



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

JENNIFER COHAN  
SECRETARY

November 21, 2019

Ms. Betty Tustin  
The Traffic Group, Inc.  
104 Kenwood Court  
Berlin, MD 21811

Dear Ms. Tustin:

The enclosed Traffic Impact Study (TIS) review letter for the proposed **Azalea Woods (f.k.a. Wilson Moore)** (Tax Parcels 135-11.00-32.01, 48.00, 49.00 and 56.00) development has been completed under the responsible charge of a registered professional engineer whose firm is authorized to work in the State of Delaware. They have found the TIS to conform to DelDOT's Development Coordination Manual and other accepted practices and procedures for such studies. DelDOT accepts this review 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,

A handwritten signature in black ink that reads "Troy Brestel".

Troy Brestel  
Project Engineer

TEB:km

Enclosures

cc with enclosures: Mr. Thomas Natelli, Jr., Natelli Communities  
Mr. Jason Palkewicz, Solutions IPEM, Inc.  
Ms. Constance C. Holland, Office of State Planning Coordination  
Ms. Janelle Cornwell, Sussex County Planning and Zoning  
Mr. Andrew Parker, McCormick Taylor, Inc.  
DelDOT Distribution

## DelDOT Distribution

Brad Eaby, Deputy Attorney General  
Shanté Hastings, Director, Transportation Solutions (DOTS)  
Drew Boyce, Director, Planning  
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Michael Simmons, Assistant Director, Project Development South, DOTS  
J. Marc Coté, Assistant Director, Development Coordination  
T. William Brockenbrough, Jr., County Coordinator, Development Coordination  
Peter Haag, Chief Traffic Engineer, Traffic, DOTS  
Alastair Probert, South District Engineer, South District  
Gemez Norwood, South District Public Works Manager, South District  
Susanne Laws, Sussex Subdivision Review Coordinator, Development Coordination  
David Dooley, Service Development Planner, Delaware Transit Corporation  
Mark Galipo, Traffic Engineer, Traffic, DOTS  
Anthony Aglio, Planning Supervisor, Statewide & Regional Planning  
Derek Sapp, Sussex County Subdivision Reviewer, Development Coordination  
Claudy Joinville, Project Engineer, Development Coordination



November 21, 2019

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

RE: Agreement No. 1773  
Traffic Impact Study Services  
**Task No. 1A Subtask 2A – Azalea Woods**

Dear Mr. Brestel:

McCormick Taylor has completed its review of the Traffic Impact Study (TIS) for the Azalea Woods residential development prepared by The Traffic Group, Inc. dated July 17, 2019. The Traffic Group prepared the report in a manner generally consistent with DelDOT's Development Coordination Manual.

The TIS evaluates the impacts of the proposed Azalea Woods residential development, proposed to be located north of US Route 9, west of Delaware Route 30 (Gravel Hill Road / Sussex Road 248) and east of Shingle Point Road (Sussex Road 249) in unincorporated Sussex County, Delaware. The proposed development would consist of 610 single-family detached homes. Two full-access driveways are proposed. One full movement access is proposed on Shingle Point Road opposite Briarwood Lane. The second full access movement is proposed along Delaware Route 30 opposite Pettyjohn Road (Sussex Road 255). Construction is expected to be complete by 2032.

The subject land is located on an approximately 316-acre assemblage of parcels. The land is currently zoned AR-1 (Agricultural Residential) in Sussex County. No rezoning is needed or sought to permit the proposed development.

DelDOT has three projects within the study area. The first is the Georgetown East Gateway Improvements project (aka Sand Hill Road Realignment Project), which will improve the existing intersection geometry of US Route 9 and Sand Hill Road/Airport Road (State Road 319). Sand Hill Road and Airport Road presently intersect US Route 9 at skewed angles at offset locations. The improvements will realign Sand Hill Road and Airport Road to intersect US Route 9 at one location at an improved angle, add turn lanes, add pedestrian and bicycle facilities, and improve drainage. Final design and right of way acquisition are underway. Utility relocations will begin in the spring of 2020. Construction is anticipated to begin in the summer of 2020.

The second project is Park Avenue Relocation – Phase 2, which involves improvements along Park Avenue (Sussex Road 321) from the Park Avenue Relocation – Phase 1 project up to the signalized intersection with US Route 9, which will be reconstructed to provide a westbound left-turn lane and a northbound right-turn lane with acceleration lane onto eastbound US Route 9, along with signal upgrades. The Phase 2 project is within the Azalea Woods study area, while the Phase



1 project is located southwest of the Azalea Woods study area. Phase 1 will relocate part of Park Avenue, a designated truck bypass through Georgetown, and upgrade another part of Park Avenue with appropriate turn lanes, shoulders, and intersection improvements. Phase 2 will consist of the improvements along the existing Park Avenue from where the Phase 1 relocation ties in west of Cedar Lane all the way up to US Route 9. Both phases of the project will combine to provide a continuous US Route 9 Truck Bypass from US Route 113 to US 9 east of the Town of Georgetown. This project is currently in the design and planning stage. Construction of Phase 1 is anticipated to begin in the fall of 2022. Construction of Phase 2 is anticipated to begin in 2023.

The third project is DelDOT’s HSIP SC, US 9 and SR 5 Intersection project. This project, initiated by the 2009 Hazard Elimination Program, is located at the intersection of US Route 9 and Delaware Route 5 and involves widening the intersection to provide turn lanes on each leg to address safety and operational issues and to accommodate large vehicles. Construction was underway in early 2019 and was substantially complete by September 2019.

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>Existing Traffic Control</i>	<i>Situations for which deficiencies occur</i>
US 9 and Sand Hill Road/Airport Road	Signalized	2018 Existing PM (Case 1) 2032 without Azalea Woods AM & PM (Case 2) * 2032 with Azalea Woods AM & PM (Case 3) * * Deficient only without East Gateway Improvements
US 9 and Park Avenue	Signalized	2018 Existing AM & PM (Case 1) 2032 without Azalea Woods AM & PM (Case 2) * 2032 with Azalea Woods AM & PM (Case 3) * * Deficient only without Park Avenue Relocation – Phase 2
US 9 and Shingle Point Road/French Road	Unsignalized	2018 Existing AM (Case 1) 2032 without Azalea Woods AM & PM (Case 2) 2032 with Azalea Woods AM & PM (Case 3)
US 9 and Stiener Road	Unsignalized	2018 Existing AM (Case 1) 2032 without Azalea Woods AM & PM (Case 2) 2032 with Azalea Woods AM & PM (Case 3)
US 9 and DE 30	Signalized	2032 without Azalea Woods AM & PM (Case 2) 2032 with Azalea Woods AM & PM (Case 3)
US 9 and Prettyman Road	Unsignalized	2018 Existing AM & PM (Case 1) 2032 without Azalea Woods AM & PM (Case 2) 2032 with Azalea Woods AM & PM (Case 3)
US 9 and DE 5	Signalized	2018 Existing AM (Case 1) 2032 without Azalea Woods AM & PM (Case 2) 2032 with Azalea Woods AM & PM (Case 3)
Park Avenue and Springfield Road	Unsignalized	2032 without Azalea Woods AM (Case 2) 2032 with Azalea Woods AM & PM (Case 3)

For three of the intersections listed in the table above, it is anticipated that future LOS deficiencies will be completely mitigated via implementation of improvements as described in the numbered recommendation items starting on page 4. The intersections and corresponding recommendation items are as follows: US Route 9 and Sand Hill Road / Airport Road (Item No. 4), US Route 9 and Park Avenue (Item No. 5), and Park Avenue and Springfield Road (also Item No. 5).

For one other intersection, US Route 9 and Shingle Point Road / French Road, it is anticipated that the recommended improvement will partially mitigate future LOS deficiencies. While it was determined that the improvement needed to achieve a complete mitigation of future LOS deficiencies at this location would not be required of this developer, the addition of a separate right-turn lane on the southbound approach of Shingle Point Road, as recommended below in Item No. 6, will reduce delays and queue lengths on that approach.

As for the other four intersections listed in the table above, we do not recommend any improvements be implemented by the developer. Additional information for each of these four intersections is provided immediately below.

#### US Route 9 and Stiener Road

This unsignalized intersection experiences LOS deficiencies in the 2018 existing AM peak hour and in the 2032 AM and PM peak hours, both without and with Azalea Woods.

The northbound Stiener Road and southbound business driveway approaches are expected to operate at LOS F in both 2032 peak hours, without and with Azalea Woods. During these times, both approaches have ten vehicles per hour or less, and the anticipated 95<sup>th</sup> percentile queue lengths are less than 25 feet. Thus, mitigation is not required as per the DelDOT Development Coordination Manual.

#### US Route 9 and Delaware Route 30

This signalized intersection exhibits LOS deficiencies in the 2032 AM and PM peak hours, both without and with Azalea Woods. Given that the intersection is already signalized and has separate left and right-turn lanes on every approach, we do not recommend any improvements be implemented by the developer at this intersection. The major improvements required to fully correct the LOS deficiencies at this intersection (i.e., widening US Route 9 to provide two through lanes in each direction) cannot be considered a reasonable developer improvement project.

#### US Route 9 and Prettyman Road

This unsignalized intersection experiences LOS deficiencies in all existing and future peak hours, with the southbound approach of Prettyman Road operating at LOS F. However, a new traffic signal at this location on US Route 9 would not be desirable, and because drivers who would use the southbound approach of Prettyman Road can choose alternative routes to access US Route 9, it was determined that improvements are not required to be implemented by the developer at this intersection.

US Route 9 and Delaware Route 5

This signalized intersection exhibits LOS deficiencies in the 2032 AM and PM peak hours, both without and with Azalea Woods. Given that the intersection is already signalized and was recently improved in 2019 to include a separate left-turn lane on every approach, we do not recommend any improvements be implemented by the developer at this intersection. The major improvements required to fully correct the LOS deficiencies at this intersection (i.e., widening US Route 9 to provide two through lanes in each direction) cannot be considered a reasonable developer improvement project.

Should the County 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 improve Shingle Point Road from Briarwood Road to US Route 9 as needed in order to meet DelDOT’s local road standards. These standards include, but are not limited to, eleven-foot travel lanes and five-foot shoulders. The developer should provide a bituminous concrete overlay to the existing travel lanes, at DelDOT’s discretion. DelDOT should analyze the existing lanes’ pavement section and recommend an overlay thickness to the developer’s engineer if necessary. Construction of this improvement should begin prior to issuance of the 226<sup>th</sup> building permit.
  
2. The developer should construct the full-movement Site Access A on Shingle Point Road. This proposed site driveway should be constructed directly across from Briarwood Lane. The proposed configuration is shown in the table below.

<b>Approach</b>	<b>Existing Configuration</b>	<b>Proposed Configuration</b>
Eastbound Briarwood Lane	One shared left-turn/right-turn lane	One shared left/through/right-turn lane
Westbound Site Access A	Approach does not exist	One shared left/through/right-turn lane
Northbound Shingle Point Road	One shared left-turn/through lane	One left-turn lane, one through lane and one right-turn lane
Southbound Shingle Point Road	One shared through/right-turn lane	One left-turn lane and one shared through/right-turn lane



Initial recommended minimum turn-lane lengths (excluding tapers) of the separate turn lanes are listed below. The developer should coordinate with DelDOT's Development Coordination Section to determine final turn-lane lengths during the site plan review.

Approach	Left-Turn Lane	Right-Turn Lane
Eastbound Briarwood Lane	N/A	N/A
Westbound Site Access A	N/A	N/A
Northbound Shingle Point Road	50 feet *	240 feet **
Southbound Shingle Point Road	210 feet **	N/A

\* Initial turn-lane length based on coordination with DelDOT's Development Coordination Section.

\*\* Initial turn-lane length based on DelDOT's *Auxiliary Lane Worksheet*.

- The developer should construct the full-movement Site Access B on Delaware Route 30. This proposed site driveway should be constructed directly across from Pettyjohn Road. The proposed configuration is shown in the table below.

Approach	Existing Configuration	Proposed Configuration
Eastbound Site Access B	Approach does not exist	One shared left/through/right-turn lane
Westbound Pettyjohn Road	One shared left-turn/right-turn lane	One shared left/through/right-turn lane
Northbound DE 30	One shared through/right-turn lane	One left-turn lane and one shared through/right-turn lane
Southbound DE 30	One shared left-turn/through lane	One left-turn lane, one through lane and one right-turn lane

Initial recommended minimum turn-lane lengths (excluding tapers) of the separate turn lanes are listed below. The developer should coordinate with DelDOT's Development Coordination Section to determine final turn-lane lengths during the site plan review.

Approach	Left-Turn Lane	Right-Turn Lane
Eastbound Site Access B	N/A	N/A
Westbound Pettyjohn Road	N/A	N/A
Northbound DE 30	210 feet *	N/A
Southbound DE 30	50 feet **	240 feet *

\* Initial turn-lane length based on DelDOT's *Auxiliary Lane Worksheet*.

\*\* Initial turn-lane length based on coordination with DelDOT's Development Coordination Section.

4. The developer should coordinate with DelDOT regarding an equitable share contribution toward DelDOT’s Georgetown East Gateway Improvements Project, which will improve the intersection of US Route 9 and Sand Hill Road / Airport Road. The amount of the contribution should be determined through coordination with DelDOT’s Development Coordination Section.
5. The developer should coordinate with DelDOT regarding an equitable share contribution toward DelDOT’s Park Avenue Relocation – Phase 2 Project, which will improve the intersections of US Route 9 & Park Avenue and Park Avenue & Springfield Road. While the design of improvements under the DelDOT project has not yet been finalized, at US Route 9 & Park Avenue it should include a westbound left-turn lane and a northbound right-turn lane with acceleration lane onto eastbound US Route 9, and at Park Avenue & Springfield Road it should include a westbound right-turn lane. The amount of the contribution should be determined through coordination with DelDOT’s Development Coordination Section.
6. The developer should improve the intersection of US Route 9 and Shingle Point Road / French Road. The proposed configuration is shown in the table below.

<b>Approach</b>	<b>Existing Configuration</b>	<b>Proposed Configuration</b>
Eastbound US Route 9	One shared left/through/right-turn lane	One shared left/through/right-turn lane
Westbound US Route 9	One shared left/through/right-turn lane	One shared left/through/right-turn lane
Northbound French Road	One shared left/through/right-turn lane	One shared left/through/right-turn lane
Southbound Shingle Point Road	One shared left/through/right-turn lane	One shared left-turn/through lane and one right-turn lane

Initial recommended minimum turn-lane lengths (excluding tapers) of the separate turn lanes are listed below.

<b>Approach</b>	<b>Left-Turn Lane</b>	<b>Right-Turn Lane</b>
Eastbound US Route 9	N/A	N/A
Westbound US Route 9	N/A	N/A
Northbound French Road	N/A	N/A
Southbound Shingle Point Road	N/A	200 feet *

\* Initial turn-lane length based on storage length per queuing analysis



The developer should coordinate with DelDOT's Development Coordination Section to determine all final design details including the above turn-lane lengths during the site plan review. Construction of this improvement should begin prior to issuance of the 101<sup>st</sup> building permit.

7. The following bicycle and pedestrian improvements should be included:
  - a. Adjacent to the proposed right-turn lanes on southbound Delaware Route 30 and northbound Shingle Point Road at the proposed site entrances, 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.
  - b. Appropriate bicycle symbols, directional arrows, pavement markings, and signing should be included along bicycle facilities and turn lanes within the project limits.
  - c. Utility covers should be made flush with the pavement.
  - d. If clubhouses or other community facilities are constructed as shown on the site plan, bicycle parking should be provided near building entrances. Where building architecture provides for an awning, other overhang, or indoor parking, the bicycle parking should be covered.
  - e. A minimum 15-foot wide permanent easement from the edge of the right-of-way should be dedicated to DelDOT within the site frontages along Delaware Route 30 and Shingle Point Road.
  - f. Within the easements along the Delaware Route 30 site frontage and the Shingle Point Road southern site frontage, a minimum of a ten-foot wide shared-use path that meets current AASHTO and ADA standards should be constructed. The shared-use paths should meet AASHTO and ADA standards. Each shared-use path should have a minimum of a five-foot buffer from the roadway. At the property boundaries, the shared-use paths should connect to the adjacent property or to the shoulder in accordance with DelDOT's *Shared-Use Path and/or Sidewalk Termination Reference Guide* dated August 1, 2018. The developer should coordinate with DelDOT's Development Coordination Section to determine the details of the shared-use path connections at the property boundaries. No shared-use path is required along the northern site frontage of Shingle Point Road.
  - 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 development. These sidewalks should each be a minimum of five-feet wide (with a minimum of a five-foot



buffer from the roadway) and should meet current AASHTO and ADA standards. Internal sidewalks in the development should connect to the proposed shared-use paths along Delaware Route 30 and Shingle Point Road.

- i. Access-ways should be used to connect shared-use paths or sidewalks along a road to an interior trail or subdivision street when the spacing between streets is inadequate to accommodate convenient pedestrian and bicycle travel. Based on the Office of State Planning Coordination PLUS review (August 20, 2018), two access-ways are recommended, both on Shingle Point Road. One would be near the northern limit of the site frontage and the other near the southern limit of the site frontage. The developer should coordinate with DeIDOT's Development Coordination Section during the site plan review to determine exact locations and design details for these access-ways.
- j. Where internal sidewalks are located alongside of parking spaces, a buffer should be added to prevent vehicular overhang onto the sidewalk.

Improvements in this TIS may be considered "significant" under DeIDOT's *Work Zone Safety and Mobility Procedures and Guidelines*. These guidelines are available on DeIDOT's website at [http://deldot.gov/Publications/manuals/de\\_mutcd/index.shtml](http://deldot.gov/Publications/manuals/de_mutcd/index.shtml).

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

Additional details on our review of this TIS are attached. Please contact me at (610) 640-3500 or through e-mail at [ajparker@mccormicktaylor.com](mailto:ajparker@mccormicktaylor.com) if you have any questions concerning this review.

Sincerely,

**McCormick Taylor, Inc.**

A handwritten signature in black ink, appearing to read "Andrew J. Parker".

Andrew J. Parker, PE, PTOE  
Project Manager

Enclosure

## **General Information**

**Report date:** July 17, 2019

**Prepared by:** The Traffic Group, Inc.

**Prepared for:** Natelli Communities

**Tax parcel:** 135-11.00-32.01, part of 48.00, 49.00, and 56.00

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

## **Project Description and Background**

**Description:** The proposed Azalea Woods development consists of 610 single-family detached homes.

**Location:** The site is located north of US Route 9, west of Delaware Route 30 (Gravel Hill Road / Sussex Road 248) and east of Shingle Point Road (Sussex Road 249) in unincorporated Sussex County. A site location map is included on page 10.

**Amount of land to be developed:** approximately 316 acres

**Land use approval(s) needed:** Subdivision approval. The land is currently zoned AR-1 (Agricultural Residential). No rezoning is needed or sought to permit the proposed development.

**Proposed completion year:** 2032

**Proposed access locations:** Two full-access driveways are proposed. One full movement access is proposed on Shingle Point Road opposite Briarwood Lane. The second full access movement is proposed along Delaware Route 30 opposite Pettyjohn Road (Sussex Road 255).

### **Daily Traffic Volumes (per DelDOT Traffic Summary 2018):**

- 2018 Average Annual Daily Traffic on Delaware Route 30: 5,449 vehicles/day
- 2018 Average Annual Daily Traffic on Shingle Point Road: 1,220 vehicles/day



## **2015 Delaware Strategies for State Policies and Spending**

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

The proposed Azalea Woods residential development is located within Investment Level 4.

#### *Investment Level 4*

Investment Level 4 areas are predominantly rural or agricultural and contain much of Delaware's open space and natural areas. These areas are home to agribusiness activities, farm complexes, and small settlements/unincorporated communities that are often found at historic crossroads. Investment Level 4 areas may also have scattered single-family detached residential homes. Existing transportation facilities and services will be maintained by the state while they continue to manage the transportation system in a manner that will support the preservation of the natural environment and agricultural business. Construction of new homes is discouraged; housing policies will focus on maintenance and rehabilitation of existing homes and communities. In addition, the Department of Education does not support the construction of new educational facilities in Investment Level 4 areas. The educational needs of Investment Level 4 areas would likely need to be met through facilities located in Investment Level 1-3 areas.

In general, the state will limit its investments in public infrastructure systems; investments should address existing public health, safety, or environmental risks, preserve rural character and natural resources, and discourage further development that is unrelated to the area's needs.

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

The proposed Azalea Woods residential development includes 610 single-family detached homes and is located within an Investment Level 4 area. New housing developments are discouraged in such areas. The state would be responsible for providing many public services to the residents of the development, such as school construction and transportation, police and fire/EMS services, and additional maintenance of the transportation system. Given the location of the development in an Investment Level 4 area, the state generally does not intend to make these significant investments. Rather, the state intends to support agricultural activities and protect the rural and natural character of these areas. Based on the *2015 Delaware Strategies for State Policies and Spending* document, the proposed development does not appear to be compatible with an Investment Level 4 area and additional discussion is required.

## **Comprehensive Plan**

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

*(Source: Sussex County Comprehensive Plan, March 2019)*

The Sussex County Comprehensive Plan 2045 Future Land Use Map indicates that the proposed development parcels are within the Low Density Area (categorized as a Rural Area).

All lands designated as Low-Density Areas are currently zoned AR-1. Under that zoning designation, single family detached homes are permitted at 2 homes per acre on lots containing a minimum of ½ acre if that tract connects to central sewers. Where on-site septic systems are used, single-family detached homes are permitted on minimum ¾ acre lots. AR-1 zoning regulations

also permit an average of 2 homes per acre where a cluster-style site plan is used, and a portion of the tract is preserved in permanent open space. Using these zoning regulations and additional incentives, Sussex County hopes to retain the rural environment of Low Density Areas and set aside significant open space.

In Sussex County, many farmland owners located in the Low-Density Areas have built up significant equity in their land – in numerous cases through multiple generations. This equity is a liquid asset that can serve as collateral to secure operating loans. It is also equity that can be realized through land sales if and when these landowners no longer desire to continue farming. For this reason, the Sussex County Council supports State and local land use policies that will preserve the value of farmland. The Sussex County approach emphasizes the following policies and actions to help sustain agriculture, maintain the rural landscape and sustain reasonable development rights:

- The County strongly supports voluntary farmland preservation and has worked jointly with the State to facilitate the acquisition of development rights to agricultural land.
- The County uses zoning to mandate that a certain portion of a residential subdivision must be permanently preserved in common open space.
- The County provides density bonuses, under certain conditions, to developers who agree to pay into a fund that Sussex County uses to acquire open space.
- The County requires developers to plant landscaped buffers to physically separate new development from the surrounding countryside.
- The County is also considering establishing Agribusiness Areas which will enable certain limited, yet important agriculture industries to develop in support of Sussex County's large agricultural economy without unnecessary delay.
- The County supports continued agricultural operations and affords them specific protections as are listed in Sussex County Code Section 99 -6 (G)(1) and(2) and 99 -16 (D).

The following guidelines should apply to future growth in Low Density Areas:

*Permitted uses* – The primary uses envisioned in Low Density Areas are agricultural activities and homes. Business development should be largely confined to businesses addressing the needs of these two uses. Industrial and agribusiness uses that support or depend on agriculture should be permitted. The focus of retail and office uses in Low Density Areas should be providing convenience goods and services to nearby residents. Commercial uses in these residential areas should be limited in their location, size and hours of operation. More intense commercial uses should be avoided in these areas. Institutional and commercial uses may be appropriate depending on surrounding uses.

*Densities* – Base densities in Low Density Areas should be unchanged from the current zoning provisions. The minimum lot size should be  $\frac{3}{4}$  acre for lots served by on-lot septic systems and  $\frac{1}{2}$  acre for lots with central sewers. The cluster option permitted in Low Density Areas should

continue to permit overall site densities of up to 2 units per acre, provided significant open space is set aside and the tract connects to public sewers.

*Infrastructure* – Development where lots are no smaller than  $\frac{3}{4}$  acre can be accommodated in this planning area without central sewers. Other development should require central sewer service.

**Proposed Development’s Compatibility with Comprehensive Plan:** The proposed Azalea Woods residential development is planned to be developed as 610 single-family detached homes on a 316-acre assemblage of parcels. The site is currently zoned AR-1 (Agricultural Residential), and the developer plans to develop under that zoning as a Residential Cluster Community. The purpose of this zoning district is to protect agricultural lands and activities and other valuable natural resources. Low-density housing is permitted along with churches, recreational facilities, and accessory uses as may be necessary or is normally compatible with residential surroundings. The Sussex County Comprehensive Plan 2045 Future Land Use Map indicates that the proposed development parcels are within the Low Density Area (categorized as a Rural Area). The proposed development appears to comply with the characteristics and *Permitted Uses* for Low Density Areas. However, due to the possibility of some lots being smaller than  $\frac{1}{2}$  acre, this development raises questions regarding consistency with Sussex County regulations; therefore additional discussion may be required.

### **Relevant Projects in the DelDOT Capital Transportation Program**

DelDOT has three projects within the study area. The first is the Georgetown East Gateway Improvements project (aka Sand Hill Road Realignment Project), which will improve the existing intersection geometry of US Route 9 and Sand Hill Road/Airport Road (State Road 319). Sand Hill Road and Airport Road presently intersect US Route 9 at skewed angles at offset locations. The improvements will realign Sand Hill Road and Airport Road to intersect US Route 9 at one location at an improved angle, add turn lanes, add pedestrian and bicycle facilities, and improve drainage. Final design and right of way acquisition are underway. Utility relocations will begin in the spring of 2020. Construction is anticipated to begin in the summer of 2020.

The second project is Park Avenue Relocation – Phase 2, which involves improvements along Park Avenue (Sussex Road 321) from the Park Avenue Relocation – Phase 1 project up to the signalized intersection with US Route 9, which will be reconstructed to provide a westbound left-turn lane and a northbound right-turn lane with acceleration lane onto eastbound US Route 9, along with signal upgrades. The Phase 2 project is within the Azalea Woods study area, while the Phase 1 project is located southwest of the Azalea Woods study area. Phase 1 will relocate part of Park Avenue, a designated truck bypass through Georgetown, and upgrade another part of Park Avenue with appropriate turn lanes, shoulders, and intersection improvements. Phase 2 will consist of the improvements along the existing Park Avenue from where the Phase 1 relocation ties in west of Cedar Lane all the way up to US Route 9. Both phases of the project will combine to provide a continuous US Route 9 Truck Bypass from US Route 113 to US 9 east of the Town of Georgetown. This project is currently in the design and planning stage. Construction of Phase 1 is anticipated to begin in the fall of 2022. Construction of Phase 2 is anticipated to begin in 2023.

The third project is DelDOT’s HSIP SC, US 9 and SR 5 Intersection project. This project, initiated by the 2009 Hazard Elimination Program, is located at the intersection of US Route 9 and Delaware Route 5 and it involves widening the intersection to provide turn lanes on each leg to address safety and operational issues and to accommodate large vehicles. Construction was underway in early 2019 and was substantially complete by September 2019.

**Trip Generation**

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

- 610 single-family detached homes (ITE Land Use Code 210)

Table 1  
AZALEA WOODS PEAK HOUR TRIP GENERATION

Land Use	Weekday AM Peak Hour			Weekday PM Peak Hour		
	In	Out	Total	In	Out	Total
610 Single-Family Homes	109	329	438	363	213	576

Table 2  
AZALEA WOODS DAILY TRIP GENERATION

Land Use	Weekday Daily		
	In	Out	Total
610 Single-Family Homes	2744	2744	5488

**Overview of TIS**

**Intersections examined:**

- 1) US Route 9 & Sand Hill Road / Airport Road
- 2) US Route 9 & Park Avenue
- 3) US Route 9 & Shingle Point Road / French Road
- 4) US Route 9 & Stiener Road (Sussex Road 320)
- 5) US Route 9 & Delaware Route 30
- 6) US Route 9 & Prettyman Road (Sussex Road 254)
- 7) US Route 9 & Delaware Route 5
- 8) Shingle Point Road & Briarwood Road (Sussex Road 253)
- 9) Shingle Point Road & Briarwood Lane / Site Access A
- 10) Park Avenue & Springfield Road (Sussex Road 47)
- 11) Delaware Route 30 & Huff Road (Sussex Road 252)



- 12) Delaware Route 30 & Shingle Point Road
- 13) Delaware Route 30 & Pettyjohn Road / Site Access B
- 14) Pettyjohn Road & Prettyman Road
- 15) Delaware Route 30 & Prettyman Road

**Conditions examined:**

- 1) 2018 existing (Case 1)
- 2) 2032 without Azalea Woods (Case 2)
- 3) 2032 with Azalea Woods (Case 3)

**Peak hours evaluated:** Weekday morning and evening peak hours

**Committed developments considered:**

- 1) Sand Hill Valley – 393 Single-family detached homes
- 2) Sports at the Beach – Nothing further to be built out at this time
- 3) Sussex County Sports Complex – 10 soccer fields
- 4) Cheer Life Care Village – 365 unit continuing care retirement community
- 5) Food Lion Shopping Center – Project not moving forward
- 6) Royal Farms #256 – 5,166 sf super convenience market with gas
- 7) Besche Property – 287 unit multifamily housing, low-rise
- 8) Two Farms, Inc. Retail Site – 14,950 sf retail

**Intersection Descriptions**

**1) US Route 9 & Sand Hill Road / Airport Road**

**Type of Control:** signalized

**Eastbound Approach:** (US Route 9) one left-turn lane and one shared through/right-turn lane

**Westbound Approach:** (US Route 9) one left-turn lane and one shared through/right-turn lane

**Northbound Approach:** (Airport Road) one shared left-turn/through/right-turn lane

**Southbound Approach:** (Sand Hill Road) one shared left-turn/through/right-turn lane

**2) US Route 9 & Park Avenue**

**Type of Control:** signalized

**Eastbound Approach:** (US Route 9) one shared through/right-turn lane

**Westbound Approach:** (US Route 9) one shared left-turn/through lane

**Northbound Approach:** (Park Avenue) one shared left-turn/right-turn lane

**3) US Route 9 & Shingle Point Road / French Road**

**Type of Control:** two-way stop

**Eastbound Approach:** (US Route 9) one shared left-turn/through/right-turn lane

**Westbound Approach:** (US Route 9) one shared left-turn/through/right-turn lane

**Northbound Approach:** (French Road) one shared left-turn/through/right-turn lane, stop control

**Southbound Approach:** (Shingle Point Road) one shared left-turn/through/right-turn lane, stop control

**4) US Route 9 & Stierer Road**

**Type of Control:** one-way stop (T-intersection)

**Eastbound Approach:** (US Route 9) one shared through/right-turn lane

**Westbound Approach:** (US Route 9) one shared left-turn/through lane

**Northbound Approach:** (Stierer Road) one shared left-turn/right-turn lane, stop control

**Southbound Approach:** (private business driveway) one shared left-turn/right-turn lane, stop control

**5) US Route 9 & Delaware Route 30**

**Type of Control:** signalized

**Eastbound Approach:** (US Route 9) one left-turn lane, one through lane, one bicycle lane, and one yield control right-turn lane

**Westbound Approach:** (US Route 9) one left-turn lane, one through lane, one bicycle lane, and one yield control right-turn lane

**Northbound Approach:** (Delaware Route 30) one left-turn lane, one through lane, one bicycle lane, and one yield control right-turn lane

**Southbound Approach:** (Delaware Route 30) one left-turn lane, one through lane, one bicycle lane, and one yield control right-turn lane

**6) US Route 9 & Prettyman Road**

**Type of Control:** one-way stop

**Eastbound Approach:** (US Route 9) one shared left-turn/through lane

**Westbound Approach:** (US Route 9) one through lane and one right-turn lane

**Southbound Approach:** (Prettyman Road) one shared left-turn/right-turn lane, stop controlled

**7) US Route 9 & Delaware Route 5**

**Type of Control:** signalized (recently improved)

**Eastbound Approach:** (US Route 9) one left-turn lane, one shared through/right-turn lane, and one bicycle lane

**Westbound Approach:** (US Route 9) one left-turn lane, one shared through/right-turn lane, and one bicycle lane

**Northbound Approach:** (Delaware Route 5) one left-turn lane and one shared through/right-turn lane

**Southbound Approach:** (Delaware Route 5) one left-turn lane, one shared through/right-turn lane, and one bicycle lane

**8) Shingle Point Road & Briarwood Road**

**Type of Control:** one-way stop (T-intersection)

**Eastbound Approach:** (Briarwood Road) one shared left-turn/right-turn lane, stop controlled

**Northbound Approach:** (Shingle Point Road) one shared left-turn/through lane

**Southbound Approach:** (Shingle Point Road) one shared through/right-turn lane

**9) Shingle Point Road & Briarwood Lane / Site Access A**

**Type of Control:** existing one-way stop (T-intersection); proposed two-way stop (four-leg intersection)

**Eastbound Approach:** (Briarwood Lane) existing one shared left-turn/right-turn lane; proposed shared left-turn/through/right-turn lane, stop control

**Westbound Approach:** (Site Access A) proposed one shared left-turn/through/right-turn lane, stop control

**Northbound Approach:** (Shingle point Road) existing one shared left-turn/through lane; proposed one shared left-turn/through and one right-turn lane

**Southbound Approach:** (Shingle Point Road) existing one shared through/right-turn lane; proposed one left-turn and one shared through/right-turn lane

**10) Park Avenue & Springfield Road**

**Type of Control:** existing one-way stop (T-intersection)

**Westbound Approach:** (Springfield Road) one shared left-turn/right-turn lane, stop control

**Northbound Approach:** (Park Avenue) one shared through/right-turn lane

**Southbound Approach:** (Park Avenue) one shared left-turn/through lane

**11) Delaware Route 30 & Huff Road**

**Type of Control:** one-way stop (T-intersection)

**Eastbound Approach:** (Huff Road) One shared left-turn/right-turn lane, stop control

**Northbound Approach:** (Delaware Route 30) one shared left-turn/through lane

**Southbound Approach:** (Delaware Route 30) one shared through/right-turn lane

**12) Delaware Route 30 & Shingle Point Road**

**Type of Control:** two-way stop controlled

**Eastbound Approach:** (Shingle Point Road) one shared left-turn/right-turn lane, stop control

**Westbound Approach:** (Shingle Point Road) one shared left-turn/right-turn lane, stop control

**Northbound Approach:** (Delaware Route 30) one shared left-turn/through lane (southern section) and one shared through/right-turn lane (northern section)

**Southbound Approach:** (Delaware Route 30) one shared through/left-turn lane (northern section) and one shared through/right-turn lane (southern section)

**13) Delaware Route 30 & Pettyjohn Road / Site Access B**

**Type of Control:** existing one-way stop; proposed two-way stop

**Eastbound Approach:** (Site Access B) proposed one shared left-turn/through/right-turn lane, stop control

**Westbound Approach:** (Pettyjohn Road) existing one shared left-turn/right-turn lane, stop control; proposed one shared left-turn/through/right-turn lane, stop control

**Northbound Approach:** (Delaware Route 30) existing one shared through/right-turn lane; proposed one left-turn lane and one shared through/right-turn lane

**Southbound Approach:** (Delaware Route 30) existing one shared left-turn/through lane; proposed one shared left-turn/through lane and one right-turn lane

**14) Pettyjohn Road & Prettyman Road**

**Type of Control:** two-way stop (four-leg intersection)

**Eastbound Approach:** (Prettyman Road) one shared left-turn/through/right-turn lane

**Westbound Approach:** (Prettyman Road) one shared left-turn/through/right-turn lane

**Northbound Approach:** (Pettyjohn Road) one shared left-turn/through/right-turn lane, stop control

**Southbound Approach:** (Pettyjohn Road) one shared left-turn/through/right-turn lane, stop control

**15) Delaware Route 30 & Prettyman Road**

**Type of Control:** one-way stop

**Westbound Approach:** (Prettyman Road) one shared left-turn/right-turn lane, stop control

**Northbound Approach:** (Delaware Route 30) one shared through/right-turn lane

**Southbound Approach:** (Delaware Route 30) one shared left-turn/through lane

**Safety Evaluation**

**Crash Data:** Per current DelDOT policy, review of crash data was not conducted at this time.

**Sight Distance:** Sight distance issues were noted at three intersections during a September 10, 2019 field investigation of the study area. Delaware Route 30 & Huff Road is located on a horizontal curve. Sight distance is limited looking left from northbound Huff Road. Sight distance at Pettyjohn Road & Prettyman Road is limited by trees and a utility pole, looking right from southbound Pettyjohn Road. Sight distance at Delaware Route 30 & Prettyman Road is limited by trees, looking left from westbound Prettyman Road.

**Transit, Pedestrian, and Bicycle Facilities**

**Existing transit service:** Based on the DART Bus Stop Map (accessed September 10, 2019), the Delaware Transit Corporation (DTC) operates Route 206 from Georgetown to Lewes, which has stops along US Route 9.

**Planned transit service:** TTG contacted a DTC representative, who indicated that no future service is planned at this time. The DTC representative stated the site is too far north of DART's current Route 206 to deviate for direct transit service.

**Existing bicycle and pedestrian facilities:** Several study area roadways are identified as “Bicycling Routes” on the *Sussex County Bicycle Map* published by DelDOT:

- US Route 9:
  - Regional Bicycle Route with bikeway
  - Over 5,000 vehicles daily
- Delaware Route 5: Regional bicycle route with bikeway
- Delaware Route 30: Regional bicycle route with bikeway
- Prettyman Road: Connector bicycle route without bikeway
- Sand Hill Road: Bicycle route with bikeway

There are no existing sidewalks or exclusive pedestrian facilities in the immediate areas of the proposed site entrances on Delaware Route 30 or Shingle Point Road. There are new sidewalks, pedestrian facilities and bike lanes at the US Route 9 & Delaware Route 5 intersection. There are also bike lanes on all four approaches at the US Route 9 & Delaware Route 30 intersection.

**Planned bicycle and pedestrian facilities:** The TIS states that a representative from DelDOT’s Local Systems Planning Section was contacted to determine requested accommodations for bicycles and pedestrians. It is requested that sidewalks be included at the entrances of the development to encourage walking and biking to Delaware Route 9. This would also allow for the possibility of future sidewalks along Pettyjohn Road, Delaware Route 30, and Shingle Point Road. It is also requested to have a pedestrian or bicycle connection to Shingle Point Road at the northern end of the property.

### **Previous Comments**

In a review letter dated July 3, 2019, DelDOT indicated that the revised Preliminary TIS was acceptable.

It appears that all substantive comments from DelDOT’s TIS Scoping Memorandum, Traffic Count Review, Preliminary TIS Review, Revised Preliminary TIS Review, and other correspondence were addressed in the Final TIS submission.

### **General HCS Analysis Comments**

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

- 1) For signalized intersections, the TIS and McCormick Taylor applied heavy vehicle factors (HV) by lane group using existing data. The TIS and McCormick Taylor generally assumed future HV to be the same as existing HV at all intersections. There are some discrepancies between the TIS and McCormick Taylor’s heavy vehicle factor calculations. Both the TIS and McCormick Taylor assumed 3% HV for future movements to and from the proposed site access points (as per DelDOT’s Development Coordination Manual).
- 2) For existing conditions, the TIS and McCormick Taylor determined overall intersection peak hour factors (PHF) for each intersection. As per the DelDOT Development Coordination Manual, existing PHFs are generally applied to future conditions as well.

- 3) For analyses of signalized intersections, McCormick Taylor used a base saturation flow rate of 1,750 pc/hr/ln per DelDOT's Development Coordination Manual.
- 4) The TIS and McCormick Taylor used different Right Turn on Red and pedestrian volumes when analyzing some intersections. All volumes for McCormick Taylor's analyses were taken directly from traffic counts in Appendix A of the TIS.
- 5) The TIS and McCormick Taylor used different signal timings when analyzing the signalized intersections in some cases.
- 6) For analyses of all intersections, the TIS assumed 0% grade for all movements. McCormick Taylor utilized field data for existing grades and assumed future grades to be the same.
- 7) McCormick Taylor utilized new signal phasing and roadway improvements when analyzing US Route 9 & Delaware Route 5. The Traffic Group utilized both old and updated signal timings and roadway layouts for existing, background, and total scenarios.

Table 3  
Peak Hour Levels of Service (LOS)  
Based on Azalea Woods Traffic Impact Study – July 2019  
Prepared by The Traffic Group, Inc.

Signalized Intersection <sup>1</sup>	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>US 9 &amp; Sand Hill Road / Airport Road</b>				
2018 Existing (Case 1)	E (66.3)	E (77.6)	D (49.8)	F (79.8)
2032 without Azalea Woods (Case 2)	F (173.4)	F (252.0)	F (103.0)	F (173.1)
2032 with Azalea Woods (Case 3)	F (199.0)	F (276.2)	F (122.7)	F (193.4)
2032 with Azalea Woods (Case 3) with East Gateway Improvements Project <sup>2</sup>	D (39.7)	D (50.7)	D (41.9)	D (54.9)

<sup>1</sup> For both unsignalized and signalized analyses, the numbers in parentheses following levels of service 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> Proposed improvements as part of the DelDOT project include realigning Sand Hill Road and Airport Road to intersect US Route 9 at one location at an improved angle, adding turn lanes, adding pedestrian and bicycle facilities, and improving drainage. The northbound and southbound approaches would each have one shared left/through lane and one right-turn lane, the westbound US Route 9 would have one left-turn lane, one through lane and one channelized right-turn lane, and the eastbound US Route 9 approach would have two left-turn lanes, one through lane and one channelized right-turn lane.

Table 4  
Peak Hour Levels of Service (LOS)  
Based on Azalea Woods Traffic Impact Study – July 2019  
Prepared by The Traffic Group, Inc.

Signalized Intersection <sup>3</sup>	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>US 9 &amp; Park Avenue</b>				
2018 Existing (Case 1)	F (129.4)	F (114.5)	F (157.5)	F (137.0)
2032 without Azalea Woods (Case 2)	F (545.1)	F (673.9)	F (759.4)	F (905.5)
2032 with Azalea Woods (Case 3)	F (754.6)	F (1554)	F (1135.1)	F (3456.9)
2032 with Azalea Woods (Case 3) with Park Avenue Relocation – Phase 2 <sup>4</sup>	D (44.4)	D (46.1)	D (42.4)	D (52.3)

<sup>3</sup> For both unsignalized and signalized analyses, the numbers in parentheses following levels of service 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> Proposed improvements as part of the DelDOT project include adding a westbound left-turn lane and a northbound right-turn lane with acceleration lane onto eastbound US Route 9.



Table 5  
Peak Hour Levels of Service (LOS)  
Based on Azalea Woods Traffic Impact Study – July 2019  
Prepared by The Traffic Group, Inc.

Unsignalized Intersection <sup>5</sup> Two-Way Stop	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>US 9 &amp; Shingle Point Road / French Road</b>				
2018 Existing (Case 1)				
Eastbound Left	A (10.0)	B (11.0)	B (10.1)	B (10.9)
Westbound Left	B (10.3)	A (8.9)	A (9.3)	A (8.9)
Northbound Left/Through/Right	E (38.8)	D (28.1)	E (36.1)	D (26.4)
Southbound Left/Through/Right	C (21.8)	D (27.1)	C (23.7)	D (30.8)
2032 without Azalea Woods (Case 2)				
Eastbound Left	B (11.7)	B (14.1)	B (11.8)	B (13.9)
Westbound Left	B (11.5)	A (9.8)	B (10.2)	A (9.8)
Northbound Left/Through/Right	F (94.4)	F (94.7)	F (85.2)	F (85.2)
Southbound Left/Through/Right	E (47.2)	F (113.0)	F (59.4)	F (172.6)
2032 with Azalea Woods (Case 3)				
Eastbound Left	B (12.4)	C (18.0)	B (12.6)	C (17.8)
Westbound Left	B (11.5)	A (9.9)	B (10.3)	A (9.9)
Northbound Left/Through/Right	F (133.1)	F (***)	F (120.5)	F (***)
Southbound Left/Through/Right	F (1589)	F (***)	F (2122.1)	F (***)
2032 with Azalea Woods (Case 3) <i>With Improvement Option 1</i> <sup>6</sup>				
Eastbound Left	N/A	N/A	B (12.6)	C (17.8)
Westbound Left	N/A	N/A	B (10.3)	A (9.9)
Northbound Left/Through/Right	N/A	N/A	F (120.5)	F (***)
Southbound Left/Through/Right	N/A	N/A	F (501.4)	F (***)
2032 with Azalea Woods (Case 3) <i>With Improvement Option 2</i> <sup>7</sup>				
Eastbound Left	N/A	N/A	B (12.6)	C (17.8)
Westbound Left	N/A	N/A	N/A	N/A
Northbound Right	N/A	N/A	C (16.3)	C (16.2)
Southbound Left/Right	N/A	N/A	F (68.7)	F (73.2)

\*\*\* Delay is too great to be calculated by HCS

<sup>5</sup> For both unsignalized and signalized analyses, the numbers in parentheses following levels of service 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> Improvement Option 1 adds a separate right-turn lane on the southbound approach of Shingle Point Road.

<sup>7</sup> Improvement Option 2 includes Improvement Option 1 and reconfigures US Route 9 with eastbound left-turn lane and an eastbound median acceleration lane for use by southbound left-turn drivers, thereby reducing conflicts and delays. For analysis purposes, this median lane is assumed to have storage for 2 southbound-left turn vehicles. The downstream acceleration lane would be separated from the upstream eastbound left-turn lane by a concrete channelization island. The northbound French Road approach to US Route 9 would be converted to right-in/right-out.

Table 6  
Peak Hour Levels of Service (LOS)  
Based on Azalea Woods Traffic Impact Study – July 2019  
Prepared by The Traffic Group, Inc.

Unsignalized Intersection <sup>8</sup> One-Way Stop	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>US 9 &amp; Stiener Road</b>				
2018 Existing (Case 1)				
Eastbound Left	A (9.4)	A (9.9)	A (9.4)	A (9.9)
Westbound Left	A (9.1)	A (8.9)	A (9.1)	A (8.9)
Northbound Left/Through/Right	D (30.9)	D (26.1)	D (32.9)	D (27.8)
Southbound Left/Through/Right	E (44.6)	C (24.9)	E (44.7)	C (24.9)
2032 without Azalea Woods (Case 2)				
Eastbound Left	B (10.5)	B (11.5)	B (10.5)	B (11.5)
Westbound Left	A (9.8)	A (9.8)	A (9.8)	A (9.8)
Northbound Left/Through/Right	F (56.8)	F (50.5)	F (62.4)	F (56.0)
Southbound Left/Through/Right	F (91.8)	E (49.9)	F (91.9)	F (50.0)
2032 with Azalea Woods (Case 3)				
Eastbound Left	B (10.7)	B (11.9)	B (10.7)	B (11.9)
Westbound Left	B (10.1)	B (10.1)	B (10.1)	B (10.1)
Northbound Left/Through/Right	F (65.5)	F (59.9)	F (72.5) <sup>9</sup>	F (67.0) <sup>9</sup>
Southbound Left/Through/Right	F (108)	F (60.3)	F (107.8) <sup>9</sup>	F (60.4) <sup>9</sup>

<sup>8</sup> For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

<sup>9</sup> 95<sup>th</sup> percentile queue length is anticipated to be less than 1 vehicle (25 feet).

Table 7  
Peak Hour Levels of Service (LOS)  
Based on Azalea Woods Traffic Impact Study – July 2019  
Prepared by The Traffic Group, Inc.

Signalized Intersection <sup>10</sup>	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
US 9 & DE 30				
2018 Existing (Case 1)	C (25.8)	C (28.9)	C (27.5)	C (34.3)
2032 without Azalea Woods (Case 2)	D (53.4)	F (84.9)	E (60.8)	F (90.6)
2032 with Azalea Woods (Case 3)	E (65.7)	F (103.2)	E (72.0)	F (108.3)
2032 with Azalea Woods (Case 3) with Modified Signal Timings	D (44.6)	E (78.9)	D (49.0)	E (72.8)

<sup>10</sup> For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 8  
Peak Hour Levels of Service (LOS)  
Based on Azalea Woods Traffic Impact Study – July 2019  
Prepared by The Traffic Group, Inc.

Unsignalized Intersection <sup>11</sup> One-Way Stop	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>US 9 &amp; Prettyman Road</b>				
2018 Existing (Case 1)				
Eastbound Left	A (9.4)	B (10.1)	A (9.4)	B (10.1)
Southbound Left/Right	F (111.8)	F (71.4)	F (91.2)	F (61.3)
2032 without Azalea Woods (Case 2)				
Eastbound Left	B (10.5)	B (12.2)	B (10.5)	B (12.2)
Southbound Left/Right	F (603.0)	F (502.1)	F (498.9)	F (406.2)
2032 with Azalea Woods (Case 3)				
Eastbound Left	B (10.6)	B (12.9)	B (10.6)	B (12.9)
Southbound Left/Right	F (986.9)	F (884.3)	F (833.6) <sup>12</sup>	F (731.8) <sup>13</sup>
2032 with Azalea Woods (Case 3) <i>With Improvement Option 1</i> <sup>14</sup>				
Eastbound Left	N/A	N/A	N/A	N/A
Southbound Left/Right	N/A	N/A	E (44.4) <sup>15</sup>	E (35.6) <sup>16</sup>

<sup>11</sup> For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

<sup>12</sup> 95<sup>th</sup> percentile queue length is anticipated to be approximately 16 vehicles (400 feet).

<sup>13</sup> 95<sup>th</sup> percentile queue length is anticipated to be approximately 10 vehicles (250 feet).

<sup>14</sup> Improvement Option 1 consists of widening US Route 9 and/or shifting lanes to create a median acceleration lane on eastbound US Route 9 for use by southbound left-turn drivers, thereby reducing conflicts and delays. For analysis purposes, this median lane is assumed to have storage for 2 southbound-left turn vehicles. The eastbound US Route 9 left-turn movement onto Prettyman Road would be restricted.

<sup>15</sup> 95<sup>th</sup> percentile queue length is anticipated to be approximately 4 vehicles (100 feet).

<sup>16</sup> 95<sup>th</sup> percentile queue length is anticipated to be approximately 2 vehicles (50 feet).

Table 9  
Peak Hour Levels of Service (LOS)  
Based on Azalea Woods Traffic Impact Study – July 2019  
Prepared by The Traffic Group, Inc.

Signalized Intersection <sup>17</sup>	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
US 9 & DE 5 <sup>18</sup>				
2018 Existing (Case 1)	E (60.1)	E (65.1)	E (65.7)	D (50.0)
2032 without Azalea Woods (Case 2)	F (198.9)	F (240.7)	N/A	N/A
<i>With DelDOT Project &amp; New Signal Timing</i>	F (155.4)	F (155.7)	F (180.2)	F (175.1)
2032 with Azalea Woods (Case 3)	F (223.7)	F (279.4)	N/A	N/A
<i>With DelDOT Project &amp; New Signal Timing</i>	F (183.9)	F (189.6)	F (211.9)	F (210.5)
<i>With DelDOT Project &amp; Modified Signal Timings</i>	F (116.9)	F (120.1)	N/A	N/A
<i>With Additional Through Lane on US Route 9 in Each Direction</i>	N/A	N/A	D (38.7)	D (37.7)

<sup>17</sup> For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

<sup>18</sup> As DelDOT's HSIP SC, US 9 and SR 5 Intersection project was substantially complete when McCormick Taylor conducted a review of this TIS, McCormick Taylor's analyses are based on the completed/improved intersection configuration and signal phasing for all scenarios. The TIS ran analyses of both the previously existing unimproved condition and the improved condition at this intersection for all scenarios.

Table 10  
Peak Hour Levels of Service (LOS)  
Based on Azalea Woods Traffic Impact Study – July 2019  
Prepared by The Traffic Group, Inc.

Unsignalized Intersection <sup>19</sup> One-Way Stop (T-Intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Shingle Point Road &amp; Briarwood Road</b>				
2018 Existing (Case 1)				
Eastbound Left/Right	A (9.7)	A (9.9)	A (9.8)	B (10.1)
Northbound Left	A (7.5)	A (7.5)	A (7.5)	A (7.5)
2032 without Azalea Woods (Case 2)				
Eastbound Left/Right	A (9.8)	B (10.1)	A (9.9)	B (10.2)
Northbound Left	A (7.5)	A (7.5)	A (7.5)	A (7.5)
2032 with Azalea Woods (Case 3)				
Eastbound Left/Right	B (10.4)	B (10.4)	B (10.5)	B (10.5)
Northbound Left	A (7.7)	A (7.7)	A (7.7)	A (7.7)

<sup>19</sup> For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 11  
Peak Hour Levels of Service (LOS)  
Based on Azalea Woods Traffic Impact Study – July 2019  
Prepared by The Traffic Group, Inc.

Unsignalized Intersection <sup>20</sup> Existing One-Way Stop Proposed Two-Way Stop	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Shingle Point Road &amp; Briarwood Lane / Site Access A</b>				
2018 Existing (Case 1)				
Eastbound Left/Through/Right	A (9.5)	A (9.3)	A (9.5)	A (9.3)
Northbound Left	A (7.7)	A (7.5)	A (7.7)	A (7.5)
2032 without Azalea Woods (Case 2)				
Eastbound Left/Through/Right	A (9.6)	A (9.3)	A (9.6)	A (9.3)
Northbound Left	A (7.8)	A (7.5)	A (7.8)	A (7.5)
2032 with Azalea Woods (Case 3)				
Eastbound Left/Through/Right	B (10.4)	B (10.1)	B (10.4)	B (10.1)
Westbound Left/Through/Right	B (12.9)	B (11.5)	B (12.9)	B (11.5)
Northbound Left	A (7.8)	A (7.5)	A (7.8)	A (7.5)
Southbound Left	A (7.5)	A (7.9)	A (7.5)	A (7.9)

<sup>20</sup> For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 12  
Peak Hour Levels of Service (LOS)  
Based on Azalea Woods Traffic Impact Study – July 2019  
Prepared by The Traffic Group, Inc.

Unsignalized Intersection <sup>21</sup> One-Way Stop (T-Intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Park Avenue &amp; Springfield Road</b>				
2018 Existing (Case 1)				
Westbound Left/Right	D (25.5)	C (23.7)	D (27.2)	D (25.2)
Southbound Left	A (8.0)	A (8.5)	A (8.0)	A (8.5)
2032 without Azalea Woods (Case 2)				
Westbound Left/Right	D (34.9)	D (31.3)	E (38.4)	D (34.2)
Southbound Left	A (8.1)	A (8.6)	A (8.1)	A (8.6)
2032 with Azalea Woods (Case 3)				
Westbound Left/Right	E (41.1)	E (38.0)	E (43.7)	E (42.4)
Southbound Left	A (8.1)	A (8.6)	A (8.1)	A (8.8)
2032 with Azalea Woods (Case 3) <i>With Improvement Option 1</i> <sup>22</sup>				
Westbound Left/Right	N/A	N/A	D (31.4)	D (31.9)
Southbound Left	N/A	N/A	A (8.1)	A (8.8)

<sup>21</sup> For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

<sup>22</sup> Improvement Option 1 adds a separate right-turn lane to the westbound Springfield Road approach.



Table 13  
Peak Hour Levels of Service (LOS)  
Based on Azalea Woods Traffic Impact Study – July 2019  
Prepared by The Traffic Group, Inc.

Unsignalized Intersection <sup>23</sup> One-Way Stop (T-Intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>DE 30 &amp; Huff Road</b>				
2018 Existing (Case 1)				
Eastbound Left/Right	B (11.3)	B (10.7)	B (11.3)	B (11.0)
Northbound Left	A (8.0)	A (7.9)	A (8.2)	A (8.0)
2032 without Azalea Woods (Case 2)				
Eastbound Left/Right	C (16.8)	C (17.0)	B (12.2)	C (18.6)
Northbound Left	A (8.2)	A (8.4)	A (8.5)	A (8.6)
2032 with Azalea Woods (Case 3)				
Eastbound Left/Right	C (18.8)	C (19.9)	B (12.9)	C (22.5)
Northbound Left	A (8.2)	A (8.7)	A (8.5)	A (8.8)

<sup>23</sup> For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 14  
Peak Hour Levels of Service (LOS)  
Based on Azalea Woods Traffic Impact Study – July 2019  
Prepared by The Traffic Group, Inc.

Unsignalized Intersection <sup>24</sup>	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>DE 30 &amp; Shingle Point Road North</b>				
2018 Existing (Case 1)				
Westbound Left/Right	B (14.0)	B (13.7)	B (14.0)	B (13.7)
Southbound Left	A (7.6)	A (7.8)	A (7.6)	A (7.8)
2032 without Azalea Woods (Case 2)				
Westbound Left/Right	C (17.1)	C (17.3)	C (17.1)	C (17.3)
Southbound Left	A (7.7)	A (8.1)	A (7.7)	A (8.1)
2032 with Azalea Woods (Case 3)				
Westbound Left/Right	C (19.7)	C (22.3)	C (19.7)	C (22.3)
Southbound Left	A (7.9)	A (8.2)	A (7.9)	A (8.2)

<sup>24</sup> For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 15  
Peak Hour Levels of Service (LOS)  
Based on Azalea Woods Traffic Impact Study – July 2019  
Prepared by The Traffic Group, Inc.

Unsignalized Intersection <sup>25</sup>	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>DE 30 &amp; Shingle Point Road South</b>				
2018 Existing (Case 1)				
Eastbound Left/Right	B (13.2)	C (15.7)	B (12.7)	B (14.6)
Northbound Left	A (8.3)	A (7.8)	A (8.3)	A (7.8)
2032 without Azalea Woods (Case 2)				
Eastbound Left/Right	C (15.8)	C (21.7)	C (15.8)	C (19.2)
Northbound Left	A (8.6)	A (8.0)	A (8.6)	A (8.0)
2032 with Azalea Woods (Case 3)				
Eastbound Left/Right	C (19.9)	D (29.3)	C (18.1)	C (24.5)
Northbound Left	A (8.6)	A (8.2)	A (8.6)	A (8.2)

<sup>25</sup> For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 16  
Peak Hour Levels of Service (LOS)  
Based on Azalea Woods Traffic Impact Study – July 2019  
Prepared by The Traffic Group, Inc.

Unsignalized Intersection <sup>26</sup> Existing One-Way Stop Proposed Two-Way Stop	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>DE 30 &amp; Pettyjohn Road / Site Access B</b>				
2018 Existing (Case 1)				
Eastbound Left/Through/Right	-	-	-	-
Westbound Left/Through/Right	B (11.2)	B (11.4)	B (10.9)	B (12.0)
Northbound Left	-	-	-	-
Southbound Left	A (7.6)	A (7.7)	A (7.6)	A (7.8)
2032 without Azalea Woods (Case 2)				
Eastbound Left/Through/Right	-	-	-	-
Westbound Left/Through/Right	B (13.0)	B (13.6)	B (12.6)	B (14.9)
Northbound Left	-	-	-	-
Southbound Left	A (7.8)	A (8.0)	A (7.8)	A (8.1)
2032 with Azalea Woods (Case 3)				
Eastbound Left/Through/Right	C (18.4)	C (18.1)	C (16.4)	C (20.7)
Westbound Left/Through/Right	C (17.7)	C (22.8)	C (16.8)	D (28.6)
Northbound Left	A (8.1)	A (8.2)	A (8.0)	A (8.3)
Southbound Left	A (7.8)	A (8.0)	A (7.8)	A (8.1)

<sup>26</sup> For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 17  
Peak Hour Levels of Service (LOS)  
Based on Azalea Woods Traffic Impact Study – July 2019  
Prepared by The Traffic Group, Inc.

Unsignalized Intersection <sup>27</sup> Two-Way Stop	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Prettyman Road &amp; Pettyjohn Road</b>				
2018 Existing (Case 1)				
Eastbound Left	A (7.7)	A (7.5)	A (7.9)	A (7.5)
Westbound Left	A (8.5)	A (7.3)	A (7.5)	A (7.3)
Northbound Left/Through/Right	B (10.7)	B (10.5)	A (10.0)	B (10.5)
Southbound Left/Through/Right	A (9.7)	A (10.0)	B (10.2)	B (10.0)
2032 without Azalea Woods (Case 2)				
Eastbound Left	A (7.4)	A (7.5)	A (7.9)	A (7.5)
Westbound Left	A (8.5)	A (7.3)	A (7.4)	A (7.3)
Northbound Left/Through/Right	B (11.0)	B (10.7)	B (11.0)	B (10.7)
Southbound Left/Through/Right	A (9.9)	B (10.2)	A (9.9)	B (10.2)
2032 with Azalea Woods (Case 3)				
Eastbound Left	A (7.4)	A (7.5)	A (7.9)	A (7.5)
Westbound Left	A (8.5)	A (7.4)	A (7.5)	A (7.4)
Northbound Left/Through/Right	A (10.0)	B (10.8)	A (10.0)	B (10.8)
Southbound Left/Through/Right	B (10.2)	B (11.1)	B (10.2)	B (11.1)

<sup>27</sup> For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 18  
Peak Hour Levels of Service (LOS)  
Based on Azalea Woods Traffic Impact Study – July 2019  
Prepared by The Traffic Group, Inc.

Unsignalized Intersection <sup>28</sup> One-Way Stop	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>DE 30 &amp; Prettyman Road</b>				
2018 Existing (Case 1)				
Westbound Left/Right	A (9.5)	B (10.2)	A (9.5)	B (10.2)
Southbound Left	A (7.8)	A (7.9)	A (7.8)	A (7.8)
2032 without Azalea Woods (Case 2)				
Westbound Left/Right	A (9.9)	B (11.3)	B (10.1)	B (11.3)
Southbound Left	A (7.9)	A (8.1)	A (8.0)	A (8.1)
2032 with Azalea Woods (Case 3)				
Westbound Left/Right	B (10.2)	B (11.6)	B (10.4)	B (11.6)
Southbound Left	A (8.0)	A (8.2)	A (8.1)	A (8.2)

<sup>28</sup> For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.