



STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION

800 BAY ROAD
P.O. Box 778
DOVER, DELAWARE 19903

July 14, 2010

CAROLANN WICKS, P.E.
SECRETARY

Mr. David Culver
General Manager
New Castle County Department of Land Use
87 Reads Way
New Castle, DE 19720

Dear Mr. Culver:

The enclosed Traffic Impact Study (TIS) conditions letter for the **Milltown Square** 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 prepared the TIS to conform to DelDOT's Standards and Regulations for Subdivision Streets and other accepted practices and procedures for such studies. As discussed in the enclosed letter, it replaces a letter dated September 14, 2009, which we sent to you on September 16, 2009. DelDOT accepts this TIS and concurs with the recommendations. We are providing it to you in fulfillment of our joint agreement regarding the review of TIS. If you have any questions concerning this letter or the enclosed conditions letter, please contact me at (302) 760-2134.

Sincerely,

T. William Brockenbrough, Jr.
County Coordinator

TWB:km

Enclosures

cc with enclosures:

Ms. Constance C. Holland, Office of State Planning Coordination
Mr. Tigist Zegeye, WILMAPCO
Mr. Ramesh Batta, Ramesh C. Batta Associates, P.A.
Mr. George Haggerty, New Castle County Department of Land Use
Mr. John Janowski, New Castle County Department of Land Use
Mr. Andrew Parker, McCormick Taylor
Mr. Mir Wahed, Johnson, Mirmiran, and Thompson

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Theodore G. Bishop, Assistant Director, Development Coordination
Mark Tudor, Group Engineer, Project Development North, DOTS
Mark Alexander, Canal District Engineer, Canal District
Ivan Mitchell, Service Development Planner, Delaware Transit Corporation
Marc Côté, Subdivision Engineer, Development Coordination
T. William Brockenbrough, Jr., County Coordinator, Development Coordination
Anthony Aglio, Bicycle and Pedestrian Coordinator, Statewide & Regional Planning
Richard Woodhall, Subdivision Manager, Development Coordination
Troy Brestel, Project Engineer, Development Coordination



July 14, 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 231B–Milltown Square

Dear Mr. Brockenbrough,

Johnson, Mirmiran, and Thompson (JMT) has completed an updated the Traffic Impact Study (TIS) for the Milltown Square development. This updated task was assigned as Task Number 231B. Due to changes in proposed entrances, more importantly, due to additional meetings and coordination regarding entrance design, the previous TIS letter needed updates. This is the second version of the TIS letter to be issued for this project. JMT 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 Milltown Square development, which is proposed along the west side of Delaware Route 7 (Limestone Road/New Castle Road 31), and east of Old Limestone Road (New Castle Road 31A) in New Castle County, Delaware. The development would consist of mixed-use retail, office and residential on approximately 8.56 acre assemblage of parcels. The parcels are currently zoned S (Suburban) and are proposed to be changed to CN (Commercial Neighborhood). As per the revised plan, only one right-in/right-out/left-in access is proposed along Delaware Route 7. Construction is anticipated to be completed by 2011.

An earlier version of this development was evaluated in a TIS and DelDOT released the letter on September 16, 2009. At that time, the developer was proposing two access points: one right-in/left-out access along Old Limestone Road and one right-in/right-out/left-in access along Delaware Route 7. However, to minimize the impact of traffic on Old Limestone Road, the developer has revised the site plan on June 15, 2010 eliminating the entrance on Old Limestone Road. This revised TIS letter reflects that change.

DelDOT currently has no recent or ongoing projects within the study area. In addition, none of the study area intersections were selected for the Hazard Elimination Program (HEP f.k.a. HSIP) within the last five years. However, 0.48 miles of McKennans Church Road (New Castle Road 276) in front of the Milltown Shopping Center was selected in 2003 as HEP Site I. The improvements suggested in the HEP report included the restriction of the left-turn out from the

Milltown Shopping Center entrance onto Delaware Route 7. In addition, installation of a channelized island on the southern Milltown Shopping Center access on McKennans Church Road was also suggested to prohibit left-turn out movements from the shopping center. The prohibition of left-turn out movements from the Milltown Shopping Center onto Delaware Route 7 has already been implemented through striping and installing left-turn restriction signs.

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

The following intersections exhibit 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 7 and Pike Creek Sports Center/Site Entrance	2009 Existing PM (Case 1), 2011 No build PM (Case 2), 2011 PM and Saturday with Milltown Square development with one right-in/right-out/left-in site access on Delaware Route 7 (Case 3), 2011 PM and Saturday with Milltown Square development with both site accesses (Case 4), 2011 AM, PM and Saturday with Milltown Square development with one full site access on Delaware Route 7 (Case 5)
Delaware Route 7 and Milltown Shopping Center	2009 Existing PM (Case 1), 2011 No Build PM (Case 2), 2011 PM with Milltown Square development (Cases 3, 4 and 5)
Milltown Road and Old Limestone Road	2011 Saturday with Milltown Square development with both site accesses (Case 4)

The unsignalized intersection of Delaware Route 7 and Pike Creek Sports Center/proposed Site Entrance exhibits LOS deficiencies on the westbound Pike Creek Sports Center entrance in the existing 2009 and 2011 no build during the PM peak hour. In 2011 build conditions with the Milltown Square right-in/right-out/left-in access on Delaware Route 7 (Cases 3 and 4), the westbound Pike Creek Sports Center entrance exhibits LOS deficiencies during the PM and Saturday peak hours. In addition, with Milltown Square full access on Delaware Route 7 (Case 5) the eastbound site entrance exhibits LOS deficiencies during all peak hours and the westbound Pike Creek Sports Center entrance exhibits LOS deficiencies during the PM and Saturday peak hours. Based on the HCS unsignalized intersection analyses the 95th percentile westbound approach queue is expected to be approximately 125 feet and the eastbound approach queue is expected to be approximately 160 feet. The minor street approach delays and the queues would not be unexpected in an urbanized condition. In addition, this intersection is only about 700 feet south of an existing signalized intersection at Delaware Route 7 and Arundel Drive. Also, there are several unsignalized intersections along Delaware Route 7 north and south of the site entrance. We do not recommend installing a traffic signal at this intersection in order to eliminate LOS deficiencies.

The intersection of Delaware Route 7 and Milltown Shopping Center exhibits LOS deficiencies on the Milltown Shopping Center approach in the existing 2009 and 2011 cases with and without the development of Milltown Square during the PM peak hour. As mentioned earlier, based on

the HEP recommendation the westbound left-turn from the Milltown Shopping Center is prohibited and due to the presence of a continuous northbound right-turn lane the westbound right-turn movement can turn onto northbound Delaware Route 7 without conflicting with the northbound through traffic. Based on the field observation it appears that most drivers comply with the left-turn out prohibition from the Milltown Shopping Center and the level of service deficiency applies to the westbound right-turn movement which is borderline LOS E but closer to LOS D. Also, based on the HEP study there was no indication that the southbound U-turn from Delaware Route 7 has any adverse affect on the intersection operation. In addition, based on the NCHRP (National Cooperative Highway Research Program) Report 420 and 524 published by Transportation Research Board, eliminating left-turns from driveways and replacing them with U-turns are preferable design alternatives. As such we do not recommend any improvements at this intersection.

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

1. The developer should construct a new right-in/right-out/left-in site entrance on Delaware Route 7 across from the Pike Creek Sports Center. The proposed configuration is shown in the table below.

Approach	Current Configuration	Proposed Configuration
Southbound Delaware Route 7	One left-turn lane and two through lanes	One left-turn lane, two through lanes and one right-turn lane
Northbound Delaware Route 7	One left-turn/U-Turn lane, two through lanes and one right-turn lane	No Change
Westbound Pike Creek Sports Center	One shared left-turn/right-turn lane	No Change
Eastbound Milltown Square	Approach does not exist	One right-turn lane

Based on DelDOT's *Standards and Regulations for Subdivision Streets and State Highway Access*, the recommended turn-lane lengths (excluding tapers) are 290 feet for the southbound right-turn lane and 220 feet for the northbound left-turn lane; however, due to physical constraints DelDOT's Subdivision Section may determine that a shorter southbound right-turn lane is acceptable. In addition, the storage lengths based on the HCS analysis provide shorter queue lengths than what is reported above.

2. The developer should restripe westbound Milltown Road to convert the outside through lane to a right-turn lane onto Old Limestone Road because only one receiving through lane is needed on the westbound approach at the Limestone Road/Milltown Road intersection.

3. The developer should restripe southbound Delaware Route 7 at the intersection of Delaware Route 7 and Milltown Road to create a five-foot wide bike lane between the southbound through and right-turn lane. After crossing the intersection southbound cyclists should merge with the eastbound right-turn acceleration lane on southbound Delaware Route 7. At the end of the acceleration lane cyclists should move onto the southbound Delaware Route 7 shoulder. As necessary, DelDOT's Subdivision Section may identify additional signing and striping modifications needed to accommodate cyclists on the southbound acceleration lane.
4. The following bicycle, pedestrian and transit improvements should be included:
 - a. 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 Limestone Road and Milltown Road.
 - b. ADA compliant curb ramps and crosswalks should be provided at all pedestrian crossings, including all site entrances. Type 3 curb ramps are discouraged.
 - c. 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.
 - d. 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.
 - e. Appropriate bike symbols and directional arrows should be provided within bike lanes as well as through all right-turn lanes. Share the Road (MUTCD W16-1) and appropriate bicycle warning signs should be installed.
 - f. Where right-turn lanes are added to southbound Limestone Road, a minimum of a five-foot bicycle lane should be dedicated and striped with appropriate markings for bicyclists through the turn lane in order to facilitate safe and unimpeded bicycle travel.
 - g. A right-turn yield to bikes sign (MUTCD R4-4) should be added at the start of each right-turn lane.
 - h. Covered bike parking racks should be provided near the commercial locations to be included with this development. Stop bars at the intersection should be extended across bike lanes.
 - i. Utility covers should be moved outside of the designated bicycle lane or should be flush with the pavement.
 - j. Pedestrian and bicycle paths should be provided within the site as well as between the site and its adjoining properties, to reduce vehicular traffic and provide non-motorized connections.
 - k. The Delaware Transit Corporation (DTC) requests improvements to the two existing bus stops along southbound Delaware Route 7 located within the study area. Both stops should tie into the proposed frontage sidewalk and curbing on Delaware Route 7. The stop nearest Milltown Road should be relocated about 50 feet to the north, and should have a 9' x 12' wide shelter pad to accommodate a 5' x 10' shelter. The stop



nearest the proposed site entrance on Delaware Route 7 should also have a 9' x 12' wide shelter pad to accommodate a 5' x 10' shelter.

1. The developer should coordinate DTC regarding the installation of an 8' x 8' concrete bus pad on westbound Milltown Road in front of the site frontage to accommodate DART Route 36. The internal sidewalks should be connected to this stop and should include parking facilities for bicyclists.

Improvements in this TIS may be considered "significant" under DelDOT's Work Zone Safety and Mobility Procedures and Guidelines. These guidelines are available on DelDOT'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 DelDOT's Traffic Section. Mr. Weiser can be reached at (302) 659-4073 or by email at Adam.Weiser@state.de.us.

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

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: July 16, 2009

Prepared by: JMT

Prepared for: Ramesh C. Batta Associates, P.A.

Tax Parcels: 08-037.00-040 and 08-038.00-002

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

Project Description and Background

Description: The proposed development will consist of 90,728 square feet of Mixed-Use Retail, Office, and Residential space.

Location: The land is located along the southwest side of Limestone Road (Delaware Route 7), the westerly side of Milltown Road, and along the northeasterly side of Old Limestone Road in the City of Wilmington in New Castle County, Delaware.

Amount of Land to be developed: Approximately 8.56 acres of land

Land Use approval(s) needed: Subdivision Approval and rezoning from Suburban(S) to Commercial Neighborhood (CN)

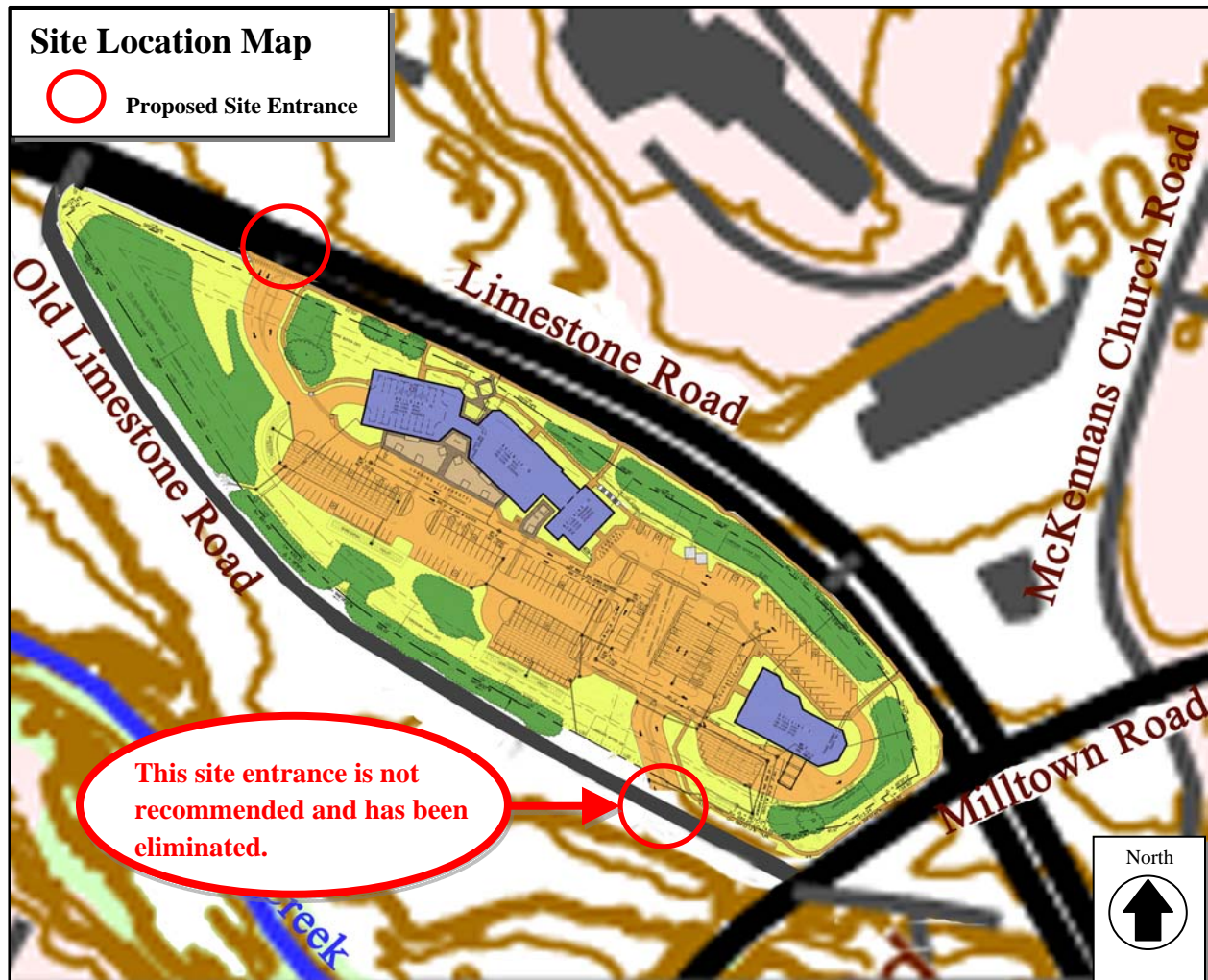
Proposed completion date: 2011

Proposed access locations: One site access point is proposed: one right-in/right-out/left-in site entrance along Delaware Route 7. The developer has eliminated the site access originally proposed on Old Limestone Road.

Daily Traffic Volumes:

- 2008 Average Annual Daily Traffic on Delaware Route 7: 36,580 vehicles per day
- 2008 Average Annual Daily Traffic on Milltown Road: 15,201 vehicles per day

Site Location Map



**Graphic is an approximation based on the Land Development plan included in TIS dated March 6, 2009*

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 Milltown Square development is located within Investment Level 1.

Description of Investment Levels:

Investment Level 1

These areas are often municipalities or urban/urbanizing places where density is generally higher than in 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 included 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 Milltown Square development falls within Investment Level 1 is to be developed with mixed use, office and retail commercial sites, consistent with the character of other developments in this area. According to Livable Delaware, reinvestment and redevelopment within these areas is encouraged. It is therefore concluded that the proposed development generally complies with the policies stated in the 2004 update of the Livable Delaware "Strategies for State Policies and Spending."

Comprehensive Plans

(Source: New Castle County 2007 Comprehensive Development Plan Update, adopted July 24, 2007)

New Castle County Comprehensive Plan:

The future land use plan goals for developments in New Castle County aims to protect and improve the quality of life in the county by minimizing the impacts of proposed developments and abating all potential nuisances through implementation of the strategies contained in the *Comprehensive Plan* document and a balancing of the regulations contained in the New Castle County Unified Development Code to allow a variety of uses and development options.

Additionally the plan aims to promote the use of redevelopment and in-fill to help meet projected development needs throughout New Castle County by encouraging the redevelopment and development of infill parcels where infrastructure already exists as a means of accommodating growth. The plan states that these reinvestments are improving the appearance and desirability of the previously developed areas, easing growth pressure on the rural areas, and helping to reverse the trend of decay in older suburbs.

Proposed Development's Compatibility with Comprehensive Plan:

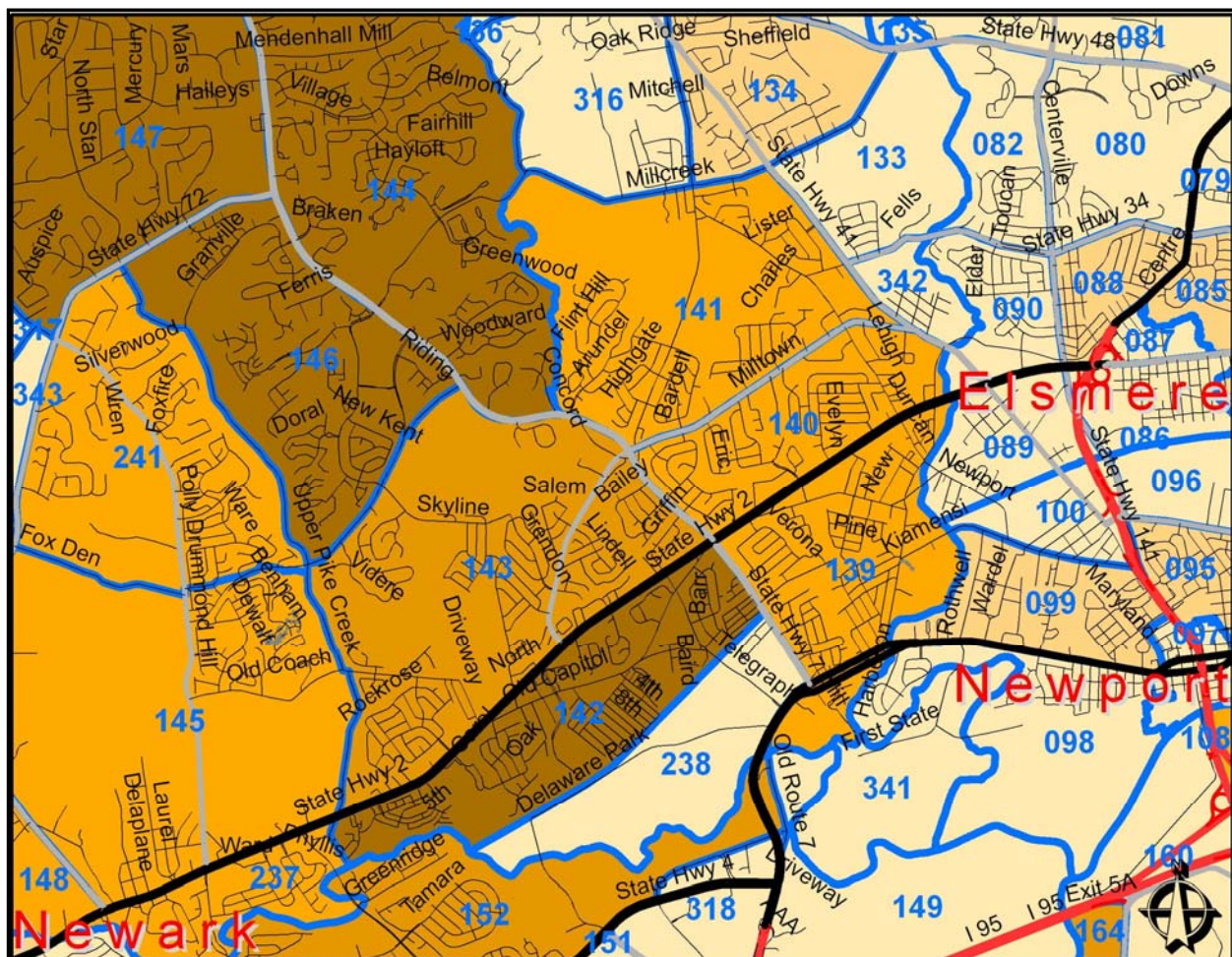
The Suburban District is used to in-fill tracts containing at least five (5) acres or where New Castle County seeks to redevelop the area to suburban character. NC (Neighborhood Commercial) district is defined to have a suburban character and the scale and intensity of the

development is regulated to ensure that uses primarily serve the surrounding residential neighborhoods. The developer wishes to rezone the site parcels that are currently zoned S (Suburban) to NC (Neighborhood Commercial). The proposed development is a mixed use development that matches with the character of the surrounding land use. Further this development is in line with the objectives of the New Castle County Comprehensive Plan by bringing jobs to New Castle County's already populated areas where infrastructure is already in place. With the elimination on the proposed access on Old Limestone Road, the proposed site creates a transitional character with the higher impact orientation towards Limestone Road and minimizes impacts along Old Limestone Road. Thus the proposed development is deemed to be compatible with the New Castle County Comprehensive Plan.

Transportation Analysis Zones (TAZ)

Transportation Analysis Zones (TAZ) where development would be located: 143

TAZ Boundaries:



Current employment estimate for TAZ: 3252 jobs in 2005

Future employment estimate for TAZ: 2984 jobs in 2030

Current Population estimate for TAZ: 6462 people in 2005

Future Population estimate for TAZ: 6743 people in 2030

Current household estimate for TAZ: 2623 houses in 2005

Future household estimate for TAZ: 2904 houses in 2030

Relevant committed developments in the TAZ: None

Would the addition of committed developments to current estimates exceed future projections: N/A

Would the addition of committed developments and the proposed development to current estimates exceed future projections: No

Relevant Projects in the DelDOT Capital Transportation Program (FY 2008-FY 2013)

DelDOT currently has no relevant projects within the study area.

Trip Generation

Trip generation for the proposed development was computed using comparable land uses and equations contained in Trip Generation, Eight Edition, published by the Institute of Transportation Engineers. The following land use was utilized to estimate the amount of new traffic generated for this development.

- 16 Residential Units (ITE Land Use code 220)
- 40,256 square feet General Office (ITE Land Use code 710)
- 6,514 square foot high-turnover sit-down restaurants (ITE Land Use code 932)
- 21,256 square feet Retail (Shopping center) (ITE Land Use code 820)

Table 1
Milltown Square Development Trip Generation

Land Use	ADT	AM Peak			PM Peak			Sat Mid-day Peak		
		Ent	Ext	Tot	Ent	Ext	Tot	Ent	Ext	Tot
16 Residential Units	221	2	10	12	17	9	26	13	13	26
Internal Capture		1	3	4	5	5	10	5	4	9
Net Primary Trips		1	7	8	12	4	16	8	9	17
40,256 square feet Office	662	80	11	91	21	103	124	10	8	18
Internal Capture		2	2	4	7	24	31	0	0	0
Net Primary Trips		78	9	87	14	79	93	10	8	18
6,514 square feet high turnover restaurant	828	39	36	75	43	30	73	49	43	92
Internal Capture		3	1	4	6	5	11	6	5	11
Sub-Total (External Trips)		36	35	71	37	25	62	43	38	81
Pass-By Trips		0	0	0	16	11	27	19	16	35
Net Primary Trips		36	35	71	21	14	35	24	22	46

Land Use	ADT	AM Peak			PM Peak			Sat Mid-day Peak		
		Ent	Ext	Tot	Ent	Ext	Tot	Ent	Ext	Tot
21,256 square feet Shopping Center	2482	38	24	62	110	115	225	163	150	313
Internal Capture		2	2	4	17	19	36	19	19	38
Sub-Total (External Trips)		36	22	58	93	96	189	144	131	275
Pass-By Trips		0	0	0	57	59	116	55	50	105
Net Primary Trips		36	22	58	36	37	73	89	81	170
Total Trips	4193	151	73	224	83	134	217	131	120	251

Intersections Examined

- 1) Site Entrance/Delaware Route 7/Pike Creek Sports Center
- 2) Delaware Route 7/Old Limestone Road/Limestone Presbyterian Church
- 3) Delaware Route 7/Arundel Drive/Doherty Funeral Home - Signalized
- 4) Delaware Route 7/Concord Drive
- 5) Delaware Route 7/Milltown Shopping Center (Liquor World)
- 6) Delaware Route 7/Milltown Road
- 7) Delaware Route 7/U-turn immediately south of Milltown Road
- 8) Milltown Road/McKennans Church Road
- 9) Milltown Road/Old Limestone Road
- 10) Site Entrance/Old Limestone Road
- 11) Milltown Road/Thunder Hollow Road/Old Milltown Road
- 12) Milltown Road/John Dickinson High School

Conditions Examined:

- a. 2009 Existing -Case 1
- b. 2011 without development (No-Build)- Case 2
- c. 2011 with full development (Build with one limited site access on Route 7 only) - Case 3
- d. 2011 with full development (Build with both site accesses) - Case 4
Note: While Case 4 was evaluated with two site access, the developer has revised the site plan on June 15, 2010 and is proposing only one access point on Delaware Route 7.
- e. 2011 with full development (Build with full site access on Route 7 only) – Case 5

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

Committed Developments Considered:

- 1) Linden Hill Offices (48,000 SF of General Office Space)
- 2) Limestone Shopping Center (5,589 SF Convenience Store with gas pumps)

Intersection Descriptions

1. Delaware Route 7 & Pike Creek Sports Center/Proposed Site Entrance

Type of Control: existing two-way stop control

Westbound approach: (Pike Creek Sports Center Entrance) one shared left/through/right-turn lane

Northbound approach: (Delaware Route 7) one left-turn lane, two through lanes, one right-turn lane

Southbound approach: (Delaware Route 7) one left-turn lane, two through lanes

Eastbound approach: (Proposed Site Entrance) no existing lanes, proposed one right-turn lane

2. Delaware Route 7 & Old Limestone Road/Limestone Presbyterian Church

Type of Control: existing two-way stop control

Eastbound approach: (Old Limestone Road) one shared left/through/right-turn lane

Northbound approach: (Delaware Route 7) one left-turn lane, two through lanes, one right-turn lane

Southbound approach: (Delaware Route 7) one left-turn lane, two through lanes, one right-turn lane

3. Delaware Route 7/Arundel Drive/Doherty Funeral Home-Signalized

Type of Control: Signalized four-leg intersection

Eastbound approach: (Doherty Funeral Home) one left/through/right-turn lane

Westbound approach: (Arundel Drive) one right turn lane, one through/left turn lane

Northbound approach: (Delaware Route 7) one left turn lane, two through lanes, one right-turn lane

Southbound approach: (Delaware Route 7) one left turn lane, two through lanes, one right-turn lane

4. Delaware Route 7 & Concord Drive

Type of Control: Right-In/Right-Out stop controlled

Westbound approach (Concord Drive) one right-turn only lane, yield-controlled

Northbound approach: (Delaware Route 7) two through lanes, one right-turn lane

Southbound approach: (Delaware Route 7) two through lanes

5. Delaware Route 7 & Milltown Shopping Center

Type of Control: two-way stop controlled T-intersection

Westbound approach (Milltown Shopping Center Access) one shared right/through/left-turn lane

Northbound approach: (Delaware Route 7) three through lanes, and one right-turn lane

Southbound approach (Delaware Route 7) two left-turn lanes, two through lanes, and one right-turn lane

6. Delaware Route 7 & Milltown Road

Type of Control: signalized four-leg intersection

Eastbound approach: (Milltown Road) two left-turn lanes, two through lanes, one right-turn lane

Westbound approach: (Milltown Road) two left-turn lanes, one through lane, one right-turn lane

Northbound approach: (Delaware Route 7) one left-turn lane, two through lanes

Southbound approach: (Delaware Route 7) two left-turn lanes, two through lanes, one right-turn lane

7. Delaware Route 7 & U-turn

Type of Control: stop controlled

Northbound approach: (Delaware Route 7) two through lanes, one right-turn lane

Southbound approach: (Delaware Route 7) one left-turn lane, two through lanes

8. Milltown Road & McKennans Church Road

Type of Control: signalized four-way intersection

Eastbound approach: (Milltown Road) one left-turn lane, two through lanes

Westbound approach: (Milltown Road) two through lanes, one through/right turn lane

Northbound approach: (McKennans Church Road) one left-turn lane, one through lane, one right-turn lane

Southbound approach: (McKennans Church Road) one right-turn lane, one left-turn lane

9. Milltown Road & Old Limestone Road

Type of Control: two-way stop-controlled intersection

Eastbound approach: (Milltown Road) one shared left-turn/through lane, one shared through/right-turn lane

Westbound approach: (Milltown Road) two through lanes

Northbound approach: (Old Milltown Road) one shared left/through/right-turn lane

Southbound approach: (Old Limestone Road) existing one-way northbound lane, proposed two-way roadway with one southbound shared left/through/right-turn lane and one northbound through lane in the Case 4 condition

10. Old Limestone Road & Site Entrance

Type of Control: proposed two-way stop-controlled T-intersection

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

Northbound approach: (Old Limestone Road) existing one through lane, proposed one through lane, one right-turn lane

Southbound approach: (Old Limestone Road) no existing lanes, proposed one shared left/right-turn lane

Note: The developer has eliminated the site entrance previously proposed at this location. Presently, no entrance is proposed at this location.

11. Milltown Road & Thunder Hollow Road/Old Milltown Road

Type of Control: two-way stop-controlled intersection

Eastbound approach: (Milltown Road) one shared left/through/right-turn lane

Westbound approach: (Milltown Road) one right-turn lane, one shared through/left-turn lane

Northbound approach: (Old Milltown Road) one shared left/through/right-turn lane

Southbound approach: (Thunder Hollow Road) one shared left/through/right-turn lane

12. Milltown Road & John Dickinson High School

Type of Control: two-way stop-controlled T-intersection

Eastbound approach: (Milltown Road) one left-turn lane, one shared through/right-turn lane

Westbound approach: (Milltown Road) one right-turn lane, one shared through lane

Southbound approach: (John Dickinson High School) one left-turn lane, one right-turn lane

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: The DART Route 36, connecting Eastburn Acres, Prices Corner, and Wilmington, travels along Milltown Road. The Route 36 has a stop just east of the Milltown Road/McKennans Church Road intersection. The DART Routes 19 and 30, connecting Polly Drummond Shopping Center and Wilmington, travels along Limestone Road. Both Routes have a stop at the North-West corner of the Limestone Road/Arundel Drive intersection, as well as stops on either side of Limestone Road north of Milltown Road, and a stop on the west side of Limestone Road just south of the Pike Creek Sports Center Entrance.

Planned transit service: JMT contacted Ivan Mitchell of the DTC and he indicated that DTC would request improvements to both bus stops that are currently located on southbound Limestone Road. The bus stops on Limestone Road should tie into the proposed frontage sidewalk and curbing, and should have 9' deep by 12' wide shelter pads to accommodate 5' x 10' shelters. He also mentioned that a possible bus pull off on the Milltown Road frontage was being contemplated to accommodate transit service on Route 36. The DTC also requests that pedestrian linkages are provided at the Limestone Road/Milltown Road intersection in order to allow pedestrians to safely access the bus stops.

Existing bicycle and pedestrian facilities: According to the *Delaware Bicycle Facility Master Plan*, Delaware Route 7 is designated as Statewide Bicycle Route 1 with bikeways, which extends south from Pennsylvania to Maryland. Milltown Road is designated as Regional Bicycle Route NC-3 with bikeways, which extends northeast from Newark to Wilmington.

According to the Delaware Bicycle Touring Map for New Castle County, Delaware Route 7 has below average cycling conditions with high vehicular volumes (>10,000 vehicles per day). Milltown Road and McKennans Church Road have above average cycling conditions with high vehicular volumes (>10,000 vehicles per day), and Old Limestone Road has above average cycling conditions with low traffic volumes (<2,000 vehicles per day).

Planned bicycle and pedestrian facilities: JMT contacted DelDOT's Bicycle and Pedestrian Facilities Team and, in a letter dated June 22, 2009 Anthony Aglio indicated that the following bicycle and pedestrian facilities are required. In the letter, Mr. Aglio commented that Livable Delaware's updated State Strategies for Spending Map indicates the site is located in Investment Level 1 area where transportation options should be diverse and include the use of public transportation, walking, and bicycling. The site is located on Limestone Road, which is designated as a Statewide Bicycle Route. As such, the following requests should be incorporated into the project to facilitate bicycle and pedestrian transportation:

- ADA compliant sidewalks should be extended along Old Limestone Road.

- 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.
- Ensure existing sidewalk on Limestone Road meets ADA requirements and DelDOT standards.
- Appropriate bike symbols and directional arrows should be provided within bike lanes as well as through all right-turn lanes
- Pedestrian and bicycle paths should be provided within the site as well as between the site and its adjoining properties, so as to reduce vehicular traffic and provide non-motorized connections.
- The developer should contact DART regarding the addition of a transit service and transit facilities at this location. Internal sidewalks should connect to this stop and include parking facilities for bicyclists.

General HCS Analysis Comments:

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

- 1 In addition to the future condition, *Case 2 - 2011 No Build*, the following Cases are also tested as part of the Milltown Square study and the subsequent TIS review. As the impact of these improvements is network wide, they are discussed below instead of describing these in each individual table.
 - Case 3 – 2011 Build with one right-in/right-out/left-in site access on Delaware Route 7 only: This scenario would not allow an access on Old Limestone Road.
 - Case 4 – 2011 Build with both site access points: This scenario would allow both a right-in/right-out/left-in access on Delaware Route 7 as well as a right-in/left-out access on Old Limestone Road. (Note-while the TIS evaluated this scenario based on the original TIS scope and subsequent site plan, the developer has since modified the site plan. The site access proposed on Old Limestone Road has been eliminated.)
 - Case 5 – 2011 Build with one full site access on Delaware Route 7 only: This scenario would not allow an access on Old Limestone Road, but would have a full access on Delaware Route 7.

Table 2
PEAK HOUR LEVELS OF SERVICE (LOS)
Traffic Impact Study for Milltown Square development
Prepared by JMT

Unsignalized Intersection¹ Two-Way Stop Control	LOS		
Delaware Route 7 & Pike Creek Sports Center/ Proposed Site Entrance	Weekday AM	Weekday PM	Sat Peak Hour
2009 Existing (Case 1)			
Northbound Delaware Route 7-Left	C (16.6)	B (12.6)	B (14.4)
Southbound Delaware Route 7-Left	B (10.7)	C (16.2)	B (12.9)
Westbound Pike Creek Sports Center Entrance	C (16.1)	E (42.5)	C (22.6)
2011 No Build (Case 2)			
Northbound Delaware Route 7-Left	C (17.2)	B (13.2)	B (14.9)
Southbound Delaware Route 7-Left	B (10.7)	C (16.8)	B (13.3)
Westbound Pike Creek Sports Center Entrance	C (16.4)	E (46.2)	C (23.5)
2011 Full Build with Delaware Route 7 partial Site Access (Case 3)			
Northbound Delaware Route 7-Left	C (22.1)	B (14.7)	C (18.4)
Southbound Delaware Route 7-Left	B (11.0)	C (17.5)	B (13.8)
Eastbound Site Access-Right	C (21.1)	C (22.3)	D (26.1)
Westbound Pike Creek Sports Center Entrance	D (26.0)	F (153.7)	F (56.8)
2011 Full Build with both Site Accesses (Case 4)			
Northbound Delaware Route 7-Left	C (19.5)	B (14.0)	C (16.6)
Southbound Delaware Route 7-Left	B (10.8)	C (17.2)	B (13.6)
Eastbound Site Access-Right	C (18.7)	C (17.1)	C (19.3)
Westbound Pike Creek Sports Center Entrance	C (20.9)	F (103.5)	E (37.1)
2011 Full Build with Delaware Route 7 full Site Accesses (Case 5)			
Northbound Delaware Route 7-Left	C (24.9)	C (15.8)	C (21.3)
Southbound Delaware Route 7-Left	B (10.7)	C (16.4)	B (13.0)
Eastbound Site Access	F (60.8)	F (118.2)	F (133.5)
Westbound Pike Creek Sports Center Entrance	D (29.1)	F (153.7)	F (62.6)

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)
Traffic Impact Study for Milltown Square development
Prepared by JMT

Signalized Intersection ²	LOS		
	Weekday AM	Weekday PM	Sat Peak Hour
Delaware Route 7 & Pike Creek Sports Center/ Proposed Site Entrance			
2011 Full Build with both Site Accesses (Case 5)	C (24.7)	C (34.3)	C (25.4)

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

Table 4
PEAK HOUR LEVELS OF SERVICE (LOS)
Traffic Impact Study for Milltown Square development
Prepared by JMT

Unsignalized Intersection ³ Two-Way Stop Control	LOS		
Delaware Route 7 & Old Limestone Road/Limestone Presbyterian Church ⁴	Weekday AM	Weekday PM	Sat Peak Hour
2009 Existing (Case 1)			
Northbound Delaware Route 7-Left	C (17.2)	B (13.2)	C (15.0)
Southbound Delaware Route 7-Left	B (10.2)	C (17.7)	B (13.5)
Eastbound Old Limestone Road	C (17.1)	C (21.8)	C (19.8)
2011 No Build (Case 2)			
Northbound Delaware Route 7-Left	C (17.7)	B (13.7)	C (15.4)
Southbound Delaware Route 7-Left	B (10.5)	C (17.7)	B (13.4)
Eastbound Old Limestone Road	C (17.5)	C (22.8)	C (19.9)
2011 Full Build with Delaware Route 7 partial Site Access (Case 3)			
Northbound Delaware Route 7-Left	C (20.3)	B (14.4)	C (16.8)
Southbound Delaware Route 7-Left	B (10.7)	C (18.2)	B (13.7)
Eastbound Old Limestone Road	C (18.6)	C (17.2)	C (18.3)
2011 Full Build with both Site Accesses (Case 4)			
Northbound Delaware Route 7-Left	C (18.3)	B (13.9)	C (15.7)
Southbound Delaware Route 7-Left	B (10.6)	C (17.9)	B (13.6)
Eastbound Old Limestone Road	C (18.0)	C (23.5)	C (20.5)
2011 Full Build with Delaware Route 7 full Site Access (Case 5)			
Northbound Delaware Route 7-Left	C (18.3)	B (13.9)	C (15.7)
Southbound Delaware Route 7-Left	B (10.6)	C (18.2)	B (13.6)
Eastbound Old Limestone Road	C (18.5)	C (17.1)	C (18.1)

³ For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

⁴ The westbound approach is one way, therefore HCS did not generate any delay.

Table 5
PEAK HOUR LEVELS OF SERVICE (LOS)
Traffic Impact Study for Milltown Square development
Prepared by JMT

Signalized Intersection ⁵	LOS		
	Weekday AM	Weekday PM	Sat Peak Hour
Delaware Route 7 & Arundel Drive/Doherty Funeral Home			
2009 Existing (Case 1)	B (15.4)	B (18.2)	B (16.8)
2011 No Build (Case 2)	B (15.8)	A (19.0)	B (17.4)
2011 Full Build with Delaware Route 7 partial Site Access (Case 3)	B (16.0)	B (19.6)	B (17.4)
2011 Full Build with Delaware Route 7 partial Site Access (Case 3) with southbound left-turn protected phase ⁶	B (17.2)	C (22.1)	B (18.8)
2011 Full Build with both Site Accesses (Case 4)	B (16.0)	B (19.6)	B (17.4)
2011 Full Build with Delaware Route 7 full Site Accesses (Case 5)	B (16.0)	B (19.6)	B (17.4)

⁵ For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

⁶ Additional analyses were performed considering southbound left-turn as protected only phase instead of protected/permissive phase.

Table 6
PEAK HOUR LEVELS OF SERVICE (LOS)
Traffic Impact Study for Milltown Square development
Prepared by JMT

Unsignalized Intersection⁷ Two-Way Stop Control	LOS		
	Weekday AM	Weekday PM	Sat Peak Hour
Delaware Route 7 & Concord Drive			
2009 Existing (Case 1)			
Westbound Concord Drive-Right	B (12.0)	C (16.4)	C (16.8)
2011 No Build (Case 2)			
Westbound Concord Drive-Right	B (12.2)	C (16.8)	C (17.2)
2011 Full Build with Delaware Route 7 partial Site Access (Cases 3 and 5)			
Westbound Concord Drive-Right	B (12.3)	C (17.1)	C (17.5)
2011 Full Build with both Site Accesses (Case 4)			
Westbound Concord Drive-Right	B (12.3)	C (17.1)	C (17.5)

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

Table 7
PEAK HOUR LEVELS OF SERVICE (LOS)
Traffic Impact Study for Milltown Square development
Prepared by JMT

Unsignalized Intersection⁸ Two-Way Stop Control	LOS		
	Weekday AM	Weekday PM	Sat Peak Hour
Delaware Route 7 & Milltown Shopping Center			
2009 Existing (Case 1)			
Southbound Delaware Route 7-Left	B (11.5)	C (24.8)	C (15.6)
Westbound Milltown Center Access	B (13.3)	E (38.5)	C (16.6)
2011 No Build (Case 2)			
Southbound Delaware Route 7-Left	B (11.1)	C (21.8)	C (15.9)
Westbound Milltown Center Access	B (13.2)	E (35.2)	C (17.2)
2011 Full Build with Delaware Route 7 partial Site Access (Case 3)			
Southbound Delaware Route 7-Left	B (11.9)	D (27.2)	C (18.7)
Westbound Milltown Center Access	B (14.0)	E (38.8)	C (18.7)
2011 Full Build with both Site Accesses (Case 4)			
Southbound Delaware Route 7-Left	B (11.4)	D (25.3)	C (17.3)
Westbound Milltown Center Access	B (13.5)	E (36.7)	C (17.9)
2011 Full Build with Delaware Route 7 full Site Accesses (Case 5)			
Southbound Delaware Route 7-Left	B (11.6)	C (22.7)	C (16.8)
Westbound Milltown Center Access	B (13.9)	E (37.2)	C (18.4)

⁸ For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

Table 8
PEAK HOUR LEVELS OF SERVICE (LOS)
Traffic Impact Study for Milltown Square development
Prepared by JMT

Signalized Intersection ⁹	LOS		
	Weekday AM	Weekday PM	Sat Peak Hour
Delaware Route 7 & Milltown Road			
2009 Existing (Case 1)	D (49.6)	D (54.0)	D (48.5)
2011 No Build (Case 2)	D (48.0)	D (53.9)	D (50.7)
2011 Full Build with Delaware Route 7 partial Site Access (Case 3)	D (46.5)	D (54.8)	D (50.0)
2011 Full Build with both Site Accesses (Case 4)	D (47.3)	D (54.9)	D (49.7)
2011 Full Build with Delaware Route 7 full Site Accesses (Case 5)	D (46.5)	D (54.1)	D (49.5)

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

Table 9
PEAK HOUR LEVELS OF SERVICE (LOS)
Traffic Impact Study for Milltown Square development
Prepared by JMT

Unsignalized Intersection¹⁰ Two-Way Stop Control	LOS		
	Weekday AM	Weekday PM	Sat Peak Hour
Delaware Route 7 & U-Turn			
2009 Existing (Case 1)			
Southbound Delaware Route 7-Left	B (12.9)	C (16.1)	B (14.1)
2011 No Build (Case 2)			
Southbound Delaware Route 7-Left	B (12.4)	C (16.3)	B (14.2)
2011 Full Build with Delaware Route 7 partial Site Access (Cases 3 and 5)			
Southbound Delaware Route 7-Left	B (13.0)	C (17.7)	C (15.1)
2011 Full Build with both Site Accesses (Case 4)			
Southbound Delaware Route 7-Left	B (13.0)	C (18.1)	C (15.3)

¹⁰ For unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, those numbers are X-critical, a composite volume-to-capacity ratio

Table 10
PEAK HOUR LEVELS OF SERVICE (LOS)
Traffic Impact Study for Milltown Square development
Prepared by JMT

Signalized Intersection ¹¹	LOS		
	Weekday AM	Weekday PM	Sat Peak Hour
Milltown Road & McKennans Church Road			
2009 Existing (Case 1)	D (43.2)	D (41.3)	C (34.2)
2011 No Build (Case 2)	D (37.7)	D (42.8)	C (33.8)
2011 Full Build with Delaware Route 7 partial Site Access (Cases 3 and 5)	D (38.1)	D (43.6)	C (34.2)
2011 Full Build with both Site Accesses (Case 4)	D (38.1)	D (43.7)	C (34.3)

¹¹ For unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, those numbers are X-critical, a composite volume-to-capacity ratio

Table 11
PEAK HOUR LEVELS OF SERVICE (LOS)
Traffic Impact Study for Milltown Square development
Prepared by JMT

Unsignalized Intersection ¹² Two-Way Stop Control	LOS		
	Weekday AM	Weekday PM	Sat Peak Hour
Milltown Road & Old Limestone Road			
2009 Existing (Case 1)			
Northbound Old Milltown Road	B (11.5)	A (9.6)	A (9.3)
Eastbound Milltown Road	A (8.4)	A (8.7)	A (9.6)
Westbound Milltown Road	A (8.4)	A (8.4)	A (8.1)
2011 No Build (Case 2)			
Northbound Old Milltown Road	B (11.6)	A (9.7)	A (9.3)
Eastbound Milltown Road	A (8.4)	A (8.8)	A (9.5)
Westbound Milltown Road	A (8.5)	A (8.5)	A (8.2)
2011 Full Build with Delaware Route 7 partial Site Access (Cases 3 and 5)			
Northbound Old Milltown Road	B (11.9)	A (9.7)	A (9.4)
Eastbound Milltown Road	A (8.5)	A (8.9)	A (9.7)
Westbound Milltown Road	A (8.5)	A (8.5)	A (8.2)
2011 Full Build with both Site Accesses (Case 4)			
Northbound Old Milltown Road	B (12.7)	A (9.7)	A (9.3)
Southbound Old Limestone Road	C (19.0)	D (28.0)	E (41.3)
Eastbound Milltown Road	A (8.7)	A (9.0)	A (10.0)
Westbound Milltown Road	A (8.5)	A (8.5)	A (8.1)
2011 Full Build with both Site Accesses ¹³ (Case 4)			
Northbound Old Milltown Road	C (15.1)	A (9.7)	A (9.4)
Southbound Old Limestone Road-Right	B (11.6)	B (12.7)	C (15.3)
Westbound Milltown Road	A (8.6)	A (8.5)	A (8.2)

¹² For unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, those numbers are X-critical, a composite volume-to-capacity ratio

¹³ Additional analyses were performed considering Old Limestone Road approach as a right-in/right-out only movement.

Table 12
PEAK HOUR LEVELS OF SERVICE (LOS)
Traffic Impact Study for Milltown Square development
Prepared by JMT

Unsignalized Intersection ¹⁴ Two-Way Stop Control	LOS		
	Weekday AM	Weekday PM	Sat Peak Hour
Old Limestone Road & Site Entrance			
2011 Full Build with both Site Accesses (Case 4)			
Westbound Site Entrance	A (8.7)	A (8.9)	A (8.9)

¹⁴ For unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, those numbers are X-critical, a composite volume-to-capacity ratio

Table 13
PEAK HOUR LEVELS OF SERVICE (LOS)
Traffic Impact Study for Milltown Square development
Prepared by JMT

Unsignalized Intersection ¹⁵ Two-Way Stop Control	LOS		
	Weekday AM	Weekday PM	Sat Peak Hour
Milltown Road & Thunder Hollow Road/Old Milltown Road			
2009 Existing (Case 1)			
Northbound Old Milltown Road	B (12.0)	D (32.7)	B (10.7)
Southbound Thunder Hollow Road	C (22.6)	D (29.8)	C (22.8)
Eastbound Milltown Road	A (8.6)	A (8.8)	A (9.5)
Westbound Milltown Road	A (8.6)	A (8.7)	A (8.1)
2011 No Build (Case 2)			
Northbound Old Milltown Road	B (11.4)	D (31.3)	B (10.6)
Southbound Thunder Hollow Road	C (19.5)	D (28.5)	C (22.0)
Eastbound Milltown Road	A (8.5)	A (8.8)	A (9.5)
Westbound Milltown Road	A (8.4)	A (8.6)	A (8.1)
2011 Full Build with Delaware Route 7 partial Site Access (Cases 3 and 5)			
Northbound Old Milltown Road	B (11.6)	D (32.9)	B (10.8)
Southbound Thunder Hollow Road	C (20.3)	D (30.3)	C (23.0)
Eastbound Milltown Road	A (8.5)	A (8.9)	A (9.5)
Westbound Milltown Road	A (8.5)	A (8.7)	A (8.2)
2011 Full Build with both Site Accesses (Case 4)			
Northbound Old Milltown Road	B (11.6)	D (32.9)	B (10.8)
Southbound Thunder Hollow Road	C (20.3)	D (30.3)	C (23.0)
Eastbound Milltown Road	A (8.5)	A (8.9)	A (9.5)
Westbound Milltown Road	A (8.5)	A (8.7)	A (8.2)

¹⁵ For unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, those numbers are X-critical, a composite volume-to-capacity ratio

Table 14
PEAK HOUR LEVELS OF SERVICE (LOS)
Traffic Impact Study for Milltown Square development
Prepared by JMT

Signalized Intersection ¹⁶	LOS		
	Weekday AM	Weekday PM	Sat Peak Hour
Milltown Road & John Dickinson High School			
2009 Existing (Case 1)	C (28.7)	C (32.7)	B (12.7)
2011 No Build (Case 2)	C (27.8)	C (31.9)	B (13.4)
2011 Full Build with Delaware Route 7 partial Site Access (Cases 3 and 5)	C (28.2)	C (33.4)	B (13.7)
2011 Full Build with both Site Accesses (Case 4)	C (28.2)	C (33.4)	B (13.7)

¹⁶ For unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, those numbers are X-critical, a composite volume-to-capacity ratio