

DEPARTMENT OF TRANSPORTATION 800 Bay Road P.O. Box 778 Dover, Delaware 19903

STATE OF DELAWARE

JENNIFER COHAN SECRETARY

July 26, 2019

Mr. Christopher Duke Becker Morgan Group, Inc. 250 South Main Street Suite 109 Newark, Delaware 19711

Dear Mr. Duke:

The enclosed Traffic Impact Study (TIS) review letter for the proposed **KH** – **Angola** (Tax Parcel 234-11.00-56.02, 56.03, 56.06, 56.09) 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 <u>Development Coordination</u> <u>Manual</u> and other accepted practices and procedures for such studies. DelDOT accepts this review 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,

Trey But I

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 Ms. Janelle Cornwell, Sussex County Planning and Zoning Mr. Andrew Parker, McCormick Taylor, Inc. DelDOT Distribution



DelDOT Distribution

Brad Eaby, Deputy Attorney General Shanté Hastings, Director, Transportation Solutions (DOTS) Drew Boyce, Director, Planning Mark Luszcz, Chief Traffic Engineer, Traffic, DOTS Michael Simmons, Assistant Director, Project Development South, DOTS J. Marc Coté, Assistant Director, Development Coordination T. William Brockenbrough, Jr., County Coordinator, Development Coordination Peter Haag, Traffic Studies Manager, Traffic, DOTS Alastair Probert, South District Engineer, South District Gemez Norwood, South District Public Works Manager, South District Susanne Laws, Sussex Subdivision Review Coordinator, Development Coordination David Dooley, Service Development Planner, Delaware Transit Corporation Mark Galipo, Traffic Engineer, Traffic, DOTS Anthony Aglio, Planning Supervisor, Statewide & Regional Planning John Andrescavage, Sussex County Subdivision Reviewer, Development Coordination Claudy Joinville, Project Engineer, Development Coordination



July 25, 2019

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

RE: Agreement No. 1773 Traffic Impact Study Services Task No. 1A Subtask 26A – KH Angola

Dear Mr. Brestel:

McCormick Taylor has completed its review of the Traffic Impact Study (TIS) for the KH Angola development prepared by Becker Morgan Group, Inc., dated June 2019. Becker Morgan Group prepared the report in a manner generally consistent with DelDOT's *Development Coordination Manual*.

The TIS evaluates the impacts of the KH Angola development, proposed to be located on the southeast corner of the intersection of Delaware Route 24 and Robinsonville Road / Angola Road (Sussex Route 277), in Sussex County, Delaware. The proposed development would consist of a 3,500 sf convenience store with gas pumps. Two access points are proposed; one full access along Angola Road and one rights-in/rights-out access along Delaware Route 24. Construction is anticipated to be completed by 2022.

The subject land consists of four parcels totaling approximately 3.5 acres. The land is currently zoned AR-1 (agricultural residential) within Sussex County, and the developer seeks a conditional use approval to permit the proposed land use.

DelDOT currently has one active project within the study area. DelDOT's Hazard Elimination Program (HEP), formerly Highway Safety Improvement Program (HSIP), includes improvements at the intersections of Delaware Route 24 and Camp Arrowhead Road (Sussex Road 279) / Fairfield Road, and Delaware Route 24 and Robinsonville Road / Angola Road. Planned improvements at both intersections are part of State Contract No. T201200902.

The improvements at the intersection of Delaware Route 24 and Robinsonville Road / Angola Road will include widening the westbound Angola Road and eastbound Robinsonville Road approaches to provide separate left-turn, through, and right-turn lanes. The northbound and southbound Delaware Route 24 approaches will also be widened to provide separate left-turn, through, and right-turn lanes. In addition, the left-turn and right-turn lanes will be extended on all approaches to meet storage requirements.



This HEP project is currently in design, with right-of-way acquisition starting in the fall of 2019 and construction starting in the spring of 2021.

It is also noted that the proposed development is located within the boundary of the Henlopen Transportation Improvement District (TID) as presently contemplated by Sussex County and DelDOT. The 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.

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

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

Intersection	Existing Traffic Control	Situations for which deficiencies occur
Delaware Route 24 and Robinsonville Road / Angola Road	Signalized	2019 existing Saturday (case 1); 2022 AM, PM & Saturday without and with KH Angola (case 2 & 3)

For the projected future LOS deficiencies at the intersection of Delaware Route 24 and Robinsonville Road / Angola Road, it is noted that the deficiencies are only anticipated to occur without DelDOT's Delaware Route 24 at Robinsonville Road / Angola Road Intersection Improvements Project. When analyzed with the improvements planned as part of that project, future LOS is acceptable (either without or with the KH Angola development). It is also important to note that the DelDOT project is currently projected to go to construction in spring of 2021, and the KH Angola project is anticipated to be complete in 2022. Should the DelDOT project be delayed, or should the KH Angola project move forward sooner than expected, coordination between the developer, DelDOT, and Sussex County is critical to ensure acceptable design and operations of the intersection and site accesses as the KH Angola project is constructed and opens to traffic. This could potentially involve additional improvements by the developer that are not currently anticipated or recommended.

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



1. The developer should construct Site Access A on Angola Road. The proposed configuration is shown in the table below.

Approach	Current Configuration	Proposed Configuration
Northbound Site Access A	Does not exist	One shared left-turn/right-turn lane
Eastbound Angola Road	One through lane	One through lane and one right-turn lane
Westbound Angola Road	One through lane	One left-turn lane (continuing to the downstream signalized intersection), one through lane, and one right-turn lane (for the downstream signalized intersection)

Note that proposed configuration above reflects the anticipated future condition in which the westbound Angola Road left-turn lane and right-turn lane for the downstream signalized intersection at Delaware Route 24 would extend beyond the Site Access A location. These and other improvements at the signalized intersection are planned as part of DelDOT's Delaware Route 24 at Robinsonville Road / Angola Road Intersection Improvements Project (see project description on Page 1, and Item No. 3 below).

Initial recommended minimum turn-lane lengths (excluding tapers) of the separate turn lanes *at Site Access A* 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 process.

Approach	Left-Turn Lane	Right-Turn Lane
Northbound	N/A	N/A
Site Access A	IN/A	
Eastbound	N/A	100 feat *
Angola Road	IN/A	190 leet
Westbound	160 faat **	N/A
Angola Road		IN/A

* Turn-lane length based on DelDOT's *Auxiliary Lane Worksheet*, although distance may be limited by site constraints and proximity to the upstream intersection.

** Turn-lane length is based on DelDOT's *Auxiliary Lane Worksheet*. Length shown is from the Site Access A location to the beginning of the full-width portion of the turn lane, which may not match the current turn lane design of DelDOT's intersection improvements project. Note that the turn lane will continue past Site Access A to the downstream signalized intersection.



2. The developer should construct Site Access B on Delaware Route 24. The proposed configuration is shown in the table below.

Approach	Current Configuration	Proposed Configuration		
Northbound Delaware Route 24	One through lane	One left-turn lane (for the downstream signalized intersection), one through lane, and one right turn lane (continuing to the downstream signalized intersection)		
Southbound Delaware Route 24	One through lane	One through lane		
Westbound Site Access B	Does not exist	One right-turn lane		

The developer should also construct a concrete median on Delaware Route 24 from the stop bar at the Robinsonville Road / Angola Road signal to a point sufficiently far enough south of Site Access B to physically restrict the lefts-out and lefts-in movements at Site Access B. The developer should also erect "No Left Turn" signs (MUTCD R3-2) on the southbound and westbound approaches. The developer should coordinate with DelDOT's Development Coordination Section to determine design details for the Delaware Route 24 median during the site plan review process.

Note that proposed configuration in the table above reflects the anticipated future condition in which the northbound Delaware Route 24 left-turn lane and right-turn lane for the downstream signalized intersection at Robinsonville Road / Angola Road would extend beyond the Site Access B location. These and other improvements at the signalized intersection are planned as part of DelDOT's Delaware Route 24 at Robinsonville Road / Angola Road Intersection Improvements Project (see project description on Page 1, and Item No. 3 below).

Initial recommended minimum turn-lane lengths (excluding tapers) of the separate turn lanes *at Site Access B* 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 process.

Approach	Left-Turn Lane	Right-Turn Lane		
Northbound	NI/A	205 foot *		
Delaware Route 24	IN/A	303 leet		
Southbound	NI/A	N/A		
Delaware Route 24	IN/A	IN/A		
Westbound	NI/A	N/A		
Site Access B	IN/A	IN/A		

Turn-lane length is based on DelDOT's *Auxiliary Lane Worksheet*. Length shown is from the Site Access B location to the beginning of the full-width portion of the turn lane, which does not match the current turn lane design of DelDOT's intersection improvements project. Note that the turn lane will continue past Site Access B to the downstream signalized intersection.

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- 3. The developer should coordinate with DelDOT regarding an equitable share contribution toward DelDOT's Delaware Route 24 at Robinsonville Road / Angola Road Intersection Improvements Project. The amount of the contribution should be determined through coordination with DelDOT's Development Coordination Section. The developer should also coordinate with DelDOT regarding the design of site accesses, associated turn lanes, and all bicycle and pedestrian facilities to ensure they are acceptable and integrated into the design of the DelDOT intersection improvements project as appropriate.
- 4. The following bicycle and pedestrian improvements should be included:
 - a. Adjacent to the proposed right-turn lanes on northbound Delaware Route 24 and eastbound Angola Road at the proposed site entrances, a minimum of a five-foot bicycle lane should be dedicated and striped with appropriate markings for bicyclists through the turn lane in order to facilitate safe and unimpeded bicycle travel. These bicycle lanes are also proposed as part of the DelDOT intersection improvements project; as such the developer should coordinate with DelDOT regarding the design details to ensure they are acceptable for both projects.
 - 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 easement from the edge of the right-of-way should be dedicated to DelDOT within the site frontage along Delaware Route 24 and Angola Road.
 - e. Within the easements along Delaware Route 24 and Angola Road, a minimum of a tenfoot wide shared-use path that meets current AASHTO and ADA standards should be constructed along each site frontage. Each shared-use path should have a minimum of a five-foot buffer from the roadway. Each 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 exact locations and details of the shared-use path connections at the property boundaries.
 - f. ADA compliant curb ramps and crosswalks should be provided at all pedestrian crossings within the development. Type 3 curb ramps are discouraged.
 - g. Internal sidewalks for pedestrian safety should be constructed within the development. These sidewalks should each be a minimum of five feet wide and should meet current AASHTO and ADA standards. These internal sidewalks should connect to the proposed shared-use paths along Delaware Route 24 and Angola Road.



- h. Where internal sidewalks are located alongside of parking spaces, a buffer should be added to prevent vehicular overhang onto the sidewalk.
- i. The developer should coordinate with the Delaware Transit Corporation (DTC) regarding the possibility of including a bus stop to be located within the site frontage along Delaware Route 24.

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 <u>ajparker@mccormicktaylor.com</u> if you have any questions concerning this review.

Sincerely,

McCormick Taylor, Inc.

Auchstan J. Värken

Andrew J. Parker, P.E., PTOE Project Manager

Enclosure

General Information

Report date: June 2019 Prepared by: Becker Morgan Group, Inc. Prepared for: KH Sussex, LLC Tax parcel: 234-11.00-56.02, 56.03, 56.06, and 56.09 Generally consistent with DelDOT's *Development Coordination Manual*: Yes

Project Description and Background

Description: The proposed commercial development would consist of a 3,500 sf convenience store with gas pumps.

Location: The KH Angola development is proposed to be located on the southeast corner of the intersection of Delaware Route 24 and Robinsonville Road / Angola Road (Sussex Route 277), in Sussex County, Delaware. A site location map is included on page 8.

Amount of land to be developed: approximately 3.5 acre assemblage of parcels

Land use approval(s) needed: Subdivision approval. The land is currently zoned AR-1 (agricultural residential) within Sussex County, and the developer seeks a conditional use approval to permit the proposed land use.

Proposed completion date: 2022

Proposed access locations: Two access points are proposed; one full access along Angola Road and one rights-in/rights-out access along Delaware Route 24.

Daily Traffic Volumes (per DelDOT Traffic Summary 2018):

- 2018 Average Annual Daily Traffic on Angola Road: 3,309 vpd
- 2018 Average Annual Daily Traffic on DE 24: 19,142 vpd

Detailed TIS Review by McCormick Taylor, Inc.



2015 Delaware Strategies for State Policies and Spending

Location with respect to the Strategies for State Policies and Spending Map of Delaware: The proposed KH Angola retail development is located within Investment Level 3 area.

Investment Level 3

Investment Level 3 areas fall into two categories. The first category covers land that is in the longterm growth plans of counties or municipalities, but where development is not necessary to accommodate expected short-term population growth. The second category includes lands that are adjacent to fast growing Investment Level 1 and 2 areas but are often impacted by environmentally sensitive features, agricultural-preservation issues, or other infrastructure issues. From a housing perspective, Investment Level 3 areas are characterized by low density and rural homes.

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

The proposed KH Angola development is comprised of a 3,500 square-foot convenience market with gas pumps, located within an Investment Level 3 area. Investment Level 3 reflects areas where growth is anticipated by the county in the long-term. Given that the location is in a Growth Area as defined by Sussex County and that the anticipated opening date for this development is three years out, the proposed development generally appears to comply with the guidelines of Investment Level 3 areas as described in the 2015 "Strategies for State Policies and Spending."

Comprehensive Plan

Sussex County Comprehensive Plan:

(Source: Sussex County Comprehensive Plan Update, June 2008)

The Sussex County Comprehensive Plan Future Land Use Map indicates that the proposed development parcels are within the Environmentally Sensitive Developing Area (categorized as a Growth Area).

Growth Areas, including the Environmentally Sensitive Developing Area, are designed to accommodate concentrated levels of development. The Environmentally Sensitive Developing Area has been designated by Sussex County for large areas around Rehoboth Bay, Indian River Bay, and Little Assawoman Bay (the inland bays). This designation recognizes two characteristics of these areas. First, these regions are among the most desirable locations in Sussex County for new housing, as reflected in new construction data and real estate prices. Second, these regions contain ecologically important wetlands and other coastal lands that help absorb floodwaters and provide extensive habitat for native flora and fauna. These areas also have great impacts upon the water quality of the bays and inlets and upon natural habitats.

The challenge in these regions is to safeguard genuine natural areas and mitigate roadway congestion without stifling the tourism and real estate markets that: a) provide many jobs; b) create business for local entrepreneurs; and c) help keep local tax rates reasonable. The County has major initiatives to extend public sewer service to replace failing on-site systems in many of these areas.

Very careful control of stormwater runoff is an extremely important concern to keep sediment and other pollutants out of the inland bays.

The following major guidelines should apply to future growth in Environmentally Sensitive Developing Areas:

Permitted uses – Environmentally Sensitive Developing Areas are areas that can accommodate development provided special environmental concerns are addressed. A range of housing types should be permitted in Environmentally Sensitive Areas, including single-family homes, townhouses and multi-family units. Retail and office uses are appropriate but larger shopping centers and office parks should be confined to selected locations with access to arterial roads. Careful mixtures of homes with light commercial and institutional uses can be appropriate to provide for convenient services and to allow people to work close to home. Major new industrial uses are not proposed in these areas. Industrial zones are regulated by the Delaware Coastal Zone Act, which restrict heavy industry and bulk transfer.

Densities – The Environmentally Sensitive Developing Areas function as an "overlay" area to several underlying zoning districts. It may be advisable for legal reasons to convert this overlay area into regular zoning districts, while maintaining the current standards. Most of the Environmental Sensitive Developing Areas should continue to allow 2 homes per acre. The option should exist to go up to 4 units per acre if the developer uses optional density bonuses. Smaller lots and flexibility in dimensional standards should be allowed if the developer uses a cluster option that results in permanent preservation of a substantial percentage of the tract.

The County may also consider an additional layer of protection in the Environmentally Sensitive Developing Areas. Tidal wetland area could be subtracted from the total tract size so that "net" tract size is used as the basis for calculating how much development is allowed.

All applicants for developments of a minimum size (as specified in zoning) should continue to be required to provide information that analyzes the development's potential environmental impacts, including effects on stormwater runoff, nitrogen and phosphorous loading, wetlands, woodlands, wastewater treatment, water systems, and other matters that affect the ecological sensitivity of the inland bays.

Infrastructure – Central water and sewer facilities are strongly encouraged. If central utilities are not possible, permitted densities should be limited to 2 units per acre.

Proposed Development's Compatibility with Comprehensive Plan: The proposed development is planned to be developed as a 3,500 square-foot convenience market with gas pumps on a 3.5-acre parcel. The site is currently zoned AR-1 (agricultural residential) within Sussex County, and no rezoning is proposed. The purpose of this zoning district is to protect agricultural lands and activities and other valuable natural resources. Low-density housing is permitted along with churches, recreational facilities, and accessory uses as may be necessary or is normally compatible with residential surroundings. The proposed development appears to comply with the characteristics of Growth Areas in general as well as the *Permitted Uses* for the Environmentally Sensitive Developing Area.

Detailed TIS Review by *McCormick Taylor, Inc.*

While the type of use proposed for this site appears to be permitted in this location by the Comprehensive Plan, there are specific regulations that must be followed. In addition, there is uncertainty regarding suitability of the proposed use in an AR-1 zoning district. For this reason, the developer seeks a conditional use approval to permit the proposed land use. As this development raises questions regarding consistency with Sussex County zoning regulations, additional discussion may be required.

Relevant Projects in the DelDOT Capital Transportation Program

DelDOT currently has one active project within the study area. DelDOT's Hazard Elimination Program (HEP), formerly Highway Safety Improvement Program (HSIP), includes improvements at the intersections of Delaware Route 24 and Camp Arrowhead Road (Sussex Road 279) / Fairfield Road, and Delaware Route 24 and Robinsonville Road / Angola Road. Planned improvements at both intersections are part of State Contract No. T201200902.

The improvements at the intersection of Delaware Route 24 and Camp Arrowhead Road / Fairfield Road will include widening of the southbound Fairfield Road approach to provide separate left-turn, through and right-turn lanes. In addition, the improvements will include extending the left-turn and right-turn lanes on all approaches to meet storage requirements.

The improvements at the intersection of Delaware Route 24 and Robinsonville Road / Angola Road will include widening the westbound Angola Road and eastbound Robinsonville Road approaches to provide separate left-turn, through, and right-turn lanes. The northbound and southbound Delaware Route 24 approaches will also be widened to provide separate left-turn, through, and right-turn lanes. In addition, the left-turn and right-turn lanes will be extended on all approaches to meet storage requirements.

This HEP project is currently in design, with right-of-way acquisition starting in the fall of 2019 and construction starting in the spring of 2021.

It is also noted that the proposed development is located within the boundary of the Henlopen Transportation Improvement District (TID) as presently contemplated by Sussex County and DelDOT. The 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.

Trip Generation

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

• Super Convenience Market w/ Gas Station (ITE Land Use Code 960)

Table 1KH ANGOLA PEAK HOUR TRIP GENERATION

Land Use	Weekday AM Peak Hour		Weekday PM Peak Hour			SAT Peak Hour			
	In	Out	Total	In	Out	Total	In	Out	Total
Super Convenience Market with Gasoline Pumps	108	108	216	121	121	242	81	81	162
Pass-By Trips	-82	-82	-164	-92	-92	-184	-62	-62	-124
TOTAL TRIPS	26	26	52	29	29	58	19	19	38

Table 2 KH ANGOLA DAILY TRIP GENERATION

Land Use	Weekday Daily				
	In	Out	Total		
Super Convenience Market with Gasoline Pumps	1466	1466	2932		
Pass-By Trips	-1114	-1114	-2228		
TOTAL TRIPS	352	352	704		

Overview of TIS

Intersection examined:

- 1) Angola Road & Proposed Site Access A
- 2) Delaware Route 24 & Proposed Site Access B
- 3) Delaware Route 24 & Robinsonville Road / Angola Road

Conditions examined:

- 1) 2019 existing conditions (case 1)
- 2) 2022 without KH Angola development (case 2)
- 3) 2022 with KH Angola development (case 3)
 - a. with rights-in/rights-out at Delaware Route 24 site access
 - b. with rights-in-only at Delaware Route 24 site access

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

Committed developments considered:

- 1) Acadia (fka Insight at Lewes Point) 238 single family detached houses
- 2) Cape Henlopen Elementary School (720-student elementary school)
- 3) Pelican Landing (88,000 square-foot shopping center)
- 4) Marsh Island (152 single-family detached houses)
- 5) Marsh Farm Estates (104 single-family detached houses)
- 6) Saddle Ridge (81 single-family detached houses)
- 7) Rehoboth Point Yacht Club (188 condominiums and 5,000 square-foot restaurant)

Intersection Descriptions

- Angola Road & Proposed Site Access A Type of Control: one-way stop (T-intersection) Northbound approach: (Proposed Site Access A) proposed shared left-turn/right-turn lane, stop-controlled Eastbound approach: (Angola Road) existing one through lane; proposed one through lane and one right-turn lane Westbound approach: (Angola Road) existing one through lane; proposed one left-turn lane and one through lane
- Delaware Route 24 & Proposed Site Access B Type of Control: one-way stop (T-intersection) Northbound approach: (Delaware Route 24) existing one through lane; proposed one through lane and one right-turn lane Southbound approach: (Delaware Route 24) existing one through lane; proposed one through lane Westbound approach: (Proposed Site Access) proposed one right-turn lane, stopcontrolled

3) Delaware Route 24 & Robinsonville Road / Angola Road

Type of Control: signalized four-leg intersection

Northbound approach: (Delaware Route 24) existing one left-turn lane and one shared through/right-turn lane with right turn channelization; proposed (with DelDOT project) as one left-turn lane, one through lane, and one channelized right-turn lane

Southbound approach: (Delaware Route 24) existing one left-turn lane and one shared through/right-turn lane; proposed (with DelDOT project) as one left-turn lane, one through lane, and one channelized right-turn lane

Eastbound approach: (Robinsonville Road) existing one shared through/left-turn lane and one right-turn lane; proposed (with DelDOT project) as one left-turn lane, one through lane, and one right-turn lane

Westbound approach: (Angola Road) existing one shared through/left-turn lane and one right-turn lane; proposed (with DelDOT project) as one left-turn lane, one through 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: Sight distance is not anticipated to be a problem at this location, but as always adequacy of available sight distance should be confirmed during the site plan review process for all proposed movements at the site access.

The study area generally consists of straight and flat roadways and there are few potential visual obstructions. Sight distance appears adequate throughout the study area. No problematic sight distance issues have been reported or indicated by crash data.

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: The nearest existing transit service is DART bus route 215, which runs along Delaware Route 24 past the KH Angola site. The nearest existing marked transit stops are located on Delaware Route 24 at Peddlers Village (nearly 2 miles from the proposed development).

Planned transit service: There are currently no plans to provide transit service to the proposed development.

Existing bicycle and pedestrian facilities: According to the Sussex County bicycle map, Delaware Route 24 is classified as a "high traffic regional bicycle route with bikeway." Angola Road and Robinsonville Road are each classified as a "connector bicycle route without a bikeway."

There are no marked crosswalks, curb ramps, or pedestrian signals at the study intersection. There are no sidewalks along any of the roadways in the study area.

Planned bicycle and pedestrian facilities: McCormick Taylor contacted a representative of DelDOT's Local Systems Planning Section to determine pedestrian and bicycle accommodations for the proposed development. Maria Andaya recommended to install a 10-foot wide shared-use path along the property frontage on both Delaware Route 24 and Angola Road. Maria also informed that Project Development South has an active project at this intersection (Contract Number T201200902).

It is noted that as part of the DelDOT project, bike lanes are proposed to be added along Delaware Route 24 through the proposed right-turn lanes the Robinsonville Road / Angola Road intersection.

Previous Comments

In a review letter dated May 20, 2019, DelDOT indicated that the Preliminary TIS was acceptable as submitted.

It appears that all substantive comments from DelDOT's TIS Scoping Memorandum, Traffic Count Review, 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)

 For unsignalized and signalized intersections, the TIS and McCormick Taylor applied heavy vehicle factors (HV) by movement using existing data. In some instances, the TIS and McCormick Taylor calculated different heavy vehicle factors with the existing data. Both the TIS and McCormick Taylor assumed 3% HV for future movements to and from the proposed site access point (as per DelDOT's Development Coordination Manual).

- 2) For existing conditions, the TIS and McCormick Taylor determined and utilized overall intersection peak hour factors (PHF). For future conditions, the TIS and McCormick Taylor generally assumed existing PHF for all intersections other than the proposed site entrances. At the site entrances, future PHF were based on the DelDOT Development Coordination Manual.
- 3) Some lane widths were inconsistent with the values presented elsewhere in the study. The TIS utilized the default HCS7 lane width values. McCormick Taylor used field data and measurements from Google Earth for the lane widths.
- 4) For analyses of all intersections, the TIS and McCormick Taylor used a base saturation flow rate of 1,750 pc/hr/ln per DelDOT's Development Coordination Manual.
- 5) The TIS and McCormick Taylor used different signal timings when analyzing the signalized intersections in some cases. The exact signal timings to be implemented are currently being developed

Table 3PEAK HOUR LEVELS OF SERVICE (LOS)Based on Traffic Impact Study for KH AngolaReport dated June 2019Prepared by Becker Morgan Group, Inc.

Proposed Unsignalized Intersection ¹ One-Way Stop Control (T-Intersection)	LOS per TIS			LOS per McCormick Taylor		
Angola Road &	Weekday	Weekday	Saturday	Weekday	Weekday	Saturday
Proposed Site Access A	AM	PM	Mid-Day	AM	PM	Mid-Day
2022 with KH Angola (case 3a)						
Westbound Angola Road - Left	A (7.6)	A (8.3)	A (8.2)	A (7.6)	A (8.3)	A (8.1)
Northbound Site Access	B (11.9)	B (14.9)	C (15.8)	B (11.9)	B (14.9)	C (15.8)
2022 with KH Angola (case 3b)						
Westbound Angola Road - Left	A (7.6)	A (8.3)	A (8.2)	A (7.6)	A (8.3)	A (8.1)
Northbound Site Access	B (12.7)	C (16.9)	C (17.4)	B (12.7)	C (16.9)	C (17.4)

¹ For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 4PEAK HOUR LEVELS OF SERVICE (LOS)Based on Traffic Impact Study for KH AngolaReport dated June 2019Prepared by Becker Morgan Group, Inc.

Proposed Unsignalized Intersection ² One-Way Stop Control (T-Intersection)		LOS per TIS	5	LOS per McCormick Taylor			
Delaware Route 24 &	Weekday	Weekday	Saturday	Weekday	Weekday	Saturday	
Proposed Site Access B	AM	PM	Mid-Day	AM	PM	Mid-Day	
2022 with KH Angola (case 3a)							
Westbound Site Access – Right	B (14.9)	C (16.0)	C (22.3)	B (14.9)	C (16.0)	C (22.3)	

 $^{^{2}}$ 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 5PEAK HOUR LEVELS OF SERVICE (LOS)Based on Traffic Impact Study for KH AngolaReport dated June 2019Prepared by Becker Morgan Group, Inc.

Signalized Intersection ³	LOS per TIS			LOS per McCormick Taylor			
Delaware Route 24 &	Weekday	Weekday	Saturday	Weekday	Weekday	Saturday	
Robinsonville Road / Angola Road ⁴	AM	PM	M1d-Day	AM	PM	M1d-Day	
2019 existing (case 1)	C (26.5)	C (28.1)	E (63.9)	C (26.8)	C (28.1)	E (62.9)	
2022 without KH Angola (case 2) ⁵	N/A	N/A	N/A	E (59.0)	E (73.1)	E (136.4)	
2022 without KH Angola (case 2) with DelDOT improvements	C (21.2)	C (23.2)	C (27.9)	C (21.3)	C (23.3)	C (27.5)	
2022 with KH Angola (case 3a) ⁵	N/A	N/A	N/A	F (85.1)	F (80.5)	F (153.3)	
2022 with KH Angola (case 3a) with DelDOT improvements	C (23.5)	C (24.2)	C (31.1)	C (23.7)	C (24.2)	C (30.5)	
2022 with KH Angola (case 3b) with DelDOT improvements	C (23.4)	C (24.3)	C (30.6)	C (23.5)	C (24.3)	C (30.0)	

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.

⁴ The traffic volumes for this intersection were taken from a previous study for the "Middle Creek Preserve" residential development. The volumes were then adjusted to reflect the traffic in the surrounding intersections in the study area. Given these adjustments from the original traffic count, McCormick Taylor assumed a PHF of 0.92 for all peak hours based on guidance in the DelDOT Development Coordination Manual.

⁵ Per the DelDOT TIS Scoping Meeting, this future case (without DelDOT improvements) was not required to be analyzed by Becker Morgan Group. McCormick Taylor included analysis of this case to illustrate projected future LOS deficiencies if the DelDOT Project is delayed and improvements are not constructed by 2022.