



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

NICOLE MAJESKI  
SECRETARY

March 5, 2021

Mr. Ted Williams  
Landmark Science & Engineering, Inc.  
200 Continental Drive  
New Castle, Delaware 19713

Dear Mr. Williams:

The enclosed Traffic Impact Study (TIS) review letter for the proposed **Summit Campus** (Protocol Tax Parcel #1300700016) development has been completed under the responsible charge of a registered professional engineer whose firm is authorized to work in the State of Delaware. They have found the TIS to conform to DelDOT's Development Coordination Manual and other accepted practices and procedures for such studies. DelDOT accepts this letter and concurs with the recommendations. If you have any questions concerning this letter or the enclosed review letter, please contact me at (302) 760-2167.

Sincerely,

Troy Brestel  
Project Engineer

TEB:sf

Enclosures

cc with enclosures: Mr. Keith Hopkins, Appoquinimink School District  
Ms. Constance C. Holland, Office of State Planning Coordination  
Mr. George Haggerty, New Castle County Department of Land Use  
Mr. Owen Robotino, New Castle County Department of Land Use  
Mr. Mir Wahed, Johnson, Mirmiran & Thompson, Inc.  
Ms. Joanne Arellano, Johnson, Mirmiran & Thompson, Inc.  
DelDOT Distribution

## DelDOT Distribution

Brad Eaby, Deputy Attorney General  
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Pamela Steinebach, Assistant Director, Project Development North, DOTS  
Todd Sammons, Assistant Director, Development Coordination  
T. William Brockenbrough, Jr., County Coordinator, Development Coordination  
Peter Haag, Chief Traffic Engineer, Traffic, DOTS  
Kerry Yost, Traffic Calming and Subdivision Relations Manager, Traffic, DOTS  
Kevin Canning, Canal District Engineer, Canal District  
Matthew Vincent, Canal District Public Works Engineer, Canal District  
Jared Kaufmann, Service Development Planner, Delaware Transit Corporation  
Anthony Aglio, Planning Supervisor, Statewide & Regional Planning  
Wendy Polasko, Subdivision Engineer, Development Coordination  
Sireen Muhtaseb, New Castle Review Coordinator, Development Coordination  
Pao Lin, Subdivision Manager, Development Coordination  
Mark Galipo, Traffic Engineer, Traffic, DOTS  
Claudy Joinville, Project Engineer, Development Coordination  
Annamaria Furmato, Project Engineer, Development Coordination



March 4, 2021

Mr. Troy E. Brestel  
Project Engineer  
Delaware Department of Transportation  
Development Coordination, Division of Planning  
800 Bay Road  
Dover, DE 19901

RE: Agreement No. 1945F  
Project Number T202069012  
Traffic Impact Study Services  
Task 19A – Summit Campus

Dear Mr. Brestel:

Johnson, Mirmiran, and Thompson (JMT) has completed a review of the Traffic Impact Study (TIS) for Summit Campus, which was prepared by Landmark Science & Engineering in January 2021. This review was assigned as Task Number 19A. The report is prepared in a manner generally consistent with DelDOT's *Development Coordination Manual*.

The TIS evaluates the impacts of a proposed school campus in New Castle County, Delaware. The campus would be developed in two phases. Phase I will be comprised of a 107,473 square-foot elementary school. Phase II will be comprised of a 40,000 square-foot early childhood center, a 132,000 square-foot middle school, and a 264,000 square-foot high school.

The site is located on the northeast corner of the intersection of Summit Bridge Road (New Castle Road 16) and Beaston Road (New Castle Road 415). The subject property is on an approximately 142.70-acre parcel. The subject land is currently zoned as S (Suburban) and the developer does not plan to rezone the land. One signalized access point is proposed along Summit Bridge Road opposite the Summit Aviation entrance. Construction for the elementary school is anticipated to be completed in 2023 and construction for the full build of the site is anticipated to be completed in 2027.

The site is located adjacent to the Southern New Castle County TID which was established in August 2014 for the area bounded by Lorewood Grove Road and the Chesapeake and Delaware (C&D) Canal to the north, Marl Pit Road to the south, Delaware Route 1 and US Route 13 to the east, and US Route 301, Delaware Route 72, and Delaware Route 896 to the west. Recommendations for study intersections within the TID are summarized in the *Traffic Analysis for the Southern New Castle County TID Technical Report*, dated November 2013. The TID is currently in operation, however updated analysis is being conducted to determine if the recommended improvements from the November 2013 report are sufficient or if additional improvements are necessary. The updated analysis and study are scheduled to be completed in 2021.



DelDOT has several ongoing and recently completed projects within the study area. The *US 301 Corridor Improvements* project (including DelDOT Contract No. T200811301, T200911301, T200911302, T200911302, T200911308, T201011301, and T201011302) was divided into several sections which were recently constructed within the study area. The aim of the project was to reduce traffic congestion in the project area and improve highway safety by removing through traffic, especially heavy vehicle truck traffic, from the local roads. The project constructed a four-lane limited access toll road, US Route 301, on a new alignment which extends from the Maryland State Line, west of Middletown, to the vicinity of Armstrong Corner Road. The new US Route 301 continues northeast, crossing Summit Bridge Road and Boyds Corner Road before curving east and tying into Delaware Route 1 south of the Chesapeake and Delaware (C&D) Canal. Access to the new US Route 301 is provided via intersections south of Middletown (Levels Road), in the vicinity of Armstrong Corner Road, and at Jamison Corner Road. Construction of the above-mentioned contracts were completed and the new US Route 301 opened to traffic in January 2019. Additional information can be found on the DelDOT project website at <http://deldot.gov/information/projects/us301/index.shtml>

The *SR 896 and Bethel Church Road Interchange* project (DelDOT Contract No. T200911305) will be implemented independently from the *US 301 Corridor Improvements* project and is intended to improve the safety and operation of the intersection of Summit Bridge Road and Bethel Church Road. The project is anticipated to include the removal of the existing signal at the Bethel Church Road and Summit Bridge Road intersection and the conversion to a grade-separated intersection. Additionally, the eastbound and westbound Bethel Church Road approaches are anticipated to be terminated with cul-de-sacs prior to the intersection with Summit Bridge Road. Design work is scheduled to begin in FY 2023. Construction is not yet scheduled. More information can be found at DelDOT's website: <https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T200911305#project-details1>

In conjunction with the *SR 896 and Bethel Church Road Interchange* project, the *US 301 Spur Road* project is planned to include a 4.5-mile, limited-access highway that will start from the US 301 Mainline at approximately 2/3 of a mile south of Armstrong Corner Road and connect to Summit Bridge Road at the proposed Summit Bridge Road/Bethel Church Road interchange. The eastbound Bethel Church Road approach would be realigned, and ramps would be added to connect to the proposed Spur Road. Additionally, DelDOT is undergoing monitoring efforts for the US 301 Spur Road. Specifically, DelDOT is monitoring traffic volumes, crash data, and land use information along the corridor with the goal of determining when to construct the Spur Road. More information can be found at DelDOT's website: <https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T200911305#project-details1>

Additionally, an Electric Red Light Safety Program site exists on Summit Bridge Road at the study intersection with the Summit Crossing Entrance. Also, the railroad crossing along Boyds Corner Road, east of the study intersection with Summit Bridge Road/Churchtown Road is scheduled for reconstruction in Fall of 2021 as part of the *Boyds Corner Road Railroad Crossing Safety Improvements DOT Crossing #531610Y* (DelDOT Contract No. T201500514) project. This



reconstruction will include mill and overlay, signing, and striping along Boyds Corner Road in the vicinity of the railroad crossing.

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

The New Castle County Level of Service (LOS) Standards as stated in Section 40.11.210 of the Unified Development Code (UDC) apply to all signalized, all-way-stop, and roundabout intersections. Based on an evaluation of the signalized intersections, two of them will require the implementation of physical roadway and/or traffic control improvements:

Intersection	LOS Deficiencies Occur		Case
	AM	PM	
Summit Bridge Road/Bethel Church Road (New Castle Road 433)	X		Case 1 – 2020 Existing
	X		Case 2 – 2027 without development
	X		Case 3 – 2023 with Phase I development
	X		Case 4 – 2027 with full development
Summit Bridge Road/Boyds Corner Road (New Castle Road 15)/Churchtown Road (New Castle Road 432)	X		Case 4 – 2027 with full development



Additionally, separate from the UDC but based on the LOS evaluation criteria as stated in DelDOT’s *Development Coordination Manual*, the following stop-controlled study intersections exhibit LOS deficiencies.

Intersection	LOS Deficiencies Occur		Case
	AM	PM	
Summit Bridge Road (New Castle Road 16)/Site Entrance/Summit Aviation Entrance	X	X	Case 3 – 2023 with Phase I development
	X	X	Case 4 – 2027 with full development
Summit Bridge Road/Old School House Road (New Castle Road 431)	X	X	Case 1 – 2020 Existing
	X	X	Case 2 – 2027 without development
	X	X	Case 3 – 2023 with Phase I development
	X	X	Case 4 – 2027 with full development
Boyds Corner Road/Ratledge Road (New Castle Road 414)	X	X	Case 2 – 2027 without development
	X	X	Case 3 – 2023 with Phase I development
	X	X	Case 4 – 2027 with full development

The existing unsignalized Site Entrance/Summit Aviation Entrance intersection with Summit Bridge Road would exhibit LOS deficiencies during the AM and PM peak hours under future conditions with the proposed development. These deficiencies occur along the westbound Site Entrance approach and the southbound Summit Bridge Road left turn with delays of 1,000 seconds per vehicle or more and 304.8 seconds per vehicle, respectively, during the AM peak hour under Case 4 conditions. However, the developer has proposed that the intersection be converted to a signalized intersection with separate turn lanes added along Summit Bridge Road. With signalization, the additional turn lanes, and protected-permitted left turn phases along the northbound and southbound approaches, the intersection would improve to operate at LOS D (49.9 seconds of delay per vehicle) during the AM peak hour under Case 4 conditions. Due to the calculated 95<sup>th</sup> percentile queue length along the southbound left turn lane (approximately 445 feet), an additional analysis was conducted to evaluate the provision of dual left turn lanes along the southbound Summit Bridge Road approach to the intersection with protected-only left turn phasing. With signalization and the provision of dual left turn lanes with protected-only phasing along the southbound approach, the intersection would operate at LOS D (51.3 seconds of delay per vehicle) during the AM peak hour under Case 4 conditions with a calculated 95<sup>th</sup> percentile queue length of approximately 245 feet.

JMT is completing a Traffic Signal Justification Study for the Site Entrance/Summit Aviation Entrance intersection. The study is anticipated to be submitted to DelDOT by March 12, 2021.



Additionally, the Peak-Hour Volume warrant is met at the intersection during the AM peak hour under Case 3 conditions and during the AM and PM peak hours under Case 4 conditions. More information regarding the signal warrant evaluation will be provided once the Signal Justification Study has been completed by JMT. As such, we recommend the developer enter into a traffic signal agreement for the intersection of the Site Entrance/Summit Aviation Entrance and Summit Bridge Road to construct the proposed Site Entrance as the westbound approach and convert the intersection to be signalized.

The existing signalized Summit Bridge Road intersection with Bethel Church Road exhibits LOS deficiencies during the AM peak hour under existing and future conditions, with or without the proposed development. However, as part of the *SR 896 and Bethel Church Road Interchange* project, the intersection will be converted to a grade-separated interchange. Therefore, we do not recommend that the developer implement any improvements at this intersection. However, it is recommended that the developer be responsible to fund an equitable portion of the improvements made to the intersection as part of the *SR 896 and Bethel Church Road Interchange* (DelDOT Contract No. T200911305) project.

The existing signalized Summit Bridge Road/Churchtown Road intersection with Boyds Corner Road exhibits LOS deficiencies during the AM peak hour under future conditions with the full build out of the proposed development. These deficiencies could be mitigated by converting the right turn lane along the northbound Summit Bridge Road approach to a shared through/right turn lane. Additionally, widening along northbound Summit Bridge Road, north of the intersection with Boyds Corner Road, would be needed to maintain the westbound right turn acceleration lane. With the conversion of the right turn lane to a shared through/right turn lane along northbound Summit Bridge Road and widening north of the intersection, the intersection would improve to operate at LOS D (52.8 seconds of delay per vehicle) or better under Case 4 conditions. However, due to the extensive scope of these improvements, it would be unreasonable to require the developer to construct these improvements. Additionally, the intersection is part of the Southern New Castle County TID study area and volumes at this intersection may be reduced in the future due to the anticipated Spur Road construction. Therefore, we do not recommend the developer implement any improvements at this intersection.

The existing unsignalized Summit Bridge Road intersection with Old School House Road exhibits LOS deficiencies during the AM and PM peak hours under existing and future conditions, with or without the proposed development. These deficiencies occur along the eastbound Old School House Road approach, with delays of up to 591.8 seconds per vehicle and 95<sup>th</sup> percentile queues up to approximately 280 feet during the AM peak hour under Case 4 conditions. These LOS deficiencies could be mitigated by signalization of the intersection while maintaining the existing intersection footprint or the installation of a roundabout. However, due to the right-of-way constraints along the southwest corner of the intersection and the absence of other roundabouts along Summit Bridge Road in the immediate area, we do not recommend the installation of a roundabout at this intersection. With the implementation of a signal, the intersection would operate at LOS B (19.7 seconds of delay per vehicle) or better under Case 4 conditions. Additionally, the Peak-Hour Volume warrant is met during the AM peak hour under Case 4 conditions. Therefore, we recommend that the developer enter into a traffic signal agreement for the intersection of





Summit Bridge Road and Old School House Road and coordinate with DelDOT on the implementation and equitable cost sharing of a traffic signal installation.

The existing unsignalized Boyds Corner Road intersection with Ratledge Road exhibits LOS deficiencies during the AM and PM peak hours under future conditions, with or without the proposed development. These deficiencies occur along the southbound Ratledge Road approach, with delays of 1,000 seconds per vehicle or more and 95<sup>th</sup> percentile queues up to approximately 1,300 feet during the AM peak hour under Case 4 conditions. These LOS deficiencies could be mitigated by signalization of the intersection and widening the southbound Ratledge Road approach to provide one left turn lane and one right turn lane. With the implementation of a signal, the intersection would operate at LOS D (47.4 seconds of delay per vehicle) or better under Case 4 conditions. As this intersection is part of the Southern New Castle County TID study area, we do not recommend the developer implement any improvements at this intersection. However, it is recommended that the developer be responsible to fund an equitable portion of any improvements made to the intersection as part of the Southern New Castle County TID.

As mentioned in the September 24, 2020 PLUS application response from DelDOT, two long-range planning considerations may impact the site design of the Appoquinimink Summit Campus. DelDOT wants to preserve the possibility of a passenger rail station between Boyds Corner Road and the C&D Canal, as well as the realignment of Lorewood Grove Road to intersect Summit Bridge Road. Both of these possible improvements would likely involve land from the Appoquinimink Summit Campus site. The developer should coordinate with the DelDOT Development Coordination section regarding accommodating future potential DelDOT improvements.

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

1. The developer shall improve Summit Bridge 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 a signalized full access site entrance for the proposed Summit Campus development on Summit Bridge Road, approximately 700 feet north of the northeast point of tangency of the intersection with Beaston Road and across from the existing Summit Aviation Entrance. The intersection should be consistent with the lane configurations shown in the table below. However, the lane configurations of the site





entrance may be impacted by the results of the Signal Justification Study being performed by JMT and coordination with DelDOT Traffic.

<b>Approach</b>	<b>Current Configuration</b>	<b>Proposed Configuration</b>
Eastbound Summit Aviation Entrance	One right turn lane	One shared left turn/through/right turn lane
Westbound Site Entrance	Approach does not exist	One left turn lane, one shared left turn/through lane, and one channelized right turn lane
Northbound Summit Bridge Road	Two through lanes	One left turn lane, two through lanes, and one channelized right turn lane
Southbound Summit Bridge Road	Two through lanes and one right turn lane	One left turn lane, two through lanes, and one right turn lane

Based on DelDOT’s *Development Coordination Manual*, the recommended minimum storage lengths (excluding taper) of the separate left turn and right turn lanes along Summit Bridge Road are listed below.

<b>Approach</b>	<b>Left Turn Lane</b>	<b>Right Turn Lane</b>
Northbound Summit Bridge Road	140 feet	410 feet
Southbound Summit Bridge Road	290 feet	150 feet

The existing southbound right turn lane is approximately 150 feet long (excluding taper) and the developer should maintain the existing southbound right turn lane. The calculated queue lengths from the HCS analysis can be accommodated within the recommended storage lengths. The developer should enter into a traffic signal agreement with DelDOT to include pedestrian signals, crosswalks, interconnection, and ITS equipment such as CCTV cameras at DelDOT’s discretion.

3. The developer should enter into an agreement with DelDOT to fund an equitable portion of the improvements to the intersection of Summit Bridge Road and Bethel Church Road as part of the *SR 896 and Bethel Church Road Interchange* (DelDOT Contract No. T200911305) project. The developer should coordinate with DelDOT on the implementation and equitable cost sharing of the improvements.
4. The developer should enter into an agreement with DelDOT to fund an equitable portion of improvements to the Boyds Corner Road and Ratledge Road intersection as part of the Southern New Castle County TID. The developer should coordinate with DelDOT on the implementation and equitable cost sharing of the improvements.



5. The developer should enter into a traffic signal agreement with DelDOT for the intersection of Summit Bridge Road and Old School House Road for the installation of a traffic signal. The intersection should be consistent with the lane configurations shown in the table below:

<b>Approach</b>	<b>Current Configuration</b>	<b>Proposed Configuration</b>
Eastbound Old School House Road	One shared left turn/right turn lane	No change
Northbound Summit Bridge Road	One shared left turn/through lane and one bypass lane	One left turn lane and one through lane
Southbound Summit Bridge Road	One through lane and one right turn lane	No change

The recommended minimum storage length is 90 feet (excluding taper for the northbound left turn lane). The calculated queue lengths from the HCS analysis can be accommodated within the existing storage length for the southbound Summit Bridge Road right turn lane, and therefore should be maintained. The traffic signal agreement should include pedestrian signals, crosswalks, interconnection, and ITS equipment such as CCTV cameras at DelDOT's discretion.

6. The developer should coordinate with the DelDOT Development Coordination section regarding accommodating future potential DelDOT improvements associated with a passenger rail station between Boyds Corner Road and the C&D Canal, as well as the realignment of Lorewood Grove Road to intersect Summit Bridge Road. These potential future DelDOT improvements may impact the site design of the Appoquinimink Summit Campus.
7. The following bicycle, pedestrian, and transit improvements should be included:
  - a. A minimum of fifteen-foot wide permanent easement from the edge of the right-of-way should be dedicated to DelDOT along the Summit Bridge Road site frontage. Within the easement, the developer should construct a ten-foot wide shared-use path (SUP). The SUP should extend from the northern property line, go around Parcel 7 (Lands N.O.F. Neville), and connect to Beaston Road. Additionally, the SUP should tie-in to any school crossings. The SUP should be designed to meet current AASHTO and ADA standards. A minimum five-foot setback should be maintained from the edge of the pavement to the SUP. If feasible, the SUP should be placed behind utility poles and street trees should be provided within the buffer area. The developer should coordinate with DelDOT's Development Coordination Section during the plan review process to identify the exact location of the SUP.
  - b. At least one internal connection of a sidewalk or SUP from the SUP along Summit Bridge Road is required.



- c. Where internal sidewalks are located alongside of parking spaces, a buffer, physical barrier, or signage should be added to eliminate vehicular overhand onto the sidewalk.
  - d. Internal bicycle racks should be provided.
  - e. ADA compliant curb ramps and marked crosswalks should be provided along the site entrance.
  - f. Minimum five-foot wide bicycle lanes should be incorporated in the right turn lane and shoulder along the northbound Summit Bridge Road approach to the site entrance.
  - g. Utility covers should be moved outside of any designated bicycle lanes and any proposed sidewalks/SUP or should be flush with the pavement.
8. School zone signing and striping, potential school crossings at controlled/uncontrolled locations, and enhanced school zone notifications such as flashing beacons should be provided. The developer should coordinate with DeIDOT Development Coordination Section regarding the design during the Entrance Plan review process.
9. Due to the proximity of the proposed development to the Summit Airport, we recommend that deed restrictions be required similar to the attached Avigation Nuisance Easement and Non-Suit Covenant (pages 48 and 49). The applicant should contact Mr. Joshua Thomas at (302) 760-4834 at DeIDOT's Statewide and Regional Planning Section to determine whether the proposed development is within the Runway Protection Zone. If so, restrictions may apply.

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

Improvements in this TIS may be considered "significant" under DeIDOT's *Work Zone Safety and Mobility Procedures and Guidelines*. These guidelines are available on DeIDOT's website at [https://www.deldot.gov/Publications/manuals/de\\_mutcd/index.shtml](https://www.deldot.gov/Publications/manuals/de_mutcd/index.shtml). For any additional information regarding the work zone impact and mitigation procedures during construction, please contact Mr. Don Weber, Assistant Director for Traffic Operations and Management. Mr. Weber can be reached at (302) 659-4651 or by email at [Don.Weber@delaware.gov](mailto:Don.Weber@delaware.gov).



Additional details on our review of the TIS are attached. Please contact me at (302) 266-9600 if you have any questions concerning this review.

Sincerely,  
Johnson, Mirmiran, and Thompson, Inc.

A handwritten signature in black ink, appearing to read 'Joanne M. Arellano'.

Joanne M. Arellano, P.E., PTOE

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

## **General Information**

**Report date:** January 2021

**Prepared by:** Landmark Science & Engineering

**Prepared for:** Appoquinimink School District

**Tax Parcel:** 13-007.00-016

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

## **Project Description and Background**

**Description:** The proposed development is a K-12 school campus consisting of a 40,000 square-foot early childhood center, a 107,473 square-foot elementary school, and a 396,000 square-foot middle and high school. The proposed development will be constructed in two phases. Phase I will consist of the 107,473 square foot elementary school. Phase II will consist of the 40,000 square foot early childhood center and the 396,000 square foot middle and high school.

**Location:** The subject site is located on the northeast corner of the intersection of Summit Bridge Road (New Castle Road 16) and Beaston Road (New Castle Road 415), in New Castle County Delaware.

**Amount of Land to be developed:** An approximately 142.70-acre parcel.

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

**Proposed completion date:** Phase I in 2023 and full build in 2027.

**Proposed access locations:** One full access entrance is proposed on the east side of Summit Bridge Road, directly across from the entrance to Summit Aviation.

### **Daily Traffic Volumes:**

- 2019 Average Annual Daily Traffic on Summit Bridge Road (New Castle Road 16): 23,493

**Site Map**



*\*Graphic is an approximation based on the Schematic Design Plan prepared by Landmark Science & Engineering dated August 11<sup>th</sup>, 2020.*



## **Relevant and On-going Projects**

DelDOT has several ongoing and recently completed projects within the study area. The *US 301 Corridor Improvements* project (including DelDOT Contract No. T200811301, T200911301, T200911302, T200911308, T201011301, and T201011302) was divided into several sections which were recently constructed within the study area. The aim of the project was to reduce traffic congestion in the project area and improve highway safety by removing through traffic, especially heavy vehicle truck traffic, from the local roads. The project constructed a four-lane limited access toll road, US Route 301, on a new alignment which extends from the Maryland State Line, west of Middletown, to the vicinity of Armstrong Corner Road. The new US Route 301 continues northeast, crossing Summit Bridge Road and Boyds Corner Road before curving east and tying into Delaware Route 1 south of the Chesapeake and Delaware (C&D) Canal. Access to the new US Route 301 is provided via intersections south of Middletown (Levels Road), in the vicinity of Armstrong Corner Road, and at Jamison Corner Road. Construction of the above-mentioned contracts were completed and the new US Route 301 opened to traffic in January 2019. Additional information can be found on the DelDOT project website at <http://deldot.gov/information/projects/us301/index.shtml>

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In conjunction with the *SR 896 and Bethel Church Road Interchange* project, the *US 301 Spur Road* project is planned to include a 4.5-mile, limited-access highway that will start from the US 301 Mainline at approximately 2/3 of a mile south of Armstrong Corner Road and connect to Summit Bridge Road at the proposed Summit Bridge Road/Bethel Church Road interchange. The eastbound Bethel Church Road approach would be realigned, and ramps would be added to connect to the proposed Spur Road. Additionally, DelDOT is undergoing monitoring efforts for the US 301 Spur Road. Specifically, DelDOT is monitoring traffic volumes, crash data, and land use information along the corridor with the goal of determining when to construct the Spur Road. More information can be found at DelDOT's website:

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Additionally, an Electric Red Light Safety Program site exists on Summit Bridge Road at the study intersection with the Summit Crossing Entrance. Also, the railroad crossing along Boyds Corner Road, east of the study intersection with Summit Bridge Road/Churchtown Road is scheduled for reconstruction in Fall of 2021 as part of the *Boyds Corner Road Railroad Crossing Safety Improvements DOT Crossing #531610Y* (DelDOT Contract No. T201500514) project. This



reconstruction will include mill and overlay, signing, and striping along Boyds Corner Road in the vicinity of the railroad crossing.

### **Livable Delaware**

*(Source: Delaware Strategies for State Policies and Spending, 2020)*

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

The proposed development is located within the Investment Level 2 and Level 3. The majority of the site exists in Level 3.

#### *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. Overall, the State's intent is to use its spending and management tools to promote well-designed development in these areas. Such development provides for a variety of housing types, user-friendly transportation systems, essential open spaces and recreational facilities, other public facilities, and services to promote a sense of community.

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. Investment Level 2 Areas are ideal locations for Transportation Improvement Districts and Complete Community Enterprise Districts. Other priorities for Level 2 Areas include: Corridor Capacity Preservation, off-alignment multi-use paths, interconnectivity of neighborhoods and public facilities, and signal-system enhancements.

#### *Investment Level 3*

Investment Level 3 Areas generally fall into two categories. The first category covers lands that are in the long-term growth plans of counties or municipalities where development is not necessary to accommodate expected population growth during a five-year planning period (or longer). In these instances, development in Investment Level 3 may be least appropriate for new growth and

development in the near term. The second category includes lands that are adjacent to or intermingled with fast-growing areas within counties or municipalities that are otherwise categorized as Investment Levels 1 or 2. Environmentally sensitive features, agricultural-preservation issues, or other infrastructure issues most often impact these lands. In these instances, development and growth may be appropriate in the near term, but the resources on the site and in the surrounding area should be carefully considered and accommodated by state agencies and local government with land-use authority. Investment Level 3 is further characterized by areas with new development separated from existing development by a substantial amount of vacant land that is not contiguous with existing infrastructure, areas that are experiencing some development pressure, areas with existing but disconnected development, and possible lack of adequate infrastructure.

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

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

The majority of the proposed site would be located in an Investment Level 3 area and can be considered in the subcategory of Level 3 which encompasses “lands that are adjacent to or intermingled with fast-growing areas within counties or municipalities that are otherwise categorized as Investment Levels 1 or 2 (where)... sensitive features... or other infrastructure issues most often impact these lands.” This subcategorization is supported by existence of the small portions of the site that fall in Investment Level 2 and surrounding Level 1 and 2 areas. Under this circumstance development may be appropriate in near term such that the land’s resources are carefully considered by the relevant authorities and local infrastructure improvement is supported by the landowner as development occurs. Therefore, the proposed development is generally consistent with the 2020 update of the Livable Delaware “Strategies for State Policies and Spending.”

**Comprehensive Plans**

*(Source: New Castle County July 2012)*

**New Castle County Comprehensive Plan:**

Per the *New Castle County Comprehensive Plan Future Land Use Map*, the proposed development is in an area designated as a Low Density Residential. Per the *New Castle County Comprehensive Plan Future Zoning Districts Map* the proposed development is in an area designated as Suburban.

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

Per the *New Castle County Comprehensive Plan 2012 Zoning District Map*, the proposed development is also in an area designated Suburban. Suburban zoning areas require "significant areas of open space and/or landscaping... to maintain the balance between green space and

buildings that characterize suburban character." The Schematic Design Plan prepared by Landmark Science & Engineering, dated August 11, 2020, depicts significant areas of open space and landscaping. Therefore, the proposed development is generally consistent with the *New Castle County July 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 Codes: 520 (Elementary School), 522 (Middle School/Junior High School), and 530 (High School).

**Table 1**  
Summit Trip Generation Phase I

Land Use	ADT	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
107,473 SF Elementary School (ITE Code 520)	2,098	412	337	749	66	81	147
<b>Total Trips</b>	2,098	412	337	749	66	81	147

**Table 1 Continued**  
Summit Trip Generation Full Development

Land Use	ADT	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
147,473 SF Elementary School (ITE Code 520)	2,879	565	463	1,028	91	111	202
132,00 SF Middle School (ITE Code 522)	2,662	146	120	266	82	75	157
264,00 SF High School (ITE Code 530)	3,714	633	259	892	138	118	256
<b>Total Trips</b>	9,255	1,344	842	2,186	311	304	615

## **Overview of TIS**

### **Intersections examined:**

1. Summit Bridge Road (New Castle Road 16) / Site Entrance / Summit Aviation Entrance
2. Summit Bridge Road / Old Summit Bridge Road (New Castle Road 63)
3. Summit Bridge Road / Summit Bridge Drive
4. Summit Bridge Road / Bethel Church Road (New Castle Road 433)
5. Summit Bridge Road / Red Lion Road (New Castle Road 35)
6. Old Summit Bridge Road / Goodwin Drive
7. Old Summit Bridge Road / Bethel Church Road
8. Bethel Church Road / Choptank Road (New Castle Road 435)
9. Summit Bridge Road / Beaston Road (New Castle Road 415)
10. Summit Bridge Road / Victoria Drive
11. Summit Bridge Road / Summit Crossing Entrance
12. Summit Bridge Road / Boyds Corner Road (New Castle Road 15) /Churchtown Road (New Castle Road 432)
13. Summit Bridge Road / Old School House Road (New Castle Road 431)
14. Boyds Corner Road / Ratledge Road (New Castle Road 414)
15. Churchtown Road / Choptank Road

### **Conditions examined:**

1. Case 1 – Existing (2020)
2. Case 2 – 2027 without development
3. Case 3 – 2023 with Phase I development
4. Case 4 – 2027 with full development

### **Committed Developments considered:**

1. Summit Pointe: Unbuilt 99 single-family detached houses.
2. Summit Bridge/Silver Wind Estates: Unbuilt 35 single-family detached houses (out of total 36)
3. Summit Circle: Unbuilt 14 single-family detached houses.
4. Rothwell Village: Unbuilt 85 single-family detached houses (out of total 150).
5. Summit Aviation Additions: Partly built 129,068 SF additions including 80,000 SF warehousing space, 50,600 SF hangar, and 1,300 SF storage space (out of total 289,718 SF).
6. Whispering Woods (50 age-restricted single-family detached houses, and 79 single-family attached houses)

7. Whitehall
  - a. Village 1 (76,317 SF commercial, 2,750 SF office, 95 single-family detached houses, 330 units of low-rise multi-family housing)
  - b. Village 2 (65 single-family detached houses, 370 units of low-rise multi-family houses, and a 20,800 SF school)
  - c. Hamlet 3 (28 single-family detached houses, 185 units of low-rise multi-family housing, and a 15,600 SF school)
  - d. Hamlet 4 (147 single-family detached houses and 174 units of low-rise multi-family housing)
  - e. Village 5 (500 single-family detached houses)
  - f. Village 6 (500 single-family detached houses)
  - g. Hamlet 7 (149 single-family detached houses, and 80 units of low-rise multi-family houses)
8. Whitehall Scott Run Business Park (1,835,360 SF industrial park and 75,000 SF shopping center)
9. Bayberry North (98 single-family detached houses, and 16 units of low-rise multi-family housing)
10. Windsor at Hyetts Corner (48 single-family detached houses)
11. Winchelsea (148 single-family detached houses, and 326 units of low-rise multi-family housing)
12. Bayberry Town Center (145 units of low-rise multi-family housing, 31,000 SF office building, 61,200 SF athletic club, and 186,345 SF shopping center)
13. Bayberry South (544 single-family detached houses, 74 units of low-rise multi-family housing, and 143 age-restricted single-family detached houses)
14. Boyds Corner Farm (Coburn Farm) (113 single-family detached houses, 94,000 SF shopping center, and 17,300 SF office building)
15. MOT Charter High School additions (11,230 SF)

\*Note: Committed development information for development Nos. 7 through 16 has been updated per trip data developed as part of the Southern New Castle County TID and included in a letter from DelDOT dated November 5, 2020.

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

### **Intersection Descriptions**

#### **1. Summit Bridge Road (New Castle Road 16) / Site Entrance / Summit Aviation Entrance**

**Type of Control:** Existing two-way stop-controlled intersection (T-Intersection), Proposed signalized intersection.

**Eastbound Approach:** (Summit Aviation Entrance) Existing a right turn lane, stop controlled. Proposed one left turn lane and one right turn lane.

**Westbound Approach:** (Site Entrance) Proposed two left turn lanes and one channelized right turn lane.

**Northbound Approach** (Summit Bridge Road) Existing two through lanes, Proposed one left turn lane, two through lanes, and one channelized right turn lane.

**Southbound Approach** (Summit Bridge Road) Existing two through lanes and one right turn lane, Proposed one left turn lane, two through lanes, and one right turn lane.

**2. Summit Bridge Road/ Old Summit Bridge Road (New Castle Road 63)**

**Type of Control:** Existing signalized intersection.

**Westbound Approach:** (Old Summit Bridge Road) Existing one left turn and one channelized right turn lane.

**Northbound Approach** (Summit Bridge Road) Existing one left turn lane, two through lanes and one right turn lane.

**Southbound Approach** (Summit Bridge Road) Existing one left turn lane and two through lanes.

**3. Summit Bridge Road / Summit Bridge Drive**

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

**Eastbound Approach:** (Summit Bridge Drive) Existing one right turn lane, stop controlled.

**Northbound Approach:** (Summit Bridge Road) Existing one left turn lane and two through lanes.

**Southbound Approach:** (Summit Bridge Road) Existing two through lanes and one right turn lane.

**4. Summit Bridge Road / Bethel Church Road (New Castle Road 433)**

**Type of Control:** Existing signalized intersection.

**Eastbound Approach:** (Bethel Church Road) Existing two left turn lanes and one channelized right turn lane.

**Westbound Approach:** (Bethel Church Road) Existing one right turn lane.

**Northbound Approach:** (Summit Bridge Road) Existing one left turn lane and two through lanes.

**Southbound Approach:** (Summit Bridge Road) Existing two through lanes and one channelized right turn lane.

**5. Summit Bridge Road/ Red Lion Road (New Castle Road 35)**

**Type of Control:** Existing signalized intersection.

**Eastbound Approach:** (Red Lion Road) Existing one left turn lane, one shared left turn/through lane and one channelized right turn lane.

**Westbound Approach:** (Red Lion Road) Existing one left turn lane, one shared left turn/through lane and one channelized right turn lane.

**Northbound Approach:** (Summit Bridge Road) Existing one left turn lane, two through lanes and one channelized right turn lane.

**Southbound Approach:** (Summit Bridge Road) Existing one left turn lane, two through lanes and one channelized right turn lane.

**6. Old Summit Bridge Road/ Goodwin Drive**

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

**Eastbound Approach:** (Old Summit Bridge Road) Existing one shared through/right turn lane.

**Westbound Approach:** (Old Summit Bridge Road) Existing one shared left turn/through lane.

**Northbound Approach:** (Goodwin Drive) Existing one shared left turn/right turn lane, stop-controlled.

**7. Old Summit Bridge Road/ Bethel Church Road**

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

**Eastbound Approach:** (Old Summit Bridge Road) Existing one shared left turn/through lane.

**Westbound Approach:** (Old Summit Bridge Road) Existing one shared through/right turn lane.

**Southbound Approach:** (Bethel Church Road) Existing one shared left turn/right turn lane, stop-controlled.

**8. Bethel Church Road/ Choptank Road (New Castle Road 435)**

**Type of Control:** Existing single-lane roundabout (T-intersection).

**Eastbound Approach:** (Bethel Church Road) Existing one shared left turn/right turn lane.

**Westbound Approach:** (Choptank Road) Existing one shared left turn/right turn lane.

**Northbound Approach:** (Bethel Church Road) Existing one shared through/right turn lane.

**9. Summit Bridge Road/ Beaston Road (New Castle Road 415)**

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

**Westbound Approach:** (Beaston Road) Existing one shared left turn/right turn lane, stop controlled.

**Northbound Approach:** (Summit Bridge Road) Existing one through lane and one shared through/right turn lane.

**Southbound Approach:** (Summit Bridge Road) Existing two through lanes.



#### **10. Summit Bridge Road/ Victoria Drive/ Summit Aviation**

**Type of Control:** Existing signalized intersection.

**Eastbound Approach:** (Summit Aviation) Existing one left turn lane and one shared through/channelized right turn lane.

**Westbound Approach:** (Victoria Drive) Existing one left turn lane and one shared through/right turn lane.

**Northbound Approach** (Summit Bridge Road) Existing one left turn lane, two through lanes and one right turn lane.

**Southbound Approach:** (Summit Bridge Road) Existing one left turn lane, two through lanes and one channelized right turn lane.

#### **11. Summit Bridge Road/ Summit Crossing Entrance**

**Type of Control:** Existing signalized intersection

**Eastbound Approach:** (Summit Crossing Entrance) Existing one shared left turn/through lane and one right turn lane.

**Westbound Approach:** (Summit Crossing Entrance) Existing one shared left turn/through lane and one right turn lane.

**Northbound Approach** (Summit Bridge Road) Existing one left turn lane, two through lanes and one right turn lane.

**Southbound Approach:** (Summit Bridge Road) Existing one left turn lane, two through lanes and one right turn lane.

#### **12. Summit Bridge Road/ Boyds Corner Road (New Castle Road 15) /Churchtown Road (New Castle Road 432)**

**Type of Control:** Existing signalized intersection.

**Eastbound Approach:** (Churchtown Road) Existing one left turn lane and one shared through/right turn lane.

**Westbound Approach:** (Boyds Corner Road) Existing two left turn lanes, one through lane and one channelized right turn lane.

**Northbound Approach** (Summit Bridge Road) Existing one left turn lane, two through lanes and one right turn lane.

**Southbound Approach:** (Summit Bridge Road) Existing two left turn lanes, two through lanes and one right turn lane.

#### **13. Summit Bridge Road/ Old School House Road (New Castle Road 431)**

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

**Eastbound Approach:** (Old School House Road) Existing one shared left turn/right turn lane, stop controlled.

**Northbound Approach:** (Summit Bridge Road) Existing one shared left turn/through lane and one by-pass lane.

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

#### **14. Boyds Corner Road/ Ratledge Road (New Castle Road 414)**

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

**Eastbound Approach:** (Boyds Corner Road) Existing one shared left turn/through lane and one by-pass lane.

**Westbound Approach:** (Boyds Corner Road) Existing one through lane and one right turn lane.

**Southbound Approach:** (Ratledge Road) Existing one shared left turn/right turn lane, stop controlled.

#### **15. Churchtown Road/ Choptank Road**

**Type of Control:** Existing single lane roundabout (four-legged)

**Eastbound Approach:** (Churchtown Road) Existing one shared left turn/through/right turn lane.

**Westbound Approach:** (Churchtown Road) Existing one shared left turn/through/right turn lane.

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

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

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

**Existing transit service:** Per DelDOT Gateway, Delaware Transit Corporation (DTC) currently provides existing services through the study area via DART Route 302. DART Route 302 runs along Summit Bridge Road but has no existing bus stops at any of the study intersections. DART Route 302 provides six round trips from 5:45 am to 6:47 pm on weekdays.

#### **Planned transit service:**

Per email correspondence on January 28<sup>th</sup>, 2021 with Mr. Jared Kauffman, Fixed-Route Planner, at the DTC, there are no transit improvements recommended for this study.

**Existing bicycle and pedestrian facilities:** According to DelDOT's New Castle County Bicycle Map, Statewide and Connector Bicycle Routes exist within the study area. The Statewide Bicycle Route travels along Summit Bridge Road north of the study intersection with Bethel Church Road. The State Bicycle Route then travels long Bethel Church Road through the study intersection with Choptank Road and continues along Choptank Road through the study intersection with Churchtown Road. One of the Connector Bicycle Routes travels along Summit Bridge Road from the study intersection with Bethel Church Road, through eight study intersections (Summit Bridge Drive, Old Summit Bridge Road, Site Entrance/Summit Aviation Entrance, Beaston Road, Victoria Drive, Summit Crossing Entrance, Boyds Corner Road/Churchtown Road, and Old School House Road). Another Connector Bicycle Route travels along Churchtown Road/Boyds

Corner Road and traverses three of the study intersections (Choptank Road, Summit Bridge Road, and Ratledge Road).

**Planned bicycle and pedestrian facilities:** Per email correspondence dated February 3<sup>rd</sup> 2021, from Mr. John Fiori, DelDOT's Bicycle Coordinator and Ms. Linda Osiecki, DelDOT's Pedestrian Coordinator, the following improvements were recommended:

- Install a 10-foot wide shared-use path along the entire property frontage with angle terminations into the shoulder. The shared-use path should go around Parcel 7 (Lands N.O.F. Neville) and connect at Beaston Road.
- Install a privacy fence around Parcel 7.
- At least one internal connection of a sidewalk or shared use path from the shared-use path along Summit Bridge Road is required.
- The site shall dedicate right-of-way per the roadway classification and establish a 15' wide permanent easement along the property frontage of Summit Bridge Road.
- All entrance, roadway and/or intersection improvements required shall incorporate bicycle and pedestrian facilities. Per the DCM, if the right turn lane is warranted, then a bike lane shall be incorporated along the right turn lane; if a left turn lane is required any roadway improvements shall include a shoulder matching the roadway functional classification or existing conditions

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

- Summit Bridge Road – LTS: 4

### **Crash Evaluation**

A crash evaluation was not included in the Final TIS.

### **Signal Justification Study**

JMT is conducting a Signal Justification Study. The results of that study will be included in the revised TIS review letter.

### **Previous Comments**

All comments from DelDOT for the Preliminary Traffic Impact Study (PTIS) have been addressed in the Final TIS.

## **General HCS Analysis Comments**

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

1. 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, Case 3 and Case 4 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, whereas the TIS did not.
2. 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 site entrances, whereas the TIS did not. The TIS utilized a heavy vehicle percentage of 0% at all signalized intersections and 3% at all unsignalized intersections.
3. Per DelDOT's *Development Coordination Manual*, JMT and the TIS utilized the existing PHF for the Case 1 scenario and a future PHF for Cases 2 and 3 scenarios of 0.80 for roadways with less than 500 vph, 0.88 for roadways between 500 and 1,000 vph, and 0.92 for roadways with more than 1,000 vph or the existing PHF, whichever was higher.
4. For the signalized intersection HCS analysis, JMT utilized Field-Measured Phase Times whereas the TIS did not.
5. JMT modeled all the existing signalized study intersections located along Summit Bridge Road, south of the C&D Canal in one coordinated corridor to be consist with DelDOT Timing Plans and existing conditions, whereas the TIS modeled the signalized intersections individually.
6. JMT utilized an arrival type of 4 for all the approaches along the northbound and southbound Summit Bridge Road approaches whereas the TIS utilized the HCS default arrival type of 3.
7. TIS modeled right turn movements as an unsignalized movements along all approaches to the signalized intersections, whereas JMT modeled right turn movements as unsignalized only if an acceleration lane is provided.
8. JMT utilized yellow, red clearance, minimum green, and passage times, as well as offsets and recall modes consistent with the DelDOT Timing Plans, whereas the TIS did not.

Table 2  
Peak Hour Levels Of Service (LOS)  
Based on Final Traffic Impact Study for Appoquinimink Summit Campus  
Report Dated: January 2021  
Prepared by: Landmark Science & Engineering

Unsignalized Intersection Two-Way Stop Control (T-intersection) <sup>1</sup>	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Summit Bridge Road (New Castle Road 16) / Site Entrance / Summit Aviation Entrance</b> <sup>2</sup>				
2020 Existing (Case 1)				
Eastbound Summit Aviation Entrance Approach	B (12.0)	C (15.0)	B (12.2)	C (15.3)
Northbound Summit Bridge Road Left Turn	B (12.9)	D (26.6)	B (13.1)	D (27.6)
2027 Without Development (Case 2)				
Eastbound Summit Aviation Entrance Approach	B (13.8)	C (19.7)	B (13.9)	C (19.9)
Northbound Summit Bridge Road Left Turn	C (15.3)	D (32.4)	C (15.5)	D (33.1)
2023 With Development of Phase I (Case 3)				
Eastbound Summit Aviation Entrance Approach	-	-	B (14.2)	C (19.7)
Westbound Site Entrance Approach	-	-	*	*
Northbound Summit Bridge Road Left Turn	-	-	C (16.1)	D (32.5)
Southbound Summit Bridge Road Left Turn	-	-	C (23.0)	B (12.9)

\*HCS reported delays of 1000 seconds per vehicle or more.

<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> JMT utilized a heavy vehicle percentage of 7% for all the entering and exiting volumes for Site Entrance due to the high volume of school buses.

Table 2 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Final Traffic Impact Study for Appoquinimink Summit Campus  
Report Dated: January 2021  
Prepared by: Landmark Science & Engineering

Unsignalized Intersection Two-Way Stop Control (T-intersection) <sup>1</sup>	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Summit Bridge Road (New Castle Road 16) / Site Entrance / Summit Aviation Entrance</b> <sup>2</sup>				
2027 With Full Development (Case 4)				
Eastbound Summit Aviation Entrance Approach	-	-	B (13.9)	C (19.9)
Westbound Site Entrance Approach	-	-	*	*
Northbound Summit Bridge Road Left Turn	-	-	C (15.5)	D (33.1)
Southbound Summit Bridge Road Left Turn	-	-	F (304.8)	B (15.0)

\*HCS reported delays of 1000 seconds per vehicle or more.

Table 2 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Final Traffic Impact Study for Appoquinimink Summit Campus  
Report Dated: January 2021  
Prepared by: Landmark Science & Engineering

Signalized Intersection <sup>1</sup>	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Summit Bridge Road (New Castle Road 16) / Site Entrance / Summit Aviation Entrance</b>				
2023 With Development of Phase I (Case 3) <sup>3</sup>	B (11.5)	A (7.4)	B (18.7)	B (14.7)
2027 With Full Development (Case 4) <sup>3</sup>	D (42.4)	B (10.5)	D (43.1)	B (19.3)
2027 With Full Development (Case 4) <i>with Improvement</i> <sup>4</sup>	-	-	C (31.6)	C (21.4)

<sup>3</sup> JMT modeled the eastbound Summit Aviation Entrance approach as one shared left turn/through/right turn lane with split phase along the eastbound and westbound approaches, whereas the TIS modeled the eastbound Summit Aviation Entrance approach with one left turn lane and one right turn lane and protected-permissive left turn phasing along the eastbound and westbound approaches.

<sup>4</sup> Improvement scenario includes providing two left turn lanes along the southbound Summit Bridge Road approach and updating the northbound and southbound Summit Bridge Road left turn phasing to protected-only.



Table 3  
Peak Hour Levels Of Service (LOS)  
Based on Final Traffic Impact Study for Appoquinimink Summit Campus  
Report Dated: January 2021  
Prepared by: Landmark Science & Engineering

Signalized Intersection <sup>1</sup>	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Summit Bridge Road (New Castle Road 16) / Old Summit Bridge Road (New Castle Road 63)</b>				
2020 Existing (Case 1)	-	-	B (16.3)	A (6.4)
2020 Existing (Case 1) <i>with Optimization</i> <sup>5</sup>	A (4.6)	A (3.5)	A (7.2)	A (5.5)
2027 Without Development (Case 2)	-	-	B (18.2)	A (7.5)
2027 Without Development (Case 2) <i>with Optimization</i> <sup>5</sup>	A (5.9)	A (4.6)	B (11.2)	A (6.0)
2023 With Development of Phase I (Case 3)	-	-	B (17.7)	A (7.5)
2023 With Development of Phase I (Case 3) <i>with Optimization</i> <sup>5</sup>	A (6.7)	A (4.7)	B (14.1)	A (6.9)
2027 With Full Development (Case 4)	-	-	B (17.6)	A (7.6)
2027 With Full Development (Case 4) <i>with Optimization</i> <sup>5</sup>	A (9.1)	A (5.4)	B (14.5)	A (8.4)

<sup>5</sup> Signal Optimization scenario includes optimizing splits and utilizing a cycle length of 120 seconds during the AM and PM peak hours.

Table 4  
Peak Hour Levels Of Service (LOS)  
Based on Final Traffic Impact Study for Appoquinimink Summit Campus  
Report Dated: January 2021  
Prepared by: Landmark Science & Engineering

Unsignalized Intersection Two-Way Stop Control (T-Intersection) <sup>1</sup>	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Summit Bridge Road (New Castle Road 16) / Summit Bridge Drive</b>				
2020 Existing (Case 1)				
Eastbound Summit Bridge Drive Approach	B (12.5)	B (14.8)	B (12.6)	B (14.9)
Northbound Summit Bridge Road Left Turn	B (10.1)	B (12.7)	B (10.2)	B (12.8)
2027 Without Development (Case 2)				
Eastbound Summit Bridge Drive Approach	B (15.0)	C (21.5)	C (15.1)	C (21.8)
Northbound Summit Bridge Road Left Turn	B (11.9)	C (19.0)	B (12.1)	C (19.4)
2023 With Development of Phase I (Case 3)				
Eastbound Summit Bridge Drive Approach	C (16.3)	C (21.5)	C (16.5)	C (21.8)
Northbound Summit Bridge Road Left Turn	B (12.9)	C (19.0)	B (13.0)	C (19.4)
2027 With Full Development (Case 4)				
Eastbound Summit Bridge Drive Approach	C (21.1)	C (23.4)	C (21.4)	C (23.7)
Northbound Summit Bridge Road Left Turn	C (16.2)	C (20.8)	C (16.5)	C (21.3)

Table 5  
Peak Hour Levels Of Service (LOS)  
Based on Final Traffic Impact Study for Appoquinimink Summit Campus  
Report Dated: January 2021  
Prepared by: Landmark Science & Engineering

Signalized Intersection <sup>1</sup>	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Summit Bridge Road (New Castle Road 16)/ Bethel Church Road (New Castle Road 433) <sup>6</sup></b>				
2020 Existing (Case 1)	-	-	F (181.3)	C (30.1)
2020 Existing (Case 1) <i>with Optimization</i> <sup>5</sup>	C (26.3)	B (18.4)	E (68.4)	C (26.1)
2027 Without Development (Case 2)	-	-	F (251.0)	D (51.9)
2027 Without Development (Case 2) <i>with Optimization</i> <sup>5</sup>	F (101.4)	D (47.5)	F (153.7)	C (33.0)
2023 With Development of Phase I (Case 3)	-	-	F (248.4)	D (51.3)
2023 With Development of Phase I (Case 3) <i>with Optimization</i> <sup>5</sup>	F (95.4)	D (46.7)	F (151.6)	D (37.3)
2027 With Full Development (Case 4)	-	-	F (277.5)	E (64.7)
2027 With Full Development (Case 4) <i>with Optimization</i> <sup>5</sup>	F (93.4)	D (54.6)	F (176.6)	D (38.0)

<sup>6</sup> JMT modeled the signal phasing consistent with existing conditions, whereas the TIS did not.

Table 5 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Final Traffic Impact Study for Appoquinimink Summit Campus  
Report Dated: January 2021  
Prepared by: Landmark Science & Engineering

Signalized Intersection <sup>7</sup>	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Summit Bridge Road (New Castle Road 16) / Bethel Church Road (New Castle Road 433) <sup>8</sup></b>				
2020 Existing (Case 1)	-	-	D (42.3)	B (16.6)
2020 Existing (Case 1) <i>with Optimization</i> <sup>5</sup>	-	-	C (33.4)	B (17.2)
2027 Without Development (Case 2)	-	-	F (104.8)	D (45.0)
2027 Without Development (Case 2) <i>with Optimization</i> <sup>5</sup>	-	-	F (83.2)	C (26.6)
2023 With Development of Phase I (Case 3)	-	-	F (105.6)	D (44.1)
2023 With Development of Phase I (Case 3) <i>with Optimization</i> <sup>5</sup>	-	-	F (88.3)	C (26.7)
2027 With Full Development (Case 4)	-	-	F (130.4)	E (55.2)
2027 With Full Development (Case 4) <i>with Optimization</i> <sup>5</sup>	-	-	F (107.2)	C (31.1)

<sup>7</sup> The numbers in parentheses following levels of service are average delay per vehicle, measured in seconds based on Synchro methodology.

<sup>8</sup> Due to an atypical signal operation that is not consistent with NEMA methodology, JMT conducted an additional analysis in Synchro 10 to be consistent with the existing signal phasing.

Table 6  
Peak Hour Levels Of Service (LOS)  
Based on Final Traffic Impact Study for Appoquinimink Summit Campus  
Report Dated: January 2021  
Prepared by: Landmark Science & Engineering

Signalized Intersection <sup>1</sup>	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Summit Bridge Road (New Castle Road 16) / Red Lion Road (New Castle Road 35)</b> <sup>9, 10</sup>				
2020 Existing (Case 1)	B (15.7)	C (20.4)	C (34.4)	D (37.5)
2020 Existing (Case 1) <i>with Optimization</i> <sup>11</sup>	-	-	C (30.9)	C (34.4)
2027 Without Development (Case 2)	B (18.3)	D (35.5)	D (54.9)	E (76.7)
2027 Without Development (Case 2) <i>with Optimization</i> <sup>11</sup>	-	-	D (40.0)	D (45.2)
2023 With Development of Phase I (Case 3)	B (19.7)	C (34.5)	E (61.1)	E (75.3)
2023 With Development of Phase I (Case 3) <i>with Optimization</i> <sup>11</sup>	-	-	D (43.1)	D (47.7)
2027 With Full Development (Case 4)	C (27.4)	D (45.1)	F (80.5)	F (87.2)
2027 With Full Development (Case 4) <i>with Optimization</i> <sup>11</sup>	-	-	D (51.4)	D (48.1)

<sup>9</sup> JMT utilized a cycle length of 150 seconds during the AM and PM peak hours for Cases 1, 2, 3, and 4 consistent with DelDOT timing, whereas the TIS did not.

<sup>10</sup> JMT modeled the eastbound and westbound Red Lion Road approaches as split phase consistent with existing conditions, whereas the TIS modeled the approaches as concurrent phases with protected-permissive left turn phasing.

<sup>11</sup> Signal Optimization scenario includes optimizing splits while maintaining cycle lengths consistent with the DelDOT Timing Plans.

Table 7  
Peak Hour Levels Of Service (LOS)  
Based on Final Traffic Impact Study for Appoquinimink Summit Campus  
Report Dated: January 2021  
Prepared by: Landmark Science & Engineering

Unsignalized Intersection Two-Way Stop Control (T-Intersection) <sup>1</sup>	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Old Summit Bridge Road (New Castle Road 16) / Goodwin Drive</b>				
2020 Existing (Case 1)				
Westbound Old Summit Bridge Road Left Turn	A (7.4)	A (7.6)	A (7.4)	A (7.6)
Northbound Goodwin Drive Approach	A (9.4)	A (9.6)	A (9.5)	A (9.8)
2027 Without Development (Case 2)				
Westbound Old Summit Bridge Road Left Turn	A (7.5)	A (8.0)	A (7.5)	A (8.1)
Northbound Goodwin Drive Approach	A (9.8)	B (10.8)	B (10.0)	B (11.3)
2023 With Development of Phase I (Case 3)				
Westbound Old Summit Bridge Road Left Turn	A (7.6)	A (8.0)	A (7.6)	A (8.1)
Northbound Goodwin Drive Approach	A (10.0)	B (10.8)	A (10.3)	B (11.3)
2027 With Full Development (Case 4)				
Westbound Old Summit Bridge Road Left Turn	A (7.6)	A (8.0)	A (7.6)	A (8.1)
Northbound Goodwin Drive Approach	B (10.4)	B (11.0)	B (10.9)	B (11.5)

Table 8  
Peak Hour Levels Of Service (LOS)  
Based on Final Traffic Impact Study for Appoquinimink Summit Campus  
Report Dated: January 2021  
Prepared by: Landmark Science & Engineering

Unsignalized Intersection Two-Way Stop Control (T-Intersection) <sup>1</sup>	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Old Summit Bridge Road (New Castle Road 63) / Bethel Church Road (New Castle Road 433)</b>				
2020 Existing (Case 1)				
Eastbound Old Summit Bridge Road Left Turn	A (7.4)	A (7.4)	A (7.5)	A (7.4)
Southbound Goodwin Drive Approach	A (8.8)	A (8.8)	A (8.9)	A (8.9)
2027 Without Development (Case 2)				
Eastbound Old Summit Bridge Road Left Turn	A (7.8)	A (7.6)	A (7.9)	A (7.7)
Southbound Goodwin Drive Approach	A (9.6)	A (9.8)	A (9.8)	B (10.1)
2023 With Development of Phase I (Case 3)				
Eastbound Old Summit Bridge Road Left Turn	A (7.8)	A (7.6)	A (8.0)	A (7.7)
Southbound Goodwin Drive Approach	A (9.6)	A (9.7)	A (9.9)	A (10.0)
2027 With Full Development (Case 4)				
Eastbound Old Summit Bridge Road Left Turn	A (7.9)	A (7.6)	A (8.0)	A (7.7)
Southbound Goodwin Drive Approach	A (9.6)	A (9.6)	A (9.9)	A (9.9)

**Table 9**  
**Peak Hour Levels Of Service (LOS)**  
Based on Final Traffic Impact Study for Appoquinimink Summit Campus  
Report Dated: January 2021  
Prepared by: Landmark Science & Engineering

<b>Roundabout <sup>1</sup></b>	<b>LOS per TIS</b>		<b>LOS per JMT</b>	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Bethel Church Road (New Castle Road 433) / Choptank Road (New Castle Road 435)</b>				
2020 Existing (Case 1)				
Eastbound Bethel Church Road Approach	A (5.9)	A (6.1)	A (5.9)	A (6.1)
Westbound Bethel Church Road Approach	A (4.5)	A (8.2)	A (4.4)	A (7.9)
Northbound Choptank Road Approach	A (9.6)	A (5.4)	A (9.6)	A (5.4)
Overall	A (7.4)	A (7.1)	A (7.4)	A (6.9)
2027 Without Development (Case 2)				
Eastbound Bethel Church Road Approach	A (6.0)	A (6.1)	A (6.3)	A (6.3)
Westbound Bethel Church Road Approach	A (4.5)	A (8.3)	A (4.7)	A (8.4)
Northbound Choptank Road Approach	A (9.5)	A (5.6)	B (10.2)	A (5.6)
Overall	A (7.3)	A (7.3)	A (7.8)	A (7.3)



Table 9 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Final Traffic Impact Study for Appoquinimink Summit Campus  
Report Dated: January 2021  
Prepared by: Landmark Science & Engineering

Roundabout <sup>1</sup>	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Bethel Church Road / Choptank Road (New Castle Road 435)</b>				
2023 With Development of Phase I (Case 3)				
Eastbound Bethel Church Road Approach	A (6.1)	A (6.0)	A (6.1)	A (6.1)
Westbound Bethel Church Road Approach	A (4.6)	A (8.0)	A (4.7)	A (8.0)
Northbound Choptank Road Approach	A (9.4)	A (5.5)	A (9.4)	A (5.5)
Overall	A (7.3)	A (6.9)	A (7.3)	A (7.0)
2027 With Full Development (Case 4)				
Eastbound Bethel Church Road Approach	A (6.8)	A (6.4)	A (6.8)	A (6.5)
Westbound Bethel Church Road Approach	A (4.9)	A (8.5)	A (5.0)	A (8.5)
Northbound Choptank Road Approach	B (11.2)	A (5.7)	B (11.3)	A (5.8)
Overall	A (8.3)	A (7.4)	A (8.4)	A (7.4)

Table 10  
Peak Hour Levels Of Service (LOS)  
Based on Final Traffic Impact Study for Appoquinimink Summit Campus  
Report Dated: January 2021  
Prepared by: Landmark Science & Engineering

Unsignalized Intersection Two-Way Stop Control (T-Intersection) <sup>1</sup>	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Summit Bridge Road (New Castle Road 16) / Beaston Road (New Castle Road 415)</b>				
2020 Existing (Case 1)				
Westbound Beaston Road Approach	B (14.3)	B (12.0)	B (14.4)	B (12.0)
2027 Without Development (Case 2)				
Westbound Beaston Road Approach	C (16.8)	B (14.3)	C (17.0)	B (14.4)
2023 With Development of Phase I (Case 3)				
Westbound Beaston Road Approach	C (19.4)	B (14.5)	C (19.6)	B (14.6)
2027 With Full Development (Case 4)				
Westbound Beaston Road Approach	D (29.0)	C (15.9)	D (29.4)	C (16.0)

Table 11  
Peak Hour Levels Of Service (LOS)  
Based on Final Traffic Impact Study for Appoquinimink Summit Campus  
Report Dated: January 2021  
Prepared by: Landmark Science & Engineering

Signalized Intersection <sup>1</sup>	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Summit Bridge Road (New Castle Road 16) / Victoria Drive<sup>12, 13, 14</sup></b>				
2020 Existing (Case 1)	-	-	A (5.0)	A (7.1)
2020 Existing (Case 1) <i>with Optimization</i> <sup>5</sup>	A (5.0)	A (4.0)	A (9.4)	A (7.0)
2027 Without Development (Case 2)	-	-	A (5.8)	A (7.6)
2027 Without Development (Case 2) <i>with Optimization</i> <sup>5</sup>	A (6.2)	A (5.8)	A (5.5)	A (9.7)
2023 With Development of Phase I (Case 3)	-	-	A (5.8)	A (7.6)
2023 With Development of Phase I (Case 3) <i>with Optimization</i> <sup>5</sup>	A (6.7)	A (5.9)	A (4.1)	A (8.8)
2027 With Full Development (Case 4)	-	-	A (6.1)	A (7.9)
2027 With Full Development (Case 4) <i>with Optimization</i> <sup>5</sup>	A (9.9)	A (6.5)	A (6.7)	B (10.6)

<sup>12</sup> JMT modeled the eastbound Victoria Drive approach as one left turn lane and one shared through/right turn lane to match existing conditions, whereas the TIS modeled the approach as one left turn lane, one through lane, and one right turn lane.

<sup>13</sup> JMT modeled the eastbound and westbound Victoria Drive approaches as concurrent phases with permitted left turn phasing to be consistent with existing conditions, whereas the TIS modeled the approaches with protected-permissive left turn phasing.

<sup>14</sup> JMT modeled the northbound and southbound Summit Bridge Road approaches with protected-permissive left turn phasing consistent with existing conditions, whereas the TIS modeled the approaches with protected-only left turn phasing.

Table 12  
Peak Hour Levels Of Service (LOS)  
Based on Final Traffic Impact Study for Appoquinimink Summit Campus  
Report Dated: January 2021  
Prepared by: Landmark Science & Engineering

Signalized Intersection <sup>1</sup>	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Summit Bridge Road (New Castle Road 16) / Summit Crossing Entrance <sup>15</sup></b>				
2020 Existing (Case 1)	-	-	A (9.8)	A (8.5)
2020 Existing (Case 1) <i>with Optimization</i> <sup>5</sup>	B (10.1)	B (11.9)	B (11.1)	A (8.2)
2027 Without Development (Case 2)	-	-	B (10.4)	A (8.7)
2027 Without Development (Case 2) <i>with Optimization</i> <sup>5</sup>	A (9.5)	B (11.3)	B (18.7)	A (9.9)
2023 With Development of Phase I (Case 3)	-	-	B (10.3)	A (8.7)
2023 With Development of Phase I (Case 3) <i>with Optimization</i> <sup>5</sup>	A (9.5)	B (11.2)	B (17.0)	A (9.2)
2027 With Full Development (Case 4)	-	-	A (10.1)	A (8.6)
2027 With Full Development (Case 4) <i>with Optimization</i> <sup>5</sup>	B (11.6)	B (11.3)	B (19.3)	A (7.8)

<sup>15</sup> JMT modeled the northbound and southbound Summit Bridge Road approaches with protected-permissive left turn phasing consistent with existing conditions, whereas the TIS modeled the approaches with protected-only left turn phasing.

Table 13  
Peak Hour Levels Of Service (LOS)  
Based on Final Traffic Impact Study for Appoquinimink Summit Campus  
Report Dated: January 2021  
Prepared by: Landmark Science & Engineering

Signalized Intersection <sup>1</sup>	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Summit Bridge Road (New Castle Road 16) / Boyds Corner Road (New Castle Road 15) / Churchtown Road (New Castle Road 432) <sup>16</sup></b>				
2020 Existing (Case 1)	-	-	E (81.8)	C (31.0)
2020 Existing (Case 1) <i>with Optimization</i> <sup>5</sup>	C (27.2)	C (29.3)	C (31.1)	C (28.1)
2027 Without Development (Case 2)	-	-	F (115.4)	F (85.0)
2027 Without Development (Case 2) <i>with Optimization</i> <sup>5</sup>	D (38.5)	F (115.7)	D (52.5)	D (43.1)
2027 Without Development (Case 2) <i>with Optimization and Improvement</i> <sup>5, 17</sup>	-	-	C (32.6)	C (34.8)
2023 With Development of Phase I (Case 3)	-	-	F (123.6)	F (87.3)
2023 With Development of Phase I (Case 3) <i>with Optimization</i> <sup>5, 18</sup>	D (50.5)	F (118.5)	D (54.8)	D (41.4)
2023 With Development of Phase I (Case 3) <i>with Optimization and Improvement</i> <sup>5, 17</sup>	-	-	D (36.0)	C (34.5)
2027 With Full Development (Case 4)	-	-	F (144.8)	F (98.6)
2027 With Full Development (Case 4) <i>with Optimization</i> <sup>5, 18</sup>	E (75.9)	F (132.8)	F (84.1)	D (52.2)
2027 With Full Development (Case 4) <i>with Optimization and Improvement</i> <sup>5, 17</sup>	-	-	D (46.3)	D (38.9)

<sup>16</sup> JMT modeled the eastbound Churchtown Road and westbound Boyds Corner Road approaches as split phase consistent with existing conditions, whereas the TIS did not.

<sup>17</sup> Improvement scenario includes to converting the northbound right turn lane to a shared through/right turn lane.

<sup>18</sup> JMT optimization scenario included decreasing the minimum green time for the westbound approach to 5 seconds and optimizing offsets.

Table 14  
Peak Hour Levels Of Service (LOS)  
Based on Final Traffic Impact Study for Appoquinimink Summit Campus  
Report Dated: January 2021  
Prepared by: Landmark Science & Engineering

Unsignalized Intersection Two-Way Stop Control (T-Intersection) <sup>1</sup>	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Summit Bridge Road (New Castle Road 16) / Old School House Road (New Castle Road 431) <sup>19</sup></b>				
2020 Existing (Case 1)				
Eastbound Old School House Road Approach	C (23.9)	D (29.7)	E (37.9)	E (37.1)
Northbound Summit Bridge Road Left Turn	A (8.9)	B (10.8)	A (8.9)	B (10.9)
2027 Without Development (Case 2)				
Eastbound Old School House Road Approach	D (28.8)	E (36.1)	F (51.5)	E (48.9)
Northbound Summit Bridge Road Left Turn	A (9.2)	B (11.3)	A (9.2)	B (11.5)
2023 With Development of Phase I (Case 3)				
Eastbound Old School House Road Approach	E (40.3)	E (38.2)	F (98.7)	F (55.2)
Northbound Summit Bridge Road Left Turn	A (9.5)	B (11.3)	A (9.5)	B (11.4)
2027 With Full Development (Case 4)				
Eastbound Old School House Road Approach	F (150.2)	F (57.8)	F (591.8)	F (113.1)
Northbound Summit Bridge Road Left Turn	B (10.1)	B (11.8)	B (10.1)	B (12.0)

<sup>19</sup> JMT model northbound Summit Bridge Road approach as a left turn lane and a through lane consistent with existing conditions, whereas the TIS modeled the approach as a shared left turn/through lane and one through lane.

Table 14 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Final Traffic Impact Study for Appoquinimink Summit Campus  
Report Dated: January 2021  
Prepared by: Landmark Science & Engineering

Roundabout <sup>1</sup>	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Summit Bridge Road (New Castle Road 16) / Old School House Road (New Castle Road 431) <sup>20</sup></b>				
2027 Without Development (Case 2)				
Eastbound Old School Housel Road Approach	-	-	A (6.9)	A (10.0)
Northbound Summit Bridge Road Approach	-	-	B (14.1)	B (12.5)
Southbound Summit Bridge Road Approach	-	-	A (8.6)	D (26.1)
Overall	-	-	B (11.5)	C (20.0)
2023 With Development of Phase I (Case 3)				
Eastbound Old School Housel Road Approach	-	-	A (7.8)	A (10.0)
Northbound Summit Bridge Road Approach	-	-	C (17.8)	B (12.5)
Southbound Summit Bridge Road Approach	-	-	A (9.7)	D (25.8)
Overall	-	-	B (13.9)	C (19.8)
2027 With Full Development (Case 4)				
Eastbound Old School Housel Road Approach	-	-	B (10.2)	B (11.3)
Northbound Summit Bridge Road Approach	-	-	F (52.5)	B (15.0)
Southbound Summit Bridge Road Approach	-	-	B (12.5)	E (36.1)
Overall	-	-	D (34.0)	D (26.6)

<sup>20</sup> Improvement scenario includes providing a single lane roundabout.

Table 14 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Final Traffic Impact Study for Appoquinimink Summit Campus  
Report Dated: January 2021  
Prepared by: Landmark Science & Engineering

Signalized Intersection <sup>1</sup>	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Summit Bridge Road (New Castle Road 16) / Old School House Road (New Castle Road 431)</b>				
2027 Without Development (Case 2) with Improvement I <sup>21</sup>	-	-	A (9.9)	B (10.9)
2027 Without Development (Case 2) with Improvement II <sup>22</sup>	-	-	B (10.2)	B (11.0)
2023 With Development of Phase I (Case 3) with Improvement I <sup>21</sup>	-	-	B (11.1)	B (11.6)
2023 With Development of Phase I (Case 3) with Improvement II <sup>22</sup>	-	-	B (11.7)	B (11.6)
2027 With Full Development (Case 4) with Improvement I <sup>21</sup>	-	-	B (17.3)	B (14.0)
2027 With Full Development (Case 4) with Improvement II <sup>22</sup>	-	-	B (19.7)	B (14.2)

<sup>21</sup> Improvement Scenario I includes providing signalization with a 90 second cycle length during AM peak hour and 120 second during the PM peak hour for Cases 2, 3 and 4 with protected-permissive left turn phasing along northbound Summit Bridge Road. The eastbound Old School House Road approach was modeled as one left turn lane and one right turn lane, the northbound Summit Bridge Road approach was modeled as one left turn lane and one through lane, and the southbound Summit Bridge Road approach was modeled as one through lane and one right turn lane.

<sup>22</sup> Improvement Scenario II includes the improvements in Improvement Scenario I, with a shared left turn/right turn lane along the eastbound Old School House Road approach.



Table 15  
Peak Hour Levels Of Service (LOS)  
Based on Final Traffic Impact Study for Appoquinimink Summit Campus  
Report Dated: January 2021  
Prepared by: Landmark Science & Engineering

Unsignalized Intersection Two-Way Stop Control (T-Intersection) <sup>1</sup>	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Boys Corner Road (New Castle Road 15) / Ratledge Road (New Castle Road 414) <sup>23</sup></b>	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2020 Existing (Case 1)				
Eastbound Boys Corner Road Left Turn	B (1.0)	B (1.5)	A (9.7)	A (9.2)
Southbound Ratledge Road Approach	C (22.7)	C (20.3)	D (27.6)	C (18.7)
2027 Without Development (Case 2)				
Eastbound Boys Corner Road Left Turn	B (11.0)	B (12.9)	B (11.0)	B (12.7)
Southbound Ratledge Road Approach	F (569.7)	F (736.3)	F (812.9)	*
2023 With Development of Phase I (Case 3)				
Eastbound Boys Corner Road Left Turn	B (11.7)	B (12.9)	B (11.7)	B (12.8)
Southbound Ratledge Road Approach	F (866.1)	F (761.2)	*	*
2027 With Full Development (Case 4)				
Eastbound Boys Corner Road Left Turn	B (14.4)	B (14.0)	B (14.2)	B (13.9)
Southbound Ratledge Road Approach	*	*	*	*

\*HCS reported delays of 1000 seconds per vehicle or more

<sup>23</sup> JMT modeled the eastbound Boys Corner Road approach as one left turn lane and one through lane consistent with existing conditions, whereas the TIS modeled the approach as one shared left turn/through lane and one through lane.

Table 15 (continued)  
Peak Hour Levels Of Service (LOS)  
Based on Final Traffic Impact Study for Appoquinimink Summit Campus  
Report Dated: January 2021  
Prepared by: Landmark Science & Engineering

<b>Signalized Intersection <sup>1,24</sup></b>	<b>LOS per TIS</b>		<b>LOS per JMT</b>	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Boys Corner Road (New Castle Road 15) / Ratledge Road (New Castle Road 414)</b>				
2027 Without Development (Case 2)	-	-	B (17.5)	B (16.6)
2023 With Development of Phase I (Case 3)	-	-	C (33.7)	C (28.0)
2027 With Full Development (Case 4)	-	-	D (47.4)	C (33.6)

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<sup>24</sup> Improvement scenario is in accordance with the Southern New Castle County TID improvement to signalize the intersection. A 120 second cycle length was utilized during the AM and PM peak hours for Cases 1, 2, 3 and 4 with a protected-permissive left turn phasing along eastbound Boys Corner Road. One left turn lane and one through lane are provided along the eastbound Boys Corner Road approach, one through lane and one right turn lane are provided along the westbound Boys Corner Road approach, and one left turn lane and one right turn lane are provided along the southbound Ratledge Road approach.

Table 16  
Peak Hour Levels Of Service (LOS)  
Based on Final Traffic Impact Study for Appoquinimink Summit Campus  
Report Dated: January 2021  
Prepared by: Landmark Science & Engineering

Roundabout <sup>1</sup>	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Churchtown Road (New Castle Road 432) / Choptank Road (New Castle Road 435)</b>				
2020 Existing Conditions (Case 1)				
Eastbound Churchtown Road Approach	A (7.6)	A (6.6)	A (7.8)	A (6.8)
Westbound Churchtown Road Approach	A (6.0)	A (6.3)	A (6.2)	A (6.4)
Northbound Choptank Road Approach	A (7.8)	A (6.9)	A (8.0)	A (6.9)
Southbound Choptank Road Approach	A (6.6)	A (9.5)	A (6.6)	A (9.5)
Overall	A (7.2)	A (7.8)	A (7.3)	A (7.8)
2027 Without Development (Case 2)				
Eastbound Churchtown Road Approach	A (7.7)	A (7.7)	A (7.9)	A (7.9)
Westbound Churchtown Road Approach	A (6.2)	A (7.2)	A (6.4)	A (7.4)
Northbound Choptank Road Approach	A (7.8)	A (8.0)	A (8.2)	A (8.1)
Southbound Choptank Road Approach	A (6.9)	B (11.5)	A (7.0)	B (11.7)
Overall	A (7.3)	A (9.1)	A (7.5)	A (9.4)

Table 16  
Peak Hour Levels Of Service (LOS)  
Based on Final Traffic Impact Study for Appoquinimink Summit Campus  
Report Dated: January 2021  
Prepared by: Landmark Science & Engineering

Roundabout <sup>1</sup>	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Churchtown Road (New Castle Road 432) / Choptank Road (New Castle Road 435)</b>				
2023 With Development of Phase I (Case 3)				
Eastbound Churchtown Road Approach	A (7.7)	A (7.5)	A (8.0)	A (7.7)
Westbound Churchtown Road Approach	A (6.3)	A (7.1)	A (6.5)	A (7.3)
Northbound Choptank Road Approach	A (7.8)	A (7.8)	A (8.1)	A (7.9)
Southbound Choptank Road Approach	A (6.9)	B (10.9)	A (7.0)	B (11.1)
Overall	A (7.3)	A (8.8)	A (7.5)	A (9.0)
2027 With Full Development (Case 4)				
Eastbound Churchtown Road Approach	A (8.6)	A (7.9)	A (8.8)	A (8.1)
Westbound Churchtown Road Approach	A (6.7)	A (7.4)	A (7.0)	A (7.6)
Northbound Choptank Road Approach	A (8.6)	A (8.1)	A (9.0)	A (8.3)
Southbound Choptank Road Approach	A (7.5)	B (11.8)	A (7.6)	B (12.1)
Overall	A (8.0)	A (9.4)	A (8.2)	A (9.6)

# Avigation Nuisance Easement & Non-Suit Covenant

This indenture made this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by and between \_\_\_\_\_, hereinafter referred to as Grantor, and \_\_\_\_\_ hereinafter referred to as Grantee, witnesseth:

WHEREAS the Grantor is the owner in fee of a certain parcel of land (“the Property”) in the County of \_\_\_\_\_, State of Delaware; and

WHEREAS said parcel of land is near or adjacent to \_\_\_\_\_, an operating airport (“Airport”); and

WHEREAS the Grantee is the owner of said airport; and

WHEREAS the Grantor proposes to make a use of said Property and to develop thereon the following:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

, which use and development require approval by Municipal and County authorities subject to the applicable provisions of law; and

WHEREAS the Grantor has been advised that the subject Property is located adjacent to the Airport; that the present and future impacts of Airport operations might be considered annoying to users of the Property for its stated purpose and might interfere with the unrestricted use and enjoyment of the Property in its intended use; that these Airport impacts might change over time, for example and not by way of limitation by an increase in the number of aircraft using the Airport, louder aircraft, seasonal variations, and time-of-day variations; that changes in Airport, air traffic control operating procedures or in Airport layout could result in increased noise impacts; and that the Grantor’s and users’ own personal perceptions of the noise exposure could change and that his or her sensitivity to aircraft noise could increase;

NOW, THEREFORE, for and in consideration of the mutual covenants, agreements and conditions contained herein, the parties hereto agree as follows:

Grantor does hereby grant a permanent nuisance and avigation easement (“Easement”) to Grantee over all of the following described real estate:

By virtue of this agreement, the Grantor, for and on behalf of himself and all successors in interest to any and all of the real property above described, waives as to Grantee or any successor agency legally authorized to operate said airport, any and all claims for damage of any kind whatsoever incurred as a result of aircraft using the Easement granted herein regardless of any future changes in volume or character of aircraft overflights, or changes in airport design and operating policies, or changes in air traffic control procedures.

The Grantor, for and on behalf of himself and all successors in interest to any and all of the real property above described, does further hereby covenant and agree with the Grantee, its successors and assigns, that it will not, from and after the effective date hereof, sue, prosecute, molest, or trouble the Grantee, its successors and assigns, in

These covenants and agreements shall run with the land of the Grantor, as hereinabove described, for the benefit of the Grantee, and its successors and assigns in the ownership, use and operation of the aforesaid Airport.

Grantee, its successors and assigns, shall have and hold said Easement and all rights appertaining thereto until said Airport shall be abandoned and shall cease to be used for airport purposes.

If any provision of this Easement or any amendments hereto, or the application thereof to any person, thing or circumstances is held invalid, such invalidity shall not affect the provisions or application of this Easement or such amendments that can be given effect without the invalid provisions or application, and to this end the provisions of this Easement and such amendments are declared to be severable.

IN WITNESS WHEREOF, the Grantor has hereunto set its hand and seal the day and year first above written.

\_\_\_\_\_(SEAL)

\_\_\_\_\_(SEAL)

## NOTARY ACKNOWLEDGEMENT

STATE OF DELAWARE

ss.

COUNTY OF KENT

**BE IT REMEMBERED** that on this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_ personally, came before me, the subscriber, a Notary Public for the State and County aforesaid, \_\_\_\_\_, party(ies) to this Indenture, known to me personally to be such, and acknowledged this Indenture, to his/her (their) act or deed.

**GIVEN** under my Hand and Seal of office the day and year first above written.

\_\_\_\_\_  
Notary Public, State of Delaware

My Commission Expires \_\_\_\_\_