



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

NICOLE MAJESKI  
SECRETARY

May 13, 2021

Mr. Michael Kaszyski  
Duffield Associates, Inc.  
5400 Limestone Road  
Wilmington, DE 19808

Dear Mr. Kaszyski:

The enclosed Traffic Impact Study (TIS) review letter for the proposed **Peninsula Square** (Tax Parcel 234-23.00-115.00) 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 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

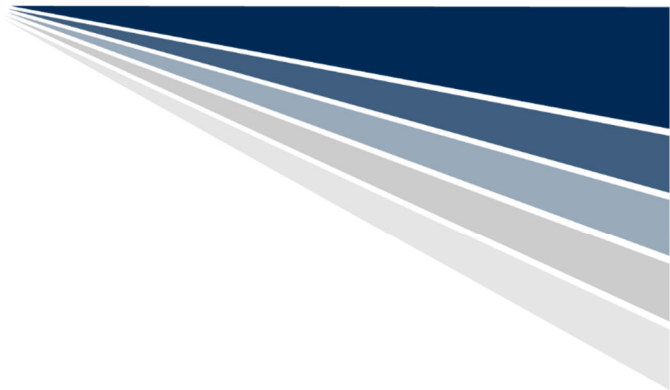
TEB:km

Enclosures

cc with enclosures: Mr. Stephen Gorski, Duffield Associates, Inc.  
Mr. David Edgell, Office of State Planning Coordination  
Mr. Jamie Whitehouse, Sussex County Planning and Zoning  
Mr. Mir Wahed, Johnson, Mirmiran & Thompson, Inc.  
Ms. Joanne Arellano, Johnson, Mirmiran & Thompson, Inc.  
Mr. Brian Yates, Johnson, Mirmiran & Thompson, Inc.  
DelDOT Distribution

## DelDOT Distribution

Brad Eaby, Deputy Attorney General  
Shanté Hastings, Director, Transportation Solutions (DOTS)  
J. Marc Coté, Director, Planning  
Mark Luszcz, Deputy Director, Traffic, DOTS  
Michael Simmons, Assistant Director, Project Development South, DOTS  
Todd Sammons, Assistant Director, Development Coordination  
T. William Brockenbrough, Jr., County Coordinator, Development Coordination  
Peter Haag, Chief Traffic Engineer, Traffic, DOTS  
Alistair Probert, South District Engineer, South District  
Matt Schlitter, South District Public Works Manager, South District  
Jared Kauffman, Service Development Planner, Delaware Transit Corporation  
Tremica Cherry, Service Development Planner, Delaware Transit Corporation  
Anthony Aglio, Planning Supervisor, Statewide & Regional Planning  
Wendy Polasko, Subdivision Engineer, Development Coordination  
Richard McCabe, Sussex Review Coordinator, Development Coordination  
Mark Galipo, Traffic Engineer, Traffic, DOTS  
Claudy Joinville, Project Engineer, Development Coordination  
Annamaria Furmato, Project Engineer, Development Coordination



May 11, 2021

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

RE: Agreement No. 1945F  
Project Number T202069012  
Traffic Impact Study Services  
**Task 14A-Peninsula Square TIS**

Dear Mr. Brestel:

Johnson, Mirmiran and Thompson (JMT) has completed the review of the Traffic Impact Study (TIS) for Peninsula Square, prepared by Duffield Associates, Inc. dated April 2020. This task was assigned as Task Number 14A. The report is prepared in a manner generally consistent with DelDOT's *Development Coordination Manual*.

The TIS evaluates the impacts of a proposed mixed-use development in Long Neck, Sussex County, Delaware. The development would be comprised of 144 multi-family mid-rise homes, a 100-room hotel, and a 61,200 square foot shopping center. Construction is anticipated to be complete in 2021.

The site is located on the southwest corner of the intersection of Delaware Route 24 and Autumn Road/Bay Farm Road (Sussex Road 299). Two access points are proposed: one full access along Autumn Road and a rights-in/rights-out/lefts-in access along Delaware Route 24.

The subject property is on an approximately 30-acre parcel that is zoned as CR-1 (Commercial Residential) and the developer does not plan to rezone the land.

DelDOT has two relevant and ongoing improvement projects within the study area including the *HSIP SR 24 at SR 5/SR 23 Intersection Improvements* project (DelDOT Contract No. T201200903). This project aims to improve the safety and operation of the Delaware Route 24 and Delaware Route 5/Delaware Route 23 intersection. The project location was identified as a high crash location as part of the DelDOT Highway Safety Improvement Program (HSIP). Recommendations were made from the *SR 24, SR 30 to Love Creek Traffic Study* performed in November 2010.

The project will reconstruct the traffic signal at the intersection of Delaware Route 24 and Delaware Route 5/Delaware Route 23. Crosswalks, curb ramps, and pedestrian signals will be installed along all legs of the intersection. The westbound Delaware Route 23 left turn lane onto



Delaware Route 24 will be extended and the channelized right turn islands along eastbound Delaware Route 5 and southbound Delaware Route 24 will be eliminated.

Construction is expected to begin in June 2021 and be completed in Fall 2022. Advanced utility work is underway. More information regarding the *HSIP SR 24 at SR 5/SR 23 Intersection Improvements* project can be found at:

<https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T201200903>

The second project within the study area is the *HSIP SR 24 at Mount Joy Road and SR 24 at Bay Farm Road Intersection Improvements* project (DelDOT Contract No. T200711201). The project will widen to provide turn lanes along each approach to the Delaware Route 24 intersections with Mount Joy Road/Oak Orchard Road and Bay Farm Road/Autumn Lane. The project location was identified as a high crash location as part of the DelDOT Highway Safety Improvement Program (HSIP). Recommendations were made from the *SR 24, SR 30 to Love Creek Traffic Study* performed in November 2010.

The project is under design with construction anticipated to begin in late Summer/early Fall 2021 and be completed in Fall 2022. Advanced utility work is underway. More information regarding the *HSIP SR 24 at Mount Joy Road and SR 24 at Bay Farm Road Intersection Improvements* project can be found at:

<https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T200711201>

The Delaware Route 24 and Oak Orchard Road/Mount Joy Road (Sussex Road 297) study intersection was included in DelDOT's 2015 *Hazard Elimination Program* (HEP) as Site I. Site I is a 0.50-mile corridor along Mount Joy Road/Oak Orchard Road from 0.01 mile south of Oak Meadow Drive to 0.22 mile north of Delaware Route 24. The Site I Task I Report included a crash evaluation and a sight distance review of the Delaware Route 24 and Oak Orchard Road/Mount Joy Road intersection. The remedial improvements included additional signage as well as increasing the yellow time at the intersection per DelDOT guidelines. Based on the latest signal timing plans from DelDOT, the yellow time has been adjusted per DelDOT guidelines. The Site I report mentioned that the improvements proposed as part of the *HSIP SR 24 at Mount Joy Road and SR 24 at Bay Farm Road Intersection Improvements* project (DelDOT Contract No. T200711201) would address the identified crash clusters and no additional studies were recommended.

Based on our review of the TIS, 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. The table below incorporates the traffic analysis for the Cases 2 and 3 (with and without the development) conditions with the improvements from the *HSIP SR 24 at SR 5/SR 23 Intersection Improvements* (DelDOT Contract No. T201200903) and *HSIP SR 24 at Mount Joy Road and SR 24 at Bay Farm Road Intersection Improvements* (DelDOT Contract No. T200711201) projects.



Intersection	LOS Deficiencies Occur			Case
	AM	PM	Saturday	
Site Entrance A/Delaware Route 24		X	X	Case 3b- 2021 with development and rights-in/rights-out/lefts-in
Delaware Route 24/Sherwood Forest		X	X	Case 2- 2021 without development
		X	X	Case 3- 2021 with development
Delaware Route 24/Legion Road	X	X	X	Case 2- 2021 without development
	X	X	X	Case 3- 2021 with development
Delaware Route 24/Indian Mission Road/Long Neck Road (Sussex Road 22)			X	Case 2- 2021 without development
			X	Case 3- 2021 with development
Delaware Route 24/White Pine Drive			X	Case 2- 2021 without development
			X	Case 3- 2021 with development
Delaware Route 24/Greens Way			X	Case 2- 2021 without development
			X	Case 3- 2021 with development
Delaware Route 24/Banks Road (Sussex Road 298)			X	Case 2- 2021 without development
			X	Case 3- 2021 with development
Indian Mission Road (Delaware Route 5)/Friendship Road (Sussex Road 306A)			X	Case 3- 2021 with development
Delaware Route 5/Stonewater Creek Road			X	Case 2- 2021 without development
			X	Case 3- 2021 with development
Delaware Route 5/Cannon Road (Sussex Road 307)	X			Case 2- 2021 without development
	X	X		Case 3- 2021 with development

The unsignalized Site Entrance A intersection with Delaware Route 24 is proposed approximately 500 feet west of Autumn Road and exhibits LOS deficiencies during the AM and PM peak hours under future conditions with the proposed development and a full access along Delaware Route 24 (Case 3b). Due to the proximity of the adjacent Autumn Road/Bay Farm Road signal, neither a roundabout nor a signal is feasible to be constructed at this location. Therefore, we recommend the developer construct Site Entrance A as a rights-in/rights-out/lefts-in access along Delaware Route 24.

Furthermore, Site Entrance A is proposed approximately 40 feet west of the entrance to the shopping center containing Harris Teeter on the southern side of Delaware Route 24. As such, we recommend that the proposed Site Entrance A be located directly across from the shopping center



entrance. Based on coordination with DelDOT, Site Entrance A can be constructed as a full access if located directly across from the shopping center.

The unsignalized Sherwood Forest intersection with Delaware Route 24 exhibits LOS deficiencies during the PM and Summer Saturday peak hours under future conditions, with or without the proposed development. The deficiencies occur along the northbound and southbound Sherwood Forest approaches with delays of up to 68.2 and 68.4 seconds per vehicle, respectively, under future conditions with the development (Case 3). These deficiencies could be mitigated by the provision of either a roundabout or a traffic signal. However, due to the proximity of adjacent residences, a roundabout is not feasible at this location. Additionally, the volumes executing turning movements from Sherwood Forest onto Delaware Route 24 would not meet the volume-based traffic signal warrants (a maximum of 9 left turning vehicles from Sherwood Forest). Furthermore, the calculated 95<sup>th</sup> percentile queue lengths along the northbound and southbound Sherwood Forest approaches are approximately 35 feet and 10 feet, respectively. Due to the extensive scope of the improvements and the occurrence of the deficiencies under Case 2 conditions when the proposed development is not built, it would be unreasonable to require the developer to improve the Delaware Route 24/Sherwood Forest intersection. As such, we do not recommend any improvements be implemented by the developer at this intersection. However, it is recommended the developer be responsible to fund an equitable portion of the improvements at the Delaware Route 24/Sherwood Forest intersection as part of the *HSIP SR 24 at SR 5/SR 23 Intersection Improvements* project (DelDOT Contract No. T201200903).

The unsignalized Legion Road intersection with Delaware Route 24 exhibits LOS deficiencies during all peak hours under future conditions, with or without the proposed development. The deficiencies occur along the northbound Legion Road approach with delays of up to 503.8 seconds per vehicle under future conditions with the development and a 95<sup>th</sup> percentile queue of approximately 245 feet. These deficiencies could be mitigated by the provision of either a roundabout or a traffic signal. Additionally, the installation of a traffic signal at this location is proposed as part of the River Farm and Peninsula Lakes developments. Therefore, we recommend that the developer enter into a traffic signal agreement for the intersection of Legion Road and Delaware Route 24 and coordinate with DelDOT on the implementation and equitable cost sharing of a traffic signal installation.

The signalized Indian Mission Road/Long Neck Road intersection with Delaware Route 24 exhibits LOS deficiencies during the Summer Saturday peak hour under future conditions with or without the proposed development. Delays of up to 68.0 seconds per vehicle are expected during the Summer Saturday peak hour under Case 3 conditions. Two through lanes along eastbound and westbound Delaware Route 24 in addition to the improvements associated with the *HSIP SR 24 at SR 5/SR 23 Intersection Improvements* project would improve the intersection to operate at LOS D (35.4 seconds of delay per vehicle) during the Case 3 Summer Saturday peak hour. However, additional widening along the Delaware Route 24 corridor may not be feasible and would be an unreasonable requirement of the developer due to the extensive scope. Therefore, we do not recommend that the developer implement any improvements at this intersection. However, it is recommended the developer be responsible to fund an equitable portion of the improvements as



part of the *HSIP SR 24 at SR 5/SR 23 Intersection Improvements* project (DelDOT Contract No. T201200903).

The unsignalized White Pine Drive intersection with Delaware Route 24 exhibits LOS deficiencies during the Summer Saturday peak hour under future conditions, with or without the proposed development. The deficiencies occur along the northbound White Pine Drive approach with delays of up to 43.4 seconds per vehicle under future conditions with the development. These deficiencies could be mitigated by the provision of either a roundabout or a traffic signal. However, due to the proximity of adjacent residences and businesses, a roundabout is not feasible at this location. Additionally, the volumes executing turning movements from White Pine Drive onto Delaware Route 24 would not meet the volume-based traffic signal warrants (a maximum of 29 left turning vehicles from White Pine Drive). Furthermore, the calculated 95<sup>th</sup> percentile queue lengths along the White Pine Drive approach is approximately 40 feet. Due to the extensive scope of the improvements and the occurrence of the deficiencies under Case 2 conditions when the proposed development is not built, it would be unreasonable to require the developer to improve the Delaware Route 24/White Pine Drive intersection. As such, we do not recommend any improvements be implemented by the developer at this intersection. However, it is recommended the developer be responsible to fund an equitable portion of the improvements at the Delaware Route 24/White Pine Drive intersection as part of the *HSIP SR 24 at SR 5/SR 23 Intersection Improvements* project (DelDOT Contract No. T201200903).

The unsignalized Greens Way intersection with Delaware Route 24 exhibits LOS deficiencies during the Summer Saturday peak hour under future conditions, with or without the proposed development. The deficiencies occur along the northbound Greens Way approach with delays of up to 50.3 seconds per vehicle under future conditions with the development. These deficiencies could be mitigated by the provision of either a roundabout or a traffic signal. Additionally, the volumes executing turning movements from Greens Way onto Delaware Route 24 would not meet the volume-based traffic signal warrants (a maximum of 21 left turning vehicles from Greens Way). Furthermore, the calculated 95<sup>th</sup> percentile queue lengths along the northbound Greens Way approach is approximately 35 feet. Due to the extensive scope of the improvements and the occurrence of the deficiencies under Case 2 conditions when the proposed development is not built, it would be unreasonable to require the developer to improve the Delaware Route 24/Greens Way intersection. As such, we do not recommend any improvements be implemented by the developer at this intersection.

The unsignalized Banks Road intersection with Delaware Route 24 exhibits LOS deficiencies during the Summer Saturday peak hour under future conditions, with or without the proposed development. The deficiencies occur along the northbound Banks Road approach with delays of up to 44.1 seconds per vehicle under future conditions with the development. These deficiencies could be mitigated by the provision of either a roundabout or a traffic signal. Additionally, the installation of a traffic signal at this location is proposed as part of the Duneside at Baywood (Phase 12 & Town Center) development. Therefore, we recommend that the developer enter into a traffic signal agreement for the intersection of Banks Road/Delaware Route 24 and coordinate with DelDOT on the implementation and equitable cost sharing of a traffic signal installation.



The unsignalized Indian Mission Road intersection with Friendship Road exhibits LOS deficiencies during the Summer Saturday peak hour under future conditions with the proposed development. The deficiencies occur along the eastbound Friendship Road approach with delays of up to 55.1 seconds per vehicle. These deficiencies can be mitigated through the provision of an additional through lane along northbound and southbound Indian Mission Road, a traffic signal, or a roundabout. However, due to the proximity of adjacent residences, a roundabout is not feasible at this location. Additionally, the volumes executing turning movements from Friendship Road onto Indian Mission Road would not meet the volume-based traffic signal warrants (a maximum of 64 left turning vehicles from Friendship Road). Furthermore, the calculated 95<sup>th</sup> percentile queue length along the eastbound Friendship Road approach is approximately 85 feet. Due to the extensive scope of the improvements, it would be unreasonable to require the developer to improve the Indian Mission Road/Friendship Road intersection. As such, we do not recommend any improvements be implemented by the developer at this intersection.

The unsignalized Delaware Route 5 intersection with Stonewater Creek Road exhibits LOS deficiencies during all peak hours under future conditions with or without the proposed development. The deficiencies occur along the westbound Stonewater Creek Road approach with delays of up to 44.4 seconds per vehicle. These deficiencies could be mitigated by the provision of either a roundabout or a traffic signal. However, the volumes executing turning movements from Stonewater Creek Road onto Delaware Route 5 would not meet the volume-based traffic signal warrants (a maximum of 65 left turning vehicles from westbound Stonewater Creek Road). Furthermore, the calculated 95<sup>th</sup> percentile queue lengths along the westbound Stonewater Creek Road approach is approximately 65 feet. Due to the extensive scope of the improvements, it would be unreasonable to require the developer to improve the Delaware Route 5/Stonewater Creek Road intersection. As such, we do not recommend any improvements be implemented by the developer at this intersection.

The unsignalized Delaware Route 5 intersection with Cannon Road exhibits LOS deficiencies during the AM peak hour under future conditions without the proposed development and during the AM and PM peak hours under future conditions with the proposed development. The deficiencies occur along the eastbound Cannon Road approach with delays of up to 41.1 seconds per vehicle under future conditions with the development. These deficiencies could be mitigated by the provision of a left turn lane along northbound Delaware Route 5, a right turn lane along southbound Delaware Route 5, and the restriping of eastbound Cannon Road as a left turn lane and a right turn lane. Additionally, a roundabout or a traffic signal would mitigate these deficiencies. However, the calculated 95<sup>th</sup> percentile queue lengths along the eastbound Cannon Road approach is approximately 85 feet. Due to the extensive scope of the improvements, it would be unreasonable to require the developer to improve the Delaware Route 5/Cannon Road intersection. As such, we do not recommend any improvements be implemented by the developer at this intersection.

Although Site Entrance B along Autumn Road (Sussex Road 209) would not have any LOS deficiencies under the future conditions with the development (Cases 3a and 3b), Site Entrance B





is proposed approximately 275 feet north of Delaware Route 24 which would be along the southbound Autumn Road auxiliary lanes proposed at the Delaware Route 24 intersection as part of the *HSIP SR 24 at Mount Joy Road and SR 24 at Bay Farm Road Intersection* project (DelDOT Contract No. T200711201). As such, Site Entrance B is recommended to be located approximately 575 feet north of the intersection, outside the limits of the proposed turn lanes as part of the DelDOT project, creating the fourth-leg at the Branch Road/Autumn Road intersection.

Should Sussex 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 Delaware Route 24 site frontage in the area affected by entrance plan construction at proposed Site Entrance A, including any auxiliary 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. However, if the *HSIP SR 24 at Mount Joy Road and SR 24 at Bay Farm Road Intersection* project (DelDOT Contract No. T200711201) is expected to be built prior to the construction of Peninsula Square, the developer should coordinate with DelDOT Project Development South Section regarding the construction timeframes and the feasibility of DelDOT incorporating the Peninsula Square entrance design into the DelDOT project.
2. The developer should provide a bituminous concrete overlay to the existing travel lanes along the Autumn Road site frontage in the area affected by entrance plan construction at proposed Site Entrance B, including any auxiliary 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.
3. The developer should construct a rights-in/rights-out/lefts-in site entrance (Site Entrance A) for the proposed Peninsula Square development on Delaware Route 24, approximately 500 feet west of Autumn Road/Bay Farm Road to be consistent with the lane configurations shown in the table below:



Approach	Current Configuration	Proposed Configuration
Eastbound Delaware Route 24	One through lane and one right turn lane*	One left turn lane, one through lane, and one right turn lane
Westbound Delaware Route 24	One through lane and one left turn lane*	One left turn lane, one through lane, and one right turn lane
Southbound Site Entrance A	Approach does not exist	One right turn lane

\*Existing eastbound right turn lane and westbound left turn lane provide access to the shopping center containing Harris Teeter directly across the Peninsula Square site frontage.

Based on DelDOT’s *Development Coordination Manual*, the recommended minimum storage length is 290 feet (excluding taper) for the westbound Delaware Route 24 right turn lane and 185 feet (excluding taper) for the eastbound Delaware Route 24 left turn lane. The calculated queue lengths from the HCS analysis can be accommodated within the recommended storage lengths.

Additionally, proposed Site Entrance A should be located directly across from the shopping center entrance containing Harris Teeter. With the proposed entrance relocated to be directly across from the shopping center, the existing storage lengths and lane configurations along Delaware Route 24 to access the shopping center containing Harris Teeter should be maintained. The storage lengths and lane configurations for the Peninsula Square site entrance should be built as recommended in the above table. Additionally, based on coordination with DelDOT, a lefts-out from Site Entrance A can be included if the entrance is located directly across from the shopping center.

The developer should submit a plan to DelDOT’s Development Coordination section depicting the design along the site frontage. The final design of the site entrance should be determined during the Entrance Plan review process.

4. The developer should construct a full access site entrance (Site Entrance B) for the proposed Peninsula Square development on Autumn Road, approximately 575 feet north of Delaware Route 24, at the Autumn Road/Branch Road intersection, to be consistent with the lane configurations shown in the table below:



Approach	Current Configuration	Proposed Configuration
Eastbound Site Entrance B	Approach does not exist	One left turn/through lane and one right turn lane
Westbound Autumn Road	One shared left turn/right turn lane	One shared left turn/through/right turn lane
Northbound Autumn Road	One through lane	One left turn lane and one shared through/right turn lane
Southbound Branch Road	One through lane	One shared left turn/through lane and one right turn lane

The westbound Autumn Road and eastbound Site Entrance B approaches should be stop-controlled. Per the Concept Site Plan prepared by Duffield Associates, Inc. dated June 26, 2018, the existing on-site roadway designated as Messiah Lane will be relocated to the north along Branch Road as part of the Peninsula Square development. Based on DelDOT’s *Development Coordination Manual*, the recommended minimum storage length is 70 feet (excluding taper) for the southbound Branch Road right turn lane and 85 feet (excluding taper) for the northbound Autumn Road left turn lane.

Additionally, Site Entrance B should be located approximately 575 feet north of the intersection, outside the limits of the proposed turn lanes as part of the *HSIP SR 24 at Mount Joy Road and SR 24 at Bay Farm Road Intersection* project (DelDOT Contract No. T200711201), and at the Branch Road/Autumn Road intersection. The calculated queue lengths from the HCS analysis can be accommodated within the recommended storage lengths. Autumn Road should also be improved to align with Site Entrance B. The developer should submit a plan to DelDOT’s Development Coordination section depicting the design along the site frontage. The final design of the site entrance should be determined during the Entrance Plan review process.

5. The developer should enter into an agreement with DelDOT to fund an equitable portion of the improvements to the intersections of Delaware Route 24 with Autumn Road/Bay Farm Road, Oak Orchard Road/Mount Joy Road, and Legion Road as part of the *HSIP SR 24 at Mount Joy Road and SR 24 at Bay Farm Road Intersection* project (DelDOT Contract No. T200711201). The developer should coordinate with DelDOT on the implementation and equitable cost sharing of the improvements.
6. The developer should enter into an agreement with DelDOT to fund an equitable portion of the improvements to the intersections of Delaware Route 24 with Indian Mission Road/Long Neck Road, White Pine Drive, Plaza Drive, and Sherwood Forest as part of the *HSIP SR 24 at SR 5/SR 23 Intersection Improvements* project (DelDOT Contract No.



T201200903). The developer should coordinate with DelDOT on the implementation and equitable cost sharing of the improvements.

- The developer should enter into a traffic signal agreement with DelDOT for the intersection of Delaware Route 24 and Legion Road for the installation of a traffic signal. The intersection should be consistent with the lane configurations shown in the table below:

Approach	Current Configuration	Proposed Configuration
Eastbound Delaware Route 24	One through lane and one right turn lane	No change
Westbound Delaware Route 24	One shared left turn/through lane	One left turn lane and one through lane
Northbound Legion Road	One shared left turn/right turn lane	No change

The recommended minimum storage length is 50 feet (excluding taper) for the westbound Delaware Route 24 left turn lane. The calculated queue lengths from the HCS analysis can be accommodated within the existing storage length for the eastbound Delaware Route 24 right turn lane. The traffic signal agreement should include pedestrian signals, crosswalks, interconnection, and ITS equipment such as CCTV cameras at DelDOT's discretion. The River Farm and Peninsula Lakes (a.k.a. Bay Farm) developments are also expected to contribute to this improvement. At DelDOT's discretion, the developer may contribute to the Traffic Signal Revolving Fund in lieu of a traffic signal agreement.

- The developer should enter into a traffic signal agreement with DelDOT for the intersection of Delaware Route 24 and Banks Road for the installation of a traffic signal. The intersection should be consistent with the lane configurations shown in the table below:

Approach	Current Configuration	Proposed Configuration
Eastbound Delaware Route 24	One through lane and one right turn lane	No change
Westbound Delaware Route 24	One left turn lane and one through lane	No change
Northbound Legion Road	One left turn lane and one right turn lane	No change

The calculated queue lengths from the HCS analysis can be accommodated within the existing storage lengths. The traffic signal agreement should include pedestrian signals, crosswalks, interconnection, and ITS equipment such as CCTV cameras at DelDOT's discretion. The Duneside at Baywood (Phase 12 & Town Center) development is also



expected to contribute to this improvement. At DelDOT's discretion, the developer may contribute to the Traffic Signal Revolving Fund in lieu of a traffic signal agreement.

9. 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 DelDOT along the Delaware Route 24 and Autumn Road site frontages. Within the easement, the developer should construct a ten-foot wide shared-use path (SUP). The SUP should be designed to meet current AASHTO and ADA standards. A minimum five-foot setback should be maintained from the edge of the pavement to the SUP. If feasible, the SUP should be placed behind utility poles and street trees should be provided within the buffer area. The developer should coordinate with DelDOT's Development Coordination section during the plan review process to identify the exact location of the SUP.
  - b. An internal connection should be provided from the SUP along Delaware Route 24 and Autumn Road into the site.
  - c. 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.
  - d. Internal bicycle racks should be provided for the commercial uses.
  - e. ADA compliant curb ramps and marked crosswalks should be provided along the Site A approach to Delaware Route 24 and the Site Entrance B approach to Autumn Road. The use of diagonal curb ramps is discouraged.
  - f. Minimum five-foot wide bicycle lanes should be incorporated in the right turn lanes and shoulder along the westbound Delaware Route 24 approach to Site Entrance A and the southbound Branch Road approach to Site Entrance B.
  - g. Utility covers should be moved outside of any designated bicycle lanes and any proposed sidewalks/shared-use paths 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 Plan 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 [https://www.deldot.gov/Publications/manuals/de\\_mutcd/index.shtml](https://www.deldot.gov/Publications/manuals/de_mutcd/index.shtml). For any additional



information regarding the work zone impact and mitigation procedures during construction please contact Mr. Don Weber, Assistant Director for Traffic Operations and Management. Mr. Weber can be reached at (302) 659-4651 or by email at [Don.Weber@delaware.gov](mailto:Don.Weber@delaware.gov).

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.

A handwritten signature in black ink, appearing to read 'Joanne M. Arellano', written in a cursive style.

Joanne M. Arellano, P.E., PTOE

cc: Mir Wahed, P.E., PTOE  
Enclosure

## **General Information**

**Report date:** April 2020

**Prepared by:** Duffield Associates, Inc.

**Prepared for:** Limitless Development Consulting LLC

**Tax Parcel:** 234-23.00-115.00

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

## **Project Description and Background**

**Description:** The developer seeks to develop 144 multi-family mid-rise homes, a 100-room hotel, and a 61,200 square foot shopping center.

**Location:** The subject site is located on the southwest corner of the intersection of Delaware Route 24 and Autumn Road/Bay Farm Road (Sussex Road 299).

**Amount of Land to be developed:** An approximately 30-acre parcel.

**Land Use approval(s) needed:** Entrance Plan.

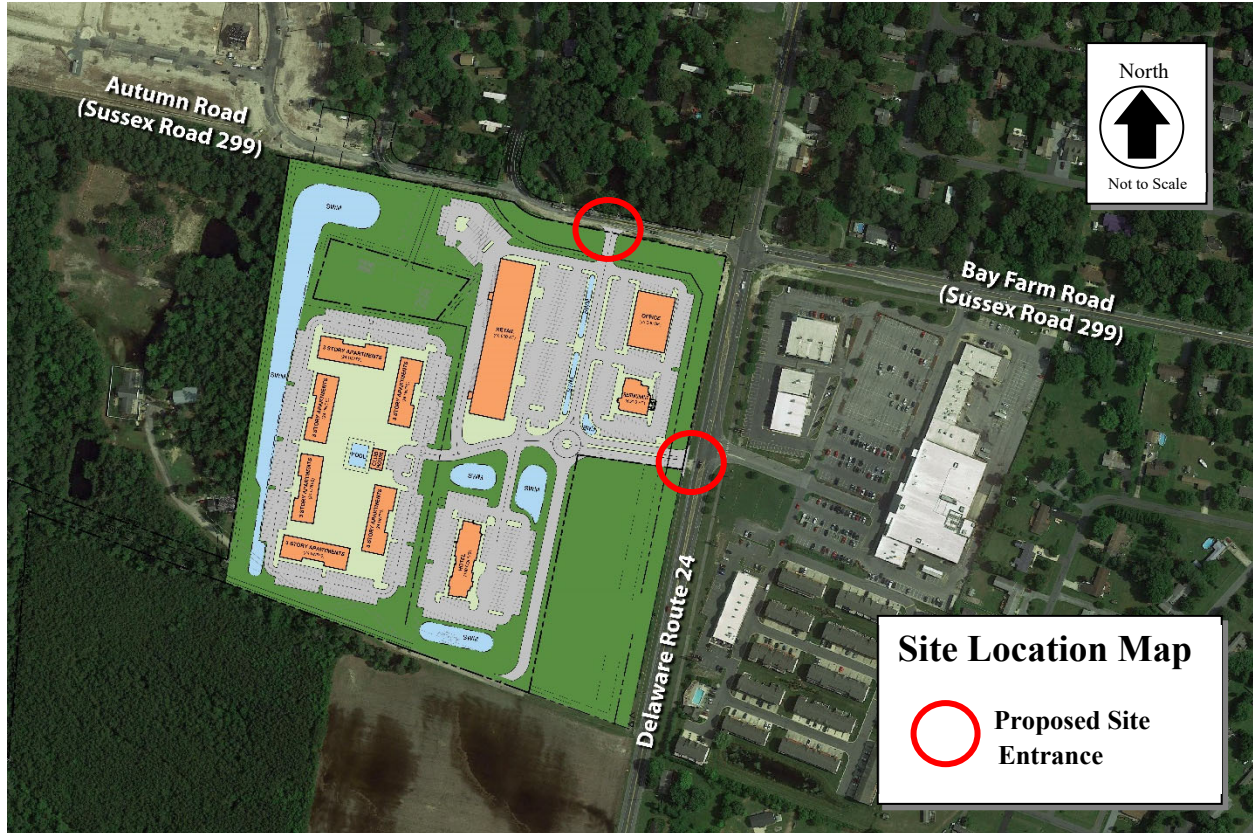
**Proposed completion date:** 2021.

**Proposed access location:** Two access points are proposed: one full access along Autumn Road and a rights-in/rights-out/lefts-in access along Delaware Route 24.

### **Daily Traffic Volumes:**

- 2019 Average Annual Daily Traffic on Delaware Route 24: 18,233 vehicles per day (non-Summer)
- 2019 Average Annual Daily Traffic on Autumn Road (Sussex Road 299): 545 vehicles per day (non-Summer)

## Site Map



*\*Graphic is an approximation based on the Concept Site Plan prepared by Duffield Associates, Inc. dated June 26, 2018.*

## Relevant and On-going Projects

DelDOT has two relevant and ongoing improvement projects within the study area including the *HSIP SR 24 at SR 5/SR 23 Intersection Improvements* project (DelDOT Contract No. T201200903). This project aims to improve the safety and operation of the Delaware Route 24 and Delaware Route 5/Delaware Route 23 intersection. The project location was identified as a high crash location as part of the DelDOT Highway Safety Improvement Program (HSIP). Recommendations were made from the *SR 24, SR 30 to Love Creek Traffic Study* performed in November 2010.

The project will reconstruct the traffic signal at the intersection of Delaware Route 24 and Delaware Route 5/Delaware Route 23. Crosswalks, curb ramps, and pedestrian signals will be installed along all legs of the intersection. The westbound Delaware Route 23 left turn lane onto Delaware Route 24 will be extended and the channelized right turn islands along eastbound Delaware Route 5 and southbound Delaware Route 24 will be eliminated.

Construction is expected to begin in June 2021 and be completed in Fall 2022. Advanced utility work is underway. More information regarding the *HSIP SR 24 at SR 5/SR 23 Intersection Improvements* project can be found at:



<https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T201200903>

The second project within the study area is the *HSIP SR 24 at Mount Joy Road and SR 24 at Bay Farm Road Intersection Improvements* project (DelDOT Contract No. T200711201). The project will widen to provide turn lanes along each approach to the Delaware Route 24 intersections with Mount Joy Road/Oak Orchard Road and Bay Farm Road/Autumn Lane. The project location was identified as a high crash location as part of the DelDOT Highway Safety Improvement Program (HSIP). Recommendations were made from the *SR 24, SR 30 to Love Creek Traffic Study* performed in November 2010.

The project is under design with construction anticipated to begin in late Summer/early Fall 2021 and be completed in Fall 2022. Advanced utility work is underway. More information regarding the *HSIP SR 24 at Mount Joy Road and SR 24 at Bay Farm Road Intersection Improvements* project can be found at:

<https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T200711201>

The Delaware Route 24 and Oak Orchard Road/Mount Joy Road (Sussex Road 297) study intersection was included in DelDOT's 2015 *Hazard Elimination Program* (HEP) as Site I. Site I is a 0.50-mile corridor along Mount Joy Road/Oak Orchard Road from 0.01 mile south of Oak Meadow Drive to 0.22 mile north of Delaware Route 24. The Site I Task I Report included a crash evaluation and a sight distance review of the Delaware Route 24 and Oak Orchard Road/Mount Joy Road intersection. The remedial improvements included additional signage as well as increasing the yellow time at the intersection per DelDOT guidelines. Based on the latest signal timing plans from DelDOT, the yellow time has been adjusted per DelDOT guidelines. The Site I report mentioned that the improvements proposed as part of the *HSIP SR 24 at Mount Joy Road and SR 24 at Bay Farm Road Intersection Improvements* project (DelDOT Contract No. T200711201) would address the identified crash clusters and no additional studies were recommended.

### **Livable Delaware**

*(Source: Delaware Strategies for State Policies and Spending, 2015)*

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

The proposed development is located within Investment Level 2, 3 and 4 areas.

#### *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.

### *Investment Level 3*

Investment Level 3 Areas generally fall into two categories. The first category covers lands that are in the long-term growth plans of counties or municipalities where development is not necessary to accommodate expected population growth during a five-year planning period (or longer). The second category includes lands that are adjacent to or intermingled with fast-growing areas within counties or municipalities that are otherwise categorized as Investment Levels 1 or 2. Investment Level 3 is further characterized by areas with new development separated from existing development by a substantial amount of vacant land that is not contiguous with existing infrastructure, areas that are experiencing some development pressure, areas with existing but disconnected development, and possible lack of adequate infrastructure.

The state will consider investing in infrastructure within Investment Level 3 Areas once the Investment Level 1 and 2 Areas are substantially built out, or when the infrastructure or facilities are logical extensions of existing systems and deemed appropriate to serve a particular area. The priorities in the Level 3 Areas are for DelDOT to focus on regional movements between towns and other population centers. Local roadway improvements will be made by developers and property owners as development occurs. Lower priority is given to transportation system–capacity improvements and transit-system enhancements.

### *Investment Level 4*

Delaware’s Investment Level 4 Areas are rural in nature and are where the bulk of the state’s open space/natural areas and agricultural industry is located. These areas contain agribusiness activities, farm complexes, and small settlements. They typically include historic crossroads or points of trade, often with rich cultural ties. Delaware’s Investment Level 4 Areas are also the location of scattered residential uses, featuring almost entirely single-family detached residential structures. Delaware’s Investment Level 4 Areas also include many unincorporated communities, typically with their own distinctive character and identity. Investment Level 4 Areas depend on a transportation system primarily of secondary roads linked to roadways used as regional thoroughfares for commuting and trucking.

It is the state's intent to discourage additional urban and suburban development in Investment Level 4 Areas unrelated to agriculture and to the areas' needs. In Investment Level 4 Areas, the state's investments and policies should retain the rural landscape and preserve open spaces and farmlands, support farmland-related industries, and establish defined edges to more concentrated development. The focus for the Level 4 Areas will be to preserve and maintain existing facilities in safe working order, corridor-capacity preservation, and the enhancement of transportation facilities to support agricultural business.

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

The majority of the site would be in the Investment Level 3 area and the rest of the site would be in the Investment Level 2 and 4 areas. According to Livable Delaware, Investment Level 3 Areas generally include lands that are adjacent to or intermingled with fast-growing areas within counties or municipalities that are categorized as Investment Levels 1 or 2. In these instances, development and growth may be appropriate in the near term but the resources in the surrounding area such as infrastructure issues should be considered. The subject site falls within an Investment Level 2 area as well, and the area is experiencing significant development (including infrastructure upgrades).

In addition, Level 3 areas in the longer term may be desirable for a variety of housing types, styles, and densities in conjunction with local government comprehensive plans, and Level 2 areas support residential growth supplemented with infrastructure and essential neighborhood services. Therefore, the proposed development is generally consistent with the 2015 update of the Livable Delaware "Strategies for State Policies and Spending."

**Comprehensive Plans**

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

**Sussex County Comprehensive Plan:**

Per the *Sussex County Comprehensive Plan Future Land Use Map*, the proposed development is in an area designated as Coastal Area and Commercial.

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

Per the *Sussex County Comprehensive Plan*, the proposed development is in an area designated as Coastal Area and Commercial. A range of uses and mixed-use developments are appropriate in Coastal Areas, including multifamily homes and commercial uses. Commercial areas include commercial corridors and shopping centers. Therefore, the proposed development is generally consistent with the *Sussex County March 2019 Comprehensive Plan*.

**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, 10<sup>th</sup> Edition: An ITE Informational Report*, published by the Institute of Transportation Engineers (ITE) for ITE Land Use Code 221 (multi-family mid-rise), Land Use Code 310 (hotel), and Land Use Code 820 (shopping center). The trip generation was approved by DelDOT during the Preliminary Traffic Impact Study (PTIS) review.

**Table 1**  
Peninsula Square Trip Generation

Land Use	ADT	AM Peak Hour			PM Peak Hour			SAT Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
144 Multi-family Housing, Mid-Rise (ITE Code 221)	783	13	36	49	38	25	63	33	34	67
100 Room Hotel (ITE Code 310)	836	27	18	45	25	24	49	41	32	73
61,200 SF Shopping Center (ITE Code 820)	4,305	113	69	182	181	197	378	218	202	420
Total Trips	5,924	153	123	276	244	246	490	292	268	560
Internal Capture	-	-3	-3	-6	-37	-37	-74	-41	-41	-82
Pass-By Trips	-	0	0	0	-56	-59	-115	-52	-46	-98
<b>Net New Trips</b>	<b>-</b>	<b>150</b>	<b>120</b>	<b>270</b>	<b>151</b>	<b>150</b>	<b>301</b>	<b>199</b>	<b>181</b>	<b>380</b>

### Overview of TIS

#### Intersections examined:

1. Site Entrance A / Delaware Route 24
2. Site Entrance B / Autumn Road (Sussex Road 299)
3. Delaware Route 24 / Autumn Road / Bay Farm (Sussex Road 299)
4. Delaware Route 24 / Sherwood Forrest
5. Delaware Route 24 / Plaza Drive
6. Delaware Route 24 / Legion Road (Sussex Road 298)
7. Delaware Route 24 / Oak Orchard Road / Mount Joy Road (Sussex Road 297)
8. Delaware Route 24 / Arrowhead Trail
9. Delaware Route 24 / Gull Point Road (Sussex Road 313)
10. Mount Joy Road / Cordrey Road (Sussex Road 308)
11. Delaware Route 24 / Indian Mission Road / Long Neck Road (Sussex Road 22)
12. Delaware Route 24 / White Pine Drive
13. Delaware Route 24 / Greens Way
14. Delaware Route 24 / Banks Road (Sussex Road 298)
15. Autumn Road / Friendship Road (Sussex Road 306A)
16. Indian Mission Road / Friendship Road

17. Delaware Route 5 / Stonewater Creek Road
18. Delaware Route 5 / Cannon Road (Sussex Road 307)

**Conditions examined:**

1. Case 1 – 2018 Existing Condition
2. Case 2 – 2021 without development
3. Case 3a– 2021 with development and with rights-in/rights-out/lefts-in access along Delaware Route 24
4. Case 3b – 2021 with development and with full access along Delaware Route 24

**Committed Developments considered:**

1. Dellwood (100 single family detached houses)
2. Coastal Club (412 single family detached houses, 218 residential condominiums/townhouses [236 detached houses and 70 condos built])
3. Pelican Point (400 single family detached houses [109 built])
4. Independence (450 single family detached houses [387 built])
5. Woodbridge (188 single family detached houses)
6. Anchors Run (263 single family detached houses)
7. Acadia (238 single family detached houses)
8. The Woods at Burton Pond (165 single family detached houses)
9. Heron Bay (64 single family detached houses)
10. Burton Pond (319 single family detached houses)
11. Deerbrook (120 single family detached houses)
12. Peninsula Lakes (588 single family detached houses, 72 multi-family low-rise houses, and 15,000 square feet of retail)
13. Baylis Estates (136 single family detached houses)

*Note: Committed development information listed about is from the TIS report and supersedes the information from the August 31, 2018 DelDOT Scoping Meeting Memorandum*

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

**Intersection Descriptions**

**1. Site Entrance A/Delaware Route 24**

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

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

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

**Southbound Approach:** (Site Entrance A) Proposed one right turn lane, stop controlled

**2. Site Entrance B/Autumn Road (Sussex Road 299)**

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

**Eastbound Approach:** (Site Entrance B) Proposed one left turn lane and one right turn lane, stop controlled

**Northbound Approach:** (Autumn Road) Existing one through lane; proposed one left turn lane and one through lane

**Southbound Approach:** (Autumn Road) Existing one through lane; proposed one through lane and one right turn lane

**3. Delaware Route 24/Autumn Road / Bay Farm (Sussex Road 299)**

**Type of Control:** Existing signalized intersection (four-legged)

**Eastbound Approach:** (Delaware Route 24) Existing one left turn lane, one through lane, and one right turn lane

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

**Northbound Approach:** (Bay Farm Road) Existing one left turn lane and one shared through/right turn lane; proposed one left turn lane, one through lane, and one right turn lane

**Southbound Approach:** (Autumn Road) Existing one left turn lane and one shared through/right turn lane; proposed one left turn lane, one through lane, and one right turn lane

*Note: The proposed lane configurations for this intersection are the improvements associated with the HSIP SR 24 at Mount Joy Road and SR 24 at Bay Farm Road Intersection Improvements project (DelDOT Contract No. T200711201).*

**4. Delaware Route 24/Sherwood Forest**

**Type of Control:** Existing stop-controlled intersection (four-legged)

**Eastbound Approach:** (Delaware Route 24) Existing one shared left turn/through/right turn lane

**Westbound Approach:** (Delaware Route 24) Existing one left turn lane, one through lane, and one right turn lane

**Northbound Approach:** (Sherwood Forest) Existing one shared left turn/through/right turn lane, stop controlled

**Southbound Approach:** (Sherwood Forest) Existing one shared left turn/through/right turn lane, stop controlled

**5. Delaware Route 24/Plaza Drive**

**Type of Control:** Existing signalized 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:** (Plaza Drive) Existing one left turn lane and one right turn lane

**6. Delaware Route 24/Legion Road (Sussex Road 298)**

**Type of Control:** Stop 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 shared left turn/through lane

**Northbound Approach:** (Legion Road) Existing one shared left turn/right turn lane, stop controlled

**7. Delaware Route 24 / Oak Orchard Road / Mount Joy Road (Sussex Road 297)**

**Type of Control:** Existing signalized intersection (four-legged)

**Eastbound Approach:** (Delaware Route 24) Existing one left turn lane, one through lane, and one right turn lane

**Westbound Approach:** (Delaware Route 24) Existing one left turn lane, one through lane, and one right turn lane

**Northbound Approach:** (Oak Orchard Road) Existing one shared left turn/through lane and one right turn lane; proposed one left turn lane, one through lane, and one right turn lane

**Southbound Approach:** (Mount Joy Road) Existing one shared left turn/through lane and one right turn lane; proposed one left turn lane, one through lane, and one right turn lane

*Note: The proposed lane configurations for this intersection are the improvements associated with the HSIP SR 24 at Mount Joy Road and SR 24 at Bay Farm Road Intersection Improvements project (DelDOT Contract No. T200711201).*

**8. Delaware Route 24/Arrowhead Trail**

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

**Eastbound Approach:** (Delaware Route 24) Existing one shared left turn/through lane and one bypass lane

**Westbound Approach:** (Delaware Route 24) Existing one shared through/right turn lane

**Southbound Approach:** (Arrowhead Trail) Existing one shared left turn/right turn lane, stop controlled

**9. Delaware Route 24/Gull Point Road (Sussex Road 313)**

**Type of Control:** Existing stop-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 shared left turn/through lane

**Northbound Approach:** (Gull Point Road) Existing one shared left turn/right turn lane, stop controlled

**10. Mount Joy Road/Cordrey Road (Sussex Road 308)**

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

**Eastbound Approach:** (Mount Joy Road) Existing one shared through/right-turn lane

**Westbound Approach:** (Mount Joy Road) Existing one shared through/left-turn lane

**Northbound Approach:** (Cordrey Road) Existing one shared left-turn/right-turn lane, stop controlled

**11. Delaware Route 24/Indian Mission/Long Neck Road (Sussex Road 22)**

**Type of Control:** Existing signalized intersection (four-legged)

**Eastbound Approach:** (Delaware Route 24) Existing one left turn lane, one through lane, and one right turn lane

**Westbound Approach:** (Delaware Route 24) Existing one left turn lane, one through lane, and one right turn lane

**Northbound Approach:** (Long Neck Road) Existing one left turn lane, one through lane, and one right turn lane

**Southbound Approach:** (Indian Mission Road) Existing one left turn lane, one through lane, and one right turn lane

**12. Delaware Route 24/White Pine Drive**

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

**Northbound Approach:** (White Pine Drive) Existing one shared left turn/right turn lane, stop controlled

**Eastbound Approach:** (Delaware Route 24) Existing one shared through/right turn lane; proposed one two-way-left turn lane and one shared through/right turn lane

**Westbound Approach:** (Delaware Route 24) Existing one shared left turn/through lane and one bypass lane; proposed one left turn lane and one through lane

*Note: The proposed lane configurations for this intersection are the improvements associated with the HSIP SR 24 at SR 5/SR 23 Intersection Improvements project (DelDOT Contract No. T201200903).*



**13. Delaware Route 24/Greens Way**

**Type of Control:** Existing stop-controlled intersection (four-legged)

**Eastbound Approach:** (Delaware Route 24) Existing one left turn lane, one through lane 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

**Northbound Approach:** (Greens Way) Existing one shared left turn/through lane and one channelized right-turn lane, stop controlled

**Southbound Approach:** (Greens Way) Existing one shared left turn/through lane and one channelized right-turn lane, stop controlled

**14. Delaware Route 24/Banks Road (Sussex Road 298)**

**Type of Control:** Existing stop-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:** (Banks Road) Existing one left turn lane and one right turn lane, stop controlled

**15. Autumn Road/Friendship Road (Sussex Road 306A)**

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

**Eastbound Approach:** (Friendship Road) Existing one shared through/right turn lane

**Westbound Approach:** (Friendship Road) Existing one shared left turn/through lane

**Northbound Approach:** (Autumn Road) Existing one share left turn/right turn lane, stop controlled

**16. Indian Mission Road/Friendship Road**

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

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

**Northbound Approach:** (Indian Mission Road) Existing one shared left turn/through lane

**Southbound Approach:** (Indian Mission Road) Existing one shared through/right turn lane

**17. Delaware Route 5/Stonewater Creek Road**

**Type of Control:** Existing stop-controlled intersection (four-legged)

**Eastbound Approach:** (Stonewater Creek Road) Existing one shared left turn/through lane and one right-turn lane, stop controlled

**Westbound Approach:** (Stonewater Creek Road) Existing one shared left turn/through lane and one right-turn lane, stop controlled

**Northbound Approach:** (Delaware Route 5) Existing one left turn lane, one through lane, and one right turn lane

**Southbound Approach:** (Delaware Route 5) Existing one left turn lane, one through lane, and one right turn lane

#### **18. Delaware Route 5/Cannon Road (Sussex Road 307)**

**Type of Control:** Existing stop-controlled intersection (four-legged)

**Eastbound Approach:** (Cannon Road) Existing one shared left turn/through/right turn lane, stop controlled

**Westbound Approach:** (Driveway) Existing one shared left turn/through/right turn lane, stop controlled

**Northbound Approach:** (Indian Mission Road) Existing one shared left turn/through/right turn lane

**Southbound Approach:** (Indian Mission Road) Existing one shared left turn/through/right turn lane

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

**Existing transit service:** Per DelDOT Gateway, Delaware Transit Corporation (DTC) currently provides existing services within the study area via DART Route 215. DART Route 215 runs along Delaware Route 24 with existing bus stops at the intersection with Indian Mission Road/Long Neck Road. DART Route 215 provides 11 round trips on weekdays and Saturdays from 5:25 AM to 12:43 AM.

**Planned transit service:** Per email correspondence on June 16, 2020 with Mr. Jared Kauffman, Fixed-Route Planner at the DTC, a pair of companion 17-foot by 8-foot Type 2 shelter pads should be installed along Delaware Route 24 south of Autumn Road/Bay Farm Road. The southbound stop should be located at least 100 feet from the intersection, and a bus pull off should be provided. The stop should have a direct pedestrian pathway to the internal pedestrian network. The northbound stop should be located nearside of Bay Farm Road. DART is in the process of determining a specific location. Additionally, a crosswalk should be provided on the southern leg of Delaware Route 24 to connect both bus stops.

**Existing bicycle and pedestrian facilities:** According to DelDOT's *Sussex County Bicycle Map*, Regional and Connection Bicycle Routes exist within the study area. One Regional Bicycle Route travels along Delaware Route 24, traversing through 12 study intersections (Banks Road, Greens Way, White Pine Drive, Indian Mission Road/Long Neck Road, Plaza Drive, Sherwood Forest, Autumn Road/Bay Farm Road, Site Entrance A, Legion Road, Oak Orchard Road/Mount Joy Road, Arrowhead Trail, and Gull Point Road). Another Regional Bicycle Road travels along Indian Mission Road/Long Neck Road and traverses through four study intersections (Cannon Road, Stonewater Creek Road, Friendship Road, and Delaware Route 24). The Connector Bicycle

Route exists along Oak Orchard Road and traverses through one study intersection (Delaware Route 24).

**Planned bicycle and pedestrian facilities:** Per email correspondence on June 8, 2020 from Mr. John Fiori, DelDOT's Bicycle Coordinator, the following improvements were recommended:

- Construct a 10-foot wide shared-use path (SUP) along the Delaware Route 24 and Autumn Road site frontages.
- An internal connection from the non-motorized facility along Delaware Route 24 and Autumn Road is required.
- Internal bicycle racks are required.
- Per the Development Coordination Manual (DCM) the site shall dedicate right-of-way per the roadway classification and establish a 15-foot wide permanent easement along the property frontages.
- All entrance, roadway and/or intersection improvements required shall incorporate bicycle and pedestrian facilities. Per the DCM, if the right turn lane is warranted, then a bike lane shall be incorporated along the right turn lane; if a left turn lane is required any roadway improvements shall include a shoulder matching the roadway functional classification or existing conditions.

**Bicycle Level of Traffic Stress in Delaware:** Researchers with the Mineta Transportation Institute developed a framework to measure low-stress connectivity, which can be used to evaluate and guide bicycle network planning. Bicycle LTS analysis uses factors such as the speed of traffic, volume of traffic, and the number of lanes to rate each roadway segment on a scale of 1 to 4, where 1 is a low-stress place to ride and 4 is a high-stress place to ride. It analyzes the total connectivity of a network to evaluate how many destinations can be accessed using low-stress routes. Developed by planners at the Delaware Department of Transportation (DelDOT), the bicycle Level of Traffic Stress (LTS) model will be applied to bicycle system planning and evaluation throughout the state. The Bicycle LTS for the roadways under existing conditions along the site frontages are summarized below. The Bicycle LTS was determined utilizing the map on the DelDOT Gateway.

- Delaware Route 24 – LTS: 3 and 4
- Autumn Road – LTS: 1

### **Crash Evaluation**

Per the crash data included in the TIS from May 10, 2016 to May 10, 2019 and provided by the Delaware Crash Analysis Reporting System, a total of 252 crashes were reported within the study area. Of the 252 crashes reported:

- 101 crashes occurred at the signalized intersection of Delaware Route 24 and Indian Mission Road/Long Neck Road.
  - Of those 101 crashes, 35 were rear end incidents and 33 were angle incidents. 19 of these crashes resulted in injuries.
- 30 crashes occurred at the signalized intersection of Delaware Route 24 and Oak Orchard Road/Mount Joy Road.

- Of those 30 crashes, 12 were rear end incidents and 11 were angle incidents. Nine of these accidents resulted in injuries.
- 29 crashes occurred at the unsignalized intersection of Delaware Route 24 and White Pine Drive.
  - Of those 29 crashes, 11 were rear-end incidents and 10 were angle incidents. Three of these accidents resulted in injuries.
- 25 crashes occurred at the signalized intersection of Delaware Route 24 and Autumn Road/Bay Farm Road.
  - Of those 24 crashes, 13 were rear end incidents and 7 were angle incidents. Four of these accidents resulted in injuries.
- 24 crashes occurred at the signalized intersection of Delaware Route 24 and Plaza Drive.
  - Of those 24 crashes, 8 were rear end incidents and 4 were angle incidents. Two of these accidents resulted in injuries.
- No fatalities were reported within the study area during the 3-year study period.

### **Previous Comments**

JMT updated the Saturday peak hour volumes utilized in the Final Traffic Impact Study (FTIS). These updated volumes were approved by DeIDOT and utilized for this review.

### **General HCS Analysis Comments**

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

1. For the intersection analyses, the TIS used HCS7 version 7.8, whereas JMT used HCS7 version 7.8.5.
2. Per DelDOT's *Development Coordination Manual*, JMT and the TIS used a heavy vehicle percentage of 3% for each movement greater than 100 vph in the Case 2 and Case 3 future scenario analyses, 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 used for the analysis of future scenarios.
3. Per DelDOT's *Development Coordination Manual* and coordination with DelDOT Planning, JMT used a heavy vehicle percentage of 5% for each movement less than 100 vph along roadways for Case 1 conditions, whereas the TIS did not.
4. Per DelDOT's *Development Coordination Manual*, JMT and the TIS utilized the existing PHF for the Case 1 scenario and a future PHF for Cases 2 and 3 scenarios of 0.80 for roadways with less than 500 vph, 0.88 for roadways between 500 and 1,000 vph, and 0.92 for roadways with more than 1,000 vph or the existing PHF, whichever was higher. The TIS utilized 0.92 for all future cases.
5. JMT incorporated pedestrians in the analysis, whereas the TIS did not.
6. JMT analyzed the Summer Saturday peak hour utilizing updated volumes which were approved by DelDOT.

**Table 2**  
**Peak Hour Levels Of Service (LOS)**  
**Based on Traffic Impact Study for Peninsula Square**  
**Report Dated: April 2020**  
**Prepared By: Duffield Associates, Inc.**

<b>Unsignalized Intersection Two-Way Stop Control (T-intersection) <sup>1</sup></b>	<b>LOS per TIS</b>			<b>LOS per JMT</b>		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Site Entrance A/Delaware Route 24</b>						
2021 with development and rights-in/rights-out/lefts-in on Delaware Route 24 (Case 3a) <sup>2</sup>						
Eastbound Delaware Route 24 Left Turn	B (10.1)	B (10.7)	B (10.3)	B (10.1)	B (10.7)	B (11.4)
Southbound Site Entrance A Approach	C (16.8)	C (20.7)	C (18.1)	C (16.8)	C (20.7)	C (23.6)
2021 with development and full access on Delaware Route 24 (Case 3b) <sup>3</sup>						
Eastbound Delaware Route 24 Left Turn	B (10.2)	B (10.5)	B (10.2)	B (10.2)	B (10.7)	B (11.4)
Southbound Site Entrance A Approach	D (29.6)	E (46.8)	D (33.0)	D (29.6)	F (51.7)	F (75.9)

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

<sup>2</sup> Both JMT and the TIS modeled the intersection with one left turn lane and one through lane along the eastbound Delaware Route 24 approach, one through lane and one right turn lane along the Delaware Route 24 approach, and one right turn lane along the Site Entrance A approach.

<sup>3</sup> Both JMT and the TIS modeled the intersection with one left turn lane and one through lane along the eastbound Delaware Route 24 approach, one through lane and one right turn lane along the Delaware Route 24 approach, and one left turn lane and one right turn lane along the Site Entrance A approach.

Table 3  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Unsignalized Intersection Two-Way Stop Control (T-intersection) <sup>1</sup>	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Site Entrance B/Autumn Way (Sussex Road 299) <sup>4</sup></b>						
2021 with development and rights-in/rights-out/lefts-in on Delaware Route 24 (Case 3a)						
Eastbound Site Entrance B Approach	A (8.3)	A (8.7)	A (8.7)	A (9.0)	A (9.3)	A (9.5)
Northbound Autumn Way Left Turn	A (8.8)	A (9.0)	A (9.0)	A (7.4)	A (7.5)	A (7.6)
2021 with development and full access on Delaware Route 24 (Case 3b)						
Eastbound Site Entrance B Approach	A (8.1)	A (8.6)	A (8.6)	A (9.1)	A (9.4)	A (9.5)
Northbound Autumn Way Left Turn	A (8.8)	A (8.9)	A (9.0)	A (7.4)	A (7.5)	A (7.6)

<sup>4</sup> Both JMT and the TIS modeled the intersection with one left turn lane and one right turn lane along the eastbound Site Entrance B approach, one shared left turn/through lane along the northbound Autumn Road approach, and one through lane and one right turn lane along the southbound Autumn Road approach.

Table 4  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Signalized Intersection <sup>1</sup>	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 24/Autumn Road/Bay Farm Road (Sussex Road 299) <sup>5, 6, 7</sup></b>						
2018 Existing (Case 1)	B (16.6)	C (24.0)	B (19.4)	C (23.0)	D (38.8)	D (36.4)
2021 without development (Case 2)	-	-	-	C (28.4)	D (47.9)	E (68.7)
2021 without development (Case 2) with DelDOT Improvements and signal optimization <sup>8</sup>	C (23.2)	C (34.3)	C (27.7)	C (22.3)	D (36.6)	D (47.0)
2021 with development and rights-in/rights-out/lefts-in on Delaware Route 24 (Case 3a)	-	-	-	C (30.7)	E (55.1)	E (72.0)
2021 with development with rights-in/rights-out/lefts-in along Delaware Route 13 (Case 3a) with DelDOT Improvements and signal optimization <sup>8</sup>	C (24.6)	D (35.3)	C (26.9)	C (26.0)	D (43.5)	D (49.5)
2021 with development and full access on Delaware Route 24 (Case 3b)	-	-	-	C (30.8)	D (54.9)	E (73.3)
2021 with development and full access on Delaware Route 24 (Case 3b) with DelDOT Improvements and signal optimization <sup>8</sup>	C (28.6)	D (37.1)	C (26.3)	C (26.5)	D (45.6)	C (33.7)

<sup>5</sup> JMT modeled the four signalized intersections along Delaware Route 24 as one signalized corridor, whereas the TIS modeled the intersections individually.

<sup>6</sup> JMT modeled the intersection using signal cycle lengths and phase split lengths per the DelDOT Signal Timing Plan, whereas the TIS did not.

<sup>7</sup> The TIS modeled the eastbound Delaware Route 24 approach with a right turn overlap, whereas the JMT did not.

<sup>8</sup> DelDOT improvements scenario includes the improvements proposed as part of *HSIP SR 24 at Mount Joy Road and SR 24 at Bay Farm Road Intersection Improvements* project (DelDOT Contract No. T200711201). This includes widening to provide turn lanes along each approach to the Delaware Route 24 intersections with Mount Joy Road/Oak Orchard Road and Bay Farm Road/Autumn Lane. Additionally, phase split lengths were optimized while maintaining the existing signal cycle length.



Table 5  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Unsignalized Intersection Two-Way Stop Control <sup>1</sup>	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 24/Sherwood Forest</b>						
2018 Existing (Case 1)						
Eastbound Delaware 24 Left Turn	A (8.1)	A (9.1)	A (8.7)	A (8.1)	A (9.1)	A (8.8)
Westbound Delaware 24 Left Turn	A (8.8)	A (9.3)	A (9.1)	A (8.7)	A (9.3)	A (9.6)
Northbound Sherwood Forest Approach	B (10.3)	C (17.2)	B (11.9)	C (15.8)	C (24.5)	D (23.7)
Southbound Sherwood Forest Approach	-	C (24.5)	C (15.3)	-	C (24.2)	C (19.2)
2021 Without Development (Case 2)						
Eastbound Delaware 24 Left Turn	A (8.8)	B (10.3)	A (9.8)	A (8.7)	B (10.3)	A (9.9)
Westbound Delaware 24 Left Turn	A (9.7)	B (10.4)	B (10.2)	A (9.7)	B (10.4)	B (11.1)
Northbound Sherwood Forest Approach	C (17.2)	E (42.7)	C (21.7)	D (25.4)	F (56.8)	E (47.0)
Southbound Sherwood Forest Approach	-	F (59.4)	D (32.3)	-	F (57.9)	E (42.0)
2021 with development (Case 3)						
Eastbound Delaware 24 Left Turn	A (8.9)	B (12.2)	B (10.1)	A (8.9)	B (10.5)	B (10.2)
Westbound Delaware 24 Left Turn	A (9.9)	B (12.5)	B (10.5)	A (9.8)	B (10.7)	B (11.4)
Northbound Sherwood Forest Approach	C (19.3)	F (286.5)	D (26.2)	D (28.0)	F (68.2)	F (56.8)
Southbound Sherwood Forest Approach	B (12.9)	F (237.2)	E (39.0)	-	F (68.4)	F (50.7)

Table 5 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Roundabout <sup>1</sup>	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 24/Sherwood Forest <sup>9</sup></b>						
2021 without Development (Case 2)	-	-	-	A (9.1)	B (14.8)	C (16.5)
2021 with Development (Case 3)	-	-	-	A (9.7)	C (16.7)	C (19.5)

Table 5 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Signalized Intersection <sup>1</sup>	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 24/Sherwood Forest <sup>10</sup></b>						
2021 without Development (Case 2)	-	-	-	B (11.3)	B (14.5)	B (10.3)
2021 with Development (Case 3)	-	-	-	B (12.2)	B (15.8)	B (13.2)

<sup>9</sup> JMT analyzed the intersection as a single-lane roundabout.

<sup>10</sup> JMT analyzed the intersection as a signalized intersection along the coordinated signalized Delaware Route 24 corridor. A 120 second cycle length was utilized for the AM and PM peak hours, and a 90 second cycle length was utilized for the Summer Saturday peak hour.

Table 6  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Signalized Intersection <sup>1</sup>	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 24/Plaza Drive</b> <sup>5, 6, 11</sup>						
2018 Existing (Case 1)	B (16.4)	C (30.6)	D (41.9)	B (17.8)	C (23.0)	B (16.5)
2021 without development (Case 2)	C (20.4)	D (36.4)	E (56.0)	C (29.6)	D (39.0)	C (23.4)
2021 without development (Case 2) with DelDOT Improvements and signal optimization <sup>8</sup>	-	-	-	B (13.9)	C (20.2)	D (39.2)
2021 with development with rights-in/rights-out/lefts-in along Delaware Route 13 (Case 3a)	C (20.8)	D (42.0)	E (64.5)	D (43.4)	D (50.1)	D (38.1)
2021 with development with rights-in/rights-out/lefts-in along Delaware Route 13 (Case 3a) with DelDOT Improvements and signal optimization <sup>8</sup>	-	-	-	B (14.3)	C (24.5)	C (20.8)
2021 with development with full access along Delaware Route 13 (Case 3b)	C (20.8)	D (42.0)	E (64.5)	D (40.1)	D (46.5)	C (32.1)
2021 with development with full access along Delaware Route 13 (Case 3b) with DelDOT Improvements and signal optimization <sup>8</sup>	-	-	-	B (13.4)	C (24.5)	B (18.1)

<sup>11</sup> The TIS modeled the northbound Plaza Drive approach with a right turn overlap, whereas JMT did not.

Table 7  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Unsignalized Intersection Two-Way Stop Control (T-intersection) <sup>1</sup>	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 24/Legion Road (Sussex Road 298)</b>						
2018 Existing (Case 1)						
Westbound Delaware Route 24 Left Turn	A (9.0)	A (9.4)	A (9.1)	A (8.9)	A (9.5)	A (9.8)
Northbound Legion Road Approach	C (21.1)	C (19.7)	C (16.6)	C (17.7)	C (20.3)	C (23.2)
2021 without Development (Case 2)						
Westbound Delaware Route 24 Left Turn	A (9.4)	B (10.4)	B (10.2)	A (9.5)	B (10.9)	B (11.2)
Northbound Legion Road Approach	F (172.3)	F (169.8)	F (100.5)	F (67.8)	F (181.4)	F (303.4)
2021 with Development (Case 3)						
Westbound Delaware Route 24 Left Turn	A (9.9)	B (11.3)	B (10.6)	A (9.8)	B (11.4)	B (11.7)
Northbound Legion Road Approach	F (281.8)	F (271.4)	F (187.7)	F (102.1)	F (287.4)	F (503.8)

Table 7 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Roundabout <sup>1</sup>	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 24/Legion Road (Sussex Road 298) <sup>9</sup></b>						
2021 without Development (Case 2)	-	-	-	A (9.6)	C (16.5)	C (18.1)
2021 with Development (Case 3)	-	-	-	B (10.7)	C (20.5)	C (24.4)

Table 7 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Signalized Intersection <sup>1</sup>	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 24/Legion Road (Sussex Road 298) <sup>10</sup></b>						
2021 without Development (Case 2)	-	-	-	B (11.2)	A (9.8)	B (13.6)
2021 with Development (Case 3)	-	-	-	B (11.6)	B (10.1)	B (13.7)

Table 8  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Signalized Intersection <sup>1</sup>	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 24/Oak Orchard Road/Mount Joy Road (Sussex Road 297)</b> <sup>5, 6, 12</sup>						
2018 Existing (Case 1)	C (23.2)	C (22.7)	C (21.1)	D (43.3)	D (54.0)	D (36.9)
2021 without development (Case 2)	-	-	-	E (61.5)	F (116.5)	E (77.5)
2021 without development (Case 2) with DelDOT Improvements and signal optimization <sup>8, 13</sup>	C (24.8)	C (28.4)	C (24.6)	C (29.2)	D (35.3)	C (31.6)
2021 with development (Case 3)	-	-	-	E (68.0)	F (139.0)	F (96.4)
2021 with development (Case 3) with DelDOT Improvements and signal optimization <sup>8, 13</sup>	C (26.0)	C (28.7)	C (26.0)	C (31.1)	D (36.1)	D (35.5)

<sup>12</sup> The TIS modeled the northbound and southbound approaches with a right turn overlap, whereas JMT did not.

<sup>13</sup> JMT modeled the northbound and southbound Oak Orchard Road/Mount Joy Road approaches with protected and permissive phasing, whereas the TIS modeled the approaches with permissive phasing.

Table 9  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Unsignalized Intersection Two-Way Stop Control (T-intersection) <sup>1</sup>	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 24/Arrowhead Trail</b> <sup>14</sup>						
2018 Existing (Case 1)						
Eastbound Delaware Route 24 Left Turn	A (8.6)	A (8.4)	A (8.0)	A (8.6)	A (8.5)	A (8.3)
Southbound Arrowhead Trail Approach	C (17.3)	C (16.6)	A (9.3)	C (16.4)	C (18.0)	B (10.9)
2021 Without Development (Case 2)						
Eastbound Delaware Route 24 Left Turn	A (9.4)	A (8.8)	A (8.4)	A (9.3)	A (8.9)	A (8.8)
Southbound Arrowhead Trail Approach	C (25.0)	D (25.5)	B (12.3)	C (23.0)	D (25.7)	C (15.3)
2021 with development (Case 3) <sup>15</sup>						
Eastbound Delaware Route 24 Left Turn	A (9.5)	A (9.0)	A (8.6)	A (9.4)	A (9.0)	A (8.9)
Southbound Arrowhead Trail Approach	D (27.0)	D (28.5)	B (13.2)	C (24.8)	D (27.9)	C (16.7)

<sup>14</sup> JMT utilized volumes different from the TIS for the Summer Saturday peak.

<sup>15</sup> TIS utilized a volume of 552 for through movement along eastbound Delaware Route 24 whereas JMT utilized a volume of 553 consistent with existing count.

Table 10  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Unsignalized Intersection Two-Way Stop Control (T-intersection) <sup>1</sup>	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 24/Gull Point Road (Sussex Road 313)</b>						
2018 Existing (Case 1)						
Westbound Delaware Route 24 Left Turn	A (8.3)	A (8.5)	A (8.3)	A (8.3)	A (8.7)	A (8.6)
Northbound Gull Point Road Approach	C (19.6)	C (17.1)	B (14.2)	C (18.9)	C (18.4)	C (16.7)
2021 without Development (Case 2)						
Westbound Delaware Route 24 Left Turn	A (8.6)	A (9.3)	A (8.9)	A (8.6)	A (9.4)	A (9.3)
Northbound Gull Point Road Approach	D (28.6)	D (25.9)	C (20.3)	D (27.0)	D (26.1)	C (24.3)
2021 with development (Case 3)						
Westbound Delaware Route 24 Left Turn	A (8.7)	A (9.5)	A (9.1)	A (8.7)	A (9.5)	A (9.4)
Northbound Gull Point Road Approach	D (31.0)	D (28.7)	C (22.2)	D (29.2)	D (28.2)	D (26.6)



Table 11  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Unsignalized Intersection Two-Way Stop Control (T-intersection)	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Mount Joy Road (Sussex Road 297)/Cordrey Road (Sussex Road 308)</b>						
2018 Existing (Case 1)						
Westbound Mount Joy Road Left Turn	A (7.5)	A (7.9)	A (7.6)	A (7.6)	A (8.0)	A (7.6)
Northbound Cordrey Road Approach	A (9.9)	B (11.2)	A (9.7)	A (9.9)	B (11.8)	A (9.8)
2021 Without Development (Case 2)						
Westbound Mount Joy Road Left Turn	A (7.7)	A (8.1)	A (7.8)	A (7.7)	A (8.2)	A (7.8)
Northbound Cordrey Road Approach	B (10.7)	B (12.6)	B (10.5)	B (10.7)	B (13.0)	B (10.7)
2021 with development (Case 3)						
Westbound Mount Joy Road Left Turn	A (7.8)	A (8.2)	A (7.9)	A (7.8)	A (8.3)	A (7.9)
Northbound Cordrey Road Approach	B (11.0)	B (13.2)	B (11.0)	B (11.0)	B (13.6)	B (11.2)

Table 12  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Signalized Intersection <sup>1</sup>	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 24/Indian Mission Road/Long Neck Road (Sussex Road 22)</b> <sup>5, 6, 16</sup>						
2018 Existing (Case 1)	C (30.9)	C (29.5)	C (30.9)	D (35.7)	D (37.3)	D (44.3)
2021 without development (Case 2)	C (31.5)	C (34.1)	C (34.3)	D (41.0)	E (56.9)	E (73.5)
2021 without development (Case 2) with DelDOT Improvements and signal optimization <sup>8</sup>	-	-	-	C (31.1)	D (38.0)	E (55.6)
2021 without development (Case 2) with DelDOT Improvements and JMT improvement <sup>17</sup>	-	-	-	C (28.2)	C (29.2)	C (33.5)
2021 with development (Case 3)	C (32.0)	C (30.1)	C (32.1)	D (41.0)	E (57.0)	F (84.3)
2021 with development (Case 3) with DelDOT Improvements and signal optimization <sup>8</sup>	-	-	-	C (32.1)	D (42.1)	E (68.0)
2021 with development (Case 3) with DelDOT Improvements and JMT improvement <sup>16</sup>	-	-	-	C (28.3)	C (29.5)	D (35.4)

<sup>16</sup> The TIS modeled intersection with a right turn overlap along all approaches, whereas JMT did not.

<sup>17</sup> JMT improvement scenario includes the widening of Delaware Route 24 to provide two through lanes along the eastbound and westbound approaches, as well as the improvements proposed as part of the *HSIP SR 24 at SR 5/SR 23 Intersection Improvements* (DelDOT Contract No. T201200903) project.

Table 13  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Unsignalized Intersection Two-Way Stop Control (T-intersection) <sup>1</sup>	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 24/White Pine Drive</b> <sup>18</sup>						
2018 Existing (Case 1)						
Westbound Delaware Route 24 Left Turn	A (8.7)	A (8.8)	A (8.7)	A (8.6)	A (8.9)	A (9.2)
Northbound White Pine Drive Approach	B (11.9)	C (18.3)	B (14.9)	C (15.0)	C (22.5)	C (24.8)
2021 without Development (Case 2)						
Westbound Delaware Route 24 Left Turn	A (9.2)	A (9.4)	A (9.1)	A (9.1)	A (9.4)	A (9.8)
Northbound White Pine Drive Approach	C (15.2)	D (27.0)	C (19.3)	C (18.9)	D (30.9)	E (37.8)
2021 with Development (Case 3)						
Westbound Delaware Route 24 Left Turn	A (9.3)	A (9.5)	A (9.2)	A (9.2)	A (9.5)	A (10.0)
Northbound White Pine Drive Approach	C (16.2)	D (29.6)	C (21.1)	C (20.0)	D (33.8)	E (43.4)

<sup>18</sup> The TIS modeled the intersection with one through lane and one right turn lane along the westbound Delaware Route 24 approach, whereas JMT modeled the intersection with one shared through/right turn lane along the westbound Delaware Route 24 approach per existing conditions.

Table 13 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Roundabout <sup>1</sup>	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 24/White Pine Drive <sup>9</sup></b>						
2021 without Development (Case 2)	-	-	-	A (7.3)	A (9.3)	B (10.1)
2021 with Development (Case 3)	-	-	-	A (7.6)	A (9.8)	B (10.9)

Table 13 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Signalized Intersection <sup>1</sup>	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 24/White Pine Drive <sup>10</sup></b>						
2021 without Development (Case 2)	-	-	-	A (5.9)	A (5.9)	B (16.2)
2021 with Development (Case 3)	-	-	-	A (6.1)	A (6.0)	B (15.5)

Table 14  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Unsignalized Intersection Two-Way Stop Control <sup>1</sup>	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 24/Greens Way <sup>19</sup></b>						
2018 Existing (Case 1)						
Eastbound Delaware Route 24 Left Turn	A (7.9)	A (8.6)	A (8.3)	A (7.9)	A (8.8)	A (8.7)
Westbound Delaware Route 24 Left Turn	A (8.7)	A (8.7)	A (8.6)	A (8.6)	A (8.9)	A (9.3)
Northbound Greens Way Approach	C (15.7)	C (20.2)	C (17.7)	B (14.7)	C (22.2)	D (26.4)
Southbound Greens Way Approach	C (18.5)	-	-	-	-	-
2021 without Development (Case 2)						
Eastbound Delaware Route 24 Left Turn	A (8.3)	A (9.2)	A (8.7)	A (8.2)	A (9.2)	A (9.2)
Westbound Delaware Route 24 Left Turn	A (9.1)	A (9.3)	A (9.2)	A (9.0)	A (9.4)	A (10.0)
Northbound Greens Way Approach	D (20.3)	D (30.5)	D (25.5)	C (18.5)	D (30.8)	E (42.6)
Southbound Greens Way Approach	C (24.5)	-	-	-	-	-
2021 with Development (Case 3)						
Eastbound Delaware Route 24 Left Turn	A (8.4)	A (9.3)	A (8.9)	A (8.3)	A (9.3)	A (9.4)
Westbound Delaware Route 24 Left Turn	A (9.2)	A (9.4)	A (9.3)	A (9.1)	A (9.5)	B (10.2)
Northbound Greens Way Approach	C (21.6)	D (33.7)	D (28.8)	C (19.6)	D (34.1)	F (50.3)
Southbound Greens Way Approach	D (26.2)	-	-	-	-	-

<sup>19</sup> As no volumes were recorded utilizing southbound Greens Way during the AM, PM, or Summer Saturday peak hours, JMT did not include volumes for this approach in the analysis.

Table 14 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Roundabout <sup>1</sup>	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 24/Greens Way <sup>9</sup></b>						
2021 without Development (Case 2)	-	-	-	A (7.1)	A (9.3)	B (11.0)
2021 with Development (Case 3)	-	-	-	A (7.4)	A (9.8)	B (12.0)

Table 14 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Signalized Intersection <sup>1</sup>	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 24/Greens Way <sup>10</sup></b>						
2021 without Development (Case 2)	-	-	-	A (8.4)	A (8.3)	B (14.9)
2021 with Development (Case 3)	-	-	-	A (8.9)	A (8.7)	B (13.9)

Table 15  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Unsignalized Intersection Two-Way Stop Control (T-intersection) <sup>1</sup>	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 24/Banks Road (Sussex Road 298)</b>						
2018 Existing (Case 1)						
Westbound Delaware Route 24 Left Turn	A (8.8)	B (9.5)	A (9.0)	A (8.8)	A (9.6)	A (9.7)
Northbound Banks Road Approach	C (15.3)	C (15.2)	C (17.6)	B (14.6)	C (16.0)	C (24.4)
2021 without Development (Case 2)						
Westbound Delaware Route 24 Left Turn	A (9.4)	B (10.3)	A (9.6)	A (9.3)	B (10.3)	B (10.7)
Northbound Banks Road Approach	C (18.9)	C (19.0)	C (22.7)	C (17.9)	C (19.1)	E (37.9)
2021 with Development (Case 3)						
Westbound Delaware Route 24 Left Turn	A (9.5)	B (10.5)	A (9.8)	A (9.4)	B (10.5)	B (10.9)
Northbound Banks Road Approach	C (20.0)	C (21.6)	D (25.1)	C (18.8)	C (21.7)	E (44.1)

Table 15 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Roundabout <sup>1</sup>	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 24/Banks Road (Sussex Road 298) <sup>9</sup></b>						
2021 without Development (Case 2)	-	-	-	A (7.8)	B (12.0)	B (13.7)
2021 with Development (Case 3)	-	-	-	A (8.2)	B (13.3)	C (15.1)

Table 15 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Signalized Intersection <sup>1</sup>	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 24/Banks Road (Sussex Road 298) <sup>10</sup></b>						
2021 without Development (Case 2)	-	-	-	B (16.2)	B (11.6)	C (29.6)
2021 with Development (Case 3)	-	-	-	B (16.7)	B (13.1)	C (30.4)



Table 16  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Unsignalized Intersection Two-Way Stop Control (T-intersection) <sup>1</sup>	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Autumn Road (Sussex Road 209)/Friendship Road (Sussex Road 306A)</b>						
2018 Existing (Case 1)						
Westbound Friendship Road Left Turn	A (7.3)	A (7.6)	A (7.3)	A (7.3)	A (7.8)	A (7.4)
Northbound Autumn Road Approach	A (8.7)	A (9.8)	A (8.7)	B (8.7)	B (10.5)	B (8.8)
2021 without development (Case 2)						
Westbound Friendship Road Left Turn	A (7.3)	A (7.6)	A (7.3)	A (7.3)	A (7.8)	A (7.4)
Northbound Autumn Road Approach	A (8.7)	A (9.8)	A (8.7)	A (8.7)	B (10.5)	A (8.9)
2021 with development (Case 3)						
Westbound Friendship Road Left Turn	A (7.4)	A (7.7)	A (7.4)	A (7.4)	A (7.9)	A (7.5)
Northbound Autumn Road Approach	A (8.9)	A (10.4)	A (9.0)	A (8.9)	B (11.1)	A (9.2)

Table 17  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Unsignalized Intersection Two-Way Stop Control (T-intersection) <sup>1</sup>	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Indian Mission Road (Delaware Route 5)/ Friendship Road (Sussex Road 306A) <sup>20</sup></b>						
2018 Existing (Case 1) <sup>21</sup>						
Eastbound Friendship Road Approach	A (10.0)	A (9.8)	B (10.8)	B (12.4)	B (14.4)	C (17.3)
Northbound Indian Mission Road Left Turn	A (8.3)	A (8.6)	A (8.5)	A (8.3)	A (8.5)	A (8.7)
2021 Without Development (Case 2)						
Eastbound Friendship Road Approach	B (14.7)	C (19.2)	C (20.5)	C (19.4)	C (23.5)	D (31.1)
Northbound Indian Mission Road Left Turn	A (8.8)	A (9.2)	A (9.1)	A (8.7)	A (9.1)	A (9.3)
2021 with development (Case 3)						
Eastbound Friendship Road Approach	A (8.9)	D (27.6)	E (35.1)	D (25.2)	D (33.4)	F (55.1)
Northbound Indian Mission Road Left Turn	A (7.4)	A (9.2)	A (9.3)	A (8.8)	A (9.2)	A (9.5)
2021 with development (Case 3) <i>with Improvement</i> <sup>22</sup>						
Eastbound Friendship Road Approach	-	-	-	C (18.8)	C (23.3)	D (31.9)
Northbound Indian Mission Road Left Turn	-	-	-	A (8.9)	A (9.3)	A (0.7)

<sup>20</sup> JMT configured Indian Mission Road (Delaware Route 5) in northbound and southbound direction and Friendship Road (Sussex Road 306A) in eastbound direction to match with existing condition whereas the TIS did not.

<sup>21</sup> JMT utilized Peak Hour factor consistent with existing counts whereas the TIS did not.

<sup>22</sup> Improvement scenario includes to providing an additional through lane along northbound and southbound of Indian Mission Road (Delaware Route 5).

Table 17 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Roundabout <sup>1</sup>	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Indian Mission Road (Delaware Route 5)/ Friendship Road (Sussex Road 306A) <sup>9</sup></b>						
2021 with development (Case 3) <sup>23</sup>	-	-	-	A (7.4)	A (8.4)	A (9.4)

Table 17 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Signalized Intersection <sup>1</sup>	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Indian Mission Road (Delaware Route 5)/ Friendship Road (Sussex Road 306A)</b>						
2021 with development (Case 3) <sup>24</sup>	-	-	-	A (7.4)	A (7.0)	B (11.7)

<sup>23</sup> This scenario includes providing a single lane roundabout.

<sup>24</sup> This scenario includes to signalization of the intersection and adding a left turn lane along northbound Indian Mission Road (Delaware Route 5) with protected/permissive phasing and a cycle length of 90 seconds during the AM, PM and Saturday peak hours.

Table 18  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Unsignalized Intersection Two-Way Stop Control	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
2018 Existing (Case 1)						
Eastbound Stonewater Creek Road Left Turn	C (19.7)	C (22.3)	C (17.1)	C (22.3)	C (21.0)	C (20.3)
Eastbound Stonewater Creek Road Right Turn	B (10.5)	B (11.1)	B (10.6)	B (10.6)	B (10.4)	B (10.7)
Eastbound Stonewater Creek Road Approach	C (15.1)	B (12.4)	B (11.8)	C (16.4)	B (12.2)	B (12.3)
Westbound Stonewater Creek Road Left Turn	C (22.3)	C (23.8)	C (19.0)	C (23.9)	C (22.1)	C (23.5)
Westbound Stonewater Creek Road Right Turn	B (11.2)	B (10.5)	B (10.7)	B (11.5)	B (10.4)	B (10.9)
Westbound Stonewater Creek Road Approach	C (16.4)	C (17.1)	C (16.3)	C (17.3)	C (16.2)	C (19.4)
Northbound Delaware Route 5 Left Turn	A (8.1)	A (8.3)	A (8.1)	A (8.2)	A (8.2)	A (8.2)
Southbound Delaware Route 5 Left Turn	A (8.3)	A (8.3)	A (8.3)	A (8.4)	A (8.2)	A (8.3)
2021 Without Development (Case 2)						
Eastbound Stonewater Creek Road Left Turn	D (30.0)	D (34.2)	C (24.4)	D (33.4)	D (34.6)	D (32.9)
Eastbound Stonewater Creek Road Right Turn	B (11.8)	B (12.5)	B (11.9)	B (11.9)	B (12.5)	B (12.3)
Eastbound Stonewater Creek Road Approach	C (20.9)	C (15.2)	B (14.2)	C (22.6)	C (15.3)	C (15.7)
Westbound Stonewater Creek Road Left Turn	E (40.4)	E (40.0)	D (30.7)	E (41.4)	E (40.5)	E (49.3)
Westbound Stonewater Creek Road Right Turn	B (12.9)	B (11.9)	B (12.2)	B (13.0)	B (12.0)	B (12.6)
Westbound Stonewater Creek Road Approach	D (25.8)	D (25.8)	C (24.6)	D (26.3)	D (26.0)	E (37.3)
Northbound Delaware Route 5 Left Turn	A (8.6)	A (8.8)	A (8.6)	A (8.6)	A (8.8)	A (8.7)
Southbound Delaware Route 5 Left Turn	A (8.8)	A (8.8)	A (8.8)	A (8.8)	A (8.8)	A (8.9)

Table 18 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Unsignalized Intersection Two-Way Stop Control	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 5/Stonewater Creek Road</b>						
2021 with development (Case 3)						
Eastbound Stonewater Creek Road Left Turn	D (32.5)	E (36.3)	D (26.6)	E (36.4)	E (37.5)	E (36.5)
Eastbound Stonewater Creek Road Right Turn	B (12.1)	B (12.8)	B (12.3)	B (12.2)	B (12.8)	B (12.7)
Eastbound Stonewater Creek Road Approach	C (22.3)	C (15.7)	B (14.9)	C (24.3)	C (15.9)	C (16.7)
Westbound Stonewater Creek Road Left Turn	E (45.8)	E (44.0)	D (34.9)	E (47.0)	E (45.1)	F (59.6)
Westbound Stonewater Creek Road Right Turn	B (13.2)	B (12.2)	B (12.6)	B (13.3)	B (12.3)	B (13.0)
Westbound Stonewater Creek Road Approach	D (28.5)	D (27.9)	D (27.6)	D (29.2)	D (28.4)	E (44.4)
Northbound Delaware Route 5 Left Turn	A (8.7)	A (8.8)	A (8.7)	A (8.7)	A (8.9)	A (8.9)
Southbound Delaware Route 5 Left Turn	A (8.8)	A (8.9)	A (8.9)	A (8.9)	A (8.9)	A (9.0)

Table 18 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

<b>Roundabout</b>	<b>LOS per TIS</b>			<b>LOS per JMT</b>		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 5/Stonewater Creek Road<sup>9</sup></b>						
2021 with development (Case 3)	-	-	-	A (7.8)	A (8.1)	A (8.3)

Table 18 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

<b>Signalized Intersection</b>	<b>LOS per TIS</b>			<b>LOS per JMT</b>		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 5/Stonewater Creek Road<sup>25</sup></b>						
2021 with development (Case 3)	-	-	-	B (16.2)	B (14.3)	B (17.2)

<sup>25</sup> This scenario includes signalization of the intersection maintaining existing lane configurations and a cycle length of 90 seconds during the AM, PM and Saturday peak hours and protected and permissive phase for northbound and southbound Delaware Route 5 left turns and split phase for the side streets.

Table 19  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Unsignalized Intersection Two-Way Stop Control	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 5/Cannon Road (Sussex Road 307) <sup>26</sup></b>						
2018 Existing (Case 1)						
Eastbound Cannon Road Approach	C (24.1)	C (21.6)	C (16.6)	C (21.4)	C (17.6)	C (15.6)
Northbound Delaware Route 5 Left Turn	A (8.3)	A (8.7)	A (8.2)	A (8.4)	A (8.6)	A (8.2)
2021 Without Development (Case 2)						
Eastbound Cannon Road Approach	F (51.6)	E (44.1)	C (24.6)	E (36.0)	D (33.2)	D (27.7)
Northbound Delaware Route 5 Left Turn	A (8.7)	A (9.3)	A (8.7)	A (8.8)	A (9.4)	A (8.9)
2021 Without Development (Case 2) <i>with Improvement</i> <sup>27</sup>						
Eastbound Cannon Road Left Turn	-	-	-	E (36.2)	D (33.8)	D (29.6)
Eastbound Cannon Road Right Turn	-	-	-	B (12.2)	B (13.4)	B (11.9)
Eastbound Cannon Road Approach	-	-	-	D (27.6)	D (26.3)	C (23.0)
Northbound Delaware Route 5 Left Turn	-	-	-	A (8.8)	A (9.4)	A (8.9)

<sup>26</sup> The TIS included the westbound Waterfront Driveway in the analysis whereas JMT omitted due to the very low volumes utilizing the Waterfront Driveway.

<sup>27</sup> Improvement scenario includes providing a left turn lane along northbound Delaware Route 5 and a right turn lane along southbound Delaware Route 5 as well as configuring the eastbound Canon Road as a left turn lane and a right turn lane.

Table 19  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Unsignalized Intersection Two-Way Stop Control	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 5/Cannon Road (Sussex Road 307) <sup>30</sup></b>						
2021 with development (Case 3)						
Eastbound Cannon Road Approach	F (61.5)	F (51.1)	D (27.5)	E (41.1)	E (37.1)	D (31.4)
Northbound Delaware Route 5 Left Turn	A (8.8)	A (9.4)	A (8.9)	A (8.9)	A (9.5)	A (9.0)
2021 with development (Case 3) <i>with Improvement</i>						
Eastbound Cannon Road Left Turn	-	-	-	E (40.7)	E (37.4)	D (33.3)
Eastbound Cannon Road Right Turn	-	-	-	B (12.5)	B (13.8)	B (12.3)
Eastbound Cannon Road Approach	-	-	-	D (30.6)	D (28.7)	D (25.4)
Northbound Delaware Route 5 Left Turn	-	-	-	A (8.9)	A (9.5)	A (9.0)



Table 19 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Roundabout	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 5/Cannon Road (Sussex Road 307)</b> <sup>9, 28</sup>						
2021 Without Development (Case 2)	-	-	-	B (13.8)	B (12.8)	A (9.0)
2021 with development (Case 3)	-	-	-	B (13.9)	B (13.1)	A (9.2)

Table 19 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Impact Study for Peninsula Square  
Report Dated: April 2020  
Prepared By: Duffield Associates, Inc.

Signalized Intersection	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Delaware Route 5/Cannon Road (Sussex Road 307)</b> <sup>33, 29</sup>						
2021 Without Development (Case 2)	-	-	-	A (9.8)	A (9.2)	A (7.6)
2021 with development (Case 3)	-	-	-	B (10.0)	A (9.5)	A (7.9)

<sup>28</sup> Waterfront Driveway omitted from analysis due to the very low volumes.

<sup>29</sup> This scenario includes signalization of the intersection with a left turn lane along northbound Delaware Route 5 operating with protected/permissive phasing and a right turn lane along southbound Delaware Route 5, and a cycle length of 90 seconds during the AM, PM, and Saturday peak hours.