



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

NICOLE MAJESKI
SECRETARY

October 12, 2023

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

Dear Mr. Christopher Duke,

The enclosed Traffic Impact Study (TIS) review letter for the **Beiser Property** (Tax Parcels: (Tax Parcel: 7-00-09500-01-2700-00001) residential development has been completed under the responsible charge of a registered professional engineer whose firm is authorized to work in the State of Delaware. They have found the TIS to conform to DelDOT's Development Coordination Manual and other accepted practices and procedures for such studies. DelDOT accepts this letter and concurs with the recommendations. If you have any questions concerning this letter or the enclosed review letter, please contact me at Annamaria.Furmato@delaware.gov.

Sincerely,

Annamaria Furmato
TIS Group Project Engineer

AF:km

Enclosures

cc with enclosures: Bill Kriss, Beiser Group, LLC
Johnathan Falkowski, Becker Morgan Group, Inc.
Kris Connelly, Kent County Department of Planning Services
Michele Green, Kent County Department of Planning Services
Joanne M. Arellano, Johnson, Mirmiran, & Thompson, Inc.
Mir Wahed, Johnson, Mirmiran, & Thompson, Inc.
DelDOT Distribution

DelDOT Distribution

Brad Eaby, Deputy Attorney General
Shanté Hastings, Deputy Secretary / Director, Transportation Solutions (DOTS)
Mark Luszcz, Deputy Director, DelDOT Traffic, DOTS
Michael Simmons, Assistant Director, Project Development South, DOTS
Peter Haag, Chief Traffic Engineer, Traffic, DOTS
Wendy Carpenter, Traffic Calming & Subdivision Relations Manager, DelDOT Traffic, DOTS
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Matthew Lichtenstein, Central District Engineer, Central District
Steve McCabe, Central District Public Works Manager, Central District
Jared Kauffman, Service Development Planner, Delaware Transit Corporation
Tremica Cherry, Service Development Planner, Delaware Transit Corporation
Pamela Steinebach, Director, Planning
Todd Sammons, Assistant Director, Development Coordination
Wendy Polasko, Subdivision Engineer, Development Coordination
Will Mobley, Acting Kent County Review Coordinator, Development Coordination
Josh Schwartz, Subdivision Manager, Development Coordination
Anthony Aglio, Planning Supervisor, Statewide & Regional Planning
Sireen Muhtaseb, TIS Group Manager, Development Coordination



October 10, 2023

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

RE: Agreement No. 1946F
Traffic Impact Study Services
Task No. 4A Subtask 18A – Beiser Property

Dear Ms. Furmato:

McCormick Taylor has completed its review of the Traffic Impact Study (TIS) for the Beiser Property development prepared by Becker Morgan Group, Inc., dated May 2023. Becker Morgan Group, Inc. prepared the report in a manner generally consistent with DelDOT's Development Coordination Manual.

The TIS evaluates the impacts of the proposed Beiser Property development, proposed to be located on the northwest corner of the intersection of S. State Street (Kent Road 27) and Locust Grove Road (Kent Road 326), and southeast of Sorghum Mill Road (Kent Road 26), in Kent County, Delaware. The proposed development would consist of 308 single-family detached houses. Two full access points are proposed, one along S. State Street and one along Sorghum Mill Road. This TIS also evaluates a potential third access point on Locust Grove Road. Construction is expected to be complete by 2031.

The subject land is located on an approximately 203.41-acre parcel. The land is currently split zoned as BG (General Business) and AC (Agricultural Conservation), and the developer is not proposing to rezone the land.

Currently, there are no active DelDOT projects within the study area. The future Magnolia Transportation Improvement District (TID) is currently under development between DelDOT, Kent County, and the Town of Magnolia. The future Magnolia TID surrounds the proposed development and includes multiple study intersections. A TID is a planning concept that seeks to proactively align transportation infrastructure spending and improvements with land use projections and future development within the designated district. Certain intersection improvements to be identified as part of the future Magnolia TID would typically require contributions from developers within the TID. Presently, DelDOT and the County are still working toward establishing the TID, but when and if that is done, it may be appropriate for the developer to exchange some of the obligations identified in this letter for an obligation to contribute to the TID. The possibility of the Beiser Property having an obligation to contribute to the future Magnolia TID would depend in part on the timing of approval of plans for this development versus the timing of formal establishment of the TID. The TID is expected to be operational in early to mid-2024.



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>
4 - S. State Street and Locust Grove Road	Unsignalized	2031 without development PM (Case 2) 2031 with development PM (Case 3a, 3b, and 3c)
5 - S. State Street and Banning Road	Unsignalized	2031 without development AM (Case 2) 2031 with development AM and PM (Case 3a, 3b, and 3c)
12 - S. State Street and Rising Sun Road/ Middle School Entrance	Unsignalized	2022 existing AM and PM (Case 1) 2031 without development AM and PM (Case 2) 2031 with development AM and PM (Case 3a, 3b, and 3c)
17 - S. State Street and N. Old Mill Road	Unsignalized	2031 with development PM (Case 3a, 3b, and 3c)
18 - Rising Sun Road and Walnut Shade Road/ Voshells Mill Star Hill Road / Sorghum Mill Road	Signalized	2022 existing PM (Case 1) 2031 without development PM (Case 2) 2031 with development AM and PM (Case 3a, 3b, and 3c)

S. State Street and Locust Grove Road (Table 5, Page 24)

This unsignalized intersection is expected to experience LOS deficiencies during the PM peak hour in Case 2, Case 3a, Case 3b, and Case 3c. The stop controlled southbound approach is expected to operate at LOS F with 69.8 seconds of delay and queues over 90 feet long in Case 3a. The developer found that a traffic signal is not warranted at the intersection and noted that a roundabout would mitigate the LOS deficiency. However, the developer has recommended entering into a signal agreement with DelDOT because of the anticipated right-of-way acquisitions associated with a roundabout. It should be noted that the right-of-way required for a roundabout would likely be similar to that of a traffic signal with the necessary turn lanes. As such, we recommend converting the intersection to a three-leg single-lane roundabout as described below in Item No. 4.

S. State Street and Banning Road (Table 6, Page 25)

This unsignalized intersection is expected to experience LOS deficiencies during the AM peak hour in Case 2, and the AM and PM peak hours in Case 3a, Case 3b, and Case 3c. The stop controlled eastbound approach is expected to operate at LOS F with 61.5 seconds of delay and queues over 87 feet long in all Case 3 scenarios in the AM peak hour. The developer found that a traffic signal is not warranted at the intersection and noted that a roundabout would mitigate the LOS deficiency. However, the developer has recommended entering into a signal agreement with DelDOT because of the right-of-way acquisitions associated with a roundabout. It should be noted that the right-of-way required for a roundabout would likely be similar to that of a traffic signal with the necessary turn lanes. As such, we recommend converting the intersection to a four-leg single-lane roundabout as described below in Item No. 5.

S. State Street and Rising Sun Road / Middle School Entrance (Table 13, Page 33)

This unsignalized intersection is expected to experience LOS deficiencies during both peak hours and all Cases. The stop controlled westbound approach is expected to operate at LOS F with 225.0 seconds of delay and queues less than one vehicle long during the PM peak hour in Case 3a. The delay on the westbound approach is resulting from two left turning vehicles. It should be noted that if the eastbound left-turn is restricted, the intersection is still expected to have LOS deficiencies. The side street right-turns are yield-controlled with dedicated acceleration lanes. If the right-turn volume is removed from the approaches, there are 8 westbound vehicles and 13 eastbound vehicles in the Case 3 PM peak hour. According to the DelDOT Development Coordination Manual section 2.2.8.12.5, where the Future with Project (FWP) volume on a stop-controlled approach would be 10 vph or less, mitigation is not required. As such, we recommend that the developer make no improvements at this intersection.

S. State Street and N. Old Mill Road (Table 18, Page 39)

This unsignalized intersection is expected to experience LOS deficiencies during the PM peak hour in Case 3a, Case 3b, and Case 3c. The stop controlled eastbound approach is expected to operate at LOS E with 38.4 seconds of delay and queues over 35 feet long in all Case 3 scenarios in the PM peak hour. The developer did not find an LOS deficiency at this intersection and did not recommend mitigation. Although a Preliminary Traffic Signal Justification Study (TSJS) has not been conducted at this location, the warrants for a traffic signal are not expected to be met at this intersection based on the traffic volumes presented in the TIS. Considering the marginal LOS deficiency, the distance from the proposed development, and construction and right-of-way challenges, the developer is not asked to make mitigating improvements at this intersection.

Rising Sun Road and Walnut Shade Road / Voshells Mill Star Hill Road / Sorghum Mill Road (Table 19, Page 40)

This signalized intersection is expected to experience LOS deficiencies during the PM peak hour in Case 1 and Case 2 and during both AM and PM peak hours in Case 3a, Case 3b, and Case 3c. During the PM peak hour in all Case 3 scenarios, the intersection is expected to operate at LOS F with 94.3 seconds of delay and queues over 543 feet on the westbound Sorghum Mill Road approach. The developer recommends signal timing improvements as mitigation. However, McCormick Taylor was not able to replicate a similar reduction in delay without geometric improvements at the intersection. To mitigate the deficiencies, we recommend the construction of a 250-foot left-turn lane on westbound Sorghum Mill Road, a 250-foot left-turn lane on eastbound Voshells Mill Star Hill Road, and a 250-foot left-turn lane on northbound Walnut Shade Road.

SR 10 and S. State Street (Table 17, Page 38)

The developer found that this intersection is expected to experience LOS deficiencies in Case 2 and all Case 3 scenarios. McCormick Taylor did not find an LOS deficiency. The developer has recommended signal timing improvements and extending the westbound SR 10 left-turn lane to mitigate signal delay and accommodate queuing. However, McCormick Taylor did not calculate queuing beyond the available storage length. We recommend that the developer make no improvements at this intersection.

Should Kent 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, unless a Design Deviation is requested and approved by the Department. 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. The following items should be implemented at the same time as site construction once all agency approvals and permits are secured and completed in accordance with DelDOT’s Standards and Specifications.

1. The developer shall improve the State-maintained road(s) on which they front (S. State Street, Sorghum Mill Road, and Locust Grove Road), within the limits of their frontage, to meet DelDOT’s standards for their Functional Classification as found in Section 1.1 of the Development Coordination Manual and elsewhere therein. The improvements shall include both directions of travel, regardless of whether the developer’s lands are on one or both sides of the road. Frontage is defined in Section 1 of the Development Coordination Manual, which states “This length includes the length of roadway perpendicular to lines created by the projection of the outside parcel corners to the roadway.” Questions on or appeals of this requirement should be directed to the DelDOT Subdivision Review Coordinator in whose area the development is located.
2. The developer should construct the full-movement Site Entrance A on S. State Street. The proposed configuration is shown in the table below.

Approach	Current Configuration	Approach	Proposed Configuration
Eastbound	Approach does not exist	Eastbound	No Change
Westbound	Approach does not exist	Westbound Site Entrance A	One shared left/right turn lane. Stop Control.
Northbound S. State Street	One through lane	Northbound S. State Street	One through lane and one right turn lane.
Southbound S. State Street	One through lane	Southbound S. State Street	One left turn lane and one through lane.

At the proposed Site Entrance A intersection, separate turn lanes are warranted on both S. State Street approaches based on DelDOT’s *Auxiliary Lane Worksheet*. Initial recommended minimum turn-lane lengths (excluding tapers) include a 120-foot left-turn lane on southbound S. State Street and a 240-foot right-turn lane on northbound S. State Street. 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.

- The developer should construct the full-movement Site Entrance C on Sorghum Mill Road. The proposed configuration is shown in the table below.

Approach	Current Configuration	Approach	Proposed Configuration
Eastbound Sorghum Mill Road	One through lane	Eastbound Sorghum Mill Road	One through lane and one right turn lane
Westbound Sorghum Mill Road	One through lane	Westbound Sorghum Mill Road	One left turn lane and one through lane
Northbound	Approach does not exist	Northbound Site Entrance C	One shared left/right turn lane. Stop Control.
Southbound	Approach does not exist	Southbound	No Change

At the proposed Site Entrance C intersection, separate turn lanes are warranted on both Sorghum Mill Road approaches based on DelDOT’s *Auxiliary Lane Worksheet*. Initial recommended minimum turn-lane lengths (excluding tapers) include a 135-foot left-turn lane on westbound Sorghum Mill Road and a 190-foot right-turn lane on eastbound Sorghum Mill Road. 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.

- The developer should design and construct a single-lane roundabout at the intersection of S. State Street and Locust Grove Road. The developer should coordinate with DelDOT’s Subdivision Section to determine details regarding design, schedule and construction of the roundabout.
- The developer should design and construct a single-lane roundabout at the intersection of S. State Street and Banning Road. The developer should coordinate with DelDOT’s Subdivision Section to determine details regarding design, schedule and construction of the roundabout.
- Regarding the intersection of Rising Sun Road and Walnut Shade Road / Voshells Mill Star Hill Road / Sorghum Mill Road, the developer should design and construct a 250-foot left-turn lane on westbound Sorghum Mill Road, a 250-foot left-turn lane on eastbound Voshells Mill Star Hill Road, and a 250-foot left-turn lane on northbound Walnut Shade Road. In the event that the Magnolia TID is established before this development moves

forward, it may be advantageous for the developer to contribute to the TID in place of this recommendation.

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.
 - 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. A minimum 15-foot wide permanent easement from the edge of the right-of-way should be dedicated to DelDOT within the site frontages on Locust Grove Road, S. State Street and Sorghum Mill Road. Within the easement, a minimum of a 5-foot wide sidewalks should be constructed. The sidewalks should meet AASHTO and ADA standards and should have a minimum of a five-foot buffer from the roadway. At the property boundaries, the sidewalks 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 sidewalk design and connections/terminations at or before the boundaries of the property.
 - e. ADA compliant curb ramps and crosswalks should be provided at all pedestrian crossings, including all site entrances. Type 3 curb ramps are discouraged.
 - f. 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 the site frontages.
 - g. The developer should construct Type 2 (5' x 8') bus pads at the existing DART bus stops near site entrances on Sorghum Mill Road and S. State Street. These stops include 3089 and 3077 near Site Entrance A on S. State Street and stops 4094 and 4095 north of Site Entrance C on Sorghum Mill Road.
 - h. The developer should design and construct pedestrian crossings near the existing DART bus stops on Sorghum Mill Road and S. State Street to facilitate access to the DART stops. The location of the crossing should be determined through coordination with DelDOT's Development Coordination Section, DelDOT's Traffic Section, and



DTC. In doing so, if requested by DelDOT, the developer will need to conduct an analysis to determine what type of crossing treatment would be appropriate and should assume that the minimum pedestrian crossing volume threshold is met. The analysis must be based on guidance and worksheets found in NCHRP Report 562.

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 and constructability issues will be further addressed through DelDOT’s 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



Scope of Improvements Figure Beiser Property TIS

-  Proposed Site Entrance - Frontage improvements and turn lanes as described in the review letter.
-  Study Intersection - Improvements Recommended
-  Study Intersection - No Improvements

General Information

Report date: May 2023

Prepared by: Becker Morgan Group, Inc.

Prepared for: Beiser Group, LLC

Tax parcels: 7-00-09500-01-2700-00001

Generally consistent with DelDOT's Development Coordination Manual: Yes

Project Description and Background

Description: The proposed development would consist of 308 single-family detached houses. The development is proposed to be located on the northwest corner of the intersection of S. State Street (Kent Road 27) and Locust Grove Road (Kent Road 326), and southeast of Sorghum Mill Road (Kent Road 26), in Kent County, Delaware. A site location map is included on page 10.

Amount of land to be developed: An approximately 203.41-acre parcel.

Land use approval(s) needed: The land is currently split zoned as BG (General Business) and AC (Agricultural Conservation), and the developer is not proposing to rezone the land.

Proposed completion year: 2031

Proposed access locations: Two full access points are proposed, one along S. State Street and one along Sorghum Mill Road. This TIS also evaluates a potential third access point on Locust Grove Road. Discussions on whether to allow access on Sorghum Mill Road and whether to require access on Locust Grove Road are ongoing at this time.

Average Daily Traffic Volumes (per DelDOT Traffic Summary 2022):

- S. State Street: 12,110 vehicles/day
- Sorghum Mill Road: 3,073 vehicles/day
- Locust Grove Road: 644 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 Beiser Property development is located within Investment Levels 1 and 2.

Investment Level 1

Investment Level 1 Areas are often municipalities, towns, or urban/urbanizing places in counties. Density is generally higher than in the surrounding areas. There are a variety of transportation opportunities available. Buildings may have mixed uses, such as a business on the first floor and apartments above.

In Investment Level 1 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. 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. These areas would be a prime location for designating "pre-permitted areas" to help steer development where the local government and citizens are most prepared to accept it.

Investment Level 2

This investment level has many diverse characteristics. These areas can be composed of less developed areas within municipalities, rapidly growing areas in the counties that have or will have public water and wastewater services and utilities, areas that are generally adjacent to or near Investment Level 1 Areas, smaller towns and rural villages that should grow consistently with their historic character, and suburban areas with public water, wastewater, and utility services. These areas have been shown to be the most active portion of Delaware's developed landscape. They serve as transition areas between Level 1 and the more open, less populated areas. They generally contain a limited variety of housing types, predominantly detached single-family dwellings.

In Investment Level 2, state investments and policies should support and encourage a wide range of uses and densities, promote other transportation options, foster efficient use of existing public and private investments, and enhance community identity and integrity.

Investments should encourage departure from the typical single-family-dwelling developments and promote a broader mix of housing types and commercial sites encouraging compact, mixed-use development where applicable. Overall, the State's intent is to use spending and management tools to promote well-designed development in these areas. Such development provides for a variety of housing types, user-friendly transportation systems, and provides essential open spaces and recreational facilities, other public facilities, and services to promote a sense of community. Investment Level 2 areas are prime locations for designating "pre-permitted areas."

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

The proposed Beiser Property development consists of approximately 308 single-family detached houses in an Investment Level 1 and 2 area. Investment Levels 1 and 2 are areas where growth is anticipated by local, county, and State plans in the near-term future. As such, the proposed

development appears to comply with the guidelines set forth in the 2020 “Strategies for State Policies and Spending”.

Comprehensive Plan

Kent County Comprehensive Plan:

(Source: Kent County Comprehensive Plan, September 2018)

The Kent County Comprehensive Plan Future Land Use Map indicates that the proposed Beiser Property site is within the designated “Growth Zone Overlay” and is planned for “Low Density Residential” land use.

Proposed Development’s Compatibility with Comprehensive Plan:

The proposed Beiser Property residential development project includes 308 single family detached houses on an approximately 203.41-acre parcel. The land is currently split zoned as BG (General Business) and AC (Agricultural Conservation), and the developer is not proposing to rezone the land. The 2018 Kent County Comprehensive plan indicates that the land is planned for “Low Density Residential” land use. It appears that the proposed Beiser Property residential development fits within the intended land use for this location.

Relevant Projects in the DelDOT Capital Transportation Program

Currently, there are no active DelDOT projects within the study area. The future Magnolia Transportation Improvement District (TID) is currently under development between DelDOT, Kent County, and the Town of Magnolia. The future Magnolia TID surrounds the proposed development and includes multiple study intersections. A TID is a planning concept that seeks to proactively align transportation infrastructure spending and improvements with land use projections and future development within the designated district. Certain intersection improvements to be identified as part of the future Magnolia TID would typically require contributions from developers within the TID. Presently, DelDOT and the County are still working toward establishing the TID but when and if that is done, it may be appropriate for the developer to exchange some of the obligations identified in this letter for an obligation to contribute to the TID. The possibility of the Beiser Property having an obligation to contribute to the future Magnolia TID would depend in part on the timing of approval of plans for this development versus the timing of formal establishment of the TID.

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:

- 308 Single-Family Detached Housing Units (ITE Land Use Code 210)

Table 1
BEISER PROPERTY PEAK HOUR TRIP GENERATION

Land Use	Size	Weekday AM Peak Hour			Weekday PM Peak Hour			Average Daily Trips (Weekday)		
		In	Out	Total	In	Out	Total	In	Out	Total
LUC 210: Single Family Detached Housing	308 Units	54	153	207	180	106	286	1420	1420	2840
TOTAL TRIPS		54	153	207	180	106	286	1420	1420	2840

Overview of TIS

Intersections examined:

- 1) Site Entrance A / S. State Street (Kent Road 27)
- 2) Site Entrance B / Locust Grove Road (Kent Road 362)
- 3) Site Entrance C / Sorghum Mill Road (Kent Road 26)
- 4) S. State Street / Locust Grove Road
- 5) S. State Street / Banning Road (Kent Road 366)
- 6) S. State Street / Ponderosa Drive (Kent Road 364)
- 7) Briarbush Road (Kent Road 367) / Banning Road
- 8) Locust Grove Road / Carolina Avenue / Water Edge Lane
- 9) Sorghum Mill Road (Kent Road 26) / Locus Grove Road
- 10) Sorghum Mill Road / Cypress Branch Road (Kent Road 363)
- 11) Delaware Route 10 / Sorghum Mill Road
- 12) S. State Street / Rising Sun Road (Kent Road 29) / Middle School Entrance
- 13) S. State Street / Sorghum Mill Road
- 14) S. State Street / Pleasant Hill Drive
- 15) S. State Street / Cool Spring Drive
- 16) Delaware Route 10 / S. State Street
- 17) S. State Street / N. Old Mill Road (Kent Road 355)
- 18) Rising Sun Road / Walnut Shade Road (Kent Road 30) / Voshells Mill Star Hill Road (Kent Road 360)
- 19) Rising Sun Road / S. Old Mill Road (Kent Road 355) / Steffens Boulevard
- 20) Walnut Shade Road / Briarbush Road
- 21) Voshells Mill Star Hill Road / Lochmeath Way (Kent Road 361)

Conditions examined:

- 1) 2022 Existing (Case 1)
- 2) 2031 No-Build (Case 2)
- 3) 2031 Build
 - a. Case 3a – with access on S. State Street and Locust Grove Road
 - b. Case 3b – with access on S. State Street and Sorghum Mill Road
 - c. Case 3c – with access on S. State Street, Locust Grove Road, and Sorghum Mill Road

Peak hours evaluated: Weekday morning and evening peak hours

Committed developments considered:

- 1) Patriots Crest (f.k.a. Berkshire) – 104 single-family detached houses (all units remain to be built).
- 2) Fifer Farm – 70 single-family detached houses (30 units remain to be built).
- 3) Magnolia Estates – 185 single-family detached houses (all units remain to be built).
- 4) Champions Club at Jonathan’s Landing – 306 single-family detached houses (20 units built).

Intersection Descriptions

1) Site Entrance A / S. State Street (Kent Road 27)

Type of Control: proposed minor stop-controlled intersection

Northbound Approach: (S. State Street) one through lane and one right-turn lane

Southbound Approach: (S. State Street) one left-turn lane and one through lane

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

2) Site Entrance B / Locust Grove Road (Kent Road 362)

Type of Control: proposed minor stop-controlled intersection

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

Eastbound Approach: (Locust Grove Road) one left-turn lane and one through lane (in case 3c, a bypass lane is proposed in place of a left-turn lane.)

Westbound Approach: (Locust Grove Road) one shared through lane and one right-turn lane

3) Site Entrance C / Sorghum Mill Road (Kent Road 26)

Type of Control: proposed minor stop-controlled intersection

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

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

Westbound Approach: (Sorghum Mill Road) one left-turn lane and one through lane

4) S. State Street / Locust Grove Road

Type of Control: minor stop-controlled intersection

Northbound Approach: (S. State Street) one through and one right-turn lane

Southbound Approach: (S. State Street) one shared left-turn/through lane

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

5) S. State Street / Banning Road / Golden Oak Drive

Type of Control: minor stop-controlled intersection

Northbound Approach: (S. State Street) one shared left-turn/through lane and one bypass lane

Southbound Approach: (S. State Street) one shared left-turn/through lane and one right-turn lane

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

Westbound Approach: (Golden Oak Drive) one shared left-turn/through/right-turn lane, stop-controlled

6) S. State Street / Ponderosa Drive / Brookdale Road

Type of Control: minor stop-controlled intersection

Northbound Approach: (S. State Street) one shared left-turn/through and one right-turn lane

Southbound Approach: (S. State Street) one shared left-turn/through and one right-turn lane

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

Westbound Approach: (Ponderosa Drive) one shared left-turn/through/right-turn lane, stop-controlled

7) Briarbush Road (Kent Road 367) / Banning Road

Type of Control: minor stop-controlled intersection

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

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

Eastbound Approach: (Banning Road) one shared left-turn/through lane and one right-turn lane, stop-controlled

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

8) Locust Grove Road / Carolina Avenue / Water Edge Lane

Type of Control: minor stop-controlled intersection

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

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

Eastbound Approach: (Carolina Avenue) one shared left-turn/through/right-turn lane, stop-controlled

Westbound Approach: (Water Edge Lane) one shared left-turn/through/right-turn lane, stop-controlled

9) Locust Grove Road / Sorghum Mill Road

Type of Control: minor stop-controlled intersection

Northbound Approach: (Locust Grove Road) one shared left-turn/right-turn lane, stop-controlled

Eastbound Approach: (Sorghum Mill Road) one shared through/right-turn lane

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

10) Sorghum Mill Road / Cypress Branch Road (Kent Road 363)

Type of Control: minor stop-controlled intersection

Northbound Approach: (Sorghum Mill Road) one shared through/right-turn lane

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

Westbound Approach: (Cypress Branch Rd) one shared left-turn/right-turn lane, stop controlled

11) DE 10 (E Lebanon Road) / Sorghum Mill Road

Type of Control: minor stop-controlled intersection

Northbound Approach: (Sorghum Mill Road) one right-turn lane, stop-controlled

Eastbound Approach: (DE 10) one U-turn-lane, two through lanes, and one right-turn lane

Westbound Approach: (DE 10) one left-turn lane and two through lanes

12) S. State Street / Rising Sun Road (Kent Road 29) / Middle School Entrance

Type of Control: minor stop-controlled intersection

Northbound Approach: (S. State Street) one left-turn lane, one through lane, and one right-turn lane

Southbound Approach: (S. State Street) one left-turn lane and one shared through/right-turn lane

Eastbound Approach: (Rising Sun Road) one shared left-turn/through/right-turn lane, stop-controlled

Westbound Approach: (Middle School Entrance) one shared left-turn/through lane and one right-turn lane, stop-controlled

13) S. State Street / Sorghum Mill Road

Type of Control: signalized intersection

Northbound Approach: (S. State Street) one left-turn lane, one through lane, and one right-turn lane

Southbound Approach: (S. State Street) one left-turn lane, one through lane, and one right-turn lane

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

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

14) S. State Street / Pleasant Hill Drive

Type of Control: minor stop-controlled intersection

Northbound Approach: (S. State Street) one shared left-turn/through lane and one bypass lane

Southbound Approach: (S. State Street) one through lane and one right-turn lane

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

15) S. State Street / Cool Spring Drive

Type of Control: minor stop-controlled intersection

Northbound Approach: (S. State Street) one shared left-turn/through lane and one bypass lane

Southbound Approach: (S. State Street) one through lane and one right-turn lane

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

16) DE 10 (E Lebanon Road) / S. State Road

Type of Control: signalized intersection

Northbound Approach: (S, State Street) one left-turn lane, one through lane, and one right-turn lane

Southbound Approach: (S. State Street) one left-turn lane, one through lane, and one right-turn lane

Eastbound Approach: (DE 10) one left-turn lane, two through lanes, and one right-turn lane

Westbound Approach: (DE 10) one left-turn lane, two through lanes, and one right-turn lane

17) S. State Street / N. Old Mill Road (Kent Road 355)

Type of Control: minor stop-controlled intersection

Northbound Approach: (S. State Street) one shared left-turn/through lane

Southbound Approach: (S. State Street) one through lane and one right-turn lane

Eastbound Approach: (N. Old Mill Road) one shared left-turn/right-turn lane, stop-controlled

18) Rising Sun Road / Walnut Shade Road (Kent Road 30) / Voshells Mill Star Hill Road (Kent Road 360)

Type of Control: signalized five-leg intersection

Northbound Approach: (Walnut Shade Road) one shared two left-turn/two right-turn lane

Northwestbound Approach: (Rising Sun Road) one shared two left-turn/through/right-turn lane

Southeastbound Approach: (Rising Sun Road) one shared left-turn/through/two right-turn lane

Southwestbound Approach: (Sorghum Mill Road) one shared two left-turn/through/right-turn lane

Eastbound Approach: (Voshells Mill Star Hill Road) one shared left-turn/through/two right-turn lane

19) Rising Sun Road / S. Old Mill Road (Kent Road 355) / Steffens Boulevard

Type of Control: minor stop-controlled intersection

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

Southbound Approach: (Rising Sun Road) one shared left-turn/through lane and one right-turn lane

Eastbound Approach: (Steffens Boulevard) one shared left-turn/through/right-turn lane, stop-controlled

Westbound Approach: (S. Old Mill Road) one shared left-turn/through lane and one right turn lane, stop-controlled

20) Walnut Shade Road / Briarbush Road

Type of Control: minor stop-controlled intersection

Northbound Approach: (Walnut Shade Road) one shared through/right-turn lane

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

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

21) Voshells Mill Star Hill Road / Lochmeath Way (Kent Road 361)

Type of Control: minor stop-controlled intersection

Southbound Approach: (Voshells Mill Star Hill Road) one shared left-turn/right-turn lane, stop-controlled

Eastbound Approach: (Lochmeath Way) one shared left-turn/through lane

Westbound Approach: (Lochmeath Way) one shared through/right-turn lane

Safety Evaluation

Crash Data: The TIS included a limited review of Delaware Crash Analysis Reporting System (CARS) data that only covered the three proposed site entrances. Per the DelDOT Development Coordination Manual section 2.2.8.5.D.1, if an intersection in the study area, or a location along the site frontage, has been addressed in current or past Highway Safety Improvement Programs (HSIPs) the TIS shall report on the status or results of its inclusion in the HSIP program. Five of the 22 study intersections, not including proposed site entrances, have been included in past HSIP programs. The TIS did not include the status of these HSIP sites or an explanation of why all study intersections were not included in the safety evaluation.

Sight Distance: The proposed Site Entrance A on S State Street and Site Entrance C on Sorghum Mill Road have unobstructed views looking left and right. The location of proposed Site Entrance B on Locust Grove Road was not clearly defined in the TIS, but there are segments of Locust Grove Road that have sufficient sight distance for a potential site entrance. As always, the adequacy of available sight distance must 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) operates two bus routes along the frontages of the proposed development and several adjacent study intersections. Route 105 (Dover Air Force Base - Dover Transit Center) travels along S. State Street and Sorghum Mill Road. Intercounty Route 303 (Dover - Milford - Georgetown) travels along S. State Street and continues south of the study area.

Planned transit service: DTC has requested that the developer make ADA improvements at the existing DART bus stops along Sorghum Mill Road and S. State Street near the proposed development. The developer should coordinate the scope of improvements with DTC and DelDOT's Subdivision Section.

Existing bicycle and pedestrian facilities: According to the *Kent County Bicycle Map* published by DelDOT, S. State Street is designated as a Statewide Bicycle Route and Sorghum Mill Road is a Suggested Connector Bicycle Route, both with Bikeways and AADT over 5,000 vehicles per day. There are existing sidewalks along Sorghum Mill Road and S. State Street in front of both elementary and middle schools that extend between the proposed Beiser Property development site frontages along both roads. At the intersection of S. State Street and Sorghum Mill Road there are striped pedestrian crosswalks with pedestrian signals on the northbound and westbound approaches.

Planned bicycle and pedestrian facilities: A multi-use path is recommended along all property frontages with a bicycle lane to be included between the through lane and right-turn lanes into the site entrances. DTC also has requested signalized pedestrian crossings in the vicinity of the existing DART bus stops along Sorghum Mill Road and S. State Street near the proposed development.

Previous Comments

The initial scoping memorandum between the developer and DeIDOT was dated May 10, 2022.

In a review letter dated August 2, 2022, DeIDOT requested minor revisions to the volume figures for existing volumes, noted that the proposed ATR factors would not be needed, and directed the developer to proceed with the Preliminary TIS.

In a second review letter dated September 19, 2022, DeIDOT requested changes to the committed development trip generation, trip distribution, and the associated traffic volume figures.

In a third review letter dated October 19, 2022, DeIDOT requested revisions to committed development volume figures, Case 3 volume figures, and directed the developer to proceed with the Final TIS.

It appears that all substantive comments from DeIDOT's TIS Scoping Memorandum 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) The TIS used Highway Capacity Software (HCS) version 7.8.5 to complete the traffic analyses of all intersections except for the intersection of Rising Sun Road / Walnut Shade Road / Voshells Mill Star Hill Road where they used Synchro version 11. McCormick Taylor used HCS 2023 for all unsignalized intersections and Synchro version 11 for signalized intersections.
- 2) The TIS and McCormick Taylor generally used heavy vehicle percentages (HV%) from turning movement counts for existing and future conditions (as per DeIDOT's Development Coordination Manual section 2.2.8.11.6.H). The TIS selectively reduced HV% on some turning movements in all cases without apparent justification. McCormick Taylor and the TIS assumed 3% HV at proposed site entrances in future conditions.
- 3) 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 DeIDOT Development Coordination Manual section 2.2.8.11.6.F where applicable.
- 4) For analyses of all intersections, McCormick Taylor and the TIS assumed 0% grade for all movements.

Table 2
Peak Hour Levels of Service (LOS)
Based on Beiser Property Traffic Impact Study – May 2023
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ¹ Minor Stop-Controlled (TWSC)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
1 – S. State Street & Site Entrance A				
2031 Build Condition (Case 3a)				
Southbound S. State Street – Lefts	A (9.4)	A (9.2)	A (9.4)	A (9.2)
Westbound Site Entrance A	B (12.9)	C (16.8)	C (22.0)	D (26.0)
2031 Build Condition (Case 3b)				
Southbound S. State Street – Lefts	A (9.3)	A (9.2)	A (9.3)	A (9.2)
Westbound Site Entrance A	B (14.1)	D (25.7)	D (25.7)	D (34.2)
2031 Build Condition (Case 3c)				
Southbound S. State Street – Lefts	A (9.6)	A (9.1)	A (9.3)	A (9.1)
Westbound Site Entrance A	C (20.6)	C (16.2)	C (21.0)	C (24.7)

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 Beiser Property Traffic Impact Study – May 2023
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ² Minor Stop-Controlled (TWSC)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2 – Locust Grove Road & Site Entrance B				
2031 Build Condition (Case 3a)				
Southbound Site Entrance B	A (7.5)	A (7.5)	A (9.1)	A (9.3)
Eastbound Locust Grove Road - Lefts	A (7.3)	A (7.5)	A (7.3)	A (7.5)
2031 Build Condition (Case 3c)				
Southbound Site Entrance B	A (7.3)	A (7.5)	A (8.9)	A (9.0)
Eastbound Locust Grove Road - Lefts	A (7.3)	A (7.4)	A (7.3)	A (7.4)

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 Beiser Property Traffic Impact Study – May 2023
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ³ Minor Stop-Controlled (TWSC)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
3 – Sorghum Mill Road & Site Entrance C				
2031 Build Condition (Case 3b)				
Northbound Site Entrance C	B (11.5)	B (11.1)	B (11.5)	B (11.1)
Westbound Sorghum Mill Road - Lefts	A (8.0)	A (7.8)	A (8.0)	A (7.8)
2031 Build Condition (Case 3c)				
Northbound Site Entrance C	B (11.3)	B (11.0)	B (11.3)	B (11.0)
Westbound Sorghum Mill Road - Lefts	A (8.0)	A (7.7)	A (8.0)	A (7.7)

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 Beiser Property Traffic Impact Study – May 2023
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ⁴ Minor Stop-Controlled (TWSC)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
4 – S. State Street & Locust Grove Road				
2022 Existing Condition (Case 1)				
Southbound S. State Street - Lefts	A (9.9)	A (8.4)	A (9.9)	A (8.4)
Westbound Locust Grove Road	C (19.6)	C (23.0)	C (20.2)	C (23.5)
2031 No Build Condition (Case 2)				
Southbound S. State Street - Lefts	B (10.6)	A (8.8)	B (10.6)	A (8.8)
Westbound Locust Grove Road	C (24.6)	E (41.2)	D (25.8)	E (43.2)
2031 Build Condition (Case 3a)				
Southbound S. State Street - Lefts	B (10.7)	A (9.1)	B (10.7)	A (9.1)
Westbound Locust Grove Road	D (28.5)	F (62.9)	D (30.6)	F (69.8)
2031 Build Condition (Case 3b)				
Southbound S. State Street - Lefts	B (10.7)	A (9.0)	B (10.7)	A (9.0)
Westbound Locust Grove Road	D (26.6)	E (48.5)	D (28.1)	F (51.2)
2031 Build Condition (Case 3c)				
Southbound S. State Street - Lefts	B (10.7)	A (9.0)	B (10.7)	A (9.0)
Westbound Locust Grove Road	D (29.4)	F (52.0)	D (31.4)	F (56.7)
2031 Build Condition (Case 3a) w/ Improvements (Roundabout)				
Overall	A (8.6)	B (10.4)	A (8.6)	B (10.4)
2031 Build Condition (Case 3b) w/ Improvements (Roundabout)				
Overall	A (8.5)	A (9.9)	A (8.5)	A (9.9)
2031 Build Condition (Case 3c) w/ Improvements (Roundabout)				
Overall	A (8.5)	A (9.9)	A (8.5)	A (9.9)

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 Beiser Property Traffic Impact Study – May 2023
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ⁵ Minor Stop-Controlled (TWSC)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
5 – S. State Street & Banning Road / Golden Oak Drive				
2022 Existing Condition (Case 1)				
Southbound S. State Street - Lefts	A (8.7)	A (8.3)	A (8.7)	A (8.3)
Northbound S. State Street - Lefts	A (8.2)	A (9.1)	A (8.2)	A (9.1)
Westbound Golden Oak Drive	B (12.3)	-	B (12.3)	-
Eastbound Banning Road	C (25.0)	C (21.5)	D (27.0)	D (26.5)
2031 No Build Condition (Case 2)				
Southbound S. State Street - Lefts	A (9.0)	A (8.7)	A (9.2)	A (8.7)
Northbound S. State Street - Lefts	A (8.4)	A (9.8)	A (8.5)	A (9.8)
Westbound Golden Oak Drive	B (13.2)	-	B (13.8)	-
Eastbound Banning Road	D (32.2)	D (34.5)	E (48.7)	D (37.3)
2031 Build Condition (Case 3a)				
Southbound S. State Street - Lefts	A (9.1)	A (8.8)	A (9.3)	A (8.8)
Northbound S. State Street - Lefts	A (8.5)	A (9.9)	A (8.7)	A (9.9)
Westbound Golden Oak Drive	B (13.4)	-	B (14.0)	-
Eastbound Banning Road	E (37.5)	E (42.0)	F (61.5)	E (46.1)
2031 Build Condition (Case 3b)				
Southbound S. State Street - Lefts	A (9.1)	A (8.8)	A (9.3)	A (8.8)
Northbound S. State Street - Lefts	A (8.5)	A (9.9)	A (8.7)	A (9.9)
Westbound Golden Oak Drive	B (13.4)	-	B (14.0)	-
Eastbound Banning Road	E (37.5)	E (42.0)	F (61.5)	E (46.1)
2031 Build Condition (Case 3c)				
Southbound S. State Street - Lefts	A (9.1)	A (8.8)	A (9.3)	A (8.8)
Northbound S. State Street - Lefts	A (8.5)	A (9.9)	A (8.7)	A (9.9)
Westbound Golden Oak Drive	B (13.4)	-	B (14.0)	-
Eastbound Banning Road	E (37.5)	E (42.0)	F (61.5)	E (46.1)

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 (continued)
Peak Hour Levels of Service (LOS)
Based on Beiser Property Traffic Impact Study – May 2023
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ⁶ Minor Stop-Controlled (TWSC)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
5 – S. State Street & Banning Road / Golden Oak Drive				
2031 Build Condition (Case 3a) w/ Improvements (Roundabout)				
Overall	A (8.2)	A (10.0)	A (8.3)	A (10.0)
2031 Build Condition (Case 3b) w/ Improvements (Roundabout)				
Overall	A (8.2)	A (10.0)	A (8.3)	A (10.0)
2031 Build Condition (Case 3c) w/ Improvements (Roundabout)				
Overall	A (8.2)	A (10.0)	A (8.3)	A (10.0)

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 7
Peak Hour Levels of Service (LOS)
Based on Beiser Property Traffic Impact Study – May 2023
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ⁷ Minor Stop-Controlled (TWSC)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
6 – S. State Street & Ponderosa Drive				
2022 Existing Condition (Case 1)				
Southbound S. State Street - Lefts	A (8.8)	A (8.4)	A (8.8)	A (8.4)
Northbound S. State Street - Lefts	A (8.1)	A (8.7)	A (8.1)	A (8.7)
Westbound Ponderosa Drive	B (13.3)	B (13.3)	C (19.0)	C (18.8)
Eastbound Ponderosa Drive	C (18.2)	C (22.0)	C (20.6)	C (23.9)
2031 No Build Condition (Case 2)				
Southbound S. State Street - Lefts	A (8.9)	A (8.8)	A (8.9)	A (8.8)
Northbound S. State Street - Lefts	A (8.3)	A (9.0)	A (8.3)	A (9.0)
Westbound Ponderosa Drive	B (14.3)	C (17.3)	C (20.1)	C (24.7)
Eastbound Ponderosa Drive	C (20.4)	D (29.2)	D (22.7)	D (31.4)
2031 Build Condition (Case 3a)				
Southbound S. State Street - Lefts	A (8.9)	A (9.0)	A (8.9)	A (9.0)
Northbound S. State Street - Lefts	A (8.4)	A (9.1)	A (8.4)	A (9.1)
Westbound Ponderosa Drive	C (15.3)	C (19.4)	C (16.7)	C (21.2)
Eastbound Ponderosa Drive	C (22.1)	D (32.8)	C (22.4)	D (33.0)
2031 Build Condition (Case 3b)				
Southbound S. State Street - Lefts	A (8.9)	A (9.0)	A (8.9)	A (9.0)
Northbound S. State Street - Lefts	A (8.4)	A (9.1)	A (8.4)	A (9.1)
Westbound Ponderosa Drive	C (15.3)	C (19.4)	C (16.7)	C (21.2)
Eastbound Ponderosa Drive	C (22.1)	D (32.8)	C (22.4)	D (33.0)
2031 Build Condition (Case 3c)				
Southbound S. State Street - Lefts	A (8.9)	A (9.0)	A (8.9)	A (9.0)
Northbound S. State Street - Lefts	A (8.4)	A (9.1)	A (8.4)	A (9.1)
Westbound Ponderosa Drive	C (15.3)	C (19.4)	C (16.7)	C (21.2)
Eastbound Ponderosa Drive	C (22.1)	D (32.8)	C (22.4)	D (33.0)

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 8
Peak Hour Levels of Service (LOS)
Based on Beiser Property Traffic Impact Study – May 2023
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ⁸ Minor Stop-Controlled (TWSC)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
7 – S. State Street & Banning Road/Elementary School Entrance				
2022 Existing Condition (Case 1)				
Southbound S. State Street - Lefts	A (7.6)	A (7.4)	A (7.6)	A (7.4)
Northbound S. State Street - Lefts	A (7.7)	A (7.3)	A (7.7)	A (7.3)
Westbound Ponderosa Drive	B (15.0)	A (9.4)	C (15.5)	A (9.4)
Eastbound Ponderosa Drive	B (13.1)	A (9.6)	B (14.5)	A (9.8)
2031 No Build Condition (Case 2)				
Southbound S. State Street - Lefts	A (7.6)	A (7.4)	A (7.6)	A (7.4)
Northbound S. State Street - Lefts	A (7.6)	A (7.3)	A (7.6)	A (7.3)
Westbound Ponderosa Drive	B (12.6)	A (9.5)	B (12.8)	A (9.6)
Eastbound Ponderosa Drive	B (11.4)	A (9.8)	B (12.2)	A (10.0)
2031 Build Condition (Case 3a)				
Southbound S. State Street - Lefts	A (7.6)	A (7.4)	A (7.6)	A (7.4)
Northbound S. State Street - Lefts	A (7.6)	A (7.3)	A (7.6)	A (7.3)
Westbound Ponderosa Drive	B (12.8)	A (9.6)	B (13.1)	A (9.6)
Eastbound Ponderosa Drive	B (11.4)	A (9.8)	B (12.1)	A (10.0)
2031 Build Condition (Case 3b)				
Southbound S. State Street - Lefts	A (7.6)	A (7.4)	A (7.6)	A (7.4)
Northbound S. State Street - Lefts	A (7.6)	A (7.3)	A (7.6)	A (7.3)
Westbound Ponderosa Drive	B (12.8)	A (9.6)	B (13.1)	A (9.6)
Eastbound Ponderosa Drive	B (11.4)	A (9.8)	B (12.1)	A (10.0)
2031 Build Condition (Case 3c)				
Southbound S. State Street - Lefts	A (7.6)	A (7.4)	A (7.6)	A (7.4)
Northbound S. State Street - Lefts	A (7.6)	A (7.3)	A (7.6)	A (7.3)
Westbound Ponderosa Drive	B (12.8)	A (9.6)	B (13.1)	A (9.6)
Eastbound Ponderosa Drive	B (11.4)	A (9.8)	B (12.1)	A (10.0)

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 9
Peak Hour Levels of Service (LOS)
Based on Beiser Property Traffic Impact Study – May 2023
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ⁹ Minor Stop-Controlled (TWSC)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
8 – Locust Grove Road & Carolina Avenue/Water Edge Lane				
2022 Existing Condition (Case 1)				
Southbound Locust Grove Road - Lefts	A (7.3)	A (7.3)	A (7.3)	A (7.3)
Northbound Locust Grove Road - Lefts	A (7.3)	A (7.4)	A (7.6)	A (7.4)
Westbound Carolina Avenue	A (7.9)	A (7.5)	A (8.8)	A (9.0)
Eastbound Carolina Avenue	A (8.7)	A (9.1)	A (9.4)	A (9.7)
2031 No Build Condition (Case 2)				
Southbound Locust Grove Road - Lefts	A (7.4)	A (7.3)	A (9.6)	A (7.3)
Northbound Locust Grove Road - Lefts	A (7.3)	A (7.5)	A (9.0)	A (7.5)
Westbound Carolina Avenue	A (8.0)	A (7.6)	A (7.6)	A (9.2)
Eastbound Carolina Avenue	A (8.9)	A (9.4)	A (7.4)	A (10.0)
2031 Build Condition (Case 3a)				
Southbound Locust Grove Road - Lefts	A (7.4)	A (7.4)	A (7.4)	A (7.4)
Northbound Locust Grove Road - Lefts	A (7.3)	A (7.5)	A (7.6)	A (7.5)
Westbound Carolina Avenue	A (8.1)	A (7.6)	A (9.1)	A (9.4)
Eastbound Carolina Avenue	A (9.1)	A (9.8)	A (9.8)	B (10.4)
2031 Build Condition (Case 3b)				
Southbound Locust Grove Road - Lefts	A (7.4)	A (7.3)	A (7.4)	A (7.3)
Northbound Locust Grove Road - Lefts	A (7.3)	A (7.5)	A (7.6)	A (7.5)
Westbound Carolina Avenue	A (8.0)	A (7.6)	A (9.0)	A (9.2)
Eastbound Carolina Avenue	A (8.9)	A (9.4)	A (9.6)	A (10.0)
2031 Build Condition (Case 3c)				
Southbound Locust Grove Road - Lefts	A (7.4)	A (7.4)	A (7.4)	A (7.4)
Northbound Locust Grove Road - Lefts	A (7.3)	A (7.5)	A (7.6)	A (7.5)
Westbound Carolina Avenue	A (8.0)	A (7.6)	A (9.0)	A (9.3)
Eastbound Carolina Avenue	A (9.0)	A (9.6)	A (9.7)	B (10.2)

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 10
Peak Hour Levels of Service (LOS)
Based on Beiser Property Traffic Impact Study – May 2023
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ¹⁰ Minor Stop-Controlled (TWSC)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
9 – Sorghum Mill Road & Locust Grove Road				
2022 Existing Condition (Case 1)				
Northbound Locust Grove Road	B (10.5)	B (10.3)	B (10.6)	B (10.3)
Westbound Sorghum Mill Road - Lefts	A (7.7)	A (7.6)	A (7.8)	A (7.6)
2031 No Build Condition (Case 2)				
Northbound Locust Grove Road	B (10.9)	B (10.6)	B (10.9)	B (10.6)
Westbound Sorghum Mill Road - Lefts	A (7.8)	A (7.8)	A (7.8)	A (7.8)
2031 Build Condition (Case 3a)				
Northbound Locust Grove Road	B (11.3)	B (10.8)	B (11.3)	B (10.8)
Westbound Sorghum Mill Road - Lefts	A (7.8)	A (7.8)	A (7.9)	A (7.8)
2031 Build Condition (Case 3b)				
Northbound Locust Grove Road	B (11.3)	B (10.9)	B (11.3)	B (10.9)
Westbound Sorghum Mill Road - Lefts	A (7.8)	A (7.8)	A (7.9)	A (7.8)
2031 Build Condition (Case 3c)				
Northbound Locust Grove Road	B (11.3)	B (10.9)	B (11.3)	B (10.9)
Westbound Sorghum Mill Road - Lefts	A (7.8)	A (7.8)	A (7.9)	A (7.8)

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.

Table 11
Peak Hour Levels of Service (LOS)
Based on Beiser Property Traffic Impact Study – May 2023
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ¹¹ Minor Stop-Controlled (TWSC)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
10 – Sorghum Mill Road & Cypress Branch Road				
2022 Existing Condition (Case 1)				
Southbound Sorghum Mill Road	A (8.0)	A (8.0)	A (8.0)	A (8.0)
Westbound Cyprus Branch Road - Lefts	B (12.2)	B (12.2)	B (12.2)	B (12.2)
2031 No Build Condition (Case 2)				
Southbound Sorghum Mill Road	A (8.1)	A (8.2)	A (8.1)	A (8.2)
Westbound Cyprus Branch Road - Lefts	B (13.1)	B (13.2)	B (13.1)	B (13.2)
2031 Build Condition (Case 3a)				
Southbound Sorghum Mill Road	A (8.2)	A (8.2)	A (8.2)	A (8.2)
Westbound Cyprus Branch Road - Lefts	B (13.8)	B (13.9)	B (13.8)	B (13.9)
2031 Build Condition (Case 3b)				
Southbound Sorghum Mill Road	A (8.2)	A (8.2)	A (8.2)	A (8.2)
Westbound Cyprus Branch Road - Lefts	B (13.8)	B (13.9)	B (13.8)	B (13.9)
2031 Build Condition (Case 3c)				
Southbound Sorghum Mill Road	A (8.2)	A (8.2)	A (8.2)	A (8.2)
Westbound Cyprus Branch Road - Lefts	B (13.8)	B (13.9)	B (13.8)	B (13.9)

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 12
Peak Hour Levels of Service (LOS)
Based on Beiser Property Traffic Impact Study – May 2023
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ¹² Minor Stop-Controlled (TWSC)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
11 – DE 10 (E Lebanon Road) & Sorghum Mill Road				
2022 Existing Condition (Case 1)				
Northbound Sorghum Mill Road	C (16.7)	B (12.0)	C (16.7)	B (12.1)
Westbound DE 10 - Lefts	A (9.7)	B (10.3)	A (9.9)	B (11.0)
Eastbound DE 10 – U-turns	B (10.5)	C (16.8)	B (10.5)	C (16.8)
2031 No Build Condition (Case 2)				
Northbound Sorghum Mill Road	C (20.0)	B (13.0)	C (20.0)	B (13.0)
Westbound DE 10 - Lefts	B (10.2)	B (11.5)	B (10.4)	B (12.5)
Eastbound DE 10 – U-turns	B (11.0)	C (19.3)	B (11.0)	C (19.3)
2031 Build Condition (Case 3a)				
Northbound Sorghum Mill Road	C (22.2)	B (13.4)	C (22.2)	B (13.4)
Westbound DE 10 - Lefts	B (10.3)	B (12.0)	B (10.5)	B (13.1)
Eastbound DE 10 – U-turns	B (11.0)	C (19.3)	B (11.0)	C (19.3)
2031 Build Condition (Case 3b)				
Northbound Sorghum Mill Road	C (22.2)	B (13.4)	C (22.2)	B (13.4)
Westbound DE 10 - Lefts	B (10.3)	B (12.0)	B (10.5)	B (13.1)
Eastbound DE 10 – U-turns	B (11.0)	C (19.3)	B (11.0)	C (19.3)
2031 Build Condition (Case 3c)				
Northbound Sorghum Mill Road	C (22.2)	B (13.4)	C (22.2)	B (13.4)
Westbound DE 10 - Lefts	B (10.3)	B (12.0)	B (10.5)	B (13.1)
Eastbound DE 10 – U-turns	B (11.0)	C (19.3)	B (11.0)	C (19.3)

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 13
Peak Hour Levels of Service (LOS)
Based on Beiser Property Traffic Impact Study – May 2023
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ¹³ Minor Stop-Controlled (TWSC)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
12 – S. State Street & Rising Sun Road/Middle School Entrance				
2022 Existing Condition (Case 1)				
Southbound S. State Street - Lefts	A (9.0)	A (7.9)	A (9.1)	A (7.9)
Northbound S. State Street - Lefts	A (7.9)	A (8.8)	A (7.9)	A (8.7)
Westbound Rising Sun Road	E (36.1)	E (39.0)	F (54.5)	E (47.2)
Eastbound Rising Sun Road	B (13.7)	B (14.5)	B (13.4)	B (14.5)
2031 No Build Condition (Case 2)				
Southbound S. State Street - Lefts	A (9.1)	A (8.1)	A (9.1)	A (8.1)
Northbound S. State Street - Lefts	A (8.0)	A (9.4)	A (8.0)	A (9.4)
Westbound Rising Sun Road	E (38.8)	F (79.2)	F (57.6)	F (105.0)
Eastbound Rising Sun Road	B (13.7)	C (19.3)	B (13.3)	C (19.3)
2031 Build Condition (Case 3a)				
Southbound S. State Street - Lefts	A (9.3)	A (8.2)	A (9.3)	A (8.2)
Northbound S. State Street - Lefts	A (8.2)	A (9.9)	A (8.2)	A (9.9)
Westbound Rising Sun Road	F (55.3)	F (156.0)	F (89.5)	F (225.0)
Eastbound Rising Sun Road	C (15.3)	C (26.3)	B (14.7)	D (26.3)
2031 Build Condition (Case 3b)				
Southbound S. State Street - Lefts	A (9.1)	A (8.1)	A (9.2)	A (8.1)
Northbound S. State Street - Lefts	A (8.1)	A (9.7)	A (8.2)	A (9.7)
Westbound Rising Sun Road	F (50.2)	F (126.6)	F (79.7)	F (180.6)
Eastbound Rising Sun Road	B (14.7)	C (23.7)	B (14.2)	C (23.7)
2031 Build Condition (Case 3c)				
Southbound S. State Street - Lefts	A (9.2)	A (8.2)	A (9.2)	A (8.2)
Northbound S. State Street - Lefts	A (8.1)	A (9.7)	A (8.2)	A (9.7)
Westbound Rising Sun Road	F (50.8)	F (130.2)	F (81.0)	F (186.0)
Eastbound Rising Sun Road	B (14.8)	C (24.1)	B (14.3)	C (24.1)

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 13 (continued)
Peak Hour Levels of Service (LOS)
Based on Beiser Property Traffic Impact Study – May 2023
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ¹⁴ Minor Stop-Controlled (TWSC)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
12 – S. State Street & Rising Sun Road/Middle School Entrance				
2031 Build Condition (Case 3a) w/ Improvements (Roundabout)				
Overall	B (13.2)	A (9.9)	B (12.5)	A (9.9)
2031 Build Condition (Case 3b) w/ Improvements (Roundabout)				
Overall	B (12.2)	A (9.3)	B (11.5)	A (9.0)
2031 Build Condition (Case 3c) w/ Improvements (Roundabout)				
Overall	B (12.3)	A (9.4)	B (11.6)	A (9.0)

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 14
Peak Hour Levels of Service (LOS)
Based on Beiser Property Traffic Impact Study – May 2023
Prepared by Becker Morgan Group, Inc.

Signalized Intersection ¹⁵	LOS per TIS		LOS per McCormick Taylor ¹⁶	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
13 – S. State St & Sorghum Mill Rd				
2022 Existing Condition (Case 1)				
Overall	C (21.1)	B (19.1)	C (22.1)	B (19.8)
2031 No Build Condition (Case 2)				
Overall	B (20.0)	C (20.7)	C (23.2)	C (20.4)
2031 Build Condition (Case 3a)				
Overall	C (20.5)	C (20.8)	C (23.9)	C (20.7)
2031 Build Condition (Case 3b)				
Overall	C (20.4)	C (21.1)	C (23.5)	C (20.5)
2031 Build Condition (Case 3c)				
Overall	C (20.4)	C (21.1)	C (23.6)	C (20.5)

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.

¹⁶ McCormick Taylor modeled this signalized intersection with Synchro software using HCS, 6th Edition methodology.

Table 15
Peak Hour Levels of Service (LOS)
Based on Beiser Property Traffic Impact Study – May 2023
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ¹⁷ Minor Stop-Controlled (TWSC)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
14 – S. State Street & Pleasant Hill Drive				
2022 Existing Condition (Case 1)				
Northbound State Street - Lefts	A (8.1)	B (13.0)	A (8.3)	A (9.0)
Eastbound Pleasant Hill Drive	A (9.2)	B (10.8)	C (16.3)	C (16.7)
2031 No Build Condition (Case 2)				
Northbound State Street - Lefts	A (8.1)	A (9.7)	A (8.3)	A (9.6)
Eastbound Pleasant Hill Drive	B (13.5)	B (12.7)	C (16.8)	C (20.1)
2031 Build Condition (Case 3a)				
Northbound State Street - Lefts	A (8.1)	A (9.8)	A (8.3)	A (9.7)
Eastbound Pleasant Hill Drive	B (14.1)	B (13.6)	C (17.6)	C (21.5)
2031 Build Condition (Case 3b)				
Northbound State Street - Lefts	A (8.1)	A (9.8)	A (8.3)	A (9.7)
Eastbound Pleasant Hill Drive	B (14.1)	B (13.6)	C (17.6)	C (21.5)
2031 Build Condition (Case 3c)				
Northbound State Street - Lefts	A (8.1)	A (9.8)	A (8.3)	A (9.7)
Eastbound Pleasant Hill Drive	B (14.1)	B (13.6)	C (17.6)	C (21.5)

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 16
Peak Hour Levels of Service (LOS)
Based on Beiser Property Traffic Impact Study – May 2023
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ¹⁸ Minor Stop-Controlled (TWSC)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
15 – S. State Street & Cool Spring Drive				
2022 Existing Condition (Case 1)				
Northbound State Street - Lefts	A (8.1)	A (9.0)	A (8.1)	A (9.0)
Eastbound Cool Spring Drive	B (13.6)	C (15.6)	C (15.9)	C (20.1)
2031 No Build Condition (Case 2)				
Northbound State Street - Lefts	A (8.2)	A (9.5)	A (8.2)	A (9.5)
Eastbound Cool Spring Drive	B (15.9)	B (19.2)	C (18.4)	C (24.9)
2031 Build Condition (Case 3a)				
Northbound State Street - Lefts	A (8.2)	A (9.6)	A (8.2)	A (9.6)
Eastbound Cool Spring Drive	B (16.8)	B (20.9)	C (19.4)	D (27.1)
2031 Build Condition (Case 3b)				
Northbound State Street - Lefts	A (8.2)	A (9.6)	A (8.2)	A (9.6)
Eastbound Cool Spring Drive	B (16.8)	B (20.9)	C (19.4)	D (27.1)
2031 Build Condition (Case 3c)				
Northbound State Street - Lefts	A (8.2)	A (9.6)	A (8.2)	A (9.6)
Eastbound Cool Spring Drive	B (16.8)	B (20.9)	C (19.4)	D (27.1)

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 17
Peak Hour Levels of Service (LOS)
Based on Beiser Property Traffic Impact Study – May 2023
Prepared by Becker Morgan Group, Inc.

Signalized Intersection ¹⁹	LOS per TIS		LOS per McCormick Taylor ²⁰	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
16 – DE 10 (E Lebanon Road) & S. State Street				
2022 Existing Condition (Case 1)				
Overall	D (40.0)	D (50.4)	C (31.3)	C (32.7)
2031 No Build Condition (Case 2)				
Overall	D (44.1)	E (66.6)	D (35.7)	D (37.8)
2031 Build Condition (Case 3a)				
Overall	D (49.7)	E (77.3)	D (37.7)	D (39.9)
2031 Build Condition (Case 3b)				
Overall	D (49.7)	E (77.3)	D (37.7)	D (39.9)
2031 Build Condition (Case 3c)				
Overall	D (49.7)	E (77.3)	D (37.7)	D (39.9)
2031 Build Condition (Case 3) w/ Improvements ²¹				
3a Overall	D (35.3)	D (52.6)	NA	NA
3b Overall	D (35.3)	D (52.6)	NA	NA
3c Overall	D (35.3)	D (52.6)	NA	NA

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.

²⁰ McCormick Taylor modeled this signalized intersection with Synchro software using HCS, 6th Edition methodology. Based on the Case 3 Level of Service, mitigating improvements were not evaluated.

²¹ Improvements include lengthening the WB left-turn lane to provide 415 feet of storage.

Table 18
Peak Hour Levels of Service (LOS)
Based on Beiser Property Traffic Impact Study – May 2023
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ²² Minor Stop-Controlled (TWSC)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
17 – S. State Street & N. Old Mill Road				
2022 Existing Condition (Case 1)				
Northbound State Street - Lefts	A (8.2)	A (9.4)	A (8.2)	A (9.4)
Eastbound N. Old Mill Road	C (18.4)	C (22.8)	C (19.5)	D (25.2)
2031 No Build Condition (Case 2)				
Northbound State Street - Lefts	A (8.4)	A (10.0)	A (8.4)	A (10.0)
Eastbound N. Old Mill Road	C (22.9)	D (30.5)	C (24.2)	D (34.2)
2031 Build Condition (Case 3a)				
Northbound State Street - Lefts	A (8.4)	B (10.1)	A (8.4)	B (10.1)
Eastbound N. Old Mill Road	C (24.5)	D (34.2)	D (26.0)	E (38.4)
2031 Build Condition (Case 3b)				
Northbound State Street - Lefts	A (8.4)	A (10.1)	A (8.4)	B (10.1)
Eastbound N. Old Mill Road	C (24.5)	D (34.2)	D (26.0)	E (38.4)
2031 Build Condition (Case 3c)				
Northbound State Street - Lefts	A (8.4)	A (10.1)	A (8.4)	B (10.1)
Eastbound N. Old Mill Road	C (24.5)	D (34.2)	D (26.0)	E (38.4)
2031 Build Condition (Case 3) w/ Improvements (Roundabout)				
3a Overall	--	--	A (9.1)	B (10.9)
3b Overall	--	--	A (9.1)	B (10.9)
3c Overall	--	--	A (9.1)	B (10.9)

²² 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 19
Peak Hour Levels of Service (LOS)
Based on Beiser Property Traffic Impact Study – May 2023
Prepared by Becker Morgan Group, Inc.

Signalized Intersection ^{23, 24}	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
18 - Rising Sun Rd & Walnut Shade Rd / Voshells Mill Star Hill Rd				
2022 Existing Condition (Case 1)				
Overall	B (13.9)	E (74.8)	D (51.7)	E (69.0)
2031 No Build Condition (Case 2)				
Overall	B (15.8)	F (82.3)	D (54.2)	F (82.6)
2031 Build Condition (Case 3a)				
Overall	B (16.4)	E (79.5)	E (57.7)	F (94.3)
2031 Build Condition (Case 3b)				
Overall	B (16.4)	E (79.6)	E (57.7)	F (94.3)
2031 Build Condition (Case 3c)				
Overall	B (16.4)	E (79.6)	E (57.7)	F (94.3)
2031 Build Condition (Case 3) w/ Improvements ²⁵				
3a Overall	B (16.7)	C (32.2)	D (41.4)	D (49.1)
3b Overall	B (16.7)	C (32.1)	D (41.4)	D (49.1)
3c Overall	B (16.7)	C (32.1)	D (41.4)	D (49.1)

²³ 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.

²⁴ The TIS and McCormick Taylor modeled this signalized intersection with Synchro software using the Synchro Lanes, Volumes, and Timings Report due to its nonstandard geometry and signal phasing.

²⁵ TIS improvements include optimizing signal timing parameters to coincide with future case traffic development scenarios. McCormick Taylor improvements include 250' left-turn lanes on westbound Sorghum Mill Road, southeast bound Voshells Mill Star Hill Road, and northeast bound Walnut Shade Road, and signal optimization.

Table 20
Peak Hour Levels of Service (LOS)
Based on Beiser Property Traffic Impact Study – May 2023
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ²⁶ Minor Stop-Controlled (TWSC)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
19 – Rising Sun Road & S. Old Mill Road/Steffens Boulevard				
2022 Existing Condition (Case 1)				
Southbound Rising Sun Road – Lefts	A (7.7)	A (7.7)	A (7.7)	A (7.7)
Northbound Rising Sun Road - Lefts	A (7.6)	A (7.9)	A (7.6)	A (7.9)
Westbound S. Mill Road	B (13.0)	B (14.7)	B (11.8)	B (14.7)
Eastbound S. Mill Road	B (10.6)	B (13.2)	B (12.2)	B (14.4)
2031 No Build Condition (Case 2)				
Southbound Rising Sun Road – Lefts	A (7.8)	A (7.8)	A (7.8)	A (7.8)
Northbound Rising Sun Road - Lefts	A (7.7)	A (8.1)	A (7.7)	A (8.1)
Westbound S. Mill Road	B (12.4)	B (14.1)	B (14.1)	C (16.2)
Eastbound S. Mill Road	B (11.3)	B (14.5)	B (13.0)	C (15.8)
2031 Build Condition (Case 3a)				
Southbound Rising Sun Road – Lefts	A (7.9)	A (7.8)	A (7.9)	A (7.8)
Northbound Rising Sun Road - Lefts	A (7.7)	A (8.1)	A (7.7)	A (8.1)
Westbound S. Mill Road	B (12.8)	B (14.8)	B (12.9)	B (14.7)
Eastbound S. Mill Road	B (11.6)	C (15.3)	C (13.4)	C (16.7)
2031 Build Condition (Case 3b)				
Southbound Rising Sun Road – Lefts	A (7.9)	A (7.8)	A (7.9)	A (7.8)
Northbound Rising Sun Road - Lefts	A (7.7)	A (8.1)	A (7.7)	A (8.1)
Westbound S. Mill Road	B (12.8)	B (14.8)	B (12.9)	B (14.7)
Eastbound S. Mill Road	B (11.6)	C (15.3)	C (13.4)	C (16.7)
2031 Build Condition (Case 3c)				
Southbound Rising Sun Road – Lefts	A (7.9)	A (7.8)	A (7.9)	A (7.8)
Northbound Rising Sun Road - Lefts	A (7.7)	A (8.1)	A (7.7)	A (8.1)
Westbound S. Mill Road	B (12.8)	B (14.8)	B (12.9)	B (14.7)
Eastbound S. Mill Road	B (11.6)	C (15.3)	C (13.4)	C (16.7)

²⁶ 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 21
Peak Hour Levels of Service (LOS)
Based on Beiser Property Traffic Impact Study – May 2023
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ²⁷ Minor Stop-Controlled (TWSC)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
20 – Walnut Shade Road & Briar Bush Road				
2022 Existing Condition (Case 1)				
Westbound Briar Bush Road	B (11.2)	B (10.8)	B (11.3)	B (10.8)
Southbound Walnut Shade Road – Lefts	A (7.9)	A (7.7)	A (7.9)	A (7.7)
2031 No Build Condition (Case 2)				
Westbound Briar Bush Road	B (11.5)	B (11.2)	B (11.6)	B (11.2)
Southbound Walnut Shade Road – Lefts	A (7.9)	A (7.7)	A (7.9)	A (7.8)
2031 Build Condition (Case 3a)				
Westbound Briar Bush Road	B (11.6)	B (11.3)	B (11.7)	B (11.3)
Southbound Walnut Shade Road – Lefts	A (8.0)	A (7.8)	A (8.0)	A (7.8)
2031 Build Condition (Case 3b)				
Westbound Briar Bush Road	B (11.6)	B (11.3)	B (11.7)	B (11.3)
Southbound Walnut Shade Road – Lefts	A (8.0)	A (7.8)	A (8.0)	A (7.8)
2031 Build Condition (Case 3c)				
Westbound Briar Bush Road	B (11.6)	B (11.3)	B (11.7)	B (11.3)
Southbound Walnut Shade Road – Lefts	A (8.0)	A (7.8)	A (8.0)	A (7.8)

²⁷ 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 22
Peak Hour Levels of Service (LOS)
Based on Beiser Property Traffic Impact Study – May 2023
Prepared by Becker Morgan Group, Inc.

Unsignalized Intersection ²⁸ Minor Stop-Controlled (TWSC)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
21 – Voshells Mill Star Hill Road & Lochmeath Way				
2022 Existing Condition (Case 1)				
Southbound Voshells Mill Star Hill Road	B (10.5)	B (11.2)	B (10.5)	B (11.3)
Eastbound Lochmeath Way – Lefts	A (7.7)	A (7.7)	A (7.8)	A (7.7)
2031 No Build Condition (Case 2)				
Southbound Voshells Mill Star Hill Road	B (10.8)	B (11.8)	B (10.9)	B (11.8)
Eastbound Lochmeath Way – Lefts	A (7.8)	A (7.8)	A (7.9)	A (7.8)
2031 Build Condition (Case 3a)				
Southbound Voshells Mill Star Hill Road	B (10.9)	B (12.1)	B (11.0)	B (12.1)
Eastbound Lochmeath Way – Lefts	A (7.8)	A (7.8)	A (8.0)	A (7.8)
2031 Build Condition (Case 3b)				
Southbound Voshells Mill Star Hill Road	B (10.9)	B (12.1)	B (11.0)	B (12.1)
Eastbound Lochmeath Way – Lefts	A (7.8)	A (7.8)	A (8.0)	A (7.8)
2031 Build Condition (Case 3c)				
Southbound Voshells Mill Star Hill Road	B (10.9)	B (12.1)	B (11.0)	B (12.1)
Eastbound Lochmeath Way – Lefts	A (7.8)	A (7.8)	A (8.0)	A (7.8)

²⁸ 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.