



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

NICOLE MAJESKI
SECRETARY

April 8, 2021

Mr. Christopher Duke
Becker Morgan Group, Inc.
The Tower at STAR Campus
100 Discovery Boulevard
Suite 102
Newark, Delaware 19713

Dear Mr. Duke:

The enclosed Traffic Impact Study (TIS) review letter for the **McKee Road Apartments** (Protocol Tax Parcel 2-00-06700-01-0100-00001) 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 have found the TIS to conform to DelDOT's Development Coordination Manual and other accepted practices and procedures for such studies. DelDOT accepts this letter and concurs with the recommendations. If you have any questions concerning this letter or the enclosed review letter, please contact me at (302) 760-2167.

Sincerely,
Troy Brestel
Troy Brestel
Project Engineer

TEB:km

Enclosures

cc with enclosures: Mr. J. Michael Riemann, Becker Morgan Group, Inc.
Ms. Constance C. Holland, Office of State Planning Coordination
Mr. David Hugg, City of Dover
Ms. Dawn Melson-Williams, City of Dover
Mr. Andrew Parker, McCormick Taylor, Inc.
DelDOT Distribution

DelDOT Distribution

Brad Eaby, Deputy Attorney General
Shanté Hastings, Director, Transportation Solutions (DOTS)
J. Marc Coté, Director, Planning
Mark Luszcz, Deputy Director, DOTS
Michael Simmons, Assistant Director, Project Development South, DOTS
Todd Sammons, Assistant Director, Development Coordination
T. William Brockenbrough, Jr., County Coordinator, Development Coordination
Peter Haag, Chief Traffic Engineer, Traffic, DOTS
Matthew Lichtenstein, Central District Engineer, Central District
Kerry Yost, Traffic Calming and Subdivision Relations, Traffic, DOTS
Jared Kauffmann, Service Development Planner, Delaware Transit Corporation
Anthony Aglio, Planning Supervisor, Statewide & Regional Planning
Thomas Kneavel, Safe Routes to School Coordinator, Statewide and Regional Planning
Wendy Polasko, Subdivision Engineer, Development Coordination
Olayiwola Okesola, Kent Review Coordinator, Development Coordination
Ryan Schroder, Subdivision Manager, Development Coordination
Claudy Joinville, Project Engineer, Development Coordination
Annamaria Furmato, Project Engineer, Development Coordination



April 7, 2021

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 04 – McKee Road Apartments

Dear Mr. Brestel:

McCormick Taylor has completed its review of the Traffic Impact Study (TIS) for the McKee Road Apartments development prepared by Becker Morgan Group, Inc. dated December 2020. 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 McKee Road Apartments residential development, proposed to be located on the east side of McKee Road (Kent Road 156), and southeast of Scarborough Road (Kent Road 294), opposite the intersection of Scarborough Road and McKee Road, in the City of Dover, Delaware. The proposed development would consist of 384 units of mid-rise multi-family housing and a 30,000 square-foot shopping center. One access point is proposed on McKee Road opposite Gemstone Boulevard. Construction is expected to be complete by 2025.

The subject land is located on an approximately 72.4-acre parcel. The land is currently split-zoned as C2-A (Limited Central Commercial) and RG-2 (General Residence), and the developer does not plan to rezone the land.

Currently, there is one active DelDOT project within the study area: *HEP KC, SR 8 and SR 15 Intersection Improvements* (State Project No. T201500201). This project involves the signalized intersection of Forrest Avenue (Kent Road 51) 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 2021.

It is also noted that near the proposed development site, the property located on the northeast corner of the intersection of McKee Road and College Road (Kent Road 99) was rezoned on March 8, 2021 to C-2A (Limited Central Commercial Zone), which would allow a convenience store with gasoline pumps. It is anticipated that the developer of this property will improve the intersection



of McKee Road and College Road by adding a separate right-turn lane on the westbound College Road approach.

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

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

<i>Intersection</i>	<i>Existing Traffic Control</i>	<i>Situations for which deficiencies occur</i>
McKee Road and Gemstone Boulevard / Site Access A	Unsignalized	2020 Existing weekday PM (Case 1); 2025 without development weekday AM, PM, & SAT (Case 2); 2025 with development weekday AM, PM, & SAT (Case 3)
McKee Road and College Road	Signalized	2025 without development weekday PM (Case 2); 2025 with development weekday PM (Case 3)
McKee Road and Old Forge Road	Unsignalized	2020 Existing weekday AM, PM (Case 1); 2025 without development weekday AM, PM (Case 2); 2025 with development weekday AM, PM (Case 3)
McKee Road and Taylor Road	Unsignalized	2025 without development weekday AM, PM (Case 2); 2025 with development weekday AM, PM (Case 3)
McKee Road and Brown Street	Unsignalized	2025 without development weekday AM, PM (Case 2); 2025 with development weekday AM, PM (Case 3)
Saulsbury Rd (Kent Road 156) and Forrest Ave (Kent Road 51)	Signalized	2020 Existing weekday AM, PM (Case 1); 2025 without development weekday AM, PM (Case 2); 2025 with development weekday AM, PM (Case 3)

McKee Road and Gemstone Boulevard / Site Access A

If this intersection remains unsignalized, it experiences LOS deficiencies in the weekday AM, PM and Saturday midday peak hours for 2025 conditions without and with the proposed development. Major LOS F delays and long queues would be present on both side street approaches. The projected LOS deficiencies would be resolved by installing a signal at this intersection when warranted, as described below in Item Nos. 2 and 3. Signal warrants are satisfied at full build-out of the proposed development.

McKee Road and College Road

This signalized intersection experiences LOS deficiencies in the PM peak hour for 2025 conditions without and with the proposed development. Given that the intersection is already signalized and has separate left-turn lanes on every approach, the only realistic improvement is to add a right-turn lane on the westbound approach, as described below in Item No. 4. While this improvement will not completely resolve the projected LOS deficiencies, it will reduce delays at the intersection. The major improvements required to fully correct the LOS deficiencies at this intersection (i.e.,

widening McKee Road to provide two through lanes in both directions) are not considered a reasonable developer improvement project.

McKee Road and Old Forge Road

This unsignalized intersection experiences LOS deficiencies in the weekday AM and PM peak hour for 2020 existing conditions and during 2025 conditions without and with the proposed development. All LOS deficiencies would occur on the eastbound Old Forge Road approach. A new traffic signal at this location would be neither desirable nor warranted, and because the neighborhood served by Old Forge Road also has a connection to Walker Road, we do not recommend any improvements be implemented by the developer at this intersection.

McKee Road and Taylor Road

This unsignalized intersection experiences LOS deficiencies in the AM and PM peak hour for 2025 conditions without and with the proposed development. All LOS deficiencies would occur on the westbound Taylor Road approach. A new traffic signal at this location would be neither desirable nor warranted, and because the side street volumes are very low and the neighborhood served by Taylor Road also has a connection to Walker Road, we do not recommend any improvements be implemented by the developer at this intersection.

McKee Road and Brown Street

This unsignalized intersection experiences LOS deficiencies in the AM and PM peak hour for 2025 conditions without and with the proposed development. All LOS deficiencies would occur on the westbound Brown Street approach. A new traffic signal at this location would be neither desirable nor warranted, and because the side street volumes are very low and the neighborhood served by Brown Street also has a connection to Walker Road, we do not recommend any improvements be implemented by the developer at this intersection.

Saulsbury Road and Forrest Avenue

This signalized intersection experiences LOS deficiencies in the weekday AM and PM peak hour for 2020 existing conditions and during 2025 conditions without and with the proposed development. It is anticipated that the projected LOS deficiencies would be resolved by the DelDOT's HEP KC, SR 8 and SR 15 Intersection Improvements Project, which will add a second through lane to the northbound and southbound Saulsbury Road approaches. The developer should make an equitable share contribution toward the DelDOT project, as described in Item No. 6.

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 shall improve the State-maintained road(s) on which they front (McKee 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 on McKee Road. The proposed configuration is shown in the table below. This proposed site driveway should be constructed directly across from existing Gemstone Boulevard.

Approach	Existing Configuration	Proposed Configuration
Eastbound Gemstone Boulevard	One shared left/right-turn lane	One shared left/through/right-turn lane
Westbound Site Access A	Approach does not exist	One shared left-turn/through lane and one right-turn lane
Northbound McKee Road	One shared left-turn/through lane and one bypass lane	One left-turn lane, one through lane, and one right-turn lane
Southbound McKee Road	One through lane and one right-turn lane	One left-turn lane, one through lane, and one right-turn lane

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

Approach	Left-Turn Lane	Right-Turn Lane
Eastbound Gemstone Boulevard	N/A	N/A
Westbound Site Access A	N/A	150 feet *
Northbound McKee Road	220 feet **	290 feet **
Southbound McKee Road	245 feet **	190 feet **

* Initial turn-lane length based on storage length per queuing analysis.

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

3. The developer should enter into a traffic signal agreement with DelDOT for design and construction of a traffic signal for the intersection of McKee Road and Gemstone Boulevard / Proposed Site Access A. 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 on the design details and implementation of the traffic signal. The agreement should provide for installation and activation of the signal at DelDOT's discretion.

4. The developer should coordinate with DelDOT regarding an equitable share contribution toward planned improvements at the signalized intersection of McKee Road and College Road, which are being led by the developer of a planned convenience store with gasoline pumps to be located on the northeast corner of that intersection. The planned improvements would modify the intersection by adding a separate right-turn lane on the westbound College Road approach. This westbound right-turn lane is initially recommended to be 175 feet in length (excluding taper), although DelDOT's Development Coordination Section will determine final turn-lane length and design details. Note that the addition of a right-turn lane on the westbound College Road approach will require modification/relocation of the existing light pole, pedestrian signal pole, and ADA curb ramp on the northeast corner of the intersection.

As the addition of traffic generated by the McKee Road Apartments development would increase the 95th percentile queue length in the proposed westbound right-turn lane by approximately 25% (during the critical future PM peak hour, compared to future conditions without McKee Road Apartments traffic), the amount of the developer's contribution should be 25% of the total cost to design and construct the separate westbound right-turn lane.

5. The developer should enter into a traffic signal agreement with DelDOT for the intersection of McKee Road and College Road, in association with the physical improvements described in Item No. 4. The agreement should include pedestrian signals, crosswalks, interconnection, and ITS equipment such as CCTV cameras at DelDOT's discretion.
6. The developer should coordinate with DelDOT regarding an equitable share contribution toward DelDOT's HEP KC, SR 8 and SR 15 Intersection Improvements Project. The amount of the contribution should be determined through coordination with DelDOT's Development Coordination Section.
7. The following bicycle, pedestrian, and transit improvements should be included:
 - a. Per the DelDOT Development Coordination Manual section 5.2.9.2, bicycle lanes are required where right turn lanes are being installed. Exceptions can be considered through the design deviation process.
 - 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 McKee Road.
- f. Within the easement along the McKee Road 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. The shared-use path should be constructed from the proposed site access to the southern edge of the site frontage. At the southern property boundary, 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 should coordinate with DelDOT's Development Coordination Section to determine the details of the shared-use path connection at the southern property boundary.
- 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 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 McKee Road and to the proposed signalized intersection of McKee Road and Gemstone Boulevard / Proposed Site Access A.
- i. A pedestrian connection between the proposed development and the Emerald Pointe neighborhood directly across McKee Road must be provided in the form of a crosswalk with pedestrian signals at the proposed signalized intersection of McKee Road and Gemstone Boulevard / Proposed Site Access A.
- j. The developer should coordinate with DelDOT regarding a possible direct pedestrian connection between the proposed site and North Dover Elementary School located south of the site. Existing site and environmental conditions may not allow for such a connection to be feasible.
- k. Where internal sidewalks are located alongside of parking spaces, a buffer should be added to prevent vehicular overhang onto the sidewalk.



1. The developer should coordinate with the Delaware Transit Corporation (DTC) regarding the possibility of including two bus stops to be located within the site frontage along McKee Road (one toward the southern end of the frontage and one toward the northern end). If bus stops are included, then sidewalks should also be constructed to connect the bus stops to the retail and residential locations within the site. The developer should coordinate with DTC and DelDOT regarding details of these bus stops and any associated accommodations.

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: December 2020

Prepared by: Becker Morgan Group, Inc.

Prepared for: LC Management

Tax parcel: 2-05-06700-02-5700-00001

Generally consistent with DelDOT's Development Coordination Manual: Yes

Project Description and Background

Description: The proposed McKee Road residential development consists of 384 units of mid-rise multi-family housing and a 30,000 square-foot shopping center square feet of retail space.

Location: The site is located on the east side of McKee Road (Kent Road 156), and southeast of Scarborough Road (Kent Road 294), opposite the intersection of Scarborough Road and McKee Road, in the City of Dover, Kent County. A site location map is included on page 9.

Amount of land to be developed: approximately 72.4 acre parcel

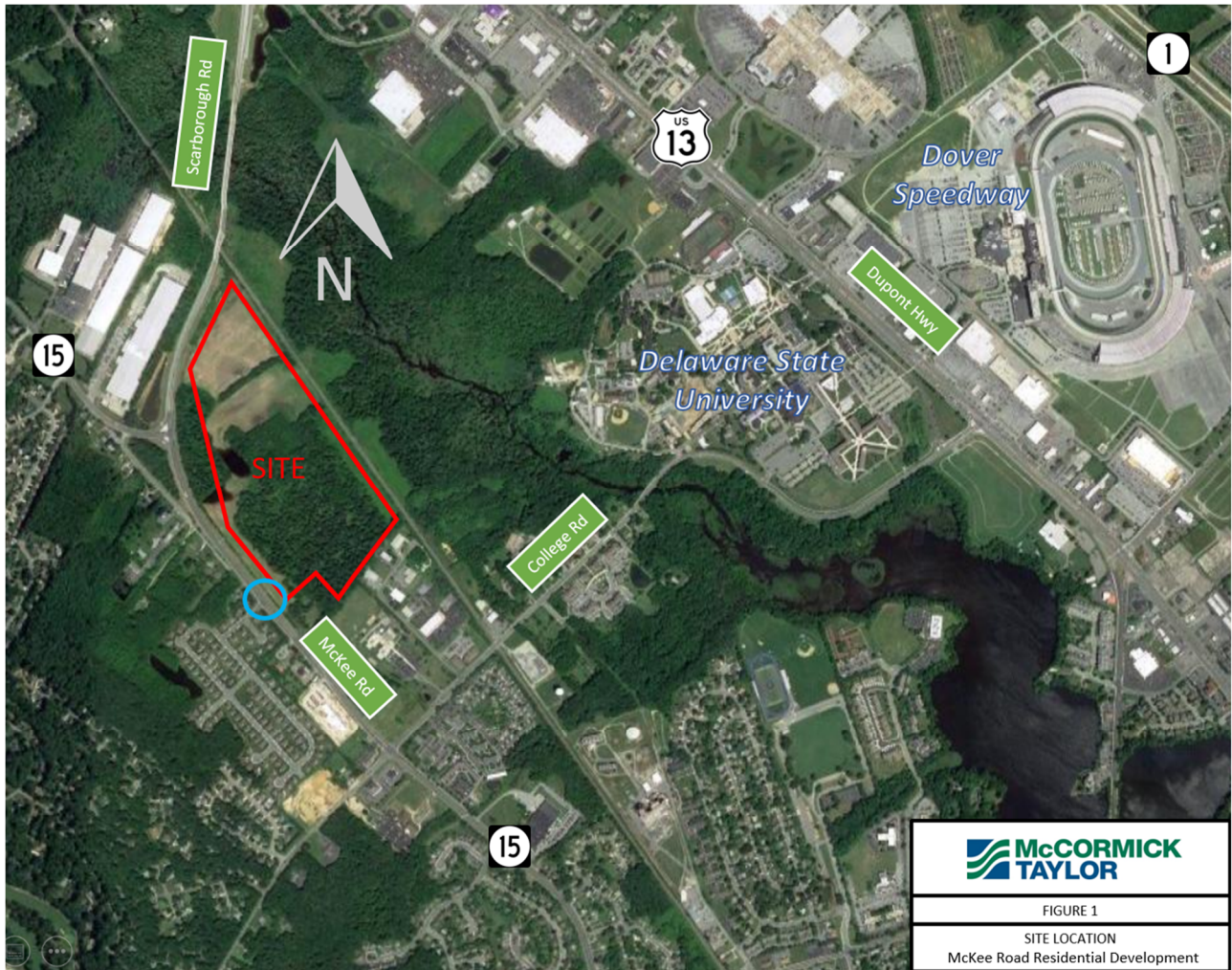
Land use approval(s) needed: Subdivision approval. The land is currently split-zoned as C2-A (Limited Central Commercial) and RG-2 (General Residence), and the developer does not plan to rezone the land.

Proposed completion year: 2025

Proposed access locations: One access point is proposed on McKee Road opposite Gemstone Boulevard.

Daily Traffic Volumes (per DelDOT Traffic Summary 2019):

- 2019 Average Annual Daily Traffic on McKee Road: 21,638 vehicles/day



2015 Delaware Strategies for State Policies and Spending

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

The proposed McKee Road Apartments 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 McKee Road Apartments development falls within Investment Level 1 and is to be developed as a residential and commercial site. The proposed development is consistent with the character of Investment Level 1. It is therefore concluded that 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's Comprehensive Plan Future Land Use Map currently indicates that the proposed McKee Road Development site was not classified as within the boundaries of the City of Dover at the time the map was created. This parcel was recently annexed into the City. However, the Comprehensive Plan does identify the parcel as a potential Annexation Area with a potential Land Use of "Mixed Use". Also, it is known that the land is currently split-zoned as C2-A (Limited Central Commercial) and RG-2 (General Residence) in the City of Dover.

Proposed Development's Compatibility with Comprehensive Plan:

The proposed development appears to comply with the City of Dover's Comprehensive Plan. The McKee Road Apartments development (residential and commercial development) generally aligns with both the anticipated Future Land Use and the zoning of the City of Dover.

Relevant Projects in the DelDOT Capital Transportation Program

Currently, there is one active DelDOT project within the study area: *HEP KC, SR 8 and SR 15 Intersection Improvements* (State Project No. T201500201). This project involves the signalized intersection of Forrest Avenue (Kent Road 51) 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 2021.

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:

- 384 units of mid-rise multi-family housing (ITE Land Use Code 221)
- 30,000 square-foot shopping center (ITE Land Use Code 820)

Table 1
MCKEE ROAD APARTMENTS PEAK HOUR TRIP GENERATION

Land Use	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour		
	In	Out	Total	In	Out	Total	In	Out	Total
384 Multi-Family Mid Rise	33	95	128	98	63	161	82	86	168
Internal Capture	-1	-1	-2	-30	-11	-41	-30	-12	-42
External Trips	32	94	126	68	52	120	52	74	126
Pass-By Trips	0	0	0	0	0	0	0	0	0
Primary Trips	32	94	126	68	52	120	52	74	126
30,000 SF Shopping Center	103	64	167	107	116	223	124	115	239
Internal Capture	-1	-1	-2	-11	-30	-41	-12	-30	-42
External Trips	102	63	165	96	86	182	112	85	197
Pass-By Trips	0	0	0	-33	-29	-62	-29	-22	-51
Primary Trips	102	63	165	63	57	120	83	63	146
TOTAL TRIPS	134	157	291	164	138	302	164	159	323

Overview of TIS

Intersections examined:

- 1) Gemstone Boulevard / Site Access & McKee Road
- 2) Scarborough Road & McKee Road
- 3) Scarborough Road & Crawford Carroll Avenue (Kent Road 294A) / South Delaware Tech Drive
- 4) Scarborough Road & US Route 13
- 5) McKee Road & College Road (Kent Road 99)
- 6) McKee Road & Old Forge Drive

- 7) McKee Road & Taylor Drive
- 8) McKee Road & Brown Street
- 9) McKee Road & Walker Road (Kent Road 70) / Walker Road (Kent Road 157)
- 10) Saulsbury Road (Kent Road 156) & Forrest Avenue (Kent Road 51)

Conditions examined:

- 1) 2020 existing (Case 1)
- 2) 2025 without McKee Road Apartments (Case 2)
- 3) 2025 with McKee Road Apartments (Case 3)

Peak hours evaluated: Weekday morning and evening and Saturday mid-day peak hours

Committed developments considered:

- 1) 1436 New Burton Road (635,000 square-foot business park)
- 2) Eden Hill (324 apartments, 217 townhouses, 110 duplexes, 88 single-family detached houses, 153,380 square feet of commercial space, 149,600 square feet of medical office space, 65,000 square-foot skilled nursing facility)
- 3) Dunkin' Donuts Shopping Center (33,996 square-foot shopping center)
- 4) Stonebrook East Subdivision (255 Multi-family Mid-Rise Housing Units)
- 5) Stonebrook West Subdivision (89 Single Family Detached Units and 110 Multi-family Mid-Rise Housing Units)
- 6) Maidstone (191 Senior Adult Detached Housing Units)

Intersection Descriptions

1) Gemstone Boulevard / Site Access & McKee Road

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

Eastbound Approach: (Gemstone Boulevard) existing one shared left-turn/right-turn lane; proposed one shared left-turn/through/right-turn lane, stop control

Westbound Approach: (Site Access) proposed one left-turn lane; proposed one shared through/right-turn lane

Northbound Approach: (McKee Road) existing one shared left-turn/through lane, one bypass lane; proposed one left-turn lane, one through lane, one bicycle lane, and one right turn lane

Southbound Approach: (McKee Road) existing one through lane and one right-turn lane; proposed one left-turn lane, one through lane, and one right-turn lane

2) Scarborough Road & McKee Road

Type of Control: existing signalized

Eastbound Approach: (McKee Road) one left-turn lane and one right-turn lane

Northbound Approach: (McKee Road) one left-turn lane and one through lane

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

- 3) **Scarborough Road & Crawford Carroll Avenue / South Delaware Tech Drive**
Type of Control: existing signalized
Eastbound Approach: (South Delaware Tech Drive) one left-turn lane, one through lane, and one right-turn lane
Westbound Approach: (Crawford Carroll Avenue) one left-turn lane, one through lane, one bicycle lane, and one right-turn lane
Northbound Approach: (Scarborough Road) one left-turn lane, two through lanes, and one right-turn lane
Southbound Approach: (Scarborough Road) one left-turn lane, one through lane, and one right-turn lane

- 4) **Scarborough Road & US Route 13**
Type of Control: existing signalized
Eastbound Approach: (Scarborough Road) two left-turn lanes, two through lanes, one right-turn lane
Westbound Approach: (Scarborough Road) two left-turn lanes, two through lanes, one right-turn lane
Northbound Approach: (US Route 13) two left-turn lanes, two through lanes, two right-turn lanes
Southbound Approach: (US Route 13) two left-turn lanes, two through lanes, one right-turn lane

- 5) **McKee Road & College Road**
Type of Control: existing signalized
Eastbound Approach: (College Road) one left-turn lane, one through lane, and one right-turn lane
Westbound Approach: (College Road) one left-turn lane and one through lane
Northbound Approach: (McKee Road) one left-turn lane, one through lane, and one right-turn lane
Southbound Approach: (McKee Road) one left-turn lane, one through lane, and one right-turn lane

- 6) **McKee Road & Old Forge Drive**
Type of Control: existing one-way stop (T-intersection)
Westbound Approach: (Old Forge Drive) one shared left-turn / one right-turn lane, stop control
Northbound Approach: (McKee Road) one left-turn lane and one through lane
Southbound Approach: (McKee Road) one through lane and one right-turn lane

- 7) **McKee Road & Taylor Drive**
Type of Control: existing one-way stop (T-intersection)
Westbound Approach: (Taylor Drive) one shared left-turn / right-turn lane, stop control
Northbound Approach: (McKee Road) one through lane and one right-turn lane
Southbound Approach: (McKee Road) one left-turn lane and one through lane

8) McKee Road & Brown Street

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

Westbound Approach: (Taylor Drive) one shared left-turn / right-turn lane, stop control

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

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

9) McKee Road & Walker Road

Type of Control: existing signalized

Eastbound Approach: (Walker Road) one left-turn, one through lane, one bicycle lane, and one right-turn lane

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

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

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

10) Saulsbury Road & Forrest Avenue

Type of Control: existing signalized

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

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

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

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

Safety Evaluation

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

Sight Distance: The study area generally consists of relatively flat roadways and there are few visual obstructions. Sight distance appears adequate throughout the study area. No problematic sight distance issues have been reported or indicated by crash data. 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: Based on the current DART Bus Stop Map, the Delaware Transit Corporation (DTC) does currently operate several fixed-route transit bus services in the area of the proposed McKee Road residential development. Route 302 runs along Scarborough Road / McKee Road / Saulsbury Road and the closest stop to the site is in both directions near the intersection of McKee Road and College Road.

Planned transit service: There are no additional transit amenities proposed at this time, but additional bus stops may be provided at the intersection of the site access and Gemstone Boulevard which would provide worthwhile connectivity to the development as well as the surrounding existing residential and retail to encourage other modes of transportation.

- Bus stops on southern and northern ends of the entrance in order to provide convenient locations for residents and retail locations.
- Companion stops across the street are needed to provide trips in both directions for those taking transit.
- Separated pedestrian pathways leading into the site from the shared use path are needed.

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

- US Route 13:
 - Connector Bicycle Route with bikeway
 - Over 5,000 vehicles daily
- Scarborough Road:
 - Not designated a connector bicycle route, but it does have an off-road trail bikeway
 - Over 5,000 vehicles daily
- McKee Road:
 - Statewide Bicycle Route with bikeway
 - Over 5,000 vehicles daily
- Saulsbury Road:
 - Statewide Bicycle Route with bikeway
 - Over 5,000 vehicles daily
- College Road:
 - Connector Bicycle Route with bikeway
 - Over 5,000 vehicles daily
- Walker Road:
 - Connector Bicycle Route with bikeway
 - Over 5,000 vehicles daily
- Forrest Avenue:
 - Regional Bicycle Route without a bikeway
 - Over 5,000 vehicles daily

There are existing sidewalks and exclusive pedestrian facilities in the immediate area of the proposed site entrance on McKee Road (on the opposite side of the road). There are also bicycle lanes at several of the study area intersections.

Planned bicycle and pedestrian facilities: The TIS indicates there will be accommodations for bicycles and pedestrians at the site entrance intersection. It is requested that a 10-foot-wide shared use path be provided across the frontage.

Previous Comments

In a review letter dated November 4, 2020, DelDOT indicated that the revised Preliminary TIS was acceptable as submitted.

It appears that all substantive comments from DelDOT'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 Becker Morgan 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 DelDOT 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 based on the turning movement counts. Future PHFs were determined as per the DelDOT Development Coordination Manual section 2.2.8.11.6.F.
- 4) For analyses of all intersections, the TIS and McCormick Taylor 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 McKee Road Traffic Impact Study – December 2020
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ¹ Two-Way Stop Control	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
McKee Road & Gemstone Boulevard / Site Access						
2020 Existing (Case 1)						
Eastbound Gemstone Blvd – Left/Right	D (30.9)	D (33.3)	C (21.0)	D (33.4)	E (35.9)	C (20.8)
Northbound McKee Rd – Left	B (10.0)	A (9.7)	A (9.1)	B (10.2)	A (9.9)	A (9.1)
2025 without McKee Road (Case 2)						
Eastbound Gemstone Blvd – Left/Right	F (50.0)	F (63.5)	E (37.0)	F (56.2)	F (68.7)	E (35.7)
Northbound McKee Rd – Left	B (10.9)	B (10.5)	B (10.1)	B (11.1)	B (10.8)	B (10.1)
2025 with McKee Road (Case 3)						
Eastbound Gemstone Blvd – Left/Right	F (147.7)	F (257.5)	F (97.1)	F (191.4)	F (383.9)	F (96.6)
Westbound Site Access – Left	F (1458)	F (1961)	F (984)	F (1772)	F (2565)	F (979.1)
Westbound Site Access – Right	C (17.0)	D (25.4)	C (17.1)	C (17.6)	D (27.7)	C (17.1)
Northbound McKee Rd – Left	B (10.9)	B (10.5)	B (10.1)	B (11.1)	B (10.7)	B (10.1)
Southbound McKee Rd – Left	B (10.4)	B (12.5)	B (10.5)	B (10.5)	B (13.0)	B (10.5)

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.

Table 3
Peak Hour Levels of Service (LOS)
Based on McKee Road Traffic Impact Study – December 2020
Prepared by Becker Morgan Group, Inc.

Signalized Intersection ²	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Saturday Mid-Day	Weekday AM	Weekday PM	Saturday Mid-Day
McKee Road & Scarborough Road						
2020 Existing (Case 1)	B (14.2)	B (12.9)	A (9.5)	C (24.0)	B (17.6)	B (14.7)
2025 without McKee Road (Case 2)	C (22.6)	C (20.3)	B (13.3)	C (31.2)	C (22.9)	B (18.5)
2025 with McKee Road (Case 3)	C (29.7)	C (30.5)	B (14.7)	C (34.9)	C (25.4)	C (20.1)

² 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 McKee Road Traffic Impact Study – December 2020
Prepared by Becker Morgan Group, Inc.

Signalized Intersection ³	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Saturday Mid-Day	Weekday AM	Weekday PM	Saturday Mid-Day
Scarborough Road & Crawford Carrol Ave / Del Tech Drive						
2020 Existing (Case 1)	B (12.8)	C (20.2)	B (17.4)	B (15.7)	C (23.3)	B (18.5)
2025 without McKee Road (Case 2)	B (13.3)	C (21.1)	B (16.4)	B (16.1)	C (24.8)	B (17.6)
2025 with McKee Road (Case 3)	B (13.5)	C (21.5)	B (16.4)	B (16.2)	C (25.4)	B (17.6)

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 5
Peak Hour Levels of Service (LOS)
Based on McKee Road Traffic Impact Study – December 2020
Prepared by Becker Morgan Group, Inc.

Signalized Intersection ⁴	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Saturday Mid-Day	Weekday AM	Weekday PM	Saturday Mid-Day
US Route 13 & Scarborough Road						
2020 Existing (Case 1)	D (39.5)	D (35.6)	C (23.9)	D (49.5)	D (46.6)	D (36.4)
2025 without McKee Road (Case 2)	D (43.4)	D (42.3)	C (30.3)	D (52.4)	D (52.5)	D (43.5)
2025 with McKee Road (Case 3)	D (44.5)	D (43.5)	C (31.1)	D (52.8)	D (53.1)	D (44.4)

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 6
Peak Hour Levels of Service (LOS)
Based on McKee Road Traffic Impact Study – December 2020
Prepared by Becker Morgan Group, Inc.

Signalized Intersection ⁵	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Saturday Mid-Day	Weekday AM	Weekday PM	Saturday Mid-Day
McKee Road & College Road						
2020 Existing (Case 1)	C (30.4)	D (46.3)	C (32.9)	C (28.3)	D (45.6)	C (31.1)
2025 without McKee Road (Case 2)	D (43.1)	E (73.8)	D (37.2)	D (38.2)	E (75.4)	C (34.9)
2025 without McKee Road (Case 2) <i>With separate WB right-turn lane</i>	N/A	N/A	N/A	C (34.4)	D (50.7) ⁶	C (32.4)
2025 with McKee Road (Case 3)	D (51.0)	F (89.0)	D (40.1)	D (45.0)	F (90.0)	D (37.9)
2025 with McKee Road (Case 3) <i>With Optimized Signal Timings</i>	D (45.6)	E (77.1)	D (40.1)	D (40.3)	E (78.6)	D (35.6)
2025 with McKee Road (Case 3) <i>With separate WB right-turn lane</i>	D (43.3)	E (58.3)	D (37.5)	D (38.8)	E (58.6) ⁷	C (34.2)

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.

⁶ In Case 2 PM peak hour, the 95th percentile queue length in the proposed westbound right turn lane would be approximately 5 vehicles (125').

⁷ In Case 3 PM peak hour, the 95th percentile queue length in the proposed westbound right turn lane would be just over 6 vehicles (150').

Table 7
Peak Hour Levels of Service (LOS)
Based on McKee Road Traffic Impact Study – December 2020
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	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
McKee Road & Old Forge Drive						
2020 Existing (Case 1)						
Eastbound Old Forge Dr – Left	F (76.7)	F (76.1)	-	F (76.7)	F (76.1)	-
Eastbound Old Forge Dr – Right	C (18.2)	C (15.9)	-	C (18.2)	C (19.4)	-
Northbound McKee Rd – Left	B (10.3)	B (10.0)	-	B (10.3)	B (10.0)	-
2025 without McKee Road (Case 2)						
Eastbound Old Forge Dr – Left	F (182.6)	F (202.9)	-	F (182.6)	F (202.5)	-
Eastbound Old Forge Dr – Right	C (22.8)	C (19.4)	-	C (22.8)	C (19.4)	-
Northbound McKee Rd – Left	B (11.4)	B (11.1)	-	B (11.4)	B (11.1)	-
2025 with McKee Road (Case 3)						
Eastbound Old Forge Dr – Left	F (245.4)	F (253.8)	-	F (245.4)	F (253.1)	-
Eastbound Old Forge Dr – Right	C (24.6)	C (20.3)	-	C (24.6)	C (20.3)	-
Northbound McKee Rd – Left	B (11.8)	B (11.3)	-	B (11.8)	B (11.3)	-

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 McKee Road Traffic Impact Study – December 2020
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	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
McKee Road & Taylor Drive						
2020 Existing (Case 1)						
Westbound Taylor Dr – Left/Right	D (29.3)	D (33.1)	-	D (29.3)	D (33.1)	-
Southbound McKee Rd – Left	A (9.6)	B (10.2)	-	A (9.6)	B (10.2)	-
2025 without McKee Road (Case 2)						
Westbound Taylor Dr – Left/Right	E (44.8)	F (58.4)	-	E (44.8)	F (58.4)	-
Southbound McKee Rd – Left	B (10.3)	B (11.6)	-	B (10.3)	B (11.6)	-
2025 with McKee Road (Case 3)						
Westbound Taylor Dr – Left/Right	F (52.2)	F (66.4)	-	F (52.2)	F (66.4)	-
Southbound McKee Rd – Left	B (10.6)	B (11.9)	-	B (10.6)	B (11.9)	-

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 McKee Road Traffic Impact Study – December 2020
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ¹⁰ One-Way Stop (T-Intersection)	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
McKee Road & Brown Street						
2020 Existing (Case 1)						
Westbound Brown St – Left/Right	D (29.3)	D (33.1)	-	D (29.3)	D (33.1)	-
Southbound McKee Rd – Left	A (9.6)	B (10.2)	-	A (9.6)	B (10.2)	-
2025 without McKee Road (Case 2)						
Westbound Brown St – Left/Right	E (44.8)	F (58.4)	-	E (44.8)	F (58.4)	-
Southbound McKee Rd – Left	B (10.3)	B (11.6)	-	B (10.3)	B (11.6)	-
2025 with McKee Road (Case 3)						
Westbound Brown St – Left/Right	F (52.2)	F (66.4)	-	F (52.2)	F (66.4)	-
Southbound McKee Rd – Left	B (10.6)	B (11.9)	-	B (10.6)	B (11.9)	-

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.

Table 10
Peak Hour Levels of Service (LOS)
Based on McKee Road Traffic Impact Study – December 2020
Prepared by Becker Morgan Group, Inc.

Signalized Intersection ¹¹	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Saturday Mid-Day	Weekday AM	Weekday PM	Saturday Mid-Day
McKee Road & Walker Road						
2020 Existing (Case 1)	C (28.5)	C (32.2)	-	C (30.2)	C (29.0)	-
2025 without McKee Road (Case 2)	D (37.1)	D (51.5)	-	D (35.6)	D (39.3)	-
2025 with McKee Road (Case 3)	D (40.8)	E (57.7)	-	D (36.9)	D (42.6)	-

¹¹ 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 McKee Road Traffic Impact Study – December 2020
Prepared by Becker Morgan Group, Inc.

Signalized Intersection ¹²	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Saturday Mid-Day	Weekday AM	Weekday PM	Saturday Mid-Day
Saulsbury Road & Forrest Avenue						
2020 Existing (Case 1)	E (73.0)	F (121.0)	-	E (64.1)	F (98.0)	-
2025 without McKee Road (Case 2)	F (109.6)	F (176.4)	-	F (109.2)	F (152.6)	-
2025 with McKee Road (Case 3)	F (115.2)	F (180.8)	-	F (115.2)	F (156.4)	-

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.