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

NICOLE MAJESKI
SECRETARY

October 4, 2023

Nicole R. Kline-Elsier, P.E., PTOE
McMahon, a Bowman Company
835 Springdale Drive, suite 200
Exton, PA 19341

Dear Ms. Nicole Kline-Elsier:

The enclosed Traffic Impact Study (TIS) review letter for the proposed **Wawa Lincoln** (Protocol Tax Parcel: 130-6.00-115.00) commercial 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: Dennis Silicato, Silicato Development
David Kuklish, Bohler Engineering
Braden Garrison, McMahon, a Bowman Company
David L. Edgell, Office of State Planning Coordination
Jamie Whitehouse, Sussex County Planning & Zoning
Joanne M. Arellano, Johnson, Mirmiran, & Thompson, Inc.
Mir Wahed, Johnson, Mirmiran, & Thompson, Inc.
DelDOT Distribution

DelDOT

DelDOT Distribution

Brad Eaby, Deputy Attorney General
Shanté Hastings, Deputy Secretary / Director of Transportation Solutions (DOTS)
Mark Luszcz, Deputy Director, DelDOT Traffic, DOTS
Michael Simmons, Assistant Director, Project Development South, DOTS
Peter Haag, Chief Traffic Engineer, DelDOT Traffic, DOTS
Wendy Carpenter, Traffic Calming & Subdivision Relations Manager, DelDOT Traffic, DOTS
Sean Humphrey, Traffic Engineer, DelDOT Traffic, DOTS
Matt Schlitter, South District Public Works Engineer, Maintenance & Operations
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, Planning
Wendy Polasko, Subdivision Engineer, Development Coordination, Planning
Kevin Hickman, Sussex County Review Coordinator, Development Coordination, Planning
Derek Sapp, Sussex County Subdivision Reviewer, Development Coordination, Planning
Sireen Muhtaseb, TIS Group Manager, Development Coordination, Planning
Anthony Aglio, Planning Supervisor, Statewide & Regional Planning, Planning
Jennifer Cinelli, Transportation Planner, Statewide & Regional Planning

September 29, 2023

Ms. Annamaria Furmato
Project Engineer
Delaware Department of Transportation
Development Coordination, Division of Planning
800 Bay Road
Dover, DE 19901

RE: Agreement No. 1945F
Project Number 202069012/PO#611882
Traffic Impact Study Services
Task 11-15A –Wawa Lincoln TIS

Dear Ms. Furmato:

Johnson, Mirmiran, and Thompson (JMT) has completed a review of the Traffic Impact Study (TIS) for the Wawa Lincoln development, which was prepared by McMahon, a Bowman Company, dated March 24, 2023. This review was assigned as Task Number 11-15A. The report is prepared in a manner generally consistent with DelDOT's *Development Coordination Manual*.

The TIS evaluates the impacts of a proposed 5,585 square-foot convenience store and gas station with 16 vehicle fueling positions in Sussex County, Delaware. The site is located on the northeast corner of the intersection of US Route 113 and Johnson Road (Sussex Road 207). The subject property is on an approximately 3.21-acre assemblage of parcels that is currently zoned as C-1 (General Commercial) and the developer does not plan to rezone the land. Construction for the development is anticipated to be completed in 2024. Two access points are proposed: one along Johnson Road and one along US Route 113.

The TIS evaluated the entrance along Johnson Road as full access and included four access scenarios for the proposed entrance along US Route 113:

- Case 3a – no access along US Route 113
- Case 3b – rights-in only access on US Route 113
- Case 3c – rights-out only access on US Route 113
- Case 3d – rights-in/rights-out access on US Route 113

It should be noted that the latest site plan depicts an increase in the proposed convenience store size to approximately 5,915 square feet which is approximately 330 square feet larger than what was evaluated within the TIS. As the increase in size would have a minimal increase to the projected trip generation, an updated TIS reflecting the new proposed store size is not required by DelDOT. Page 14 contains a table summarizing the difference in trip generation between the two store sizes. The recommendations contained within this letter are based on the 5,585 square feet convenience store with gas and are applicable to the latest site plan depicting the increased convenience store size of 5,915 square feet.

DelDOT has relevant and ongoing improvement projects within the study area including the *Corridor Capacity Preservation Program* (CCPP), which aims to maintain the regional importance and preserve the intended function and capacity of existing designated transportation routes within the Program. The main objectives of the program are listed below:

- Prevent the need to build an entirely new road
- Minimize the transportation impacts of increased economic growth
- Maintain an existing road's ability to handle traffic efficiently and safely
- Preserve the ability to make future improvements
- Sort local and through traffic

US Route 113 is one of the highways included in the CCPP. More information regarding the CCPP can be found at https://deldot.gov/Programs/corr_cap/index.shtml

The *US 113 North/South Study* examined potential improvements throughout the entire length of US Route 113 in Delaware, from the Maryland state line in Selbyville to SR 1 north of Milford. The study is divided into four geographic areas, and the site falls into the Milford/Lincoln area. As of July 1, 2007, DelDOT was prohibited from proceeding with the US 113 North/South Study in the Milford/Lincoln area. Given the lack of community consensus, DelDOT is not performing any work to further develop and advance any of the alternatives at this time. More information about the US 113 North/South Study can be found at:
https://deldot.gov/projects/Studies/us113/milford/index.shtml

A pavement and rehabilitation project is planned along Fitzgerald Road (Sussex Road 207) from US Route 113 to Shawnee Road (Delaware Route 36). The project proposes resurfacing and is planned to be complete in Fall of 2023.

Based on our review of the traffic impact study, 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. The table below does not include any signalized intersections that exhibit LOS deficiencies that can be mitigated with signal timing optimization as optimization would not be the responsibility of the developer.

Intersection	LOS Deficiencies Occur			Case
	AM	PM	SAT	
Site Entrance A/Johnson Road (Sussex Road 207)	X	X		Case 3a – 2024 with Development
	X	X		Case 3b – 2024 with Development
	X	X		Case 3c – 2024 with Development
US Route 113/Johnson Road	X	X		Case 2 – 2024 without Development
	X	X		Case 3a – 2024 with Development
	X	X		Case 3b – 2024 with Development
	X	X		Case 3c – 2024 with Development
	X	X		Case 3d – 2024 with Development

- Case 3a – no access along US Route 113
- Case 3b – rights-in only access on US Route 113
- Case 3c – rights-out only access on US Route 113
- Case 3d – rights-in/rights-out access on US Route 113

Site Entrance A/Johnson Road

The unsignalized Site Entrance A intersection with Johnson Road would exhibit LOS deficiencies along the southbound Site Entrance A approach under Case 3a (2024 with development and with no access along US Route 113), Case 3b (2024 with development and with rights-in only access along US Route 13), and Case 3c (2024 with development and with rights-out only access along US Route 113) conditions during the weekday AM and PM peak hours. However, with the provision of a separate left turn lane and right turn lane along the southbound Site Entrance A approach, the intersection would operate at acceptable LOS during all peak hours under Case 3a and Case 3b conditions. Under Case 3c conditions, the southbound Site Entrance A approach would continue to experience capacity constraints with a delay of 35.3 seconds per vehicle with the provision of separate turn lanes but the calculated 95th percentile queue length would be approximately 60 feet and could be accommodated onsite without impeding onsite operations. Under Case 3d (2024 with development and with rights-in/rights-out access along US Route 113) conditions, the intersection would operate at acceptable LOS D with a delay of 34.8 seconds per vehicle, however, the delay would improve to 24.0 seconds per vehicle with the provision of southbound turn lanes. As such, it is recommended that the developer construct the Site Entrance A and Johnson Road intersection with one left turn lane and one right turn lane along the southbound Site Entrance A approach.

US Route 113/Johnson Road

The signalized US Route 113 and Johnson Road intersection exhibits LOS deficiencies during the weekday AM and PM peak hours under future conditions with or without the proposed development (regardless of the US Route 113 entrance configuration). Under Case 2 (2024 without development) conditions during the PM peak hour, the US Route 113 and Johnson Road intersection would operate at LOS E with a delay of 77.7 seconds per vehicle. Under Case 3a

conditions (2024 with development and with no access along US Route 113) during the PM peak hour, the US Route 113 and Johnson Road intersection would operate at LOS F with 90.3 seconds of delay per vehicle. Per the CCPP, direct access may be permitted along US Route 113 if providing access only to Johnson Road would degrade operations and capacity at the US Route 113/Johnson Road intersection.

To mitigate the LOS deficiencies, it is recommended the developer reconstruct the intersection to provide one left turn lane, one through lane, and one right turn lane along the eastbound and westbound approaches and the conversion of the phasing along those approaches to be concurrent with protected-permitted left turn phasing. With the recommended improvements, the US Route 113/Johnson Road intersection would improve during the PM peak hour to operate at LOS D with 53.4 seconds of delay per vehicle.

Under Case 3a conditions with the recommended intersection improvements during the PM peak hour, the projected 95th percentile queue length along the westbound Johnson Road approach would be approximately 390 feet which would spillback past Site Entrance A (Site Entrance A is proposed approximately 365 feet east of the US Route 113 intersection). Under Case 3d conditions with the recommended intersection improvements during the PM peak hour, the projected 95th percentile queue length along the westbound Johnson Road approach would be approximately 340 feet which would not spillback past Site Entrance A. Therefore, to minimize the potential for queue lengths to spillback onto the proposed Johnson Road site entrance, it is recommended that a rights-in/rights-out entrance be provided along US Route 113.

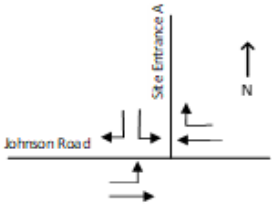
It appears that the Site Entrance A intersection could be relocated further east (approximately 545 feet east of the northeast point of tangency at the Johnson Road/US Route 113 intersection). Therefore, the proposed Site Entrance A approach to Johnson Road should be located as far east from the US Route 113 intersection as possible (approximately 545 feet east of the northeast point of tangency at the Johnson Road/US Route 113 intersection). Additionally, it is recommended that the developer enter into a signal agreement for the US Route 113 and Johnson Road intersection and modify the eastbound and westbound Johnson Road approaches to provide one left turn lane, one through lane, and one right turn lane.

Should Sussex County approve the proposed development, the following items should be incorporated into the site design and reflected on the record plan, 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 and Design Deviations approved 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 US Route 113 and Johnson 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

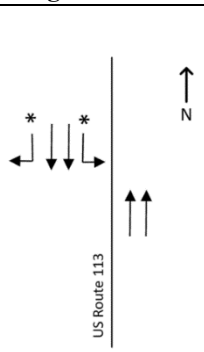
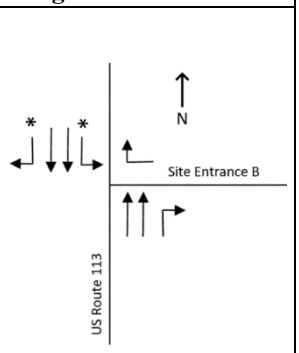
roadway perpendicular to lines created by the projection of the outside parcel corners to the roadway." The developer should coordinate with DelDOT's Development Coordination Section during the site plan review to determine the improvements.

2. The developer should construct an unsignalized Site Entrance A for the proposed Wawa Lincoln development along Johnson Road as shown on the Recommendations Map on page 8, approximately 545 feet east of the northeast point of tangency at the intersection with US Route 113. The intersection should be consistent with the lane configurations shown in the table below.

Approach	Current Configuration		Proposed Configuration	
Eastbound Johnson Road	One through lane		One left turn lane and one through lane	
Westbound Johnson Road	One through lane		One through lane and one right turn lane	
Southbound Site Entrance A	Approach does not exist		One left turn lane and one right turn lane	

Based on DelDOT's *Development Coordination Manual,* the recommended minimum storage length (excluding taper) of the eastbound Johnson Road left turn lane is 170 feet and the westbound Johnson Road right turn lane is 240 feet. However, due to the adjacent Johnson Road/US Route 113 intersection auxiliary lanes, the eastbound Johnson Road left turn lane is recommended to be 100 feet (excluding taper). The projected queues from the HCS analysis can be accommodated within the recommended storage lengths.

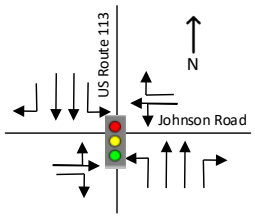
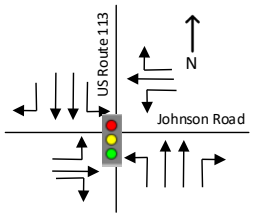
3. The developer should construct an unsignalized rights-in/rights-out Site Entrance B for the proposed Wawa Lincoln development along US Route 113 as shown on the Recommendations Map on page 8, approximately 350 feet north of the northeast point of tangency at the intersection with Johnson Road. The intersection should be consistent with the lane configurations shown in the table below.

Approach	Current Configuration		Proposed Configuration	
Westbound Site Entrance B	Approach does not exist		One right turn lane	
Northbound US Route 113	Two through lanes		Two through lanes and one right turn lane	
Southbound US Route 113	One left turn lane*, two through lanes, and one right turn lane*		No change	

*Turn lanes are for the adjacent US Route 113/Johnson Road intersection

Based on DelDOT's *Development Coordination Manual,* the recommended minimum storage length (excluding taper) of the northbound US Route 113 right turn lane is 410 feet. However, due to the length of the site frontage and the adjacent Johnson Road/US Route 113 intersection, the northbound right-turn lane is recommended to be 250 feet (excluding taper). The projected queues from the HCS analysis can be accommodated within the recommended storage length.

4. The developer should modify the eastbound and westbound Johnson Road approaches to US Route 113 to provide one left turn, one through lane, and one right turn lane. The acceleration lane and channelization for the westbound Johnson Road right turn lane should be removed. Concurrent signal phasing with protected/permissive left turns and signalized pedestrian crossings should be provided. The intersection, as shown on the Recommendations Map on page 8, should be consistent with the lane configurations depicted in the table below.

Approach	Current Configuration		Proposed Configuration	
Eastbound Johnson Road	One shared left turn/through lane and one right turn lane		One left turn lane, one through lane, and one right turn lane	
Westbound Johnson Road	One shared left turn/through lane and one right turn lane		One left turn lane, one through lane, and one right turn lane	
Northbound US Route 113	One left turn lane, two through lanes, and one right turn lane		No Change	
Southbound US Route 113	One left turn lane, two through lanes, and one right turn lane		No Change	

The recommended minimum storage lengths (excluding taper) are summarized in the table below. The projected queues from the HCS analysis can be accommodated within the recommended storage lengths.

Approach	Left Turn Lane	Right Turn Lane
Eastbound Johnson Road	100 feet	190 feet
Westbound Johnson Road	340 feet	280 feet

The developer should coordinate with DelDOT's Development Coordination Section during the plan review process regarding the design.

5. The developer should enter into a traffic signal agreement with DelDOT for the US Route 113 and Johnson Road intersection. The developer should coordinate with the DelDOT Subdivision Section to execute the traffic signal agreement.

6. Cross-access easements should be provided to the properties adjacent to the site.

7. The following bicycle, pedestrian, and transit improvements should be included:

a. A minimum of fifteen-foot wide permanent easement from the edge of the right-of-way should be dedicated to DelDOT along the US Route 113 and Johnson Road site frontage. Within the easement, the developer should construct a ten-foot wide shared-use path (SUP) with an angled termination into the shoulder where the shoulder/bike lane is at least five feet wide. The SUP should be designed to meet current AASHTO and ADA standards. A minimum five-foot setback should be maintained from the edge of the pavement to the SUP. If feasible, the SUP should be placed behind utility poles and street trees should be provided within the buffer area. The developer should coordinate with DelDOT's Development Coordination Section during the plan review process to identify the exact location of the SUP.

b. Internal connections from the SUP along both US Route 113 and Johnson Road into the site are required.

c. ADA compliant curb ramps and marked crosswalks should be provided along the Site Entrance approaches to Johnson Road and US Route 113.

d. Minimum five-foot wide bicycle lanes should be incorporated in the right turn lane and shoulder along the Johnson Road approaches to the Site Entrance.

e. Utility covers should be moved outside of any designated bicycle lanes and any proposed sidewalks/SUP or should be flush with the pavement.

f. Bicycle parking should be provided near the building entrances. Where the building architecture provides for an awning or other overhang, the bicycle parking should be covered.

Please note that this review generally focuses on capacity and level of service issues; additional safety, operational, and constructability issues will be further addressed through DelDOT's Plan Review process.

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 https://www.deldot.gov//Publications/manuals/de_mutcd/index.shtml.

Additional details on our review of the TIS are attached. Please contact me at (302) 266-9600 if you have any questions concerning this review.

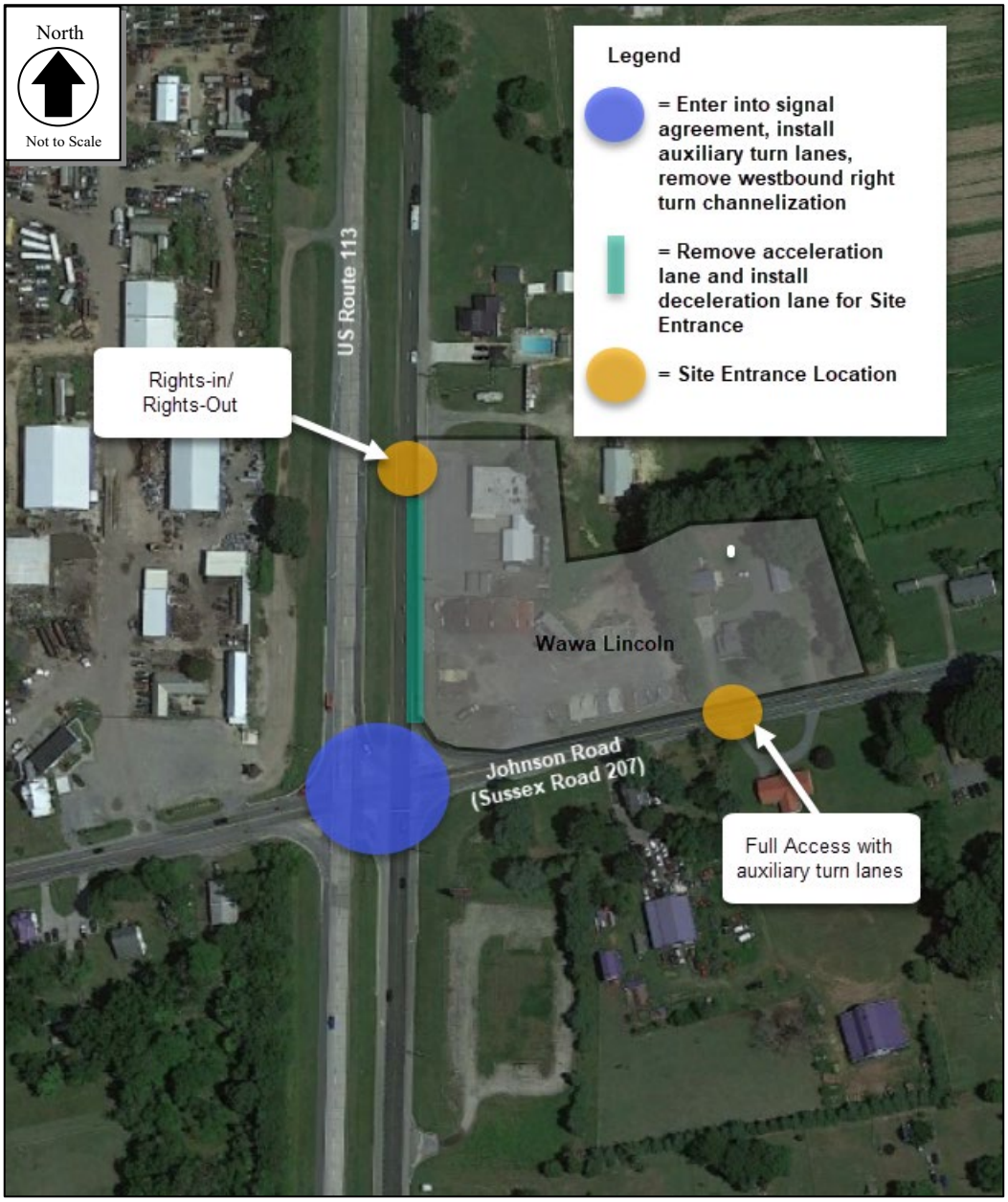
Sincerely,
Johnson, Mirmiran, and Thompson, Inc.

Joanne M. Arellano, P.E., PTOE

cc: Mir Wahed, P.E., PTOE
Janna Brown, P.E.

Enclosure

Recommendations Map



General Information

Report date: March 24, 2023
Prepared by: McMahon, a Bowman Company
Prepared for: Silicato Development
Tax Parcels: 130-6.00-115.00, 116.01, 118.00 and 118.01
Generally consistent with DelDOT's *Development Coordination Manual (DCM)*: Yes

Project Description and Background

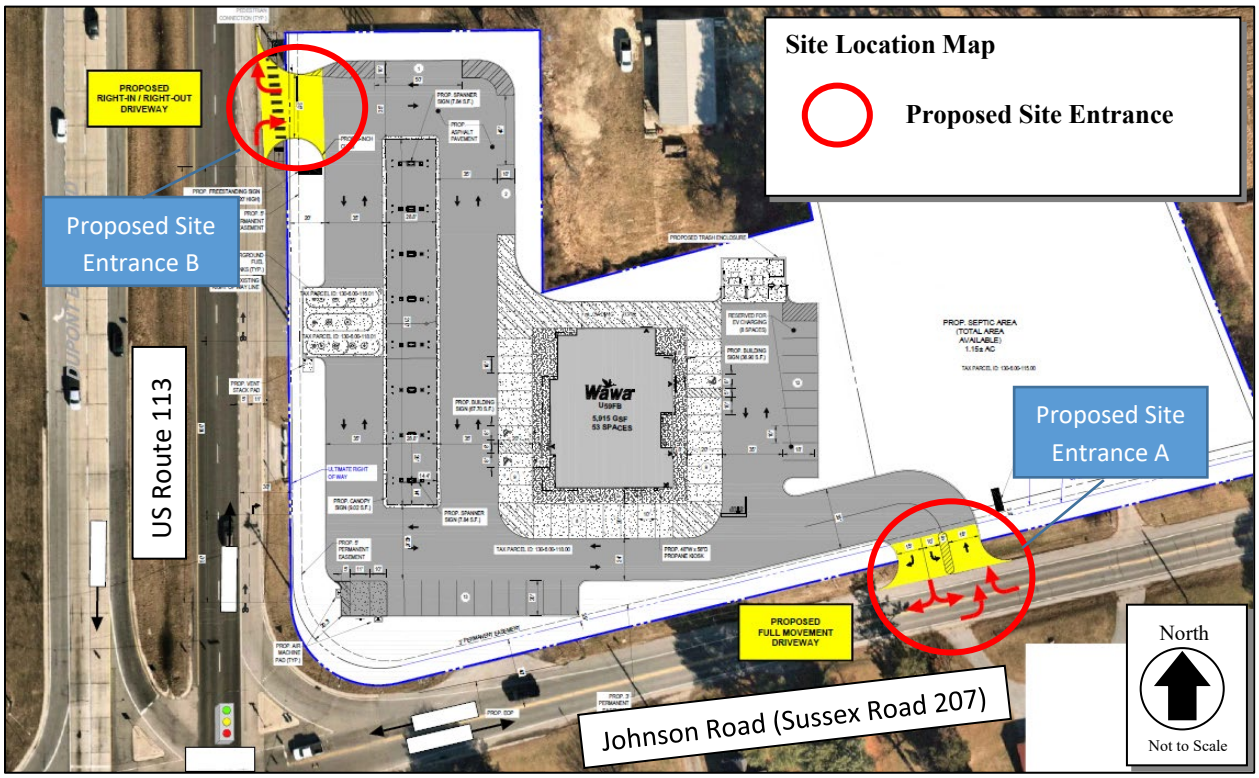
Description: The proposed development consists of a 5,585 square-foot convenience market/gas station with 16 vehicle fueling positions.
Location: The site is located on the northeast corner of the US 113 and Johnson Road intersection, in Sussex County, Delaware.
Amount of Land to be developed: An approximately 3.21-acre assemblage of parcels.
Land Use approval(s) needed: Entrance Plan.
Proposed completion date: 2024.
Proposed access locations: Two full access points are proposed: one on Johnson Road and one on US Route 113.

Daily Traffic Volumes:

- 2022 Average Annual Daily Traffic on Johnson Road: 7,258 vehicles per day.
- 2022 Average Annual Daily Traffic on US Route 113: 17,028 vehicles per day.

*AADT is sourced from data provided by DelDOT Gateway.

Site Map



**Graphic is Figure 2 from the Final Traffic Impact Study for the Lincoln Wawa prepared by McMahon, a Bowman Company, dated March 24, 2023. This graphic does not reflect the recommended entrance configurations.*

Relevant and On-going Projects

DelDOT has relevant and ongoing improvement projects within the study area including the *Corridor Capacity Preservation Program* (CCPP), which aims to maintain the regional importance and preserve the intended function and capacity of existing designated transportation routes within the Program. The main objectives of the program are listed below:

- Prevent the need to build an entirely new road
- Minimize the transportation impacts of increased economic growth
- Maintain an existing road's ability to handle traffic efficiently and safely
- Preserve the ability to make future improvements
- Sort local and through traffic

US Route 113 is one of the highways included in the CCPP. More information regarding the CCPP can be found at https://deldot.gov/Programs/corr_cap/index.shtml

The *US 113 North/South Study* examined potential improvements throughout the entire length of US Route 113 in Delaware, from the Maryland state line in Selbyville to SR 1 north of Milford. The study is divided into four geographic areas, and the site falls into the Milford/Lincoln area. As

of July 1, 2007, DelDOT was prohibited from proceeding with the US 113 North/South Study in the Milford/Lincoln area. Given the lack of community consensus, DelDOT is not performing any work to further develop and advance any of the alternatives at this time. More information about the US 113 North/South Study can be found at:
https://deldot.gov/projects/Studies/us113/milford/index.shtml

A pavement and rehabilitation project is planned along Fitzgerald Road (Sussex Road 207) from US Route 113 to Shawnee Road (Delaware Route 36). The project proposes resurfacing and is planned to be complete in Fall of 2023.

Livable Delaware

(Source: Delaware Strategies for State Policies and Spending, 2020)

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

Investment Level 3

Investment Level 3 Areas generally fall into two categories. The first category covers lands that are in the long-term growth plans of counties or municipalities where development is not necessary to accommodate expected population growth during a five-year planning period (or longer). In these instances, development in Investment Level 3 may be least appropriate for new growth and development in the near term. The second category includes lands that are adjacent to or intermingled with fast-growing areas within counties or municipalities that are otherwise categorized as Investment Levels 1 or 2. Environmentally sensitive features, agricultural-preservation issues, or other infrastructure issues most often impact these lands. In these instances, development and growth may be appropriate in the near term, but the resources on the site and in the surrounding area should be carefully considered and accommodated by state agencies and local government with land-use authority. Investment Level 3 is further characterized by areas with new development separated from existing development by a substantial amount of vacant land that is not contiguous with existing infrastructure, areas that are experiencing some development pressure, areas with existing but disconnected development, and possible lack of adequate infrastructure.

The state will consider investing in infrastructure within Investment Level 3 Areas once the Investment Level 1 and 2 Areas are substantially built out, or when the infrastructure or facilities are logical extensions of existing systems and deemed appropriate to serve a particular area. The priorities in the Level 3 Areas are for DelDOT to focus on regional movements between towns and other population centers. DelDOT also supports the development and implementation of Transportation Improvement Districts in Investment Level 3 areas. Local roadway improvements will be made by developers and property owners as development occurs. Lower priority is given to transportation system–capacity improvements and transit-system enhancements.

Proposed Development's Compatibility with Livable Delaware:
The proposed site is located in Investment Level 3. Investment Level 3 areas include lands that are

adjacent to or intermingled with fast-growing areas within counties or municipalities that are otherwise categorized as Investment Levels 1 or 2 and development may be appropriate in the near term. The proposed site is adjacent to the fast-growing city of Milford which is categorized as Investment Level 1. Therefore, the proposed development is generally consistent with the 2020 update of the Livable Delaware "Strategies for State Policies and Spending."

Comprehensive Plan

(Source: Sussex County Comprehensive Plan, 2019)

Sussex County Comprehensive Plan:
Per the *Sussex County Comprehensive Plan Existing Land Use Map,* the proposed development is currently zoned as Agricultural and Undeveloped Lands. Per the *Sussex County Comprehensive Plan Future Land Use Map,* the proposed development is designated as Low Density within a Rural Area.

Proposed Development's Compatibility with the Sussex County Comprehensive Plan:
The *Sussex County Comprehensive Plan* states that Low Density areas may include land use designated as General Commercial District (C-1). The proposed site is currently zoned at C-1 and the developer does not plan to rezone. Therefore, the proposed development is generally consistent with the *Sussex County Comprehensive Plan*.

Trip Generation

The trip generation for the proposed development was determined by using the comparable land use and rates/equations contained in the *Trip Generation, 11th Edition: An ITE Informational Report*, published by the Institute of Transportation Engineers (ITE) for ITE Land Use Code 945 (Convenience Store/Gas Station) using the land use subcategory of vehicle fueling positions and the independent variable of square footage. Trip generation was reviewed by DelDOT as part of the Preliminary TIS (PTIS) submission.

It should be noted that the latest site plan depicts an increase in the proposed convenience store size to approximately 5,915 square feet which is approximately 330 square feet larger than what was evaluated within the TIS. As the increase in size would have a minimal increase to the projected trip generation, an updated TIS reflecting the new proposed store size is not required by DelDOT. Page 14 contains a table summarizing the difference in trip generation between the two store sizes.

Table 1a
Wawa Lincoln Trip Generation – TIS

Land Use	ADT	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Midday Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
5,585 square-foot Convenience Market/Gas Station (ITE – 945)	7,161	255	255	510	220	221	441	195	196	391
Pass-by Trips		-194	-194	-388	-165	-166	-331	-146	-147	-293
New Trips	**7,161**	**61**	**61**	**122**	**55**	**55**	**110**	**49**	**49**	**98**

Table 1b
Wawa Lincoln Trip Generation – Latest Site Plan

Land Use	ADT	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Midday Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
5,915 square-foot Convenience Market/Gas Station (ITE – 945)	7,585	270	270	540	233	234	467	207	208	415
Pass-by Trips		-205	-205	-410	-175	-175	-350	-155	-156	-311
New Trips	**7,585**	**65**	**65**	**130**	**58**	**59**	**117**	**52**	**52**	**104**

Table 1c
Wawa Lincoln Trip Generation Comparison – New Trips

Land Use	ADT	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Midday Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
5,585 square-foot Convenience Market/Gas Station (ITE – 945)	7,161	61	61	122	55	55	110	49	49	98
5,915 square-foot Convenience Market/Gas Station (ITE – 945)	7,585	65	65	130	58	59	117	52	52	104
Difference	**424**	**4**	**4**	**8**	**3**	**4**	**7**	**3**	**3**	**6**

Overview of TIS

Intersections examined:

1. Site Entrance A / Johnson Road (Sussex Road 207)
2. Site Entrance B / US Route 113
3. US Route 113 / Johnson Road

Conditions examined:

1. Case 1 – 2022 Existing
2. Case 2 – 2024 without Development
3. Case 3 – 2024 with Development
   a. Full access on Johnson Road
   b. Full access on Johnson Road and rights-in only on US Route 113
   c. Full access on Johnson Road and rights-out only on US Route 113
   d. Full access on Johnson Road and one rights-in/rights-out access on US Route 113

Committed Developments considered:

1. Milford Ponds (504 single-family houses, 264 apartments; 181 single-family detached houses have been built)
2. Cypress Hall (548 residential units, 246,914 square-foot shopping center; 78,000 square feet of the shopping center has been built)
3. Simpson's Crossing (450 single-family detached houses, 342 townhouses, 231 apartments; 34 single-family detached houses have been built)
4. Hearthstone Manor I (178 single-family detached houses, 952 condominiums; 97 single-family detached houses and 440 condominiums have been built)
5. Hearthstone Manor II (1,015 condominiums, 123 single-family detached houses)
6. Cuppage Pond Estates (97 single-family detached houses)
7. Cypress Creek Estates (78 single-family detached houses)

*Committed development information provided in the Final TIS supersedes the information provided by the October 31, 2022, DelDOT Scoping Meeting Memorandum.

Peak hours evaluated: Weekday AM, weekday PM, and Saturday midday.

Intersection Descriptions

1. **Site Entrance A / Johnson Road (Sussex Road 207)**
   Type of Control: Proposed two-way stop-controlled intersection (T-intersection).
   Eastbound Approach: (Johnson Road) Existing one through lane; proposed one left turn lane and one through lane.
   Westbound Approach: (Johnson Road) Existing one through lane; proposed one through lane and one right turn lane.
   Southbound Approach: (Site Entrance A) Proposed one shared left turn/right turn lane, stop-controlled.

*A private driveway exists at the northbound leg of the intersection.

2. **Site Entrance B / US Route 113**
   Type of Control: Proposed one-way stop-controlled intersection (T-intersection).
   Westbound Approach: (Site Entrance B) Proposed one right turn lane, stop-controlled.
   Northbound Approach: (US Route 113) Existing two through lanes; proposed two through lanes and one right turn lane.

3. **US Route 113 / Johnson Road**
   Type of Control: Existing signalized intersection (Four-legged).
   Eastbound Approach: (Johnson Road) Existing one shared left turn/through lane and one channelized right turn lane.
   Westbound Approach: (Johnson Road) Existing one shared left turn/through lane and one channelized right turn lane.
   Northbound Approach: (US Route 113) Existing one channelized left turn lane, two through lanes and one right turn lane.
   Southbound Approach: (US Route 113) Existing one channelized left turn lane, two through lanes and one right turn lane.

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: Per DelDOT Gateway, DART Route 303 operates along US Route 113 and has two stops within the study area. Route 303 provides eight round trips from 4:46 AM to 8:57 PM on weekdays.

Planned transit service: Per email correspondence on April 6, 2023, with Mr. Jared Kauffman, Fixed-Route Planner for DART, the following improvements were recommended:

- A sidewalk or SUP is needed along both US 113 and Johnson Road with pedestrian access into the site.
- While DART is not requesting bus stops to be constructed, barriers, like a ditch or fence, should not be placed between the pedestrian pathway and the roadway so DART is able to construct a bus stop when DART deems it necessary.
- It is recommended to provide bicycle parking.

Existing bicycle and pedestrian facilities: According to DelDOT's Sussex County Delaware Bicycle Map, Johnson Road is considered a statewide bicycle route.

Planned bicycle and pedestrian facilities: Per email correspondence on April 11, 2023, with Mr. Anthony Aglio, DelDOT's Bicycle and Pedestrian Coordinator, the following improvements were recommended:

- Require a 10-foot Shared Use Pathway with a 5-foot grass buffer area along both frontages extending to the frontage property limits.

- A pedestrian connection should be provided to the internal sidewalk surrounding the building from our requested multi-use pathway.

Bicycle Level of Traffic Stress in Delaware: Researchers with the Mineta Transportation Institute developed a framework to measure low-stress connectivity, which can be used to evaluate and guide bicycle network planning. Bicycle LTS analysis uses factors such as the speed of traffic, volume of traffic, and the number of lanes to rate each roadway segment on a scale of 1 to 4, where 1 is a low-stress place to ride and 4 is a high-stress place to ride. It analyzes the total connectivity of a network to evaluate how many destinations can be accessed using low-stress routes. Developed by planners at the Delaware Department of Transportation (DelDOT), the bicycle Level of Traffic Stress (LTS) model will be applied to bicycle system planning and evaluation throughout the state. The Bicycle LTS for the roadways under existing conditions along the site frontage are summarized below. The Bicycle LTS was determined utilizing the DelDOT Gateway.

- Johnson Road LTS: 3
- US Route 113 LTS: 3 and 4

Crash Evaluation

Per the crash data included in the TIS from January 1, 2020, to December 31, 2022, provided by the Delaware Department of Transportation (DelDOT), a total of 50 crashes were reported within the study area. Of the 50 crashes reported, no fatalities occurred.

At the US Route 113 and Johnson Road intersection, 50 crashes were reported including 20 rear-end, one head-on, 16 angle, six sideswipe, one rear to rear, and six collisions were not between two vehicles.

Previous Comments

All comments from the PTIS have been addressed in the Final TIS.

Sight Distance Evaluation

No sight distance constraints were noted at the proposed site entrance locations per a field visit conducted on April 18, 2023.

General HCS Analysis Comments

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

1) The TIS used version 7.6 of HCS7, whereas JMT used version 7.9.6 of HCS7 to complete the analysis.

2) Per DelDOT's *Development Coordination Manual*, JMT used a heavy vehicle percentage of 3% for each movement greater than 100 vph in the Case 2 and Case 3 future scenario analysis, unless the existing heavy vehicle percentage was greater than 3% and there was no significant increase of vehicles along that movement, in which case the existing heavy vehicle percentage was used for the analysis of future scenarios, whereas the TIS utilized the existing heavy vehicle percentage in all cases.

3) Per DelDOT's *Development Coordination Manual* and coordination with DelDOT Planning, JMT used a heavy vehicle percentage of 5% for each movement less than 100 vph along roadways in the analyses, whereas the TIS utilized the existing heavy vehicle percentage.

4) Per DelDOT's *Development Coordination Manual,* JMT utilized the existing PHF for the Case 1 scenario and a future PHF for Case 2 and 3 scenarios of 0.80 for roadways with less than 500 vph, 0.88 for roadways between 500 and 1,000 vph, and 0.92 for roadways with more than 1,000 vph or the existing PHF, whichever was higher. The TIS utilized the existing PHF for all cases.

5) The TIS and JMT used different cycle lengths and/or signal timing parameters when analyzing the signalized intersections in some cases.

6) The TIS assumed one full access along Johnson Road and included four access scenarios for the proposed entrance along US Route 113:
   - Case 3a – no access along US Route 113
   - Case 3b – rights-in only access on US Route 113
   - Case 3c – rights-out only access on US Route 113
   - Case 3d – rights-in/rights-out access on US Route 113

Table 2
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for Lincoln Wawa
Report Dated: March 24, 2023
Prepared by: McMahon, a Bowman Company

Unsignalized Intersection Two-Way Stop Control (T-intersection) [1]	**LOS per TIS**			**LOS per JMT**		
Site Entrance A / Johnson Road (Sussex Road 207) [2]	Weekday AM	Weekday PM	Saturday Midday	Weekday AM	Weekday PM	Saturday Midday
2024 with Development (Case 3a)						
Eastbound Johnson Road Left Turn	A (9.8)	A (9.8)	A (9.1)	A (9.8)	A (9.8)	A (9.1)
Southbound Site Entrance Approach	F (66.5)	F (80.7)	D (30.8)	F (66.5)	F (80.7)	D (30.8)
2024 with Development (Case 3a) *with Improvements* [3]						
Eastbound Johnson Road Left Turn	-	-	-	A (9.8)	A (9.8)	A (9.1)
Southbound Site Entrance Approach	-	-	-	D (25.8)	D (30.5)	C (20.0)
2024 with Development (Case 3b)						
Eastbound Johnson Road Left Turn	-	-	-	A (9.2)	A (9.3)	A (8.8)
Southbound Site Entrance Approach	-	-	-	E (35.5)	E (42.2)	C (23.2)
2024 with Development (Case 3b) *with Improvements* [3]						
Eastbound Johnson Road Left Turn	-	-	-	A (9.2)	A (9.3)	A (8.8)
Southbound Site Entrance Approach	-	-	-	C (19.9)	C (22.6)	C (17.0)
2024 with Development (Case 3c)						
Eastbound Johnson Road Left Turn	-	-	-	A (9.8)	A (9.8)	A (9.1)
Southbound Site Entrance Approach	-	-	-	E (49.6)	F (60.7)	D (29.2)

[1] For signalized and unsignalized analysis, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.
[2] JMT and the TIS modeled the intersection with one shared left/right turn lane for the southbound approach. The eastbound approach was modeled with one left turn lane and one through lane. The westbound approach was modeled with one through lane and one right turn lane.
[3] JMT conducted an additional scenario considering the intersection with one left turn lane and one right turn lane along the Southbound Site Entrance approach.

Table 2 Continued
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for Lincoln Wawa
Report Dated: March 24, 2023
Prepared by: McMahon, a Bowman Company

Unsignalized Intersection Two-Way Stop Control (T-intersection) [1]	**LOS per TIS**			**LOS per JMT**		
Site Entrance A / Johnson Road (Sussex Road 207) [2]	Weekday AM	Weekday PM	Saturday Midday	Weekday AM	Weekday PM	Saturday Midday
2024 with Development (Case 3c) *with Improvements* [3]						
Eastbound Johnson Road Left Turn	-	-	-	A (9.8)	A (9.8)	A (9.1)
Southbound Site Entrance Approach	-	-	-	D (28.8)	E (35.3)	C (22.4)
2024 with Development (Case 3d)						
Eastbound Johnson Road Left Turn	A (9.2)	A (9.3)	A (8.8)	A (9.2)	A (9.3)	A (8.8)
Southbound Site Entrance Approach	D (28.3)	D (34.8)	C (21.6)	D (28.3)	D (34.8)	C (21.6)
2024 with Development (Case 3d) *with Improvements* [3]						
Eastbound Johnson Road Left Turn	-	-	-	A (9.2)	A (9.3)	A (8.8)
Southbound Site Entrance Approach	-	-	-	C (19.9)	C (24.0)	C (17.8)

Table 3
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for Lincoln Wawa
Report Dated: March 24, 2023
Prepared by: McMahon, a Bowman Company

Unsignalized Intersection Two-Way Stop Control (T-intersection) [1]	**LOS per TIS**			**LOS per JMT**		
Site Entrance B / US Route 113	Weekday AM	Weekday PM	Saturday Midday	Weekday AM	Weekday PM	Saturday Midday
2024 with Development (Case 3c)						
Westbound Site Entrance Approach	-	-	-	B (13.5)	C (19.0)	C (15.1)
2024 with Development (Case 3d)						
Westbound Site Entrance Approach	B (13.5)	C (19.0)	C (15.1)	B (13.5)	C (19.0)	C (15.1)

Table 4
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for Lincoln Wawa
Report Dated: March 24, 2023
Prepared by: McMahon, a Bowman Company

Signalized Intersection [1]	**LOS per TIS**			**LOS per JMT**		
US Route 113 / Johnson Road [4, 5, 6]	Weekday AM	Weekday PM	Saturday Midday	Weekday AM	Weekday PM	Saturday Midday
2022 Existing (Case 1) *with DelDOT timings* [7]	-	-	-	D (47.8)	D (45.2)	C (34.6)
2022 Existing (Case 1) *with signal optimization* [8]	C (34.6)	C (32.2)	C (22.3)	D (45.2)	D (40.9)	C (23.8)
2024 without Development (Case 2) [8]	E (76.9)	E (69.8)	C (34.4)	E (60.3)	E (77.7)	D (40.4)
2024 with Development (Case 3a) [9]	F (87.4)	F (90.3)	D (43.5)	E (78.1)	F (90.3)	D (51.6)
2024 with Development (Case 3a) *with Improvement Scenario I* [10]	-	-	-	D (49.0)	D (49.1)	C (29.7)
2024 with Development (Case 3a) *with Improvement Scenario II* [11]	-	-	-	E (57.7)	E (56.8)	D (41.2)
2024 with Development (Case 3b)	-	-	-	F (81.2)	F (94.8)	D (52.1)

[4] The TIS modeled all approaches to the intersection with unsignalized right turns, whereas JMT modeled the intersection using an unsignalized movement for the westbound right turn only. JMT conducted a supplemental Synchro analysis to obtain the right turn delay for the westbound right turn movement.
[5] The TIS modeled Phase 4 of the signal as the eastbound through direction, while JMT modeled Phase 4 of the signal as the westbound through direction to be consistent with DelDOT's signal timing.
[6] JMT applied the Field Measured Phase Times option within HCS, consistent with DelDOT methodology, whereas the TIS did not.
[7] JMT modeled the intersection utilizing the split green times consistent with DelDOT MAX 1 green times.
[8] JMT utilized a cycle length of 150 seconds for AM Peak and 120 seconds for PM and SAT Midday Peak, whereas the TIS utilized various cycle lengths.
[9] JMT utilized a cycle length of 150 seconds for AM Peak, 180 seconds for PM Peak, and 120 seconds for SAT Midday Peak, whereas the TIS utilized various cycle lengths.
[10] JMT and the TIS conducted an additional scenario considering concurrent minor street phasing with protected-permitted left turn phasing. The intersection was modeled one left turn lane, one through lane, and one right turn lane along the eastbound and westbound approaches.
[11] Improvement Scenario II includes the same improvements as Improvement Scenario I, with protected-only left turn phasing along the minor street approaches.

Table 4 Continued
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for Lincoln Wawa
Report Dated: March 24, 2023
Prepared by: McMahon, a Bowman Company

Signalized Intersection [1]	**LOS per TIS**			**LOS per JMT**		
US Route 113 / Johnson Road [4, 5, 6]	Weekday AM	Weekday PM	Saturday Midday	Weekday AM	Weekday PM	Saturday Midday
2024 with Development (Case 3b) *with Improvement Scenario I* [10,12]	-	-	-	D (51.3)	D (53.3)	D (36.7)
2024 with Development (Case 3c)	-	-	-	F (80.5)	F (92.3)	D (51.9)
2024 with Development (Case 3c) *with Improvement Scenario I* [10]	-	-	-	D (50.5)	D (49.7)	C (30.3)
2024 with Development (Case 3d) [13]	F (98.1)	F (101.7)	D (52.6)	F (83.6)	F (96.6)	D (53.4)
2024 with Development (Case 3d) *with Improvement Scenario I* [10,12]	D (49.0)	D (43.5)	C (28.1)	D (51.3)	D (53.4)	C (33.4)
2024 with Development (Case 3d) *with Improvement Scenario II* [12, 11]	-	-	-	E (62.1)	E (61.3)	D (45.1)
2024 with Development (Case 3d) *with Improvement Scenario III* [12, 14]	-	-	-	E (59.8)	E (61.4)	D (39.7)
2024 with Development (Case 3d) *with Improvement Scenario IV* [12, 15]	-	-	-	D (48.6)	E (58.0)	D (38.1)
2024 with Development (Case 3d) *with Improvement Scenario V* [12, 16]	-	-	-	D (43.3)	D (49.9)	C (33.9)

[12] JMT analyzed the westbound right turn lane without an acceleration lane to accommodate the provision of a rights-in movement and deceleration lane at the proposed Site Entrance along US Route 113.
[13] JMT utilized a cycle length of 150 seconds for AM Peak and SAT Midday Peak, and 180 seconds for PM Peak, whereas the TIS utilized various cycle lengths.
[14] Improvement Scenario III includes one left turn lane, one through lane, and one right turn lane along the eastbound and westbound approaches while maintaining the existing split phasing.
[15] Improvement Scenario IV includes one left turn lane, one shared left turn/through lane, and one right turn lane along the eastbound and westbound approaches while maintaining the existing split phasing.
[16] Improvement Scenario V includes one left turn lane, one through lane, and one right turn lane along the eastbound approach and two left turn lanes, one through lane, and one right turn lane along the westbound approach while maintaining the existing split phasing.