



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

JENNIFER COHAN
SECRETARY

November 2, 2020

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

Dear Mr. Wilson:

The enclosed Traffic Impact Study (TIS) review letter for the **Calvary Baptist Church** (Protocol Tax Parcel 2-05-07500-01-0600-00001) 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 prepared the TIS in a manner that conforms 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,

A handwritten signature in black ink that reads "Troy Brestel".

Troy Brestel
Project Engineer

TEB:sf

Enclosures

cc with enclosures: Mr. Charles Fletcher, Calvary Baptist Church
Mr. Troy Adams, Mountain Consulting, Inc.
Mr. David Heatwole, SiteWorks Engineering, Inc.
Ms. Constance C. Holland, Office of State Planning Coordination
Mr. David Hugg, City of Dover
Mr. Andrew Parker, McCormick Taylor, Inc.
DelDOT Distribution

DelDOT Distribution

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David Dooley, Service Development Planner, Delaware Transit Corporation
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Jeff Steward, Kent Plan Reviewer, Central District
Kerry Yost, Traffic Studies Engineer, Traffic, DOTS
Mark Galipo, Traffic Engineer, Traffic, DOTS
Claudy Joinville, Project Engineer, Development Coordination



October 30, 2020

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

RE: Agreement No. 1946F
Traffic Impact Study Services
Task No. 1A Subtask 02 – Calvary Baptist Church

Dear Mr. Brestel:

McCormick Taylor has completed its review of the Traffic Impact Study (TIS) for the Calvary Baptist Church development prepared by The Traffic Group, Inc. dated March 20, 2020. The Traffic Group prepared the report in a manner generally consistent with DelDOT's Development Coordination Manual.

The TIS evaluates the impacts of a proposed 37,000 square-foot church to be located on the south side of Forrest Avenue (Delaware Route 8 / Kent Road 51) east of Artis Drive (Kent Road 197), in the City of Dover, Kent County. One full-access driveway is proposed along Forrest Avenue. Construction is expected to be complete by 2022.

In September 2020, the developer's engineer notified DelDOT that the size of the proposed church has been reduced from approximately 37,000 square feet down to 22,443 square feet. Given that the TIS was submitted before this change, the operational analysis of the study area intersections is therefore conservative as it was based on higher traffic volumes associated with the larger size church. As the conservative analysis did not yield any recommendations for improvements at off-site intersections, no improvements would be needed for the smaller church either. Therefore, analysis using lower volumes associated with the smaller church was not conducted. Recommendations for design of the turn lanes at the site access was based on volumes associated with updated/smaller church plan.

The subject land is located on an approximately 75.65-acre parcel. The land is currently zoned as R-10 (one family residence) and is subject to the COZ-1 (Corridor Overlay Zone). The developer does not plan to rezone the parcel.

DelDOT has three projects within the study area. The first project is *HEP KC, SR 8 and SR 15 Intersection Improvements* (State Project No. T201500201), which involves the signalized intersection of Forrest Avenue and Saulsbury Road (Kent Road 156). Currently there is a single left turn lane, one through lane, a bike lane and a channelized right turn lane along the Saulsbury Road approaches. Forrest Avenue features one left turn lane, two through lanes and a channelized right turn lane. The project will provide an additional through lane on both the northbound and southbound Saulsbury Road approaches, along with minor improvements along Forrest Avenue.



Based on information obtained from DelDOT, this project is currently in design. Right of way acquisition began in the fall of 2019. Construction is expected to begin in the year 2021.

A second project in the study area is *Kenton Road, SR 8 to Chestnut Grove Road* (State Project No. T201604501). Pedestrian and bicycle improvements are proposed on Kenton Road (Kent Road 104) along with additional travel lanes in some sections. Based on information obtained from DelDOT, this project is currently in design. Right of way acquisition began in the fall of 2019. The project is currently funded for construction in FY 2026.

The third project is a potential connector road between Forrest Avenue and Commerce Way. As currently envisioned, the new road would have two travel lanes with accommodations for pedestrians and bicyclists. This project is in a very preliminary phase. Preliminary engineering is funded for the years 2021 through 2023. Right-of-way acquisition is expected occur in 2024 through 2025. Construction is expected to be complete by 2026.

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

All intersections within the study area exhibit adequate existing and future level of service (LOS) for Sunday morning peak hour conditions, so physical roadway and/or traffic control improvements to address any such deficiencies are not necessary. However, several items are recommended to accommodate the proposed site access and to address bicycle/pedestrian/transit needs.

Should the City of Dover 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 should construct the full-movement site access on Forrest Avenue. The proposed configuration is shown in the table below.

Approach	Existing Configuration	Proposed Configuration
Eastbound Forrest Avenue	One through lane	One through lane and one right-turn lane
Westbound Forrest Avenue	One through lane	One left-turn lane and one through lane
Northbound Site Access	Approach does not exist	One left-turn lane and one right-turn lane

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

Approach	Left-Turn Lane	Right-Turn Lane
Eastbound Forrest Avenue	N/A	190 feet *
Westbound Forrest Avenue	210 feet *	N/A

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

2. The following bicycle and pedestrian improvements should be included:
 - a. Adjacent to the proposed right-turn lane on eastbound Forrest Avenue at the proposed site entrance, a minimum of a five-foot bicycle lane should be dedicated and striped with appropriate markings for bicyclists through the turn lane in order to facilitate safe and unimpeded bicycle travel.
 - 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. Bicycle parking should be provided near the church building entrance. Where building architecture provides for an awning, other overhang, or indoor parking, the bicycle parking should be covered.
 - e. A minimum 15-foot wide permanent easement from the edge of the right-of-way should be dedicated to DelDOT within the site frontages along Forrest Avenue and Artis Drive.
 - f. Within the easement along the Forrest Avenue site frontage, a minimum of a ten-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 eastern property boundary, the shared-use path should connect to the shoulder in accordance with DelDOT's *Shared-Use Path and/or Sidewalk Termination Reference Guide* dated August 1, 2018. At the western end of the Forrest Avenue site frontage, the shared-use path should continue west and south within the easement along the Artis Drive site frontage to the existing farm lane. The developer should coordinate with DelDOT's Development Coordination Section to determine the appropriate treatment for the western terminus of the shared-use path at the farm lane.
 - g. ADA compliant curb ramps and crosswalks should be provided at all pedestrian crossings, including all site entrances. Type 3 curb ramps are discouraged.
 - h. Internal sidewalks for pedestrian safety and to promote walking as a viable transportation alternative should be constructed within the church property. 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 property should connect to the proposed shared-use path along Forrest Avenue.

- i. Where internal sidewalks are located alongside of parking spaces, a buffer should be added to prevent vehicular overhang onto the sidewalk.
- j. The developer should coordinate with the Delaware Transit Corporation (DTC) regarding the possibility of including a bus stop to be located along the Forrest Avenue site frontage, which could served by a potential future bus route running past the site.

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: March 20, 2020

Prepared by: The Traffic Group, Inc.

Prepared for: Mountain Consulting

Tax parcel: ED-05-075.00-01-06.00

Generally consistent with DelDOT's Development Coordination Manual: Yes

Project Description and Background

Description: The proposed Calvary Baptist Church seeks to develop a 37,000 square foot church along Forrest Avenue. The size of the planned church was recently reduced to 22,443 square feet, but it was agreed that revised operational analysis of off-site intersections was not needed.

Location: The site is located on the south side of Forrest Avenue (DE Route 8 / Kent Road 51) east of Artis Drive (Kent Road 197), in the City of Dover, Kent County. A site location map is included on page 6.

Amount of land to be developed: approximately 75.65 acre parcel

Land use approval(s) needed: Subdivision approval. The land is currently zoned as R-10 (one family residence) and is subject to the COZ-1 (Corridor Overlay Zone). The developer does not plan to rezone the parcel.

Proposed completion year: 2022

Proposed access locations: One full-access driveway is proposed along Forrest Avenue.

Sunday Traffic Volumes (per DelDOT Traffic Summary 2019):

- 2019 Average Annual Daily Traffic on Forrest Avenue (Sunday): 12,187 vehicles/day
- 2019 **Sunday only** Average Daily Traffic on Forrest Avenue (per March 2019 ATR counts by The Traffic Group, Inc.): 7,272 vehicles/Sunday



2015 Delaware Strategies for State Policies and Spending

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

The proposed Calvary Baptist Church development is located within Investment Level 1.

Investment Level 1

Areas of the state designated as Investment Level 1 are most prepared for growth and are where the state can make cost-effective infrastructure investments in schools, roads, and public safety. In these areas, state investments and policies should support and encourage a wide range of uses and densities, promote a variety of transportation options, foster efficient use of existing public and private investments, and enhance community identity and integrity. Investment Level 1 areas are often municipalities, towns, or urban/urbanizing places. Density is generally higher than in the surrounding areas. Overall, it is the state's intent to use its spending and management tools to maintain and enhance community character, to promote well-designed and efficient new growth, and to facilitate redevelopment in Investment Level 1 Areas.

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

The proposed Calvary Baptist Church development is located within an Investment Level 1 area; Nearby land uses along the Forrest Avenue corridor primarily include medium density residential, retail/service businesses, restaurants, educational, and places of worship.

The proposed development is generally consistent with neighboring land uses and the character of Investment Level 1 areas. The Strategies for State Policies and Spending document encourages making use of existing infrastructure through infill development and redevelopment of underutilized tracts in Level 1 areas. The proposed development is consistent with these guidelines. The proposed development appears to generally comply with the policies stated in the 2015 "Strategies for State Policies and Spending."

Comprehensive Plan

City of Dover Comprehensive Plan:

(Source: City of Dover 2019 Comprehensive Plan, adopted January 2020)

The City of Dover Comprehensive Plan Land Development Plan Map indicates that the proposed development parcel is within a Residential Medium Density area. While this area was intended for a residential use, the Calvary Baptist Church project was approved as a Conditional Use by the City of Dover Planning Commission on July 15, 2019.

Relevant Projects in the DelDOT Capital Transportation Program

DelDOT has three projects within the study area. The first project is *HEP KC, SR 8 and SR 15 Intersection Improvements* (State Project No. T201500201), which involves the signalized intersection of Forrest Avenue and Saulsbury Road. Currently there is a single left turn lane, one through lane, a bike lane and a channelized right turn lane along the Saulsbury Road approaches. Forrest Avenue features one left turn lane, two through lanes and a channelized right turn lane. The project will provide an additional through lane on both the northbound and southbound

Saulsbury Road approaches, along with minor improvements along Forrest Avenue. Based on information obtained from DelDOT, this project is currently in design. Right of way acquisition began in the fall of 2019. Construction is expected to begin in the year 2021.

A second project in the study area is *Kenton Road, SR 8 to Chestnut Grove Road* (State Project No. T201604501). Pedestrian and bicycle improvements are proposed on Kenton Road along with additional travel lanes in some sections. Based on information obtained from DelDOT, this project is currently in design. Right of way acquisition began in the fall of 2019. The project is currently funded for construction in FY 2026.

The third project is a potential connector road between Forrest Avenue and Commerce Way. As currently envisioned, the new road would have two travel lanes with accommodations for pedestrians and bicyclists. This project is in a very preliminary phase. Preliminary engineering is funded for the years 2021 through 2023. Right-of-way acquisition is expected occur in 2024 through 2025. Construction is expected to be complete by 2026.

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:

- Church (ITE Land Use Code 560)

Table 1
CALVARY BAPTIST CHURCH PEAK HOUR TRIP GENERATION

Land Use	Sunday Peak Hour		
	In	Out	Total
Church (37,000 sq ft)	177	193	370

Table 2
CALVARY BAPTIST CHURCH DAILY TRIP GENERATION

Land Use	Sunday ADT
	Total
Church (37,000 sq ft)	1,022

Overview of TIS

Intersections examined:

- 1) Forrest Avenue & Site Access
- 2) Forrest Avenue & Dover High Drive
- 3) Forrest Avenue & Cranberry Run Drive
- 4) Forrest Avenue & Mifflin Road
- 5) Forrest Avenue & Kenton Road
- 6) Forrest Avenue & Independence Boulevard
- 7) Forrest Avenue & Modern Maturity Center
- 8) Forrest Avenue & Saulsbury Road
- 9) Kenton Road & Walker Road
- 10) Forrest Avenue & Artis Drive
- 11) Forrest Avenue & Sharon Hill Road
- 12) Forrest Avenue & Rose Valley School Road

Conditions examined:

- 1) 2019 existing (Case 1)
- 2) 2022 without Calvary Baptist (Case 2)
- 3) 2022 with Calvary Baptist (Case 3)

Peak hour evaluated: Sunday morning peak hour

Committed developments considered:

- 1) Eden Hill (132 apartments, 335 townhomes, 101 single-family detached houses, 135,380 sf shopping center, 154,702 sf medical-office space)
- 2) Dunkin Donuts Shopping Center (33,996 sf shopping center)

Intersection Descriptions

1) Forrest Avenue & Site Access

Type of Control: no existing intersection; proposed one-way stop control (T-intersection)

Eastbound Approach: (Forrest Avenue) one through lane and one right-turn lane

Westbound Approach: (Forrest Avenue) one left-turn lane and one through lane

Northbound Approach: (Site Access) one left-turn lane and one right-turn lane, stop control

2) Forrest Avenue & Dover High Drive

Type of Control: Signalized

Eastbound Approach: (Forrest Avenue) one through lane and one right-turn lane

Westbound Approach: (Forrest Avenue) one left-turn lane and one through lane

Northbound Approach: (Dover High Drive) one left-turn lane and one right-turn lane

3) Forrest Avenue & Cranberry Run Drive

Type of Control: One-way stop control (T-intersection)

Eastbound Approach: (Forrest Avenue) one left-turn lane and one through lane

Westbound Approach: (Forrest Avenue) one shared through/right-turn lane

Southbound Approach: (Cranberry Run Drive) one shared left/right-turn lane, stop control

4) Forrest Avenue & Mifflin Road

Type of Control: Signalized

Eastbound Approach: (Forrest Avenue) one through lane and one right-turn lane

Westbound Approach: (Forrest Avenue) one left-turn lane and one through lane

Northbound Approach: (Mifflin Road) one left-turn lane and one right-turn lane

5) Forrest Avenue & Kenton Road

Type of Control: Signalized

Eastbound Approach: (Forrest Avenue) one left turn lane, two through lanes, and one right-turn lane

Westbound Approach: (Forrest Avenue) one left turn lane, two through lanes, and one right-turn lane

Northbound Approach: (Kent Eight Plaza) one shared left-turn/through lane and one right-turn lane

Southbound Approach: (Kenton Road) one exclusive left-turn lane, one shared left-turn/through lane, one right-turn lane

6) Forrest Avenue & Independence Boulevard

Type of Control: Signalized

Eastbound Approach: (Forrest Avenue) one left turn lane, two through lanes, and one right-turn lane

Westbound Approach: (Forrest Avenue) one left turn lane, two through lanes, and one right-turn lane

Northbound Approach: (Independence Boulevard) one left-turn lane and one shared through/right-turn lane

Southbound Approach: (Independence Boulevard) one left-turn lane and one shared through/right-turn lane

7) Forrest Avenue & Modern Maturity Center

Type of Control: Signalized

Eastbound Approach: (Forrest Avenue) one left turn lane and two through lanes

Westbound Approach: (Forrest Avenue) one left turn lane, two through lanes, and one right-turn lane

Southbound Approach: (Modern Maturity Center) one left-turn lane and one right-turn lane

Note: site access for the Dunkin' Donuts Shopping Center committed development will become the fourth leg of this intersection for Case 2 and Case 3 scenarios. The new northbound approach will have one left-turn lane and one shared through/right-turn lane.

8) Forrest Avenue & Saulsbury Road

Type of Control: Signalized

Eastbound Approach: (Forrest Avenue) one left turn lane, two through lanes, and one right-turn lane

Westbound Approach: (Forrest Avenue) one left turn lane, two through lanes, and one right-turn lane

Northbound Approach: (Saulsbury Road) one left-turn lane, one through lane, one right-turn lane

Southbound Approach: (Saulsbury Road) one left-turn lane, one through lane, one right-turn lane

9) Kenton Road & Walker Road

Type of Control: Signalized

Westbound Approach: (Walker Road) one left-turn lane and one right-turn lane

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

Southbound Approach: (Kenton Road) one left-turn lane and one through lane

10) Forrest Avenue & Artis Drive

Type of Control: One-way stop control (T-intersection)

Eastbound Approach: (Forrest Avenue) one through lane and one right-turn lane

Westbound Approach: (Forrest Avenue) one shared left-turn/through lane with defacto bypass lane (right turn lane for downstream intersection at Sharon Hill Road)

Northbound Approach: (Artis Drive) one left-turn lane and one right-turn lane, stop control

11) Forrest Avenue & Sharon Hill Road

Type of Control: One-way stop control (T-intersection)

Eastbound Approach: (Forrest Avenue) one shared left-turn/through lane

Westbound Approach: (Forrest Avenue) one through lane and one right-turn lane

Southbound Approach: (Sharon Hill Road) one shared left/right-turn lane, stop control

12) Forrest Avenue & Rose Valley School Road

Type of Control: Two-way stop control

Eastbound Approach: (Forrest Avenue) one shared left-turn/through lane and one right-turn lane

Westbound Approach: (Forrest Avenue) one shared left-turn/through lane and one right-turn lane

Northbound Approach: (Rose Valley School Road) one shared left/through/right-turn lane, stop control

Southbound Approach: (Rose Valley School Road) one shared left/through/right-turn lane, stop control

Safety Evaluation

Crash Data: Per current DelDOT policy, review of crash data was not conducted at this time.

Sight Distance: The proposed site access on Forrest Avenue is located between two horizontal curves, so sight distance is limited looking in either direction (especially to the left/west) from the proposed northbound driveway approach. As always adequacy of available sight distance should be confirmed during the site plan review process for all proposed movements at the site access.

Other than the curves in the vicinity of the proposed site access, and some challenging existing sight distance aspects at the Forrest Avenue intersections with Artis Drive and Sharon Hill Road due to a horizontal curve and skewed intersection geometry, the study area generally consists of mostly straight and flat roadways, and there are few potential visual obstructions.

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: Route 101 (Walker Road) and Route 102 (Gateway West) are the two DART routes that feature service within the study area. Neither route operates near the subject site and neither features service on Sunday.

Planned transit service: There are no known planned additions to transit service in the vicinity of the proposed church. That said, the property immediately to the east of the Calvary Baptist Church site has a bus pull-off and bus stop pad along the sidewalk, which could be utilized if future bus service is ever brought to this part of Forrest Avenue.

Existing bicycle and pedestrian facilities: Four of the study area roadways are identified as “Bicycling Routes” on the *Kent County Bicycle Map* published by DelDOT:

- Forrest Avenue:
 - Regional Bicycle Route with and without bikeway
 - Over 5,000 vehicles daily
- Saulsbury Road:
 - Statewide Bicycle Route with bikeway
 - Over 5,000 vehicles daily
- Walker / Kenton Road:
 - Connector Bicycle Route with and without bikeway
 - Over 5,000 vehicles daily
- Mifflin Road:
 - Undesignated Bicycle Route with bikeway
 - Over 5,000 vehicles daily

There are no existing sidewalks or exclusive pedestrian facilities in the immediate area of the proposed site entrance on Forrest Avenue. There are however existing pedestrian facilities (shared-use path) and bike lanes east of the proposed Site Access, beginning approximately 800 feet west of the Dover High Drive signalized intersection and continuing to the east.

Planned bicycle and pedestrian facilities: With regard to bicycle planning, the Dover/Kent County MPO Regional Bicycle Plan adopted September 2011 was reviewed. It recommends providing an in-road bike lane along Forrest Avenue for 1.8 miles from the railroad tracks to Heatherfield Way. This recommendation does not impact site frontage, as that section of Forrest Avenue is entirely east of the Calvary site. Other bicycle and pedestrian facility improvements are proposed as part of the three DeIDOT projects described in this review letter.

The Calvary Baptist Church development is planning to install a shared-use path along the Forrest Avenue site frontage, continuing to the farm lane on Artis Drive just south of Forrest Avenue.

Previous Comments

In a review letter dated July 16, 2019, DeIDOT indicated that the revised Preliminary TIS was acceptable.

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

General HCS Analysis Comments

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

- 1) Both The Traffic Group, Inc. and McCormick Taylor utilized Highway Capacity Software (HCS) version 7.8 to complete the traffic analyses.
- 2) The TIS and McCormick Taylor applied heavy vehicle factors (HV) by lane group using existing data. The TIS and McCormick Taylor generally assumed future HV to be the same as existing HV at all intersections. Both the TIS and McCormick Taylor assumed 3% HV for future movements to and from the proposed site access points as per the DeIDOT Development Coordination Manual section 2.2.8.11.6.H.
- 3) For existing conditions, the TIS and McCormick Taylor determined overall intersection peak hour factors (PHF) for each intersection. While the TIS typically increased the PHF for future scenarios, McCormick Taylor generally applied existing PHFs to future scenarios as per guidance in the DeIDOT Development Coordination Manual section 2.2.8.11.6.F.
- 4) For analyses of signalized intersections, McCormick Taylor used a base saturation flow rate of 1,750 pc/hr/ln per DeIDOT's Development Coordination Manual.
- 5) For analyses of all intersections, the TIS and McCormick Taylor assumed 0% grade for all movements.
- 6) The TIS and McCormick Taylor used different signal timings when analyzing the signalized intersections in some cases.

Table 3
Peak Hour Levels of Service (LOS)
Based on Calvary Baptist Church Traffic Impact Study – March 2020
Prepared by The Traffic Group, Inc.

Unsignalized Intersection ¹ Two-Way Stop	LOS per TIS	LOS per McCormick Taylor
Forrest Avenue & Site Access ²	Sunday morning	Sunday morning
2022 with Calvary (Case 3)		
Westbound Forrest Ave – Left	A (8.9)	A (8.9)
Northbound Site Access – Left	D (32.7)	D (32.7) ³
Northbound Site Access – Right	B (12.4)	B (12.4)

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 Analysis assumes PHF of 0.88 per DelDOT guidelines. Actual PHF could be lower if there is a surge of exiting traffic in a short period of time after church services ends, leading to longer delays and queues on the northbound site driveway egress than shown above.

³ 95th percentile queue length is anticipated to be approximately 2 vehicles (50 feet).

Table 4
Peak Hour Levels of Service (LOS)
Based on Calvary Baptist Church Traffic Impact Study – March 2020
Prepared by The Traffic Group, Inc.

Signalized Intersection ⁴	LOS per TIS	LOS per McCormick Taylor
Forrest Avenue & Dover High Drive ⁵	Sunday morning	Sunday morning
2019 Existing (Case 1)	B (14.9)	B (19.9)
2022 without Calvary (Case 2)	B (13.4)	C (21.0)
2022 with Calvary (Case 3)	B (14.6)	C (25.1)

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.

⁵ The TIS analyzed the westbound left-turn movement as protected-permitted. McCormick Taylor analyzed it as it currently operates, which is protected-prohibited.

Table 5
Peak Hour Levels of Service (LOS)
Based on Calvary Baptist Church Traffic Impact Study – March 2020
Prepared by The Traffic Group, Inc.

Unsignalized Intersection ⁶ One-Way Stop	LOS per TIS	LOS per McCormick Taylor
Forrest Avenue & Cranberry Run Drive	Sunday morning	Sunday morning
2019 Existing (Case 1)		
Eastbound Forrest Ave – Left	A (8.6)	A (8.6)
Southbound Cranberry Run	C (22.8)	C (22.8)
2022 without Calvary (Case 2)		
Eastbound Forrest Ave – Left	A (8.5)	A (8.8)
Southbound Cranberry Run	C (21.4)	D (25.5)
2022 with Calvary (Case 3)		
Eastbound Forrest Ave – Left	A (8.9)	A (9.3)
Southbound Cranberry Run	D (27.2)	D (34.5)

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.

Table 6
Peak Hour Levels of Service (LOS)
Based on Calvary Baptist Church Traffic Impact Study – March 2020
Prepared by The Traffic Group, Inc.

Signalized Intersection ⁷	LOS per TIS	LOS per McCormick Taylor
Forrest Avenue & Mifflin Road	Sunday morning	Sunday morning
2019 Existing (Case 1)	C (26.7)	C (24.2)
2022 without Calvary (Case 2)	B (16.2)	C (33.8)
2022 with Calvary (Case 3)	B (19.5)	D (47.8)

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

Table 7
Peak Hour Levels of Service (LOS)
Based on Calvary Baptist Church Traffic Impact Study – March 2020
Prepared by The Traffic Group, Inc.

Signalized Intersection ⁸	LOS per TIS	LOS per McCormick Taylor
Forrest Avenue & Kenton Road	Sunday morning	Sunday morning
2019 Existing (Case 1)	D (37.6)	D (37.7)
2022 without Calvary (Case 2)	C (34.5)	C (34.6)
2022 with Calvary (Case 3)	D (49.1)	D (40.1)

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 Calvary Baptist Church Traffic Impact Study – March 2020
Prepared by The Traffic Group, Inc.

Signalized Intersection ⁹	LOS per TIS	LOS per McCormick Taylor
Forrest Avenue & Independence Boulevard	Sunday morning	Sunday morning
2019 Existing (Case 1)	B (15.7)	B (14.6)
2022 without Calvary (Case 2)	B (14.8)	B (14.8)
2022 with Calvary (Case 3)	B (14.9)	B (15.0)

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 Calvary Baptist Church Traffic Impact Study – March 2020
Prepared by The Traffic Group, Inc.

Signalized Intersection ¹⁰	LOS per TIS	LOS per McCormick Taylor
Forrest Avenue & Modern Maturity Center ¹¹	Sunday morning	Sunday morning
2019 Existing (Case 1)	A (4.4)	A (4.4)
2022 without Calvary (Case 2)	B (11.0)	B (11.7)
2022 with Calvary (Case 3)	B (11.0)	B (11.8)

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 Cases 2 and 3 at this intersection include the addition of the south leg for the Dunkin' Donuts shopping center committed development.

Table 10
Peak Hour Levels of Service (LOS)
Based on Calvary Baptist Church Traffic Impact Study – March 2020
Prepared by The Traffic Group, Inc.

Signalized Intersection ¹²	LOS per TIS	LOS per McCormick Taylor
Forrest Avenue & Saulsbury Road	Sunday morning	Sunday morning
2019 Existing (Case 1)	D (39.3)	D (39.2)
2022 without Calvary (Case 2)	D (45.6)	D (54.9)
2022 with Calvary (Case 3)	D (51.6)	D (54.9)

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 Calvary Baptist Church Traffic Impact Study – March 2020
Prepared by The Traffic Group, Inc.

Signalized Intersection ¹³	LOS per TIS	LOS per McCormick Taylor
Kenton Road & Walker Road	Sunday morning	Sunday morning
2019 Existing (Case 1)	A (9.9)	A (9.9)
2022 without Calvary (Case 2)	A (10.0)	A (10.0)
2022 with Calvary (Case 3)	B (10.1)	B (10.1)

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 Calvary Baptist Church Traffic Impact Study – March 2020
Prepared by The Traffic Group, Inc.

Unsignalized Intersection ¹⁴ One-Way Stop	LOS per TIS	LOS per McCormick Taylor
Forrest Avenue & Artis Drive	Sunday morning	Sunday morning
2019 Existing (Case 1)		
Westbound Forrest Ave – Left	A (8.2)	A (8.2)
Northbound Artis Dr – Left	C (16.3)	C (16.3)
Northbound Artis Dr – Right	B (10.5)	B (10.5)
2022 without Calvary (Case 2)		
Westbound Forrest Ave – Left	A (8.3)	A (8.3)
Northbound Artis Dr – Left	C (17.0)	C (17.7)
Northbound Artis Dr – Right	B (10.7)	B (10.9)
2022 with Calvary (Case 3)		
Westbound Forrest Ave – Left	A (8.5)	A (8.6)
Northbound Artis Dr – Left	C (20.2)	C (21.5)
Northbound Artis Dr – Right	B (11.3)	B (11.6)

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.

Table 13
Peak Hour Levels of Service (LOS)
Based on Calvary Baptist Church Traffic Impact Study – March 2020
Prepared by The Traffic Group, Inc.

Unsignalized Intersection ¹⁵ One-Way Stop	LOS per TIS	LOS per McCormick Taylor
Forrest Avenue & Sharon Hill Road	Sunday morning	Sunday morning
2019 Existing (Case 1)		
Eastbound Forrest Ave – Left	A (8.1)	A (8.0)
Southbound Sharon Hill Road	C (15.1)	C (15.1)
2022 without Calvary (Case 2)		
Eastbound Forrest Ave – Left	A (8.2)	A (8.1)
Southbound Sharon Hill Road	C (15.9)	C (16.5)
2022 with Calvary (Case 3)		
Eastbound Forrest Ave – Left	A (8.3)	A (8.2)
Southbound Sharon Hill Road	C (18.2)	C (19.1)

¹⁵ 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 Calvary Baptist Church Traffic Impact Study – March 2020
Prepared by The Traffic Group, Inc.

Unsignalized Intersection ¹⁶ Two-Way Stop	LOS per TIS	LOS per McCormick Taylor
Forrest Avenue & Rose Valley School Road	Sunday morning	Sunday morning
2019 Existing (Case 1)		
Eastbound Forrest Ave – Left	A (7.9)	A (7.9)
Westbound Forrest Ave – Left	A (7.9)	A (7.9)
Northbound Rose Valley Road	B (14.0)	B (14.0)
Southbound Rose Valley Road	B (12.8)	B (12.8)
2022 without Calvary (Case 2)		
Eastbound Forrest Ave – Left	A (7.9)	A (7.9)
Westbound Forrest Ave – Left	A (7.9)	A (8.0)
Northbound Rose Valley Road	B (14.3)	B (14.8)
Southbound Rose Valley Road	B (13.0)	B (13.4)
2022 with Calvary (Case 3)		
Eastbound Forrest Ave – Left	A (8.0)	A (8.0)
Westbound Forrest Ave – Left	A (8.0)	A (8.0)
Northbound Rose Valley Road	C (15.0)	C (15.6)
Southbound Rose Valley Road	B (13.9)	B (14.3)

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.