



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

February 5, 2014

SHAILEN P. BHATT  
SECRETARY

Mr. Derrick Kennedy  
Rybinski Engineering  
21 Canterbury Drive  
Kennett Square, PA 19348

Dear Mr. Kennedy:

The enclosed Traffic Impact Study (TIS) letter for the **Windswept** residential 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 performed 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 letter and concurs with the recommendations. If you have any questions concerning this letter or the enclosed review letter, please contact me at (302) 760-2167.

Sincerely,

Troy Brestel  
Project Engineer

TEB:km

Enclosures

cc with enclosures: Ms. Constance C. Holland, Office of State Planning Coordination  
Mr. Lawrence Lank, Director, Sussex County Planning and Zoning  
Mr. Mir Wahed, Johnson, Mirmiran, & Thompson, Inc.  
DelDOT Distribution

## DelDOT Distribution

Frederick H. Schranck, Deputy Attorney General  
Robert McCleary, Director, Transportation Solutions (DOTS)  
Drew Boyce, Director, Planning  
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Steve Sisson, Sussex County Subdivision Coordinator, Development Coordination  
John Fiori, Subdivision Manager, Development Coordination  
Marco Boyce, Planning Supervisor, Statewide & Regional Planning  
Claudy Joinville, Project Engineer, Development Coordination



February 4, 2014

Mr. Troy Brestel  
Project Engineer  
Development Coordination  
DelDOT Division of Planning  
P O Box 778  
Dover, DE 19903

RE: Agreement No. 1528  
Traffic Impact Study Services  
**Task 13B-Windswept**

Dear Mr. Brestel:

Johnson, Mirmiran and Thompson (JMT) has completed the Traffic Impact Study (TIS) for the Windswept development. This task was assigned Task Number 13B and 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 Windswept development proposed along Delaware Route 24 (John J. Williams Highway/Sussex Road 24), between Tanglewood Drive and the entrance to Beacon Middle School in Sussex County, Delaware. The Winswept Stables exist on the site with one access point along Delaware Route 24. As part of the Windswept development, the existing equestrian facility would be removed and 115 single-family detached houses would be constructed. The subject property is a 37.6-acre parcel that is zoned AR-1 (Agricultural) and is proposed to be rezoned to MR (Multi-Family Residential) with an RPC (Residential Planned Community) overlay with the construction of Windswept. Access would be provided via one full access driveway along Delaware Route 24. Construction is anticipated to be complete in 2017.

DelDOT currently has two relevant projects within the study area: SR 24, Love Creek Bridge to Mulberry Knoll Road improvements (Contract # T201212201), and SR 24, Mulberry Knoll Road to SR 1 improvements (Contract # T200411209). The SR 24, Love Creek Bridge to Mulberry Knoll Road improvement project includes the addition of separate left turn lanes along the Delaware Route 24 approaches to the Mulberry Knoll Road intersection. Design plans have been completed, however no construction dates have been established in the latest Capital Transportation Program (CTP). It should be noted that a traffic signal warrant analysis was conducted at the intersection of Delaware Route 24 and Mulberry Knoll Road and the results are summarized in an August 26, 2008 Technical Memorandum prepared by Rummel, Klepper, & Kahl (RK&K). Based on the results, a traffic signal was not warranted under existing conditions but was warranted during the PM and Saturday peak hours with the addition of potential future development in the area. However, due to the uncertainty of the future developments, it was recommended that a traffic signal not be considered at this location at that time.



The SR 24, Mulberry Knoll Road to SR 1 project involves roadway widening along Delaware Route 24 to provide a four lane section (two through lanes in each direction with auxiliary turn lanes provided at each signalized intersection) from west of Plantation Road to west of Delaware Route 1. Also as part of this project, the northbound Warrington Road and southbound Plantation Road approaches to Delaware Route 24 would be widened to provide one left-turn lane, one left/through lane, one through lane, and one right-turn lane on each approach. This project would address the capacity constraints along Delaware Route 24 due to growth in the area. Based on the latest CTP, construction is scheduled to be completed in 2018. For additional information regarding SR 24, Mulberry Knoll Road to SR 1, please see the project website at [http://deldot.gov/information/projects/SR24\\_MulberryKnollRoad\\_SR21/index.shtml](http://deldot.gov/information/projects/SR24_MulberryKnollRoad_SR21/index.shtml).

DelDOT's 2011 High Risk Rural Roads Program (HRRRP) included one report, Site 12, that was within the project area. Site 12 is a 0.39 mile section of Delaware Route 24 from 0.57-mile west of Retz Lane to 0.18-mile west of Retz Lane. The Site 12 report included a crash summary as well as field observations at the entrance to the Winswept Stables and the entrance to the Beacon Middle School. The suggested improvements within the Site 12 report include installing Advance Street Name (W16-8P) plaques indicating Beacon Middle School with the Signal Ahead warning signs along eastbound and westbound Delaware Route 24, installing Type 2 Object Markers (OM2-2) on all utility poles within the site limits, installing a STOP sign at the entrance to the Winswept Stables, and modifying the signal timings along Delaware Route 24 at the Beacon Middle School to provide a 5-second yellow change interval. A STOP sign has been installed at the entrance to the Winswept Stables and the signal timings along Delaware Route 24 at the Beacon Middle School has been updated to provide a 5-second yellow change interval.

In addition, DelDOT conducted a School Zone MUTCD Compliance Review for the Beacon Middle School and summarized the results in a report dated July 2013. The review included a study of all the existing traffic control devices at the school and assessed whether the school zone met the minimum requirements contained in the latest version of the Delaware Manual on Uniform Traffic Control Devices (DE MUTCD). Several signage and pavement marking modifications to comply with the latest DE MUTCD standards were recommended in the report.

DelDOT has a pavement rehabilitation and resurfacing project (Contract # T201306303) proposed along Robinsonville Road (Sussex Road 277) from Delaware Route 24 to Webb's Landing Road (Sussex Road 277B) and from Kendale Road (Sussex Road 287) to Plantation Road (Sussex Road 275). This project involves a 6" full depth reclamation and then either a micro-surfacing or a thin overlay. The proposed work is scheduled to be completed during the Fall of 2014.

Based on our review of the traffic impact study, 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 24 / Site Entrance	2017 AM, PM and Saturday Build conditions with Windswept Development (Case 3)
Delaware Route 24 / Mulberry Knoll Road	2013 AM, PM and Saturday Existing (Case 1) 2017 AM, PM and Saturday No Build conditions without Windswept Development (Case 2) 2017 AM, PM and Saturday Build conditions with Windswept Development (Case 3)
Delaware Route 24 / Plantation Road / Warrington Road	2013 Saturday Existing (Case 1) 2017 Saturday No Build conditions without Windswept Development (Case 2) 2017 PM and Saturday Build conditions with Windswept Development (Case 3)

The unsignalized site entrance to Delaware Route 24 exhibits LOS deficiencies during each future peak period once development of Windswept is accounted for. However, deficiencies take place only on the southbound site entrance approach. The projected maximum 95<sup>th</sup> percentile queue length under Case 3 conditions is approximately 108 feet along the southbound site entrance approach during the Saturday midday peak hour. As such, we do not recommend any additional improvements along the site entrance.

The unsignalized intersection of Delaware Route 24 with Mulberry Knoll Road exhibits LOS deficiencies during each of the existing and future peak periods. The LOS deficiencies occur even with the installation of the separate left turn lanes along Delaware Route 24 as part of the DelDOT SR 24, Love Creek Bridge to Mulberry Knoll Road, improvement project. The LOS deficiencies take place along the northbound and southbound Mulberry Knoll Road approaches to the intersection. The projected maximum 95<sup>th</sup> percentile queue lengths under Case 3 conditions (with the DelDOT improvement project) are approximately 29 feet and 54 feet along the northbound and southbound Mulberry Knoll Road approaches during the PM peak hour, respectively.

To address the LOS deficiency at this intersection, we recommend that a traffic signal be installed when the appropriate warrants are met as demonstrated through a Signal Justification Study. However, we do not believe it would be reasonable to assign sole responsibility to the developer for the installation of a traffic signal as the LOS deficiencies would exist even without the proposed Windswept development. It should be noted that the SR 24, Love Creek Bridge to Mulberry Knoll Road DelDOT improvement project, which includes the improvement of Delaware Route 24 and Mulberry Knoll Road, has not been scheduled for construction within the currently proposed *Capital Transportation Program* FY 2014 – FY 2019 as the project is being developed to allow for the use of federal funding. With federal funding, the State would be responsible for 20% of the total project costs, including any costs related to the right-of-way. The remaining 80% could come from Delaware’s allotment of Federal Highway Funds. We recommend that the developer be responsible for funding a portion of the total state allocation, which would be 20% of the total project cost. At least one other proposed development, Love



Creek RV Resort and Campground, would be responsible to improve this intersection if it receives necessary rezoning and conditional use approvals.

The signalized intersection of Delaware Route 24 with Plantation Road and Warrington Road exhibits LOS deficiencies during each of the existing and future peak periods. During the 2013 Existing (Case 1) and 2017 No Build (Case 2) conditions, these deficiencies are limited to the midday Summer Saturday, while deficiencies occur during both the Weekday PM and Summer Saturday in the 2017 Build (Case 3) conditions. However, the SR 24, Mulberry Knoll Road to SR 1, DelDOT improvement project addresses the LOS deficiencies at this intersection. Specifically, with the addition of a through/left turn lane in both the northbound and southbound approaches to the intersection, and the addition of a through lane in both the eastbound and westbound directions, this intersection would operate at acceptable levels of service under future conditions with or without the Windswept development. As a result, we do not recommend any additional improvements be implemented by the developer at this intersection; however, it is recommended that the developer be responsible to fund an equitable portion to the DelDOT SR 24, Mulberry Knoll Road to SR 1, project. At least two other developments (Sawgrass North and Plantation Medical and Professional Center) are also responsible to improve this intersection as well.

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

1. The developer should provide a bituminous concrete overlay to the existing travel lanes along the site frontage, at DelDOT’s direction. DelDOT should analyze the existing lanes’ pavement section and recommend an overlay thickness to the developer’s engineer if necessary.
2. The developer should construct a full site entrance for the proposed Windswept development on Delaware Route 24 to be consistent with the proposed lane configurations as shown in the table below:

<b>Approach</b>	<b>Current Configuration</b>	<b>Proposed Configuration</b>
Southbound Site Entrance	Approach does not exist	One shared left turn/right turn lane
Eastbound Delaware Route 24	One through lane	One left turn lane and one through lane
Westbound Delaware Route 24	One through lane	One right turn lane and one through lane

Based on DelDOT’s *Standards and Regulations for Subdivision Streets and State Highway Access*, the recommended minimum storage lengths (excluding tapers) are 235 feet for the eastbound left turn lane and 350 feet for the westbound right turn lane,



respectively, along Delaware Route 24. It should be noted that storage lengths based on the HCS analysis provide shorter queue lengths than what is reported here.

3. The developer should enter into an agreement with DelDOT to fund an equitable portion of the State’s 20% commitment to the improvements planned at the Delaware Route 24 intersection with Mulberry Knoll Road as part of the DelDOT SR 24, Love Creek Bridge to Mulberry Knoll Road, project (Contract #T201212201). As discussed above, at least one other development, Love Creek RV Resort and Campground, would be responsible to improve this intersection if it moves forward. The proposed configuration along each approach to the intersection is shown in the table below.

Approach	Current Configuration	Proposed Configuration
Eastbound Delaware Route 24	One shared through/left turn and one right turn lane	One left turn lane, one through lane, and one right turn lane
Westbound Delaware Route 24	One shared through/left turn and one right turn lane	One left turn lane, one through lane, and one right turn lane
Northbound Mulberry Knoll Road	One shared through/left turn/right turn lane	No Change
Southbound Mulberry Knoll Road	One shared through/left turn/right turn lane	No Change

The recommended storage lengths (excluding taper) of the separate left turn and right turn lanes along Delaware Route 24 are listed below. These lengths are consistent with what was recommended for the Love Creek RV Resort and Campground Traffic Impact Study. It should be noted that the storage lengths listed below for the eastbound right turn lane, the westbound left turn lane, and the westbound right turn lane are longer than what is proposed in the latest DelDOT design plans for this project.

Approach	Left Turn Lane	Right Turn Lane
Eastbound Delaware Route 24	260 feet	190 feet
Westbound Delaware Route 24	235 feet	290 feet

The storage lengths are based on DelDOT’s *Standards and Regulations for Subdivision Streets and State Highway Access*. The storage lengths based on HCS analysis provide shorter queue lengths than what is reported here.

4. The developer should enter into an agreement with DelDOT to fund an equitable portion of the proposed improvements planned at the Delaware Route 24 intersection with Plantation Road and Warrington Road as part of the the DelDOT SR 24, Mulberry Knoll Road to SR 1, improvement project (Contract # T200411209). At least two other developments (Sawgrass North and Plantation Medical and Professional Center) are also



responsible to improve this intersection as well. The proposed configuration is shown in the table below.

<b>Approach</b>	<b>Current Configuration</b>	<b>Proposed Configuration</b>
Eastbound Delaware Route 24	One left turn lane, one through lane, and one right turn lane	One left turn lane, two through lanes, and one right turn lane
Westbound Delaware Route 24	One left turn lane, one through lane, and one right turn lane	One left turn lane, two through lanes, and one right turn lane
Northbound Warrington Road	One left turn lane, one through lane, and one right turn lane	One left turn lane, one shared through/left turn lane, one through lane, and one right turn lane
Southbound Plantation Road	One left turn lane, one through lane, and one right turn lane	One left turn lane, one shared through/left turn lane, one through lane, and one right turn lane

The recommended storage lengths (excluding taper) of the separate left turn and right turn lanes along Delaware Route 24 and Plantation and Warrington Roads are listed below. These lengths are based on the most recent design plans for the DeIDOT SR 24, Mulberry Knoll Road to SR 1, improvement project (Contract # T200411209). These lengths should be confirmed as design plans for this intersection progress.

<b>Approach</b>	<b>Left Turn Lane</b>	<b>Right Turn Lane</b>
Eastbound Delaware Route 24	700 feet	350 feet
Westbound Delaware Route 24	160 feet	315 feet
Northbound Warrington Road	250 feet	300 feet
Southbound Plantation Road	750 feet	250 feet

5. The following bicycle, pedestrian, and transit improvements should be included:
  - a. A minimum fifteen-foot wide permanent easement from the edge of the right-of-way should be dedicated to DeIDOT along the Delaware Route 24 site frontage. Within this easement, a ten-foot wide multi use path that meets current AASHTO and ADA standards should be constructed. A minimum five-foot setback should be maintained from the edge of the pavement to the multi use path. The multi use path should be generally connected and aligned with the existing multi use path fronting Hart's Landing on Delaware Route 24 to provide connectivity. Should the location of





- wetlands on the property provide difficulties in constructing the multi use path, the developer should coordinate with DelDOT's Subdivision Section during the plan review process to identify an acceptable, alternative approach to provide the path.
- b. Bicycle lanes should be provided along both directions of Delaware Route 24. The bike lane should be provided through the right turn lane along westbound Delaware Route 24 at the site entrance and a RIGHT TURN YIELD TO BIKES sign (MUTCD R4-4) should be installed at the start of the right turn lane.
  - c. A bus pull off should be provided along Delaware Route 24 near the property entrance and an ADA compliant 17 feet by 8 feet concrete bus shelter pad along with a five-foot wide sidewalk be provided to connect the bus pad to the interior of the development. Additionally, an ADA compliant 5 feet by 8 feet concrete pad is recommended to be provided across from the Delaware Route 24 site entrance.
  - 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. ADA compliant curb ramps and marked crosswalks should be provided at the site entrance. The use of Type 3 curb ramps is discouraged.
  - f. Utility covers should be moved outside of any designated bicycle lanes or should be flush with the pavement.

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

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. 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](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.

Mir Wahed, P.E., PTOE  
Enclosure

## **General Information**

**Report date:** February, 2014.

**Prepared by:** JMT

**Prepared for:** Seaside Communities RDC, LLC

**Tax Parcels:** 334-18.00-40.00

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

## **Project Description and Background**

**Description:** 115 single-family detached houses.

**Location:** The project is located along Delaware Route 24 (John J. Williams Highway/Sussex Road 24), between Tanglewood Drive and the entrance to Beacon Middle School in Sussex County, Delaware.

**Amount of Land to be developed:** 37.6 acres of land.

**Land Use approval(s) needed:** Subdivision approval and rezoning.

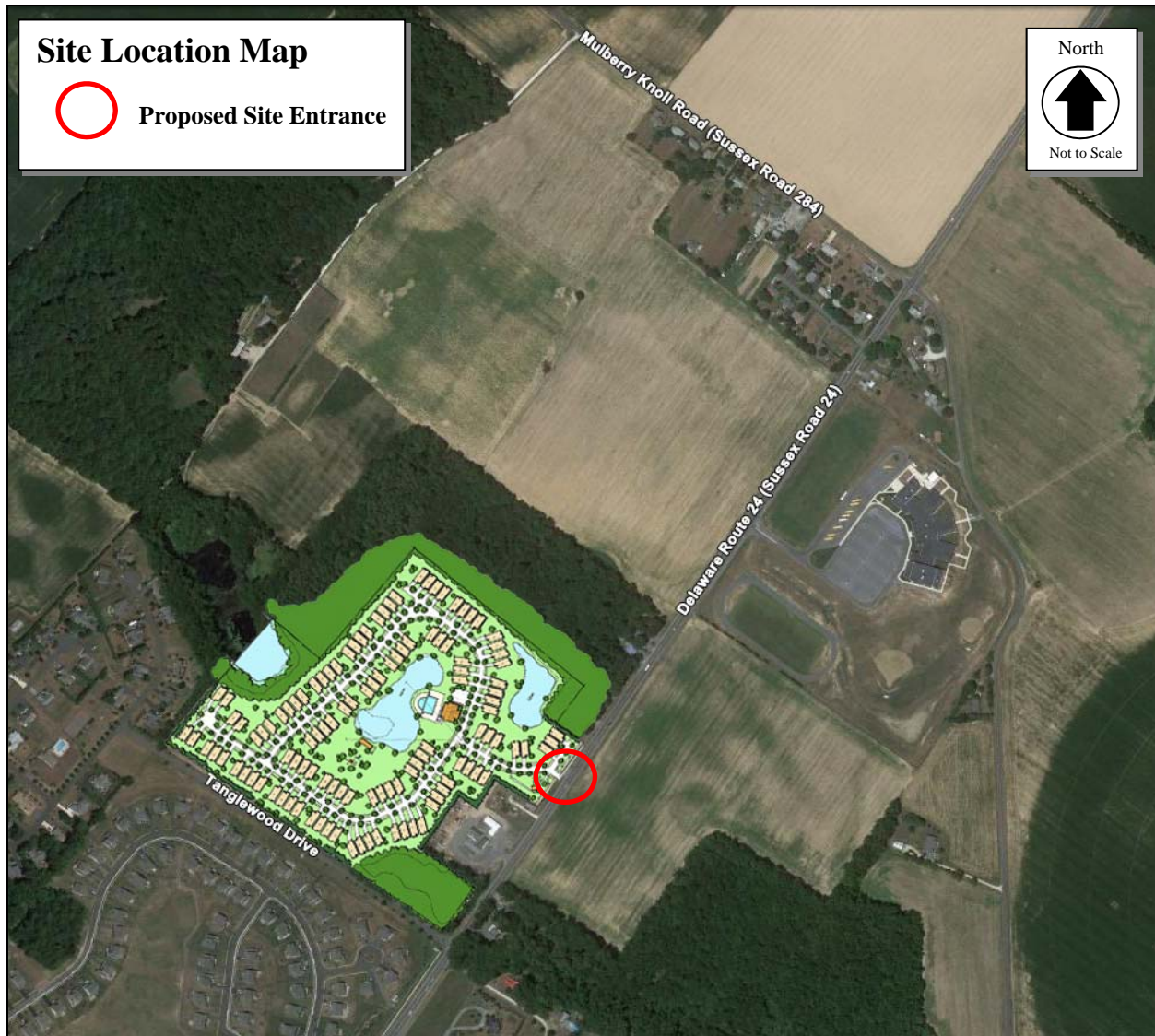
**Proposed completion date:** 2017.

**Proposed access locations:** One full access along Delaware Route 24.

**Daily Traffic Volumes:**

- 2012 Average Annual Daily Traffic on Delaware Route 24: 17,972 vehicles per day.

**Site Map**



*\*Graphic is an approximation based on the preliminary plan prepared by Solutions, IPEM.*

**Relevant and On-going Projects**

DelDOT currently has two relevant projects within the study area: SR 24, Love Creek Bridge to Mulberry Knoll Road improvements (Contract # T201212201), and SR 24, Mulberry Knoll Road to SR 1 improvements (Contract # T200411209). The SR 24, Love Creek Bridge to Mulberry Knoll Road improvement project includes the addition of separate left turn lanes along the Delaware Route 24 approaches to the Mulberry Knoll Road intersection. Design plans have been completed but no dates have been established in the latest Capital Transportation Program (CTP) to when construction would be completed. It should be noted that a traffic signal warrant analysis was conducted at the intersection of Delaware Route 24 and Mulberry Knoll Road and the results are summarized in an August 26, 2008 Technical Memorandum prepared by Rummel, Klepper,

& Kahl (RK&K). Based on the results, a traffic signal was not warranted under existing conditions but was warranted during the PM and Saturday peak hours with the addition of potential future development in the area. Due to the uncertainty of the future developments, it was recommended that a traffic signal not be considered at this location at that time.

The SR 24, Mulberry Knoll Road to SR 1 project involves roadway widening along Delaware Route 24 to provide a four lane section (two through lanes in each direction with auxiliary turn lanes provided at each signalized intersection) from west of Plantation Road to west of Delaware Route 1. Also as part of this project, the northbound Warrington Road and southbound Plantation Road approaches to Delaware Route 24 would be widened to provide one left-turn lane, one left/through lane, one through lane, and one right-turn lane on each approach. This project would address the capacity constraints along Delaware Route 24 due to growth in the area. Based on the latest CTP, construction is scheduled to be completed in 2018. For additional information regarding SR 24, Mulberry Knoll Road to SR 1, please see the project website at [http://deldot.gov/information/projects/SR24\\_MulberryKnollRoad\\_SR21/index.shtml](http://deldot.gov/information/projects/SR24_MulberryKnollRoad_SR21/index.shtml).

DelDOT's 2011 HRRRP included one report, Site 12, that was within the project area. Site 12 is a 0.39 mile section of Delaware Route 24 from 0.57-mile west of Retz Lane to 0.18-mile west of Retz Lane. The Site 12 report included a crash summary as well as field observations at the entrance to the Winswept Stables and the entrance to the Beacon Middle School. The suggested improvements within the Site 12 report include installing Advance Street Name (W16-8P) plaques indicating Beacon Middle School with the Signal Ahead warning signs along eastbound and westbound Delaware Route 24, installing Type 2 Object Markers (OM2-2) on all utility poles within the site limits, installing a STOP sign at the entrance to the Winswept Stables, and modifying the signal timings along Delaware Route 24 at the Beacon Middle School to provide a 5-second yellow change interval. A STOP sign has been installed at the entrance to the Winswept Stables and the signal timings along Delaware Route 24 at the Beacon Middle School does provide a 5-second yellow change interval.

In addition, DelDOT conducted a School Zone MUTCD Compliance Review for the Beacon Middle School and summarized the results in a report dated July 2013. The review included a study of all the existing traffic control devices at the school and assessed whether the school zone met the minimum requirements contained in the latest version of the Delaware Manual on Uniform Traffic Control Devices (DE MUTCD). Several signage and pavement marking modifications to comply with the latest DE MUTCD standards were recommended in the report.

DelDOT has a pavement rehabilitation and resurfacing project (Contract # T201306303) proposed along Robinsonville Road (Sussex Road 277) from Delaware Route 24 to Webb's Landing Road (Sussex Road 277B) and from Kendale Road (Sussex Road 287) to Plantation Road (Sussex Road 275). This project involves a 6" full depth reclamation and then either a micro-surfacing or a thin overlay. The proposed work is scheduled to be completed during the Fall of 2014.

### **Livable Delaware**

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

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

The proposed development is located within the Investment Level 2 area.

#### **Investment Level 2**

These areas can be composed of less developed areas within municipalities, rapidly growing areas in the counties that have or will have public water and wastewater services and utilities, areas that are generally adjacent to or near Investment Level 1 Areas, smaller towns and rural villages that should grow consistently with their historic character, and suburban areas with public water, wastewater, and utility services. They serve as transition areas between Level 1 and the state's more open, less populated areas. They generally contain a limited variety of housing types, predominantly detached single-family dwellings.

In Investment Level 2 Areas, like 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. Investments should encourage departure from the typical single-family-dwelling developments and promote a broader mix of housing types and commercial sites encouraging compact, mixed-use development where applicable. Level 2 Areas share similar priorities as with the Level 1 Areas where the aim remains to: make context sensitive transportation system capacity enhancements, preserve existing facilities, make safety enhancements, make transportation system capacity improvements, create transit system enhancements, ensure ADA accessibility, and close gaps in the pedestrian system, including the Safe Routes to School projects. Other priorities for Level 2 Areas include: Corridor Capacity Preservation, off-alignment multi-use paths, interconnectivity of neighborhoods and public facilities, and signal-system enhancements.

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

According to Livable Delaware, use of the land located within Investment Level 2 areas should support residential growth. Further, sidewalks and bike paths are proposed as part of the Windswept development improving pedestrian accessibility in the area especially to the nearby Beacon Middle School. Therefore, this development appears to be generally consistent with the 2010 update of the Livable Delaware "Strategies for State Policies and Spending."

### **Comprehensive Plans**

(Source: *Sussex County, June 2008 Comprehensive Plan Update*)

#### **Sussex County Comprehensive Plan:**

According to the Sussex County Comprehensive Plan, the future land use of the property would be within the Low Density Area. Additionally, the entire site is designated as an Environmentally Sensitive Developing area. This designation characterizes a location to be desirable for new housing.

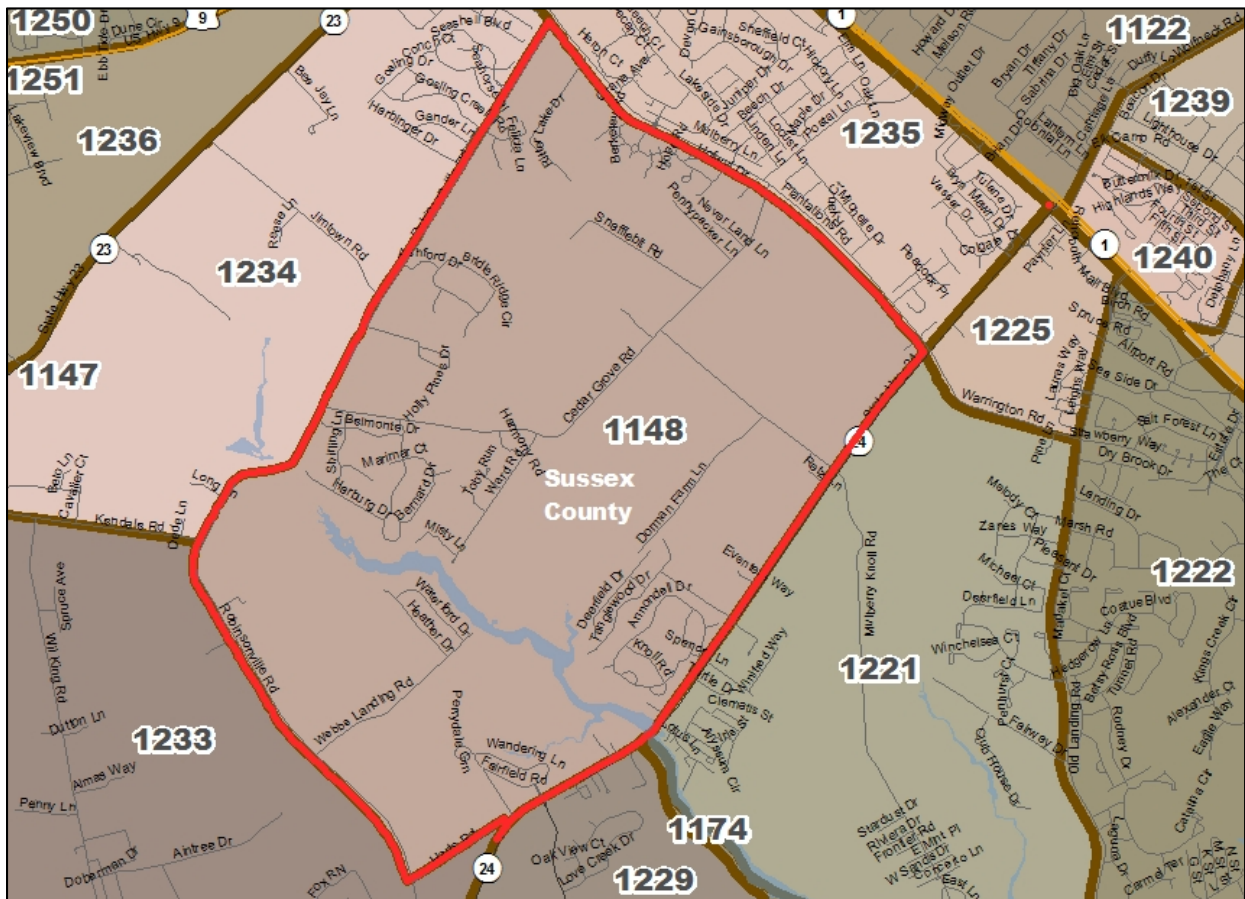
**Proposed Development’s Compatibility with the Sussex County Comprehensive Plan:**

Per the Sussex County Comprehensive Plan, a primary use envisioned in Low Density Areas are single family detached homes. As such, the development is generally compatible with the Sussex County Comprehensive Plan.

**Transportation Analysis Zones (TAZ)**

**Transportation Analysis Zones (TAZ) where development would be located: 1148**

**TAZ Boundaries:**



- Current employment estimate for TAZ: 44 in 2010**
- Future employment estimate for TAZ: 178 in 2040**
- Current Population estimate for TAZ: 1,218 in 2010**
- Future Population estimate for TAZ: 1,487 in 2040**
- Current household estimate for TAZ: 500 in 2010**
- Future household estimate for TAZ: 694 in 2040**
- Relevant committed developments in the TAZ: Love Creek RV Park & Campground.**

**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: Yes.**

### **Trip Generation**

The trip generation for the proposed development was determined by using the comparable land use and rates/equations contained in the *Trip Generation, 9<sup>th</sup> Edition: An ITE Informational Report*, published by the Institute of Transportation Engineers (ITE) for ITE Land Use Code 210 (single family detached).

The peak period trip generation for the Windswept development is included in Table 1.

**Table 1**  
WINDSWEPT

Land Use	ADT	AM Peak Hour			PM Peak Hour			SAT Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
115 Unit Single-Family Detached Houses	1,194	23	67	90	75	44	119	60	51	111

### **Overview of TIS**

#### **Intersections examined:**

1. Delaware Route 24 (John J. Williams Highway/Sussex Road 24)/Site Entrance
2. Delaware Route 24/Mulberry Knoll Road (Sussex Road 284)
3. Delaware Route 24/Entrance to Beacon Middle School
4. Delaware Route 24/Plantation Road (Sussex Road 275)/Warrington Road (Sussex Road 275)

#### **Conditions examined:**

1. Case 1 - 2013 Existing conditions
2. Case 2 – 2017 No Build (without Windswept development)
3. Case 3 – 2017 Build (with Windswept development)

**Peak hours evaluated:** Weekday morning, weekday evening and summer Saturday midday peak hours.

#### **Committed Developments considered:**

1. Deep Valley Farm (197 single-family detached houses)
2. Heritage Village (146 residential condominium/townhouses)
3. Summercrest (101 single-family detached houses)
4. Redden Farm (97 single-family detached houses)
5. Love Creek RV Resort and Campground (628 recreational vehicle campsites)

## Intersection Descriptions

### 1. Delaware Route 24 and Site Entrance (Proposed Full Access)

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

**Eastbound Approach:** (Delaware Route 24) proposed one left-turn lane and one through lane

**Westbound Approach:** (Delaware Route 24) proposed one right-turn lane and one through lane

**Southbound Approach:** (Proposed Site Entrance) proposed one shared left turn/right turn lane, stop controlled

*Note: An existing entrance named Eventers Way serves the subject property. However, due to the low volume of traffic utilizing the entrance during peak periods, an analysis at the existing entrance was omitted during Case 1 and Case 2 conditions.*

### 2. Delaware Route 24 and Mulberry Knoll Road (Sussex Road 284)

**Type of Control:** existing stop controlled intersection

**Eastbound Approach:** (Delaware Route 24) existing one shared through/left turn lane and one channelized right turn lane; proposed one left turn lane, one through lane, and one right turn lane

**Westbound Approach:** (Delaware Route 24) existing one shared through/left turn lane and one channelized right turn lane; proposed one left turn lane, one through lane, and one channelized right turn lane

**Northbound Approach:** (Mulberry Knoll Road) one shared through/left turn/right turn lane, stop controlled

**Southbound Approach:** (Mulberry Knoll Road) one shared through/left turn/right turn lane, stop controlled

*Note: The intersection is being improved as part of the DelDOT SR 24, Love Creek to Mulberry Knoll Road project. As part of the DelDOT project, separate left turn lanes would be added to the Delaware Route 24 approaches to the intersection.*

### 3. Delaware Route 24 and Entrance to Beacon Middle School

**Type of Control:** existing signal controlled intersection (T-intersection)

**Eastbound Approach:** (Delaware Route 24) existing one through lane and one right turn lane

**Westbound Approach:** (Delaware Route 24) existing one left turn lane and one through lane

**Northbound Approach:** (Entrance to Beacon Middle School) existing one left turn lane and one channelized right turn lane

### 4. Delaware Route 24 and Plantation Road(Sussex Road 275)/Warrington Road (Sussex Road 275)

**Type of Control:** existing signal controlled intersection

**Eastbound Approach:** (Delaware Route 24) existing one left turn lane, one through lane, and one channelized right turn lane; proposed one left turn lane, two through lanes, and one channelized right turn lane



**Westbound Approach:** (Delaware Route 24) existing one left turn lane, one through lane, and one channelized right turn lane; proposed one left turn lane, two through lanes, and one right turn lane

**Northbound Approach:** (Warrington Road) existing one left turn lane, one through lane, and one channelized right turn lane; proposed one left turn lane, one shared left/through lane, one through lane, and one right turn lane

**Southbound Approach:** (Plantation Road) existing one left turn lane, one through lane, and one channelized right turn lane; proposed one left turn lane, one shared left/through lane, one through lane, and one right turn lane

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

**Existing transit service:** Delaware Transit Corporation (DTC) currently does not provide any service in the study area. The closest bus route to the subject property is DTC Route 207. DTC Route 207 is a seasonal route that operates during the resort season (from Memorial Day to Labor Day). This route operates nine daily round trips from Rehoboth to Massey's Landing between 6:45 a.m. to 11:15 p.m. The route does traverse through all of the study locations. The closest bus stop is at the Delaware Route 24 intersection with the Love Creek Marina, which is approximately 0.6 mile west of the proposed project.

**Planned transit service:** JMT contacted Lisa Collins, Service Development Planner of DTC. In an email from December 3, 2013, it was noted that the DTC is planning to expand DTC Route 207 to operate year round weekdays and add a new DTC Route 215 operating between Millsboro and Rehoboth. DTC Route 215 is planned to operate 16 round trips from 6:00 a.m. to 9:00 p.m. weekdays. Both routes could serve the proposed Windswept development along the Delaware Route 24 site entrance. As such, Ms. Collins recommended that a bus pull off be provided along Delaware Route 24 near the property entrance and an ADA compliant 17 feet by 8 feet concrete bus shelter pad along with a 5 foot sidewalk be provided along the property frontage to connect the bus pad to the interior of the development. Additionally, an ADA compliant 5 feet by 8 feet concrete pad is recommended to be provided across from the Delaware Route 24 site entrance.

**Existing bicycle and pedestrian facilities:** According to DelDOT's *Delaware Bicycle Facility Master Plan* (October 2005) and the *Sussex County Bicycle Map*, Statewide Bicycle Route 1 and Regional Bicycle Route S-5 exist within the study area. Within the area, Statewide Bicycle Route 1 runs along Plantation Road and traverses through one of the project's study intersections (the Plantation Road intersection with Delaware Route 24 and Warrington Road). Regional Bicycle Route S-5 runs along Delaware Route 24 and traverses through all of the project's study intersections (the Delaware Route 24 intersections with the Site Entrance, Beacon Middle School Entrance, Mulberry Knoll Road, and Plantation Road/Warrington Road).

**Planned bicycle and pedestrian facilities:** JMT contacted Mr. Marco Boyce, DelDOT's Bicycle and Pedestrian Coordinator and Ms. Sarah Coakley, DelDOT's Pedestrian and Safe Routes to School Coordinator. In a December 3, 2013 email, Ms. Coakley recommended the provision of a 15 feet wide permanent easement and the construction of a sidewalk or a 10 foot wide shared-use path along the Delaware Route 24 frontage. A 10 foot wide shared used path is warranted given its location in proximity to a middle school and other nearby developments. Ms. Coakley further states that a shared use path on both sides of Delaware Route 24 would be an

optimal design. In addition, Ms. Coakley recommended that 5 foot bike lanes be provided along both directions of Delaware Route 24 and the signage and pavement markings be modified per DelDOT's July 2013 School Zone MUTCD Compliance Review for Beacon Middle School.

**Bicycle Level of Service and Bicycle Compatibility Index:** According to the League of Illinois Bicyclists (LIB), Bicycle Level of Service (BLOS) is an emerging national standard for quantifying the bike-friendliness of a roadway by measuring on-road bicyclist comfort levels for specific roadway geometries and traffic conditions. Utilizing the 10-year projected AADT along the site frontage, the BLOS with the construction of the proposed development and the provision of 5 foot bike lanes are summarized below. The BLOS was determined utilizing the calculators published on the LIB website: <http://www.bikelib.org/roads/blos/blosform.htm>

- Delaware Route 24 – BLOS: C

### **Previous Comments**

None.

**General HCS Analysis Comments**

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

1. JMT performed analysis using HCS+T7F, Version 5.5.
2. Per DelDOT's *Standards and Regulations for Subdivision Streets and State Highway Access*, JMT used a peak hour factor of 0.92 for intersections with volumes over 1,000 vehicles per day in future scenario analysis, unless the existing peak hour factor was greater than 0.92, in which case the existing peak hour factor was used for analysis of future scenarios.
3. Per DelDOT's *Standards and Regulations for Subdivision Streets and State Highway Access*, JMT used a heavy vehicle percentage of 3% for each movement in future scenario analysis, unless the existing heavy vehicle percentage was greater than 3% and there was no significant increase of vehicles along that movement, in which case the existing heavy vehicle percentage was use for analysis of future scenarios.

Table 2  
PEAK HOUR LEVELS OF SERVICE (LOS)  
Based on Traffic Impact Study for Windswept  
Prepared by JMT

Unsignalized Intersection <sup>1</sup> (T-intersection)	LOS		
	Weekday AM	Weekday PM	Saturday Midday
<b>Delaware Route 24 / Site Entrance</b>			
2017 with development of Windswept (Case 3)			
Eastbound Delaware Route 24 – Left / Through	A (8.2)	B (10.2)	A (9.7)
Southbound Site Entrance	F (58.7)	F (80.8)	F (244.9)
2017 with development of Windswept (Case 3) <i>with improvements</i> <sup>2</sup>			
Eastbound Delaware Route 24 - Left	A (8.2)	B (10.2)	A (9.7)
Southbound Site Entrance	F (57.2)	F (75.4)	F (220.8)
2017 with development of Windswept (Case 3) <i>with improvements</i> <sup>3</sup>			
Eastbound Delaware Route 24 - Left	A (8.2)	B (10.2)	A (9.7)
Southbound Site Entrance - Left	F (60.7)	F (78.7)	F (227.4)
Southbound Site Entrance - Right	B (10.7)	C (17.0)	C (15.5)

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

<sup>2</sup> Improvement scenario includes the addition of a left turn lane and right turn into the site along Delaware Route 24, warranted per DelDOT's Auxiliary Lane Spreadsheet, and a site entrance lane configuration consisting of one shared right/left turn lane.

<sup>3</sup> Improvement scenario includes the addition of a left turn lane and right turn into the site along Delaware Route 24, warranted per DelDOT's Auxiliary Lane Spreadsheet, and a site entrance lane configuration consisting of one right turn lane and one left turn lane.

Table 3  
PEAK HOUR LEVELS OF SERVICE (LOS)  
Based on Traffic Impact Study for Windswept  
Prepared by JMT

Unsignalized Intersection <sup>4</sup> (Two way Stop Control)	LOS		
	Weekday AM	Weekday PM	Saturday Midday
<b>Delaware Route 24 / Mulberry Knoll Road</b>			
2013 Existing (Case 1) <sup>5</sup>			
Eastbound Delaware Route 24 – Left/Through	A (8.9)	B (11.0)	A (9.5)
Westbound Delaware Route 24 – Left/Through	B (12.6)	A (9.3)	B (10.9)
Northbound Mulberry Knoll Road	F (65.5)	E (44.0)	D (25.8)
Southbound Mulberry Knoll Road	F (57.6)	D (32.6)	E (43.4)
2017 without development of Windswept (Case 2)			
Eastbound Delaware Route 24 – Left/Through	A (8.9)	B (11.8)	A (9.9)
Westbound Delaware Route 24 – Left/Through	B (12.2)	A (9.5)	B (11.2)
Northbound Mulberry Knoll Road	F (59.2)	F (73.2)	D (30.5)
Southbound Mulberry Knoll Road	D (30.0)	E (41.4)	F (51.1)
2017 with development of Windswept (Case 3)			
Eastbound Delaware Route 24 – Left/Through	A (9.0)	B (12.3)	B (10.1)
Westbound Delaware Route 24 – Left/Through	B (12.5)	A (9.7)	B (11.4)
Northbound Mulberry Knoll Road	F (74.8)	F (112.3)	D (34.7)
Southbound Mulberry Knoll Road	E (35.8)	F (51.0)	F (66.2)

<sup>4</sup> For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

<sup>5</sup> Existing AM & PM heavy vehicle percentages based on July 9, 2010 traffic counts, as heavy vehicle percentages were not provided within the March 24, 2010 counts.

Table 3 (cont.)  
PEAK HOUR LEVELS OF SERVICE (LOS)  
Based on Traffic Impact Study for Windswept  
Prepared by JMT

Unsignalized Intersection <sup>6</sup> (Two way Stop Control)	LOS		
	Weekday AM	Weekday PM	Saturday Midday
<b>Delaware Route 24 / Mulberry Knoll Road</b>			
2017 with development of Windswept (Case 3) <i>with improvements</i> <sup>7</sup>			
Eastbound Delaware Route 24 - Left	A (9.0)	B (12.3)	B (10.1)
Westbound Delaware Route 24 - Left	B (12.5)	A (9.7)	B (11.4)
Northbound Mulberry Knoll Road	F (60.9)	F (86.7)	D (30.2)
Southbound Mulberry Knoll Road	D (29.9)	E (46.5)	E (47.7)

<sup>6</sup> For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

<sup>7</sup> Improvement scenario assumes build out of DelDOT intersection improvement project, including provision of separate turn lanes along the eastbound and westbound Delaware Route 24 approaches.

Table 3 (cont.)  
PEAK HOUR LEVELS OF SERVICE (LOS)  
Based on Traffic Impact Study for Windswept  
Prepared by JMT

Signalized Intersection <sup>8</sup> (T-intersection)	LOS		
	Weekday AM	Weekday PM	Saturday Midday
Delaware Route 24 / Mulberry Knoll Road <sup>9</sup>			
2017 with development of Windswept (Case 3) with improvements <sup>10</sup>	D (40.1)	C (23.7)	B (19.4)

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

<sup>9</sup> No upstream signal information accounted for in EB direction during SAT peak due to Beacon Middle School being closed in the summer months.

<sup>10</sup> Improvement scenario assumes build out of DeIDOT intersection improvement project, including provision of separate turn lanes along the eastbound and westbound Delaware Route 24 approaches with the addition of a 150 second cycle length traffic signal.

Table 4  
PEAK HOUR LEVELS OF SERVICE (LOS)  
Based on Traffic Impact Study for Windswept  
Prepared by JMT

Signalized Intersection <sup>11</sup>	LOS		
	Weekday AM	Weekday PM	Saturday Midday
<b>Delaware Route 24 / Entrance to Beacon Middle School<sup>12,13,14</sup></b>			
2013 Existing (Case 1)	D (49.4)	B (10.2)	n/a
2017 without development of Windswept (Case 2) <sup>15</sup>	C (27.3)	B (13.2)	n/a
2017 with development of Windswept (Case 3)	C (34.8)	B (16.4)	n/a

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

<sup>12</sup> Right turn on red volume percentages provided in traffic counts were used proportionally in each analysis case.

<sup>13</sup> No Summer Saturday midday peak hour analysis was performed because Beacon Middle School is closed on Saturdays during the summer months.

<sup>14</sup> Signal runs under free operation 24 hours a day, seven days a week. As such, cycle length of 120 seconds assumed during the weekday AM peak hour. Based on field data, 60 seconds was assumed during the weekday PM peak hour.

<sup>15</sup> Per DelDOT standards, PHF was increased to be a minimum of 0.92 with a total intersection volume over 1,000 vph.



Table 5  
PEAK HOUR LEVELS OF SERVICE (LOS)  
Based on Traffic Impact Study for Windswept  
Prepared by JMT

Signalized Intersection <sup>16</sup>	LOS		
	Weekday AM	Weekday PM	Saturday Midday
<b>Delaware Route 24 / Plantation Road / Warrington Road<sup>17,18</sup></b>			
2013 Existing (Case 1)	C (29.9)	D (45.5)	F (96.8)
2017 without development of Windswept (Case 2)	C (31.8)	D (53.0)	F (92.6)
2017 with development of Windswept (Case 3)	C (30.8)	E (57.3)	F (84.8)
2017 with development of Windswept (Case 3) <i>with improvements<sup>19,20</sup></i>	C (24.2)	D (35.7)	C (30.9)

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

<sup>17</sup> Heavy vehicle percentage count data was not available. As such, a 3% heavy vehicle percentage was applied to each movement for each case. Right turn on red count data was not available. As such, right turn movements were modeled as permissive within the signal phasing where separate right turn lanes are provided.

<sup>18</sup> Signal runs under free operation 24 hours a day, seven days a week. As such, cycle length of 90 seconds assumed during the weekday AM and Saturday peak hours, respectively. Based on field data, a cycle length of 135 seconds assumed during the PM peak hour.

<sup>19</sup> Improvement scenario assumes build out of DelDOT intersection improvement project, including the addition of one through lane in the eastbound and westbound directions and one left/through lane in the northbound and southbound directions.

<sup>20</sup> Analysis assumes that 35% of left turning vehicles utilize the shared left/through lane in the northbound and southbound directions.