



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

CAROLANN WICKS, P.E.  
SECRETARY

September 28, 2010

Ms. Ann Marie Townshend  
Director  
Department of Planning & Inspections  
City Hall - The Plaza  
P.O. Box 475  
Dover, DE 19903-0475

Dear Ms. Townshend:

The enclosed Traffic Impact Study (TIS) review letter for the **South Dover Plaza** development has been completed under the responsible charge of a registered professional engineer whose firm is authorized to work in the State of Delaware. They have found the TIS 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 this TIS review and concurs with the recommendations. We are providing it to you for your information in your review of the plans for the subject development. If you have any questions concerning this letter or the attached review letter, please contact me at (302) 760-2134.

Sincerely,

T. William Brockenbrough, Jr., P.E.  
County Coordinator

TWB:km  
Enclosure  
cc with enclosure:

DelDOT Distribution  
Ms. Constance C. Holland, Office of State Planning Coordination  
Ms. Nicole R. Kline, P.E., McMahon Associates  
Mr. Mir A. Wahed, P.E., Johnson, Mirmiran, & Thompson  
Mr. Andrew J. Parker, P.E., McCormick Taylor

## DelDOT Distribution

Frederick H. Schranck, Deputy Attorney General  
Brett Taylor, Chief of Community Relations, Public Relations  
Natalie Barnhart, Director, Transportation Solutions (DOTS)  
Ralph A. Reeb, Director, Division of Planning  
Michael H. Simmons, P.E., Assistant Director, Project Development South, DOTS  
Donald D. Weber, P.E., Chief Traffic Engineer, Traffic, DOTS  
Mark Luszcz, P.E., Assistant Chief Traffic Engineer, Traffic, DOTS  
Thomas E. Meyer, P.E., Traffic Studies Manager, Traffic, DOTS  
Theodore G. Bishop, Assistant Director, Development Coordination  
Thomas Greve, P.E., District Engineer, Central District  
Jennifer Pinkerton, P.E., Deputy Principal Assistant, Pavement Management  
William J. Dryden, Transportation Planner, Project Development South, DOTS  
Lisa Collins, Service Development Planner, Delaware Transit Corporation  
Marc Coté, P.E., Subdivision Engineer, Development Coordination  
Todd J. Sammons, P.E., Project Manager, Kent, Development Coordination  
Julio Seneus, Subdivision Manager, Development Coordination  
Anthony Aglio, Bicycle Coordinator, Statewide & Regional Planning  
Richard Sinegar, Pedestrian Coordinator, Statewide & Regional Planning  
Troy Brestel, Project Engineer, Development Coordination



September 28, 2010

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

RE: Agreement No. 1406  
Traffic Impact Study Services  
**Task 229A-South Dover Plaza**

Dear Mr. Brockenbrough,

Johnson, Mirmiran and Thompson (JMT) has completed the review of the Traffic Impact Study for the South Dover Plaza, prepared by McMahon Associates dated April, 2010. This review was assigned Task Number 229A. McMahon Associates 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 South Dover Plaza, which is proposed on the northeast corner of the intersection of US Route 113 (Bay Road/Kent Road 7) and the Bay Court Plaza driveway and the Blue Hen Corporate Center entrance in Dover, Kent County. The development would consist of 119,025 square feet of retail, two restaurants of 9,800 square feet each and a 4,200 square foot bank on an approximately 12.95 acre assemblage of parcels. The parcels are currently zoned C-4 (Highway Commercial) and will be developed under the same zoning. The developer is proposing two full unsignalized access points on the Bay Court Plaza driveway opposite the current available points of entry to the existing retail users. No access points are proposed along US Route 113. Construction is anticipated to be completed by 2012.

DelDOT currently has no relevant project in the study area.

However, some of the study area intersections were evaluated under DelDOT's 2006 and 2007 Hazard Elimination Program (HEP f.k.a. HSIP) as part of the Site S and Site Y studies. Site S included a 0.49 mile corridor along Court Street/South Little Creek Road (Kent Road 67) from 0.14 mile west of US Route 13 (South DuPont Highway/Kent Road 24) to 0.24 miles east of US Route 113. The study included the signalized intersections of US Route 13 at Court Street and US Route 113 at South Little Creek Road/Court Street. Recommendations at the US Route 113 and South Little Creek Road/Court Street intersection included installing a "No Merge" sign on the northeast corner of the intersection, restriping a bicycle symbol and installing a painted island on the westbound right-turn approach and installing a left-turn pavement marking arrow on the westbound South Little Creek Road left-turn lane approaching US Route 113. All the recommended improvements from the HEP report have been implemented.



Site Y included a 0.89 mile section of US Route 13/DuPont Highway/Bay Road from 0.18 miles south of Court Street to 0.13 miles north of Spring Garden Lane. In addition to the merge operation of northbound US Route 13 and US Route 113 (Bay Road), the study included the signalized intersections of US Route 13 at US Route 113 (southbound left-turn) and US Route 113 at South Little Creek Road/Court Street. The study looked into the merging and weaving (north of the merge) operation from the US Route 13 and US Route 113 merge to the intersection of US Route 13 and East Loockerman Street and the impact of two closely spaced signalized intersections on this merge operation. Capacity analysis was performed to determine the impact of modifying the left-turn phasing on the southbound US Route 113 (Bay Road) approach at the intersection of US Route 113 and South Little Creek Road/Court Street. The HEP committee recommended modifications to the sequence of the southbound US Route 113 left-turn phase to a lagging left-turn phase. This modification would provide additional time for the northbound US Route 113 platoon to clear the US Route 13 and US Route 113 merge prior to the northbound US Route 13 platoon. However, this recommendation has not been implemented. All other recommendations including the replacement of the stop lines on southbound US Route 13 and a left-turn arrow on the westbound South Little Creek Road approach have been implemented.

In addition, DelDOT will have potential future pavement rehabilitation and resurfacing projects that would include the intersections of US Route 13 at Court Street and US Route 13 at US Route 113 (southbound left-turn). The project is scheduled to be constructed in 2011; however, the exact timing is contingent upon the completion of the City of Dover sewer project along US Route 13, between White Oak Road and South State Street.

Based on our review, all the intersections analyzed for this TIS would operate with Level of Service D or better with or without the South Dover Plaza development. The requested improvements mentioned in items 1 to 9 are related to road network improvements and are not based on any Level of Service requirement.

The three intersections of US Route 13 and Court Street, US Route 113 and South Little Creek Road/Court Street, and US Route 13 and US Route 113 (southbound left-turns) are controlled by the same signal controller located at the intersection of US Route 13 and Court Street. Although these three closely spaced intersections would operate at acceptable levels of service during the 2012 build condition, the 95<sup>th</sup> percentile approach queue length would extend past the available storage during the peak hours. The following table provides the distance between intersections and the peak hour queues for 2012 with and without the development of South Dover Plaza.



Street	Cross-Street	Distance to Upstream Intersection	2012 No Build Peak Hour Queue Length			2012 Full Build Peak Hour Queue Length		
			AM	PM	Saturday	AM	PM	Saturday
Court Street	US Route 113	400'	420'	765'	510'	420'	765'	510'
Court Street	US Route 13	400'	465'	445'	295'	480'	505'	435'
US Route 13	US Route 113 (southbound left-turns)	315'	720'	1400'	850'	730'	1475'	850'
US Route 113	Court Street/South Little Creek Road	500'	690'	820'	735'	715'	880'	825'

Based on the HCS analysis the queue length would extend past the available storage with or without the development of the South Dover Plaza. Also, based on our field observation some of the queue lengths exceed the available storage during existing peak hours. Although, the development of the South Dover Plaza would increase the queue further, the increase in queue between the 2012 no-build and build scenarios are minimal. Due to the physical constraints and the potential major capital investments we would not recommend any additional queue capacity improvements at these intersections. However, the implementation of a shorter intersection cycle length would reduce the overall approach queue lengths at these intersections. In addition, these three intersections have recently been reviewed as part of the HEP study and improvements have already been implemented through HEP. Given the very recent HEP improvements at these three intersections we do not recommend any additional physical improvements at this time. Instead, we recommend monitoring the queue length during peak hours at these intersections.

The intersection of US Route 113 and the Bay Court Plaza driveway and the Blue Hen Corporate Center entrance operate at acceptable levels of service with or without the development of the South Dover Plaza. The 95<sup>th</sup> percentile queue lengths on the eastbound approach in the existing condition are approximately 110 feet and 95 feet during the PM and Saturday mid-day peak hour respectively. The 95<sup>th</sup> percentile queue lengths on the eastbound approach in the 2012 build condition would approximately be 350 feet and 365 feet during the PM and Saturday mid-day peak hour respectively. The distance between the proposed site access nearest to the US Route 113 and the intersection of US Route 113 and Bay Court Plaza Driveway/Blue Hen Corporate Center entrance is approximately 270 feet. Therefore, if the site is developed as proposed, one could expect the eastbound queue of vehicles exiting Bay Court Plaza to back up past this access at least once every weekday and Saturday peak hour. We do not expect this situation to affect traffic on US Route 113, but the City should be aware of it and consider requiring a redesign of the site, to prohibit left turns out onto the Bay Court Plaza driveway, if they find it objectionable.

Further regarding the intersection of US Route 113 and the Bay Court Plaza driveway and the Blue Hen Corporate Center entrance, the 95<sup>th</sup> percentile northbound left-turn queue lengths in the 2012 build condition are approximately 305 feet and 290 feet in the PM and Saturday mid-day peak hour respectively. The existing storage for the two northbound left-turn lanes is approximately 250 feet. The 95<sup>th</sup> percentile southbound right-turn queue lengths in the 2012 build condition are approximately 350 feet and 465 feet in the PM and Saturday mid-day peak hour respectively. The existing storage for the southbound right-turn lane is approximately 160 feet. In addition, the entrance and exit driveways for the Enterprise Rental Car are located along



southbound US Route 113 within 400 feet north of the intersection of US Route 113 and Bay Court Plaza Driveway/Blue Hen Corporate Center entrance. With the extension of the southbound right-turn lane, vehicles entering and exiting the Enterprise Rental Car driveway would need to maneuver through the southbound US Route 113 right-turn lane. To serve the Enterprise Rental Car property with a safe and accessible entrance we would recommend that the developer provide internal access to the Enterprise property through the proposed development.

The southern driveway of Capital Homes, which is located approximately 600 feet north of the intersection of US Route 113 and Bay Court Plaza Driveway/Blue Hen Corporate Center entrance, presently encroaches on the proposed South Dover Plaza development and, if it remains, would render one of the proposed buildings undevelopable. While the developer of South Dover Plaza may not be responsible for providing access to Capital Homes, it would seem necessary that the City and DelDOT work with both parties to ensure that Capital Homes has adequate opportunity to reconfigure their access and does so in a timely manner. The goal would be to allow Capital Homes to maintain access in and out of their business without undue delay or expense to the developers of South Dover Plaza.

Should the City of Dover 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. Implementation of road improvements, or combinations thereto, should be required prior to issuance of Certificate (s) of Occupancy.

1. The developer should provide a bituminous concrete overlay to the right-turn lane/shoulder along the site frontage on southbound US Route 113 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 City of Dover should require the developer to provide a bituminous concrete overlay and restripe the Bay Court Plaza driveway to meet the City of Dover standards.
3. The City of Dover should work with Capital Homes and the developer to achieve the orderly relocation of Capital Homes' southern driveway or the closure of that driveway and the modification of their northern driveway to handle two-way traffic. The relocated or modified driveway will require DelDOT review, approval and permitting.
4. The developer should remove the existing driveway along southbound US Route 113 located approximately 220 feet north of the intersection of US Route 113 and Bay Court Plaza Driveway/Blue Hen Corporate Center entrance. The existing building and the driveway is proposed to be removed upon completion of construction of the proposed South Dover Plaza access along the Bay Court Plaza driveway.



5. The developer should construct a site entrance on the Bay Court Plaza driveway across from the existing median opening located approximately 270 feet west of the intersection of US Route 113 and Bay Court Plaza Driveway/Blue Hen Corporate Center entrance. A full access at this location would be acceptable to DelDOT. The City is advised, however, that at times the eastbound queue from the signal at US Route 113 would briefly block this site entrance.
6. The developer should construct a full access site entrance on the Bay Court Plaza driveway across from the existing median opening located approximately 500 feet west of the intersection of US Route 113 and Bay Court Plaza Driveway/Blue Hen Corporate Center entrance.
7. The developer should lengthen the southbound right-turn lane at the intersection of US Route 113 and Bay Court Plaza Driveway/Blue Hen Corporate Center entrance to provide 450 feet of storage (excluding taper). However, due to physical constraints, DelDOT's Subdivision Section may determine that a shorter southbound right-turn lane is acceptable.
8. The developer should provide a cross-access easement to the Enterprise Rental Car property and should make a good faith effort to include that property in their development and to eliminate that property's access on US Route 113.
9. The developer should extend the northbound left-turn storage lengths at the intersection of US Route 113 and Bay Court Plaza Driveway/Blue Hen Corporate Center entrance to provide 300 feet of storage (excluding taper).
10. The following bicycle, pedestrian, and transit improvements should be included:
  - a. A ten-foot wide multi-use path that meets current AASHTO and ADA standards should be constructed along the site frontage on US Route 113. A five-foot minimum setback should be maintained from the edge of the pavement to the multi-use path. Presently, it appears that all or most of the path can be built within the existing right-of-way, but some construction and maintenance easements may be necessary.
  - b. A minimum of a five-foot wide sidewalk (with a minimum of a five-foot wide buffer from the roadway) that meets current AASHTO and ADA standards should be included and connected along the site frontages on Bay Court Plaza driveway.
  - c. ADA compliant curb ramps and marked crosswalks should be provided at the site entrance. The use of Type 3 curb ramps is discouraged.
  - d. All internal streets should include five-foot wide ADA compliant sidewalks that meet current AASHTO standards, setback five feet from the roadway. These internal sidewalks should extend to the site entrances and connect to the frontage sidewalk.



- e. 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.
- f. Covered bike parking racks should be provided near the building entrances. Identification of specific locations may be deferred pending the determination of building tenants.
- g. Share the Road (MUTCD W16-1) and appropriate bicycle warning signs should be installed on westbound Court Street at the intersection of US Route 113 and South Little Creek Road/Court Street due to the termination of the westbound bicycle lane at this intersection.
- h. A bus pull off with a 5' x 12' ADA compliant concrete pad and a bus shelter should be provided along the site frontage on southbound US Route 113. The internal and frontage sidewalks should connect to this stop. Parking facilities for bicyclists should be included.
- i. A bus pull off with a 5' x 12' ADA compliant concrete pad and a bus shelter should be provided on internal street along the interior island and across from the proposed restaurant. The internal sidewalk should connect to this stop. Parking facilities for bicyclists should be included.

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](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](mailto: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:** April, 2010.

**Prepared by:** McMahon Associates.

**Prepared for:** S.H.E. Holdings, LLC.

**Tax Parcels:** ED 05-077.00-01-10.00 and 9.00.

**Generally consistent with DelDOT's Rules and Regulations for Subdivision Streets:** Yes.

## **Project Description and Background**

**Description:** 119,025 square foot retail, two restaurants of 9,800 square foot each, and a 4,200 square foot bank.

**Location:** The project is proposed on the northeast corner of the intersection of US Route 113 (Bay Road/Kent Road 7) and Bay Court Plaza Driveway/Blue Hen Corporate Center Entrance in Dover, Kent County.

**Amount of Land to be developed:** Approximately 12.95 acres assemblage of parcels.

**Land Use approval(s) needed:** Commercial Entrance Approval.

**Proposed completion date:** 2012.

**Proposed access locations:** Two full unsignalized access points are proposed on Bay Court Plaza Driveway opposite the current available points of entry to the existing retail users. No access points are proposed along US Route 113.

### **Daily Traffic Volumes:**

- 2008 Average Annual Daily Traffic on US Route 113: 41,583 vehicles per day.

**Site Map**



*\*Graphic is an approximation based on the preliminary concept plan received from McMahon Associates dated January 18, 2010*

**Relevant and On-going Projects**

DelDOT currently has no relevant project in the study area. However, DelDOT will have a potential future pavement rehabilitation and resurfacing project that would include the intersections of US Route 13 at Court Street and US Route 13 at US Route 113 (southbound left-turn). The project is scheduled to be constructed in 2011 but the exact timing is contingent upon the completion of the City of Dover sewer project along US Route 13, between White Oak Road and South State Street.

## **Livable Delaware**

*(Source: Delaware Strategies for State Policies and Spending, July 2004)*

### **Location with respect to the Strategies for State Policies and Spending Map of Delaware:**

The proposed development is located within Investment Level 1.

### **Investment Level 1**

These areas are often municipalities or urban/urbanizing places where density is generally higher than surrounding areas. Areas classified as Investment Level 1 are population centers built around a traditional central business district which offers a wide range of opportunities for employment, shopping and recreation. Investment Level 1 Areas are considered to drive Delaware's economy and therefore reinvestment and redevelopment are encouraged.

In Investment Level 1 Areas, state investments and policies should support and encourage a wide range of uses and densities, promote other transportation options, foster efficient use of existing public and private investments, and enhance community identity and integrity. Typical transportation projects include new or expanded facilities and services for all modes of transportation, including public transportation facilities and services. Projects will also include those that manage traffic flow and congestion, support economic development and redevelopment efforts, and encourage connections between communities and the use of local streets for local trips.

### **Proposed Development's Compatibility with Livable Delaware:**

The proposed South Dover Plaza development falls within Investment Level 1 and to be developed as a commercial center and in a manner consistent with the character of other existing commercial developments in the area. Based on the prior comments received at the Preliminary Land Use Service (PLUS) review, the site layout plan would accommodate an easement such that if the Peterson property/Enterprise Rental Car site (Tax Parcel ED-05-077.00-01-08.00) is redeveloped, it's access can be through the proposed shopping center. However, to serve the Enterprise Rental Car property with a safe and accessible entrance, an internal access to the existing Enterprise property through the proposed development is recommended.

Similarly, the site layout plan is proposing an easement and a future roadway connection for the Caine property/Capital Homes (Tax Parcel ED-05-077.00-01-10.01) such that if it is redeveloped with a compatible use an internal connection could be established between the Caine Property and the South Dover Plaza. As such, this development appears to be generally consistent with the 2004 update of the Livable Delaware "Strategies for State Policies and Spending."

## **Comprehensive Plans**

*(Source: 2008 City of Dover Comprehensive Plan, Adopted by the Dover City Council February 9, 2009)*

### **City of Dover Comprehensive Plan:**

The Comprehensive Plan states that the main land development goal for Downtown Dover area is to enhance the role of Downtown Dover as a major employment, residential and commercial center as well as the symbolic and cultural heart of the community, and recognize its unique heritage and historic resources. In Commercial areas, the Dover Comprehensive plan states that the land use goal is to maintain and improve the City's position as a regional commercial center while providing its citizens convenient access to needed goods and services through well designed and spaced community and neighborhood commercial centers. The policies enumerated for Commercial Land Use are:

1. Encourage the preservation and adaptive re-use of existing commercial buildings and properties. Continue to refine the Zoning Ordinance and other codes to ensure that City ordinances do not discourage adaptive re-use of vacant commercial buildings.
2. Limit the frequency of commercial site entrances along arterial roadways by promoting shared use entrances and cross-access easements among adjoining properties.
3. Periodically review the performance of commercial sign codes to determine their effectiveness and the codes' impact on the quality of commercial corridors.
4. Promote pedestrian and bicycle improvements and connecting sidewalks between existing and proposed neighborhood commercial sites and the residential areas they serve.
5. Encourage the establishment of transit amenities such as bus shelters and bicycle racks to accommodate alternative means of access to commercial centers.

In addition, the Land Development Plan includes specific recommendations for each of the major commercial areas. The plan notes that US Route 13/US Route 113 corridor is currently dominated by highway commercial development. While few vacant developable parcels exist within this area, the Comprehensive Land Development Plan proposes to continue US Route 13/US Route 113 as the major commercial corridor in central Delaware.

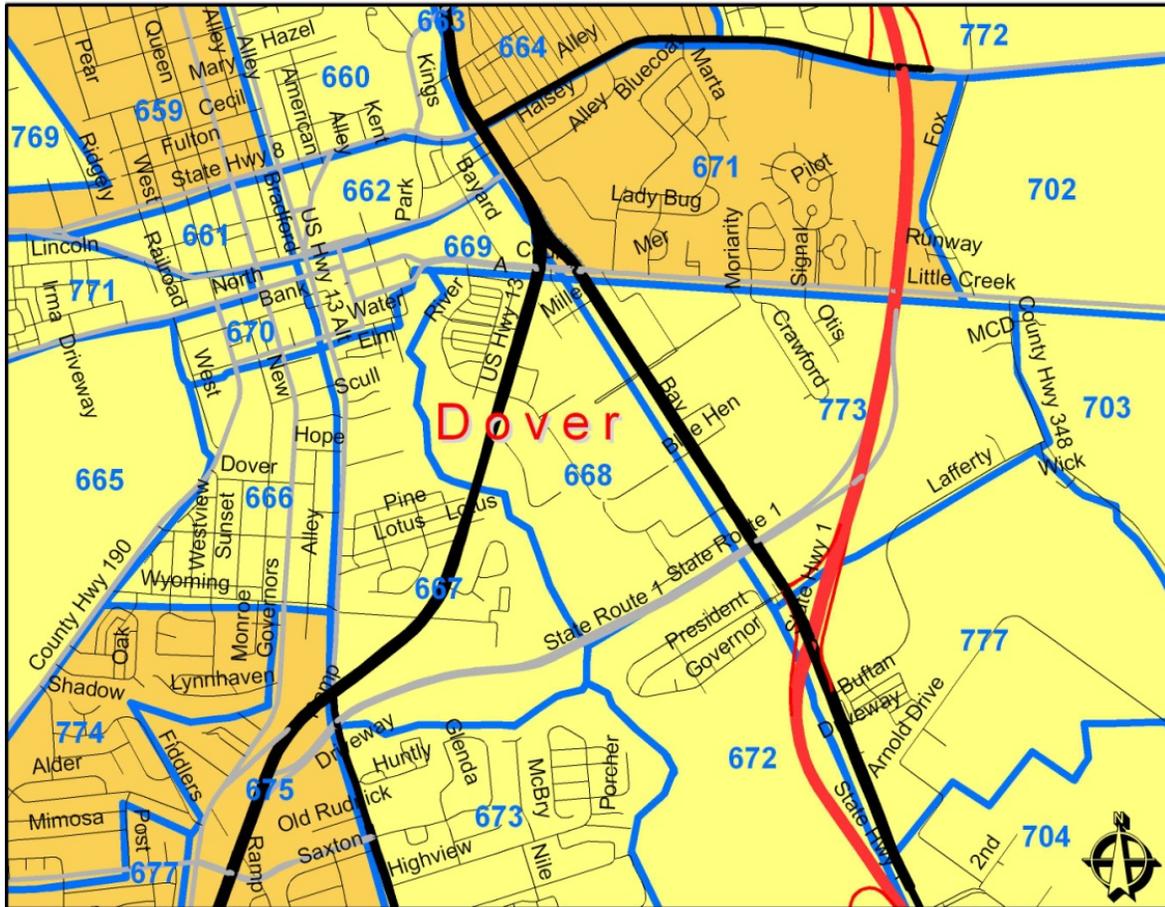
### **Proposed Development's Compatibility with the City of Dover Comprehensive Plan:**

The development is located in an area zoned as C-4 (Highway Commercial). The existing land use map shows this area as commercial land. The proposed South Dover Plaza development is proposed to be developed under the existing zoning. The development is proposed in the vacant parcels in an identified major commercial corridor. The proposed land uses are in line with nearby commercial developments. As such, the development is generally compatible with City of Dover's Comprehensive Plan.

### **Transportation Analysis Zones (TAZ)**

**Transportation Analysis Zones (TAZ) where development would be located: 668**

**TAZ Boundaries:**



**Current employment estimate for TAZ: 2906 in 2005**

**Future employment estimate for TAZ: 3060 in 2030**

**Current Population estimate for TAZ: 712 in 2005**

**Future Population estimate for TAZ: 745 in 2030**

**Current household estimate for TAZ: 275 in 2005**

**Future household estimate for TAZ: 298 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, 8<sup>th</sup> 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.

- 142,825 square foot Shopping Center - (ITE Land Use code 820)

The peak period trip generation for South Dover Plaza Shopping Center development is included in Table 1.

**Table 1**  
**SOUTH DOVER PLAZA SHOPPING CENTER TRIP GENERATION**

Land Use	ADT	AM Peak Hour			PM Peak Hour			SAT Midday Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
142,825 square foot Shopping Center	<b>8562</b>	116	74	190	396	412	808	562	518	1080
Pass-By Trips	2055	0	0	0	135	140	275	202	187	389
<b>Total Trips</b>	<b>6507</b>	<b>116</b>	<b>74</b>	<b>190</b>	<b>261</b>	<b>272</b>	<b>533</b>	<b>360</b>	<b>331</b>	<b>691</b>

*Note : The TIS scoping letter and the site layout plan detail the individual proposed land uses as 119,025 square feet of retail, two restaurants of 9,800 square feet each and a 4,200 square foot bank. However, the trip generation for this TIS was carried out for a single Shopping Center with compatible size.*

## **Overview of TIS**

### **Intersections examined:**

1. US Route 113/Bay Court Plaza Driveway/Blue Hen Corporate Center Entrance
2. US Route 113/DelDOT North Entrance/ Blue Hen Corporate Center Entrance
3. US Route 113/South Little Creek Road/Court Road
4. US Route 13/US Route 113 (Southbound Left-Turn)
5. US Route 13/Court Street

### **Conditions examined:**

1. Case 1 - 2009 Existing conditions
2. Case 2 - 2012 No Build conditions without South Dover Plaza Shopping Center
3. Case 3 - 2012 Build conditions with South Dover Plaza Shopping Center

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

**Committed Developments considered:**

1. Stover Homes Professional Campus (213,600 square feet of general office, a 7,500 square foot restaurant and a 91-room hotel)
2. Clear View Meadows (167 single-family detached houses, 88 townhouses, 48 duplexes)
3. Luther village (524 assisted living single-family detached houses , 424 unbuilt)
4. Wawa Convenience Store (5,568 square foot convenience store with 20 gasoline pumps)
5. Michael Goodland Self Storage Facility (39,950 square self storage space)
6. Blue Hen Apartment Complex (162 apartments)

*Note: Based on information from City of Dover, Luther Village trips were calculated for the unbuilt sections of the development (Phase 3 of 424 units). Additionally committed development 5 and 6, not included in the original scope were also included.*

**Intersection Descriptions**

**1. US Route 113/Bay Court Plaza Driveway/Blue Hen Corporate Center Entrance**

**Type of Control:** signalized four-legged intersection

**Eastbound Approach:** (Bay Court Plaza Driveway) one left-turn lane, one shared through/left-turn and one right-turn lane

**Westbound Approach:** (Blue Hen Corporate Center Entrance) one left-turn lane, one shared through/left-turn and one right-turn lane

**Northbound Approach:** (Northbound US Route 113) two left-turn lanes, two through lanes and one right-turn lane

**Southbound Approach:** (Southbound US Route 113) two left-turn lanes, two through lanes and one right-turn lane

*Note: Intersection of US Route 113/Bay Court Plaza Driveway/Blue Hen Corporate Center Entrance is coordinated with US Route 113/DelDOT North Entrance/Blue Hen Corporate Center Entrance.*

**2. US Route 113/DelDOT North Entrance/Blue Hen Corporate Center Entrance**

**Type of Control:** signalized four-legged intersection

**Eastbound Approach:** (DelDOT North Entrance) one left-turn lane, one shared through/left-turn and one right-turn lane

**Westbound Approach:** (Blue Hen Corporate Center Entrance) one left-turn lane, one shared through/left-turn and one right-turn lane

**Northbound Approach:** (Northbound US Route 113) one left-turn lane, two through lanes and one right-turn lane

**Southbound Approach:** (Southbound US Route 113) one left-turn lane, two through lanes and one right-turn lane

*Note: Intersection of US Route 113/Bay Court Plaza Driveway/Blue Hen Corporate Center Entrance is coordinated with US Route 113/DelDOT North Entrance/Blue Hen Corporate Center Entrance.*

**3. US Route 113/South Little Creek Road/Court Street**

**Type of Control:** signalized four-legged intersection

**Eastbound Approach:** (Court Street) one left-turn lane, one through lane and one right-turn lane

**Westbound Approach:** (South Little Creek Road) one left-turn lane, one through lane and one right-turn lane

**Northbound Approach:** (Northbound US Route 113) two left-turn lanes, two through lanes and one right-turn lane

**Southbound Approach:** (Southbound US Route 13) two left-turn lanes, two through lanes and one right-turn lane

4. **US Route 13/US Route 113 (Southbound Left)**

**Type of Control:** signalized two-legged intersection

**Northbound Approach:** (Northbound US Route 13) two through lanes

**Southbound Approach:** (Southbound US Route 113) two left-turn lanes

5. **US Route 13/Court Street**

**Type of Control:** signalized four-legged intersection

**Eastbound Approach:** (Court Street) one shared through/left-turn lane, one through lane, and one right-turn lane

**Westbound Approach:** (Court Street) one left-turn lane, one shared through/left-turn and one shared through/right-turn lane

**Northbound Approach:** (Northbound US Route 13) one left-turn lane, two through lanes and one right-turn lane

**Southbound Approach:** (Southbound US Route 13) two through lanes and one right-turn lane

*Note: The controller located at the intersection of US Route 13 and Court Street controls the traffic signal timings at the intersections of US Route 13 and US Route 113 (southbound left) and US Route 113 and South Little Creek Road/Court Street.*

### **Transit, Pedestrian, and Bicycle Facilities**

**Existing transit service:** Existing DART routes 303 express and Route 107 travel along US Route 113 along the site frontage. DART Route 107 has a stop at the Bay Court Plaza that could serve the proposed South Dover Plaza. Route 107 serves Bay Court Plaza every thirty minutes from 6AM to 6PM Monday through Friday and serves hourly from 9:30AM to 5:30PM on Saturdays.

**Planned transit service:** JMT contacted Ms. Lisa Collins, Service Development Planner of DTC. In an email dated May 24, 2010, she noted that DTC could serve the property directly with a bus pull off on the interior island next to the proposed restaurant with an ADA accessible 5' x 12' bus pad and a sidewalk between the anchor store and the bus stop. She also recommended a bus pull off with an ADA accessible 5' x 12' bus pad along US Route 113 site frontage to accommodate transit service. Both bus pads would accommodate bus shelters. In addition, DTC is also considering a future bus route along US Route 113 between Dover K-Mart and Camden Wal-Mart. However, this future route is still in the conceptual phase.

**Existing bicycle and pedestrian facilities:** According to DelDOT's *Delaware Bicycle Facility Master Plan* (October 2005), US Route 13 and South Little Creek Road are designated as

Recreational Connectors. US Route 113 in the vicinity of the site is designated as a Major Highway.

The *Delaware Bicycle Touring Map* designates US Route 13 as having below average cycling conditions with high traffic volumes (greater than 10,000 vehicles per day). US Route 113 in the vicinity of the site has above average cycling conditions with high traffic volumes. South Little Creek Road has above average cycling conditions with moderate traffic volumes (between 2,000 and 10,000 vehicles per day).

**Planned bicycle and pedestrian facilities:** JMT contacted Mr. Anthony Aglio, DelDOT's Bicycle Coordinator. In an email dated May 11, 2010 he requested to provide the appropriate path and bicycle lane connections.

**Previous Comments**

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

**General HCS/Synchro Analysis Comments**

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

- 1) The TIS sometimes used incorrect peak hour factors. JMT applied the peak hour factor as per lane groups for existing conditions as customary DelDOT TIS Review methodology.
- 2) The TIS analysis sometimes used existing peak hour factors for future conditions even if volumes changed. JMT used a peak hour factor of 0.92 or the existing peak hour factor (whichever is higher) if future volumes changed.
- 3) The TIS used an arrival type of 3 for all intersections. JMT used an arrival type of 4 when two or more intersections are controlled by the same traffic controller or when the intersections are coordinated.
- 4) All approaches to the intersections are relatively flat; however, JMT used the same grades used in the TIS.
- 5) The TIS used truck factors of less than 2% for the future conditions. JMT used a truck percentage of 2% or the existing truck percentage, whichever was higher.
- 6) The TIS assumed the all exclusive right-turn lanes would only go with its associated phase. JMT assumed that all exclusive right-turns would also go during phases, where there would not be a conflict.
- 7) The TIS analyses used 0% for the percent turns using the shared through/left-turn lane. JMT analyses used appropriate percentages for the percent turns using the shared through/left-turn lane.

Table 2  
PEAK HOUR LEVELS OF SERVICE (LOS)  
Based on Traffic Impact Study for South Dover Plaza  
Report dated April, 2010  
Prepared by McMahon Associates

Signalized Intersection <sup>1</sup> (HCS Analysis)	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Sat Mid-day	Weekday AM	Weekday PM	Sat Mid-day
<b>US Route 113 &amp; Bay Court Plaza Driveway/ Blue Hen Corporate Center Entrance<sup>2,3,4,5</sup></b>						
2009 Existing Conditions (Case 1)	C (28.1)	C (33.9)	C (27.5)	B (19.4)	C (30.7)	C (24.9)
2012 without South Dover Plaza (Case 2)	C (29.9)	D (37.1)	C (28.5)	C (20.7)	C (32.0)	C (25.9)
2012 with South Dover Plaza (Case 3)	C (30.4)	D (49.1)	D (44.7)	C (22.8)	C (34.4)	C (32.7)
2012 with South Dover Plaza <sup>6</sup> (Case 3 with Proposed Improvements)	-	D (51.0)	D (41.7)	-	-	-

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

<sup>2</sup> TIS used 140 second cycle length for all peak hour analyses. JMT used 150 second cycle length for all peak hour analyses based on the signal timing plans.

<sup>3</sup> TIS assumed that east –west approach are permissive. JMT analyzed the east-west approach as split phase as observed in the field and as described in the signal timing plans.

<sup>4</sup> JMT analyzed the eastbound right-turn lane as free, due to the presence of an acceleration lane.

<sup>5</sup> TIS did not use any lane utilization factors for the shared through/left-turn lane. JMT used appropriate lane utilization factors for the through/left-turn lane.

<sup>6</sup> TIS performed additional analysis with optimized signal timing.

Table 3  
PEAK HOUR LEVELS OF SERVICE (LOS)  
Based on Traffic Impact Study for South Dover Plaza  
Report dated April, 2010  
Prepared by McMahon Associates

Signalized Intersection <sup>7</sup> (HCS Analysis)	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Sat Mid-day	Weekday AM	Weekday PM	Sat Mid-day
<b>US Route 113 &amp; DeDOT North Entrance/Blue Hen Corporate Center Entrance</b> <sup>8,9,10,11,12</sup>						
2009 Existing Conditions (Case 1)	B (16.6)	C (34.7)	C (27.0)	B (13.8)	C (23.9)	B (18.5)
2012 without South Dover Plaza (Case 2)	C (29.4)	D (38.5)	C (27.3)	B (19.5)	C (27.0)	B (19.1)
2012 with South Dover Plaza (Case 3)	C (30.6)	D (44.0)	C (29.9)	C (20.0)	C (28.9)	C (20.5)

<sup>7</sup> For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

<sup>8</sup> TIS used 140 second cycle length for all peak hour analyses. JMT used 150 second cycle length for all peak hour analyses.

<sup>9</sup> TIS assumed that east and westbound directions were permissive. JMT analyzed the intersection as a split phase based on the field observation and timing plan.

<sup>10</sup> JMT optimized the signal timings.

<sup>11</sup> JMT analyzed the eastbound right-turn as free, due to the presence of an acceleration lane.

<sup>12</sup> TIS did not use any lane utilization factors for the shared through/left-turn lane on the eastbound and westbound approaches. JMT used appropriate lane utilization factors for the through/left-turn lane on the eastbound and westbound approaches.

Table 4  
PEAK HOUR LEVELS OF SERVICE (LOS)  
Based on Traffic Impact Study for South Dover Plaza  
Report dated April, 2010  
Prepared by McMahon Associates

Signalized Intersection <sup>13</sup> (HCS Analysis)	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Sat Mid-day	Weekday AM	Weekday PM	Sat Mid-day
<b>US Route 113 &amp; South Little Creek Road/ Court Street<sup>14,15</sup></b>						
2009 Existing Conditions <sup>16</sup> (Case 1)	D (44.6)	E (78.2)	D (50.2)	D (39.4)	D (46.7)	D (38.2)
2012 without South Dover Plaza <sup>16</sup> (Case 2)	D (50.4)	F (96.7)	E (67.1)	D (39.0)	D (51.6)	D (42.7)
2012 with South Dover Plaza <sup>16</sup> (Case 3)	D (52.5)	F (116.7)	E (78.9)	D (39.0)	D (54.2)	D (44.9)
2012 with South Dover Plaza <sup>17</sup> (Case 3)	-	D (54.8)	D (50.3)	-	-	-
2012 with South Dover Plaza <sup>18</sup> (Case 3 with southbound lagging left-turn)	-	-	-	D (39.3)	D (49.5)	D (44.5)

<sup>13</sup> For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

<sup>14</sup> JMT analyzed the eastbound right-turn as free due to the presence of an acceleration lane.

<sup>15</sup> TIS used 3 seconds of yellow time for left-turn phasing. JMT used 4 seconds of yellow time for left-turn phasing as provided in the timing plan.

<sup>16</sup> TIS used same phasing splits during all peak hours. JMT used different phasing splits based on the field observation and timing plans.

<sup>17</sup> The TIS performed additional analysis with optimized signal timing.

<sup>18</sup> JMT performed additional analysis with southbound left-turn as a lagging phase.

Table 5  
PEAK HOUR LEVELS OF SERVICE (LOS)  
Based on Traffic Impact Study for South Dover Plaza  
Report dated April, 2010  
Prepared by McMahon Associates

Signalized Intersection <sup>19</sup> (HCS Analysis)	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Sat Mid-day	Weekday AM	Weekday PM	Sat Mid-day
<b>US Route 13 &amp; US Route 113<sup>20</sup></b>						
2009 Existing Conditions (Case 1)	C (31.2)	D (43.7)	C (33.9)	C (29.9)	D (41.3)	C (31.9)
2012 without South Dover Plaza (Case 2)	C (34.9)	D (48.8)	D (35.5)	C (31.0)	D (44.8)	C (32.9)
2012 with South Dover Plaza (Case 3)	D (36.0)	D (50.5)	D (39.6)	C (31.3)	D (47.7)	C (34.2)

<sup>19</sup> For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

<sup>20</sup> TIS used 140 second cycle length for all peak hour analyses. JMT used 150 second cycle length for all peak hour analyses based on the signal timing plans.

Table 6  
PEAK HOUR LEVELS OF SERVICE (LOS)  
Based on Traffic Impact Study for South Dover Plaza  
Report dated April, 2010  
Prepared by McMahon Associates

Signalized Intersection <sup>21</sup> (HCS Analysis)	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Sat Mid-day	Weekday AM	Weekday PM	Sat Mid-day
<b>US Route 13 &amp; Court Street<sup>22,23</sup></b>						
2009 Existing Conditions (Case 1)	D (36.7)	D (48.3)	C (31.8)	C (32.9)	D (41.7)	C (33.7)
2012 without South Dover Plaza (Case 2)	D (45.0)	E (61.9)	D (36.5)	D (36.8)	D (48.7)	D (35.7)
2012 with South Dover Plaza (Case 3)	D (45.3)	E (68.6)	D (39.0)	D (37.3)	D (50.5)	D (37.1)
2012 with South Dover Plaza <sup>24</sup> (Case 3)	-	D (51.2)	-	-	-	-
2012 with South Dover Plaza <sup>25</sup> (Case 3 with protected left-turn)	-	-	-	D (43.8)	D (50.8)	D (39.1)

<sup>21</sup> For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

<sup>22</sup> TIS used 140 second cycle length for all peak hour analyses. JMT used 150 second cycle length for all peak hour analyses.

<sup>23</sup> TIS did not use any lane utilization factors for the shared through/left-turn lane. JMT used appropriate lane utilization factors for the through/left-turn lane.

<sup>24</sup> The TIS performed additional analysis with optimized signal timing.

<sup>25</sup> JMT performed additional analysis with northbound protected only left-turns.