



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

JENNIFER COHAN  
SECRETARY

January 28, 2019

Mr. Joe Caloggero  
Senior Project Manager  
The Traffic Group, Inc.  
Suite H  
9900 Franklin Square Drive  
Baltimore, Maryland 21236

Dear Mr. Caloggero,

The Department has completed its review of the Traffic Impact Study (TIS) for the Sunset Village development prepared by The Traffic Group, Inc. (TTG), dated October 1, 2013. TTG prepared the report in a manner generally consistent with DelDOT's Development Coordination Manual (f.k.a. Standards and Regulations for Subdivision Streets and State Highway Access).

The TIS evaluates the impacts of Sunset Village, proposed to be located on the east side of Upper King Road (Kent Road 4) across from Derbywood, in the Town of Camden. Sunset Village would consist of 238 apartment units to be developed on an approximately 29.81-acre assemblage of parcels (Tax Parcels NM-02-103.00-01-03.00-000, 04.00-000). One access point is proposed on Upper King Road. In the TIS, construction was anticipated to be complete by 2020.

The land is currently zoned as R-3 (Residential) in the Town of Camden, and the developer does not propose to change the zoning.

DelDOT currently has one relevant project in the study area. It is the Corridor Capacity Preservation Program (CCPP), which is a statewide program intended to sustain the capacity of adopted highway corridors by various means such as limiting access points and using service roads for local vehicle trips. The general purpose of the program is to ensure that existing principal arterial roadways, including US Route 13 (South DuPont Highway / Kent Road 24) between Delaware Route 10 (Kent Road 356) and the Maryland state line, are able to efficiently carry regional traffic without impedance from the effects of local developments.



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

The proposed development will not meet the DelDOT level of service (LOS) standards as stated in the Development Coordination Manual unless physical roadway and/or traffic control improvements are implemented at the following intersection:

<i>Intersection</i>	<i>Existing Traffic Control</i>	<i>Situations for which deficiencies occur</i>
Upper King Road (Kent Road 4) & Lochmeath Way (Kent Road 361)	Unsignalized	2020 PM with Sunset Village development

All other intersections included in the scope of this TIS meet the LOS requirements in the Development Coordination Manual.

In the original scope of work, DelDOT included the intersection of US Route 13 and Lochmeath Way as one of the intersections to be analyzed. However, this intersection was later removed after an agreement between DelDOT and the Consultant that traffic impact from the development would be minimal following recent improvements at that intersection.

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

1. The developer should construct the site entrance on Upper King Road. The proposed configuration is shown in the table below.

<b>Approach</b>	<b>Current Configuration</b>	<b>Proposed Configuration</b>
Northbound Upper King Road	One through lane	One through lane and one right-turn lane
Southbound Upper King Road	One through lane	One through lane and one left-turn lane
Westbound Site Entrance	Approach does not exist	One shared left-turn / right-turn lane

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The length of roadway between the proposed site entrance and the existing Derby Circle entrance is not sufficient to accommodate the southbound left-turn lane into the proposed development. To resolve this issue, the location of the proposed entrance should be moved north to align with the Derby Circle entrance.

DelDOT understands the applicant’s position that they are unable to align the site entrance opposite Derby Circle and must keep their entrance substantially where it is proposed. Doing so is a substantial deviation from the design standards in DelDOT’s Development Coordination Manual and will require the submission of a Design Deviation Form (blank form available at [https://www.deldot.gov/Business/subdivisions/pdfs/Design\\_Deviation\\_Form.pdf?122018](https://www.deldot.gov/Business/subdivisions/pdfs/Design_Deviation_Form.pdf?122018)) during the plan review process.

Initial recommended minimum turn-lane lengths (excluding tapers) of the separate turn lanes are listed below. The developer should coordinate with DelDOT’s Subdivision Section to determine final turn-lane lengths.

<b>Approach</b>	<b>Left-Turn Lane</b>	<b>Right-Turn Lane</b>
Westbound Site Entrance	N/A	N/A
Northbound Upper King Road	N/A	240 feet**
Southbound Upper King Road	210 feet**	N/A

\*\*turn-lane length based on deceleration + storage length per DelDOT’s *Development Coordination Manual*

2. The developer should improve Upper King Road within the limits of the construction of the site entrance and its associated turn lanes in order to meet DelDOT’s major collector road standards. These standards include but are not limited to twelve-foot travel lanes and eight-foot shoulders. The developer should provide a bituminous concrete overlay to the existing lanes’ pavement section and recommend an overlay thickness to the developer’s engineer if necessary.
3. The developer should enter into an agreement with the Department to construct an exclusive westbound right-turn lane at the intersection of Upper King Road and Lochmeath Way. The deceleration + storage length of this turn lane should be 155 feet, along with a 50-foot taper. The developer should coordinate with DelDOT’s Subdivision Section to determine the final design details of this improvement.
4. The following bicycle and pedestrian improvements should be included:
  - a. A right-turn yield to bikes sign (MUTCD R4-4) should be added at the start of the right-turn lane added to northbound Upper King Road at the site entrance.
  - b. Adjacent to the right-turn lane added to Upper King Road at the site entrance, 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.

- c. Appropriate bicycle symbols, directional arrows, striping (including stop bars), and signing should be included along bicycle facilities and right-turn lanes within the project limits.
- d. Utility covers should be made flush with the pavement.
- e. Bike parking should be provided near each apartment building.
- f. A minimum of a five-foot wide sidewalk (with a minimum of a three-foot buffer from the roadway) that meets current AASHTO and ADA standards should be constructed along the Upper King Road site frontage.
- g. ADA compliant curb ramps and crosswalks should be provided at all pedestrian crossings, including all site entrances. Type 3 curb ramps are discouraged.
- h. Internal sidewalks for pedestrian safety and to promote walking as a viable transportation alternative should be constructed within the property. These sidewalks should each be a minimum of five feet wide and should meet current AASHTO and ADA standards. These internal sidewalks should connect the apartment units' entrances to the frontage sidewalks on Upper King Road.

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](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. Mark Buckalew of DelDOT's Traffic Section. Mr. Buckalew can be reached at (302) 659-4073 or by email at [Mark.Buckalew@delaware.gov](mailto:Mark.Buckalew@delaware.gov).

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.

Mr. Joe Caloggero  
January 28, 2019  
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Additional details on our review of this TIS are attached. If you have any questions concerning this review, please contact me at (302) 760-2167 or Mr. Claudy Joinville at (302) 760-2124. My email is [Troy.Brestel@delaware.gov](mailto:Troy.Brestel@delaware.gov) and Mr. Joinville's email is [Claudy.Joinville@delaware.gov](mailto:Claudy.Joinville@delaware.gov).

Sincerely,

*Troy Brestel*  
for  
Troy Brestel  
Project Engineer

TEB:cjm  
Enclosures

cc with enclosures: Mr. Phillip Tolliver, Morris & Ritchie Associates, Inc.  
Mr. Aaron Chaffinch, Town of Camden  
Mr. Brad Eaby, Deputy Attorney General  
Mr. Robert McCleary, Director, Transportation Solutions (DOTS)  
Mr. Drew Boyce, Director, Planning  
Mr. Mark Luszcz, Chief Traffic Engineer, Traffic, DOTS  
Mr. Michael Simmons, Assistant Director, Project Development South, DOTS  
Mr. J. Marc Coté, Assistant Director, Development Coordination  
Mr. T. William Brockenbrough, Jr., County Coordinator, Development Coordination  
Mr. Peter Haag, Traffic Studies Manager, Traffic, DOTS  
Mr. Matt Vincent, Central District Engineer, Central District  
Mr. David Dooley, Service Development Planner, Delaware Transit Corporation  
Mr. Mark Buckalew, Traffic Safety Engineer, Traffic Safety, DOTS  
Mr. Joshua Schwartz, Subdivision Manager, Development Coordination  
Mr. Anthony Aglio, Planning Supervisor, Statewide & Regional Planning  
Claudy Joinville, Project Engineer, Development Coordination

### **General Information**

**Report date:** October 1, 2013

**Prepared by:** The Traffic Group, Inc. (TTG)

**Prepared for:** Sunset Village

**Tax parcels:** NM-02-103.00-01-03.00-000 & 04.00-000

**Generally consistent with DeDOT's Development Coordination Manual:** Yes

### **Project Description and Background**

**Description:** The proposed Sunset Village development would consist of 238 apartment units.

**Location:** Sunset Village is proposed to be located on the east side of Upper King Road (Kent Road 4) across from Derbywood, in the Town of Camden. A site location map is included on Page 7.

**Amount of land to be developed:** approximately 29.81 acres of land

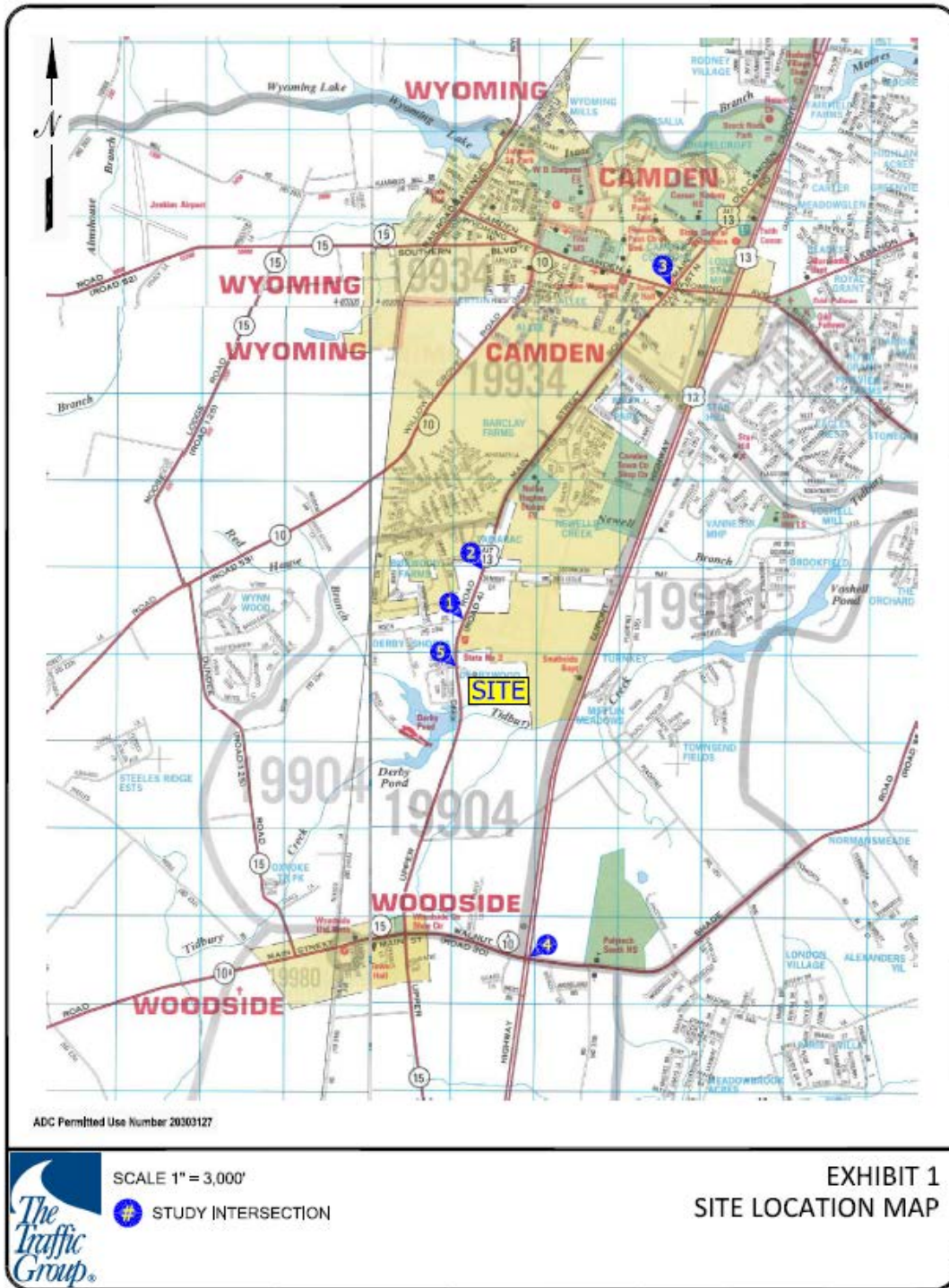
**Land use approval(s) needed:** Subdivision approval, Town of Camden Land Use approval

**Proposed completion date:** 2020

**Proposed access locations:** One full access on Upper King Road

**Daily Traffic Volumes (per DeDOT Traffic Summary 2012):**

- 2012 Average Annual Daily Traffic on Upper King Road: 3,853 vpd



## **Delaware Strategies for State Policies and Spending – 2013 Update**

**Location with respect to the Strategies for State Policies and Spending Map of Delaware:**  
The proposed Sunset Village development is located within Investment Level 1 area.

### *Investment Level 1*

Investment Level 1 Areas are areas of the state that are most prepared for growth and where the state can make cost-effective infrastructure investments for schools, roads, and public safety. In these 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. Investment Level 1 Areas are often municipalities, towns, or urban / urbanizing places in counties. Density is generally higher than in the surrounding areas. Overall, it is the state's intent to use its spending and management tools to maintain and enhance community character, to promote well-designed and efficient new growth, and to facilitate redevelopment in Investment Level 1 Areas.

### **Proposed Development's Compatibility with Strategies for State Policies and Spending:**

The proposed Sunset Village development is located within Investment Level 1 area, and is to be developed as 238 apartment units. This type of development is consistent with the character of Investment Level 1 area. It is therefore concluded that the proposed development generally complies with the policies stated in the 2013 update of the "Strategies for State Policies and Spending."

## **Comprehensive Plan**

### **Town of Camden Comprehensive Plan:**

*(Source: Town of Camden Comprehensive Plan Update 2007)*

The proposed Sunset Village is located in an area with future land use designated as High Density Residential.

The parcel is currently zoned R-3 (Multi-Family Residential), and the developer does not plan to rezone the parcels. According to Section 240-14 of the Town of Camden Comprehensive Plan, characteristics of R-3 zoning are as follows:

- This district serves to provide multi-family housing opportunities in appropriate locations throughout the town. To provide alternatives to single-family detached homes.
- Typical kinds of uses in this zone include single-family homes, detached or attached, and multi-family buildings and townhomes.

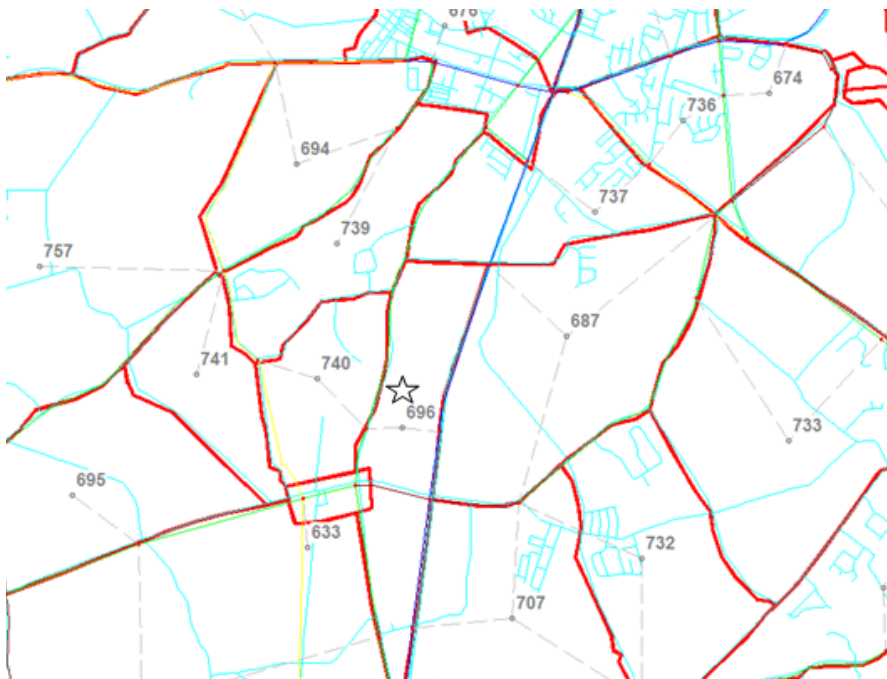


**Proposed Development's Compatibility with Comprehensive Plan:** The proposed Sunset Village residential development is planned as 238 apartment units. Given that the site's future land use designation and R-3 zoning are both residential in nature, the proposed land use (apartment) is residential; this development is consistent with the Town of Camden Comprehensive Plan.

**Transportation Analysis Zones (TAZ)**

**Transportation Analysis Zones (TAZ) where development would be located: 696**

**TAZ Boundaries:**



**Current employment estimate for TAZ:** 212 jobs in 2013

**Future employment estimate for TAZ:** 264 jobs in 2035

**Current population estimate for TAZ:** 428 people in 2013

**Future population estimate for TAZ:** 488 people in 2035

**Current household estimate for TAZ:** 443 houses in 2010

**Future household estimate for TAZ:** 573 houses in 2035

**Relevant committed developments in TAZ:** Tidbury Crossing

**Would the addition of committed developments to current estimates exceed future projections:** Yes

**Would the addition of committed developments and the proposed development to current estimates exceed future projections:** No for employment, yes for households and population

**Relevant Projects in the DelDOT Capital Transportation Program (FY 2013 – FY 2018)**

DelDOT currently has one relevant project in the study area. It is the Corridor Capacity Preservation Program (CCPP), which is a statewide program intended to sustain the capacity of adopted highway corridors by various means such as limiting access points and using service roads for local vehicle trips. The general purpose of the program is to ensure that existing principal arterial roadways, including US Route 13 (South DuPont Highway / Kent Road 24) between Delaware Route 10 (Kent Road 356) and the Maryland state line, are able to efficiently carry regional traffic without impedance from the effects of local development.

**Trip Generation**

Trip generation for the proposed development was computed using comparable land uses and equations contained in Trip Generation, Ninth Edition, 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:

- Apartment Units (ITE Land Use Code 220)

Table 1  
 SUNSET VILLAGE PEAK HOUR TRIP GENERATION

Land Use	Vehicle Type	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
238-Apartment	Cars	24	96	120	97	52	149
<b>TOTAL TRIPS</b>		<b>24</b>	<b>96</b>	<b>120</b>	<b>97</b>	<b>52</b>	<b>149</b>

Table 2  
 SUNSET VILLAGE DAILY TRIP GENERATION

Land Use	Weekday ADT		
	In	Out	Total
238-Apartment	783	783	1566
<b>TOTAL TRIPS</b>	<b>783</b>	<b>783</b>	<b>1566</b>

## **Overview of TIS**

### **Intersections examined:**

- 1) Site Entrance / Upper King Road (Kent Road 4)
- 2) Upper King Road / Bison Road (Kent Road 234)
- 3) Upper King Road / Lochmeath Way (Kent Road 361)
- 4) Main Street (Kent Road 4) / Camden-Wyoming Avenue (Delaware Route 10)
- 5) US Route 13 / Walnut Shade Road (Delaware Route 10A)

### **Conditions examined:**

- 1) 2013 existing conditions (Case 1)
- 2) 2020 without Sunset Village (Case 2)
- 3) 2020 with Sunset Village (Case 3)

### **Peak hours evaluated:**

Weekday morning and afternoon peak hours. As this TIS is for a residential development, the morning traffic counts were conducted from 7:00 AM to 9:00 AM to reflect traffic conditions when morning traffic is at its peak. Additionally, the afternoon peak period designated for traffic counts was 4:00 PM to 6:00 PM to reflect traffic conditions when afternoon traffic is at its peak.

### **Committed developments considered:**

- 1) Longacre Village (136 single-family detached houses, 129 townhouses, 80 apartments, 188,000 square feet of general office space, 20,000 square feet of fast-food restaurant with drive-through window space, and 312,000 square feet of specialty retail center space)
- 2) Tidbury Crossing (144 townhouses, 101 single-family detached houses)

## **Intersection Descriptions**

### **1) Upper King Road & Site Entrance**

**Type of Control:** proposed two-way stop-controlled (rights-in/rights-out/lefts-in/lefts-out T-intersection)

**Northbound approach:** (Upper King Road) existing one through lane; proposed one through lane and one right-turn lane

**Southbound approach:** (Upper King Road) existing one through lane; proposed one through lane and one left-turn lane

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

- 2) **Upper King Road & Bison Road**  
**Type of Control:** existing two-way stop-controlled (rights-in/rights-out/lefts-in/lefts-out T-intersection)  
**Northbound approach:** (Upper King Road) one shared left/through lane  
**Southbound approach:** (Upper King Road) one shared through/right lane  
**Eastbound approach:** (Bison Road) one share left/through/right lane
  
- 3) **Upper King Road & Lochmeath Way**  
**Type of Control:** two-way stop-controlled (rights-in/rights-out/lefts-in/lefts-out T-intersection)  
**Northbound approach:** (Upper King Road) one shared through/right lane  
**Southbound approach:** (Upper King Road) one shared left/through lane  
**Westbound approach:** (Lochmeath Way) one shared left/through/right lane
  
- 4) **Main Street & Delaware Route 10**  
**Type of Control:** signalized four-leg intersection  
**Northbound approach:** (Main Street) one shared left/through/right lane  
**Southbound approach:** (Main Street) one shared left/through/right lane  
**Eastbound approach:** (Camden Wyoming Avenue) one shared left/through/right lane  
**Westbound approach:** (Camden Wyoming Avenue) one shared left/through/right lane
  
- 5) **US Route 13 & Walnut Shade Road**  
**Type of Control:** signalized four-leg intersection  
**Northbound approach:** (US Route 13) one left-turn lane, two through lanes, and one right-turn lane  
**Southbound approach:** (US Route 13) one left-turn lane, two through lanes, and one right-turn lane  
**Eastbound approach:** (Delaware Route 10) one shared left/through lane and one right-turn lane.  
**Westbound approach:** (Delaware Route 10) one shared left/through lane and one right-turn lane.

### **Safety Evaluation**

**Crash Data:** Crash data was obtained for August 2010 through August 2013 for the intersections and roadway segments within the study area. This included a total of 63 crashes, of which 26 occurred at or very near the signalized intersection of Delaware Route 10 and Main Street. As expected for signalized intersection crashes, the majority were either angle crashes or rear-end crashes. About 25% of the crashes resulted in injuries, but there were no fatal crashes reported in the study area during this three-year period.

**Sight Distance:** The proposed site entrance on Upper King Road would be located on a slightly curved and relatively flat section of roadway and would appear to have adequate sight distance. The proposed entrance would be located on the inside of a horizontal curve, which does not seem to present sight distance and safety concerns for left-turning vehicles to and from the site. The proposed location of the Upper King Road site entrance, as well as the lane configurations and allowed movements at that intersection, may require a closer evaluation from a safety perspective.

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

**Existing transit service:** The Delaware Transit Corporation (DTC) currently operates one transit route offering service to the Camden community north of the proposed Sunset Village residential development. DART Route 104, which offers weekday and weekend service connecting Dover to Camden, travels along US Route 13 and South Street which intersects Upper King Road / South Main Street to the north of Sunset Village. The nearest bus stop to the proposed development is located east of the intersection of Voshell Mill Road and Maple Lane. Route 104 makes 12 round trips each weekday, and 9 each Saturday.

**Planned transit service:** Mr. Wayne Henderson, a Service Development Planner for the DTC, provided comments on October 29. DART Route 104 is the only DTC transit service planned for this area at this time. He suggested that if the nearest stop for DART Route 104 exceeds ¼ mile walking distance from the project the developer could work with DTC to locate additional stops and that any improvements must be ADA compliant. It is noted that the nearest bus stop for DART Route 104 is greater than the ¼ mile walking distance.

**Existing bicycle and pedestrian facilities:** According to the bicycle level of service (BLOS) calculator developed by the *League of Illinois Bicyclists* Upper King Road operates at BLOS A. The only designated bicycle lanes in the study area are found along northbound Upper King Road near the entrance to Newell's Creek (formally known as Lord Brothers) for a short distance only in the northbound direction. The only sidewalks in the area are found along the east side of Upper King Road along the frontage of Newell's Creek in the northbound direction and south of the Delaware Route 10 in both directions. There is an existing pedestrian facility at both approaches of the signalized intersection of Main Street and Delaware Route 10.

**Planned bicycle and pedestrian facilities:** DelDOT contacted Marco Boyce, Anthony Aglio, and Sarah Coakley via email on October 25, 2013 for comments regarding planned or requested bicycle and pedestrian facilities in the area of this proposed development. Sarah Coakley stated that if the development entrance is located within the one-mile walking boundary of Nellie Hughes Elementary School, then, at least, sidewalks would be required. Also, since the development is located in an Investment Level 1 Areas for Strategies for State Policies and Spending, sidewalk will be required. Anthony Aglio stated that if a right turn lane is required, then a bike lane through the right-turn lane would be needed. Mr. Aglio also recommended that a shared-use path be discussed per its connectivity to the school and possibly other nearby generators – path or sidewalk.

### **Previous Comments**

All comments from DeIDOT's Scoping Letter, Traffic Count Review, and Preliminary TIS (PTIS) Review were addressed in the Final TIS submission.

### **General HCS Analysis Comments**

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

- 1) For unsignalized intersections, the TIS and DeIDOT applied heavy vehicle (HV) percentages by movement. For signalized intersections, the TIS and DeIDOT applied HV percentages by lane group. For future conditions, the TIS and DeIDOT generally assumed future HV percentages to be the same as existing HV percentages.
- 2) For existing conditions at unsignalized intersections, the TIS and DeIDOT determined and applied, for each intersection, the peak hour factor (PHF) by movements. For future conditions, the TIS assumed future PHF for some movements that were different from the PHF DeIDOT applied. DeIDOT used future PHF of 0.92 for movements that had significant increase in trips for future conditions.
- 3) Both the TIS and DeIDOT input Right-Turn-on-Red (RTOR) volumes for signalized intersection analyses.
- 4) Neither the TIS nor DeIDOT included percent grade in their analyses.

Table 3  
 PEAK HOUR LEVELS OF SERVICE (LOS)  
*based on Traffic Impact Study for Sunset Village*  
*Report dated October 1, 2013*  
 Prepared by The Traffic Group, Inc.

<b>Unsignalized Intersection <sup>1</sup> Two-Way Stop Control (T-intersection)</b>	<b>LOS per TIS</b>		<b>LOS per DelDOT</b>	
	Weekday AM <sup>1</sup>	Weekday PM	Weekday AM	Weekday PM
<b>Upper King Road &amp; Site Entrance</b>				
2020 with Sunset Village (Case 3)				
Westbound Site Entrance	B (13.3)	B (12.3)	B (13.3)	B (12.3)
Southbound Upper King Road – Right	A (8.3)	A (8.0)	A (8.3)	A (8.0)
2020 with Sunset Village (Case 3) <i>With required turn-lane improvements <sup>2</sup></i>				
Westbound Site Entrance	N/A	N/A	B (13.3)	B (11.9)
Southbound Upper King Road– Right	N/A	N/A	A (8.3)	A (8.0)

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<sup>1</sup> For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

<sup>2</sup> Improvements include a separate right-turn lane on the northbound Upper King Road approach and a separate left-turn lane on the southbound Upper King Road approach, as warranted per DelDOT's Subdivision Manual.

Table 4  
 PEAK HOUR LEVELS OF SERVICE (LOS)  
*based on Traffic Impact Study for Sunset Village*  
*Report dated October 1, 2013*  
 Prepared by The Traffic Group, Inc.

<b>Unsignalized Intersection <sup>3</sup> Two-Way Stop Control (T-intersection)</b>	<b>LOS per TIS<sup>4</sup></b>		<b>LOS per DelDOT</b>	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Upper King Road &amp; Bison Road</b>				
2013 Existing (Case 1)				
Northbound Upper King Road	A (7.6)	A (8.2)	A (7.6)	A (8.4)
Eastbound Bison Road	B (13.8)	B (14.9)	B (14.4)	C (16.9)
2020 without Sunset Village (Case 2)				
Northbound Upper King Road - Left	A (7.6)	A (8.3)	A (7.7)	A (8.4)
Eastbound Bison Road	C (14.3)	C (15.7)	C (15.0)	C (18.1)
2020 with Sunset Village (Case 3)				
Northbound Upper King Road - Left	A (7.7)	A (8.5)	A (7.7)	A (8.7)
Eastbound Upper King Road	C (15.8)	C (17.9)	C (15.8)	C (21.7)

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<sup>3</sup> For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

<sup>4</sup> The TIS analyzes all the approaches using Peak Hour Factors that were generally different from those used in DelDOT's analysis.



Table 5  
**PEAK HOUR LEVELS OF SERVICE (LOS)**  
*based on Traffic Impact Study for Sunset Village*  
*Report dated October 1, 2013*  
*Prepared by The Traffic Group, Inc.*

<b>Unsignalized Intersection <sup>5</sup> Two-Way Stop Control (T-intersection)</b>	<b>LOS per TIS<sup>6</sup></b>		<b>LOS per DeIDOT<sup>7</sup></b>	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Upper King Road &amp; Lochmeath Way</b>				
2013 Existing (Case 1)				
Southbound Upper King Road - Left	A (8.7)	A (8.0)	A (8.6)	A (8.2)
Westbound Lochmeath Way	B (13.9)	C (21.1)	B (13.9)	D (26.2)
2020 without Sunset Village (Case 2)				
Southbound Upper King Road – Left	A (8.8)	A (8.1)	A (8.7)	A (8.3)
Westbound Lochmeath Way	B (15.0)	D (26.0)	C (15.1)	D (33.5)
2020 with Sunset Village (Case 3)				
Southbound Upper King Road – Left	A (9.1)	A (8.2)	A (8.9)	A (8.4)
Westbound Lochmeath Way	C (16.7)	E (39.9)	C (16.7)	F (60.9)
2020 with Sunset Village with improvement				
Southbound Upper King Road – Left	N/A	N/A	A (8.9)	A (8.4)
Westbound Lochmeath Way	N/A	N/A	B (14.6)	E (41.3)

<sup>5</sup> For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

<sup>6</sup> The TIS analyzes all the approaches using Peak Hour Factors that were generally different from those used in DeIDOT's analysis. The correct Peak Hour Factors result in a higher level of service.

Table 6  
**PEAK HOUR LEVELS OF SERVICE (LOS)**  
*based on Traffic Impact Study for Sunset Village*  
*Report dated October 1, 2013*  
 Prepared by The Traffic Group, Inc.

<b>Signalized Intersection <sup>7</sup></b>	<b>LOS per TIS<sup>8</sup></b>		<b>LOS per DelDOT</b>	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Main Street &amp; DE 10</b>				
2013 Existing (Case 1)	B (15.3)	B (13.6)	B (15.1)	B (13.6)
2020 without Sunset Village (Case 2)	B (17.0)	B (14.1)	B (16.6)	B (14.2)
2020 with Sunset Village (Case 3)	B (17.5)	B (14.3)	B (17.4)	B(14.3)

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<sup>7</sup> For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

<sup>8</sup> The TIS utilized a cycle length of 60.0 seconds for this intersection. After a field visit to that intersection we concur with this cycle length.

Table 7  
**PEAK HOUR LEVELS OF SERVICE (LOS)**  
*based on Traffic Impact Study for Sunset Village*  
*Report dated October 1, 2013*  
 Prepared by The Traffic Group, Inc.

<b>Signalized Intersection <sup>9</sup></b>	<b>LOS per TIS<sup>10</sup></b>		<b>LOS per DelDOT</b>	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>US Route 13 &amp; DE 10 A</b>				
2013 Existing (Case 1)	D (49.7)	D (50.8)	D (44.4)	D (43.0)
2020 without Sunset Village (Case 2)	E (65.7)	E (74.8)	D (45.9) <sup>11</sup>	D (39.6) <sup>11</sup>
2020 with Sunset Village (Case 3)	E (66.4)	E (74.9)	D (50.3) <sup>11</sup>	D (40.6) <sup>11</sup>

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<sup>9</sup> For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

<sup>10</sup> The Consultant used a uniform cycle length and timings through each analyzed scenario. Because the signal is actuated, in the review of the TIS, DelDOT optimized the signal timings for each scenario.

<sup>11</sup> For the TIS, the Consultant changed the Unit Extension parameter to 4 and 5. In the review of the TIS, DelDOT left this parameter set to 3.