



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

NICOLE MAJESKI
SECRETARY

August 12, 2022

Christopher Duke, P.E.
Becker Morgan Group, Inc.
100 Discovery Blvd, Suite 102
Newark, DE 19713

Dear Mr. Duke:

The enclosed Traffic Impact Study (TIS) review letter for the proposed **Country Club Estates** (Tax Parcels: 13-011.00-001, 13-011.00-002, 13-011.00-033, 13-011.00-162, and 13-011.00-163) 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 (302) 760-2124.

Sincerely,

Claudy Joinville
Project Engineer

CJ:svf
Enclosures
cc with enclosures:

Mr. Bill Krapf, Carter Farm, LLC
Mr. David L. Edgell, Office of State Planning Coordination
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 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)
Pamela Steinebach, Director, Planning
Mark Luszcz, Deputy Director, DOTS
Peter Haag, Chief Traffic Engineer, Traffic, DOTS
Brian Schilling, Canal District Engineer, Canal District
Matthew Vincent, Chief of Project Development North, DOTS
Todd Sammons, Assistant Director, Development Coordination
Sireen Muhtaseb, TIS Group Manager, Development Coordination
Jared Kauffmann, Service Development Planner, Delaware Transit Corporation
Anthony Aaglio, Planning Supervisor, Statewide & Regional Planning
Wendy Polasko, Subdivision Engineer, Development Coordination
John Pietrobono, New Castle Review Coordinator, Development Coordination
Pao Lin, Subdivision Manager, Development Coordination
Mark Galipo, Traffic Engineer, Traffic, DOTS
Annamaria Furfato, Project Engineer, Development Coordination



August 12, 2022

Mr. Claudy Joinville
Project Engineer
DelDOT Division of Planning
P.O. Box 778
Dover, DE 19903

RE: Agreement No. 1946F
Traffic Impact Study Services
Task No. 3A Subtask 08 – Country Club Estates

Dear Mr. Joinville:

McCormick Taylor has completed its review of the Traffic Impact Study (TIS) for the Country Club Estates development prepared by Becker Morgan Group, Inc. dated April 2022. Becker Morgan Group prepared the report in a manner generally consistent with DelDOT's Development Coordination Manual.

The TIS evaluates the impacts of the proposed Country Club Estates residential development, to be located on the north side of Churchtown Road (New Castle Road 432), just east of the Delaware – Maryland State line, in New Castle County. The proposed development would consist of 288 single-family detached houses, 36 townhomes, and 216 apartments. Two full-movement unsignalized access points are proposed for this development, both on Churchtown Road. One will be a fourth leg added to the existing T-intersection of Churchtown Road and Brady Lane, and the other will be a new T-intersection further east on Churchtown Road. A roadway interconnection from Country Club Estates to the adjacent Back Creek residential development is also proposed via the existing Irwin Drive stub street that was constructed in that development. Construction is anticipated to be complete by 2028.

The subject land is located on an approximately 294-acre assemblage of parcels. The subject land is currently zoned S (Suburban) in New Castle County. The developer does not plan to rezone the land.

Currently there are two DelDOT projects within the study area. The first is the *SR 896 and Bethel Church Rd Interchange Project*. The purpose of this project is to improve the safety and traffic operations of the intersection Delaware Route 896 (Summit Bridge Road) and Bethel Church Road. The project may result in construction of a grade separated intersection to replace the current at-grade intersection. While design was previously progressed as part of the *US 301 Corridor Improvements Project*, the *SR 896 and Bethel Church Rd Interchange Project* is currently back in the planning phase, with refined design expected to begin in the fall of 2022. Construction is expected to begin no sooner than 2027 and be completed no sooner than 2029.

The second project is the *US 301 Spur Road Project*, which is a planned 4.5-mile, limited-access highway that will start from the US Route 301 Mainline just over one-half mile south of Armstrong



Corner Road and connect to Summit Bridge Road at the proposed Summit Bridge Road / Bethel Church Road interchange. While design was previously progressed as part of the *US 301 Corridor Improvements Project*, there is currently no schedule for refined design or construction of the *US 301 Spur Road Project*.

It is also noted that the Southern New Castle County Transportation Improvement District (SNCC TID) is established to the east of Summit Bridge Road. While the Country Club Estates development is not located within the boundary of the SNCC TID, three of the intersections in the TIS study area are also within the boundary of the SNCC TID and may be subject to improvements as part of the ongoing TID process.

The proposed Country Club Estates development would meet the New Castle County Level of Service (LOS) Standards as stated in Section 40.11.210 of the Unified Development Code (UDC), for all intersections that were required by New Castle County to be analyzed.

However, as shown in the table below, based on the criteria listed in Chapter 2 of DeIDOT's Development Coordination Manual, several intersections identified by DeIDOT as being required for study may exhibit LOS deficiencies without the implementation of physical roadway and/or traffic control improvements. Each intersection listed below was not required for study by New Castle County and is therefore not subject to New Castle County's concurrency requirements.

<i>Intersection</i>	<i>Existing Traffic Control</i>	<i>Situations for which deficiencies occur</i>
Summit Bridge Road and Boyds Corner Road / Churchtown Road	Signalized	2028 without development AM (Case 2); 2028 with development AM and PM (Case 3)
Boyds Corner Road and Whispering Woods Entrance	Unsignalized	2028 without development AM and PM (Case 2); 2028 with development AM and PM (Case 3)
Boyds Corner Road and Ratledge Road	Unsignalized	2028 without development AM and PM (Case 2); 2028 with development AM and PM (Case 3)
Choptank Road and Clayton Manor Drive	Unsignalized	2028 with development AM and PM (Case 3)
Summit Bridge Road and Bethel Church Road	Signalized	2028 without development AM (Case 2); 2028 with development AM (Case 3)
Choptank Road and Armstrong Corner Road	Unsignalized	2028 with development PM (Case 3)

Summit Bridge Road and Boyds Corner Road / Churchtown Road

This signalized intersection would operate at LOS F during future AM and PM peak hours unless signal timing changes are made. These deficiencies could be mitigated by providing an additional

through lane along the northbound Summit Bridge Road approach. 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 provision of an additional through lane along northbound Summit Bridge Road and widening north of the intersection, the intersection would improve to operate at LOS D or better under Case 3 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 Transportation Improvement District (SNCC TID) study area and volumes at this intersection may be reduced in the future due to the anticipated US Route 301 Spur Road construction. As such, we recommend that this developer should not be responsible for improvements at this intersection.

Boyds Corner Road and Whispering Woods Entrance

This unsignalized T-intersection would operate at LOS F on the minor street stop-controlled approach during all future AM and PM peak hours. Adding a turn lane on the side street would not sufficiently mitigate the side street delays, and a traffic signal would not be appropriate or desired by DelDOT. This intersection is within the boundary of the SNCC TID so it is possible that improvements at this intersection may be determined and ultimately implemented as part of that process. We recommend that this developer should not be responsible for improvements at this intersection.

Boyds Corner Road and Ratledge Road

This unsignalized T-intersection would operate at LOS F on the minor street stop-controlled approach during all future AM and PM peak hours, with very lengthy delays and queues. Adding a turn lane on the side street would not sufficiently mitigate the side street delays. This intersection is within the boundary of the SNCC TID so it is possible that improvements at this intersection may be determined and ultimately implemented as part of that process. As the Country Club Estates development would add traffic to this intersection, and construction of a traffic signal is a possibility at this intersection, the developer should enter into a traffic signal agreement.

Choptank Road and Clayton Manor Drive

This unsignalized T-intersection would operate at LOS E on the minor street stop-controlled approach during the future AM and PM peak hours with Country Club Estates traffic added. Further, we evaluated an alternative volume distribution scenario in which 9% of traffic generated by Country Club Estates would utilize Clayton Manor Drive instead of the primary site access points on Churchtown Road. This resulted in slightly greater delays on the Clayton Manor Drive approach at Choptank Road. To mitigate the LOS deficiency that would occur either without or with the alternative volume distribution, the Clayton Manor Drive approach could be modified to include separate left and right-turn lanes. However, given that the deficiency is only LOS E and the potential addition of a separate turn lane would require significant modifications, we recommend that this developer should not be responsible for improvements at this intersection.

Summit Bridge Road and Bethel Church Road

This signalized intersection would operate at LOS F during the AM peak hour for all future scenarios. DelDOT has a project in planning and design that will result in a significant modification of this intersection, likely converting it to grade separated. To address the future deficiencies at this intersection that will be made worse due to the addition of traffic from Country Club Estates, the developer should make an equitable share contribution toward DelDOT's *SR 896 and Bethel Church Rd Interchange Project*.

Choptank Road and Armstrong Corner Road

This unsignalized T-intersection would operate at LOS E on the minor street stop-controlled approach during the future PM peak hour with Country Club Estates traffic added. Although mitigation is needed, adding a turn lane on the side street would provide only a limited benefit for side street delays, and DelDOT has determined that a traffic signal would not be appropriate for this intersection. Installing a roundabout is a desirable improvement. As such, the developer should coordinate with DelDOT regarding construction of a single-lane roundabout at this location.

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

1. The developer shall improve the State-maintained road(s) on which they front (Churchtown 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 Access A (western access) on Churchtown Road. The proposed configuration is shown in the table below. This proposed site driveway should be constructed directly across from existing Brady Lane.

Approach	Existing Configuration	Proposed Configuration
Eastbound Churchtown Road	One shared through/right-turn lane	One left-turn lane and one shared through/right-turn lane
Westbound Churchtown Road	One shared left-turn/through lane	One left-turn lane, one through lane, and one right-turn lane
Northbound Brady Lane	One shared left/right-turn lane	One shared left/through/right-turn lane
Southbound Site Access A	Approach does not exist	One shared left/through/right-turn lane

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

Approach	Left-Turn Lane	Right-Turn Lane
Eastbound Churchtown Road	135 feet *	N/A
Westbound Churchtown Road	135 feet *	240 feet *
Northbound Brady Lane	N/A	N/A
Southbound Site Access 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 Access B (eastern access) on Churchtown Road. The proposed configuration is shown in the table below.

Approach	Existing Configuration	Proposed Configuration
Eastbound Churchtown Road	One through lane	One left-turn lane and one through lane
Westbound Churchtown Road	One through lane	One through lane and one right-turn lane
Southbound Site Access B	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.

Approach	Left-Turn Lane	Right-Turn Lane
Eastbound Churchtown Road	160 feet *	N/A
Westbound Churchtown Road	N/A	240 feet *
Southbound Site Access B	N/A	N/A

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

4. The developer should enter into a traffic signal agreement with DelDOT for the intersection of Boyds Corner Road and Ratledge Road. The agreement should include pedestrian signals, crosswalks, interconnection, and ITS equipment such as CCTV cameras at DelDOT’s discretion. The developer should coordinate with DelDOT to determine if a contribution to DelDOT’s Traffic Signal Revolving Fund (TSRF) is an option.
5. The developer should coordinate with DelDOT regarding an equitable share contribution toward DelDOT’s *SR 896 and Bethel Church Rd Interchange Project*. The amount of the contribution should be determined through coordination with DelDOT’s Development Coordination Section.
6. The developer should enter into an agreement with DelDOT to construct or participate in the construction of a single-lane roundabout at the intersection of Choptank Road and Armstrong Corner Road at a time to be determined by DelDOT. The roundabout design should follow *NCHRP: Report 672 2nd Edition – Roundabouts: An Information Guide*, DelDOT’s *Road Design Manual*, and DelDOT’s *Design Guidance Memorandum Number 1-26* for roundabouts. The roundabout should also be designed to accommodate pedestrians and bicyclists. Additionally, lighting at the roundabout should be evaluated per DelDOT’s lighting guidelines. The developer should coordinate with DelDOT’s Development Coordination Section regarding the agreement and the roundabout design.
7. The developer should coordinate with DelDOT’s Development Coordination Section regarding a possible roadway interconnection to the adjacent Back Creek residential development. The roadway interconnection would connect with the existing Irwin Drive stub street that was constructed in that development ending at the shared property line.

8. The following bicycle and pedestrian 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 frontage along Churchtown Road.
 - f. Within the easement along the Churchtown Road site frontage, 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. A sidewalk should be provided from the northern section of the Country Club Estates site to the adjacent Back Creek residential development via the Irwin Drive stub street that was constructed in that development ending at the shared property line. The existing Irwin Drive stub street includes sidewalks on both sides of the street, and tying into those sidewalks is recommended. Details of the recommended sidewalk connection should be coordinated with DelDOT's Development Coordination Section.
 - h. ADA compliant curb ramps and crosswalks should be provided at all pedestrian crossings, including all site entrances. Type 3 curb ramps are discouraged.
 - i. 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 path along Churchtown Road.

- j. Where internal sidewalks are located alongside of parking spaces, a buffer should be added to prevent vehicular overhang onto the sidewalk.

Improvements in this TIS may be considered “significant” under 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.

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 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: April 2022

Prepared by: Becker Morgan Group, Inc.

Prepared for: LC Management

Tax parcel: 13-011.00-001, 13-011.00-002, 13-011.00-033, 13-011.00-162, 13-011.00-163

Generally consistent with DelDOT's Development Coordination Manual: Yes

Project Description and Background

Description: The proposed Country Club Estates development would consist of 288 single-family detached houses, 36 townhomes, and 216 apartments.

Location: The site is located on the north side of Churchtown Road (New Castle Road 432), just east of the Delaware – Maryland State line, in New Castle County. A site location map is included on page 10.

Amount of land to be developed: approximately 294-acre assemblage of parcels

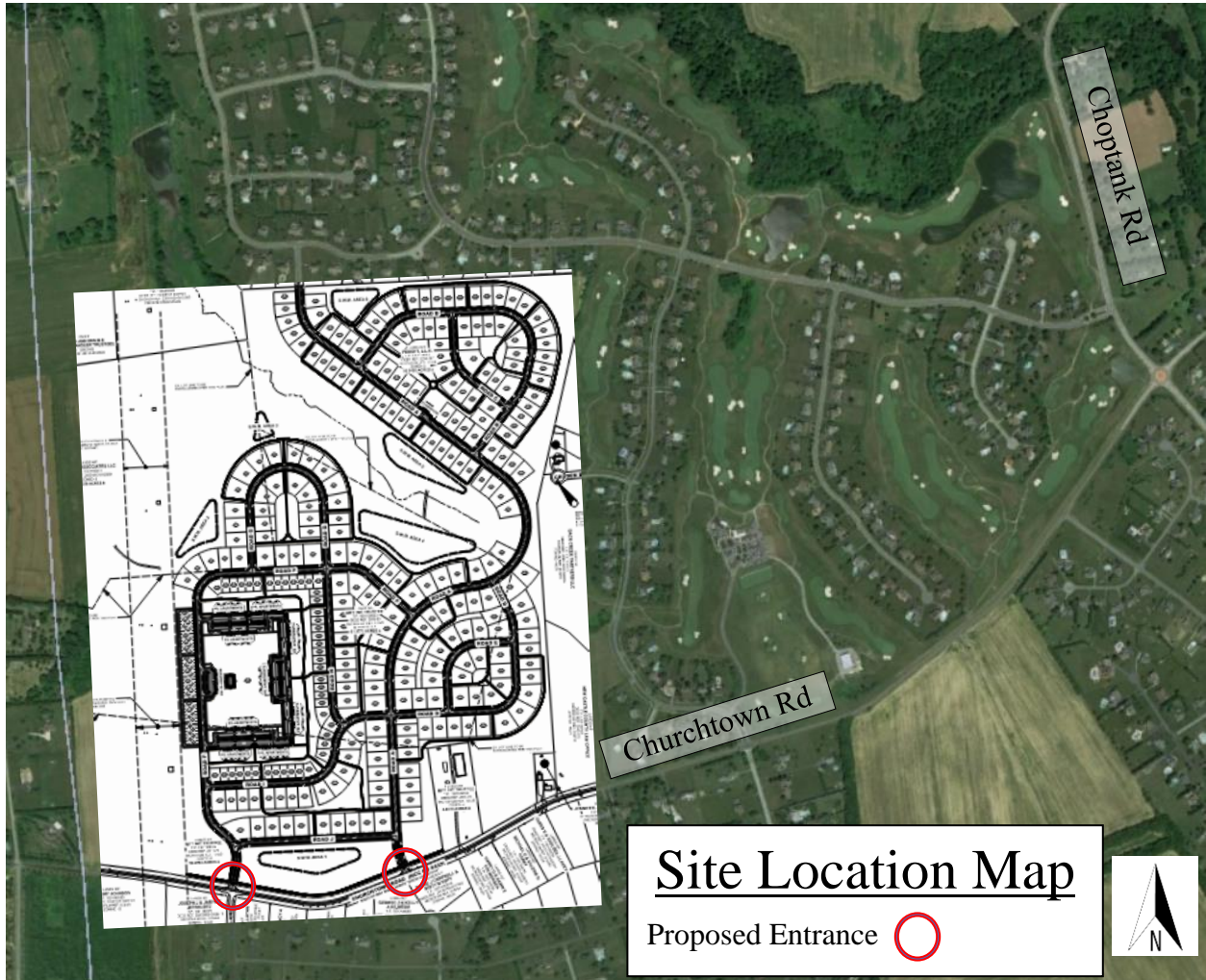
Land use approval(s) needed: Subdivision approval. The subject land is currently zoned S (Suburban) in New Castle County. The developer does not plan to rezone the land.

Proposed completion year: 2028

Proposed access locations: Two full-movement unsignalized access points are proposed for this development, both on Churchtown Road. One will be a fourth leg added to the existing T-intersection of Churchtown Road and Brady Lane, and the other will be a new T-intersection further east on Churchtown Road. A roadway interconnection from Country Club Estates to the adjacent Back Creek residential development is also proposed via the existing Irwin Drive stub street that was constructed in that development.

Daily Traffic Volumes (per DelDOT Traffic Summary 2019):

- 2019 Average Annual Daily Traffic on Churchtown Road: 2,103 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 Country Club Estates development is located mostly within Investment Level 3 and to a lesser extent within Investment Level 4.

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 this 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 governments with land-use authority.

Due to the limits of finite financial resources, state infrastructure spending on “hard” or “grey” infrastructure such as roads, sewer, water, and public facilities will generally be directed to Investment Level 1 and 2 Areas during this planning period. The State will consider investing in these types of infrastructure in 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.

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 Country Club Estates development falls within Investment Levels 3 and 4, and is to be developed with 540 residential units. The proposed development is somewhat consistent with the character of Investment Level 3. However, 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 and its compatibility with Investment Level 3 is questionable. As such, additional discussion is required.

Comprehensive Plan

New Castle County Comprehensive Plan:

(Source: New Castle County Comprehensive Plan, Updated June 2012)

The New Castle County Comprehensive Plan 2012 Future Land Use Map indicates that the proposed development is located within the Low Density Residential Area (1-3 du/acre).

Proposed Development's Compatibility with Comprehensive Plan: The proposed Country Club Estates project includes 540 dwelling units on an approximately 294-acre assemblage of parcels (1.84 du/acre). The land is currently zoned S (Suburban) in New Castle County. The developer does not plan to rezone the land. According to Section 40.02.200 of the New Castle County Unified Development Code (UDC), characteristics of the S (Suburban) zoning district are as follows:

- Permits a wide range of residential uses.
- Permits moderate to high-density development and a full range of residential uses in a manner consistent with providing a high quality suburban character. Significant areas of open space and/or landscaping shall be provided to maintain the balance between green space and buildings that characterize suburban character.
- Used to in-fill tracts containing at last five acres or where New Castle County seeks to redevelop the area to suburban character.

The proposed development appears to fit within the above characteristics of S zoning, and is within the desired density range for a Low Density Residential Area. As such, the proposed development appears to comply with New Castle County's Comprehensive Plan 2012 as well as the S zoning.

Relevant Projects in the DelDOT Capital Transportation Program

Currently there are two DelDOT projects within the study area. The first is the *SR 896 and Bethel Church Rd Interchange Project*. The purpose of this project is to improve the safety and traffic operations of the intersection Delaware Route 896 (Summit Bridge Road) and Bethel Church Road. The project may result in construction of a grade separated intersection to replace the current at-grade intersection. While design was previously progressed as part of the *US 301 Corridor Improvements Project*, the *SR 896 and Bethel Church Rd Interchange Project* is currently back in the planning phase, with refined design expected to begin in the fall of 2022. Construction is expected to begin no sooner than 2027 and be completed no sooner than 2029.

The second project is the *US 301 Spur Road Project*, which is a planned 4.5-mile, limited-access highway that will start from the US 301 Mainline just over one-half mile south of Armstrong Corner Road and connect to Summit Bridge Road at the proposed Summit Bridge Road / Bethel Church Road interchange. While design was previously progressed as part of the *US 301 Corridor*

Improvements Project, there is currently no schedule for refined design or construction of the US 301 Spur Road Project.

It is also noted that the Southern New Castle County Transportation Improvement District (SNCC TID) is established to the east of Summit Bridge Road. While the Country Club Estates development is not located within the boundary of the SNCC TID, three of the intersections in the TIS study area are also within the boundary of the SNCC TID and may be subject to improvements as part of the ongoing TID process.

Trip Generation

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

- 228 single-family detached houses (ITE Land Use Code 210)
- 36 townhomes (ITE Land Use Code 220)
- 216 apartments (ITE Land Use Code 221)

Table 1
Country Club Estates Peak Hour Trip Generation

Land Use	Weekday AM Peak Hour			Weekday PM Peak Hour		
	In	Out	Total	In	Out	Total
228 single-family detached	52	157	209	176	104	280
36 townhomes	4	14	18	15	9	24
216 apartments	19	54	73	57	36	93
TOTAL TRIPS	75	225	300	248	149	397

Overview of TIS

Intersections examined:

- 1) Churchtown Road & Brady Lane / Site Access A
- 2) Churchtown Road & Site Access B
- 3) Churchtown Road & Connemara Court / Back Creek Drive
- 4) Churchtown Road & Colonel Clayton Drive
- 5) Churchtown Road & Choptank Road
- 6) Churchtown Road & Meadow Drive
- 7) Churchtown Road & Dickerson Lane
- 8) Summit Bridge Road & Boyds Corner Road / Churchtown Road
- 9) Boyds Corner Road & Whispering Woods Entrance
- 10) Boyds Corner Road & Ratledge Road
- 11) Choptank Road & Clayton Manor Drive

- 12) Bethel Church Road & Choptank Road
- 13) Summit Bridge Road & Bethel Church Road
- 14) Choptank Road & Ernest Drive
- 15) Choptank Road & Old School House Road
- 16) Choptank Road & Armstrong Corner Road

Conditions examined:

- 1) 2021 Existing (Case 1)
- 2) 2028 without development (Case 2)
- 3) 2028 with development (Case 3)

Peak hours evaluated: Weekday morning and evening peak hours

Committed developments considered:

- 1) Carter Farm: 255 single family detached housing DUs; 36 multi-family (low-rise) DUs; 240 multi-family (mid-rise) DUs; 95 senior adult housing (detached) DUs
- 2) Summit Campus: 40,000 sf early childhood center, a 107,473 sf elementary school, and a 396,000 sf middle and high school
- 3) Highlands at Back Creek: 40 single-family detached houses
- 4) Bohemia Mill Pond: 18 single-family detached houses
- 5) Summit Pointe: 99 single-family detached houses
- 6) Summit Bridge / Silver Wind Estates: 3 single-family detached houses
- 7) Summit Circle: 14 single-family detached houses
- 8) Rothwell Village: 67 single-family detached houses
- 9) Summit Aviation Additions: Partly built 129,068 sf additions including 80,000 sf warehousing space, 50,600 sf hangar, 1,300 sf storage space out of total 289,718 sf
- 10) Whispering Woods: 31 senior adult housing detached, 35 senior adult housing attached
- 11) Whitehall:
 - a. Village 1: 76,317 sf shopping center, 2,750 sf general office, 95 single family detached housing, 330 multifamily housing (low-rise)
 - b. Village 2: 65 single family detached housing, 370 multifamily housing (low-rise), 20,800 sf elementary school
 - c. Hamlet 3: 28 single family detached housing, 185 multifamily housing (low-rise), 15,600 sf elementary school
 - d. Hamlet 4: 147 single family detached housing, 174 multifamily housing (low-rise)
 - e. Hamlet 5: 500 single family detached housing
 - f. Hamlet 6: 500 single family detached housing
 - g. Hamlet 7: 149 single family detached housing; 80 multi-family housing (low-rise)
- 12) Whitehall Scott Run Business Park: 1,835,360 sf Industrial Park; 75,000 sf Shopping Center
- 13) Bayberry North: 98 single family detached housing; 16 multifamily housing (low-rise)
- 14) Windsor at Hyetts Corner: 48 single family detached housing
- 15) Winchelsea: 194 senior adult housing (detached), 142 senior adult housing (attached)

- 16) Bayberry Town Center: 146 multifamily housing (low-rise), 31,000 sf general office building, 186,345 sf shopping center, 61,200 sf athletic club
- 17) Bayberry South: 544 single family detached housing, 74 multifamily housing (low-rise), 143 senior adult housing – detached
- 18) Boyds Corner Farm (Coburn Farm): 94,000 sf shopping center, 17,300 sf general office building, 113 single family detached housing
- 19) MOT Charter High School additions: 11,230 sf high school

Intersection Descriptions

1) Churchtown Road & Brady Lane / Site Access A

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

Eastbound Approach: (Churchtown Road) existing one shared through/right-turn lane; proposed one left-turn lane and one shared through/right-turn lane

Westbound Approach: (Churchtown Road) existing one shared through/left-turn lane; proposed one shared through/left-turn lane and one right-turn lane

Northbound Approach: (Brady Lane) one shared left/right-turn lane, stop controlled; proposed one shared left/through/right-turn lane, stop controlled

Southbound Approach: (Site Access A) proposed one shared left/through/right-turn lane, stop controlled

2) Churchtown Road & Site Access B

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

Eastbound Approach: (Churchtown Road) one left-turn lane and one through lane

Westbound Approach: (Churchtown Road) one through lane and one right-turn lane

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

3) Churchtown Road & Connemara Court / Back Creek Drive

Type of Control: two-way stop controlled

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

Westbound Approach: (Churchtown Road) one shared through/left-turn lane and one right-turn lane

Northbound Approach: (Connemara Court) one shared left/through/right-turn lane, stop controlled

Northbound Approach: (Back Creek Drive) one shared left/through/right-turn lane, stop controlled

4) Churchtown Road & Colonel Clayton Drive

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

Eastbound Approach: (Churchtown Road) one through lane and one right-turn lane

Westbound Approach: (Churchtown Road) one shared through lane/left-turn lane

Northbound Approach: (Colonel Clayton Drive) one shared left/right-turn lane, stop controlled

5) Churchtown Road & Choptank Road

Type of Control: roundabout

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

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

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

Southbound Approach: (Choptank Road) one shared left/through/right-turn lane

6) Churchtown Road & Meadow Drive

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

Eastbound Approach: (Churchtown Road) one shared through/left-turn lane

Westbound Approach: (Churchtown Road) one through lane and one right-turn lane

Southbound Approach: (Meadow Drive) one shared left/right-turn lane, stop controlled

7) Churchtown Road & Dickerson Lane

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

Eastbound Approach: (Churchtown Road) one shared through/left-turn lane and one bypass lane

Westbound Approach: (Churchtown Road) one through lane and one right-turn lane

Southbound Approach: (Dickerson Lane) one shared left/right-turn lane, stop controlled

8) Summit Bridge Road & Boyds Corner Road / Churchtown Road

Type of Control: signalized

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

Westbound Approach: (Boyds Corner Road) two left-turn lanes, one through lane, and one right-turn lane

Northbound Approach: (Summit Bridge Road) one left-turn lane, two through lanes, and one right-turn lane

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

9) Boyds Corner Road & Whispering Woods Entrance

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

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

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

Northbound Approach: (Whispering Woods Entrance) one shared left/right-turn lane, stop controlled

10) Boyds Corner Road & Ratledge Road

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

Eastbound Approach: (Boyds Corner Road) one shared through/left-turn lane and one bypass lane

Westbound Approach: (Boyds Corner Road) one through lane and one right-turn lane

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

11) Choptank Road & Clayton Manor Drive

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

Eastbound Approach: (Clayton Manor Drive) one shared left/right-turn lane, stop controlled

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

Southbound Approach: (Choptank Road) one through lane and one right-turn lane

12) Bethel Church Road & Choptank Road

Type of Control: roundabout

Eastbound Approach: (Bethel Church Road) one shared left/right-turn lane

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

Southbound Approach: (Bethel Church Road) one shared through/right-turn lane

13) Summit Bridge Road & Bethel Church Road

Type of Control: signalized

Eastbound Approach: (Bethel Church Road) two left-turn lanes and one right-turn lane

Westbound Approach: (Bethel Church Road) one right-turn-only lane

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

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

14) Choptank Road & Ernest Drive

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

Eastbound Approach: (Ernest Drive) one shared left/right-turn lane, stop controlled

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

Southbound Approach: (Choptank Road) one through lane and one right-turn lane

15) Choptank Road & Old School House Road

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

Westbound Approach: (Old School House Road) one shared left/right-turn lane, stop controlled

Northbound Approach: (Choptank Road) one through lane and one right-turn lane

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

16) Choptank Road & Armstrong Corner Road

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

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

Northbound Approach: (Choptank Road) one through lane and one right-turn lane

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

Safety Evaluation

Crash Data: Delaware Crash Analysis Reporting System (CARS) data was provided in the TIS for the three-year period from January 20, 2018, through January 20, 2021. The crash data only covered the section of Churchtown Road within one-half mile in either direction from the proposed site access. The crash data in the TIS did not cover other intersections in the study area. Within that one-mile stretch of Churchtown Road, there were 4 reportable crashes. Each of these crashes

resulted in property damage only. None of the crashes resulted in injuries or fatalities. None of the crashes involved a bicyclist or pedestrian.

Sight Distance: The study area generally consists of relatively flat roadways. Along Churchtown Road near the proposed site accesses there are few visual obstructions. However, there is horizontal curve located between the proposed sight accesses that will limit sight distance to approximately 500-600 feet at the driveways. Other than that, sight distance generally appears adequate throughout the study area. No problematic sight distance issues have been reported or indicated by crash data, which only covers a small portion of the study area. As always adequacy of available sight distance should be confirmed during the site plan review process for all proposed movements at the site accesses.

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: The Delaware Transit Corporation (DTC) does not currently operate any fixed-route transit bus service in the immediate area of the proposed Country Club Estates development. While a handful of routes do operate in the general vicinity along Summit Bridge Road and US Route 301, the nearest existing fixed-route transit stop is located more than 3 miles from the proposed development.

Planned transit service: DTC has no plans to add service in the immediate area of the development, and they did not request the developer to provide any transit-related facilities.

Existing bicycle and pedestrian facilities: According to DelDOT's New Castle County Bicycle Map, Summit Bridge Road is classified as a High-Traffic Connector Bicycle Route with Bikeway. Churchtown Road is classified as a Connector Bicycle Route without Bikeway. Bethel Church Road is classified as a Statewide Bicycle Route without Bikeway. Choptank Road is classified as a Statewide Bicycle Route with Bikeway, and it is also Delaware Bicycle Route 1. There are no bike lane or shoulders along Churchtown Road near the proposed site. There are bike lanes on Choptank Road. There are no sidewalks or crosswalks at the intersections in the study area, except sidewalks on just a few side streets and crosswalks at the two roundabout intersections.

Planned bicycle and pedestrian facilities: There are no known plans to add bike lanes, sidewalks or crosswalks at any off-site intersections. A shared-use path should be provided along the Churchtown Road site frontage.

Previous Comments

In a review letter dated January 10, 2022, DelDOT indicated that the Preliminary TIS was acceptable as submitted, with one minor revision.

It appears that substantive comments from DelDOT's TIS Scoping Memorandum, Traffic Count Review, Revised Traffic Count Review, Preliminary TIS Review, Revised Preliminary TIS Review, and other correspondence were addressed in the Final TIS submission. One exception to this is that there is no evidence that the developer contacting DelDOT Staff as requested in the Scoping Memo to obtain input on the DelDOT Projects or Bicycle/Pedestrian/Transit facilities.

General HCS Analysis Comments

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

- 1) For two-way stop control intersections, the TIS and McCormick Taylor applied heavy vehicle factors (HV) by movement using existing data. For signalized intersections, the TIS and McCormick Taylor applied HV by lane group using existing data. The TIS and McCormick Taylor generally assumed future HV to be the same as existing HV or 3%, whichever was greater.
- 2) For existing conditions, the TIS and McCormick Taylor determined overall intersection peak hour factors (PHF) for each intersection based on the turning movement counts that were available. Future PHFs were determined as per the DelDOT Development Coordination Manual section 2.2.8.11.6.F where applicable.
- 3) For analyses of signalized intersections, Becker Morgan and McCormick Taylor used a base saturation flow rate of 1,900 pc/hr/ln per DelDOT's Development Coordination Manual.
- 4) For analyses of all intersections, McCormick Taylor and the TIS assumed 0% grade for all movements.
- 5) The TIS and McCormick Taylor used different signal timings when analyzing the signalized intersections in some cases.

Table 2
Peak Hour Levels of Service (LOS)
Based on Country Club Estates Traffic Impact Study – April 2022
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ¹ Existing One-Way Stop, Proposed Two-Way Stop	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Churchtown Road & Brady Lane / Site Access A				
2021 Existing (Case 1)				
Westbound Churchtown Road – Left	A (7.6)	A (7.5)	A (7.6)	A (7.5)
Northbound Brady Lane	A (8.7)	A (8.5)	A (9.5)	A (9.1)
2028 No-Build Condition (Case 2)				
Westbound Churchtown Road – Left	A (7.7)	A (7.6)	A (7.8)	A (7.6)
Northbound Brady Lane	A (9.0)	A (8.8)	A (10.0-)	A (9.5)
2028 Build Condition (Case 3)				
Eastbound Churchtown Road – Left	A (7.6)	A (7.9)	A (7.6)	A (8.0)
Westbound Churchtown Road – Left ²	A (7.7)	A (7.6)	A (7.7)	A (7.6)
Northbound Brady Lane	A (9.0)	A (8.8)	A (9.9)	A (9.6)
Southbound Site Access A	B (12.5)	B (13.0)	B (13.5)	B (14.0)

¹ 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.

² McCormick Taylor analyzed Case 3 with a separate westbound left-turn lane to shadow the proposed and warranted eastbound left-turn lane.

Table 3
Peak Hour Levels of Service (LOS)
Based on Country Club Estates Traffic Impact Study – April 2022
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ³ One-Way Stop (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Churchtown Road & Site Access B				
2028 Build Condition (Case 3)				
Eastbound Churchtown Road – Left	A (7.6)	A (8.3)	A (7.7)	A (8.4)
Southbound Site Access B	B (14.2)	B (14.9)	B (14.2)	B (14.8)

³ 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 Country Club Estates Traffic Impact Study – April 2022
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ⁴ Two-Way Stop	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Churchtown Road & Connemara Court / Back Creek Drive				
2021 Existing (Case 1)				
Eastbound Churchtown Road – Left	A (7.4)	A (7.8)	A (7.4)	A (7.8)
Westbound Churchtown Road – Left	A (7.7)	A (7.5)	A (7.7)	A (7.5)
Northbound Connemara Court	A (0.0)	A (0.0)	A (9.4)	A (9.2)
Southbound Back Creek Drive	B (10.0+)	B (10.9)	B (10.7)	B (11.7)
2028 No-Build Condition (Case 2)				
Eastbound Churchtown Road – Left	A (7.5)	A (7.9)	A (7.5)	A (7.9)
Westbound Churchtown Road – Left	A (7.9)	A (7.6)	A (7.9)	A (7.6)
Northbound Connemara Court	A (0.0)	A (0.0)	A (9.7)	A (9.5)
Southbound Back Creek Drive	B (11.0)	B (11.7)	B (11.7)	B (12.5)
2028 Build Condition (Case 3)				
Eastbound Churchtown Road – Left	A (7.7)	A (8.6)	A (7.7)	A (8.6)
Westbound Churchtown Road – Left	A (8.5)	A (8.0)	A (8.5)	A (8.0)
Northbound Connemara Court	A (0.0)	A (0.0)	B (11.4)	B (10.8)
Southbound Back Creek Drive	C (15.0+)	C (18.5)	C (15.8)	C (19.8)

⁴ 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 Country Club Estates Traffic Impact Study – April 2022
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ⁵ One-Way Stop (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Churchtown Road & Colonel Clayton Drive				
2021 Existing (Case 1)				
Westbound Churchtown Road – Left	A (7.7)	A (7.6)	A (7.7)	A (7.6)
Northbound Colonel Clayton Drive	A (8.9)	A (8.5)	A (9.9)	A (9.5)
2028 No-Build Condition (Case 2)				
Westbound Churchtown Road – Left	A (7.9)	A (7.7)	A (7.9)	A (7.7)
Northbound Colonel Clayton Drive	A (9.2)	A (8.7)	B (10.5)	B (10.0+)
2028 Build Condition (Case 3)				
Westbound Churchtown Road – Left	A (8.5)	A (8.1)	A (8.5)	A (8.1)
Northbound Colonel Clayton Drive	B (10.7)	A (9.5)	B (12.3)	B (11.6)

⁵ 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 Country Club Estates Traffic Impact Study – April 2022
Prepared by Becker Morgan Group, Inc.

Roundabout Intersection ⁶	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Churchtown Road & Choptank Road				
2021 Existing (Case 1)				
Eastbound Churchtown Road	A (7.4)	A (6.6)	A (7.4)	A (6.6)
Westbound Churchtown Road	A (5.9)	A (6.1)	A (5.9)	A (6.1)
Northbound Choptank Road	A (7.7)	A (6.8)	A (7.7)	A (6.8)
Southbound Choptank Road	A (6.7)	A (9.8)	A (6.7)	A (9.8)
Overall Intersection	A (7.1)	A (7.9)	A (7.1)	A (7.9)
2028 No-Build Condition (Case 2)				
Eastbound Churchtown Road	B (10.7)	A (9.6)	B (10.7)	A (9.6)
Westbound Churchtown Road	A (7.5)	A (9.8)	A (7.5)	A (9.8)
Northbound Choptank Road	B (10.5)	B (10.6)	B (10.5)	B (10.6)
Southbound Choptank Road	A (9.6)	C (16.2)	A (9.6)	C (16.2)
Overall Intersection	A (9.8)	B (12.5)	A (9.8)	B (12.5)
2028 Build Condition (Case 3)				
Eastbound Churchtown Road	C (20.6)	B (14.2)	C (20.6)	B (14.2)
Westbound Churchtown Road	A (9.1)	B (14.8)	A (9.1)	B (14.8)
Northbound Choptank Road	B (14.8)	C (16.2)	B (14.8)	C (16.2)
Southbound Choptank Road	B (11.0)	E (43.1)	B (11.0)	E (43.1)
Overall Intersection	B (14.5)	D (25.3)	B (14.5)	D (25.3)
2028 Build Condition (Case 3) ⁷				
Eastbound Churchtown Road	N/A	N/A	C (19.7)	B (13.8)
Westbound Churchtown Road	N/A	N/A	A (9.0)	B (14.6)
Northbound Choptank Road	N/A	N/A	B (14.5)	C (15.9)
Southbound Choptank Road	N/A	N/A	B (11.1)	E (39.5)
Overall Intersection	N/A	N/A	B (14.1)	C (23.9)

⁶ 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.

⁷ Assumes redistribution: 9% of Country Club Estates traffic to enter and exit development via Clayton Manor Drive.
Country Club Estates

Table 7
Peak Hour Levels of Service (LOS)
Based on Country Club Estates Traffic Impact Study – April 2022
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ⁸ One-Way Stop (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Churchtown Road & Meadow Drive				
2021 Existing (Case 1)				
Eastbound Churchtown Road – Left	A (7.4)	A (7.7)	A (7.4)	A (7.7)
Southbound Meadow Drive	B (10.2)	B (10.4)	B (10.2)	B (10.4)
2028 No-Build Condition (Case 2)				
Eastbound Churchtown Road – Left	A (7.6)	A (8.0)	A (7.6)	A (8.0)
Southbound Meadow Drive	B (12.3)	B (10.0+)	B (12.8)	B (12.3)
2028 Build Condition (Case 3)				
Eastbound Churchtown Road – Left	A (7.7)	A (8.2)	A (7.7)	A (8.2)
Southbound Meadow Drive	B (13.1)	B (10.7)	B (13.6)	B (13.2)

⁸ 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 Country Club Estates Traffic Impact Study – April 2022
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ⁹ One-Way Stop (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Churchtown Road & Dickerson Lane				
2021 Existing (Case 1)				
Eastbound Churchtown Road – Left	A (7.3)	A (7.6)	A (7.3)	A (7.6)
Southbound Dickerson Lane	B (10.5)	B (10.7)	B (10.2)	B (10.4)
2028 No-Build Condition (Case 2)				
Eastbound Churchtown Road – Left	A (7.6)	A (7.9)	A (7.6)	A (7.9)
Southbound Dickerson Lane	B (14.4)	B (12.0)	B (13.6)	B (12.3)
2028 Build Condition (Case 3)				
Eastbound Churchtown Road – Left	A (7.7)	A (8.1)	A (7.7)	A (8.1)
Southbound Dickerson Lane	C (15.7)	B (13.1)	B (14.5)	B (13.2)

⁹ 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 Country Club Estates Traffic Impact Study – April 2022
Prepared by Becker Morgan Group, Inc.

Signalized Intersection ¹⁰	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Summit Bridge Road & Boyds Corner Road / Churchtown Road				
2021 Existing (Case 1)	C (24.4)	D (36.4)	C (24.4)	C (24.3)
2028 No Build Condition (Case 2)	F (100.1)	F (121.0)	F (100.1)	D (53.4)
2028 Build Condition (Case 3)	F (102.9)	F (121.2)	F (102.6)	E (55.8)
2028 Build Condition (Case 3a) <i>With Potential Signal Timing Changes</i> ¹¹	D (46.3)	D (43.1)	E (66.8)	D (47.8)

¹⁰ 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.

¹¹ The TIS analysis for Case 3a included a different cycle length for both the AM and PM peak hours. McCormick Taylor's analysis was based on the same cycle length as existing conditions for both peak hours.

Table 10
Peak Hour Levels of Service (LOS)
Based on Country Club Estates Traffic Impact Study – April 2022
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ¹² One-Way Stop (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Boyd's Corner Road & Whispering Woods Entrance				
2021 Existing (Case 1)				
Westbound Boyd's Corner Road – Left	A (8.9)	A (9.3)	A (8.9)	A (9.3)
Northbound Whispering Woods Entrance	B (14.9)	C (16.5)	C (20.9)	C (23.4)
2028 No-Build Condition (Case 2)				
Westbound Boyd's Corner Road – Left	B (11.3)	B (12.0)	B (11.3)	B (12.0)
Northbound Whispering Woods Entrance	F (140.6)	F (104.7)	F (193.9)	F (144.7)
2028 Build Condition (Case 3)				
Westbound Boyd's Corner Road – Left	B (11.5)	B (12.1)	B (11.5)	B (12.1)
Northbound Whispering Woods Entrance	F (158.3)	F (120.4)	F (221.4)	F (170.1)

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

Table 11
Peak Hour Levels of Service (LOS)
Based on Country Club Estates Traffic Impact Study – April 2022
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ¹³ One-Way Stop (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Boyd's Corner Road & Ratledge Road				
2021 Existing (Case 1)				
Eastbound Boyd's Corner Road – Left	A (9.7)	A (9.1)	A (9.7)	A (9.1)
Southbound Ratledge Road	D (27.6)	C (19.2)	D (27.5)	C (19.2)
2028 No-Build Condition (Case 2)				
Eastbound Boyd's Corner Road – Left	B (14.2)	B (13.6)	B (14.2)	B (13.6)
Southbound Ratledge Road	F (1973)	F (1121)	F (1877)	F (1041)
2028 Build Condition (Case 3)				
Eastbound Boyd's Corner Road – Left	B (14.5)	B (14.1)	B (14.5)	B (14.1)
Southbound Ratledge Road	F (2200)	F (1300)	F (2071)	F (1194)

¹³ 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 Country Club Estates Traffic Impact Study – April 2022
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ¹⁴ One-Way Stop (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Choptank Road & Clayton Manor Drive				
2021 Existing (Case 1)				
Eastbound Clayton Manor Drive	B (13.4)	B (12.6)	C (18.6)	C (18.1)
Northbound Choptank Road – Left	A (8.1)	A (9.1)	A (8.1)	A (9.1)
2028 No-Build Condition (Case 2)				
Eastbound Clayton Manor Drive	C (21.7)	C (19.6)	D (28.1)	D (28.1)
Northbound Choptank Road – Left	A (8.5)	A (9.7)	A (8.5)	A (9.7)
2028 Build Condition (Case 3)				
Eastbound Clayton Manor Drive	D (27.6)	D (25.6)	E (36.5)	E (37.3)
Northbound Choptank Road – Left	A (8.6)	B (10.2)	A (8.6)	B (10.2)
2028 Build Condition (Case 3) ¹⁵				
Eastbound Clayton Manor Drive	N/A	N/A	E (41.7)	E (43.7)
Northbound Choptank Road – Left	N/A	N/A	A (8.6)	B (10.3)
2028 Build Condition (Case 3) ¹⁵ <i>With separate turn lanes on EB approach</i>				
Eastbound Clayton Manor Drive	N/A	N/A	D (27.3)	D (34.3)
Northbound Choptank Road – Left	N/A	N/A	A (8.6)	B (10.3)

¹⁴ 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.

¹⁵ Assumes redistribution: 9% of Country Club Estates traffic to enter and exit development via Clayton Manor Drive.
Country Club Estates

Table 13
Peak Hour Levels of Service (LOS)
Based on Country Club Estates Traffic Impact Study – April 2022
Prepared by Becker Morgan Group, Inc.

Roundabout Intersection ¹⁶	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Bethel Church Road & Choptank Road				
2021 Existing (Case 1)				
Eastbound Bethel Church Road	A (5.6)	A (6.4)	A (5.6)	A (6.4)
Northbound Choptank Road	A (7.7)	A (5.1)	A (7.7)	A (5.1)
Southbound Bethel Church Road	A (4.5)	A (8.1)	A (4.5)	A (8.1)
Overall Intersection	A (6.3)	A (7.1)	A (6.4)	A (7.1)
2028 No-Build Condition (Case 2)				
Eastbound Bethel Church Road	A (8.3)	A (9.3)	A (8.3)	A (9.3)
Northbound Choptank Road	B (12.7)	A (6.6)	B (12.7)	A (6.6)
Southbound Bethel Church Road	A (5.6)	B (12.5)	A (5.6)	B (12.5)
Overall Intersection	A (9.4)	B (10.5)	A (9.4)	B (10.5)
2028 Build Condition (Case 3)				
Eastbound Bethel Church Road	A (8.7)	B (10.7)	A (8.7)	B (10.7)
Northbound Choptank Road	C (16.1)	A (7.3)	C (16.1)	A (7.3)
Southbound Bethel Church Road	A (5.9)	C (15.5)	A (5.9)	C (15.5)
Overall Intersection	B (11.3)	B (12.6)	B (11.3)	B (12.6)

¹⁶ For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 14
Peak Hour Levels of Service (LOS)
Based on Country Club Estates Traffic Impact Study – April 2022
Prepared by Becker Morgan Group, Inc.

Signalized Intersection ¹⁷	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Summit Bridge Road & Bethel Church Road				
2021 Existing (Case 1)	C (23.6)	B (13.9)	B (19.2)	A (9.1)
2028 No Build Condition (Case 2)	F (92.3)	D (35.3)	F (89.0)	C (24.5)
2028 Build Condition (Case 3)	F (99.8)	D (36.7)	F (96.9)	C (28.8)

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

Table 15
Peak Hour Levels of Service (LOS)
Based on Country Club Estates Traffic Impact Study – April 2022
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ¹⁸ One-Way Stop (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Choptank Road & Ernest Drive				
2021 Existing (Case 1)				
Eastbound Ernest Drive	A (8.9)	B (10.7)	B (12.5)	B (13.7)
Northbound Choptank Road – Left	A (8.1)	A (8.6)	A (8.1)	A (8.6)
2028 No-Build Condition (Case 2)				
Eastbound Ernest Drive	A (9.6)	B (11.7)	B (14.5)	C (16.3)
Northbound Choptank Road – Left	A (8.5)	A (9.0)	A (8.5)	A (9.0)
2028 Build Condition (Case 3)				
Eastbound Ernest Drive	B (10.1)	B (12.0)	C (16.0)	C (18.0)
Northbound Choptank Road – Left	A (8.7)	A (9.1)	A (8.8)	A (9.2)

¹⁸ For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 16
Peak Hour Levels of Service (LOS)
Based on Country Club Estates Traffic Impact Study – April 2022
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ¹⁹ One-Way Stop (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Choptank Road & Old School House Road				
2021 Existing (Case 1)				
Westbound Old School House Road	B (13.6)	C (19.4)	B (13.6)	C (19.4)
Southbound Choptank Road – Left	A (8.3)	A (8.3)	A (8.3)	A (8.3)
2028 No-Build Condition (Case 2)				
Westbound Old School House Road	C (16.5)	D (27.1)	C (16.5)	D (27.1)
Southbound Choptank Road – Left	A (8.6)	A (8.8)	A (8.6)	A (8.8)
2028 Build Condition (Case 3)				
Westbound Old School House Road	C (18.2)	D (32.9)	C (18.2)	D (32.9)
Southbound Choptank Road – Left	A (8.7)	A (9.1)	A (8.7)	A (9.1)

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

Table 17
Peak Hour Levels of Service (LOS)
Based on Country Club Estates Traffic Impact Study – April 2022
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ²⁰ One-Way Stop (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Choptank Road & Armstrong Corner Road				
2021 Existing (Case 1)				
Westbound Armstrong Corner Road	B (14.8)	B (18.0)	B (14.8)	B (18.0)
Southbound Choptank Road – Left	A (8.2)	A (8.5)	A (8.2)	A (8.5)
2028 No-Build Condition (Case 2)				
Westbound Armstrong Corner Road	C (18.0)	D (30.2)	C (18.9)	D (30.2)
Southbound Choptank Road – Left	A (8.5)	A (9.0)	A (8.5)	A (9.0)
2028 Build Condition (Case 3)				
Westbound Armstrong Corner Road	C (20.9)	E (45.2)	C (20.9)	E (45.2)
Southbound Choptank Road – Left	A (8.7)	A (9.3)	A (8.7)	A (9.3)
2028 Build Condition (Case 3) <i>With separate turn lanes on WB approach</i>				
Westbound Armstrong Corner Road	C (18.3)	C (24.4)	C (18.3)	C (24.4)
Southbound Choptank Road – Left	A (8.7)	A (9.3)	A (8.7)	A (9.3)

Roundabout Intersection ²⁰ (Potential Improvement)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Choptank Road & Armstrong Corner Road				
2028 Build Condition (Case 3)				
Westbound Armstrong Corner Road	N/A	N/A	A (5.3)	A (8.2)
Northbound Choptank Road	N/A	N/A	A (6.8)	A (8.9)
Southbound Choptank Road	N/A	N/A	A (7.9)	A (9.6)
Overall Intersection	N/A	N/A	A (7.2)	A (9.2)

²⁰ 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.