

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
800 BAY ROAD
P.O. Box 778
DOVER, DELAWARE 19903

September 12, 2011

SHAILEN P. BHATT
SECRETARY

Hon. William C. Glanden
Mayor
Town of Frederica
2 W. David Street
P.O. Box 294
Frederica, DE 19946

Dear Mr. Glanden:

The enclosed Traffic Impact Study (TIS) review letter for **Asbury Square (Lands of JMER Properties, LLC & Johnny Nichols Nurseries, LLC)** has been completed under the responsible charge of a registered professional engineer whose firm is authorized to work in the State of Delaware. They prepared the TIS so as to conform to DelDOT's Standards and Regulations for Subdivision Streets and State Highway Access and other accepted practices and procedures for such studies. DelDOT accepts the TIS and concurs with the recommendations found in the enclosed letter. We are providing it to you for your information in the Town's review of the proposed development. If you have any questions concerning this letter or the attached review letter, please contact me at (302) 760-2109.

Sincerely,

T. William Brockenbrough, Jr.
County Coordinator

TWB:km

Enclosure

cc with enclosure:

Ms. Constance C. Holland, Office of State Planning Coordination
Mr. Richard K. Vetter, Dover/Kent County MPO
Mr. D.J. Hughes, Davis, Bowen & Friedel
Mr. Ryan Mawhinney, URS Corporation
Mr. Kelly Crumpley, Kent County Department of Planning Services
Mr. Andrew J. Parker, McCormick Taylor
Mr. Mir Wahed, Johnson, Mirmiran, and Thompson

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Theodore G. Bishop, Assistant Director, Development Coordination
Thomas Greve, Central District Engineer, Central District
Lisa Collins, Service Development Planner, Delaware Transit Corporation
Marco K. Boyce, Planning Supervisor, Statewide & Regional Planning
J. Marc Coté, Subdivision Engineer, Development Coordination
Todd J. Sammons, Project Engineer, Development Coordination
Diane Calloway, Project Engineer, Development Coordination
Troy E. Brestel, Project Engineer, Development Coordination
W. Paul Hogge, Project Engineer, Development Coordination



September 9, 2011

Mr. T. William Brockenbrough, P.E.
County Coordinator
DelDOT Division of Planning
P O Box 778
Dover, DE 19903

RE: Agreement No. 2048
Traffic Impact Study Services
Task 5A-Asbury Square (Lands of JMER Properties, LLC & Johnny Nichols Nurseries, LLC)

Dear Mr. Brockenbrough:

Johnson, Mirmiran and Thompson (JMT) has completed the review of the Traffic Impact Study (TIS) for the Asbury Square commercial development (f.k.a. Lands of JMER Properties, LLC & Johnny Nichols Nurseries, LLC), prepared by Davis, Bowen & Friedel, Inc., dated May, 2011. This review was assigned Task Number 5A. Davis, Bowen & Friedel, Inc. prepared the report in a manner generally consistent with DelDOT's *Standards and Regulations for Subdivision Streets and State Highway Access*.

The TIS evaluates the impacts of the Asbury Square commercial development, which is proposed on the northeast side of Frederica Road (Kent Road 10) just northwest of the intersection of Frederica Road (Kent Road 10) and Delaware Route 1 (Kent Road 8) in Kent County. The approximately 39,451 square foot commercial development would consist of a convenience market with 16 fueling stations, and four retail spaces on approximately 7.71 acres of land. The developer originally assumed one retail space would be used by a pharmacy with a drive through window; however, the developer is now considering that the space may be used by a fast food restaurant with a drive through window instead. In order to conservatively estimate the trips for the site, a fast food restaurant was assumed by the TIS. The land is currently zoned C-1 (Commercial) and will be developed under the same zoning within the Town of Frederica limits. The developer is proposing one full access point on Frederica Road. Construction is anticipated to be completed by 2013.

DelDOT currently has three relevant or ongoing projects within the study area, first the State Route 1, North Frederica Grade Separated Intersection, second the State Route 1, South Frederica Grade Separated Intersection, and third the Corridor Capacity Preservation Program (CCPP). The Delaware Route 1, North Frederica Grade Separated Intersection project (Contract No. 24-122-03) is located at the intersection of Delaware Route 1 and Frederica Road (Delaware Route 12), north of the town of Frederica and south of Barratts Chapel Road (Kent Road 371) in Kent County. The need for the roadway improvement evolved from DelDOT's identification of seven Hazardous Spot Locations along the Delaware Route 1 corridor. The changes at this intersection will help improve safety and traffic operations, as well as preserve corridor capacity, by eliminating the at-grade median crossover and will ensure safety by restricting access. The



project is currently being constructed, and the improvements include constructing an overpass to eliminate median crossing maneuvers from northbound and southbound Delaware Route 1 within the project area. All the northbound traffic on Delaware Route 1 will now use an exit ramp and the overpass to reach the town of Frederica. Eastbound traffic on Frederica Road will also use the overpass and an entrance ramp to head north on Delaware Route 1. The southbound right turn onto Frederica Road from Delaware Route 1 and the eastbound right turn from Frederica Road onto Delaware route 1 will remain in place. None of the intersections in this project is within the area addressed by the TIS. Originally, construction was planned to start in January of 2010 and end by December of 2010. Construction is still on-going and it should be completed by the end of summer, 2011. For more information, please see the project website at http://www.deldot.gov/information/projects/north_frederica/index.shtml.

The Delaware Route 1, South Frederica Grade Separated Intersection project (DeIDOT Project No. T200812202) is located along the Delaware Route 1 corridor south of the town of Frederica in Kent County. The approximate limits are from 2,600 feet north of the Delaware Route 1 and Frederica Road intersection to 1,850 feet south of the Delaware Route 1 and Milford Neck Road (Kent Road 120)/Tub Mill Pond Road (Kent Road 119) intersection. The eastern boundary extends approximately 2,300 feet along Milford Neck Road, while the western boundary extends approximately 2,400 feet along Tub Mill Pond Road. The intersection of Frederica Road and Delaware Route 1 is also part of the Asbury Square TIS. The need for improvements at this intersection arose when the intersection of Delaware Route 1 and Frederica Road was identified as a potential grade separated intersection location through the Corridor Capacity Preservation Program. This project will improve the safety and efficiency of the intersection operations. The existing at-grade intersection at Frederica Road will be removed and the proposed entrance and exit ramps will provide access to Delaware Route 1 instead. Frederica Road will also be extended to the south to intersect with Tub Mill Pond Road. The northern limits of this extension will slightly overlap with the roadway improvements to be completed as part of the Asbury Square project. Five conceptual alternatives were developed for the grade separated intersection and displayed to the public at a May 12, 2008, workshop. Based on the input received, a preferred alternative was selected and the preliminary design was presented to the public at a workshop on November 10, 2009. This project is currently under design, and construction is scheduled to begin in the fall of 2013. For more information, see the project website at http://www.deldot.gov/information/projects/sr1_frederica/index.shtml.

The CCPP is a statewide program developed to maintain a road's ability to handle traffic efficiently and safely, and minimize the transportation impacts of increased economic growth. The CCPP strives to maintain the through capacity of certain arterial highways through the management of access along them. The main corridors in Delaware are part of this program, including Delaware Route 1 from Dover, south to Five Points. This stretch of roadway contains one of the intersections included as part of this TIS, Frederica Road at Delaware Route 1. The proposed South Frederica Grade Separated Intersection project was developed as part of the needed improvements that were identified through the CCPP. Since the site frontage for Asbury Square will be located along Frederica Road, the CCPP has no additional improvements related to this study.



In addition, DelDOT also has two pavement rehabilitation and resurfacing projects that are currently being constructed on Delaware Route 1. The first project is covered under Contract No. T201106204, and begins at Barkers Landing Road (Kent Road 107), just north of Trap Shooters Road, and runs south to the newly constructed Delaware Route 1, north Frederica grade separated intersection. The second project is covered under Contract No. T201106201, and begins at the Delaware Route 1, north Frederica grade separated intersection and runs south to Tub Mill Pond Road in Milford. Both of these projects are being completed concurrently with the North Frederica Grade Separated Intersection project. Both of these pavement and rehabilitation contracts should be completed within the next few months.

Based on our review, we have the following comments and recommendations:

The following intersection exhibits level of service (LOS) deficiencies without the implementation of physical roadway and/or traffic control improvements.

<i>Intersection</i>	<i>Situations for which deficiencies occur</i>
Delaware Route 1 and Frederica Road (South)	2011 SAT existing (Case 1) 2013 PM and SAT with and without Asbury Square (Cases 2 and 3)

The south intersection of Delaware Route 1 and Frederica Road would exhibit LOS deficiencies during the existing Saturday peak hour and for all future conditions. The LOS deficiency occurs on the eastbound minor street left turn movement. The 95th percentile queue lengths on the eastbound left turn approach are not expected to be longer than 25 foot during either peak hour. However, there are no vehicles for the eastbound left turn movement during the afternoon peak hour, and only four vehicles during the Saturday peak hour. Due to very low eastbound left turn volumes we do not recommend any improvements be implemented by the developer at this intersection. Also, as mentioned earlier, as part of the State Route 1 South Frederica Grade Separated Intersection project this eastbound movement at the Delaware Route 1 and Frederica Road intersection will be removed. The eastbound left turn movement will be addressed instead with an exit ramp and a grade separated overpass. The intersection project is scheduled to begin construction in the fall of 2013 and any deficiencies at the Delaware Route 1 and Frederica Road intersection will be addressed with this improvement.

Should the Town approve the proposed development, the following items should be incorporated into the site design and reflected on the record plan. All applicable agreements (i.e. letter agreements for off-site improvements and traffic signal agreements) should be executed prior to entrance plan approval for the proposed development.

1. The developer should improve Frederica Road along the Asbury Square site frontage to meet DelDOT’s minor arterial road standards. These standards include, but are not limited to, two twelve-foot travel lanes and two eight-foot shoulders on both sides of the road. The developer should provide a bituminous concrete overlay to the existing travel lanes, at DelDOT’s discretion. DelDOT should analyze the existing lanes’ pavement section and recommend an overlay thickness to the developer’s engineer if necessary.



2. The developer should construct a full access site entrance on Frederica Road for Asbury Square to be consistent with the proposed lane configuration as shown in the table below.

Approach	Current Configuration	Proposed Configuration
Westbound Site Approach	Approach does not exist	One shared left turn/right turn lane
Northbound Frederica Road	One through lane	One through lane and one right turn lane
Southbound Frederica Road	One through lane	One left turn lane and one through lane

The recommended minimum storage lengths (excluding tapers) of the separate turn lanes are listed below.

Approach	Left Turn Lane	Right Turn Lane
Northbound Frederica Road	-	345 feet
Southbound Frederica Road	145 feet	-

The right turn storage length provided here is based on the DelDOT's *Standards and Regulations for Subdivision Streets and State Highway Access*. The storage length based on the HCS analysis provides a shorter queue length than what is recommended in the *Standards and Regulations for Subdivision Streets and State Highway Access*. The left turn storage length was agreed to by DelDOT in a meeting with Davis, Bowen & Friedel on July 29, 2011.

3. In lieu of a monetary contribution toward the South Frederica Grade Separated Intersection project (DelDOT Project No. T200812202), the developer should extend their improvements on Frederica Road south to connect with the improvements being done as part of that project.
4. The following bicycle, pedestrian, and transit improvements should be included:
 - a. A permanent easement from the edge of the right-of-way should be dedicated to DelDOT within the site frontage along Frederica Road. Within this easement, a five-foot wide sidewalk that meets current AASHTO and ADA standards should be constructed. A five-foot minimum setback should be maintained from the edge of the pavement to the sidewalk.
 - b. Where the right turn lane is added on Frederica Road a bicycle lane should also be provided through the right turn lane. A Right Turn Yield to Bikes sign (MUTCD R4-4) should be added at the start of the right turn lane.
 - c. Where internal sidewalks are located alongside of parking spaces, a buffer, physical barrier or signage should be added to eliminate vehicular overhang onto the sidewalk.
 - d. ADA compliant curb ramps and marked crosswalks should be provided at the site entrance. The use of Type 3 curb ramps is discouraged.



- e. Bicycle Warning signs (W11-1) should be placed on both the northbound and southbound approaches on Frederica Road.
- f. Covered bike parking racks should be provided near the building entrances.
- g. Utility covers should be moved outside of the designated bicycle lane or should be flush with the pavement.

Please note that this review generally focuses on capacity and level of service issues; additional safety and operational issues will be further addressed through DeIDOT's subdivision review process.

Improvements in this TIS may be considered "significant" under DeIDOT's *Work Zone Safety and Mobility Procedures and Guidelines*. These guidelines are available on DeIDOT's website at http://www.deldot.gov/information/pubs_forms/manuals/de_mutcd/index.shtml. For any additional information regarding the work zone impact and mitigation procedures during construction please contact Mr. Adam Weiser of DeIDOT's Traffic Section. Mr. Weiser can be reached at (302) 659-4073 or by email at Adam.Weiser@state.de.us.

Additional details on our review of the TIS are attached. Please contact me at (302) 266-9600 if you have any questions concerning this review.

Sincerely,
Johnson, Mirmiran, and Thompson, Inc.

David DuPlessis, P.E.
cc: Mir Wahed, P.E., PTOE
Enclosure

General Information

Report date: May, 2011.

Prepared by: Davis, Bowen & Friedel, Inc.

Prepared for: JMER Properties, LLC.

Tax Parcels: MD-08-141.00-01-03.00.

Generally consistent with DelDOT's *Standards and Regulations for Subdivision Streets and State Highway Access*: Yes.

Project Description and Background

Description: 39,451 square feet of commercial development on the east side of Frederica Road, including 16 fueling stations for a convenience market and four additional retail spaces, with one assumed to be a fast food restaurant with a drive through window.

Location: The project is proposed on the northeast side of Frederica Road just northwest of the intersection of Frederica Road (Kent Road 10) and Delaware Route 1 (Kent Road 8) in Kent County.

Amount of Land to be developed: Approximately 7.71 acres of land.

Land Use approval(s) needed: Commercial.

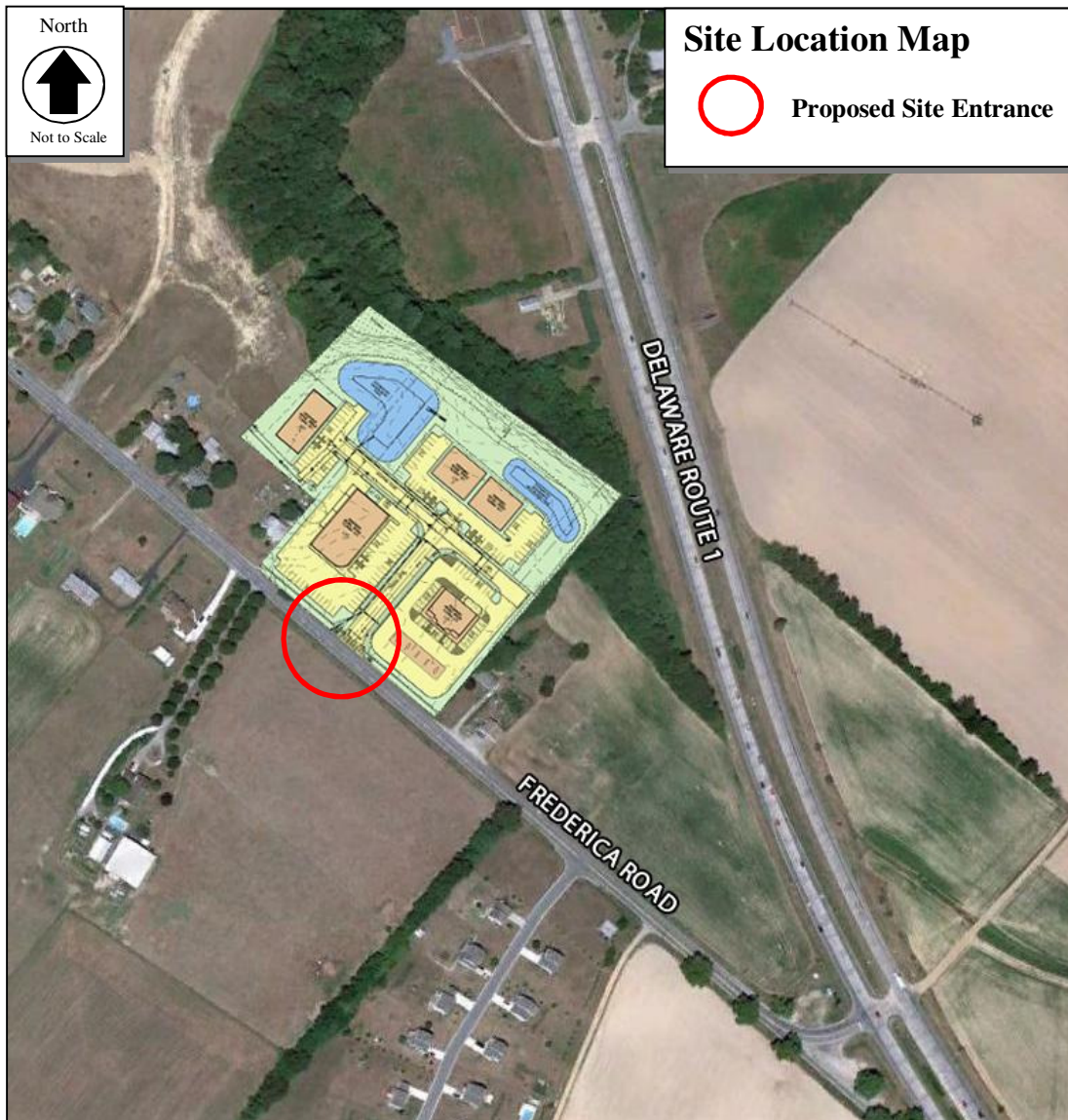
Proposed completion date: 2013.

Proposed access locations: One access point is proposed on Frederica Road.

Daily Traffic Volumes:

- 2009 Average Annual Daily Traffic on Frederica Road (Kent Road 10): 1,995 vehicles per day.

Site Map



**Graphic is an approximation based on the site plan received from Davis, Bowen & Friedel, Inc. on May 19, 2011.*

Relevant and On-going Projects

DelDOT currently has three relevant or ongoing projects within the study area, first the State Route 1, North Frederica Grade Separated Intersection, second the State Route 1, South Frederica Grade Separated Intersection, and third the Corridor Capacity Preservation Program (CCPP). The Delaware Route 1, North Frederica Grade Separated Intersection project (Contract No. 24-122-03) is located at the intersection of Delaware Route 1 and Frederica Road (Delaware Route 12), north of the town of Frederica and south of Barratts Chapel Road (Kent Road 371) in Kent County. The need for the roadway improvement evolved from DelDOT's identification of seven Hazardous Spot Locations along the Delaware Route 1 corridor. The changes at this intersection will help improve safety and traffic operations, as well as preserve corridor capacity,

by eliminating the at-grade median crossover and will ensure safety by restricting access. The project is currently being constructed, and the improvements include constructing an overpass to eliminate median crossing maneuvers from northbound and southbound Delaware Route 1 within the project area. All the northbound traffic on Delaware Route 1 will now use an exit ramp and the overpass to reach the town of Frederica. Eastbound traffic on Frederica Road will also use the overpass and an entrance ramp to head north on Delaware Route 1. The southbound right turn onto Frederica Road from Delaware Route 1 and the eastbound right turn from Frederica Road onto Delaware route 1 will remain in place. None of the intersections in this project is within the area addressed by the TIS. Originally, construction was planned to start in January of 2010 and end by December of 2010. Construction is still on-going and it should be completed by the end of summer, 2011. For more information, please see the project website at http://www.deldot.gov/information/projects/north_frederica/index.shtml.

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In addition, DelDOT also has two pavement rehabilitation and resurfacing projects that are currently being constructed on Delaware Route 1. The first project is covered under Contract No. T201106204, and begins at Barkers Landing Road (Kent Road 107), just north of Trap Shooters Road, and runs south to the newly constructed Delaware Route 1, north Frederica grade separated intersection. The second project is covered under Contract No. T201106201, and begins at the Delaware Route 1, north Frederica grade separated intersection and runs south to Tub Mill Pond Road in Milford. Both of these projects are being completed concurrently with the North Frederica Grade Separated Intersection project. Both of these pavement and rehabilitation contracts should be completed within the next few months.

Livable Delaware

(Source: Delaware Strategies for State Policies and Spending, 2010)

Location with respect to the Strategies for State Policies and Spending Map of Delaware:
The proposed development is located within Investment Level 3.

Investment Level 3

Investment Level 3 Areas generally fall into two categories. The first category covers lands that are in the long-term growth plans of counties or municipalities where development is not necessary to accommodate expected population growth during a five-year planning period (or longer). The second category includes lands that are adjacent to or intermingled with fast-growing areas within counties or municipalities that are otherwise categorized as Investment Levels 1 or 2. Investment Level 3 is further characterized by areas with new development separated from existing development by a substantial amount of vacant land that is not contiguous with existing infrastructure, areas that are experiencing some development pressure, areas with existing but disconnected development, and possible lack of adequate infrastructure.

The state will consider investing in infrastructure within Investment Level 3 Areas once the Investment Level 1 and 2 Areas are substantially built out, or when the infrastructure or facilities are logical extensions of existing systems and deemed appropriate to serve a particular area. The priorities in the Level 3 Areas are for the Department to focus on regional movements between towns and other population centers. Local roadway improvements will be made by developers and property owners as development occurs. Lower priority is given to transportation system-capacity improvements and transit-system enhancements.

Proposed Development's Compatibility with Livable Delaware:

The proposed Asbury Square commercial development falls within Investment Level 3 and is to be developed as one convenience market with 16 fueling stations and four retail spaces for general shopping, with one retail space being assumed as a fast food restaurant with a drive through window. Asbury Square is to be developed in a manner consistent with other commercial developments in the region, although the amount of commercial development in the Frederica area is limited. According to Livable Delaware, uses of the land located within Investment Level 3 include lands that are in the long-term growth plans of municipalities, as well as new development separated from existing development by large amounts of vacant land that is not contiguous with existing infrastructure. The land being developed as part of this commercial

development is part of the Town of Frederica's long-term growth plan, and is being developed in an area with limited amounts of other commercial development. As such, this commercial development appears to be generally consistent with the 2010 update of the Livable Delaware "Strategies for State Policies and Spending."

Comprehensive Plans

(Source: 2009 Town of Frederica Comprehensive Plan)

Town of Frederica Comprehensive Plan:

The proposed commercial development is situated within the Town of Frederica. This parcel is classified as Commercial (C-1), and was annexed into the Town of Frederica in June of 2008. This parcel was annexed with the intention of providing nearby locations for employment uses.

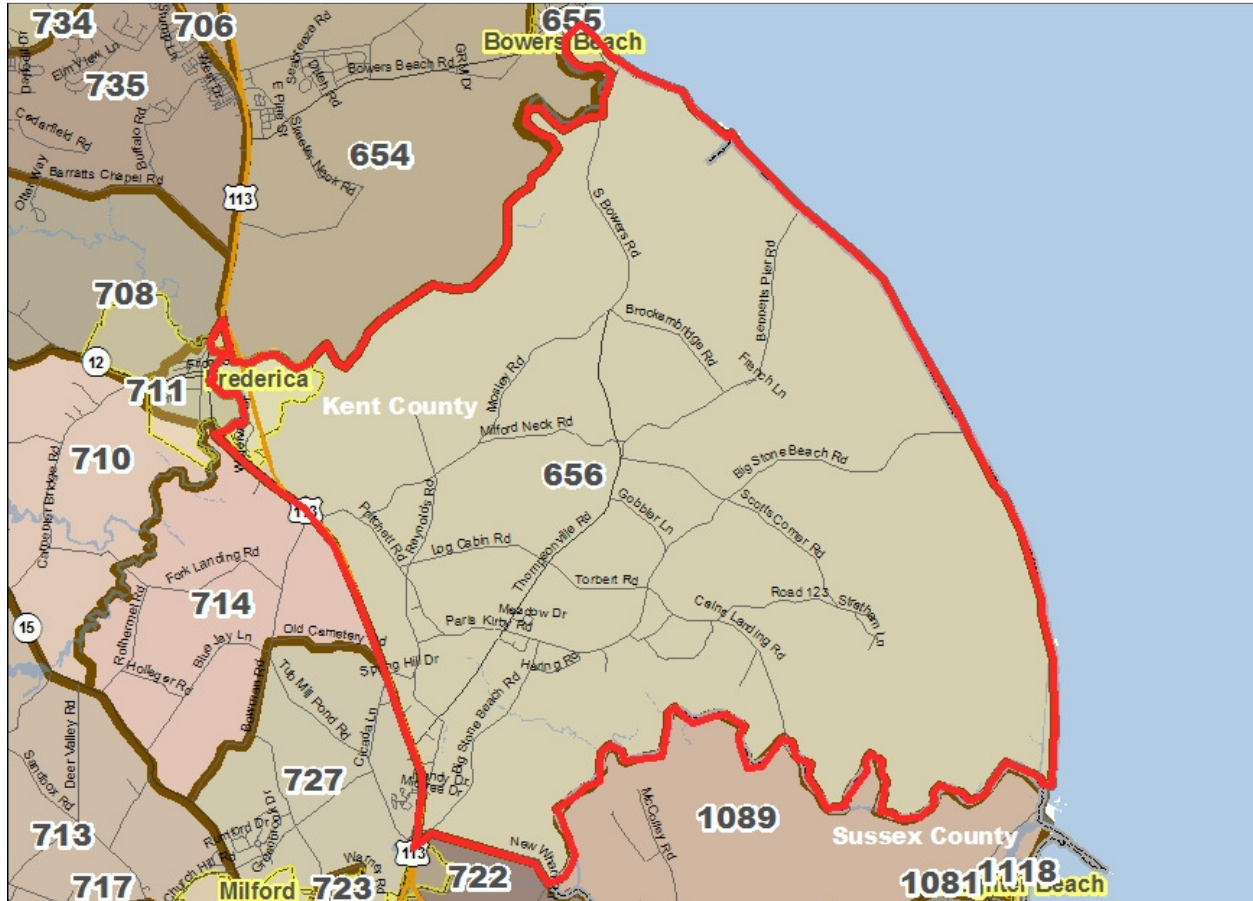
Proposed Development's Compatibility with the Town of Frederica Comprehensive Plan:

The proposed Asbury Square Commercial development maintains the same zoning and is generally compatible with the Town's Comprehensive Plan. As of 2007, the Kent County Comprehensive Plan designated this land as Low Density (1 to 2.9 Dwelling units per acre) – Agricultural Conservation (AC). However, the Kent County Comprehensive Plan identified this land in question as annexed into the municipal boundary of the Town of Frederica. This change is reflected as part of the Town of Frederica Comprehensive Plan as well as part of an Amendment in 2009. With the proposed annexation the Asbury Square site would be within the permitted zoning. As such, the commercial development is generally compatible with the Town of Frederica Comprehensive Plan.

Transportation Analysis Zones (TAZ)

Transportation Analysis Zones (TAZ) where development would be located: 656

TAZ Boundaries:



**Graphic has been taken from the Planning and Development Coordination Application.*

Current employment estimate for TAZ: 204 in 2010

Future employment estimate for TAZ: 239 in 2030

Current Population estimate for TAZ: 1906 in 2010

Future Population estimate for TAZ: 2195 in 2030

Current household estimate for TAZ: 796 in 2010

Future household estimate for TAZ: 943 in 2030

Relevant committed developments in the TAZ: None.

Would the addition of committed developments to current estimates exceed future projections: No.

Would the addition of committed developments and the proposed development to current estimates exceed future projections: Yes.

Trip Generation

Trip generation for the proposed development was computed using comparable land uses and equations contained in the *Trip Generation, 8th Edition: An ITE Informational Report*, published by the Institute of Transportation Engineers (ITE). The following land uses were utilized to estimate the amount of new traffic generated for this development.

- 19,008 square foot Shopping Center – (ITE Land Use Code 820)
- 4,768 square foot Convenience Market with Gas Pumps – (ITE Land Use Code 853)
- Fast-Food Restaurant with Drive-Through – (ITE Land Use Code 934)

The peak period trip generations for the Asbury Square commercial development are included in Table 1.

Table 1
ASBURY SQUARE TRIP GENERATION

Land Use	Weekday ADT	Saturday ADT	PM Peak Hour			SAT Peak Hour		
			In	Out	Total	In	Out	Total
Shopping Center	2,326	3,271	103	108	211	153	141	294
Convenience Market with Gas Pumps	4,032	3,272	133	132	265	82	78	160
Fast-Food Restaurant with Drive Through	2,481	3,610	88	81	169	151	146	297
Net New Trips			324	321	645	386	365	751
Internal Capture			111	111	222	179	179	358
Total External Trips			213	210	423	207	186	393
Pass-By			139	139	278	96	98	194
Total Trips	8,839	10,153	74	71	145	111	88	199

Note: Originally it was planned that a Pharmacy with a Drive Through would be used to generate a portion of the trips, but a Fast-Food Restaurant with a Drive Through was used to generate peak hour trips. At this point, the developer is unsure what type of commercial business will be using the area, so the more conservative numbers between the two options were used for the TIS.

Overview of TIS

Intersections examined:

1. Frederica Road (Kent Road 10) and Site Access Road
2. Delaware Route 1 and Frederica Road (Southern Intersection)
3. Frederica Road and Market Street (Kent Road 389)
4. David Street (Delaware Route 12 East) and Frederica Road
5. Front Street (Delaware Route 12 West) and Frederica Road

Conditions examined:

1. Case 1 - 2011 Existing conditions
2. Case 2 - 2013 No Build conditions without Asbury Square
3. Case 3 - 2013 Build conditions with Asbury Square

Peak hours evaluated: Weekday evening and Saturday mid-day peak hours

Committed Developments considered:

1. Weatherstone Crossing (199 single-family detached houses, 2 built)
2. Lynnwood Village (42 single-family detached houses, 9 built)
3. Twin Farms (208 single-family detached houses)
4. Dickinson Creek (67 single-family detached houses, 5 built)
5. Roesville Estates (475 single-family detached houses, 25 built)
6. Autumn Glen (327 single-family detached houses)
7. Fork Landing West (127 single-family detached houses)
8. Lowbar Acres (11 single-family detached houses)

Intersection Descriptions

1. Frederica Road and Site Access Road

Type of Control: proposed stop-controlled intersection (T-intersection)

Westbound Approach: (Site Entrance) proposed shared left turn/right turn lane

Northbound Approach: (Frederica Road) proposed one right turn lane and one through lane

Southbound Approach: (Frederica Road) proposed one left turn lane and one through lane

2. Delaware Route 1 and Frederica Road (Southern Intersection)

Type of Control: stop-controlled intersection (T-intersection)

Eastbound Approach: (Frederica Road) one stop controlled shared through/left turn lane and one separate right turn acceleration lane,

Northbound Approach: (Delaware Route 1) one left turn lane, two through lanes

Southbound Approach: (Delaware Route 1) one left turn lane, two through lanes and one right turn lane

Note: The eastbound approach is primarily used for left-turns, but the option of going straight through the intersection exists due to a farm entrance that composes the eastern leg of the intersection.

3. Frederica Road and Market Street

Type of Control: stop-controlled intersection (T-intersection)

Eastbound Approach: (Market Street) one shared left turn/right turn lane, stop controlled

Northbound Approach: (Frederica Road) one shared through/left turn lane

Southbound Approach: (Frederica Road) one shared through/right turn lane

4. David Street (Delaware Route 12 East) and Frederica Road

Type of Control: stop-controlled intersection

Eastbound Approach: (David Street) one left turn lane, one through/right turn lane

Northbound Approach: (Frederica Road) one through/right turn lane

Southbound Approach: (Frederica Road) one through/left turn lane

5. Front Street (Delaware Route 12 West) and Frederica Road

Type of Control: yield-controlled intersection

Westbound Approach: (Front Street) one shared through/left turn/right turn lane, yield controlled

Northbound Approach: (Frederica Road) one shared through/left turn/right turn lane

Southbound Approach: (Frederica Road) one shared through/left turn/right turn lane

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: Existing DART Route 303 and Route 305 currently travel within the Frederica area. Route 303 operates between Dover and Georgetown, Monday through Friday from 6:00 a.m. to 9:00 p.m. with 21 trips. It currently serves Frederica with 6 round trips at the corner of Frederica Road and Front Street. Route 305 operates as a seasonal beach route from Memorial Day to Labor Day between Wilmington and Rehoboth Beach on weekends from 8:30 a.m. to 10:00 p.m. with 3 round trips. This route does not serve Frederica directly but stays on US Route 113 (Delaware Route 1).

Planned transit service: JMT contacted Lisa Collins, Service Development Planner of DTC. In an email dated May 27, 2011, she noted that due to low ridership, the Route 303 trips into Frederica are proposed for elimination. She also said the DTC is considering a future commuter route between Rehoboth Beach and Dover. This route would initially run Monday through Friday with 2 round trips daily. It will serve major collection points such as park and ride lots.

Existing bicycle and pedestrian facilities: According to DelDOT's *Delaware Bicycle Facility Master Plan* (October 2005), Frederica Road is designated as a State and Local Road.

Per the *Kent County Bicycle Map*, the following bicycle routes exist in the vicinity of the site:

- A Statewide Bicycle Route exists approximately 1.80 miles north-west of the subject property and runs along Andrews Lake Road, Johnnycake Landing Road, Carpenter Bridge Road, Fork Landing Road, and Tub Mill Pond Road. Connections to this route are located at the Front Street (Delaware Route 12) intersection with Carpenters Bridge Road and the Tub Mill Pond Road intersection with Fork Landing Road.
- A Recreational Connector Bicycle Route exists approximately 0.7 miles south and east of the site and can be accessed at the Tub Mill Pond Road/Milford Neck Road intersection with Delaware Route 1. This Recreational Connector Bicycle Route traverses through Milford Neck Road and Tub Mill Pond Road until it connects with the Statewide Bicycle Route at the intersection of Fork Landing Road with Tub Mill Pond Road.

Planned bicycle and pedestrian facilities: Davis, Bowen & Friedel, Inc. contacted Mr. Anthony Aglio, DelDOT's Bicycle Coordinator. In an email dated April 28, 2011 he agreed that the following bicycle improvements should be recommended:

- A minimum fifteen-foot wide permanent easement from the edge of the right-of-way should be dedicated to DelDOT within the site frontage along Frederica Road. Within this easement, the multi-use path that is currently proposed along the site frontage should

be adjusted to an AASHTO and ADA compliant sidewalk and should tie into the shoulder at a 45 degree angle at both ends in order to be aesthetically cohesive with the neighboring pedestrian improvements. A five-foot minimum setback should be maintained from the edge of the pavement to the multi-use path.

- Where the right turn lane is added on Frederica Road a bicycle lane should also be provided through the right turn lane. A Right Turn Yield to Bikes sign (MUTCD R4-4) should be added at the start of the right turn lane.
- Where internal sidewalks are located alongside of parking spaces, a buffer, physical barrier or signage should be added to eliminate vehicular overhang onto the sidewalk.

Previous Comments

All comments from the preliminary TIS have been addressed in the final TIS.

General HCS Analysis Comments

(See table footnotes on the following pages for specific comments)

- 1) David, Bowen & Friedel, Inc. (DBF) performed analyses using HCS2000 Version 4.1f. JMT used HCS+T7F, Version 5.5. As such, some of the results are different between the two analyses.
- 2) The *DelDOT Standards and Regulations for Subdivision Streets and State Highway Access* recommends using 3% heavy vehicles for each movement at intersections when there is significant change in intersection volume. The specific movements that required changes to the truck percentages were identified based on the increase in traffic volumes by more than 75 vph per approach. The TIS used existing truck percentages for the Case 1 scenario, but then decreased the heavy vehicle volumes in the future cases. JMT used the DelDOT method of using the existing truck percentages for the Case 1 existing analyses. For future analyses, if the volumes increased by more than 75 vph and the existing truck percentage was less than 3%, then the truck percentages were increased to 3%. Existing truck percentages that were higher than 3% remained the same for all future cases.

Table 2
PEAK HOUR LEVELS OF SERVICE (LOS)
Based on Traffic Impact Study for Asbury Square
Report dated May 2011
Prepared by Davis, Bowen & Friedel, Inc.

Unsignalized Intersection ¹ Two-Way Stop Control	LOS per TIS		LOS per JMT	
	Weekday PM	Saturday Mid-Day	Weekday PM	Saturday Mid-Day
Frederica Road & Site Entrance				
2013 with Asbury Square (Case 3)				
Southbound Frederica Road	A (8.2)	A (8.0)	A (8.2)	A (8.0)
Westbound Site Entrance	B (13.9)	B (13.1)	B (13.9)	B (13.1)

¹ For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

Table 3
PEAK HOUR LEVELS OF SERVICE (LOS)
Based on Traffic Impact Study for Asbury Square
Report dated May 2011
Prepared by Davis, Bowen & Friedel, Inc.

Unsignalized Intersection ² Two-Way Stop Control	LOS per TIS		LOS per JMT	
	Weekday PM	Saturday Mid-Day	Weekday PM	Saturday Mid-Day
Delaware Route 1 & Frederica Road (Southern Intersection)^{3,4,5}				
2011 Existing (Case 1)				
Northbound Delaware Route 1 - Left	C (19.3)	C (17.8)	C (19.3)	C (17.8)
Southbound Delaware Route 1 - Left	-	-	B (12.6)	B (11.1)
Eastbound Frederica Road - Left	F (305.0)	F (272.8)	D (29.8)	E (37.7)
2013 without Asbury Square (Case 2)				
Northbound Delaware Route 1 - Left	D (27.5)	C (18.9)	D (27.5)	C (20.2)
Southbound Delaware Route 1 - Left	-	-	B (13.3)	B (11.1)
Eastbound Frederica Road - Left	F (725.0)	F (376.4)	E (40.0)	E (35.8)
2013 with Asbury Square (Case 3)				
Northbound Delaware Route 1 - Left	D (35.0)	C (22.1)	D (35.0)	C (24.3)
Southbound Delaware Route 1 - Left	-	-	B (13.2)	B (11.1)
Eastbound Frederica Road - Left	F (905.0)	F (589.2)	F (57.9)	E (36.3)

² For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

³ The TIS used inconsistent heavy vehicle percentages during the existing PM and all future PM and SAT peak hour analyses. JMT used heavy vehicle percentages based on DeDOT guidelines.

⁴ JMT analyzed this intersection with a southbound left turn/U-Turn lane as it currently exists. TIS did not include a southbound left turn lane with their analysis.

⁵ The large differences in the levels of service between TIS and JMT are due to the utilization of different versions of HCS, even though the eastbound volumes are very low.

Table 3 (Continued)
PEAK HOUR LEVELS OF SERVICE (LOS)
Based on Traffic Impact Study for Asbury Square
Report dated May 2011
Prepared by Davis, Bowen & Friedel, Inc.

Yield Condition ⁶	LOS per TIS		LOS per JMT	
	Weekday PM	Saturday Mid-Day	Weekday PM	Saturday Mid-Day
Delaware Route 1 & Southbound Frederica Road Ramp^{7,8}				
2011 Existing (Case 1)	B (13.5)	B (14.4)	B (16.1)	B (17.1)
2013 without Asbury Square (Case 2)	B (14.3)	B (12.8)	B (16.9)	B (15.5)
2013 with Asbury Square (Case 3)	B (14.5)	B (13.1)	B (17.1)	B (15.8)

⁶ For yield conditions, the numbers in parentheses following levels of service are density, measured in passenger cars per mile per lane.

⁷ The TIS utilized incorrect recreational vehicle percentages during the existing PM and SAT peak hour analyses. JMT used recreational vehicle percentages of zero.

⁸ The TIS utilized an incorrect ramp length of 1,006 feet. JMT used a ramp length of 570 feet based on MUTCD guidelines.

Table 4
PEAK HOUR LEVELS OF SERVICE (LOS)
Based on Traffic Impact Study for Asbury Square
Report dated May 2011
Prepared by Davis, Bowen & Friedel, Inc.

Unsignalized Intersection ⁹ Two-Way Stop Control	LOS per TIS		LOS per JMT	
	Weekday PM	Saturday Mid-Day	Weekday PM	Saturday Mid-Day
Frederica Road & Market Street¹⁰				
2011 Existing (Case 1)				
Northbound Frederica Road	A (7.4)	A (7.5)	A (7.4)	A (7.4)
Eastbound Market Street	A (9.0)	A (8.9)	A (9.0)	A (8.9)
2013 without Asbury Square (Case 2)				
Northbound Frederica Road	A (7.5)	A (7.6)	A (7.5)	A (7.6)
Eastbound Market Street	A (9.4)	A (9.2)	A (9.4)	A (9.2)
2013 with Asbury Square (Case 3)				
Northbound Frederica Road	A (7.6)	A (7.8)	A (7.6)	A (7.8)
Eastbound Market Street	A (9.5)	A (9.7)	A (9.5)	A (9.7)

⁹ For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

¹⁰ The TIS utilized incorrect heavy vehicle percentages during the existing PM and SAT peak hour analyses. JMT used heavy vehicle percentages based on DelDOT guidelines.

Table 5
PEAK HOUR LEVELS OF SERVICE (LOS)
Based on Traffic Impact Study for Asbury Square
Report dated May 2011
Prepared by Davis, Bowen & Friedel, Inc.

Unsignalized Intersection ¹¹ Two-Way Stop Control	LOS per TIS		LOS per JMT	
	Weekday PM	Saturday Mid-Day	Weekday PM	Saturday Mid-Day
Delaware Route 12 East (David Street) & Frederica Road^{12,13,14}				
2011 Existing (Case 1)				
Southbound Frederica Road	A (7.4)	A (7.4)	A (7.4)	A (7.3)
Westbound David Street ¹⁵	A (8.9)	-	A (8.9)	-
Eastbound David Street – Left	A (10.0)	A (9.4)	A (10.0)	A (9.4)
Eastbound David Street – Through/Right	A (8.6)	A (8.7)	A (8.6)	A (8.6)
2013 without Asbury Square (Case 2)				
Southbound Frederica Road	A (7.6)	A (7.5)	A (7.6)	A (7.5)
Westbound David Street ¹⁵	A (9.4)	-	A (9.4)	-
Eastbound David Street – Left	B (13.6)	B (12.3)	B (13.6)	B (12.3)
Eastbound David Street – Through/Right	A (8.8)	A (8.9)	A (8.8)	A (8.9)
2013 with Asbury Square (Case 3)				
Southbound Frederica Road	A (7.7)	A (7.6)	A (7.7)	A (7.6)
Westbound David Street ¹⁵	A (9.8)	-	A (9.8)	-
Eastbound David Street – Left	B (14.7)	B (13.0)	B (14.7)	B (13.0)
Eastbound David Street – Through/Right	A (8.9)	A (9.0)	A (8.9)	A (9.0)

¹¹ For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

¹² Both TIS and JMT analyzed westbound driveway as a fourth leg of the intersection, and eastbound approach to have a separate left turn lane and a shared through/right turn lane.

¹³ Northbound Frederica Road has an emergency signal, supplemented by a stop bar, which is activated only for fire emergencies.

¹⁴ The TIS used inconsistent heavy vehicle percentages during the existing SAT peak hour analyses. JMT used heavy vehicle percentages based on DelDOT guidelines.

¹⁵ The westbound approach at this intersection is a small private street. No traffic volumes were observed during the SAT peak hour counts.

Table 6
PEAK HOUR LEVELS OF SERVICE (LOS)
Based on Traffic Impact Study for Asbury Square
Report dated May 2011
Prepared by Davis, Bowen & Friedel, Inc.

Unsignalized Intersection ¹⁶ Two-Way Stop Control	LOS per TIS		LOS per JMT	
	Weekday PM	Saturday Mid-Day	Weekday PM	Saturday Mid-Day
Delaware Route 12 West (Front Street) & Frederica Road^{17,18}				
2011 Existing (Case 1)				
Northbound Frederica Road	A (7.8)	A (7.6)	A (7.8)	A (7.6)
Southbound Frederica Road	A (7.5)	A (7.4)	A (7.5)	A (7.4)
Westbound Front Street ¹⁹	B (11.4)	-	B (11.4)	-
2013 without Asbury Square (Case 2)				
Northbound Frederica Road	A (9.0)	A (8.5)	A (9.0)	A (8.5)
Southbound Frederica Road	A (7.9)	A (8.0)	A (7.9)	A (8.0)
Westbound Front Street ¹⁹	C (18.7)	-	C (18.7)	-
2013 with Asbury Square (Case 3)				
Northbound Frederica Road	A (9.1)	A (8.6)	A (9.1)	A (8.6)
Southbound Frederica Road	A (7.9)	A (8.0)	A (7.9)	A (8.0)
Westbound Front Street ¹⁹	C (20.4)	-	C (20.4)	-

¹⁶ For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

¹⁷ Southbound Frederica Road has an emergency signal, supplemented by a stop bar, which is activated only for fire emergencies.

¹⁸ The TIS used inconsistent heavy vehicle percentages during the future SAT peak hour analyses. JMT used heavy vehicle percentages based on DelDOT guidelines.

¹⁹ The westbound approach at this intersection, Front Street, is a small street. No traffic volumes were observed during the SAT peak hour counts.