



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

NICOLE MAJESKI  
SECRETARY

May 11, 2023

Mr. Joseph J. Caloggero, Jr.  
The Traffic Group, Inc.  
9900 Franklin Square Drive  
Suite H  
Baltimore, MD 21236

Dear Mr. Caloggero:

The enclosed Traffic Impact Study (TIS) review letter for the proposed **Chapel Creek (R Acres – West)** (Tax Parcel: 14-011.00-007) residential development has been completed under the responsible charge of a registered professional engineer whose firm is authorized to work in the State of Delaware. They have 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 [Annamaria.Furmato@delaware.gov](mailto:Annamaria.Furmato@delaware.gov).

Sincerely,

Annamaria Furmato  
TIS Group Project Engineer

AF:km

Enclosures

cc with enclosures: Mr. Mark McGonigal, McKee Group  
Mr. David L. Edgell, Office of State Planning Coordination  
Mr. Morris Deputy, Town of Middletown  
Mr. George Haggerty, New Castle County Department of Land Use  
Mr. Bradford Shockley, New Castle County Department of Land Use  
Mr. Owen C. Robatino, New Castle County Department of Land Use  
Mr. Andrew J. Parker, McCormick Taylor, Inc.  
Mr. Tucker Smith, McCormick Taylor, Inc.  
DelDOT Distribution

## DelDOT Distribution

Brad Eaby, Deputy Attorney General  
Shanté Hastings, Director, Deputy Secretary, Transportation Solutions (DOTS)  
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John Pietrobono, New Castle Review Coordinator, Development Coordination, Planning  
Sireen Muhtaseb, TIS Group Manager, Development Coordination, Planning  
Philip Lindsey, TIS Group Project Engineer, Development Coordination, Planning  
Pao Lin, New Castle County Subdivision Reviewer, Development Coordination, Planning  
Brian Schilling, Canal District Engineer, Canal District  
Nathan Draper, Canal District Public Works Engineer, Canal District  
Jared Kauffmann, Service Development Planner, Delaware Transit Corporation  
Tremica Cherry, Service Development Planner, Delaware Transit Corporation  
Anthony Aglio, Planning Supervisor, Statewide & Regional Planning



May 8, 2023

Ms. Annamaria Furrato  
Project Engineer  
DelDOT Division of Planning  
P.O. Box 778  
Dover, DE 19903

RE: Agreement No. 1946F  
Traffic Impact Study Services  
**Task No. 4A Subtask 03 – Chapel Creek f.k.a. Academy Green (R Acres – West)**

Dear Ms. Furrato:

McCormick Taylor has completed its review of the Traffic Impact Study (TIS) for the Chapel Creek f.k.a. Academy Green (R Acres – West) development prepared by The Traffic Group, Inc., dated September 15, 2022. The Traffic Group prepared the report in a manner generally consistent with DelDOT’s Development Coordination Manual.

The TIS evaluates the impacts of the proposed Chapel Creek f.k.a. Academy Green residential development, to be located on the south side of Green Giant Road (New Castle Road 458) and east of Gears Corner Road (New Castle Road 459), approximately 0.95 miles west of the intersection of Green Giant Road (New Castle Road 446) and Wiggins Mill Road (New Castle Road 446), in New Castle County. The proposed development would consist of 236 single-family detached houses and 176 townhomes. Two full-movement unsignalized access points are proposed for this development, one on Green Giant Road and one on Gears Corner Road. Construction is anticipated to be complete by 2029.

The subject land is located on a portion of a 345.16-acre parcel. The subject land is currently zoned SR (Suburban Reserve) in New Castle County. The developer is seeking to annex the land into the Town of Middletown under R-3 (Multi-Family Residential) zoning.

Currently there are no active DelDOT projects within the study area. The Westown Transportation Improvement District (TID) is located north of the study area for this TIS, but none of the study intersections are included in the TID.

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

The following intersection exhibits level of service (LOS) deficiencies without the implementation of physical roadway and/or traffic control improvements:

<i>Intersection</i>	<i>Existing Traffic Control</i>	<i>Situations for which deficiencies occur</i>
Green Giant Road and Summit Bridge Road	Unsignalized	2029 without development (Case 2) 2029 with development (Case 3)

### Green Giant Road & Summit Bridge Road

This unsignalized T-intersection would operate at LOS E (42.9 seconds of delay) and F (319.6 seconds of delay) on the minor street stop-controlled approach during the future without development AM and PM peak hours, respectively. With the proposed development, the minor approach would operate at LOS F (87.5 seconds of delay) during the AM peak hour and LOS F (543.7 seconds of delay) during the PM peak hour. While the developer recommends implementing a traffic signal at this location, a Traffic Signal Justification Study (TSJS) was conducted to evaluate whether a traffic signal would be warranted with the development. Per the results of the TSJS, a traffic signal is not warranted based on the Delaware MUTCD.

While a roundabout would mitigate the LOS deficiencies to acceptable levels, as noted in the TSJS, another option for mitigation would be to add a right turn lane on eastbound Green Giant Road. Although this improvement would not completely improve the LOS to acceptable levels, it would significantly reduce the amount of delay and queue length. Specifically, with the addition of the above-mentioned turn lanes, the eastbound delay and queue length in the PM peak hour would be reduced from 543.7 seconds and 517.5 feet to 138.3 seconds and 160 feet, respectively. As such, DelDOT is recommending the developer construct a right turn lane on eastbound Green Giant Road.

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

1. The developer shall improve the State-maintained road(s) on which they front (Green Giant Road and Grears Corner Road), within the limits of their frontage, to meet DelDOT's standards for their Functional Classification as found in Section 1.1 of the Development Coordination Manual and elsewhere therein. The improvements shall include both directions of travel, regardless of whether the developer's lands are on one or both sides of the road. Frontage is defined in Section 1 of the Development Coordination Manual, which states "This length includes the length of roadway perpendicular to lines created by the projection of the outside parcel corners to the roadway." Questions on or appeals of this requirement should be directed to the DelDOT Subdivision Review Coordinator in whose area the development is located.

2. The developer should construct the full-movement Site Entrance A on Green Giant Road. The proposed configuration is shown in the table below.

<b>Approach</b>	<b>Existing Configuration</b>	<b>Proposed Configuration</b>
Northbound Green Giant Road	One through lane	One through lane and one right-turn lane
Southbound Green Giant Road	One through lane	One shared through/left-turn lane and one bypass lane
Westbound Site Entrance A	Approach does not exist	One shared left/right-turn lane

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

<b>Approach</b>	<b>Bypass Lane</b>	<b>Right-Turn Lane</b>
Northbound Green Giant Road	N/A	190 feet *
Southbound Green Giant Road	50 feet *	N/A
Westbound Site Entrance A	N/A	N/A

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

3. The developer should construct the full-movement Site Entrance B on Gears Corner Road. The proposed configuration is shown in the table below.

<b>Approach</b>	<b>Existing Configuration</b>	<b>Proposed Configuration</b>
Southbound Site Entrance B	Approach does not exist	One shared left/right-turn lane
Eastbound Gears Corner Road	One through lane	One left-turn lane and one through lane
Westbound Gears Corner Road	One through lane	One through lane and one right-turn lane

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

<b>Approach</b>	<b>Left-Turn Lane</b>	<b>Right-Turn Lane</b>
Southbound Site Entrance B	N/A	N/A
Eastbound Gears Corner Road	185 feet *	240 feet *
Westbound Gears Corner Road	N/A	N/A

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

4. The developer should design and construct an eastbound right turn lane at the intersection of Green Giant Road and Summit Bridge Road. The eastbound right turn lane, excluding taper length, should be a minimum of 160 feet long. The developer should coordinate with DelDOT’s Subdivision Section to determine details regarding design and construction of this turn lane.
5. The following bicycle, pedestrian and transit improvements should be included:
  - a. Per the DelDOT Development Coordination Manual section 5.2.9.2, bicycle lanes are required where right turn lanes are being installed.
  - b. Appropriate bicycle symbols, directional arrows, pavement markings, and signing should be included along bicycle facilities and turn lanes within the project limits.
  - c. Utility covers should be made flush with the pavement.
  - d. If clubhouses or other community facilities are constructed within the site, bicycle parking should be provided near building entrances. Where building architecture provides for an awning, other overhang, or indoor parking, the bicycle parking should be covered.
  - e. A minimum 15-foot-wide permanent easement from the edge of the right-of-way should be dedicated to DelDOT within the site frontages along Green Giant Road and Gears Corner Road.

- f. Within the easement along the Green Giant Road and Grears Corner Road site frontages, a minimum of a 10-foot wide shared-use path that meets current AASHTO and ADA standards should be constructed. The shared-use path should meet AASHTO and ADA standards and should have a minimum of a five-foot buffer from the roadway. At the property boundaries, the shared-use path should connect to the adjacent property or to the shoulder in accordance with DelDOT's *Shared-Use Path and/or Sidewalk Termination Reference Guide* dated August 1, 2018. The developer shall coordinate with DelDOT's Development Coordination Section through the plan review process to determine the details of the shared-use path design and connections/terminations at or before both boundaries of the property.
- g. The shared use path described in Item 5.f. should be continuous along Green Giant Road and extend from the western extent of the adjacent development, currently known as Abbey Creek, all the way to the intersection of Green Giant Road and Grears Corner Road. The shared use path should then continue southeast along Grears Corner Road from the intersection of Green Giant Road and Grears Corner Road to the southern property boundary.
- h. The developer should coordinate with DelDOT's Development Coordination Section regarding a possible shared-use path interconnection to the adjacent development, currently known as Abbey Creek. The shared use path interconnection would connect the northeastern section of the Chapel Creek f.k.a. Academy Green development to the southwestern section of the adjacent development to provide interconnection for bicycles and pedestrians.
- i. ADA compliant curb ramps and crosswalks should be provided at all pedestrian crossings, including all site entrances. Type 3 curb ramps are discouraged.
- j. Internal sidewalks for pedestrian safety and to promote walking as a viable transportation alternative should be constructed within the development. These sidewalks should each be a minimum of five feet wide (with a minimum of a five-foot buffer from the roadway) and should meet current AASHTO and ADA standards. Internal sidewalks in the development should connect to the proposed shared-use paths along Green Giant Road and Grears Corner Road.
- k. Where internal sidewalks are located alongside of parking spaces, a buffer should be added to prevent vehicular overhang onto the sidewalk.

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

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



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

Sincerely,

**McCormick Taylor, Inc.**

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

Andrew J. Parker, PE, PTOE  
Project Manager

Enclosure



## **General Information**

**Report date:** September 15, 2022

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

**Prepared for:** The McKee Group

**Tax parcel:** 14-011.00-007

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

## **Project Description and Background**

**Description:** The proposed Chapel Creek f.k.a. Academy Green development would consist of 236 single-family detached houses and 176 townhomes.

**Location:** The site is located on the south side of Green Giant Road (New Castle Road 458) and east of Grears Corner Road (New Castle Road 459), approximately 0.95 miles west of the intersection of Green Giant Road (New Castle Road 446), in New Castle County. A site location map is included on page 8.

**Amount of land to be developed:** a portion of a 345.16-acre parcel.

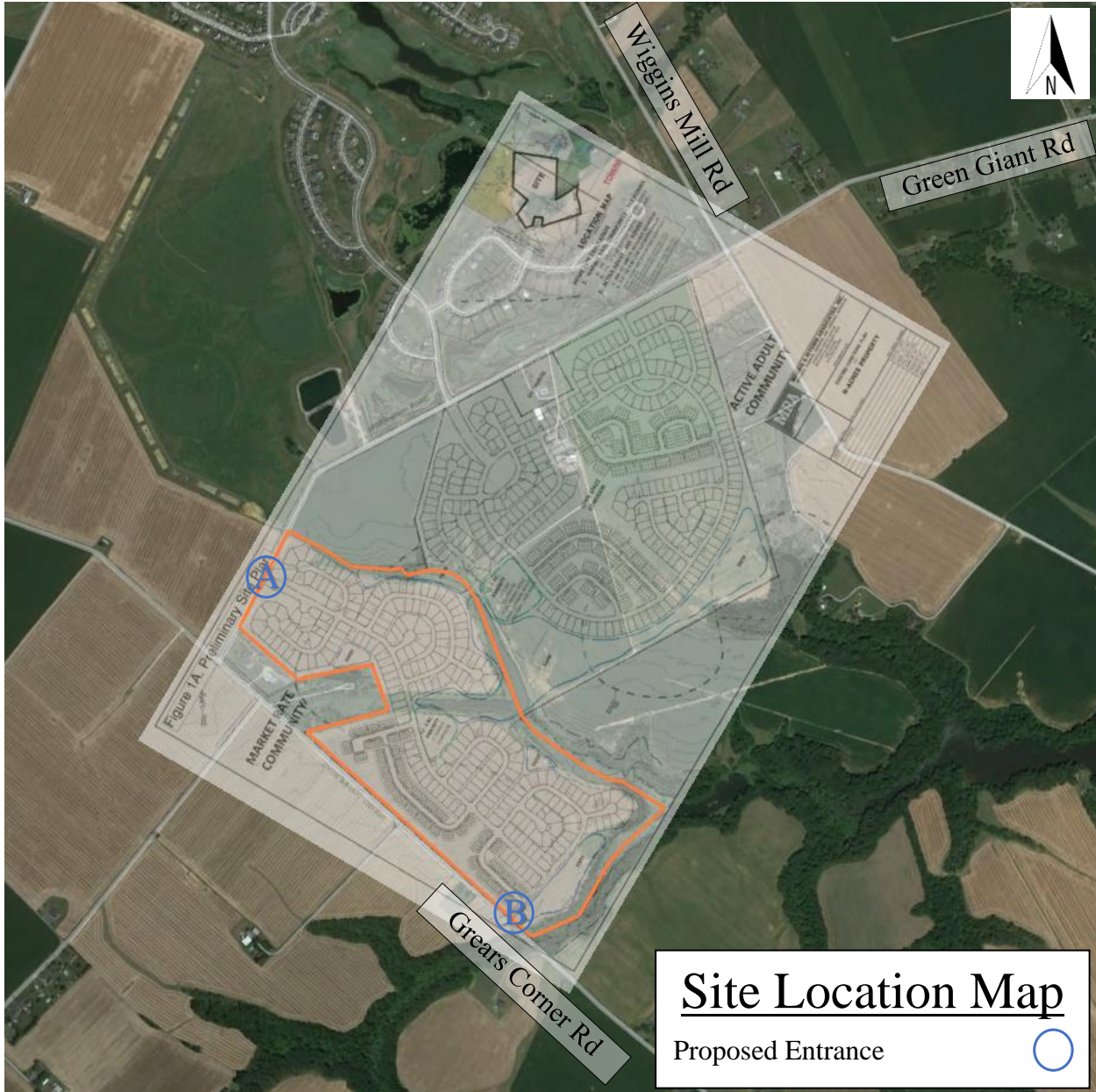
**Land use approval(s) needed:** Subdivision approval. The subject land is currently zoned SR (Suburban Reserve) in New Castle County. The developer is seeking to annex the land into the Town of Middletown under R-3 (Multi-Family Residential) zoning.

**Proposed completion year:** 2029

**Proposed access locations:** Two full-movement unsignalized access points are proposed, one on Green Giant Road and one on Grears Corner Road

**Average Daily Traffic Volumes (per DelDOT Traffic Summary 2021):**

- Green Giant Road: 223 vehicles/day
- Grears Corner Road: 1,868 vehicles/day
- Wiggins Mill Road: 1,237 vehicles/day
- Levels Road: 4,304 vehicles/day



## **2020 Delaware Strategies for State Policies and Spending**

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

The proposed Chapel Creek f.k.a. Academy Green development is located mostly within Investment Level 4.

#### *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 (for example, unincorporated areas like Clarksville in Sussex County and Port Penn in New Castle County).

Investment Level 4 Areas also boast undeveloped natural areas, such as forestlands, and large recreational uses, such as state and county parks and fish and wildlife preserves. Level 4 Areas may include natural habitats that are important for providing "ecosystem services" such as improving water quality and reducing flood risk. Sometimes, private recreational facilities, such as campgrounds or golf courses (often with associated residential developments), are also situated in Investment Level 4 Areas.

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

The proposed Chapel Creek f.k.a. Academy Green development falls within Investment Level 4, and is to be developed with 236 single-family detached houses and 176 townhomes. Investment Level 4 should emphasize only development that is compatible with and enhances agriculture, agribusiness, appropriate visitor activities, and similar economic activities. New housing developments are generally discouraged in such areas. Based on the *2020 Delaware Strategies for State Policies and Spending* document, the proposed development does not appear to be compatible with Investment Level 4. As such, additional discussion is required.

## **Comprehensive Plans**

### **New Castle County Comprehensive Plan:**

*(Source: New Castle County Comprehensive Plan 2050, July 2022)*

The New Castle County Comprehensive Plan's Future Land Use Map 2022, indicates that the proposed development is located within a Resource Preservation area. The Comprehensive Plan also indicates that the land for the proposed development is currently zoned for Suburban Reserve.

**Proposed Development's Compatibility with Comprehensive Plan:** The proposed Chapel Creek f.k.a. Academy Green development includes 236 single-family detached houses and 176 townhomes on an approximately 192-acre portion of a 345.16-acre parcel. The land is currently zoned for Suburban Reserve in New Castle County. The developer is seeking to annex the land into the Town of Middletown under R-3 (Multi-Family Residential) zoning. As such, the proposed development appears to comply with New Castle County's Comprehensive Plan 2050.

**Town of Middletown Comprehensive Plan:**

(Source: 2022 Comprehensive Plan, Town of Middletown. Draft, June 2022. Approved by Town Council on October 3, 2022. Awaiting certification by the Governor)

The updated comprehensive plan for the Town of Middletown includes a map showing proposed annexations. A portion of the proposed Chapel Creek f.k.a. Academy Green development is included in an “area of concern” which indicates that the Town has identified this land as a potential area of annexation, however, is not interested in annexing at this time. The northern part of the parcel, closest to Green Giant Road, is identified as proposed industrial annexation.

**Proposed Development’s Compatibility with Comprehensive Plan:** The proposed Chapel Creek f.k.a. Academy Green residential development appears to align with the Town’s expected growth to the south. The comprehensive plan does not include zoning for the subject parcel, as it has not been annexed. However, the proposed residential land use aligns with and complements the adjacent single family and multi family residential zoning. As such, the proposed development appears to comply with The Town of Middletown’s 2022 Comprehensive Plan.

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

Currently there are no active DelDOT projects within the study area.

**Trip Generation**

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

- 236 single-family detached houses (ITE Land Use Code 210)
- 176 town houses (single-family attached, ITE Land Use Code 215)

**Table 1  
Chapel Creek f.k.a. Academy Green Peak Hour Trip Generation**

Land Use	Weekday AM Peak Hour			Weekday PM Peak Hour		
	In	Out	Total	In	Out	Total
236 single-family detached houses	42	121	163	140	83	223
176 Townhouses	27	59	86	58	44	102
<b>TOTAL TRIPS</b>	<b>69</b>	<b>180</b>	<b>249</b>	<b>198</b>	<b>127</b>	<b>325</b>

## **Overview of TIS**

### **Intersections examined:**

- 1) Site Entrance A & Green Giant Road
- 2) Site Entrance B & Gears Corner Road
- 3) Green Giant Road & Gears Corner Road (North)
- 4) Gears Corners Road & Levels Road
- 5) Levels Road & Strawberry Lane
- 6) Green Giant Road & Wiggins Mill Road
- 7) Green Giant Road & Summit Bridge Road
- 8) Green Giant Road & Gears Corner Road (South)
- 9) Gears Corners Road & Caldwell Corner Road
- 10) Gears Corner Road & Dexter Corner Road
- 11) Gears Corner Road & Blackbird Station Road

### **Conditions examined:**

- 1) 2022 Existing (Case 1)
- 2) 2029 without development (Case 2)
- 3) 2029 with development (Case 3)

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

### **Committed developments considered:**

- 1) Middletown Village (f.k.a. Ramunno Property): 280,000 square feet of retail space and a Convenience Market with 20-vehicle fueling positions.
- 2) 301 SRV Commercial (f.k.a. Southridge): 559 dwelling units and 239,000 square feet of retail space.
- 3) Auto Mall Commercial: 268,000 square feet of retail space
- 4) Kohl North Employment: 100,000 square feet of retail space
- 5) Kohl South Commercial: 58,600 square feet of retail space
- 6) Kohl South Capano: 120 units of multi-family housing
- 7) Rocks & Reading Industrial (f.k.a. Westown Development): 200 acres of an industrial park
- 8) Levels Business Park: 89,000 square feet of retail space and 175,000 square feet of industrial park space
- 9) The Preserve: 251 single-family detached homes and 108 multi-family units
- 10) Abbey Creek: 269 senior-adult single-family detached houses and 216 units of senior-adult multi-family housing (townhomes).

## **Intersection Descriptions**

### **1) Site Entrance A & Green Giant Road**

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

**Westbound Approach:** (Site Entrance A) one shared left/right-turn lane, stop controlled

**Northbound Approach:** (Green Giant Road) one through lane and one right-turn lane

**Southbound Approach:** (Green Giant Road) one shared left-turn/through lane

### **2) Site Entrance B & Grears Corner Road**

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

**Eastbound Approach:** (Gears Corner Road) one left-turn lane and one through lane

**Westbound Approach:** (Gears Corner Road) one shared through/right-turn lane

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

### **3) Green Giant Road & Grears Corner Road (North)**

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

**Eastbound Approach:** (Gears Corner Road) one shared left-turn/through lane

**Westbound Approach:** (Gears Corner Road) one shared through/right-turn lane

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

### **4) Grears Corner Road & Levels Road**

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

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

**Southbound Approach:** (Levels Road) one shared left-turn/through lane

**Westbound Approach:** (Gears Corner Road) one shared left/right-turn lane, stop controlled

### **5) Levels Road & Strawberry Lane**

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

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

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

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

### **6) Green Giant Road & Wiggins Mill Road**

**Type of Control:** all way stop controlled

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

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

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

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

### **7) Green Giant Road & Summit Bridge Road**

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

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

**Northbound Approach:** (Summit Bridge Road) one through lane and one bypass lane

**Southbound Approach:** (Summit Bridge Road) one through lane and one right-turn lane

**8) Green Giant Road & Gears Corner Road (South)**

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

**Eastbound Approach:** (Gears Corner Road) one shared through/right-turn lane

**Westbound Approach:** (Gears Corner Road) one shared left-turn/through lane

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

**9) Gears Corner Road & Caldwell Corner Road**

**Type of Control:** all way stop controlled

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

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

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

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

**10) Gears Corner Road & Dexter Corner Road**

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

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

**Westbound Approach:** (Gears Corner Road) one shared left/through/right-turn lane, stop controlled

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

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

**11) Gears Corner Road & Blackbird Station Road**

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

**Eastbound Approach:** (Blackbird Station Road) one shared left-turn/through lane

**Westbound Approach:** (Blackbird Station Road) one shared through/right-turn lane

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

**Safety Evaluation**

**Crash Data:** Delaware Crash Analysis Reporting System (CARS) data was provided in the TIS for the three-year period from August 19, 2019, through August 19, 2022. For the entire study area there was a total of 50 reportable crashes. At the intersection of Gears Corner Road & Caldwell Corner Road there were 13 crashes. Of these, 9 were angle crashes and 5 of the angle crashes occurred within a 12-month period. All-way stop control has recently been installed at this intersection, but it is not clear when this change in traffic control occurred in relation to the crashes. The intersection of Green Giant Road & Summit Bridge Road experienced 12 crashes, with rear-end being the most common crash type. The construction of a northbound left-turn lane on Summit Bridge Road may reduce the frequency of rear-end crashes at this intersection. The third highest frequency of crashes in the study area occurred at the intersection of Gears Corner Road & Dexter Corner Road where there were 9 crashes, of which, 5 were angle crashes.

**Sight Distance:** The study area generally consists of relatively flat roadways. Along Green Giant Road there is a horizontal curve located to the east of the proposed Site Entrance A. As always adequacy of available sight distance should be confirmed during the site plan review process for all proposed movements at the site accesses. At the intersection of Gears Corner Road & Caldwell Corner Road, the Gears Corner Road approaches are skewed. As discussed in the previous paragraph, stop control was recently added to the Caldwell Corner Road approaches and it is expected that this will improve safety at the intersection related to sight distance. The two-way stop-controlled intersection of Gears Corner Road & Dexter Corner Road also has skewed approaches on Gears Corner Road. In addition to the intersection skew, the uncontrolled approaches on Dexter corner road have horizontal curvature west of the intersection that limit sight distance.

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

**Existing transit service:** Based on the current DART Bus Stop Map, the Delaware Transit Corporation (DTC) currently operates one bus route in the study area. Bus route 302 travels along Levels Road, St. Annes Church Road, and Summit Bridge Road providing service between Newark and Dover; however, there are currently no bus stops within 2 miles of the proposed development.

**Planned transit service:** Through email correspondence with DTC, there are not any planned expansions to transit service around the proposed development.

**Existing bicycle and pedestrian facilities:** According to DelDOT's New Castle County Bicycle Map, Green Giant Road (east of Wiggins Mill Road) and Wiggins Mill Road (south of Green Giant Road) are classified as Statewide Bicycle Routes without Bikeway. This route continues from the proposed development, north along Summit Bridge Road to Middletown and south along Wiggins Mill Road to Townsend. There are existing sidewalks along both sides of St. Annes Boulevard that terminate at a pedestrian crosswalk on the north side of Green Giant Road. These sidewalks extend north throughout the residential development and connect to shared use paths that lead to the Charles E. Price Memorial Park. There are also existing shared use paths along St. Annes Church Road, between Levels Road and Wiggins Mill Road.

**Planned bicycle and pedestrian facilities:** A shared use path should be added along site frontages, and DelDOT has requested that these paths be continuous between the eastern extent of the Abbey Creek Development and the southern extent of the Chapel Creek f.k.a. Academy Green development. It is also recommended that the developer include a shared use path for interconnection between Abbey Creek and Chapel Creek f.k.a. Academy Green. As part of the Abbey Creek development, DelDOT has also requested that a pedestrian crossing be constructed across Green Giant Road to provide connectivity to bicycle and pedestrian facilities to the north.



### **Previous Comments**

In a review letter dated July 5, 2022, DelDOT found the traffic counts to be acceptable, and requested revisions to the proposed trip distribution.

In an additional review letter dated August 18, 2022, DelDOT indicated that the preliminary TIS was acceptable as submitted.

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

### **General HCS Analysis Comments**

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

- 1) For the intersection analyses, both the TIS and McCormick Taylor used Highway Capacity Software (HCS) version 2022.
- 2) Per DelDOT's *Development Coordination Manual, section 2.2.8.11.6.F*, the TIS and McCormick Taylor utilized the existing peak hour factors (PHF) for the Case 1 scenario and a future PHF for Case 2 and 3 scenarios of 0.80 for intersections with less than 500 vph, 0.88 for intersections between 500 and 1,000 vph and 0.92 for intersections with more than 1,000 vph or the existing PHF, whichever is higher.
- 3) Per DelDOT's *Development Coordination Manual, section 2.2.8.11.6.H*, McCormick Taylor used a heavy vehicle percentage (HV%) of 3% for each movement or lane group in Case 2 and Case 3 future scenarios, where there was a significant increase of vehicles. For Case 1 existing scenarios, and Case 2 and Case 3 future scenarios where there is no significant increase of vehicles, the HV% from the traffic count data was used. Where a turning movement had few vehicles and a high HV%, in the existing conditions, 5% was applied in some cases. The TIS followed this methodology in most cases.
- 4) McCormick Taylor utilized a base saturation flow rate of 1,750 pchpgpl for signalized intersections following the guidance in DelDOT's *Development Coordination Manual, section 2.2.8.11.6.I*. The TIS used a base saturation flow rate of 1,900 pchpgpl.
- 5) For analyses of all intersections, McCormick Taylor and the TIS assumed 0% grade for all movements.

Table 2  
Peak Hour Levels of Service (LOS)  
Based on Chapel Creek f.k.a. Academy Green (R Acres – West)  
Traffic Impact Study – September 2022  
Prepared by The Traffic Group, Inc.

Unsignalized Intersection <sup>1</sup> One-Way Stop (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>1 - Site Entrance A &amp; Green Giant Road</b>				
2029 Build Condition (Case 3)				
Southbound Green Giant Road – Left	A (7.4)	A (7.6)	A (7.4)	A (7.6)
Westbound Site Entrance A	A (9.6)	A (9.9)	A (9.6)	A (9.9)

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

Table 3  
Peak Hour Levels of Service (LOS)  
Based on Chapel Creek f.k.a. Academy Green (R Acres – West)  
Traffic Impact Study – September 2022  
Prepared by The Traffic Group, Inc.

Unsignalized Intersection <sup>2</sup> One-Way Stop (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>2 - Site Entrance B &amp; Grears Corner Road</b>				
2029 Build Condition (Case 3)				
Eastbound Grears Corner Road – Left	A (7.8)	A (7.9)	A (7.8)	A (7.9)
Southbound Site Access B	B (11.2)	B (12.0)	B (11.2)	B (12.0)

<sup>2</sup> For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 4  
Peak Hour Levels of Service (LOS)  
Based on Chapel Creek f.k.a. Academy Green (R Acres – West)  
Traffic Impact Study – September 2022  
Prepared by The Traffic Group, Inc.

Unsignalized Intersection <sup>3</sup> One-Way Stop (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>3 - Green Giant Road &amp; Grears Corner Road (North)</b>				
2022 Existing (Case 1)				
Eastbound Grears Corner Road – Left	A (7.5)	A (7.4)	A (7.5)	A (7.4)
Southbound Green Giant Road	A (9.2)	A (9.9)	A (9.2)	A (9.9)
2029 No-Build Condition (Case 2)				
Eastbound Grears Corner Road – Left	A (7.6)	A (7.6)	A (7.6)	A (7.6)
Southbound Green Giant Road	B (10.0)	B (11.2)	B (10.0)	B (10.9)
2029 Build Condition (Case 3)				
Eastbound Grears Corner Road – Left	A (7.8)	A (7.9)	A (7.8)	A (7.8)
Southbound Green Giant Road	B (11.2)	B (13.5)	B (11.1)	B (13.5)

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

Table 5  
Peak Hour Levels of Service (LOS)  
Based on Chapel Creek f.k.a. Academy Green (R Acres – West)  
Traffic Impact Study – September 2022  
Prepared by The Traffic Group, Inc.

Unsignalized Intersection <sup>4</sup> One-Way Stop (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>4 - Grears Corner Road &amp; Levels Road</b>				
2022 Existing (Case 1)				
Westbound Grears Corner Road – Left	A (9.4)	A (9.2)	A (9.4)	A (9.2)
Southbound Levels Road	A (7.6)	A (7.6)	A (7.6)	A (7.6)
2029 No-Build Condition (Case 2)				
Westbound Grears Corner Road – Left	B (10.1)	B (10.0)	B (10.1)	B (10.0)
Southbound Levels Road	A (7.7)	A (7.9)	A (7.7)	A (7.9)
2029 Build Condition (Case 3)				
Westbound Grears Corner Road – Left	B (10.9)	B (11.1)	B (10.9)	B (11.0)
Southbound Levels Road	A (7.8)	A (8.1)	A (7.8)	A (8.1)

<sup>4</sup> For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 6  
Peak Hour Levels of Service (LOS)  
Based on Chapel Creek f.k.a. Academy Green (R Acres – West)  
Traffic Impact Study – September 2022  
Prepared by The Traffic Group, Inc.

Unsignalized Intersection <sup>5</sup> One-Way Stop (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>5 - Levels Road &amp; Strawberry Lane</b>				
2022 Existing (Case 1)				
Eastbound Strawberry Lane	A (9.7)	B (10.1)	A (9.7)	B (10.1)
Northbound Levels Road – Left	A (7.4)	A (7.7)	A (7.4)	A (7.7)
2029 No-Build Condition (Case 2)				
Eastbound Strawberry Lane	B (10.5)	B (11.5)	B (10.5)	B (11.5)
Northbound Levels Road – Left	A (7.5)	A (8.1)	A (7.5)	A (8.1)
2029 Build Condition (Case 3)				
Eastbound Strawberry Lane	B (10.9)	B (12.3)	B (10.9)	B (12.3)
Northbound Levels Road – Left	A (7.6)	A (8.2)	A (7.6)	A (8.2)

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

Table 7  
Peak Hour Levels of Service (LOS)  
Based on Chapel Creek f.k.a. Academy Green (R Acres – West)  
Traffic Impact Study – September 2022  
Prepared by The Traffic Group, Inc.

Unsignalized Intersection <sup>6</sup> All-Way Stop	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>6 - Green Giant Road &amp; Wiggins Mill Road</b>				
2022 Existing (Case 1)				
Eastbound Green Giant Road	A (8.1)	A (8.8)	A (8.1)	A (8.8)
Westbound Green Giant Road	A (8.4)	B (10.8)	A (8.4)	B (10.8)
Northbound Wiggins Mill Road	A (8.2)	A (8.8)	A (8.2)	A (8.8)
Southbound Wiggins Mill Road	A (8.7)	B (11.7)	A (8.7)	B (11.7)
Overall Intersection	A (8.4)	B (10.8)	A (8.4)	B (10.8)
2029 No-Build Condition (Case 2)				
Eastbound Green Giant Road	A (9.6)	B (10.4)	A (9.6)	B (10.4)
Westbound Green Giant Road	A (9.8)	B (12.8)	A (9.8)	B (12.8)
Northbound Wiggins Mill Road	A (9.7)	B (10.6)	A (9.7)	B (10.6)
Southbound Wiggins Mill Road	A (9.8)	C (16.2)	A (9.8)	C (16.2)
Overall Intersection	A (9.7)	B (13.6)	A (9.7)	B (13.6)
2029 Build Condition (Case 3)				
Eastbound Green Giant Road	B (10.7)	B (11.8)	B (10.7)	B (11.8)
Westbound Green Giant Road	B (10.5)	C (15.7)	B (10.5)	C (15.7)
Northbound Wiggins Mill Road	B (10.2)	B (11.6)	B (10.2)	B (11.6)
Southbound Wiggins Mill Road	B (10.3)	C (19.9)	B (10.3)	C (19.9)
Overall Intersection	B (10.5)	C (16.2)	B (10.5)	C (16.2)

<sup>6</sup> For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 8  
Peak Hour Levels of Service (LOS)  
Based on Chapel Creek f.k.a. Academy Green (R Acres – West)  
Traffic Impact Study – September 2022  
Prepared by The Traffic Group, Inc.

<b>Unsignalized Intersection <sup>7</sup> One-Way Stop (T-intersection)</b>	<b>LOS per TIS</b>		<b>LOS per McCormick Taylor</b>	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>7 - Green Giant Road &amp; Summit Bridge Road</b>				
2022 Existing (Case 1)				
Eastbound Green Giant Road	C (18.6)	D (34.5)	C (18.6)	D (34.4)
Northbound Summit Bridge Road – Left	A (8.4)	A (9.4)	A (8.4)	A (9.3)
2029 No-Build Condition (Case 2)				
Eastbound Green Giant Road	E (42.9)	F (320.8)	E (42.9)	F (319.6)
Northbound Summit Bridge Road – Left	A (8.9)	B (11.2)	A (8.9)	B (11.2)
2029 Build Condition (Case 3)				
Eastbound Green Giant Road	F (87.5)	F (545.7)	F (87.5)	F (543.7)
Northbound Summit Bridge Road – Left	A (9.0)	B (11.6)	A (9.0)	B (11.5)
2029 Build Condition (Case 3) w/ separate eastbound right turn lane				
Eastbound Green Giant Road	--	--	E (40.9)	F (138.3)
Northbound Summit Bridge Road – Left	--	--	A (9.0)	B (11.5)
<b>Signalized Intersection <sup>7</sup></b>	<b>LOS per TIS</b>		<b>LOS per McCormick Taylor</b>	
<b>7 - Green Giant Road &amp; Summit Bridge Road</b>	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2029 Build Condition (Case 3) w/ Traffic Signal	B (12.0)	B (17.3)	B (13.2)	C (21.0)
<b>Roundabout <sup>7</sup></b>	<b>LOS per TIS</b>		<b>LOS per McCormick Taylor</b>	
<b>7 - Green Giant Road &amp; Summit Bridge Road</b>	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2029 Build Condition (Case 3) w/ Roundabout	--	--	B (12.6)	C (18.9)

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



Table 9  
Peak Hour Levels of Service (LOS)  
Based on Chapel Creek f.k.a. Academy Green (R Acres – West)  
Traffic Impact Study – September 2022  
Prepared by The Traffic Group, Inc.

Unsignalized Intersection <sup>8</sup> One-Way Stop (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>8 - Green Giant Road &amp; Grears Corner Road (South)</b>				
2022 Existing (Case 1)				
Westbound Grears Corner Road – Left	A (7.3)	A (7.5)	A (7.3)	A (7.5)
Northbound Green Giant Road	A (9.7)	B (10.1)	A (9.4)	A (9.9)
2029 No-Build Condition (Case 2)				
Westbound Grears Corner Road – Left	A (7.4)	A (7.7)	A (7.4)	A (7.7)
Northbound Green Giant Road	B (10.4)	B (11.4)	B (10.0)	B (11.0)
2029 Build Condition (Case 3)				
Westbound Grears Corner Road – Left	A (7.5)	A (7.9)	A (7.5)	A (7.9)
Northbound Green Giant Road	B (11.2)	B (12.6)	B (10.6)	B (12.1)

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

Table 10  
Peak Hour Levels of Service (LOS)  
Based on Chapel Creek f.k.a. Academy Green (R Acres – West)  
Traffic Impact Study – September 2022  
Prepared by The Traffic Group, Inc.

Unsignalized Intersection <sup>9</sup> All-Way Stop	LOS per TIS <sup>10</sup>		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>9 - Grears Corner Road &amp; Caldwell Corner Road</b>				
2022 Existing (Case 1)				
Eastbound Caldwell Corner Road	A (1.7)	A (1.1)	A (8.2)	A (8.1)
Westbound Caldwell Corner Road	A (0.7)	A (1.3)	A (7.7)	A (8.1)
Northbound Grears Corner Road	B (11.0)	B (11.0)	A (8.1)	A (7.9)
Southbound Grears Corner Road	B (10.7)	B (11.4)	A (8.0)	A (8.4)
Overall Intersection	--	--	A (8.0)	A (8.2)
2029 No-Build Condition (Case 2)				
Eastbound Caldwell Corner Road	A (1.8)	A (1.1)	A (8.6)	A (8.7)
Westbound Caldwell Corner Road	A (0.7)	A (1.3)	A (8.1)	A (8.6)
Northbound Grears Corner Road	B (11.9)	B (12.0)	A (8.9)	A (8.7)
Southbound Grears Corner Road	B (11.4)	B (13.3)	A (8.5)	A (9.5)
Overall Intersection	--	--	A (8.6)	A (9.0)
2029 Build Condition (Case 3)				
Eastbound Caldwell Corner Road	A (1.8)	A (1.1)	A (9.0)	A (9.1)
Westbound Caldwell Corner Road	A (0.6)	A (1.1)	A (8.5)	A (9.2)
Northbound Grears Corner Road	B (12.5)	B (13.0)	A (9.5)	A (9.5)
Southbound Grears Corner Road	B (12.9)	C (15.3)	A (9.5)	B (10.5)
Overall Intersection	--	--	A (9.3)	A (9.8)

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

<sup>10</sup> TIS used HCS Two-Way Stop Control analysis for this intersection. All-way stop control has recently been installed at this intersection.

Table 11  
Peak Hour Levels of Service (LOS)  
Based on Chapel Creek f.k.a. Academy Green (R Acres – West)  
Traffic Impact Study – September 2022  
Prepared by The Traffic Group, Inc.

Unsignalized Intersection <sup>11</sup> Two-Way Stop	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>10 - Grears Corner Road &amp; Dexter Corner Road</b>				
2022 Existing (Case 1)				
Eastbound Grears Corner Road	A (9.5)	A (9.7)	A (9.5)	A (9.7)
Westbound Grears Corner Road	A (9.9)	A (9.7)	A (9.9)	A (9.6)
Northbound Dexter Corner Road – Left	A (7.3)	A (7.4)	A (7.4)	A (7.4)
Southbound Dexter Corner Road – Left	A (7.4)	A (7.3)	A (7.3)	A (7.3)
2029 No-Build Condition (Case 2)				
Eastbound Grears Corner Road	A (10.1)	B (10.6)	A (10.1)	B (10.6)
Westbound Grears Corner Road	B (10.6)	B (10.6)	B (10.6)	B (10.6)
Northbound Dexter Corner Road – Left	A (7.3)	A (7.5)	A (7.4)	A (7.5)
Southbound Dexter Corner Road – Left	A (7.4)	A (7.3)	A (7.3)	A (7.3)
2029 Build Condition (Case 3)				
Eastbound Grears Corner Road	A (10.7)	B (11.3)	A (10.8)	B (11.3)
Westbound Grears Corner Road	B (10.8)	B (11.5)	B (10.8)	B (11.5)
Northbound Dexter Corner Road – Left	A (7.3)	A (7.5)	A (7.4)	A (7.5)
Southbound Dexter Corner Road – Left	A (7.4)	A (7.3)	A (7.3)	A (7.3)

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

Table 12  
Peak Hour Levels of Service (LOS)  
Based on Chapel Creek f.k.a. Academy Green (R Acres – West)  
Traffic Impact Study – September 2022  
Prepared by The Traffic Group, Inc.

Unsignalized Intersection <sup>12</sup> One-Way Stop (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>11 - Grears Corner Road &amp; Blackbird Station Road</b>				
2022 Existing (Case 1)				
Eastbound Blackbird Station Road – Left	A (7.3)	A (7.3)	A (7.3)	A (7.3)
Southbound Grears Corner Road	A (9.0)	A (9.0)	A (8.9)	A (9.0)
2029 No-Build Condition (Case 2)				
Eastbound Blackbird Station Road – Left	A (7.3)	A (7.4)	A (7.3)	A (7.4)
Southbound Grears Corner Road	A (9.1)	A (9.3)	A (9.1)	A (9.3)
2029 Build Condition (Case 3)				
Eastbound Blackbird Station Road – Left	A (7.4)	A (7.5)	A (7.4)	A (7.5)
Southbound Grears Corner Road	A (9.4)	A (9.6)	A (9.4)	A (9.6)

<sup>12</sup> For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.