



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

JENNIFER COHAN  
SECRETARY

June 4, 2020

Mr. Carl Wilson  
The Traffic Group, Inc.  
9900 Franklin Square Drive  
Suite H  
Baltimore, MD 21236

Dear Mr. Wilson:

The enclosed Traffic Operational Analysis (TOA) review letter for the **Poole Farm** (Tax Parcels #23-065.00-005 & 011) 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 TOA 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. James Winfield, Lamboll Street, L.L.C.  
Ms. Constance C. Holland, Office of State Planning Coordination  
Mr. Morris Deputy, Town of Middletown  
Mr. Mir Wahed, Johnson, Mirmiran & Thompson, Inc.  
Ms. Joanne Arellano, Johnson, Mirmiran & Thompson, Inc.  
DelDOT Distribution

## DelDOT Distribution

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T. William Brockenbrough, Jr., County Coordinator, Development Coordination

Peter Haag, Chief Traffic Engineer, Traffic, DOTS

Kevin Canning, Canal District Engineer, Canal District

Matthew Vincent, Canal District Public Works Engineer, Canal District

David Dooley, Service Development Planner, Delaware Transit Corporation

Sireen Muhtaseb, New Castle Review Coordinator, Development Coordination

Anthony Aglio, Planning Supervisor, Statewide & Regional Planning

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Mark Galipo, Traffic Engineer, Traffic, DOTS

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June 3, 2020

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

RE: Agreement No. 1774  
Project Number T201769002  
Traffic Impact Study Services  
**Subtask 1B-2-Poole Farms TOA**

Dear Mr. Brestel:

Johnson, Mirmiran and Thompson (JMT) has completed the review of the Traffic Operational Analysis (TOA) for Poole Farms, prepared by The Traffic Group, Inc. dated September 19, 2019. This task was assigned as Subtask Number 1B-2. The report is prepared in a manner generally consistent with DelDOT's *Development Coordination Manual*.

The TOA evaluates the impacts of a proposed retail development in the Town of Middletown, New Castle County, Delaware. The development would be comprised of 306,000 square-feet of retail space. For this TOA review, Middletown Warwick Road is considered a north/south roadway and Levels Road is considered an east/west roadway.

The site is located on the northwest and southwest corners of the intersection of Middletown Warwick Road (New Castle Road 443) and Levels Road (New Castle Road 10). As the proposed development would be located on both sides of Levels Road, a 256,000 square-foot portion would occupy the south parcel and a 50,000 square-foot portion would occupy the north parcel. Four access points are proposed: a rights-in/rights-out access on the south side of Levels Road, a rights-in/rights-out/lefts-in access on the north side of Levels Road directly opposite the proposed entrance on the south side, a full access on Middletown Warwick Road south of Levels Road, and a rights-in only access on Middletown Warwick Road north of Levels Road. The subject property is on an approximately 57.57-acre assemblage of parcels that is zoned as C-3 (Employment/Regional Retail) and the developer does not plan to rezone the land. Construction is anticipated to be complete in 2022.

The proposed site is located within the Westown Transportation Improvement District (TID) which was established as part of the Westown Master Plan. The Westown TID is bordered by Bunker Hill Road in the north, Green Giant Road in the south, Middle Neck Road in the west, and the Norfolk Southern railroad in the east. The Westown Circulation Plan Update report is the latest traffic analysis conducted in order to update the Land Use and Transportation Plan for the Westown TID. The report includes a recommendation to improve one study intersection: Middletown Warwick Road and Levels Road. The intersection will be improved to provide dual



left turn lanes, two through lanes, and a channelized right turn lane along all approaches. These improvements, and the other improvements identified in the report, are part of the TID-CTP. Per email correspondence with DelDOT on November 5, 2019, fees have been collected for at least 10 years and approximately half of the projects have been completed. DelDOT continues to collect fees and monitor traffic to prioritize improvements recommended as part of the Westown TID.

Based on our review of the TOA, we have the following comments and recommendations: The following intersections exhibit level of service (LOS) deficiencies without the implementation of physical roadway and/or traffic control improvements.

<i><b>Intersection</b></i>	<i><b>Situations for which LOS deficiencies occur</b></i>
Site Entrance A/Middletown Warwick Road (New Castle Road 11)	2022 Saturday with full development (Case 3)
Middletown Warwick Road/Levels Road	2019 PM Existing (Case 1) 2022 AM, PM, and Saturday without development (Case 2) 2022 AM, PM, and Saturday with development of the south parcel only (Case 3a) 2022 AM, PM, and Saturday with full development (Case 3b) 2022 AM, PM, and Saturday with full development and no rights-in access on Middletown Warwick Road (Case 3c)

The unsignalized Site Entrance A intersection with Middletown Warwick Road is proposed approximately 900 feet south of the Middletown Warwick Road/Levels Road intersection and exhibits LOS deficiencies during the Saturday peak hour under future conditions with the proposed development. These deficiencies occur along the eastbound Site Entrance A approach and can be mitigated with the provision of a two-stage left turn from eastbound Site Entrance A onto northbound Middletown Warwick Road. A two-stage left turn would improve the intersection to operate at acceptable LOS C (24.9 seconds of delay per vehicle) along the eastbound Site Entrance A approach during the Saturday peak hour under Case 3 conditions. However, the provision of a two-stage left turn lane would require a break in the median along Middletown Warwick Road, which may encourage vehicles traveling southbound on Middletown Warwick Road to U-turn at the Site Entrance A intersection and weave across two through lanes to access the rights-in access for the Royal Farms.

These deficiencies at the Site Entrance A intersection with Middletown Warwick Road could be mitigated by the provision of a signalized intersection as well. However, the proposed site entrance is located in close proximity to the Levels Road intersection with Middletown Warwick Road (approximately 900 feet). Additionally, the rightmost through lane along southbound Middletown Warwick Road ends and merges with the leftmost through lane approximately 300 feet north of the proposed site entrance. Furthermore, the provision of a signalized intersection would impact the design at the existing Royal Farms rights-in entrance. It should be noted that a signal warrant evaluation was performed at the Site Entrance A intersection and Warrants 1, 2, and 3 from the



DE MUTCD would be justified. Details regarding the signal warrant evaluation can be found on Page 17 of this letter.

To address the concerns mentioned above regarding signalization at Site Entrance A, the developer could realign the United Drive approach to Middletown Warwick Road to be directly across from Site Entrance A and the lane end for the southbound through lane could occur south of Site Entrance A. The existing Royals Farms rights-in entrance could then be eliminated and a new full movement access for the Royal Farms could be provided along United Drive. Due to the scope of those improvements, it is acknowledged that the implementation may not be feasible.

Mitigation of the deficiencies at the Site Entrance A intersection with Middletown Warwick Road could also be implemented with the redesign of the entrance to provide only rights-in/rights-out movements and an interconnection be provided to the 301 Plaza Inc. gas station property located south of the site to facilitate entering vehicles from the south and exiting vehicles seeking to travel north along Middletown Warwick Road. As 375 vehicles are projected to execute a left turning movement from Site Entrance A onto northbound Middletown Warwick Road during the Saturday peak hour, a traffic signal could be installed once signal warrants are met at the Middletown Warwick Road/United Drive/gas station entrance intersection. However, it is acknowledged that the provision of an interconnection with the 301 Plaza Inc. gas station property may not be feasible.

As such, it is recommended that Site Entrance A be designed as a three-legged single lane roundabout with a southbound Middletown Warwick Road right turn bypass lane. With a roundabout, the Site Entrance A intersection with Middletown Warwick Road would operate at LOS A under Case 3 conditions for each study peak hour. The developer should coordinate with DelDOT on the design and implementation of this improvement.

The Middletown Warwick Road signalized intersection with Levels Road exhibits LOS deficiencies under existing and future conditions, with or without the proposed development. However, with signal timing split optimization, these intersections would improve to operate at LOS D or better during all peak hours under existing conditions. This intersection is planned to be improved as part of the Westown TID. These improvements include providing dual left turn lanes, two through lanes, and a channelized right turn lane along each approach. With these improvements and signal timing optimization, the intersection will operate at acceptable LOS D (47.5 seconds of delay per vehicle) or better under Case 3a, Case 3b, and Case 3c conditions. Therefore, we do not recommend the developer implement any additional improvements at this intersection.

The TOA included evaluation scenarios with and without the proposed rights-in only access (Site Entrance D) on Middletown Warwick Road north of the Levels Road signalized intersection. As the proposed rights-in only access would be located along the southbound right turn lane at the Middletown Warwick Road/Levels Road signalized intersection, the provision of the rights-in only access is not recommended.



Should the Town of Middletown 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 construct a site entrance (Site Entrances B and C) for the proposed Poole Farms development on Levels Road, approximately 700 feet west of the southwest point of tangency of the intersection with Middletown Warwick Road. The intersection should be consistent with the lane configurations shown in the table below:

Approach	Current Configuration	Proposed Configuration
Eastbound Levels Road	Two through lanes	One left turn lane, two through lanes, and one right turn lane
Westbound Levels Road	Two through lanes	Two through lanes and one right turn lane
Northbound Site Entrance B	Approach does not exist	One right turn lane
Southbound Site Entrance C	Approach does not exist	One right turn lane

Based on DelDOT's *Development Coordination Manual*, the recommended minimum storage lengths (excluding tapers) for the separate left turn and right turn lanes along Levels Road are listed below. The calculated queue lengths from the HCS analysis can be accommodated within the recommended storage lengths. 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.

Approach	Left Turn Lane	Right Turn Lane
Eastbound Levels Road	145 feet	190 feet
Westbound Levels Road	N/A	190 feet

2. The developer should construct a single lane roundabout with the westerly leg forming the site entrance (Site Entrance A) for the proposed Poole Farms development on Middletown Warwick Road, approximately 800 feet south of the southwest point of tangency of the intersection with Levels Road to be consistent with the lane configurations shown in the table below:



<b>Approach</b>	<b>Current Configuration</b>	<b>Proposed Configuration</b>
Eastbound Site Entrance A	Approach does not exist	One left turn/right turn lane
Northbound Middletown Warwick Road	Two through lanes	One left turn/through lane
Southbound Middletown Warwick Road	One through lane	One through lane and one right turn bypass lane

The developer should submit a plan to DelDOT’s Development Coordination Section depicting the design along the site frontage. The design should accommodate pedestrians and bicyclists at the roundabout. The final design of the site entrance should be determined during the Entrance Plan review process.

3. As the proposed development is within the Westtown TID, the developer should coordinate with DelDOT Planning to determine the standard fee required. Costs associated with construction of the Middletown Warwick Road approaches for the roundabout mentioned in Item 2 will be credited toward the required standard fee.
4. At DelDOT’s discretion, the developer should provide a bituminous concrete overlay to the existing travel lanes along the southbound Middletown Warwick Road site frontage in the area affected by entrance plan construction, 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.
5. At DelDOT’s discretion, the developer should provide a bituminous concrete overlay to the existing travel lanes along the eastbound and westbound Levels Road site frontage in the area affected by entrance plan construction, 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.
6. 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 Middletown Warwick Road and Levels Road site frontage. Within the easement, the developer should construct a five-foot wide sidewalk that meets current AASHTO and ADA standards. A minimum five-foot setback should be maintained from the edge of the pavement to the sidewalk. If feasible, the sidewalk 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 sidewalk.

- b. ADA compliant curb ramps and marked crosswalks should be provided along the Site Entrance A approach to Middletown Warwick Road and the Site Entrance B and C approaches to Levels Road. The use of diagonal curb ramps is discouraged.
- c. Minimum five-foot wide bicycle lanes should be incorporated in the right turn lane and shoulder along the Levels Road approaches to Site Entrances B and C.
- d. 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.
- e. Bike parking should be provided near the building entrances. Where the building architecture provides for an awning or other overhang, the bike parking should be covered.
- f. Where internal sidewalks are located alongside of the parking spaces, a buffer, physical barrier, or signage should be added to eliminate vehicular overhang onto the sidewalk.

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 TOA 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 TOA 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', is positioned below the typed name.

Joanne M. Arellano, P.E., PTOE

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

## **General Information**

**Report date:** September 19, 2019

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

**Prepared for:** Lamboll Street Development LLC

**Tax Parcels:** 23-065.00-005 & 23-065.00-011

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

## **Project Description and Background**

**Description:** The developer seeks to develop 306,000 square feet of retail space. A 256,000 square-foot portion would occupy the south parcel and a 50,000 square-foot portion would occupy the north parcel.

**Location:** Considering Middletown Warwick Road (New Castle Road 443) as a north/south roadway, and Levels Road (New Castle Road 10) as an east/west roadway, the subject site is located on the northwest and southwest corners of the intersection of Middletown Warwick Road and Levels Road in the Town of Middletown.

**Amount of Land to be developed:** Approximately 57.57-acre assemblage of parcels.

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

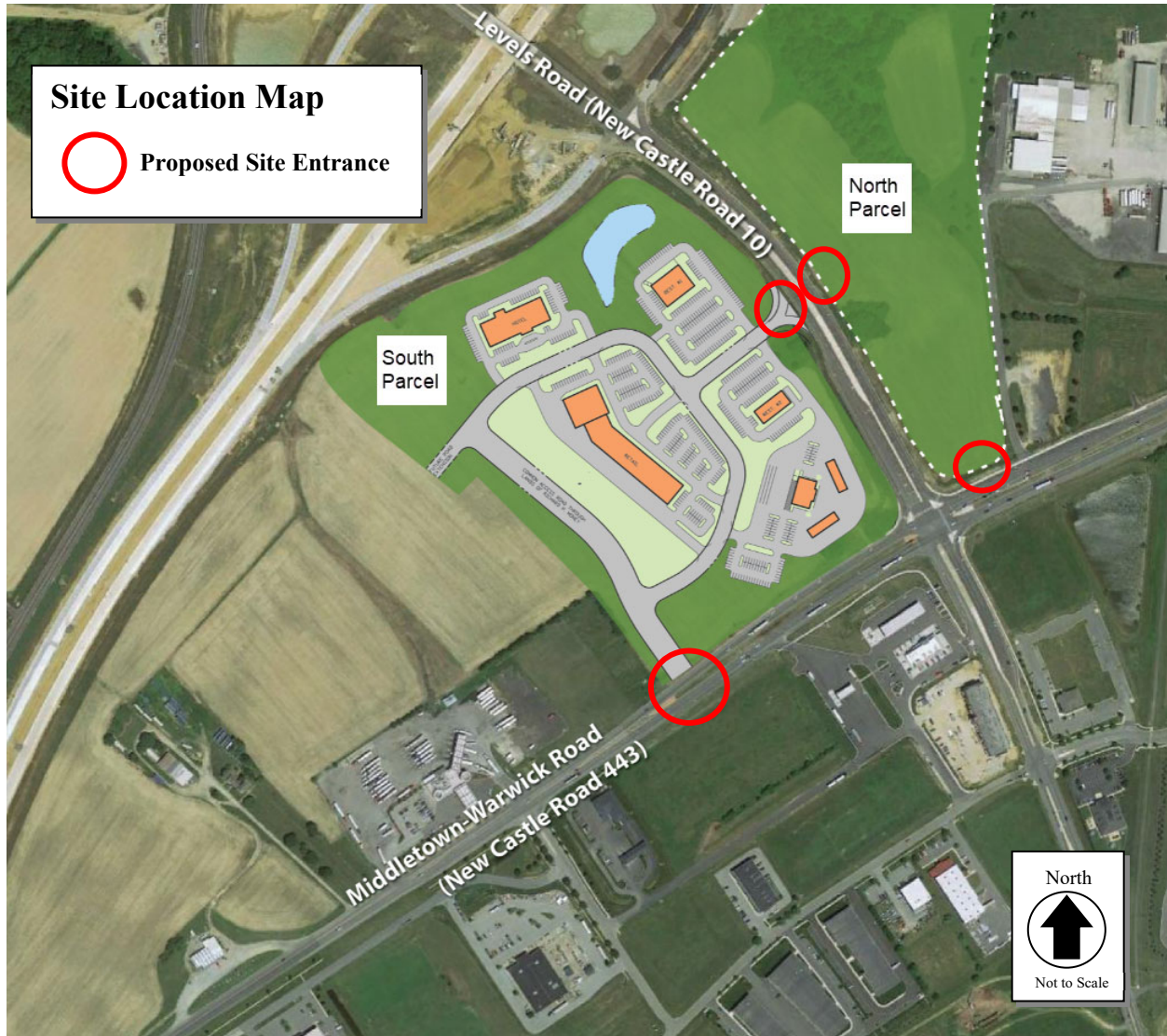
**Proposed completion date:** 2022.

**Proposed access location:** Four access points are proposed: a rights-in/rights-out access on the south side of Levels Road, a rights-in/rights-out/lefts-in access on the north side of Levels Road directly opposite the proposed entrance on the south side, a full access on Middletown Warwick Road south of Levels Road, and a rights-in only access on Middletown Warwick Road north of Levels Road.

### **Daily Traffic Volumes:**

- 2019 Average Annual Daily Traffic on Levels Road: 10,277 vehicles per day.
- 2019 Average Annual Daily Traffic on Middletown Warwick Road: 19,666 vehicles per day

**Site Map**



*\*Graphic is an approximation based on the Concept Plan prepared by Woodin and Associates dated June 17, 2019.*

**Relevant and On-going Projects**

The proposed site is located within the Westown Transportation Improvement District (TID) which was established as part of the Westown Master Plan. The Westown TID is bordered by Bunker Hill Road in the north, Green Giant Road in the south, Middle Neck Road in the west, and the Norfolk Southern railroad in the east. The Westown Circulation Plan Update report is the latest traffic analysis conducted in order to update the Land Use and Transportation Plan for the Westown TID. The report includes a recommendation to improve one study intersection: Middletown Warwick Road and Levels Road. The intersection will be improved to provide dual left turn lanes, two through lanes, and a channelized right turn lane along all approaches. These improvements, and the other improvements identified in the report, are part of the TID-CTP. Per

email correspondence with DelDOT on November 5, 2019, fees have been collected for at least 10 years and approximately half of the projects have been completed. DelDOT continues to collect fees and monitor traffic to prioritize improvements recommended as part of the Westown TID.

### **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 the Investment Level 1 and 2 areas.

#### **Investment Level 1**

These areas are often municipalities, towns, or urban/urbanizing places in counties where density is generally higher than in surrounding areas. In Investment Level 1 Areas, state investments and policies should support and encourage a wide range of uses and densities, promote other transportation options, foster efficient use of existing public and private investments, and enhance community identity and integrity. Overall, it is the state's intent to use its spending and management tools to maintain and enhance community character, to promote well-designed and efficient new growth, and to facilitate redevelopment in Investment Level 1 Areas.

In Level 1 Areas the state's first priority will be for preserving existing facilities and making safety improvements. Level 1 areas will also be the highest priority for context sensitive transportation system capacity enhancements, transit-system enhancements, ADA accessibility, and for closing gaps in the pedestrian system, including the Safe Routes to School projects. Further, Level 1 areas are the first priority for planning projects and studies, bicycle facilities, signal-system enhancements, and the promotion of interconnectivity between neighborhoods and public facilities.

#### **Investment Level 2**

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

In Investment Level 2 Areas, like Investment Level 1 Areas, state investments and policies should support and encourage a wide range of uses and densities, promote other transportation options, foster efficient use of existing public and private investments, and enhance community identity and integrity. Investments should encourage departure from the typical single-family-dwelling developments and promote a broader mix of housing types and commercial sites encouraging compact, mixed-use development where applicable. Level 2 Areas share similar priorities as with the Level 1 Areas where the aim remains to: make context sensitive transportation system capacity enhancements, preserve existing facilities, make safety enhancements, make transportation system

capacity improvements, create transit system enhancements, ensure ADA accessibility, and close gaps in the pedestrian system, including the Safe Routes to School projects. Other priorities for Level 2 Areas include: Corridor Capacity Preservation, off-alignment multi-use paths, interconnectivity of neighborhoods and public facilities, and signal-system enhancements.

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

The proposed development is located in the Investment Level 1 and 2 areas. According to Livable Delaware, Level 1 and 2 areas support and encourage a wide range of uses and enhance community identity and integrity. The proposed development is retail space in a rapidly growing area. Therefore, the proposed development is generally consistent with the 2015 update of the Livable Delaware “Strategies for State Policies and Spending.”

**Comprehensive Plans**

*(Source: 2012 Update to the 2005 Town of Middletown Comprehensive Plan)*

**Town of Middletown Comprehensive Plan:**

The subject property is zoned as C-3 (Employment/Regional Retail) and the developer does not plan to rezone the land. Per the *Town of Middletown Comprehensive Plan Future Land Use Map*, the proposed development is in an area designated for mixed-use development.

**Proposed Development’s Compatibility with the Town of Middletown Comprehensive Plan:**

Per the *Town of Middletown Comprehensive Plan Future Land Use Map*, the proposed development is in an area designated for mixed-use development. The proposed development is a shopping center and the comprehensive plan states that Middletown should encourage mixed use development. Therefore, the proposed development is generally consistent with the *Town of Middletown 2012 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 820 (shopping center). The trip generation was approved by DelDOT during the PTOA review.

**Table 1a**  
Poole Farms Trip Generation – South of Levels Road

Land Use	ADT	AM Peak Hour			PM Peak Hour			SAT Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
256,000 SF Shopping Center (ITE Code 820)	11,393	174	106	280	523	566	1,089	677	624	1,301
Pass-by Trips		-	-	-	178	192	370	176	162	338
<b>Total</b>		<b>174</b>	<b>106</b>	<b>280</b>	<b>345</b>	<b>374</b>	<b>719</b>	<b>501</b>	<b>462</b>	<b>963</b>

\*Pass-by percentages of 34% and 26% were applied to the PM and Saturday peak hours, respectively, consistent with the *ITE Trip Generation Handbook, 3<sup>rd</sup> Edition*.

**Table 1b**  
Poole Farms Trip Generation – North of Levels Road

Land Use	ADT	AM Peak Hour			PM Peak Hour			SAT Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
50,000 SF Shopping Center (ITE Code 820)	3,752	110	67	177	156	169	325	186	172	358
Pass-by Trips		-	-	-	53	57	110	48	45	93
<b>Total</b>		<b>110</b>	<b>67</b>	<b>177</b>	<b>103</b>	<b>112</b>	<b>215</b>	<b>138</b>	<b>127</b>	<b>265</b>

\*Pass-by percentages of 34% and 26% were applied to the PM and Saturday peak hours, respectively, consistent with the *ITE Trip Generation Handbook, 3<sup>rd</sup> Edition*.

## **Overview of TOA**

### **Intersections examined:**

1. Site Entrance A (South Parcel)/Middletown Warwick Road (New Castle Road 443)
2. Site Entrance B (South Parcel)/Levels Road (New Castle Road 11)
3. Site Entrance C (North Parcel)/Levels Road
4. Site Entrance D (North Parcel)/Middletown Warwick Road
5. Middletown Warwick Road/Levels Road
6. Levels Road/Northbound US-301 Ramps
7. Warwick Road (New Castle Road 443A)/Southbound US-301 Ramps

Note: As Middletown Warwick Road is considered a north/south roadway and Levels Road is considered an east/west roadway in this TOA review, the site properties are identified as the north and south parcels. This property designation differs from the April 23, 2019 DelDOT Scoping Meeting Memorandum.

### **Conditions examined:**

1. Case 1 – Existing (2019)
2. Case 2 – 2022 without development
3. Case 3a – 2022 with development of the south parcel only (256,000 square feet of retail space)
4. Case 3b – 2022 with full development (306,000 square feet of retail space)
5. Case 3c – 2022 with full development and no rights-in only access on Middletown Warwick Road

### **Committed Developments considered:**

1. Casapulla Farm – 168 age-restricted detached houses, 24 age-restricted attached houses, and 240 age-restricted apartments unbuilt
2. Middletown-Levels Business Park – 30 acres of industrial park unbuilt
3. Estates at St. Annes – 50 single-family detached houses and an 18-hole golf course unbuilt
4. Westown Residential Development – 131 single-family detached houses, 250 age-restricted detached houses, and 106 townhouses unbuilt
5. Auto Mall Facility – 193,000 square feet of retail space, 2,400,000 square feet of warehouse, and 97,000 square feet of industrial space unbuilt
6. Southridge (Westown Town Center and Phase 2) – 30 townhouses, 75,000 square feet of retail space unbuilt
7. Kohl Commercial\*

\*Per the TOA, the Kohl Commercial development was removed from the list of committed developments considered, as construction is complete.

Note: The TOA contained updated committed development information listed above which supersedes the information in the April 23, 2019 DelDOT Scoping Meeting Minutes Memorandum.

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

### **Intersection Descriptions**

- 1. Site Entrance A (South Parcel)/Middletown Warwick Road (New Castle Road 443)**  
**Type of Control:** Proposed signalized intersection (T- intersection)  
**Eastbound Approach:** (Site Entrance A) Proposed one left turn lane and one right turn lane  
**Northbound Approach:** (Middletown Warwick Road) Existing two through lanes; proposed one left turn lane and two through lanes  
**Southbound Approach:** (Middletown Warwick Road) Existing one through lane; proposed one through lane and one right turn lane
  
- 2. Site Entrance B (South Parcel)/Levels Road (New Castle Road 11)\***  
**Type of Control:** Proposed unsignalized intersection (T- intersection)  
**Eastbound Approach:** (Levels Road) Existing two through lanes; proposed two through lanes and one right turn lane  
**Westbound Approach:** (Levels Road) Existing two through lanes  
**Northbound Approach:** (Site Entrance B) Proposed one right turn lane, stop controlled  
\*Site Entrance B is proposed to be located directly across from Site Entrance C. For Cases 3b and 3c, these Site Entrances were analyzed as one intersection.
  
- 3. Site Entrance C (North Parcel)/Levels Road (New Castle Road 11)\***  
**Type of Control:** Proposed unsignalized intersection (T- intersection)  
**Eastbound Approach:** (Levels Road) Existing two through lanes; proposed one left turn lane and two through lanes  
**Westbound Approach:** (Levels Road) Existing two through lanes; proposed two through lanes and one right turn lane  
**Southbound Approach:** (Site Entrance C) Proposed one right turn lane, stop controlled  
\*Site Entrance B is proposed to be located directly across from Site Entrance C. For Cases 3b and 3c, these Site Entrances were analyzed as one intersection.
  
- 4. Site Entrance D (North Parcel)/Middletown Warwick Road\***  
**Type of Control:** Proposed unsignalized intersection (T- intersection)  
**Northbound Approach:** (Middletown Warwick Road) Existing two through lanes  
**Southbound Approach:** (Middletown Warwick Road) Existing one left turn lane, two through lanes, and one right turn lane



Note: The Site Entrance forms the westerly leg of this intersection. Due to the right-in only configuration of this intersection, a level of service/delay analysis was not conducted since there are no conflicting movements.

**5. Middletown Warwick Road/Levels Road**

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

**Eastbound Approach:** (Levels Road) Existing two left turn lanes, one through lane, and one channelized right turn lane; proposed two left turn lanes, two through lanes, and one channelized right turn lane

**Westbound Approach:** (Levels Road) Existing one left turn lane, one through lane, and one channelized right turn lane; proposed two left turn lanes, two through lanes, and one channelized right turn lane

**Northbound Approach:** (Middletown Warwick Road) Existing one left turn lane, two through lanes and one right turn lane; proposed two left turn lanes, two through lanes, and one channelized right turn lane

**Southbound Approach:** (Middletown Warwick Road) Existing one left turn lane, two through lanes, and one channelized right turn lane; proposed two left turn lanes, two through lanes, and one channelized right turn lane

**6. Levels Road/Northbound US 301 Ramps**

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

**Eastbound Approach:** (Levels Road) Existing one left turn lane and two through lanes

**Westbound Approach:** (Levels Road) Existing one through lane and one right turn lane

**Northbound Approach:** (US 301 Ramp) Existing one shared left turn/through lane and one right turn lane, stop controlled

**7. Warwick Road (New Castle Road 443A)/Southbound US 301 Ramps**

**Type of Control:** Existing signalized intersection (three-leg intersection)

**Eastbound Approach:** (Levels Road) Existing one through lane and one right turn lane

**Westbound Approach:** (Levels Road) Existing one left turn lane and one through lane

**Southbound Approach:** (US 301 Ramp) Existing one left turn lane, one shared left turn/through lane, and one right turn lane

**Transit, Pedestrian, and Bicycle Facilities**

**Existing transit service:** Delaware Transit Corporation (DTC) currently provides existing services within the study area via DART Routes 43, 47, and 302. Per the DelDOT Gateway, bus stops do not exist at any of the study intersections. DART Route 43 provides 28 round trips on weekdays from 4:45 AM to 8:11 PM. DART Route 47 provides 2 round trips on weekdays from

5:20 AM to 6:57 PM and 2 round trips on Saturdays from 5:20 AM to 6:55 PM. DART Route 302 provides 6 round trips on weekdays from 5:45 AM to 6:43 PM.

**Planned transit service:** JMT contacted Mr. Stephen Ottinger, Fixed-Route Planner at the DTC. As of November 22, 2019, we have not received a response.

**Existing bicycle and pedestrian facilities:** According to DelDOT's *New Castle County Bicycle Map*, a Connector Bicycle Route exists within the study area. The Connector Bicycle Route exists along Middletown Warwick Road and Levels Road and traverses through three of the study intersections (Site Entrance A/Middletown Warwick Road, Site Entrance D/Middletown Warwick Road, Middletown Warwick Road/Levels Road). Pedestrian facilities currently exist at one of the study intersections: Middletown Warwick Road/Levels Road.

**Planned bicycle and pedestrian facilities:** Per email correspondence on November 25, 2019 from Mr. John Fiori, DelDOT's Bicycle Coordinator, the following improvements were recommended:

- A 5-foot wide sidewalk should be provided along the Levels Road and Middletown Warwick Road site frontage with proper tie-in to the shoulder. If there is sufficient right-of-way, the sidewalk along Middletown Warwick Road should be extended to the entrance of the 301 Truck Stop. The sidewalk would require a 5-foot grass buffer (3-foot minimum) and tie into the existing sidewalk at the corners of Middletown Warwick Road/Levels Road.
- Internal connections from the sidewalk along Middletown Warwick Road and Levels Road is required.
- Internal bicycle racks should be provided at all retail stores.
- If DART recommends a bus pad with shelter near the site, the pad would need to be extended to include two 1-Loop Bike Racks (see DelDOT Detail M-4).
- Per the DCM, the site shall dedicate right-of-way per the roadway classification and establish a 15-foot wide permanent easement along the property frontage.
- 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 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 frontage are summarized below. The Bicycle LTS was determined utilizing the map on the DelDOT Gateway.

- Levels Road – LTS: 2 and 3
- Middletown Warwick Road – LTS: 3 and 4

### **Signal Warrant Evaluation**

JMT and the TOA conducted a signal warrant evaluation for the Site Entrance A intersection with Middletown Warwick Road. The evaluation was conducted using traffic volume data and geometric conditions in accordance with the Delaware Manual on Uniform Traffic Control Devices (DE MUTCD).

Based on the evaluation, Warrants 1 (Eight-hour), 2 (Four-hour), and 3 (Peak Hour) are met under 2022 conditions with the development. The evaluation is based on the provision of one shared left turn/right turn lane along the Site Entrance A approach, one left turn lane and two through lanes along the northbound Middletown Warwick Road approach, and one through lane and one right turn lane along the southbound Middletown Warwick Road approach. Note, two evaluations adjusting for right turn minor street volumes were conducted with one based on the methodology from NCHRP Report 457 and the other based on the “Pagones Theorem”. Because the intersection does not exist, the crash warrant (based on both the MUTCD and the IA-19.3 – Alternative Signal Warrant 7) is not met. Additionally, the remaining warrants are not met.

### **Previous Comments**

All comments from the Preliminary Traffic Operational Analysis (PTOA) have been addressed in the final TOA.

## **General HCS Analysis Comments**

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

1. For the intersection analyses, the TOA used HCS7 version 7.8, whereas JMT used HCS7 version 7.8.5
2. Per DelDOT's *Development Coordination Manual*, JMT 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 analysis of future scenarios. The TOA maintained the existing heavy vehicle percentages in the 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 and 3% along site entrances for Cases 1, 2 and 3 conditions, whereas the TOA used the existing heavy vehicle percentages.
4. Per DelDOT's *Development Coordination Manual*, JMT 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 TOA maintained the existing PHF in the future cases.
5. As Middletown Warwick Road is considered a north/south roadway and Levels Road is considered an east/west roadway in this TOA review, the site property is identified as the north and south parcels. This property designation differs from the April 23, 2019 DelDOT Scoping Meeting Memorandum.

Table 2  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Operational Analysis for Poole Farms  
Report Dated: September 19, 2019  
Prepared by The Traffic Group

Unsignalized Intersection Two-Way Stop Control (T-intersection) <sup>1</sup>	LOS per TOA			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Site Entrance A/Middletown Warwick Road (New Castle Road 11) <sup>2</sup></b>						
2022 with development (Case 3)						
Eastbound Site Entrance A Approach	B (10.7)	C (21.8)	E (40.7)	B (11.1)	C (21.7)	E (40.7)
Northbound Middletown Warwick Road Left Turn	A (7.9)	A (8.8)	A (9.5)	A (8.0)	A (8.8)	A (9.5)
2022 with development (Case 3) <i>with two-stage left turn</i> <sup>3</sup>						
Eastbound Site Entrance A Approach	-	-	-	B (10.8)	C (17.9)	C (24.9)
Northbound Middletown Warwick Road Left Turn	-	-	-	A (8.0)	A (8.8)	A (9.5)
2022 with development (Case 3) <i>rights-in/rights-out only access</i> <sup>4</sup>						
Eastbound Site Entrance A Approach	-	-	-	A (9.8)	B (14.0)	C (17.2)

<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 TOA modeled the intersection with one left turn lane and two through lanes provided along the northbound Middletown Warwick Road approach, one through lane and one right turn lane provided along the southbound Middletown Warwick Road approach, and one left turn lane and one right turn lane provided along the eastbound Site Entrance A approach.

<sup>3</sup> JMT conducted analysis of the two-way stop controlled intersection incorporating a two-stage left turn from eastbound Site Entrance A onto northbound Middletown Warwick Road.

<sup>4</sup> JMT conducted analysis of the two-way stop controlled intersection as a rights-in/rights-out only access.

Table 2 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Operational Analysis for Poole Farms  
Report Dated: September 19, 2019  
Prepared by The Traffic Group

Signalized Intersection <sup>1</sup>	LOS per TOA			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
Site Entrance A/Middletown Warwick Road (New Castle Road 11) <sup>2, 5</sup>						
2022 with development (Case 3) <sup>6</sup>	B (15.8)	C (23.5)	C (26.5)	B (14.5)	C (22.5)	C (24.8)

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<sup>5</sup> Scenario includes the provision of a signalized intersection. JMT modeled the intersection with a 90 second cycle length for the AM, PM, and Saturday peak hours, whereas the TOA utilized different cycle lengths during each peak hour. JMT incorporated a protected-permissive left turn phase along the northbound Middletown Warwick Road approach, whereas the TOA used a protected only left turn phase.

<sup>6</sup> The TOA assumed 3% heavy vehicles along each lane. However, JMT utilized the heavy vehicle percentage from the adjacent Middletown Warwick Road/Levels Road intersection for the northbound and southbound Middletown Warwick Road through lanes.

Table 2 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Operational Analysis for Poole Farms  
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Roundabout <sup>1</sup>	LOS per TOA			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Site Entrance A/Middletown Warwick Road (New Castle Road 11) <sup>7</sup></b>						
2022 with development (Case 3) <sup>8</sup>						
Eastbound Site Entrance A Approach	-	-	-	A (4.0)	A (7.8)	A (9.1)
Northbound Middletown Warwick Road Approach	-	-	-	A (4.6)	A (6.4)	A (7.7)
Southbound Middletown Warwick Road Approach	-	-	-	A (2.3)	A (2.0)	A (2.0)
Overall	-	-	-	A (3.3)	A (4.7)	A (5.2)

<sup>7</sup> Scenario includes the provision of a three-legged single lane roundabout with a southbound bypass lane.

<sup>8</sup> JMT utilized the heavy vehicle percentage from the adjacent Middletown Warwick Road/Levels Road intersection for the northbound and southbound Middletown Warwick Road through lanes.

Table 3  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Operational Analysis for Poole Farms  
Report Dated: September 19, 2019  
Prepared by The Traffic Group

Unsignalized Intersection Two-Way Stop Control (T-intersection) <sup>1</sup>	LOS per TOA			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
Site Entrance B/Levels Road (New Castle Road 11)						
2022 with development of the south parcel only (Case 3a)						
Northbound Site Entrance B Approach	B (10.4)	B (13.0)	B (13.4)	B (10.4)	B (13.0)	B (13.4)



Table 4  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Operational Analysis for Poole Farms  
Report Dated: September 19, 2019  
Prepared by The Traffic Group

Unsignalized Intersection Two-Way Stop Control <sup>1</sup>	LOS per TOA			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
Site Entrance B/Site Entrance C/Levels Road <sup>9</sup>						
2022 with full development (Case 3b)						
Eastbound Level Road Left Turn	A (9.0)	B (10.2)	B (10.2)	A (9.0)	B (10.2)	B (10.2)
Northbound Site Entrance B Approach	B (10.6)	B (13.8)	B (14.5)	B (10.6)	B (13.8)	B (14.5)
Southbound Site Entrance C Approach	B (10.8)	B (14.2)	B (13.9)	B (10.8)	B (14.2)	B (13.9)
2022 with full development and no rights- in only access on Middletown Warwick Road (Case 3c)						
Eastbound Level Road Left Turn	A (9.2)	B (10.6)	B (10.6)	A (9.2)	B (10.6)	B (10.6)
Northbound Site Entrance B Approach	B (10.6)	B (13.8)	B (14.5)	B (10.6)	B (13.8)	B (14.5)
Southbound Site Entrance C Approach	B (10.8)	B (14.2)	B (13.9)	B (10.8)	B (14.2)	B (13.9)

<sup>9</sup> Per the April 23, 2019 Scoping Meeting Memorandum by DelDOT, Site Entrance C will be located directly opposite Site Entrance B. JMT and the TOA analyzed the two site entrances as one intersection.

Table 5  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Operational Analysis for Poole Farms  
Report Dated: September 19, 2019  
Prepared by The Traffic Group

Signalized Intersection <sup>1</sup>	LOS per TOA			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Middletown Warwick Road/Levels Road <sup>10</sup></b>						
2019 Existing (Case 1) <sup>11</sup>	D (53.4)	E (55.3)	D (53.3)	D (35.5)	F (92.0)	D (50.7)
2019 Existing (Case 1) <i>with signal timing optimization</i> <sup>12</sup>	-	-	-	D (35.5)	D (44.9)	D (36.5)
2022 without development (Case 2) <sup>9</sup>	E (63.3)	F (144.3)	F (106.1)	E (61.3)	F (180.3)	F (122.3)
2022 without development (Case 2) <i>with signal timing optimization</i> <sup>12</sup>	-	-	-	D (52.4)	F (92.4)	E (57.3)
2022 without development (Case 2) <i>with DelDOT improvement</i> <sup>13</sup>	-	-	-	D (36.4)	D (41.2)	D (37.8)
2022 with development of the south parcel only (Case 3a) <sup>11</sup>	E (65.2)	F (165.1)	F (117.4)	E (63.0)	F (176.0)	F (142.5)
2022 with development of the south parcel only (Case 3a) <i>with signal timing optimization</i> <sup>12</sup>	-	-	-	D (44.5)	F (85.4)	E (61.0)

<sup>10</sup> The southbound Middletown Warwick Road right turn lane is a free-flow channelized movement that transitions into its own lane on Levels Road. The TOA omitted this movement in the analysis, whereas JMT included it as an unsignalized movement with zero delay.

<sup>11</sup> JMT used timings consistent with the DelDOT Timing Plan to generate the HCS Phase Duration, whereas the TOA utilized calculations within the HCS software.

<sup>12</sup> Signal optimization includes maintaining the 120 second cycle lengths for the AM, PM, and Saturday peak hours, respectively, and optimizing the splits.

<sup>13</sup> DelDOT Improvement scenario incorporates the recommendations made as part of the TID which will provide dual left turn lanes, two through lanes, and a channelized right turn lane along all approaches. Additionally, signal timing optimization was performed to optimize the splits while maintaining a 120 second cycle length for all peak hours.

Table 5  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Operational Analysis for Poole Farms  
Report Dated: September 19, 2019  
Prepared by The Traffic Group

Signalized Intersection <sup>1</sup>	LOS per TOA			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Middletown Warwick Road/Levels Road</b>						
2022 with development of the south parcel only (Case 3a) with signal timing optimization and rights-in/rights-out south access along Middletown Warwick Road <sup>12, 14</sup>	-	-	-	D (44.8)	F (85.4)	E (61.7)
2022 with development of the south parcel only (Case 3a) with DelDOT improvement <sup>13</sup>	D (37.4)	D (46.9)	D (43.3)	D (36.4)	D (41.5)	D (43.0)
2022 with development of the south parcel only (Case 3a) with DelDOT improvement and rights-in/rights-out south access along Middletown Warwick Road <sup>13, 14</sup>	-	-	-	D (36.6)	D (41.8)	D (43.7)
2022 with full development (Case 3b) <sup>11</sup>	E (71.6)	F (195.3)	F (139.2)	E (67.9)	F (182.4)	F (152.9)
2022 with full development (Case 3b) with signal timing optimization <sup>12</sup>	-	-	-	D (48.5)	F (96.3)	E (67.6)
2022 with full development (Case 3b) with signal timing optimization and rights-in/rights-out south access along Middletown Warwick Road <sup>12, 14</sup>	-	-	-	D (48.8)	F (96.1)	E (68.3)
2022 with full development (Case 3b) with DelDOT improvement <sup>13</sup>	D (39.1)	D (50.3)	D (45.4)	D (37.0)	D (43.1)	D (43.9)

<sup>14</sup> JMT conducted an additional analysis incorporating the change in volume due to a rights-in/rights-out only south access at Site Entrance A and Middletown Warwick Road.

Table 5 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Operational Analysis for Poole Farms  
Report Dated: September 19, 2019  
Prepared by The Traffic Group

Signalized Intersection <sup>1</sup>	LOS per TOA			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Middletown Warwick Road/Levels Road</b>						
2022 with full development (Case 3b) with DelDOT improvement and rights-in/rights-out south access along Middletown Warwick Road <sup>13, 14</sup>	-	-	-	D (37.2)	D (43.5)	D (45.0)
2022 with full development and no rights-in north access on Middletown Warwick Road (Case 3c) <sup>11</sup>	E (71.6)	F (195.3)	F (139.2)	E (66.5)	F (178.7)	F (149.4)
2022 with full development and no rights-in north access on Middletown Warwick Road (Case 3c) with signal timing optimization <sup>12</sup>	-	-	-	D (48.2)	F (94.3)	E (69.4)
2022 with full development, no rights-in north access on Middletown Warwick Road, and rights-in/rights-out south access along Middletown Warwick Road (Case 3c) with signal timing optimization <sup>12, 14</sup>	-	-	-	D (48.3)	F (94.4)	E (70.3)
2022 with full development and no rights-in access on Middletown Warwick Road (Case 3c) with DelDOT improvement <sup>13</sup>	D (39.1)	D (50.3)	D (45.4)	D (37.2)	D (47.5)	D (42.8)
2022 with full development, no rights-in access on Middletown Warwick Road, and rights-in/rights-out south access along Middletown Warwick Road (Case 3c) with DelDOT improvement <sup>13, 14</sup>	-	-	-	D (37.3)	D (47.5)	D (43.5)

Table 6  
Peak Hour Levels Of Service (LOS)  
Based on Traffic Operational Analysis for Poole Farms  
Report Dated: September 19, 2019  
Prepared by The Traffic Group

Unsignalized Intersection Two-Way Stop Control <sup>1</sup>	LOS per TOA			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Levels Road/US 301 Northbound Ramps <sup>15, 16</sup></b>						
2019 Existing (Case 1)						
Eastbound Levels Road Left Turn	A (7.8)	A (8.1)	A (7.9)	A (7.8)	A (8.0)	A (7.9)
Northbound US 301 Ramp Approach	A (9.8)	B (10.5)	B (10.0)	A (9.4)	B (10.5)	B (10.1)
2022 without development (Case 2)						
Eastbound Levels Road Left Turn	A (8.1)	A (8.6)	A (8.2)	A (8.0)	A (8.5)	A (8.3)
Northbound US 301 Ramp Approach	B (11.5)	B (12.5)	B (11.8)	B (10.8)	B (12.9)	B (12.1)
2022 with development of the south parcel only (Case 3a)						
Eastbound Levels Road Left Turn	A (8.1)	A (8.7)	A (8.3)	A (8.1)	A (8.6)	A (8.4)
Northbound US 301 Ramp Approach	B (11.9)	B (13.5)	B (13.0)	B (11.1)	B (14.1)	B (13.5)
2022 with full development (Case 3b & 3c)						
Eastbound Levels Road Left Turn	A (8.3)	A (9.2)	A (8.7)	A (8.2)	A (9.0)	A (8.8)
Northbound US 301 Ramp Approach	B (12.5)	C (15.2)	B (14.6)	B (11.7)	C (16.7)	C (15.6)

<sup>15</sup> JMT did not include westbound Levels Road right turns onto the US 301 Northbound Ramp in the analysis because it is a free movement, whereas the TOA did include westbound Levels Road right turns.

<sup>16</sup> JMT did not incorporate a US 301 Northbound Ramp two-stage left turn onto westbound Levels Road due to field observations, whereas the TOA did incorporate a two-stage left turn.

**Table 7**  
**Peak Hour Levels Of Service (LOS)**  
Based on Traffic Operational Analysis for Poole Farms  
Report Dated: September 19, 2019  
Prepared by The Traffic Group

<b>Signalized Intersection <sup>1</sup></b>	<b>LOS per TOA</b>			<b>LOS per JMT</b>		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
<b>Warwick Road (New Castle Road 443A)/US 301 Southbound Ramps <sup>17, 18</sup></b>						
2019 Existing (Case 1)	B (18.5)	C (20.0)	B (16.4)	B (18.6)	C (20.1)	B (16.4)
2022 without development (Case 2)	C (24.8)	C (25.5)	C (21.8)	C (25.6)	D (25.4)	C (21.4)
2022 with development of the south parcel only (Case 3a)	C (26.5)	C (30.4)	C (26.5)	C (28.1)	C (31.2)	C (26.6)
2022 with full development (Case 3b & 3c)	C (27.1)	C (31.1)	C (27.4)	C (29.3)	C (32.4)	C (27.8)

<sup>17</sup> Both the TOA and JMT utilized the MAX 1 green times from the DelDOT Timing Plan in the analysis.

<sup>18</sup> Along the southbound US 301 approach, the TOA assumed 45% of left turns in the shared left turn/through lane, whereas JMT assumed 40%.