure 8 illustrates the volume differences.

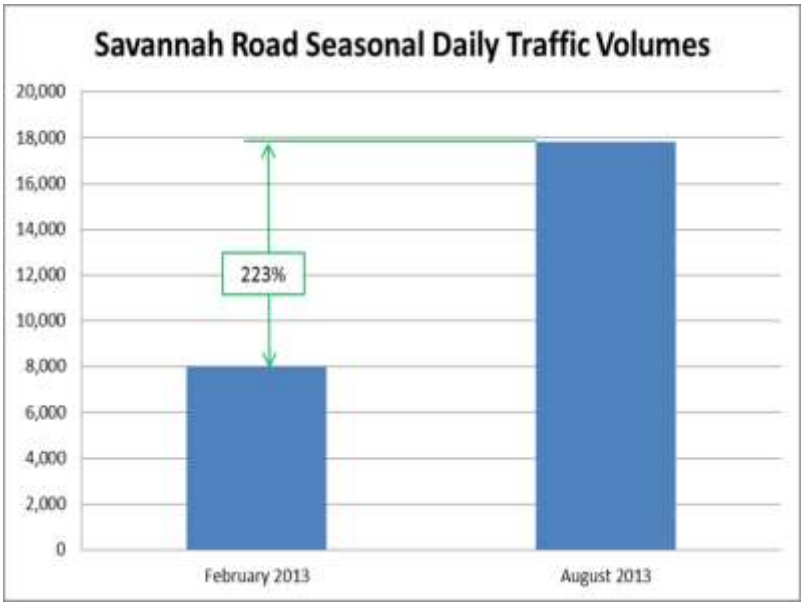


Figure 8: Comparison of daily traffic volumes on Savannah Road in the summer and in the winter.

As shown in the figure, there is a significant difference in the level of traffic with summer volumes 223% greater than winter traffic volumes.

State Route 1 is also subject to wide seasonal variations in traffic volumes. DelDOT operates a permanent traffic count station just north of Nassau. A permanent counting station collects traffic volume data continuously, 24 hours per day, every day, and all year. Review of the data reveals similar increases. On weekdays, the increase is 244%, on Fridays, the increase is 181% and on Saturdays, the increase is 213%.

Hourly Traffic Volumes by Mode of Travel

As previously noted, the volunteers divided the vehicle classes into motorized vehicles, then isolated boat trailers as a separate category, and counted bicycles and pedestrians as well. The volumes in the following figures are for the peak traffic hour of the intersection; that is, the four highest consecutive 15 minute periods of the two hour count period between 4:00 PM and 6:00 PM on August 17, 2013. Also shown in the table is the peak hour factor. This factor is a measure of the variability of traffic during the peak hour. The factor is a ratio of the total peak hour traffic divided by four times the highest fifteen minute traffic volume with the lower the number meaning the higher the variability of traffic volumes during the peak hour. Factors above 0.95 indicate very constant traffic throughout the peak hour while factors below 0.85 indicate highly variable traffic. Highly variable traffic would be characterized by large differences n size of platoons of vehicles flowing through the intersection while less variable traffic means more consistent platoons.

The peak hour and peak hour factor varied for each of the intersections as shown in Table 1.

Table 1: Intersection Traffic Factors

Intersection	Peal Hour	Peak Hour Factor
Pilottown Road (Front Street) and New Road	4:15 PM to 5:15 PM	0.86
New Road and University Connector	5:00 PM to 6:00 PM	0.97
New Road and Old Orchard Road	4:30 PM to 5:30 PM	0.91
Savannah Road and Cape Henlopen Drive	4:00 PM to 5:00 PM	0.91
Savannah Road, Front Street and Gills Neck Road	4.00 PM to 5:00 PM	0.96
Savannah Road and Third Street	4:30 PM to 5:30 PM	0.89
Kings Highway and Third Street	4:15 PM to 5:15 PM	0.86
Cape Henlopen Drive and Freeman Highway	4:15 PM to 5:15 PM	0.90
Kings Highway, Gills Neck Road and Cape Henlopen High School Driveway	4:30 PM to 5:30 PM	0.83

Review of the table indicates that as traffic approached Front Street and Savannah Road, traffic volumes grew more consistent with higher peak hour factors, indicating a more constant pressure from traffic volumes. Further, the higher peak hour factors in the center of Lewes mean even the smallest variances in traffic change the time of the peak hour.

Figure 9 shows the late afternoon traffic volumes for the Lewes Historic Byway intersections. The specific turning movement diagrams are shown in the appendix. Table 2 lists the intersections and their total intersection peak hour motorized vehicle volumes in order from highest to lowest.

Table 2: Total Intersection Peak Hour Traffic Volume

Intersection	Total Intersection Traffic Volume
Kings Highway, Gills Neck Road and Cape Henlopen High School Driveway	1,493
Cape Henlopen Drive and Freeman Highway	1,412
Savannah Road and Third Street	1,184
Savannah Road, Front Street and Gills Neck Road	1,047
Savannah Road and Cape Henlopen Drive	846
New Road and Old Orchard Road	500
Pilottown Road (Front Street) and New Road	354
New Road and University Connector	340
Kings Highway and Third Street	301

As shown in the table, The majority of the traffic passing through the community uses Kings Highway and Freeman Highway. The second highest corridor is Savannah Road followed by New Road.

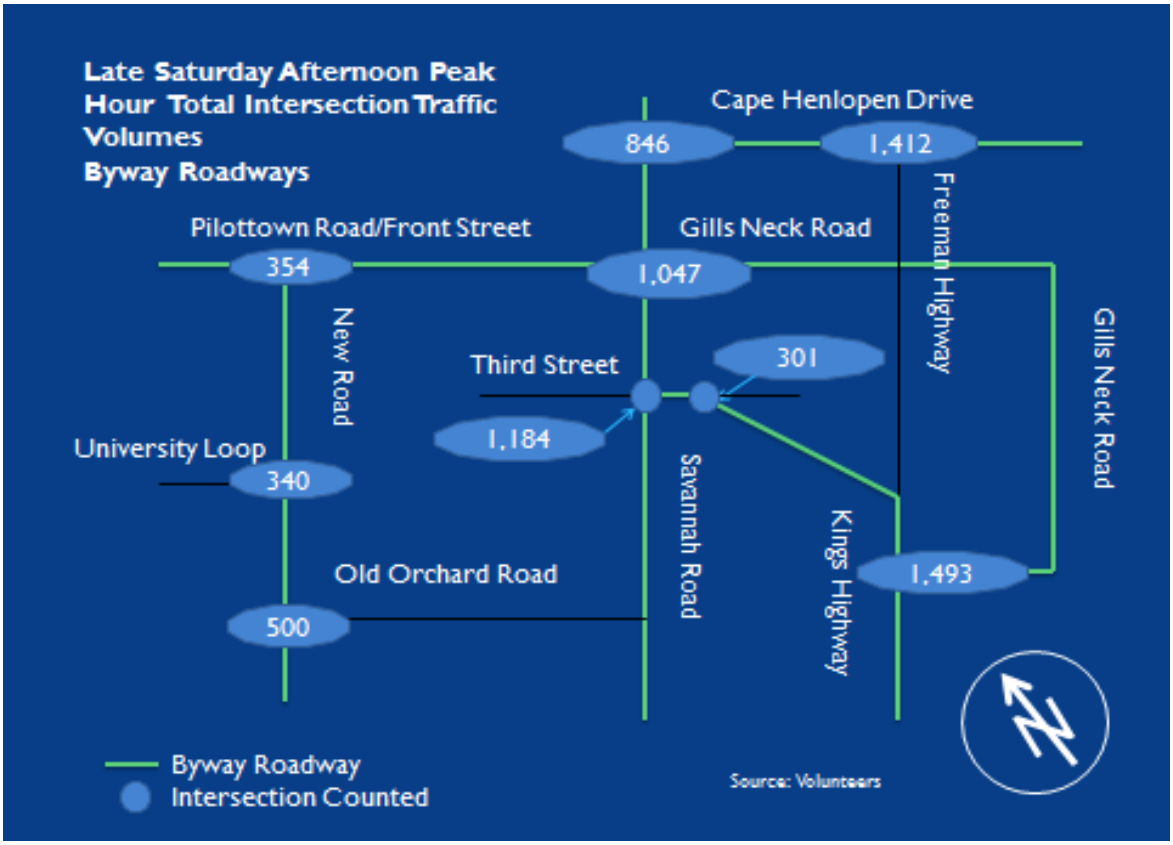


Figure 9: Late Saturday Afternoon Total Intersection Peak Hour Traffic Volumes

A major concern arising from the public outreach effort was the presence of vehicles pulling boat trailers. The narrow streets of the City make maneuvering these sometimes large trailers difficult.

Table 3 illustrates the total number of vehicles towing boat trailers at each of the study intersections.

Table 3: Total Intersection Peak Hour Boat Trailer Volumes

Intersection	Total Intersection Boat Trailer Volume
Pilottown Road (Front Street) and New Road	19
Savannah Road and Cape Henlopen Drive	17
Savannah Road, Front Street and Gills Neck Road	16
New Road and Old Orchard Road	8
New Road and University Connector	5
Kings Highway, Gills Neck Road and Cape Henlopen High School Driveway	2
Savannah Road and Third Street	1
Kings Highway and Third Street	1
Cape Henlopen Drive and Freeman Highway	0

As shown in the table, the highest number of trailers with boats was along Front Street/Pilottown Road in the vicinity of New Road followed by Cape Henlopen Drive near Savannah Road. The volunteers indicated that during other hours of the day, boat trailer traffic was higher than was counted on New Road but that the number of boat trailers on Front Street was important to consider in the analysis.

Bicycle traffic was also examined in the count program. Figure 10 illustrates the total intersection peak hour bicycle volumes.

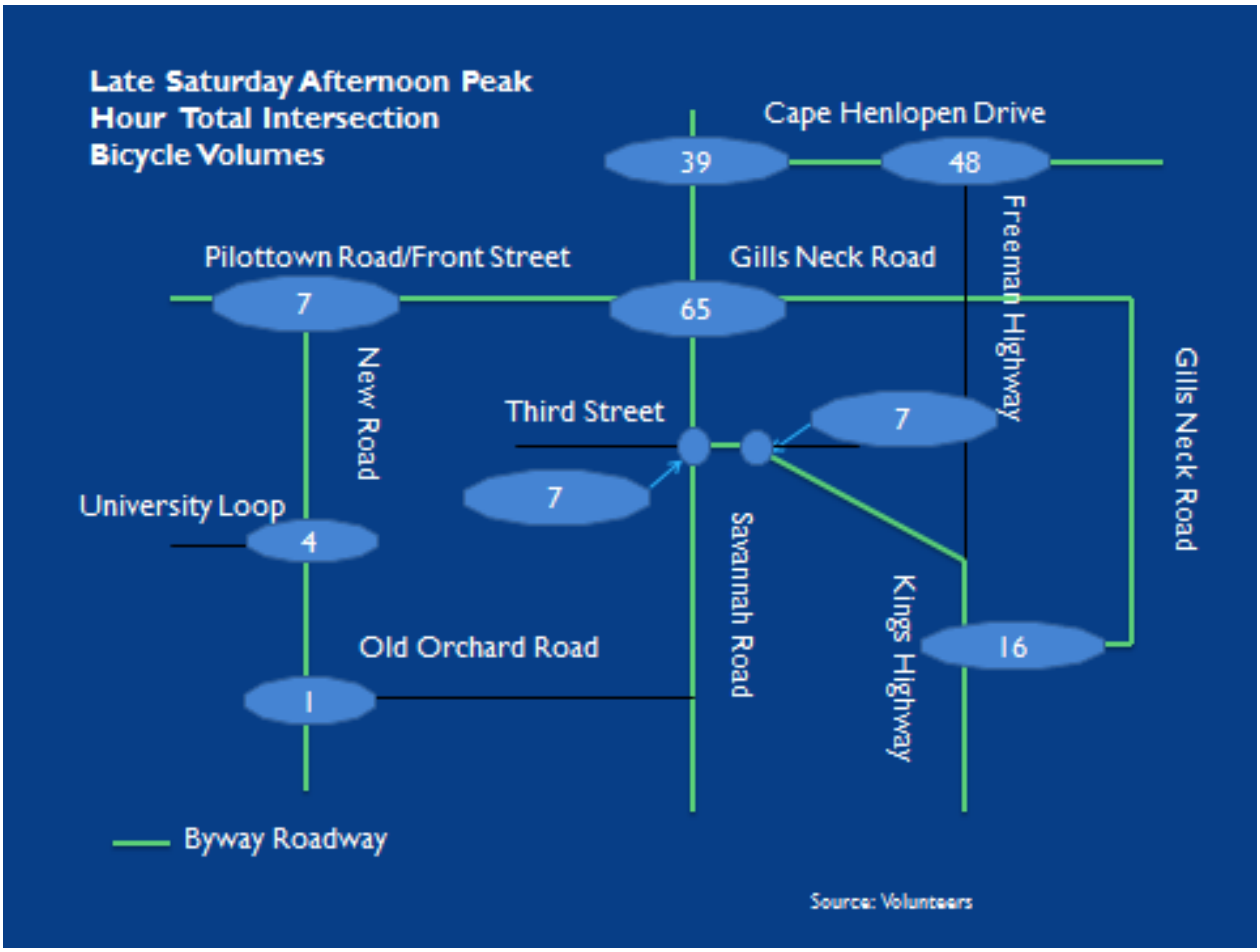


Figure 10: Late Saturday Afternoon Peak Hour Bicycle Volumes

As shown in the figure, there is a concentration of bicycles along the Cape Henlopen Drive Corridor and into the downtown area via Savannah Road. Of note is that the existing end of the Junction and Breakwater Trail at the High School carried little bicycle traffic. Most of the trail bicycle traffic followed Gills Neck Road to Savannah Road and Front Street. Additionally, the bicycle traffic on Cape Henlopen Drive is significant, emanating from Cape Henlopen State Park, the residential developments and the Cape May Lewes Ferry.

Interestingly, a number of the volunteers who live along the New Road Corridor reported that they would bicycle more if New Road was made safer for bicyclists. The lack of shoulders for most of its length and the narrow travel lanes make bicycling unpleasant along New Road. Overall, throughout the City, for the dinner hour, the number of bicyclists on the roadways is significant and a key factor to be considered as the study proceeds.

The volunteers also recorded pedestrians at the intersections that were counted. Figure 11 illustrates the number of pedestrians at the study intersections along the Byway.

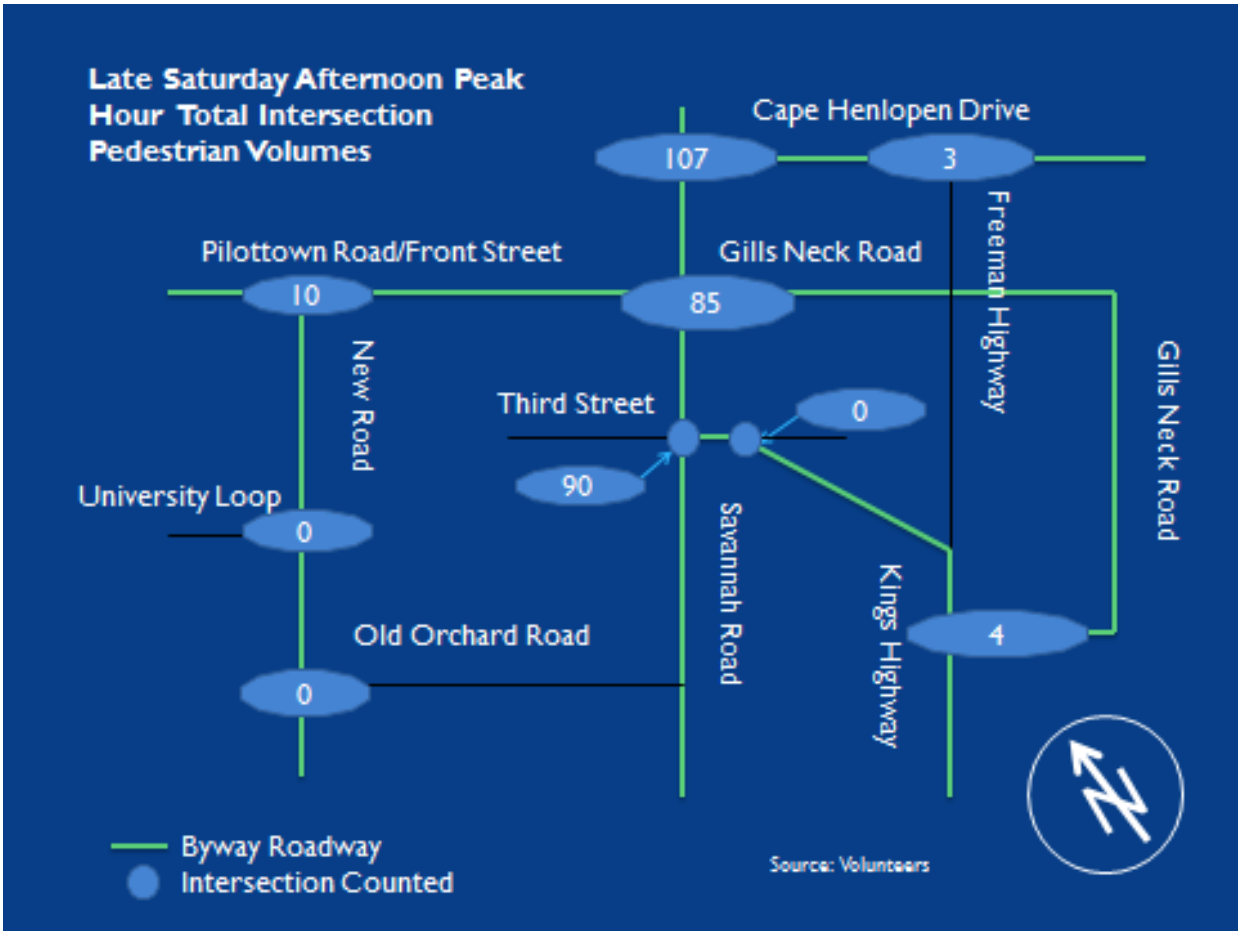


Figure 11: Late Saturday Afternoon Peak Hour Pedestrian Volumes

Review of the figure indicates that a substantial number of pedestrians were observed along Savannah Road from Cape Henlopen Drive to Third Street.

ESTIMATION OF THE CURRENT CARRYING CAPACITY OF BYWAY ROADWAYS

Loosely defined, carrying capacity is the amount of activity or use that can be handled by a system before it begins to deteriorate. Another way to describe carrying capacity is determining how much use (e.g., travel demand) a given setting (or transportation system) can absorb, before capacity is exceeded. Carrying capacity refers to a systemic breakdown in which the entire system begins to fail, as opposed to just a bottleneck where failure is localized.

The most prominent measure of the carrying capacity of a transportation system is level of service. Level of service has many definitions. In Lewes, traffic volumes vary greatly seasonally and throughout the day in all seasons. Congestion occurs seemingly randomly. A good example is how weather affects traffic volumes in the summer. Good beach days, sunny, warm surf, clear sky, attracts more beach goers than cloudy days with cold surf. Saturdays are change-over days for rental properties. When combined with good beach days can jam up the roadway network as can late afternoon traffic leaving the beach and folks headed to the downtown area for dinner. Similarly, market days create congestion as does events at the High School. Therefore, when considering carrying capacity, the analysis must consider all hours of the day and not just the typical commuter peak as in most jurisdictions.

The volunteers collected traffic count data for just two hours. In order to develop a traffic picture for an average summer day in Lewes, the traffic count data collected by the City for Savannah Road and for New Road was utilized. The hourly data collected by the City was converted to a percentage of the daily traffic. See figures 5 and 6. Then those percentages were applied to the total intersection volume data collected by the volunteers and graphs were prepared showing the total intersection volumes for the nine intersections.

To accurately describe carrying capacity, this analysis assumes that all of the intersections analyzed are controlled by a traffic signal if they are not already signalized. The reason is that as traffic increases, it is reasonable that the intersections would be signalized to adequately accommodate the increasing traffic demands. Additionally, the intersections were not improved through the addition of new travel lanes, turning lanes or turn prohibitions.

To adequately assess carrying capacity, the analysis must establish the amount of total intersection traffic that the intersection can accommodate without backing up. This, then, is the practical definition of carrying capacity of a specific intersection. To quantify this definition, a level of service scale has been developed for the City of Lewes. This scale is shown in Table 4.

Table 4: Level of Service Description

Level of Service	Percent of Capacity
A	Less than 55%
B	55% to 64%
C	64% to 73%
D	73% to 91%
E	91% to 109%
F	Greater than 109%

Percent of capacity is defined by the maximum number of vehicles that can be serviced by the intersection in one hour without backing up. Because the capacity if an intersection is relatively constant even as traffic patterns change, a direct relationship can be established between the volume passing through an intersection and the relationship of that volume to the capacity of an intersection.

To the daily traffic volume graphs of the nine intersections, the percent of capacity was determined for the count period and then, traffic volume was added until level of service 'F' was achieved. The current level of service and the level of service 'F' volumes were then noted on each of the graphs.

SAVANNAH ROAD CORRIDOR

STREET TRAFFIC ANALYSIS

Savannah Road provides direct access to downtown Lewes, the canal front and the Lewes beaches. Figure 12 illustrates the carrying capacity of the intersection of Front Street, Savannah Road and Gills Neck Road. The vertical blue bars illustrate the total intersection traffic volumes for each hour of the day. During the period of time when the volunteers were collecting traffic volume data, between the hours of 4:00 PM to 6:00 PM, the intersection was operating at Level of Service E, above 90% of the capacity of the intersection to accommodate traffic. However, when the other hours were analyzed, the intersection approaches its carrying capacity in the middle of the day when the business district is at its busiest and the beach-goers are on their way to the beach.

During the count period, many beach-goers were going home for the dinner hour and the traffic flows were unbalanced with the heaviest volumes traveling southbound on Savannah Road causing long platoons of waiting at the traffic signal.

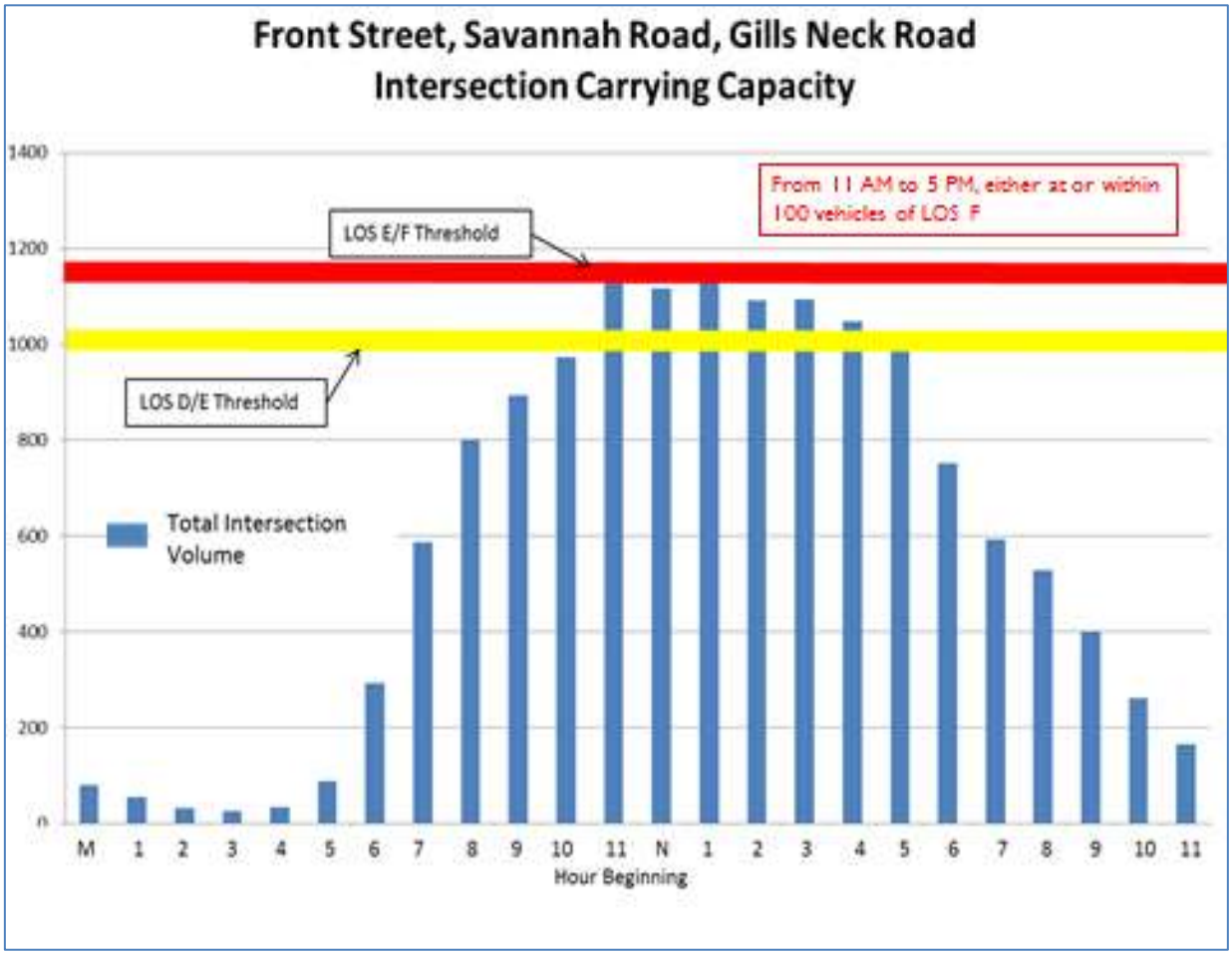


Figure 12: Carrying Capacity of the Intersection of Front Street, Savannah Road, and Gills Neck Road

At the intersection of Third Street and Savannah Road, illustrated in Figure 13, the situation is similar. While the intersection is also operating at Level of Service E, and is close to its carrying capacity, these adjacent major intersections, along with the Second Street Intersection, act as a system. Pedestrians crossing at the marked crosswalks cause traffic to stop and yield the right of way (as should be the case) and congestion ripples through the system.

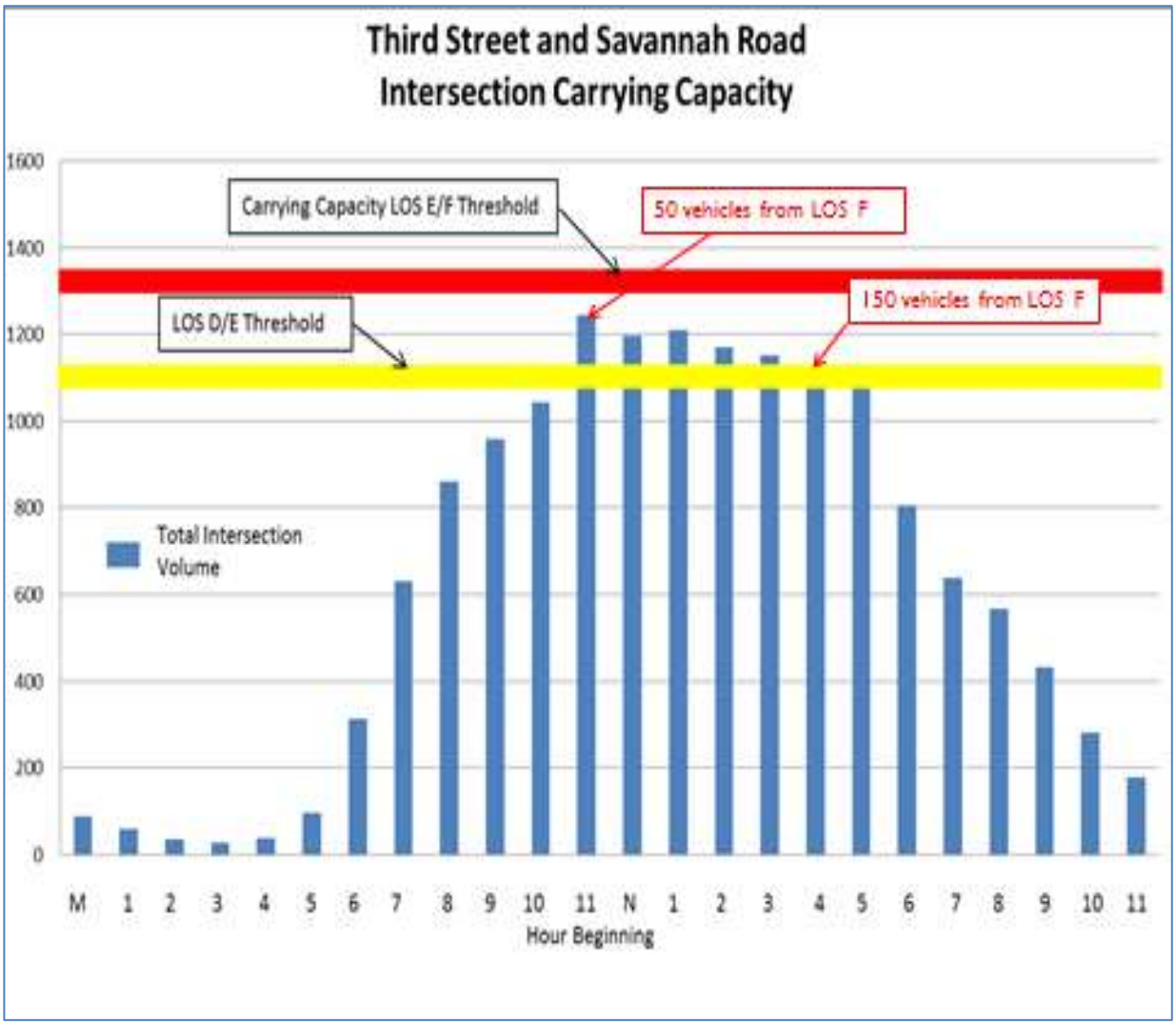


Figure 13: Carrying Capacity of the Intersection of Third Street and Savannah Road

The intersection of Savannah Road and Cape Henlopen Drive, shown in Figure 14, carries fewer vehicles throughout the day than the Front Street and Third Street intersections. It is currently operating at Level of Service B during the count period and for most of the day. This means that there is a lot of room for traffic increases before carrying capacity is reached. Observations note that the driveways and cross streets in the area, and in particular, the open curb cut at the Dairy Queen with its constant flow of customers increases congestion at the intersection.

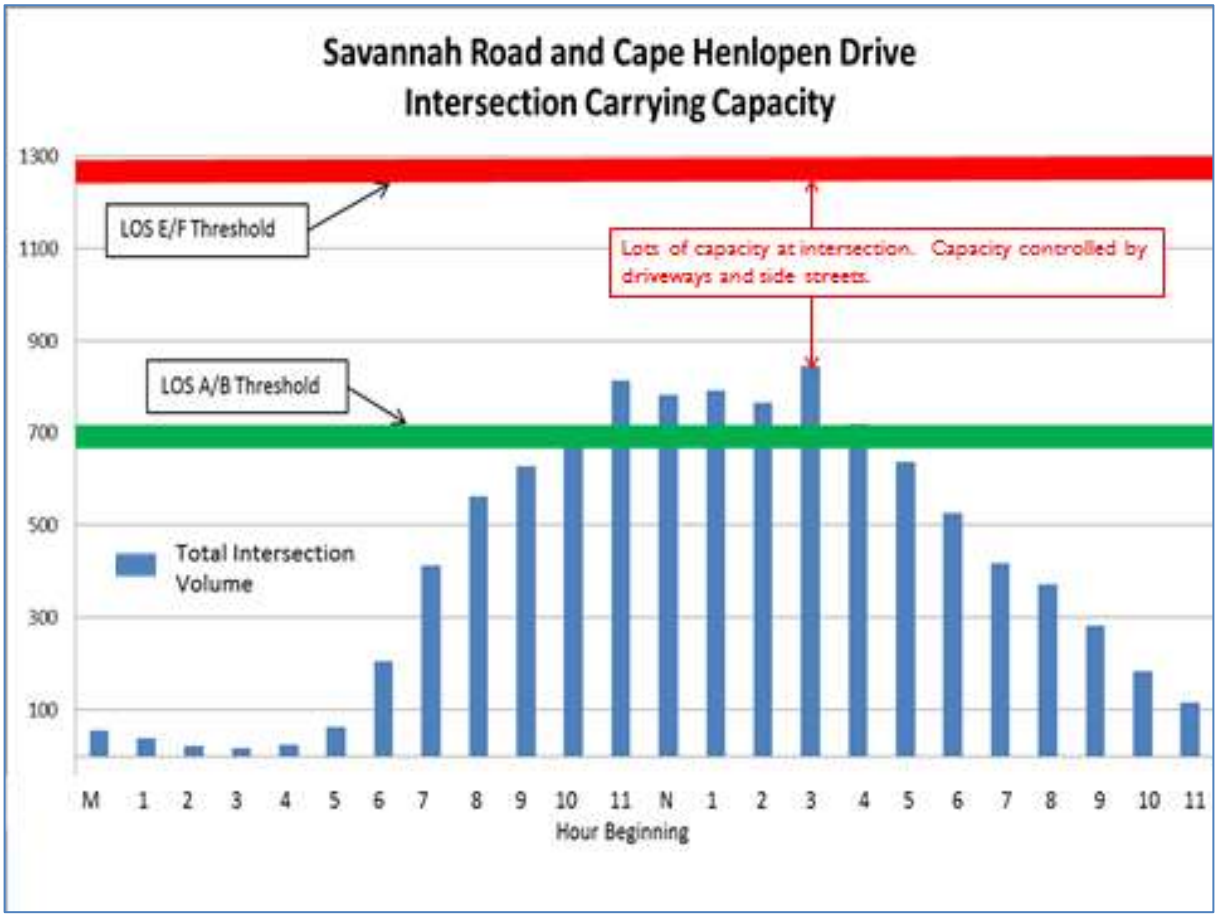


Figure 14: Carrying Capacity of the Intersection of Savannah Road and Cape Henlopen Drive

Beach Parking Analysis

Many beach goers use Savannah Road to travel to the beach parking lot at the end of the Savannah Road. Taken together with the beach parking lot on Cape Henlopen Drive, some 382 parking spaces are available to beach goers within Lewes. Beach parking is metered between May 1 and September 30 of each year. There is a two hour minimum parking fee at the Savannah Road lot. It should also be noted that residents between the canal and the Bay park at their houses and walk to the beach.

Figure 15 illustrates parking conditions at the two parking lots throughout the year.

November 16, 2013

March 30, 2007

Winter Months: Parking lots are empty

May 29, 2006

August 31, 2005

Shoulder Months: Parking lots are about half full

July 13, 2010

July 16, 2006

Summer Months: Parking lots are full

Figure 15: Beach Parking Conditions (Source: Google Earth)

As shown in the figure, the parking lots are full on a typical summer day. But there is a second problem: Because beach parking is at a premium, during peak times, when there are more people searching for spaces than there are spaces, motorists drive around looking for parking and add to the congestion. Table 5 shows the number of people traveling north of Cape Henlopen Drive on Savannah Road. While some turn off on side streets and into driveways, many continue on to the parking lot. If only 40% of the traffic leaving the intersection of Cape Henlopen Drive and Savannah Road on Savannah Road want to park in the beach lot, between 11:00 AM and 3:00 PM, parking demand exceeds supply at that lot. If the percentage increases to 50%, the number of motorists who cannot find a place in that lot to park more than doubles. For example, the 39 trips into of the parking lot at 11:00 AM are actually 78 trips into and out of the parking lot. If 50% of the traffic on Savannah Road wants to park at the beach parking lot, then the number increases by almost 2.5 times to 189. When that is the case, traffic on Savannah Road at Cape Henlopen Drive could increase between 25% at 11:00 AM and at the critical noon hour.

Table 5: Parking Analysis Savannah Road Beach Lot

Hour Beginning	Filled Spaces	Excess Demand
9:00 AM	196	0
10:00 AM	212	0
11:00 AM	232	39
12:00 PM	232	49
1:00 PM	232	27
2:00 PM	232	21
3:00 PM	232	1
4:00 PM	212	0
5:00 PM	195	0
6:00 PM	153	0

In short, the lack of parking is critical in that excess demand is forced to circulate unnecessarily on the Lewes Street Network.

Savannah Road Summary

To summarize the three locations analyzed along the Savannah Road Corridor:

- Front Street/Gills Neck Road: This is the key intersection that controls carrying capacity. It can't take much more traffic before its carrying capacity is reached.
- Third Street: This intersection is also a controlling intersection and can't take much more traffic either.
- At either Front Street or Third Street, as little as one to two vehicles per minute in the afternoon could exceed carrying capacity. That's about 10% more traffic. Further, the need to provide pedestrian crossings throughout this section of Savannah Road also increases congestion as vehicles stop for pedestrians in the crosswalks.
- Cape Henlopen Intersection controlled by adjacent side streets and driveways.

- The demand for beach parking oftentimes exceeds the supply during the summer months. When this occurs, it puts added strain on the capacity of the street system.

KINGS HIGHWAY, FREEMAN HIGHWAY AND CAPE HENLOPEN DRIVE CORRIDOR

STREET TRAFFIC ANALYSIS

The Kings Highway, Freeman Highway and Cape Henlopen Drive corridor provides direct access to the Cape May Lewes Ferry and Cape Henlopen State Park. It also provides access via Kings Highway to the eastern side of town and to the residential subdivisions along Cape Henlopen Drive and Gills Neck Road. It also provides the quickest access to the Lewes beaches. Two intersections were analyzed in this corridor: Kings Highway, Gills Neck Road and the Cape Henlopen High School Driveway and the intersection of Freeman Highway and Cape Henlopen Drive.

Figure 15 shows clearly that this intersection is currently operating in excess of its carrying

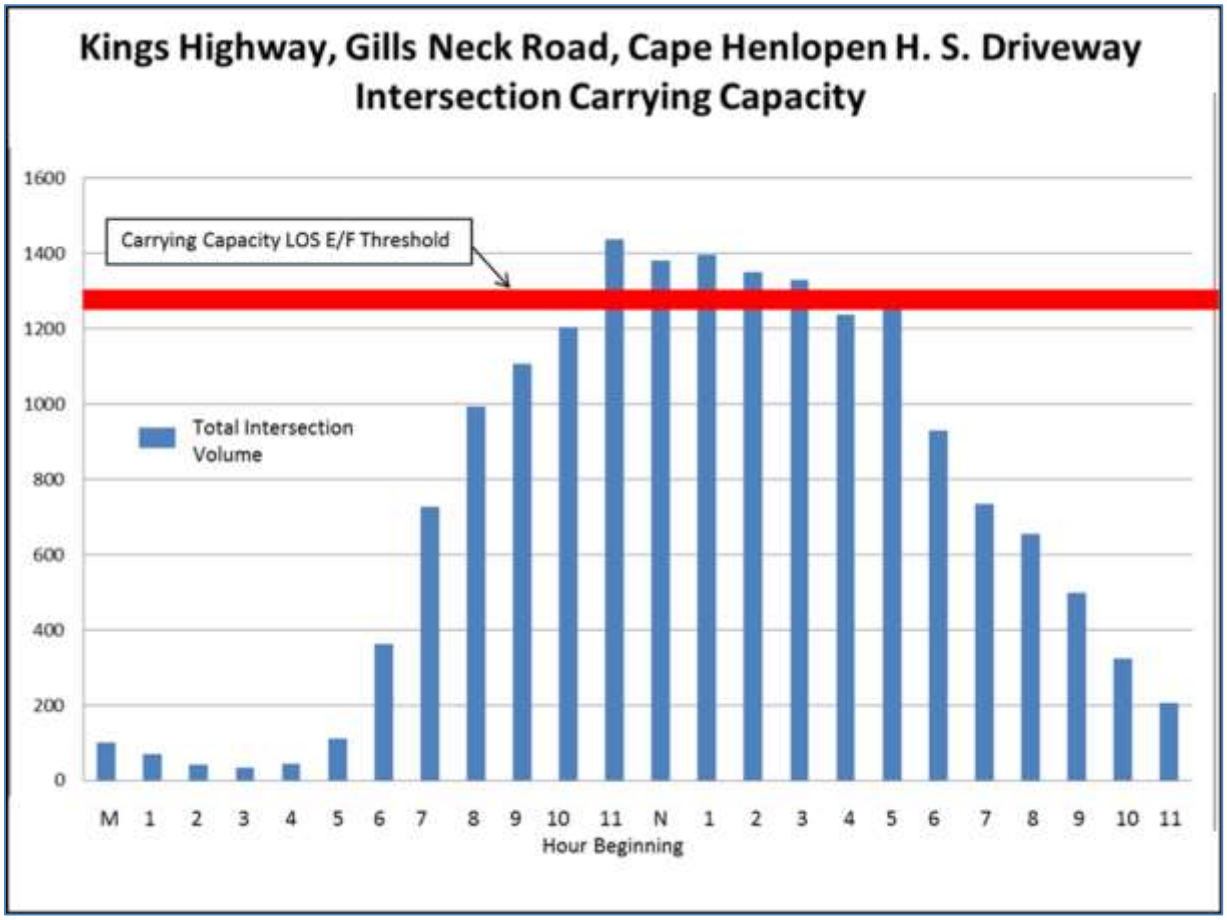


Figure 16: Carrying Capacity of the Intersection of Kings Highway, Gills Neck Road and the Cape Henlopen High School Driveway

capacity. As with the other intersections, the peak period is in the middle of the summer day. School was not in session and there were no events at the High School.

Figure 16 shows the intersection of Freeman Highway and Cape Henlopen Drive. This intersection currently has plenty of capacity remaining, operating at Level of Service B throughout the day. Even though this intersection services the second highest number of vehicles, the reason it operates

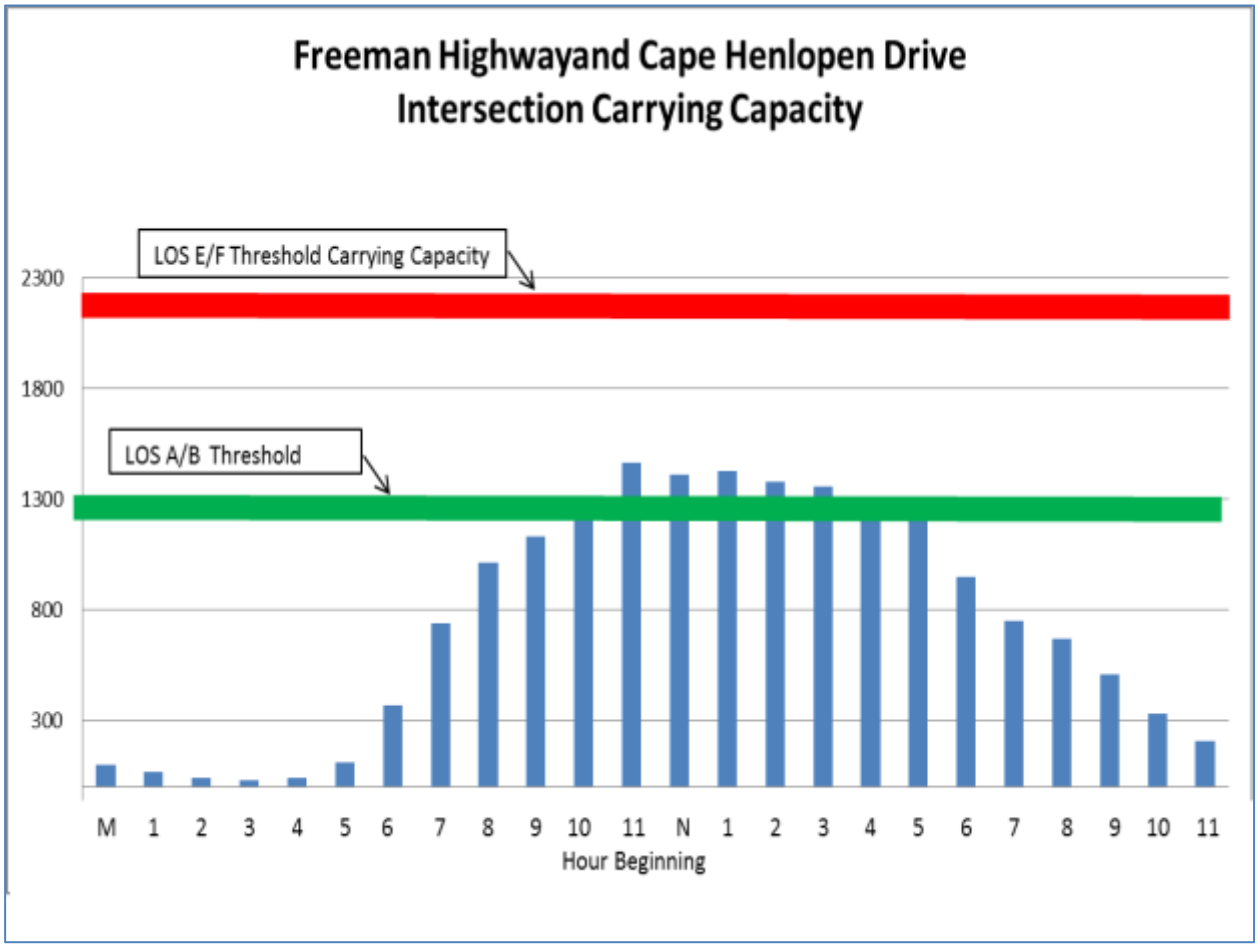


Figure 17: Carrying Capacity of the Intersection of Freeman Highway and Cape Henlopen Drive

so well is the separate right turn roadways and left turning lane on Cape Henlopen Drive.

Cape May-Lewes Ferry

The Delaware River and Bay Authority operates a popular ferry service between Cape May, New Jersey and Lewes, Delaware. During the summer months, it carries between 1,800 and 2,400 vehicles per day, both ways. It also carries both bicyclists and pedestrians. The ferry operates between 12 and 14 trips in each direction during summer weekend days depending upon demand. The schedule varies but the trips average about one per hour throughout much of the day. Tables 6

and 7 illustrate the schedule and patronage for the ferry operation on August 17, 2013, also the count day for the volunteers.

Table 6: Cape May-Lewes Ferry Schedule and Patronage for Saturday, August 17, 2013, Arriving Ferries

Cape May to Lewes	Depart Cape May	Arrive Lewes	Finish Unloading	Vehicles
1	6:30 AM	7:55 AM	8:15 AM	86
2	7:30 AM	8:55 AM	9:15 AM	105
3	8:30 AM	9:55 AM	10:15 AM	85
4	9:30 AM	10:55 AM	11:15 AM	91
5	10:15 AM	11:40 AM	Noon	92
6	11:00 AM	12:25 PM	12:45 PM	105
7	Noon	1:25 PM	1:45 PM	85
8	1:00 PM	2:25 PM	2:24 PM	87
9	1:45 PM	3:10 PM	3:30 PM	94
10	2:30 AM	3:55 PM	4:15 PM	93
11	3:30 PM	4:55 PM	5:15 PM	86
12	4:30 PM	5:55 PM	6:15 PM	94
13	6:00 PM	7:25 PM	7:45 PM	104
14	9:00 PM	9:25 PM	9:45 PM	69

Table 7: Cape May-Lewes Ferry Schedule and Patronage for Saturday, August 17, 2013, Departing Ferries

Lewes to Cape May	Begin Loading	Depart Lewes	Vehicles
1	7:40 AM	8:00 AM	93
2	8:55 AM	9:15 AM	101
3	9:55 AM	10:15 AM	91
4	10:55 AM	11:15 AM	94
5	11:35 AM	Noon	96
6	12:25 PM	12:45 PM	92
7	1:25 PM	1:45 PM	87
8	2:25 PM	2:45 PM	85
9	3:10 PM	3:30 PM	86
10	3:55 PM	4:15 PM	92
11	4:55 PM	5:15 PM	95
12	5:55 PM	6:15 PM	58
13	6:55 PM	7:25 PM	58
14	9:10 PM	9:30 PM	29

Source: Delaware River and Bay Authority

While the schedule varies due to both conditions on the Bay and demand, the data can be analyzed to understand the impact of traffic on Cape Henlopen Drive and on the Freeman Highway. Figure

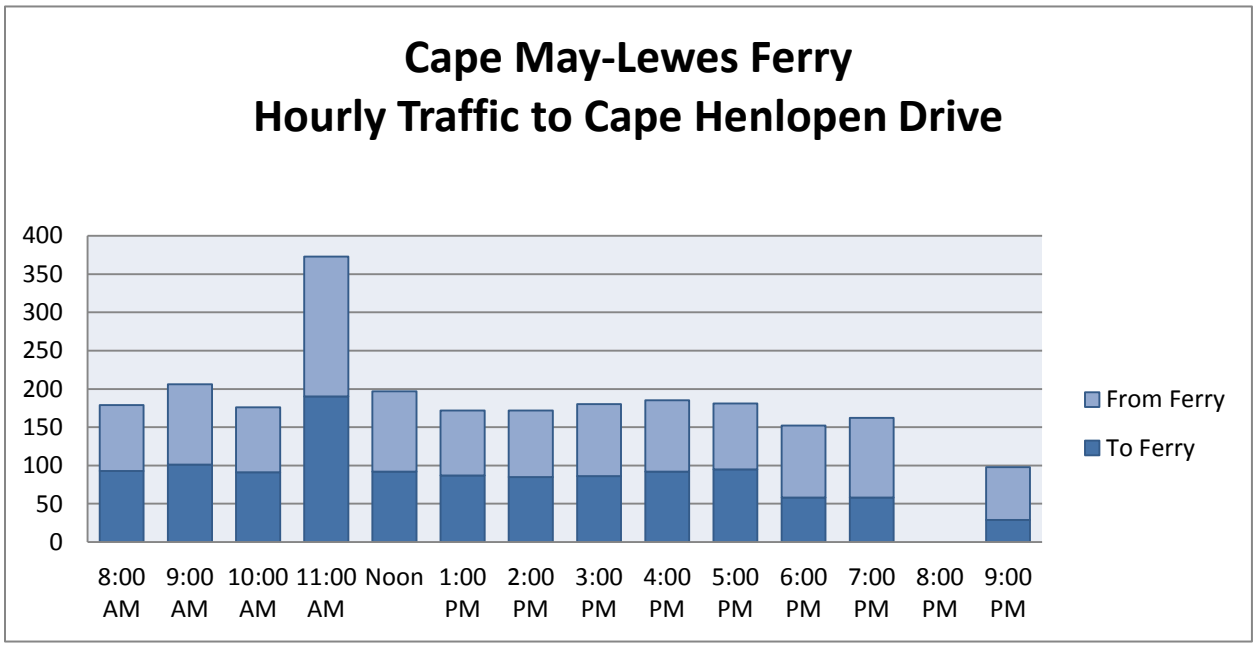


Figure 18: Hourly Traffic Patterns of the Cape May-Lewes Ferry for August 17, 2013

18 illustrates the traffic entering the ferry parking lot and the traffic leaving it. As can be seen, the schedule keeps it fairly level throughout the day by spacing one arriving and one departing trip per hour except for the 11:00 AM hour where the schedule overlaps with two arriving and departing trips in the same hour.

Adding about 200 trips per hour to Cape Henlopen Drive uses a portion of the carrying capacity of that roadway. Using the efforts of the volunteers, it is possible to assess the impact. Figure 19 illustrate the proportion of traffic to and from the Cape May-Lewes Ferry at the intersection of Cape Henlopen Drive and Freeman Highway.

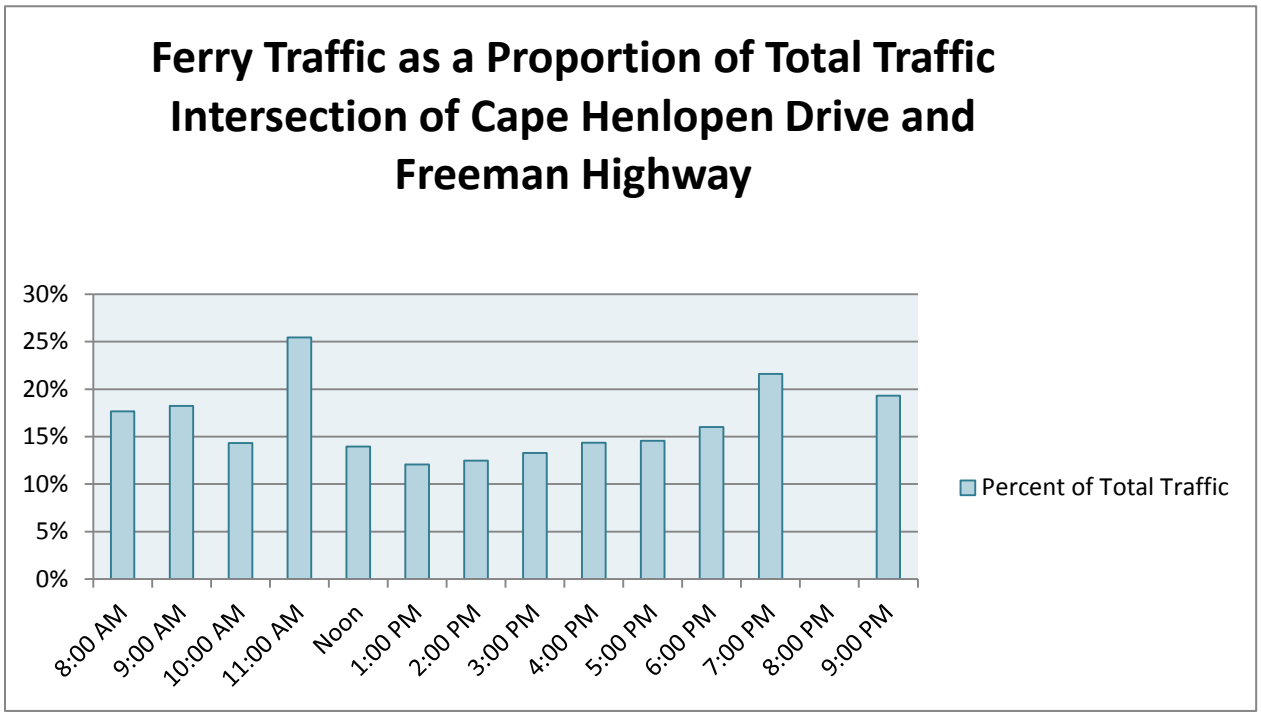


Figure 19: Ferry Traffic as a Percentage of Total Traffic at the Intersection of Cape Henlopen Drive and Freeman Highway

As shown in the figure, ferry traffic ranges from 12% to 25%.

Cape Henlopen State Park

The Cape Henlopen State Park provides a range of outdoor activities ranging from hiking, bicycling, camping and bathing at two breaches. Some 125,000 automobiles pass through its gates each year. DNREC's Division of State Parks does not record daily or hourly visitation to its state parks but does maintain a monthly tabulation. While they have recently increased the number of parking spaces available, on some days, observations show that visitors are turned away, requiring them to double back, adding to the congestion along Cape Henlopen Drive. Figure 20 illustrates the monthly distribution of visits.

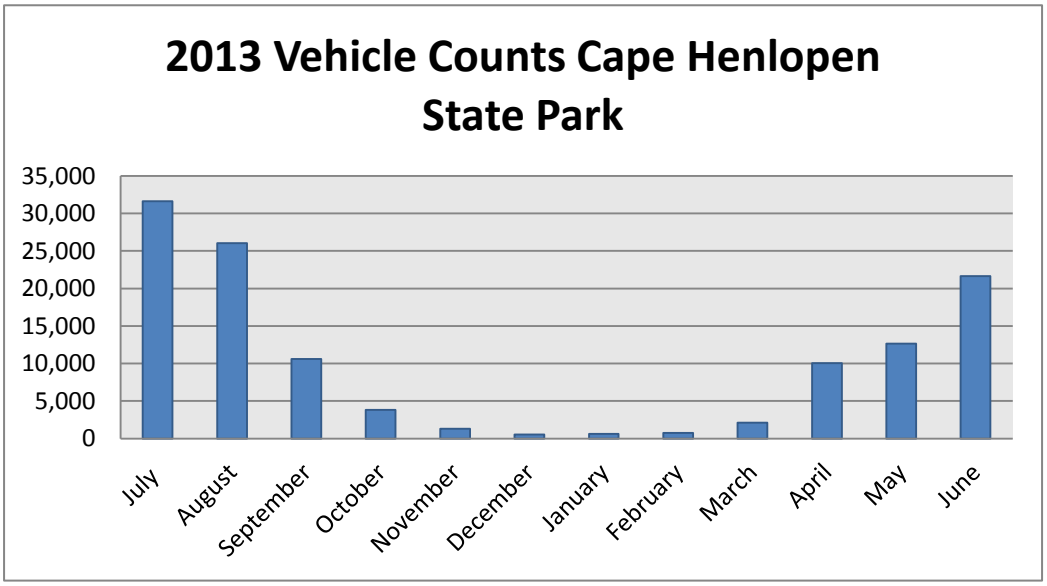


Figure 20: 2013 Vehicle Counts at Cape Henlopen State Park

As shown in the figure, July is the month with the highest visitation with in excess of 30,000 visits. August visitation was second highest at just over 25,000 visits.

Kings Highway And Freeman Highway Corridor Summary

To summarize the Kings Highway and Freeman Highway Corridor, the following is noted:

- Kings Highway, Gills Neck Road and the Cape Henlopen High School Driveway Intersection: This intersection currently operates over capacity for much of a typical summer day. It should also be noted that unlike the other roadways studied, this intersection could be improved by adding additional lanes.
- About 1/3 of the traffic passing through the intersection continues on Kings Highway into or out of the downtown area of Lewes.
- The intersection of Freeman Highway and Cape Henlopen Drive has lots of capacity available; it's a big intersection.
- Traffic to and from the Cape May-Lewes Ferry can represent as much as 25% of the traffic at the intersection of Cape Henlopen Drive and Freeman Highway, representing as many as 200 vehicles at the intersection.
- Cape Henlopen State Park attracts about 125,000 vehicles per year with more than 30,000 visits during the month of July.

New Road Corridor

The New Road Corridor serves a number of residential areas, the University of Delaware, Canal Front Park and the DNREC's Boat Launch. When Savannah Road and Kings Highway are congested, it serves as a relief valve for those familiar with Lewes.

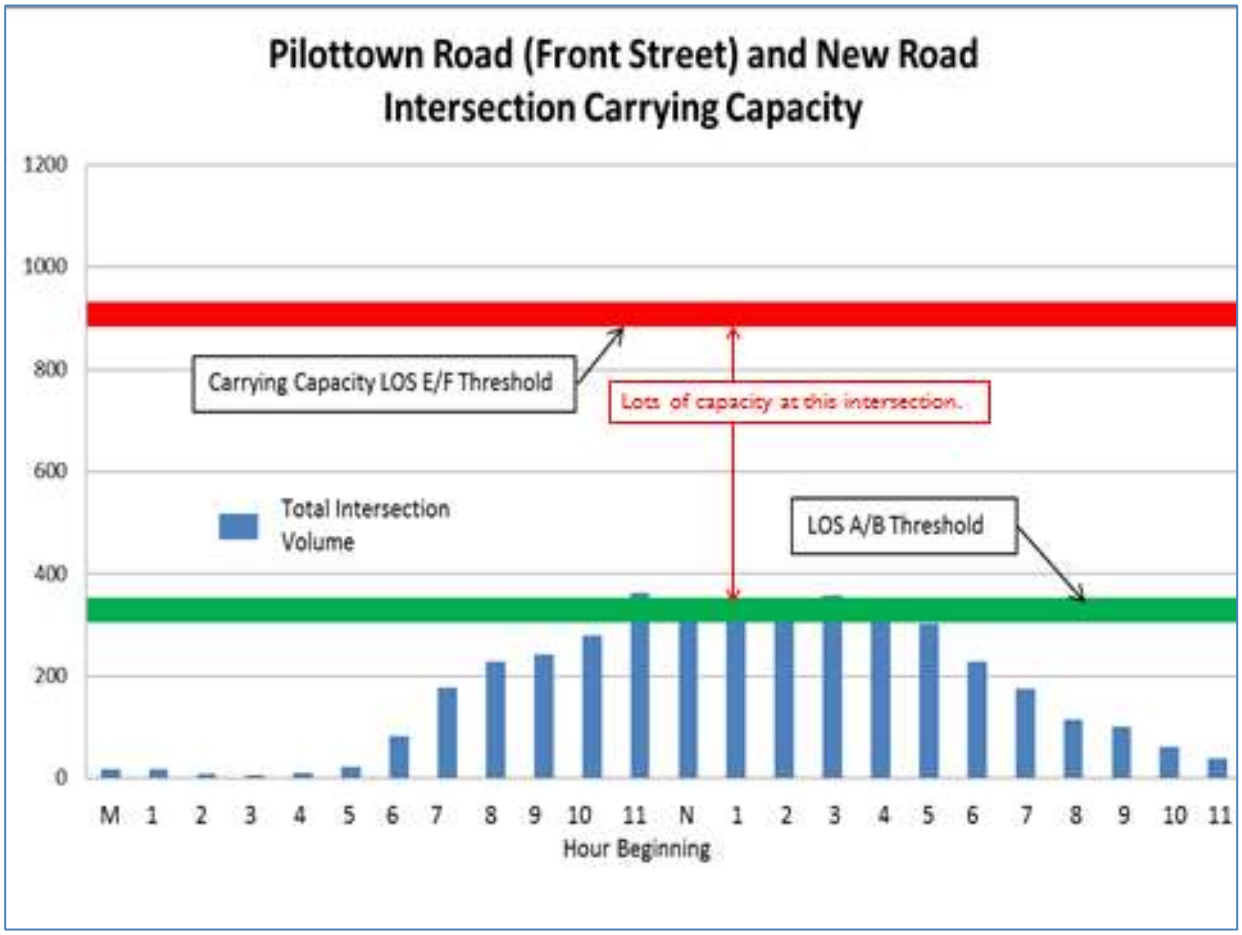


Figure 21: Carrying Capacity of the Intersection of Pilottown Road and New Road

This intersection operates well within its carrying capacity. Similarly, the other two intersections analyzed, New Road and Old Orchard and New Road and University Connector, operate within their carrying capacity. Of concern, however, is additional traffic. While it could be accommodated along New Road, as it makes its way to the downtown area, even if its only one or two vehicles per minute, carrying capacity will be exceeded there.

PLANNED/PROPOSED DEVELOPMENTS

Developments not only along the Byway roadways but also nearby, also may affect the carrying capacity of the Byway. This section examines the developments that have the most impact to the carrying capacity of the Lewes Historic Byway. The source of information for this section is the approved traffic impact study for the Showfield Development.[1]

The City of Lewes Planning Commission, the Sussex County Planning Department and the Delaware Department of Transportation are responsible for reviewing developments submitted to them. The City and County are responsible for considering development proposals against their respective zoning ordinances and subdivision and land development ordinances. DelDOT is responsible for reviewing development proposals against their roadway access standards and the level of service mitigation improvements against their road design and traffic engineering standards. While there is some coordination among the agencies listed, each agency is enabled only to follow its regulations and not enter the other agency's areas of responsibilities. Normally, this means that the city and the county review the land use issues and DelDOT stays close to the roadway operation and design issues. As a result, if a development proposal meets or the underlying land zoning requirements or is rezoned so that the new requirements are met, if the access and level of service requirements of DelDOT are met, the project is typically approved.

Based upon the submitted and approved traffic impact studies, the following planned/proposed developments listed in Table 8 could potentially impact the Byway.

[1] Orth-Rodgers & Associates, Inc., Traffic Impact Study Showfield Proposed Residential Development, October 17, 2007. DelDOT Subdivision Engineers consider this study to be the best assessment of future traffic conditions on the eastern side of Lewes. While it was prepared in 2007, few if any of the developments contained therein have been built.

Table 8: Planned/Proposed Developments East Side of Lewes, DE

Development Name	Location	Description	Peak Hour Trips to the External Roadway System		
			AM	PM	Sat
Showfield Residential Development	Freeman Highway and north and west of Gills Neck Road	198 single family detached houses and 409 single family attached houses.	307	389	348
Gills Neck Road Subdivision	Southeast corner of Gills Neck Road and Kings Highway	507 multi-family residential units, 100 room hotel, 1,000 seat performing arts center, 151, 290 sq. ft. of office, 265,700 sq. ft. shopping center, 4,000 sq. ft. drive-in bank, 8,000 sq. ft. high turnover restaurant and a 5,700 sq. ft. high turnover restaurant.	986	1,381	1,832
Jones Property Subdivision	Northbound side DE RT 1 east of Kings Highway	178 townhouses and 12,000 sq. ft. office building.	101	114	99
Cadbury Retirement Community	North of the proposed Gills Neck Road subdivision (see above)	82 apartments and 48 cottages.	10	14	39
Senators Residential Development	East of the residential portion of the Gills Neck Road Subdivision (see above)	242 single family houses	179	237	226
Breakwater Residential Development	Northeast of and adjacent to the Cadbury Development	80 single family homes and 105 townhouses	119	151	155
Hawkseye Residential Development	Northeast of and next to the Senators development	162 single family homes	123	165	155
Total Trips Generated by the potentially Impacting Developments			1,825	2,451	2,854

As can be seen, the developments listed in Table 8 will generate about 1,800 trips in the morning commuter peak, 2,450 trips in the afternoon peak and in excess of 2,800 trips during the Saturday peak hour, typically in the early afternoon.

Not all of the development generated trips affect the Byway and not all the trips that affect the Byway arrive at the choke points such as in the downtown area. As a result, each development, should it be constructed, will have a differing impact based upon their location on the roadway network, the land uses proposed and where the proposed access points are located.

An assessment was made of the level of traffic that the developments would add to the Byway intersections that are the focus of this study. The traffic impact study for the Showfield development documents an assignment of development traffic to the following intersections:

- Savannah Road, Front Street and Gills Neck Road
- Savannah Road and Third Street
- Kings Highway and Third Street
- Cape Henlopen Drive and Freeman Highway
- Kings Highway, Gills Neck Road and Cape Henlopen High School Driveway

It should be noted that this traffic will travel through other intersections on the Byway but it such analysis was beyond the scope of the traffic impact study process. Figures 22, 23 and 24 illustrate the development traffic for the morning, afternoon and Saturday peak hours, respectively.

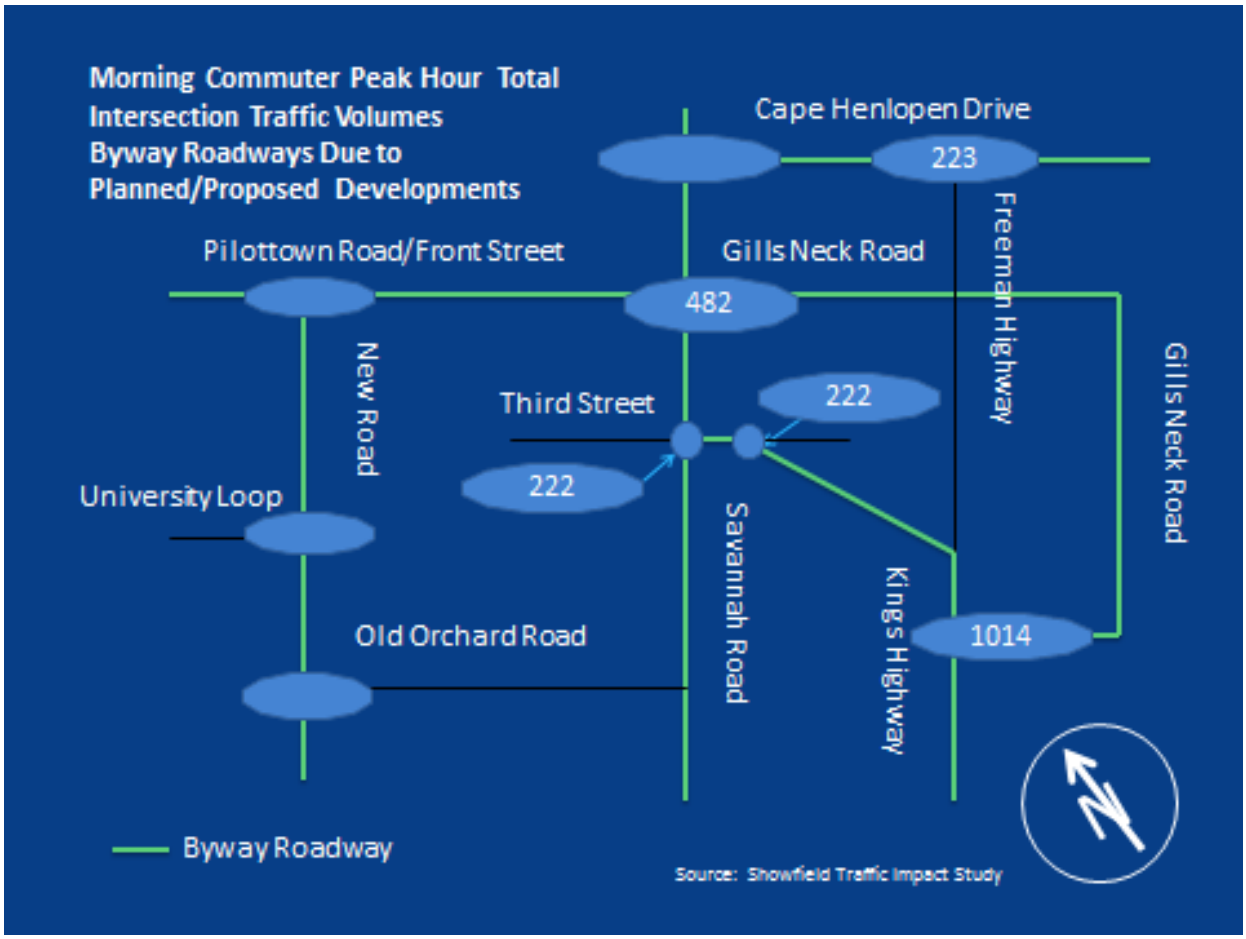


Figure 22: Morning Peak Hour Development Generated Traffic

As shown in Figure 22, during the morning peak hour, when commuters are the dominate traffic pattern, 482 additional vehicles can be expected to pass through the intersection of Front Street and Savannah Road with slightly less than half that passing through Third Street and Savannah Road and Kings Highway and Third Street. The intersection of Cape Henlopen Drive and Freeman Highway will experience an increase of 223 vehicles in the morning peak hour. The most significant increase in traffic is at the Kings Highway and Gills Neck Road intersection with 1,014 vehicles added in the morning peak hour. As will be seen in the following figures, the morning peak hour experiences the lightest increase in traffic of a typical day.

Figure 23 shows the afternoon peak development generated peak hour traffic. This peak typically carries commuter traffic returning home and in the summer, beach and recreational traffic from Cape Henlopen State Park as well as shopping traffic from the proposed and from existing shopping centers.

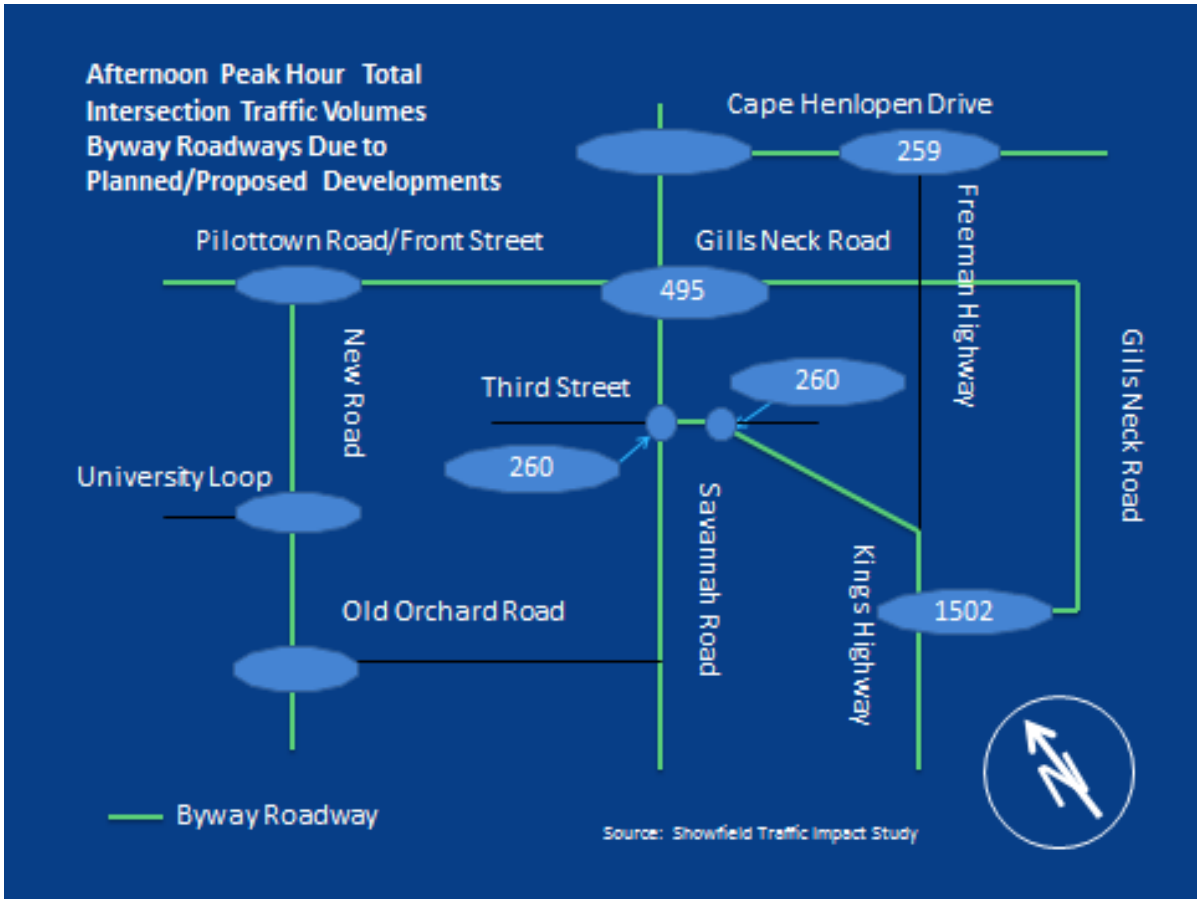


Figure 23: Afternoon Peak Hour Development Generated Traffic

As can be seen in Figure 23, traffic at the intersection of Savannah Road and Front Street will carry an additional 495 vehicles due to the proposed developments with the intersection of Savannah Road and Third Street and the intersection of Third Street and Kings Highway each carrying 260

additional vehicles in the afternoon peak hour. The Kings Highway and Gills Neck Road intersection will carry an additional 1,502 vehicles and the intersection of Cape Henlopen Drive and Freeman Highway will carry an additional 259 vehicles in the afternoon peak hour.

Figure 24 illustrates the Saturday peak hour traffic volumes generated by development traffic. This peak hour typically occurs during the early afternoon when recreational traffic is on the roadways and rental unit change-overs are well underway. In addition, this is also a peak shopping center traffic period.

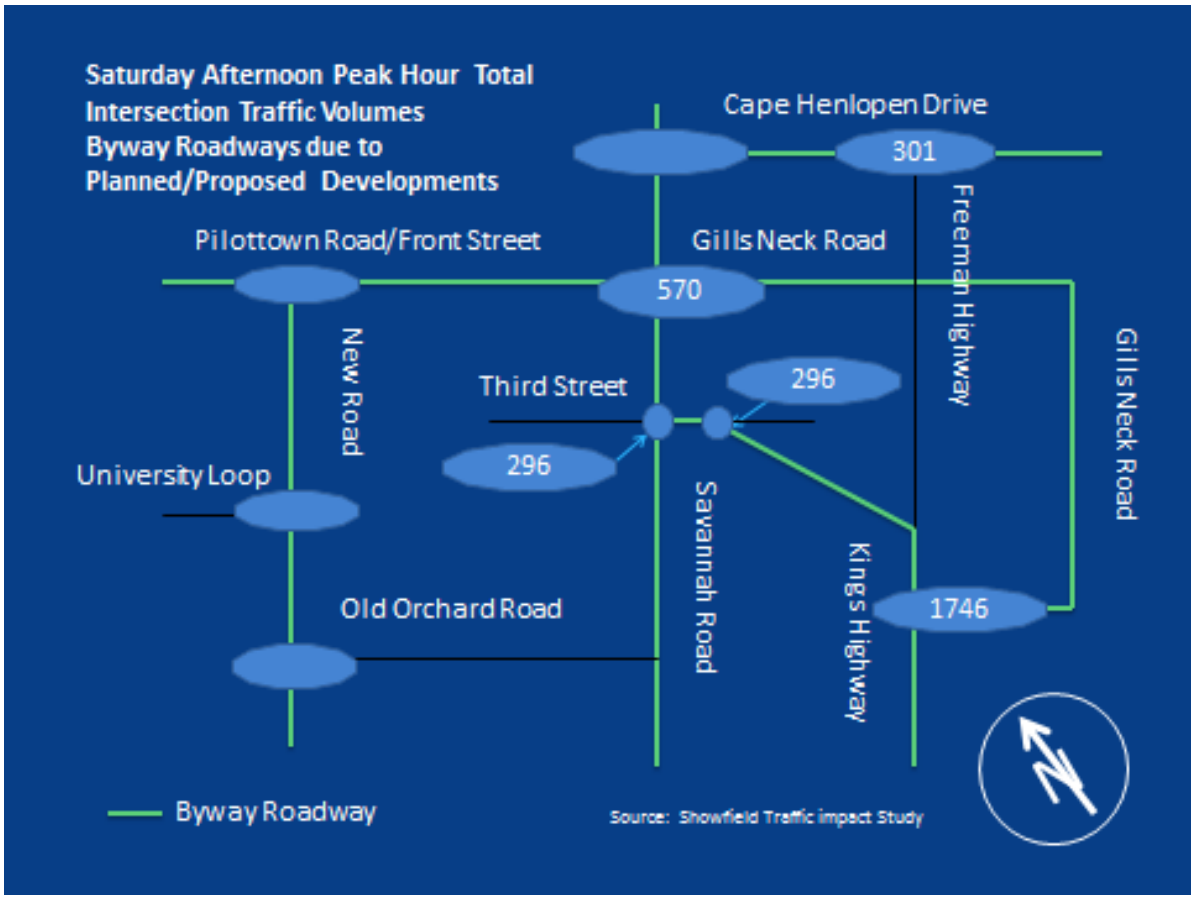


Figure 24: Saturday Peak Hour Development Generated Traffic

As shown in the figure, Saturday is the highest of the peak periods analyzed in the traffic impact study. At the intersection of Front Street and Savannah Road, development adds 570 new vehicles to the intersection in the Saturday peak hour. During the same peak hour, the intersections of Third Street and Savannah Road and Third Street and Kings Highway will experience an increase of 296 vehicles. The intersection of Kings Highway and Gills Neck Road will experience an increase of 1,746 vehicles and the intersection of Freeman Highway and Cape Henlopen Drive will experience an increase of 301 vehicles in the Saturday Peak Hour.

Table 9 highlights the increases and the resultant levels of service at the intersections on the eastern side of Lewes.

Table 9: Impact of Development Traffic

Intersection	AM Peak					PM Peak					PM Peak				
	Base Volume	Development Traffic	Total Future Traffic	Percent Increase	Resultant Level of Service	Base Volume	Development Traffic	Total Future Traffic	Percent Increase	Resultant Level of Service	Base Volume	Development Traffic	Total Future Traffic	Percent Increase	Resultant Level of Service
Savannah Road, Front Street and Gills Neck Road	802	482	1284	60%	F	1117	495	1612	44%	F	1021	570	1591	56%	F
Savannah Road and Third Street	861	222	1083	26%	D	1126	260	1386	23%	E	1210	296	1506	24%	E
Kings Highway and Third Street	262	222	484	85%	A	326	260	586	80%	A	271	296	567	109%	A
Cape Henlopen Drive and Freeman Highway	1013	223	1236	22%	A	1410	259	1669	18%	C	1244	301	1545	24%	C
Kings Highway, Gills Neck Road and Cape Henlopen High School Driveway	993	1014	2007	102%	D	1396	1502	2898	108%	D	1281	1746	3027	136%	D

Notes:

1. Base volume from count data colected by the volunteers and factored using City of Lewes data.
2. Development traffic from Shofield Traffic Impact Study as approved by DelDOT.
3. Proposed improvements by the developers will improve the level of service at the intersection of Kings Highway, Gills Neck Road and the High Scvhool Driveway to Level of service D from Level of Service F.

As shown in the table, even though Savannah Road is remote to the development area, it will be impacted by the developments, especially at Front Street with increases in traffic of as much as 60% with the critical Saturday peak hour increasing 56%. The current situation has the intersection below its carrying capacity but the developments push it beyond its carrying capacity.

The improvements along Kings Highway near Gills Neck Road and the High School, required by DelDOT for the development projects to proceed include an additional travel lane in the northbound direction on kings Highway and double left turn lanes for all major intersections including major development access points. These represent substantial improvements and will result in a substantially wider Kings Highway and Gills Neck Road.

The Existing and Future Carrying Capacity Situation

Taken together, the downtown area of Lewes, especially along the Savannah Road corridor is currently perilously close to exceeding its carrying capacity in the downtown area. One or two additional vehicles per minute would breach the Carrying Capacity ceiling and if the developments along Kings Highway are constructed, the carrying capacity will be exceeded.

The Kings Highway/Freeman Highway corridor already exceeds its carrying capacity at the high school. The major developments proposed for this area will result in major improvements and the carrying capacity in the area will not be exceeded. Other Byway Roadways operate generally below carrying capacity BUT they have the capacity to deliver more traffic to Savannah Road downtown.

Transportation management strategies should be developed to manage use of the roadway capacity especially throughout Lewes, even where the levels of service will remain acceptable into the future as this study has shown that development in one area affects traffic conditions in other areas of the City.

Such strategies need to maintain ease of access to those who have a destination in the center of Lewes and provide for pedestrians and bicycles throughout the Byway Roadways.

ASSESSMENT OF POTENTIAL RECOMMENDATIONS

Assessment of the carrying capacity of the Lewes Historic Byway reveals two major areas of concern:

1. The development of appropriate context sensitive improvements required to mitigate the traffic impacts of development proposals in the Kings Highway/Gills Neck Road area and for all Byway roadways of the Lewes Historic Byway.
2. Management of traffic due to events, tourism, the beaches and Cape Henlopen State Park.

What are Context Sensitive Solutions?

Context sensitive solutions is first a collaborative, interdisciplinary approach to transportation challenges that involves all stakeholders in developing a transportation facility design that fits its setting. It is an approach that leads to preserving and enhancing scenic, aesthetic, historic, community, and environmental resources, while improving or maintaining safety, mobility, and infrastructure conditions.

Adapted from the Joint AASHTO / FHWA Context Sensitive Solutions Strategic Planning Process, Summary Report, March 2007

As previously indicated, roadway expansion in the Lewes area will most likely be limited to mitigating or offsetting the traffic impacts of development and accommodating increased pedestrian and bicycle volumes though optimization of the public rights of way which accommodate streets and roadways, trails and greenways. This is due to the fact that there is only one way in and one way out of Lewes By vehicle: State Route 1. Sure, the Cape May Lewes Ferry provides access to Lewes but the traffic it adds to the system is small compared to the traffic going to and from State Route 1. Adding capacity to the existing roadway system only speeds traffic to the end of the road or to the next bottleneck with only minor decreases in roadway delay or travel times.

MITIGATION OF TRAFFIC IMPACTS OF DEVELOPMENT TRAFFIC

There are several developments proposed for the Kings Road and the Gills Neck Road Corridor. Some are in the pipeline, some are under construction and some are still in the planning stages. All of the developments are outside the municipal boundaries of the City of Lewes and approval of the developments is under the jurisdiction of the County of Sussex. The Delaware Department of transportation retains jurisdiction of the roadway improvements. History shows that while there is some coordination between the County and DelDOT, it has not included a process that results in transportation improvements that are context sensitive. As such, the improvements are designed to be as large as possible and with little, if any, consideration to aesthetics.

Figure 25 illustrates the location of the developments along Gills Neck Road and Kings Highway and the potential improvements that could potentially be required to mitigate the traffic impact of the developments. As with any development assessment, it is subject to schedule and scope changes by the developer-proponent and changes due to agency negotiations as part of the approval process. To that extent, the purpose of this section is to describe how context sensitive solutions can be

injected into the development process at the County level and at DelDOT. That process has already begun with the development of a commitment on the part of DelDOT to cooperate with the developers in the area and the Ad Hoc Byway Committee to develop a Master Improvement Plan for the affected Byway roadways.

At the County level, the commitment is more general as County Council must ratify the result of negotiations between the Byway Committee and the developers as part of the development approval process.

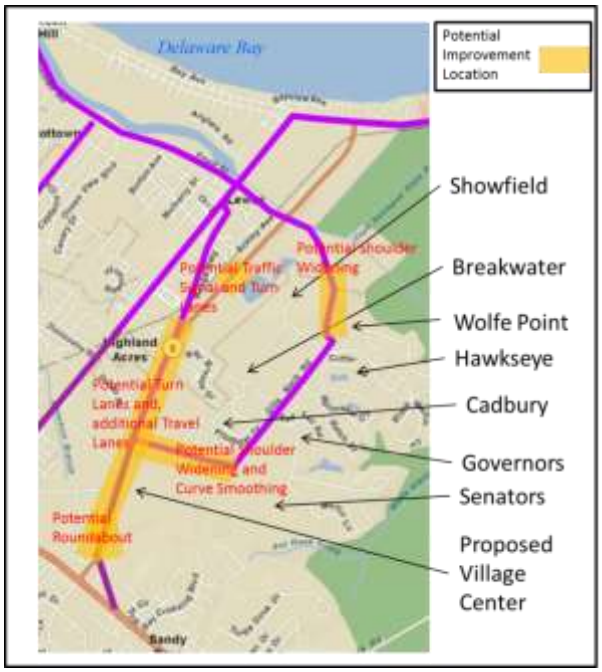


Figure 25: Proposed Developments and Potential Roadside Improvements, Gills Neck Road and Kings Highway

The Master Improvement Plan will reflect the following policy documents and references:

- Context Sensitive Solutions for Delaware Byways, Delaware Department of Transportation, June 2011.
- Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities, A Recommended Practice of the Institute of Transportation Engineers, 2009
- Delaware Byways Workshops, a Context Sensitive Champions Program Report, summarizing the results of a Context Sensitive Byways Workshop for Byways sponsored by DelDOT, Delaware Greenways and Partnership for Public Spaces, September 2011.
- A Guide for Achieving Flexibility in Highway Design, American Association of State Highway and Transportation Officials, 2004
- Executive Order No.6, State of Delaware Complete Streets Policy, December 2009.
- Smart Transportation, Planning and Designing Highways and Streets that Support Sustainable and Livable Communities, New Jersey Department of Transportation Pennsylvania Department of Transportation March.
- Standards and Regulations for Subdivision Streets and State Highway Access.
- Sussex County Code Book which includes the County Zoning Regulations and other applicable standards.

While there are conflicts among the policy, regulations and guidelines, the designation of the Lewes Historic Byway cannot be ignored. The Master Improvement Plan will be designed to recognize the designation of the Byway and emphasize the provisions of context sensitivity over normal practice. As such, roadsides shall be landscaped to preserve the viewsheds that exist today yet provide the visibility and access to the developments both residential and commercial to insure their success.

Figure 27: Landscaped Roadside

Figure 26 illustrates the elements of context sensitivity. As shown, the key elements are narrower travel lanes – instead of 12 foot lanes, 10 or 11 foot lanes. Shoulders could be narrowed, particularly if side paths for bicycles and pedestrians or sidewalks for pedestrians are provided. Roadside landscaping is a feature that provides a more pleasing environment for travel and roadside activity and calms traffic. Brick crosswalks should also be considered in conjunction with other attractive design elements. Figure 27 illustrates a well landscaped median which would be a desirable feature should additional travel lanes above the current two be warranted.

Figure 26: Landscaped median in a commercial area.

Gills Neck Road Traffic

In order to gain an additional understanding of Gills Neck Road, the volunteers again monitored vehicular, bicycle and pedestrian traffic at two locations over Labor Day weekend, August 30 and 31, 2014. The specific issue to be addressed was whether bicycle and pedestrian traffic was sufficiently high to warrant special consideration and treatment as part of DelDOT's development regulation responsibilities and provide insight into the available alternatives.

Figure 28 illustrates the monitoring stations staffed by the volunteers. Location 1 was where Gills Neck Road passes under the Freeman Highway and Location 2 was at the curve where Gills Neck Road curves towards Kings Highway. This is also the location where the Junction and Breakwater Trail intersects with and parallels Gills Neck Road on its way to Kings Highway. Traffic on Saturday, August 30, 2014, was monitored between Noon and 2:00 PM. On Sunday, August 31, 2014, traffic was monitored between 10:00 AM and Noon.

Table 10 illustrates the two hour volumes for autos, bicycles and pedestrians and Table 11 illustrates the peak hour data within the two hour periods shown in Table 10. The data collected confirmed that there are a significant number of bicycles that use Gills Neck Road. The number of

bicycles is significantly higher in the vicinity of the Junction and Breakwater Trail than at the Freeman Highway overpass.

Figure 28: Gills Neck Road Traffic Monitoring Locations

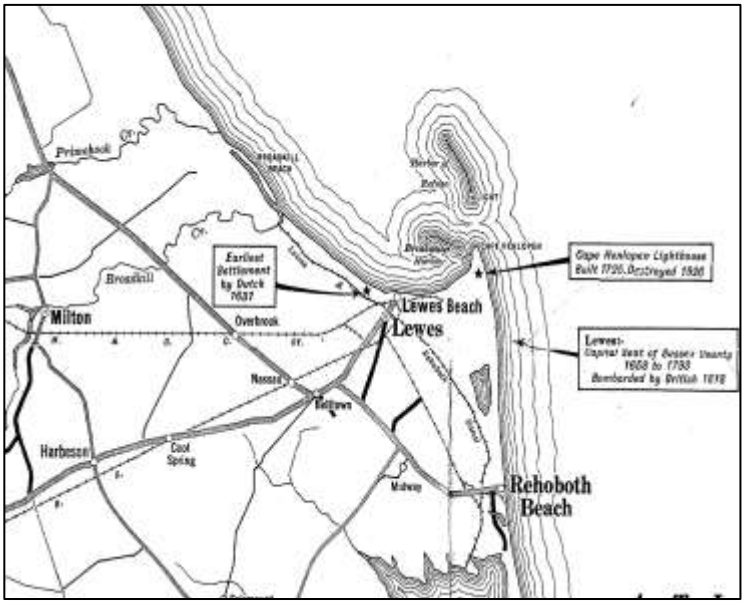
The bicycle volumes are significant and warrant special consideration. DelDOT is planning an extension of the Junction and Breakwater Trail that will connect to Downtown Lewes. See a description of the trails related to the Lewes Byway in the Reducing Vehicle Demand section below.

Table 10: Gills Neck Road Two Hour Volumes

Location 1: Gills Neck Road at Freeman Highway				
Day	Time	Autos	Bikes	Peds
Saturday	Noon to 2:00 PM	216	202	5
Sunday	10:00 AM to Noon	175	137	13
Location 2: Gills Neck Road at the Junction and Breakwater Trail				
Day	Time	Autos	Bikes	Peds
Saturday	Noon to 2:00 PM	498	196	14
Sunday	10:00 AM to Noon	446	192	30

Table 11: Gills Neck Road Peak Hour Volumes

Location 1: Gills Neck Road at Freeman Highway				
Day	Time	Autos	Bikes	Peds
Saturday	Noon to 1:00 PM	98	132	1
Sunday	11:00 AM to Noon	46	63	0
Location 2: Gills Neck Road at the Junction and Breakwater Trail				
Day	Time	Autos	Bikes	Peds
Saturday	1:00 PM to 2:00 PM	274	97	2
Sunday	10:30 AM to 11:30 AM	235	96	16



Some of the roadways in the Lewes area are historic. As shown in Figure 29, in 1932, State Route 1 as we know it today did not exist south of what today is US Route 9 and Savannah Road. It used Clay Road which, on its way to Rehoboth, aligns with the right of way for existing State Route 1 as it nears Rehoboth. Kings Highway as it extends from the center of Lewes to Clay Road has also been a transportation corridor for many years. These rights of way are historic and should be noted and preserved as such.

Figure 29: 1932 State Highway Map, Lewes Area
Source: DelDOT

Manage Development Generated Traffic

The following recommendations are designed to provide an ongoing process to preserve and enhance the Lewes Historic Byway and permit already zoned development to occur in a manner conducive to maintaining the context of the Lewes Historic byway:

1. Form a strong alliance between DelDOT, the City of Lewes, Sussex County, and the Lewes Byway Management Entity ensuring compatibility in land use design along the Byway roadways. The alliance should include land use, zoning, and transportation issues within its portfolio of issues and an important consideration is to achieve compatibility between the land development and zoning codes of the City of Lewes and the County of Sussex.

2. Use the Master Improvement Plan process to establish design guidelines for roadside and median environments as well as roadway design elements such as landscaping, selection of paving materials such as brick while recognizing that safe design is the first priority.

3. Work with developers to consider development designs that reduce impact to the Byway Roadways and provide encouragement to use alternative and active modes of transportation such as public transportation, bicycling and walking. Make full use of the aggressive trails and pathways program underway at the state level.

4. Recognize that the Byway roadways are by federal and state policy, multi-modal and should be designed not to speed traffic through an area but rather to provide access to the venues and attractions of the byway at a lower speed to provide. Traffic calming strategies should be employed as appropriate.

5. Use the summer high season traffic conditions for developing traffic mitigation strategies. Develop a Traffic Improvement District to encompass the roadways of the Lewes Historic Byway. Within the District, allow for mitigation strategies other than roadway widening such as enhancements to the public transit and jitney systems (see the sections below) and the traffic management system, additional bicycle and pedestrian improvements and enhancements and additions to the trail and greenway system. This report has demonstrated that additional capacity improvements alone only speed traffic to the next bottleneck and do not truly add capacity to the network.

Management of Traffic

This report has demonstrated that the carrying capacity of the Byway roadway network is close to being reached during the summer tourist season. The summer is also the time of major civic events in the City as well as large beach crowds and capacity crowds at Cape Henlopen State Park. As previously noted, there are times that capacity is reached in all three areas causing long back-ups and disappointed visitors who cannot access their intended venue. Some visitors traveled hours only to be disappointed – and frustrated – within a short distance of their destination.

Management of traffic destined to and along the Byway roadways is a key element of enhancing the Byway experience. Management of traffic is defined as using the available transportation infrastructure at its maximum efficiency through communications to the public and among responsible agencies, coordination of actions across agencies, management of incidents and events and providing alternative means of access. There is no formal traffic management plan in place for the Lewes area and for coastal Sussex County. However, initial coordination has begun. The governmental agencies involved include:

Figure 30: Delaware's Emergency Management Complex in Smyrna, DE

- Delaware Department of Transportation (DelDOT)
- City of Lewes
- County of Sussex
- Delaware State Police and City Police
- Cape May Lewes Ferry
- Cape Henlopen State Park
- Lewes Chamber of Commerce
- Southern Delaware Tourism
- DART First State

Primary responsibility for traffic management in Delaware rests with DelDOT. The City of Lewes has requested that DelDOT convene the noted agencies to begin developing a traffic management plan and DelDOT will assist the City of Lewes in developing a Traffic Management Plan.

The elements of a traffic management plan for the Lewes area and for Coastal Sussex County as there are clear regional traffic management needs. It is reasonable that the coordinating agency for implementation and implementation the Plan rest with DelDOT.

The Transportation Management Center, located in Smyrna, Delaware, is the nerve center of the state's emergency management system. The Traffic Management Center operates 24 hours per day, seven days per week and is never closed.

Figure 31: Control Room at the Traffic Management Center

The Center manages three separate but related systems:

- *Control Systems*. Major sub-systems: Computerized Traffic Signal System, Gate Control Monitoring System, Transit Vehicle Monitoring System, Incident Management System, and Event Management System.

Control Systems	Monitoring Systems	Informational Systems

Figure 32: Traffic Management Systems

- *Monitoring Systems*. Major Sub-systems: Video Monitoring System, Electronic Detection System, Aerial Monitoring, Motorist Assistance Patrol, #77 Cellular Reporting Service, Weather/Flood/Road Surface Monitoring System, Electronic Toll Collection –EZ-Pass,

Electronic Payment System, Interface to Police/Fire Computer Aided Dispatch, Electronic Red Light Enforcement.

- Informational Systems. Travelers Advisory Radio System, Dynamic Message Sign System, Real-time Web Site, Kiosks, Telephone Information System, Automated Commercial Vehicle Operations, Transportation Channel on Cable TV.

The Traffic Management System for the Lewes Area will comprise elements from these systems.

The major issues the ultimate Traffic Management Plan should address are:

1. Events/Overcrowded Conditions: Summertime traffic in Coastal Sussex is heavy and frustrating for tourists and visitors to navigate. Already, the TMC monitors traffic conditions on Route 1, adjusts traffic signal timing and uses the dynamic message signs to inform motorists of incidents and traffic conditions. The system must also provide notice and direction to motorists of:
    a. Local events and street closures
    b. Closures at Cape Henlopen State Park
2. Detection – both video and non-video: Detection of traffic conditions is a critical element. Cameras along with constant volume and speed detection should be placed at key locations which are subject to congestion that is non-recurring.
3. Pre-planning for Congestion – The Traffic Management Center works with local and county officials, emergency responders and event venues to develop plans for events, incidents and weather.

Congestion is defined by the Transportation Research Board as "Congestion is travel time or delay in excess of that normally incurred under light or free-flow travel conditions". There are two types of congestion: recurring and non-recurring. Recurring congestion is regular congestion that is predictable such as a commuter would face on a routine basis or on a Friday in the summer on State Route 1 heading to the shore communities.

The second type is non-recurring. The most common non-recurring construction is due to incidents such as accidents or emergency road work. Another type is event related traffic; the most notable would be for a NASCAR race at Dover Downs.

Manage Events and Overcrowding

As a popular resort area and a community with many civic activities, it is only inevitable that there are conflicting events and traffic patterns. Complicating matters is the limited capacity at the beaches for parking and at Cape Henlopen State Park. When capacity at the municipal beach parking lots is exceeded, visitors continue to circulate, adding to the congestion. When Cape Henlopen State Park reaches capacity either on the beaches or in their parking lots, the gates to the park are closed and folks either wait on Cape Henlopen Drive for an opening or turn around and look for something else to do.

The Traffic Management System previously described is a tool that can be used to coordinate events and inform motorists of the capacity situation well in advance of their arrival in the Lewes area. But that still leaves the problem of providing alternatives but without alternatives in the Lewes area, the economic value of the visit is lost. Accordingly, a method to manage arrivals is warranted. The Division of State Parks maintains a historic record of visitation and the City manages the parking meter system, both of which can pinpoint using the historic data when the potential for overcrowding is present. For those days and hours, consideration should be given to a reservation system or an advance purchase system. In addition to speed payment of entrance fees, consideration should be given to the use of E-Z Pass technology.

Consideration should also be given to remote parking located in conjunction with the Jitney routes. Such parking could be at existing underutilized parking at commercial properties, church parking lots, and school parking lots before committing to constructing additional parking spaces.

IMPROVE PUBLIC TRANSIT

Figure 31 illustrates the current public transportation services in the Lewes area. There are two

Figure 33: Public Transportation Facilities

services provided:

Figure 33: Bus Stop in Zion National Park Courtesy of Shutterstock

- DART First State Route 206 between Georgetown, Lewes and Rehoboth.
- DRBA Shuttle Service between the Cape May Lewes Ferry and downtown Lewes and a second route between the Ferry Terminal and the Park and Ride facility in Rehoboth. This service also serves the Tanger Outlets.

Cape Henlopen State Park is not currently served by public transportation. As the parking lots overflow on certain summer days, strong consideration should be given to extending the Route 206 bus to serve the State Park. A section of the parking field or a point along a park roadway could be allocated to a bus stop with a waiting area. Figure 33 illustrates an example of a bus stop in Zion National Park.

Figure 34: Jitney Network Concept.
Source: Patricia Faux and Bruce Galloway, Futurescan Project

Jitney service has been proposed a number of times over the years as a means of connecting the venues with in Lewes to its neighbors outside the city. Two major studies assessing the feasibility of a jitney service have been prepared.

The City of Lewes has considered establishing a jitney service. Several service concepts have been suggested. One of the concepts is shown in Figure 34. In order to design and operate a sustainable service, a detailed analysis by a planner that specializes in assessing the feasibility of such a service should be retained. Such an assessment could be fundable through grants such as through the CMAQ Program of the Federal Highway Administration or the Transportation Alternatives Program managed by DelDOT. Ongoing sponsorships could be solicited from the businesses and venues served.

Jitney service should connect residents and visitors to the venues and businesses. As such, consideration should be given to basing the service at the proposed Lewes Park and Ride at Five Points, serving the hotels and major shopping centers along Route 1, the downtown area and points in between. Service to the residential areas is important as well as service to the beaches and Cape Henlopen State Park. Several routes should be considered for comprehensive service as well as easy transfers between routes.

Reduce Vehicular Demand

As this report demonstrates, the roadway and street network is operating close to its carrying capacity in the downtown area of Lewes and along Kings Highway. In the downtown area, expanding the vehicle carrying capacity of the streets is not a solution for the Byway roadways or for any other streets in the City of Lewes. The Lewes area has an aggressive program to construct trails which will serve to connect a number of areas together. Already, the trails are attracting bicycles, walkers and joggers in ever increasing numbers. Expanding the trail network to include the New Road Corridor would continue to reduce trips by automobile. Extending sidewalks reduces barriers to pedestrian circulation and, based upon experience elsewhere, would also increase the number of pedestrians and as such reduce the need to drive short distances.

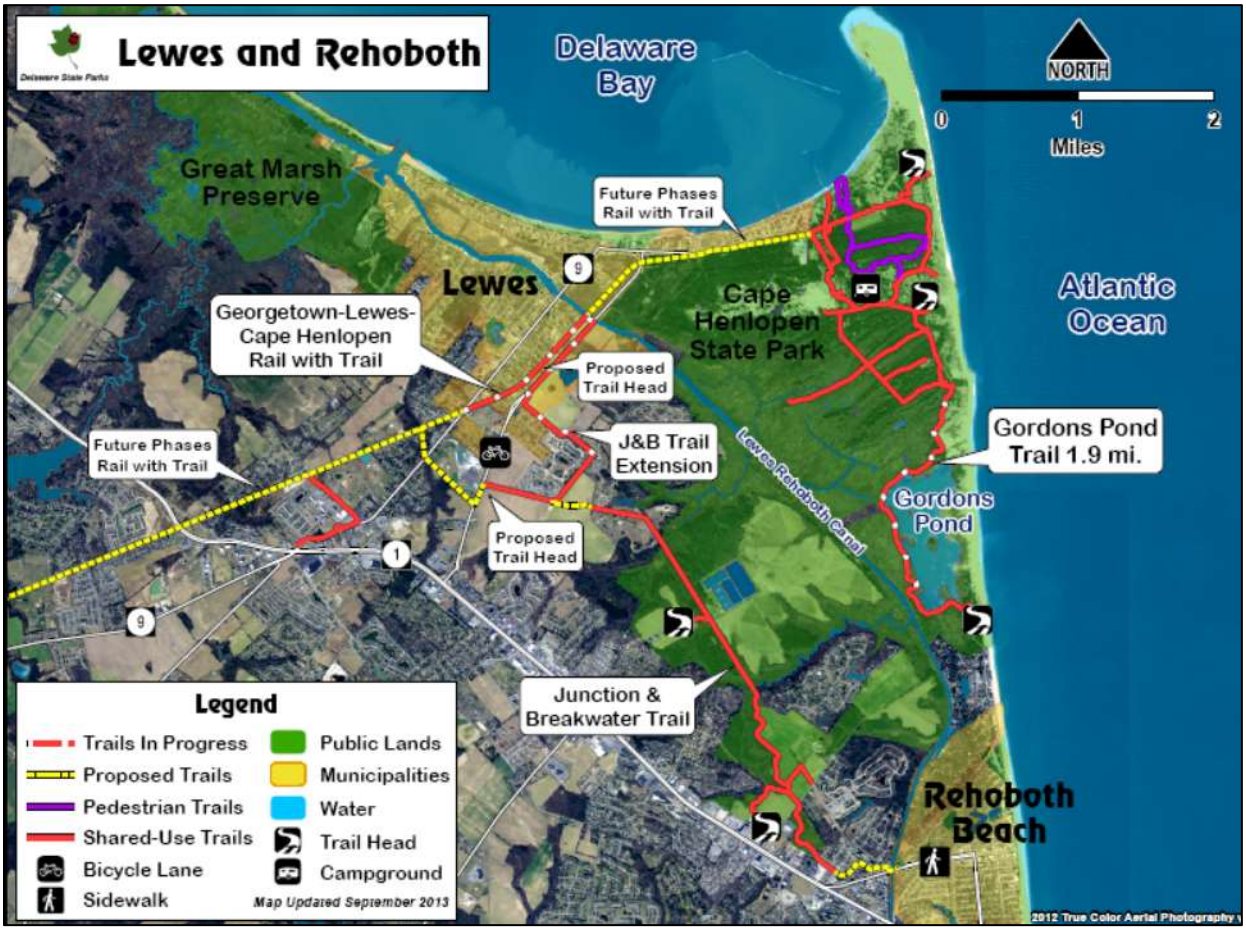


Figure 35: Trails Connecting Lewes and Rehoboth Beach
Map courtesy of DelDOT

Figure 35 illustrates the trails connecting Lewes and Rehoboth as well as the Georgetown-Lewes Trail. Of importance is the section of the Junction and Breakwater Trail as it nears Gills Neck Road and then proceeds to Lewes. The Junction and Breakwater and Gordon's Pond Trail are heavily used by bicyclists and walkers. A recent survey of 350 users of the Junction and Breakwater Trail users showed that 81% of the users were bicyclists and 90% used the trail for recreational and healthy living reasons. For more information on the survey see the report titled, "Coastal Sussex Connectivity Study"[2]

Figure 36 illustrates the recommended trail and sidewalk improvements beyond the trail plan for Lewes and Rehoboth.

[2] Delaware Greenways, Coastal Sussex Interconnectivity Study, June 2012.

Figure 36: Proposed Trail and Sidewalk Improvements

Additionally, observations along several roadways including Gills Neck Road suggest the need for education of bicyclists and motorists so as to promote courtesy and safety. Such strategies that have worked in other locations are:

- Leaflets describing the 'rules' for cycling and safety. Leaflets would be distributed at hotels, at bike shops, at information kiosks, by merchants, posted at trailheads, on bike racks and by police.
- When stopping motorists or bicyclists, police (state, county and city) should use judgment in issuing citations so as to not provide a reason that discourages visitors from returning.

Improve Wayfinding Signing and Visitor Information Services

Byway traffic consists of residents going about their daily lives, season long or extended stay visitors and short term visitors and day trippers. The first two are familiar with the area and they need little to no wayfinding signing. On the other hand, the shorter term visitors do. And that signing needs to be coordinated with printed and online materials. This section covers the on-street component of the visitor experience.

There are a number of locations in the Lewes area that provide printed material and face to face assistance to visitors: The Lewes Historical Society Headquarters, the Lewes Chamber of Commerce, Lewes City Hall, the Lewes Public Library, the Caper may Lewes Ferry Terminal and Cape Henlopen State Park. With the construction of the park and ride lot at Five Points, a new

opportunity to intercept visitors as they come into the Lewes area emerges[3]. It is recommended that a visitor's center be constructed at the facility. Such a facility could also serve all of the resorts and venues of Coastal Sussex.

Using the visitor's center as a gathering point, signing could take off from there and direct visitors to groups of Lewes Byway destinations such as:

- The Cape May Lewes Ferry, the Beaches and Cape Henlopen State Park via Kings Highway
- The Historic and Downtown Lewes via Savannah Road
- The Great Marsh and Pilottown Road via New Road.

Routes to other Coastal Sussex destinations could be established as well.

The Delaware Manual on Uniform Traffic Control Devices which sets the standards for signing on all public streets and highways in the state. An example of signing that meet the standards is shown in Figure 37.

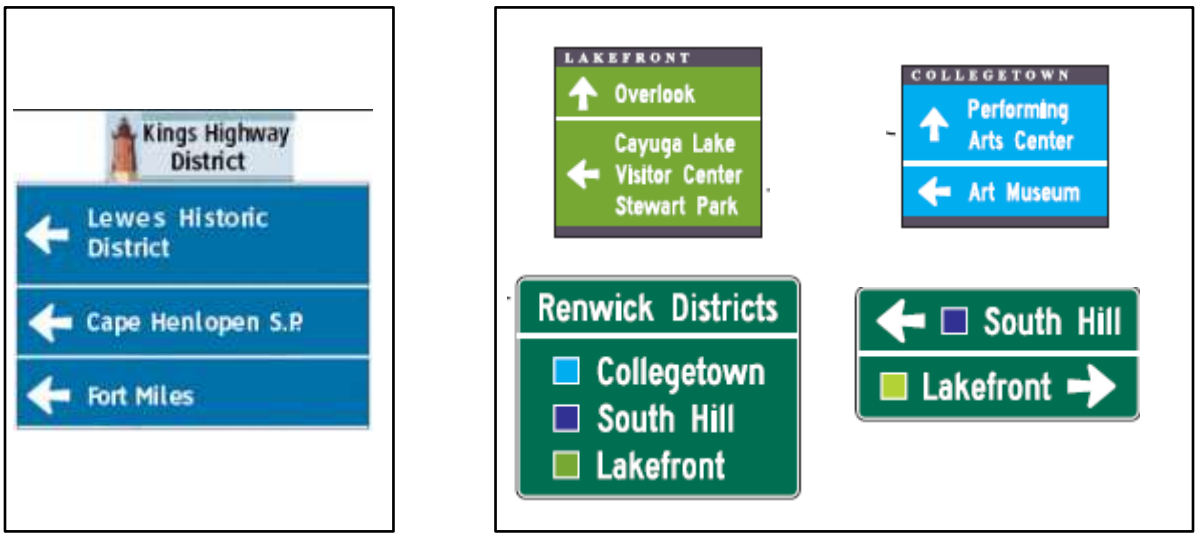


Figure 367: Wayfinding signs that meet the standards of Delaware's MUTCD

Today, many visitors use their smart phones to plan their trip and to navigate to destinations. In response to that, DelDOT's Byway Program has been developing an App that will assist visitors to access the resources and venues along Delaware's six byways. The Department has decided to use a 'crowd sourced App' called TAGWHAT. This App depends upon individual venues websites and links them together by locating them on maps and through itineraries. The website is: http://www.tagwhat.com/ . The DelDOT's Byway Coordinator will work with the TMC as the TAGWHSAT App is finalized to see how the TMC's investigations for implementing enhanced

[3] Since the proposal of a Park and Ride Lot at the former Wright Chrysler property, another location for a park and ride lot has been proposed in Five Points Village.

interface with social media/networking could work with TAGWHAT to receive and disseminate information on transportation conditions within the State of Delaware.

IMPLEMENTATION PLAN

This chapter will consider how the recommendations outlined in the previous chapter should be implemented. Recommendations cover a wide range of topics, all of which affect how vehicular traffic is managed in a context sensitive manner. The topic areas are:

- Mitigation of the Impacts of Development Traffic
- Management of Traffic
- Improve Public Transit
- Reduce Vehicular Demand
- Improve Wayfinding and/Visitor Information Services

Each of the five topic areas for which recommendations were developed are interrelated so for each to be fully effective, all must be implemented. Further, all recommendations assume that one of the key stakeholders will be the Byway Management Entity[4].

MITIGATION OF DEVELOPMENT TRAFFIC

This topic is particularly important in the Kings Highway/Gills Neck Road area where the number of developments will change the context of the Byway landscape and significantly add to the traffic volumes on both roadways. However, there is a substantial amount of developable land along the New Road Corridor which could also change the context of the Byway landscape and its scenic viewshed. Table 12 shows the recommendations and recommends implementation responsibilities.

Table 12: Mitigation of Development Traffic

Rec. No.	Recommendation Title	Description	Lead Stakeholder	Potential Funding Source
1	Landscape Master Plan	Develop a master plan describing the potential roadway improvements and recommendations to landscape them so as to retain the context of the Byway	DelDOT	Developers, Transportation Alternatives Program, Community Transportation Funds

[4] All recommendations require and assume that the Managing Entity for the Lewes Historic Byway be involved as a primary stakeholder representing the Byway as per DelDOT Policy. The Lewes Scenic and Historic Byways Committee, commonly known as the Ad Hoc Committee, is currently acting as the management entity for Byway affairs.

Rec. No.	Recommendation Title	Description	Lead Stakeholder	Potential Funding Source
2	Context Sensitive Design	Implement a policy that all transportation improvements along the Byway be designed to be sensitive to the context of the Byway and in accordance with the policy documents adopted by DelDOT for Byways.	DelDOT	Individual project funding sources.
3	Improved Coordination among the City, County and Developers	So many times the visions of the City and the County as to what type and amount of development is acceptable differ. Developers respond to that vision with their proposals. Better coordination among the three would address that issue.	Byway Management Entity	Volunteer Time
4	Establish a Traffic Improvement District	Implement a Traffic Improvement District to enable traffic mitigation strategies to include improvements to other modes of transportation including the public transportation system, the jitney system when established, traffic management system and the trails and greenway system.	DelDOT	Developers
5	Preserve and Recognize the Historic Transportation Rights of Way	Kings Highway, Savannah Road, Gills Neck Road and Front Street/Pilottown Road make up key segments of the Lewes Historic Byway. The rights of way should be recognized as historic and preserved as such.	DelDOT	DelDOT

MANAGEMENT OF TRAFFIC

A resort area, with its influx of visitors and with all of the activities taking place at multiple venues presents complex set of demands on the transportation system. This set of recommendations represents a start towards the development of a formal plan with a set of policies and procedures that will be designed to minimize the number of times and durations of those times when traffic overwhelms the system. Table 13 illustrates the recommendations related to the management of traffic.

Table 13: Management of Traffic

Rec. No.	Recommendation Title	Description	Lead Stakeholder	Potential Funding Source
1	Develop a Traffic Management Plan	Work with DelDOT's Traffic Management Center to develop a Traffic Management Plan that manages the vehicular demand on the roadway system using the Control Systems at the TMC.	DelDOT	CMAQ
2	Coordinate Special Events	Develop an office within the City with the responsibility to coordinate the traffic management for events.	City of Lewes	City Funds
3	Manage Beach Parking	Include an element in the Public Transportation Plan to provide alternative transportation to the beach on overflow days.	City of Lewes	CMAQ Funds
4	Manage Visitation to Cape Henlopen State Park	Develop a plan to manage the number of visitors to the Park to reduce the days when it is necessary to close the Park to visitors. Such strategies that could be part of managing visitation would be a reservation system for parking and implementation of E-ZPass for payments.	Division of State Parks	State Funds
5	Dynamic Message Signing	Include information regarding Lewes and Cape Henlopen State Park in the dynamic message system, on the traffic operations center radio station (AM 1380) and on the social media apps it manages.	DelDOT	DelDOT

Note that recommendations 2, 3, 4, and 5 will be integral to the Traffic Management Plan described in Recommendation No. 1.

IMPROVE PUBLIC TRANSIT

Public transportation is a key element in managing on street traffic. With only one bus route and a shuttle service provided by the Delaware River and Bay Authority, consideration should be given to creating a more comprehensive public transport system. Table 14 illustrates the recommendations that will lead to the enhancement of public transportation services.

Table 14: Improve Public Transit

Rec. No.	Recommendation Title	Description	Lead Stakeholder	Potential Funding Source
1	Develop and Implement a Jitney Service for Greater Lewes	Given the level of summertime visitation to Lewes, Jitney Service should be designed and implemented. The first step is a comprehensive assessment of demand and market. A consultant specializing in transit service planning should be brought on board to perform this analysis.	City of Lewes	CMAQ funds, private grant money and developers
2	Extend Bus Route 206 to Cape Henlopen State Park	Extending this route to the state park would provide an opportunity to manage traffic and parking enabling additional people to enjoy the facilities while reducing traffic to and from the park.	DART-First State	Bus Fares and DART funds provided by the state
3	Construct the park and ride lot at the former Wiggins Property	The proposed park and ride lot will serve as a transit center similar to the Rehoboth park and ride lot. In addition, due to its location at the beginning of the resort area, it can also serve as a visitor's center.	DART-First State	Federal and State funding.
4	Provide for Remote Parking along transit and jitney routes with bus shelters	Intercepting visitors, especially day-trippers at remote parking lots will reduce parking demand at the beaches and at the State Park. It will also reduce trips on the Byway roadways.	DelDOT	CMAQ funds, and developers

Reduce Vehicular Demand

This report has shown that increasing the capacity of the roadways of the Byway will not increase the capacity of the roadway system. The overriding reason is that Lewes is connected to only one major transportation artery: State Route 1. Vehicles either have to use or cross State Route to enter Lewes. Further, the carrying capacity of the street network is almost reached and with continued development could be exceeded. Therefore, the only answer is to reduce vehicular demand yet retaining access to the venues and activity centers of Lewes. Table 15 shows the recommendations to reduce vehicular demand through improving conditions for bicycles and pedestrians.

Table 15: Reduce Vehicular Demand

Rec. No.	Recommendation Title	Description	Lead Stakeholder	Potential Funding Source
1	Complete the Junction and Breakwater Trail	Complete the Junction and Breakwater Trail along and across Gills Neck Road and to the Library-Trailhead in a manner sensitive to the neighborhoods through which the trail passes.	DelDOT	DelDOT
2	Connect the Junction and Breakwater Trail to the Multi-Use Path along Kings Highway and extend the multi-use path on Kings Highway as development occurs	The Multi-use path on Kings Highway will connect developments and provide an alternative routing for Junction and Breakwater Trail users to access the proposed trail head at the proposed Lewes Public Library.	DelDOT	Developers and DelDOT
3	Implement the Proposed Byway Trail and Sidewalk Recommendations	Figure 35 illustrates the trail and sidewalk recommendations developed in conjunction with the Byway Corridor Management Plan.	DelDOT and State Parks as applicable	DelDOT
4	Fourth Street Bike Boulevard	An alternative pathway for bicycles and pedestrians connecting New Road to the downtown area would assist bicyclists and pedestrians who feel uncomfortable riding and walking along Pilottown Road.	City of Lewes	City Funds
5	New Road Trail	Bicyclists and pedestrians find New Road as uncomfortable to bicycle on and walk along. A parallel, multi-use trail would address this situation.	DelDOT	DelDOT

Improve Wayfinding and Visitor Information Services

Providing visitor information has been a priority of the tourism agencies and business groups in the Lewes Area. However, the Byway provides an opportunity to enhance and coordinate this service and relate it to the Byway through a wayfinding sign system. Table 16 shows the wayfinding and visitor information system as it relates to the transportation system.

Table 16: Improve Wayfinding and Visitor Information Services

Rec. No.	Recommendation Title	Description	Lead Stakeholder	Potential Funding Source
1	Revise the Park and Ride Lot Plans to Include Visitor Information	By adding an informational kiosk or a fully staffed visitor center, the Park and Ride lot would be the first stop for a visitor when arriving in the Lewes Area.	DART-First State	DelDOT TIP
2	Wayfinding Signing	Using the Byway as the access to Lewes, provide a system of wayfinding signs. Develop an advisory committee and retain a consultant to design the system.	Lewes Chamber of Commerce	Tourism Industry, State Office of Tourism
3	Implement TAGWHAT	TAGWHAT is a crowd-sourced repository of information for a given location. To the extent possible, its implementation will be coordinated with the social media platform operated by the TMC.	DelDOT	DelDOT Operating Funds