



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

JENNIFER COHAN
SECRETARY

January 7, 2020

Ms. Betty Tustin
The Traffic Group, Inc.
104 Kenwood Court
Berlin, Maryland 21811

Dear Ms. Tustin:

The enclosed Traffic Impact Study (TIS) review letter for the **Lidl - Bear** (Tax Parcels 10-048.00-001, 002, 003 & 004) development has been completed under the responsible charge of a registered professional engineer whose firm is authorized to work in the State of Delaware. They have found the TIS to conform to DelDOT's Development Coordination Manual and other accepted practices and procedures for such studies. DelDOT accepts this letter and concurs with the recommendations. If you have any questions concerning this letter or the enclosed review letter, please contact me at (302) 760-2167.

Sincerely,

Troy Brestel
Project Engineer

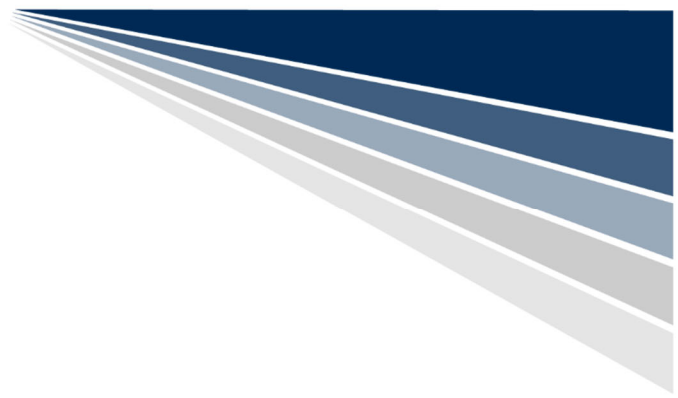
TEB:km

Enclosures

cc with enclosures: Mr. Brandon Rowe, Bohler Engineering, Inc.
Ms. Constance C. Holland, Office of State Planning Coordination
Mr. George Haggerty, New Castle County Department of Land Use
Mr. Owen Robotino, New Castle County Department of Land Use
Mr. Mir Wahed, Johnson, Mirmiran & Thompson, Inc.
Ms. Joanne Arellano, Johnson, Mirmiran & Thompson, Inc.
DelDOT Distribution

DelDOT Distribution

Brad Eaby, Deputy Attorney General
Drew Boyce, Director, Planning
Shanté Hastings, Director, Transportation Solutions (DOTS)
Mark Luszcz, Deputy Director, Traffic, DOTS
Pamela Steinebach, Assistant Director, Project Development North, DOTS
J. Marc Coté, Assistant Director, Development Coordination
T. William Brockenbrough, Jr., County Coordinator, Development Coordination
Peter Haag, Chief Traffic Engineer, Traffic, DOTS
Kevin Canning, Canal District Engineer, Canal District
Matthew Vincent, Canal District Public Works Engineer, Canal District
David Dooley, Service Development Planner, Delaware Transit Corporation
Sireen Muhtaseb, New Castle Review Coordinator, Development Coordination
Anthony Aglio, Planning Supervisor, Statewide & Regional Planning
Mark Galipo, Traffic Engineer, Traffic, DOTS
Claudy Joinville, Project Engineer, Development Coordination
Will Mobley, Johnson, Mirmiran & Thompson, Inc.



January 6, 2020

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

RE: Agreement No. 1774
Project Number T201769002
Traffic Impact Study Services
Subtask 1B-1-Lidl Bear TIS

Dear Mr. Brestel:

Johnson, Mirmiran and Thompson (JMT) has completed the review of the Traffic Impact Study (TIS) for Lidl, Bear, prepared by The Traffic Group, Inc. dated July 3, 2019. This task was assigned as Subtask Number 1B-1. The report is prepared in a manner generally consistent with DelDOT's *Development Coordination Manual*.

The TIS evaluates the impacts of a proposed retail development in New Castle County, Delaware. The development would be comprised of a 29,089 square-foot grocery store and a 7,200 square-foot retail store. The site is located on the south side of US Route 40, approximately 650 feet east of the intersection of US Route 40 and Salem Church Road (New Castle Road 48). Two access points are proposed along US Route 40; one full access at the existing signalized intersection of US Route 40 and Glasgow Drive and a rights-in only access just west of the full access at Glasgow Drive. The subject property is on an approximately 4.71-acre assemblage of parcels that is zoned as NC21 (Single Family) and the developer seeks to have the County rezone the land to CR (Commercial Regional). Construction is anticipated to be complete in 2020.

DelDOT has several proposed improvement projects within the study area. Some of the projects were developed from the *Route 40 Corridor 20-Year Transportation Plan* which details highway, transit, and bicycle and pedestrian improvements that are, or will be, needed to address already planned growth and development to enhance the quality of life in the US Route 40 Corridor. The Plan was developed by a steering committee comprised of DelDOT, New Castle County, and other stakeholders including elected officials, residents, business owners, and developers. The Plan was adopted on June 19, 2000 and two of the projects included in the Plan are within the study area. These projects are among these described below. Altogether, there are four DelDOT capital projects and three DelDOT safety studies, which have yet to result in capital projects, in the study area.

The *US 40, Salem Church Road to Walther Road* widening project (DelDOT Contract No. T201611902) was identified as part of the *Route 40 Corridor 20-Year Transportation Plan*. The widening project proposes to add an additional travel lane in each direction along US Route 40



from west of Salem Church Road to Walther Road. This project will also incorporate pedestrian and bicycle improvements with the addition of a multi-use path for the length of the project. A portion of the widening along eastbound US Route 40 from east of Church Road/Wellington Drive to west of David Place was completed in Fall of 2018 by the Rockwood development. The design associated with the remaining portion of the widening is underway. Construction is anticipated to begin in Summer of 2023 and be completed in Summer of 2025.

The second project in the study area identified as part of the *Route 40 Corridor 20-Year Transportation Plan* is the *Route 40 and SR 7 Interchange* project which aims to improve safety and congestion at the intersection of US Route 40 and Delaware Route 7 with grade separation. Concepts are currently being considered for both Delaware Route 7 over US Route 40 and US Route 40 over Delaware Route 7. Preliminary engineering for this project is expected to start in Fiscal Year 2023. More information on this project and the *Route 40 Corridor 20-Year Transportation Plan* is available at the following link:

https://www.deldot.gov/information/projects/rt40/pages/20_plan_appendix_c.shtml.

The *US 40 and SR 7 Intersection Improvements* project (DelDOT Contract No. T201200104) proposes improvements to pedestrian safety at the intersection. In the 2010 Hazard Elimination Program (HEP), Site K recommended upgrades to the intersection due to significant pedestrian activity. The project proposes to install signalized pedestrian crossings across the north and south legs of the US Route 40 and Delaware Route 7 intersection, as well as across the west leg of the US Route 40 and Governors Square entrance intersection. Additionally, the northbound and southbound Delaware Route 7 rights turns are proposed to be signalized at the intersection with US Route 40. Sidewalk connections will also be provided along both sides of Delaware Route 7 from US Route 40 to south of Songsmith Drive and along the south side of US Route 40 from Delaware Route 7 to west of the Wawa. A multi-use path will be added along the north side of US Route 40 from Delaware Route 7 to the Governors Square shopping center. Construction was completed Fall of 2019.

DelDOT has a pavement rehabilitation project planned along US Route 40 from US Route 13 to Delaware Route 72 (Contract #T201606119). The project includes the resurfacing of US Route 40 with ADA upgrades to non-compliant curb ramps. The project traverses through all nine of the study intersections along US Route 40 (Glasgow Drive/Site Entrance A, Site Entrance B, Brookmont Drive, Church Road/Wellington Drive, Rockwood Road, Walther Road/Glendale Boulevard, Porter Road/Salem Church Road, Becks Woods Drive, and Scotland Drive). Construction is anticipated to begin in Summer 2020 and to be completed in Spring 2021.

The *US 40 Pedestrian Safety Study, SR 72 to Buckley Boulevard* was completed by DelDOT in April 2019. The study reviewed pedestrian crash history, collected pedestrian, transit, and traffic data, and evaluated pedestrian safety along the US Route 40 corridor from Delaware Route 72 to Buckley Boulevard. The study supported the pedestrian and bicycle improvements outlined in the Route 40 corridor plan and recommended continuous sidewalks or multi-use paths along both sides of US Route 40, lighting throughout the entire corridor, and median barrier treatments along “priority segments” of US Route 40.



DelDOT’s 2015 Hazard Elimination Program (HEP) included Site L, which is within the project area. Site L is a north-south corridor along Church Road, 0.24 miles south of US Route 40 to US Route 40. The US Route 40 intersection with Church Road/Wellington Drive is included. The Site L report included a crash summary, sight distance review, and field observations at the intersection. No additional studies or improvements were recommended.

Salem Church Road/Porter Road from Joan Drive to Bradley Drive is a 2019 HEP site that includes four study intersections along Salem Church Road/Porter Road (Cornell Drive, Salem Center Driveway, US Route 40, and Caledonia Way/Joan Drive). The HEP site study is currently underway and the completion date has not been established yet.

Based on our review of the traffic impact study, we have the following comments and recommendations:

The New Castle County Level of Service (LOS) Standards as stated in Section 40.11.210 of the Unified Development Code (UDC) apply to all signalized, all-way-stop, and roundabout intersections. Based on an evaluation of the signalized intersections, six of them will require the implementation of physical roadway and/or traffic control improvements:

<i>Intersection</i>	<i>Situations for which LOS deficiencies occur</i>
Glasgow Drive (Site Entrance A)/US Route 40	2020 AM and Saturday with development (Case 3)
US Route 40/Church Road (New Castle Road 382)/Wellington Drive	2019 AM, PM, and Saturday Existing (Case 1) 2020 AM, PM, and Saturday without development (Case 2) 2020 AM, PM, and Saturday with development (Case 3)
US Route 40/Walther Road (New Castle Road 346)/Glendale Boulevard	2019 PM and Saturday Existing (Case 1) 2020 PM and Saturday without development (Case 2) 2020 PM and Saturday with development (Case 3)
US Route 40/Porter Road/Salem Church Road	2019 AM and PM Existing (Case 1) 2020 AM, PM, and Saturday without development (Case 2) 2020 AM, PM, and Saturday with development (Case 3)
US Route 40/Scotland Drive	2019 Saturday Existing (Case 1) 2020 Saturday without development (Case 2) 2020 Saturday with development (Case 3)
Porter Road/Caledonia Way/Joan Drive	2019 AM Existing (Case 1) 2020 AM without development (Case 2) 2020 AM with development (Case 3)

Additionally, separate from the UDC but based on the LOS evaluation criteria as stated in DelDOT’s *Development Coordination Manual*, movements at the following stop-controlled intersections exhibit LOS deficiencies without the implementation of physical roadway and/or traffic control improvements:



<i>Intersection</i>	<i>Situations for which LOS deficiencies occur</i>
US Route 40/Rockwood Road	2019 AM Existing (Case 1) 2020 AM, PM, and Saturday without development (Case 2) 2020 AM, PM, and Saturday with development (Case 3)
Salem Church Road/Cornell Drive	2019 AM and PM Existing (Case 1) 2020 AM, PM, and Saturday without development (Case 2) 2020 AM, PM, and Saturday with development (Case 3)

The US Route 40 signalized intersections with Glasgow Drive (Site Entrance A), Church Road/Wellington Drive, Walther Road/Glendale Boulevard, and Scotland Drive all exhibit LOS deficiencies under existing and future conditions, with or without the proposed development. However, with signal timing split optimization, these intersections would improve to operate at LOS D or better during all peak hours under future conditions, with or without the proposed development. Therefore, we do not recommend any geometric intersection modifications be implemented by the developer at these intersections.

Although the US Route 40 intersection with Glasgow Drive (Site Entrance A) would operate at acceptable LOS under future conditions with the proposed development and signal timing optimization, operational issues may occur along the northbound Site Entrance A approach to US Route 40. Specifically, the calculated 95th percentile queue length under Case 3 conditions along the northbound Site Entrance A approach would be approximately 175 feet which would impact on-site circulation and obstruct parking adjacent to the Site Entrance. With signal timing adjustments, the northbound queue could be reduced. However, it is recommended that the developer coordinate with the DeIDOT Development Coordination Section regarding the feasibility of increasing the storage length at the Site Entrance A approach.

Additionally, the Porter Road intersection with Caledonia Way/Joan Drive exhibits LOS deficiencies during the AM peak hour under existing and future conditions, with or without the proposed development. However, with signal timing split optimization, the intersection would improve to operate at LOS D (38.4 seconds of delay per vehicle) during the Case 3 AM peak hour. Therefore, we do not recommend any improvements be implemented by the developer at the Porter Road intersection with Caledonia Way/Joan Drive.

The US Route 40 intersection with Porter Road/Salem Church Road exhibits LOS deficiencies during the AM and PM peak hours under existing conditions, and during the AM, PM, and Saturday peak hours under future conditions, with or without the proposed development. With the widening of US Route 40 as part of the *US 40, Salem Church Road to Walther Road* project (DeIDOT Contract No. T201611902), this intersection will improve to operate at LOS D (52.1 seconds of delay per vehicle) during the Case 3 PM peak hour. However, it is acknowledged that the DeIDOT US Route 40 widening project will be completed after the construction of the Lidl development.



The Traffic Group provided JMT with optimized corridor offsets along US Route 40. With optimized corridor offsets and signal timing splits, the US Route 40 intersection with Porter Road/Salem Church Road would improve to operate at LOS D (54.9 seconds of delay per vehicle) during the Case 3 PM peak hour. The other study intersections along the US Route 40 corridor would operate at acceptable LOS with the offset optimization. As such, we do not recommend any improvements be implemented by the developer at this intersection; however, it is recommended that the developer be responsible to fund an equitable portion of the *US 40, Salem Church Road to Walther Road* project discussed above.

The unsignalized intersection of US Route 40 and Rockwood Road exhibits LOS deficiencies along the US Route 40 U-turn/left-turn movements during the AM peak hour under existing conditions, and during the AM, PM, and Saturday peak hours under future conditions, with or without the proposed development. However, operations at this intersection are impacted by the two adjacent signalized intersections (the US Route 40 intersections with Walther Road/Glendale Boulevard and Church Road/Wellington Drive). With signal timing split optimization at the adjacent intersections, the unsignalized intersection of US Route 40 and Rockwood Road would improve to operate at LOS D (34.6 seconds of delay per vehicle) along the westbound US Route 40 left turn during the Case 3 PM peak hour. Therefore, it is not recommended that any improvements be implemented by the developer at the US Route 40 and Rockwood Road intersection.

The unsignalized intersection of Salem Church Road and Cornell Drive exhibits LOS deficiencies during the AM and PM peak hours under existing conditions, and during the AM, PM, and Saturday peak hours under future conditions, with or without the proposed development. The deficiencies take place along the westbound Cornell Drive approach with LOS F (85.1 seconds of delay per vehicle) and a calculated 95th percentile queue length of approximately 135 feet during the PM peak hour under Case 3 conditions. The deficiencies at the Salem Church Road and Cornell Drive intersection can be mitigated through the provision of a single lane roundabout or a signalized intersection. Cornell Drive is the entrance to a mobile home park that is presently proposed for redevelopment. It is our understanding that improvements to this entrance are the responsibility of the mobile home park owner. In addition, the LOS deficiencies occur under existing conditions without the proposed development. Furthermore, the deficiency occurs along the Cornell Drive approach and does not impact operations along Salem Church Road. As such, it is unreasonable to require the developer to improve the intersection. Therefore, we do not recommend that the developer implement any improvements at this intersection.

Should New Castle County approve the proposed development, the following items should be incorporated into the site design and reflected on the record plan. 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. At DelDOT's discretion, the developer should provide a bituminous concrete overlay to the existing travel lanes along the eastbound US Route 40 site frontage from the southeast tangent point at the Glasgow Drive/Site Entrance A intersection to approximately 550 feet



west. DelDOT should analyze the existing lanes' pavement section and recommend an overlay thickness to the developer's engineer, if necessary.

- The developer should maintain the full access site entrance for the proposed Lidl development on US Route 40 at the intersection with Glasgow Drive to be consistent with the lane configurations shown in the table below:

Approach	Current Configuration	Proposed Configuration
Eastbound US Route 40	One left turn lane, two through lanes, and one right turn lane	No change
Westbound US Route 40	One left turn lane, two through lanes, and one channelized right turn lane	No change
Northbound Site Entrance A	One shared left turn/through lane and one right turn lane	No change
Southbound Glasgow Drive	One left turn lane, one shared left turn/through lane, and one channelized right turn lane	No change

Based on DelDOT's *Development Coordination Manual*, the recommended minimum storage lengths (excluding taper) of the separate left turn and right turn lanes along US Route 40 are listed below. The calculated queue lengths from the HCS analysis can be accommodated within the recommended storage lengths. The developer should coordinate with DelDOT on the feasibility of extending the median along the westerly leg to provide a pedestrian refuge area and install a pedestrian push button. If feasible, the developer should submit a plan to DelDOT Development Coordination and other pertinent Sections depicting the design. The final design of the intersection should be determined during the Entrance Plan review process.

Approach	Left Turn Lane	Right Turn Lane
Eastbound US Route 40	800 feet*	240 feet
Westbound US Route 40	220 feet*	220 feet*

*Existing storage lengths recommended to be maintained

- The developer should coordinate with DelDOT's Development Coordination section during the Entrance Plan review process to determine the feasibility of increasing the storage length along Site Entrance A.



4. The developer should construct a rights-in only site entrance for the proposed Lidl development on US Route 40, approximately 270 feet west of the southwest point of tangency of the intersection with Glasgow Drive to be consistent with the lane configurations shown in the table below:

Approach	Current Configuration	Proposed Configuration
Eastbound US Route 40	Three through lanes*	Three through lanes* and one right turn lane

*One through lane along the eastbound US Route 40 approach is a left turn lane for the adjacent intersection with Glasgow Drive.

Based on DelDOT’s *Development Coordination Manual*, the recommended minimum storage length is 350 feet (excluding taper) for the eastbound US Route 40 right turn lane. The calculated queue lengths from the HCS analysis can be accommodated within the recommended storage lengths. The eastbound US Route 40 right turn lane should be a separate lane and not part of a continuous right turn lane for the right turn movement at the Glasgow Drive/Site Entrance A intersection. The developer should submit a plan to DelDOT’s Development Coordination and other pertinent Sections depicting the design along the site frontage. The final design of the site entrances should be determined during the Entrance Plan review process.

5. The developer should enter into an agreement with DelDOT to fund an equitable portion of the improvements planned as part of the *US 40, Salem Church Road to Walther Road* widening project (DelDOT Contract No. T201611902). The widening project proposes to add an additional travel lane in each direction along US Route 40 from Salem Church Road to Walther Road. This project will also incorporate pedestrian and bicycle improvements with the addition of a shared-use path for the length of the project. The developer should coordinate with DelDOT on the implementation and equitable cost sharing of these improvements. The site plan should include sufficient space for DelDOT to acquire the right-of-way for the third through lane and construct it without disturbing the shared-use path. The value of the needed right-of-way can be included in the developer’s contribution to this project.
6. The following bicycle, pedestrian, and transit improvements should be included:
 - a. A minimum fifteen-foot wide permanent easement from the edge of the right-of-way should be dedicated to DelDOT along the US Route 40 site frontage. Within the easement, the developer should construct a ten-foot wide shared-use path that meets current AASHTO and ADA standards. A minimum five-foot setback should be maintained from the edge of the pavement to the shared-use path. If feasible, the



shared-use path should be placed behind utility poles and street trees should be provided within the buffer area. It is acknowledged that the developer has contributed some of the easement as part of the *US 40, Salem Church Road to Walther Road* widening project (DelDOT Contract No. T201611902). The developer should coordinate with DelDOT's Development Coordination section during the plan review process to identify the exact location of the shared-use path and if additional right-of-way is needed for the permanent easement.

- b. ADA compliant curb ramps and marked crosswalks should be provided along the Site Entrance A and B approaches to US Route 40. The use of diagonal curb ramps is discouraged. The curb ramps should be designed to accommodate the shared-use path. Existing pedestrian signal heads may need to be relocated to meet ADA compliance due to the provision of the shared use path.
- c. Minimum five-foot wide bicycle lanes should be incorporated in the right turn lane and shoulder along the US Route 40 approaches to Site Entrance A and B.
- d. Utility covers should be moved outside of any designated bicycle lanes and any proposed sidewalks/shared-use paths or should be flush with the pavement.
- e. Bike parking should be provided near the building entrance. Where the building architecture provides for an awning or other overhang, the bike parking should be covered.
- f. Where internal sidewalks are located alongside of the parking spaces, a buffer, physical barrier, or signage should be added to eliminate vehicular overhang onto the sidewalk.

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 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. For any additional information regarding the work zone impact and mitigation procedures during construction please contact Mr. Don Weber, Assistant Director for Traffic Operations and Management. Mr. Weber can be reached at (302) 659-4651 or by email at Don.Weber@delaware.gov.

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.

A handwritten signature in black ink, appearing to read 'Joanne M. Arellano', written in a cursive style.

Joanne M. Arellano, P.E., PTOE

cc: Mir Wahed, P.E., PTOE

Enclosure

General Information

Report date: July 3, 2019

Prepared by: The Traffic Group, Inc.

Prepared for: Lidl US, LLC

Tax Parcels: 10-048.00-001, 002, 003 & 004

Generally consistent with DelDOT's *Development Coordination Manual*: Yes

Project Description and Background

Description: The developer seeks to develop a 29,089 square-foot grocery store and a 7,200 square-foot retail store.

Location: The subject site is located on the south side of US Route 40 (New Castle Road 32), approximately 650 feet east of the intersection of US Route 40 and Salem Church Road (New Castle Road 48).

Amount of Land to be developed: Approximately 4.71-acre assemblage of parcels.

Land Use approval(s) needed: Rezoning and Entrance Plan.

Proposed completion date: 2020.

Proposed access location: Two access points are proposed along US Route 40; one full access at the existing signalized intersection of US Route 40 and Glasgow Drive and a rights-in only access just west of the full access at Glasgow Drive.

Daily Traffic Volumes:

- 2019 Average Annual Daily Traffic on US Route 40: 41,297 vehicles per day.

Site Map



**Graphic is an approximation based on the Site Plan prepared by Bohler Engineering dated August 31, 2019.*

Relevant and On-going Projects

DelDOT has several proposed improvement projects within the study area. Some of the projects were developed from the *Route 40 Corridor 20-Year Transportation Plan* which details highway, transit, and bicycle and pedestrian improvements that are, or will be, needed to address already planned growth and development to enhance the quality of life in the US Route 40 Corridor. The Plan was developed by a steering committee comprised of DelDOT, New Castle County, and other stakeholders including elected officials, residents, business owners, and developers. The Plan was adopted on June 19, 2000 and two of the projects included in the Plan are within the study area. These projects are among these described below. Altogether, there are four DelDOT capital projects and three DelDOT safety studies, which have yet to result in capital projects, in the study area.

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widening project proposes to add an additional travel lane in each direction along US Route 40 from west of Salem Church Road to Walther Road. This project will also incorporate pedestrian and bicycle improvements with the addition of a multi-use path for the length of the project. A portion of the widening along eastbound US Route 40 from east of Church Road/Wellington Drive to west of David Place was completed in Fall of 2018 by the Rockwood development. The design associated with the remaining portion of the widening is underway. Construction is anticipated to begin in Summer of 2023 and be completed in Summer of 2025.

The second project in the study area identified as part of the *Route 40 Corridor 20-Year Transportation Plan* is the *Route 40 and SR 7 Interchange* project which aims to improve safety and congestion at the intersection of US Route 40 and Delaware Route 7 with grade separation. Concepts are currently being considered for both Delaware Route 7 over US Route 40 and US Route 40 over Delaware Route 7. Preliminary engineering for this project is expected to start in Fiscal Year 2023. More information on this project and the *Route 40 Corridor 20-Year Transportation Plan* is available at the following link:

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The *US 40 Pedestrian Safety Study, SR 72 to Buckley Boulevard* was completed by DelDOT in April 2019. The study reviewed pedestrian crash history, collected pedestrian, transit, and traffic data, and evaluated pedestrian safety along the US Route 40 corridor from Delaware Route 72 to Buckley Boulevard. The study supported the pedestrian and bicycle improvements outlined in the Route 40 corridor plan and recommended continuous sidewalks or multi-use paths along both sides of US Route 40, lighting throughout the entire corridor, and median barrier treatments along “priority segments” of US Route 40.

DelDOT's 2015 Hazard Elimination Program (HEP) included Site L, which is within the project area. Site L is a north-south corridor along Church Road, 0.24 miles south of US Route 40 to US Route 40. The US Route 40 intersection with Church Road/Wellington Drive is included. The Site L report included a crash summary, sight distance review, and field observations at the intersection. No additional studies or improvements were recommended.

Salem Church Road/Porter Road from Joan Drive to Bradley Drive is a 2019 HEP site that includes four study intersections along Salem Church Road/Porter Road (Cornell Drive, Salem Center Driveway, US Route 40, and Caledonia Way/Joan Drive). The HEP site study is currently underway and the completion date has not been established yet.

Livable Delaware

(Source: Delaware Strategies for State Policies and Spending, 2015)

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

The proposed development is located within the Investment Level 1 area.

Investment Level 1

These areas are often municipalities, towns, or urban/urbanizing places in counties where density is generally higher than in surrounding areas. In Investment Level 1 Areas, 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. 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.

In Level 1 Areas the state's first priority will be for preserving existing facilities and making safety improvements. Level 1 areas will also be the highest priority for context sensitive transportation system capacity enhancements, transit-system enhancements, ADA accessibility, and for closing gaps in the pedestrian system, including the Safe Routes to School projects. Further, Level 1 areas are the first priority for planning projects and studies, bicycle facilities, signal-system enhancements, and the promotion of interconnectivity between neighborhoods and public facilities.

Proposed Development's Compatibility with Livable Delaware:

The proposed development is located in the Investment Level 1 area. According to Livable Delaware, Level 1 areas support and encourage a wide range of uses and enhance community identity and integrity. The proposed development is a grocery store and retail store along a corridor with multiple shopping centers and retail stores. Therefore, the proposed development is generally consistent with the 2015 update of the Livable Delaware "Strategies for State Policies and Spending."

Comprehensive Plans

(Source: New Castle County 2012 Comprehensive Plan)

New Castle County Comprehensive Plan:

The subject property is zoned as NC21 (Single Family) and the developer plans to rezone the land to CR (Commercial Regional). Per the *New Castle County Comprehensive Plan Future Land Use Map*, the proposed development is in an area designated for low residential density.

Proposed Development’s Compatibility with the New Castle County Comprehensive Plan:

Per the *New Castle County Comprehensive Plan Future Land Use Map*, the proposed development is in an area designated for low residential density. The proposed development is a grocery and retail store. The comprehensive plan states that transit corridors (such as US Route 40) “are areas where infill and redevelopment should be focused, with an emphasis on a diversity of housing types [and] mix of uses.” Additionally, the plan states that providing nearby diverse uses, such as supermarkets and other retail, in close proximity to residential neighborhoods will make communities sustainable. Therefore, the proposed development is generally consistent with the *New Castle County 2012 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, 10th Edition: An ITE Informational Report*, published by the Institute of Transportation Engineers (ITE) for ITE Land Use Code 820 (shopping center).

Table 1
Lidl Trip Generation

Land Use	ADT	AM Peak Hour			PM Peak Hour			SAT Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
36,289 SF Shopping Center (ITE Code 820)	3,018	21	13	34	123	134	257	145	133	278
Pass-by Trips		-	-	-	42	46	88	38	35	73
Total		21	13	34	81	88	169	107	98	205

*Pass-by percentages of 34% and 26% were applied to the PM and Saturday peak hours, respectively, consistent with the *ITE Trip Generation Handbook, 3rd Edition*.

Overview of TIS

Intersections examined:

1. Glasgow Drive (Site Entrance A) / US Route 40
2. Site Entrance B / US Route 40 (rights-in only)
3. US Route 40 / Brookmont Drive
4. US Route 40 / Church Road (New Castle Road 382) / Wellington Drive
5. US Route 40 / Rockwood Road
6. US Route 40 / Walther Road (New Castle Road 346) / Glendale Boulevard
7. Church Road (New Castle Road 382) / Rockwood Road
8. US Route 40 / Porter Road / Salem Church Road (New Castle Road 48)
9. US Route 40 / Becks Woods Drive
10. US Route 40 / Scotland Drive
11. Porter Road / Caledonia Way / Joan Drive
12. Porter Road / Huckleberry Avenue
13. Salem Church Road / Salem Center Driveway
14. Salem Church Road / Cornell Drive

Conditions examined:

1. Case 1 – Existing (2019)
2. Case 2 – 2020 without development
3. Case 3 – 2020 with development

Committed Developments considered:

1. Salem Center; Parcel B* – 28,600 SF shopping center unbuilt
2. Porter Road Business Center – 35,000 SF industrial park unbuilt
3. St. Andrews Addition – 12 townhouses and 284 apartments unbuilt
4. St. Andrews Center – 16,432 SF shopping center unbuilt
5. Meridian Crossing I & II – 22 single-family detached houses, 15 single-family attached houses, 38 age-restricted single family houses, 39 age-restricted townhouses, and 200 non age-restricted townhouses unbuilt
6. Wellington Commons – 31,624 SF shopping center unbuilt
7. Elizabeth Plaza – 15,208 SF retail unbuilt
8. Rockwood A, B, & C – 270 apartments unbuilt
9. Fox Run Business Center – 195,636 SF office space unbuilt
10. Belltown Business Center – 120,000 SF warehouse unbuilt
11. French Park – 139 townhouses and 372 apartments unbuilt

*Per the TIS, the Salem Center, Parcel B development was removed from the list of committed developments considered, as no information on the development has been provided on the New Castle County land use website since 1999.

Note: The TIS contained updated committed development information listed above which supersedes the information in the February 28, 2019 scoping meeting minutes memorandum.

Peak hours evaluated: Weekday morning, Weekday evening, and Saturday midday peak hours.

Intersection Descriptions

1. Glasgow Drive (Site Entrance A) / US Route 40

Type of Control: Existing signalized intersection (four-leg intersection)

Eastbound Approach: (US Route 40) Existing one left turn lane, two through lanes, and one right turn lane

Westbound Approach: (US Route 40) Existing one left turn lane, two through lanes, and one channelized right turn lane

Northbound Approach: (Site Entrance A) Existing one shared left turn/through lane and one right turn lane

Southbound Approach: (Glasgow Drive) Existing one left turn lane, one shared left turn/through lane, and one channelized right turn lane

2. Site Entrance B / US Route 40 (rights-in only)

Type of Control: Proposed unsignalized intersection (T- intersection)

Eastbound Approach: (US Route 40) Existing three through lanes*; proposed one right turn lane

Westbound Approach: (US Route 40) Existing three through lanes

*One through lane along eastbound US Route 40 is an exclusive left turn lane at the adjacent Glasgow Drive intersection.

Note: The Site Entrance forms the southerly leg of this intersection. Due to the right-in only configuration of this intersection, a level of service/delay analysis was not conducted since there are no conflicting movements.

3. US Route 40 / Brookmont Drive

Type of Control: Existing signalized intersection (T-intersection)

Eastbound Approach: (US Route 40) Existing two left turn lanes and two through lanes

Westbound Approach: (US Route 40) Existing two through lanes and one channelized right turn lane

Southbound Approach: (Brookmont Drive) Existing two left turn lanes and one channelized right turn lane

4. US Route 40 / Church Road (New Castle Road 382) / Wellington Drive

Type of Control: Existing signalized intersection (four-leg intersection)

Eastbound Approach: (US Route 40) Existing one left turn lane, two through lanes, and one right turn lane

Westbound Approach: (US Route 40) Existing one left turn lane, two through lanes, and one right turn lane

Northbound Approach: (Church Road) Existing one shared left turn/through lane and one right turn lane

Southbound Approach: (Wellington Drive) Existing one left turn lane, one shared left turn/through lane, and one right turn lane

5. US Route 40 / Rockwood Road

Type of Control: Existing two-way stop-controlled intersection (T-intersection)

Eastbound Approach: (US Route 40) Existing one left turn lane, three through lanes, and one channelized right turn lane

Westbound Approach: (US Route 40) Existing one left turn lane and two through lanes

Northbound Approach: (Rockwood Road) Existing one right turn lane, stop controlled

6. US Route 40 / Walther Road (New Castle Road 346) / Glendale Boulevard

Type of Control: Existing signalized intersection (four-leg intersection)

Eastbound Approach: (US Route 40) Existing one left turn lane, three through lanes, and one right turn lane

Westbound Approach: (US Route 40) Existing one left turn lane, three through lanes, and one right turn lane

Northbound Approach: (Glendale Boulevard) Existing one shared left turn/through lane and one right turn lane

Southbound Approach: (Walther Road) Existing one left turn lane, one shared left turn/through lane, and one right turn lane

7. Church Road (New Castle Road 382) / Rockwood Road

Type of Control: Existing two-way stop-controlled intersection (four-leg intersection)

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

Westbound Approach: (Rockwood Road) Existing one left turn lane and one shared through/right turn lane, stop controlled

Northbound Approach: (Church Road) Existing one left turn lane, one through lane, and one right turn lane

Southbound Approach: (Church Road) Existing one left turn lane, one through lane, and one right turn lane

8. US Route 40 / Porter Road / Salem Church Road (New Castle Road 48)

Type of Control: Existing signalized intersection (four-leg intersection)

Eastbound Approach: (US Route 40) Existing one left turn lane, two through lanes, and one right turn lane

Westbound Approach: (US Route 40) Existing one left turn lane, two through lanes, and one right turn lane

Northbound Approach: (Porter Road) Existing one left turn lane, one through lane, and one channelized right turn lane

Southbound Approach: (Salem Church Road) Existing two left turn lanes, one through lane, and one channelized right turn lane

9. US Route 40 / Becks Woods Drive

Type of Control: Existing signalized intersection (T-intersection)

Eastbound Approach: (US Route 40) Existing one left turn lane and two through lanes

Westbound Approach: (US Route 40) Existing one left turn lane, two through lanes, and one right turn lane

Southbound Approach: (Becks Woods Drive) Existing one left turn lane and one channelized right turn lane

10. US Route 40 / Scotland Drive

Type of Control: Existing signalized intersection (four-leg intersection)

Eastbound Approach: (US Route 40) Existing two left turn lanes, two through lanes, and one channelized right turn lane

Westbound Approach: (US Route 40) Existing two left turn lanes, two through lanes, and one channelized right turn lane

Northbound Approach: (Scotland Drive) Existing one left turn lane, one shared left turn/through lane, and one channelized right turn lane

Southbound Approach: (Scotland Drive) Existing one left turn lane, one shared left turn/through lane, and one channelized right turn lane

11. Porter Road / Caledonia Way / Joan Drive

Type of Control: Existing signalized intersection (four-leg intersection)

Eastbound Approach: (Caledonia Way) Existing one shared left turn/through lane and one right turn lane

Westbound Approach: (Joan Drive) Existing one shared left turn/through/right turn lane

Northbound Approach: (Porter Road) Existing one left turn lane, one through lane, and one right turn lane

Southbound Approach: (Porter Road) Existing one left turn lane, one through lane, and one right turn lane

12. Porter Road / Huckleberry Avenue

Type of Control: Existing two-way stop-controlled intersection (T-intersection)

Westbound Approach: (Huckleberry Avenue) Existing one shared left turn/right turn lane, stop controlled

Northbound Approach: (Porter Road) Existing one through lane and one right turn lane

Southbound Approach: (Porter Road) Existing one through lane and one bypass lane

13. Salem Church Road / Salem Center Driveway

Type of Control: Existing two-way stop-controlled intersection (four-leg intersection)

Eastbound Approach: (Salem Center Driveway) Existing one right turn lane, stop controlled

Westbound Approach: (Salem Center Driveway) Existing one right turn lane, stop controlled

Northbound Approach: (Salem Church Road) Existing one through lane and one right turn lane

Southbound Approach: (Salem Church Road) Existing one through lane and one shared through/right turn lane

14. Salem Church Road / Cornell Drive

Type of Control: Existing two-way stop-controlled intersection (T-intersection)

Westbound Approach: (Cornell Drive) Existing one shared left turn/right turn lane, stop controlled

Northbound Approach: (Porter Road) Existing one through lane and one channelized right turn lane

Southbound Approach: (Porter Road) Existing one through lane and one bypass lane

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: Delaware Transit Corporation (DTC) currently provides existing services within the study area via DART Routes 40 and 64. Per the DelDOT Gateway, bus stops exist along US Route 40 at the intersections with Brookmont Drive, Church Road/Wellington Drive, Rockwood Road, Walther Road/Glendale Boulevard, Porter Road/Salem Church Road, Becks Woods Drive, and Scotland Drive. Additionally, bus stops exist along Porter Road at the intersection with Caledonia Way/Joan Drive. DART Route 40 provides 38 round trips on weekdays from 4:31 AM to 11:53 PM, 14 round trips on Saturdays from 6:20 AM to 8:28 PM, and 11 round trips on Sundays from 8:51 AM to 7:53 PM. DART Route 64 provides 13 round trips on weekdays from 5:04 AM to 6:53 PM.

Planned transit service: DelDOT contacted Mr. Jared Kauffman, Fixed-Route Planner at the DTC. Per email correspondence on August 19, 2019 from Mr. Kauffman, no transit improvements are recommended in this area at this time. However, he recommended the following

pedestrian/bicycle improvements: a crosswalk along the south leg of the US Route 40 intersection with Site Entrance A, a pedestrian connection between the proposed connection with the trailer park and the shared-use path, and a pedestrian connection between the proposed connection with the trailer park and the internal sidewalk.

Existing bicycle and pedestrian facilities: According to DelDOT's *New Castle County Bicycle Map*, a Statewide Bicycle Route and a Connector Bicycle Route exist within the study area. The Statewide Bicycle Route exists along Salem Church Road/Porter Road and traverses through five of the study intersections (US Route 40, Caledonia Way/Joan Drive, Huckleberry Avenue, Salem Center Driveway, and Cornell Drive). The Connector Bicycle Route exists along US Route 40 and traverses through nine of the study intersections (Glasgow Drive/Site Entrance A, Site Entrance B, Brookmont Drive, Church Road/Wellington Drive, Rockwood Road, Walther Road/Glendale Boulevard, Porter Road/Salem Church Road, Becks Woods Drive, and Scotland Drive). Pedestrian facilities currently exist at eight of the intersections along US Route 40 (Glasgow Drive/Site Entrance A, Brookmont Drive, Church Road/Wellington Drive, Rockwood Road, Walther Road/Glendale Boulevard, Salem Church Road/Porter Road, Becks Woods Drive, and Scotland Drive). Additionally, pedestrian facilities currently exist at four of the intersections along Salem Church Road/Porter Road (Caledonia Way/Joan Drive, Huckleberry Avenue, Salem Center Driveway, and Cornell Drive), and at the intersection of Church Road and Rockwood Road.

Planned bicycle and pedestrian facilities: Per email correspondence on September 16, 2019 from Mr. John Fiori, DelDOT's Bicycle Coordinator, the following improvements were recommended:

- A 10-foot wide shared use path should be provided along the US Route 40 site frontage with proper tie-in to the shoulder. The existing 5-foot-wide ramps will need to be improved to 10-foot-wide ramps, to match the shared use path. This will include the relocation of the existing pedestrian signal heads.
- The existing right turn lane along eastbound US Route 40 at Glasgow Drive/Site Entrance A should be improved to include a 5-foot-wide bicycle lane. Additionally, the proposed right turn lane along eastbound US Route 40 at Site Entrance B should include a 5-foot-wide bicycle lane.
- All entrance, roadway and/or intersection improvements required shall incorporate bicycle and pedestrian facilities.
- The existing pedestrian crosswalk along the western leg of the US Route 40 at Glasgow Drive/Site Entrance A intersection is not safe. The median at this leg of the intersection should be extended to provide a pedestrian refuge.

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 roadway under existing conditions along the site frontage are summarized below. The Bicycle LTS was determined utilizing the map on the DelDOT Gateway.

- US Route 40 – LTS: 4

Previous Comments

All comments from the Preliminary Traffic Impact Study (PTIS) have been addressed in the final TIS.

General HCS Analysis Comments

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

1. For the intersection analyses, the TIS used HCS7 version 7.8, whereas JMT used HCS7 version 7.8.5
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 analyses, 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 analysis of future scenarios. The TIS maintained the existing heavy vehicle percentages in the future scenarios.
3. Per DelDOT's *Development Coordination Manual* and coordination with DelDOT Planning, JMT used a heavy vehicle percentage of 3% for each movement less than 100 vph for Cases 1, 2 and 3 conditions whereas the TIS used the existing heavy vehicle percentages.
4. Per DelDOT's *Development Coordination Manual*, JMT utilized the existing PHF for the Case 1 scenario and a future PHF for Cases 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 maintained the existing PHF in the future scenarios.
5. JMT applied an Arrival Type of 4 along eastbound and westbound US Route 40 to account for the signalized coordinated network of the corridor, whereas the TIS used an Arrival Type 3.
6. For Cases 1, 2 and 3 conditions the TIS optimized timings whereas JMT used the splits consistent with the DelDOT Timing Plans. JMT conducted additional scenarios incorporating optimized timing for Cases 2 and 3 when needed for mitigation.

Table 2
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Lidl, Bear
Report Dated: July 3, 2019
Prepared by The Traffic Group

Signalized Intersection ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
Glasgow Drive (Site Entrance A)/US Route 40 ²						
2019 Existing (Case 1)	A (7.8)	B (15.2)	B (12.5)	C (27.9)	B (16.1)	B (19.5)
2020 without development (Case 2)	A (7.7)	B (14.4)	B (12.1)	C (27.7)	B (16.5)	C (21.4)
2020 with development (Case 3) ³	B (11.3)	C (25.1)	C (22.3)	F (85.7)	D (49.0)	E (78.8)
2020 with development (Case 3) <i>and with Signal Optimization</i> ⁴	B (11.3)	C (32.2)	-	C (27.1)	C (31.8)	C (20.7)
2020 with development (Case 3) <i>and with Signal Optimization and Offset Optimization</i> ^{4, 5}	-	-	-	-	D (44.2)	-

¹ For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

² Both the TIS and JMT assumed 50% lane utilization for the left turn movement along the southbound Glasgow Drive shared left turn/through lane.

³ Both the TIS and JMT maintained the right-turn-on-red volumes consistent with Cases 1 and 2 along the northbound Site Entrance approach.

⁴ Signal Optimization scenario includes optimizing signal splits while maintaining the cycle lengths consistent with the DelDOT Timing Plans.

⁵ Offset Optimization includes adjusted corridor offsets provided by the Traffic Group to address deficiencies at the US Route 40 and Porter Road/Salem Church Road.

Table 3
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Lidl, Bear
Report Dated: July 3, 2019
Prepared by The Traffic Group

Signalized Intersection ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
US Route 40/Brookmont Drive						
2019 Existing (Case 1)	A (9.5)	B (16.1)	B (11.6)	A (7.1)	B (12.6)	B (10.4)
2020 without development (Case 2)	B (10.2)	B (18.7)	B (15.7)	A (8.0)	B (14.9)	B (12.0)
2020 with development (Case 3)	B (10.2)	B (19.4)	B (17.7)	A (8.1)	B (15.7)	B (13.2)
2020 with development (Case 3) <i>and with Offset Optimization</i> ⁵	-	-	-	-	C (32.9)	-

Table 4
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Lidl, Bear
Report Dated: July 3, 2019
Prepared by The Traffic Group

Signalized Intersection ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
US Route 40/Church Road ⁶ (New Castle Road 382)/Wellington Drive						
2019 Existing (Case 1) ⁷	D (47.1)	C (29.7)	D (35.3)	F (199.3)	F (55.8)	F (192.6)
2020 without development (Case 2)	E (68.3)	D (35.9)	D (44.1)	F (187.7)	F (84.5)	F (190.6)
2020 without development (Case 2) and with Signal Optimization ⁴	-	-	-	D (41.4)	D (41.1)	D (39.4)
2020 with development (Case 3)	E (70.3)	D (37.9)	D (48.3)	F (126.4)	F (82.2)	F (164.6)
2020 with development (Case 3) and with Signal Optimization ⁴	D (54.1)	C (34.4)	-	D (46.6)	D (40.1)	D (38.9)
2020 with development (Case 3) and with Signal Optimization and Offset Optimization ^{4, 5}	-	-	-	-	D (42.0)	-

⁶ JMT assumed 40% lane utilization for left turn movements along the southbound Wellington Drive shared left turn/through lane whereas the TIS utilized 45%.

⁷ For Case 1 Saturday peak period, JMT used a volume of 1,409 along the westbound through movement consistent with Exhibit 4 of the report whereas the TIS did not.

Table 5
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Lidl, Bear
Report Dated: July 3, 2019
Prepared by The Traffic Group

Unsignalized Intersection Two-Way Stop Control (T-intersection) ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
US Route 40/Rockwood Road						
2019 Existing (Case 1)						
Eastbound US Route 40 U-Turn	C (15.7)	C (16.1)	B (11.3)	B (13.1)	D (30.6)	C (21.6)
Westbound US Route 40 Left Turn	B (13.4)	C (15.7)	C (16.7)	E (37.0)	B (12.7)	D (32.0)
Northbound Rockwood Road Approach	C (20.1)	B (11.6)	B (12.8)	B (12.6)	B (12.3)	B (11.3)
2020 without development (Case 2)						
Eastbound US Route 40 U-Turn	-	-	-	B (14.2)	F (53.5)	D (34.0)
Westbound US Route 40 Left Turn	-	-	-	F (55.7)	C (18.4)	F (70.8)
Northbound Rockwood Road Approach	-	-	-	B (13.0)	B (12.5)	B (11.5)
2020 without development (Case 2) and with Signal Optimization ⁸						
Eastbound US Route 40 U-Turn	C (17.6)	D (29.0)	B (12.3)	C (17.3)	D (34.1)	D (28.4)
Westbound US Route 40 Left Turn	B (13.3)	C (16.8)	B (13.3)	C (17.1)	D (32.5)	D (34.2)
Northbound Rockwood Road Approach	C (19.7)	B (12.7)	C (15.3)	C (17.8)	B (11.7)	B (12.6)

⁸ JMT utilized the proportion of time blocked values for the intersection from HCS files with incorporated signal optimization at adjacent signalized intersections.

Table 5 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Lidl, Bear
Report Dated: July 3, 2019
Prepared by The Traffic Group

Unsignalized Intersection Two-Way Stop Control (T-intersection) ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
US Route 40/Rockwood Road						
2020 with development (Case 3)						
Eastbound US Route 40 U-Turn	-	-	-	B (14.1)	F (57.3)	E (37.2)
Westbound US Route 40 Left Turn	-	-	-	F (56.6)	C (20.1)	F (81.3)
Northbound Rockwood Road Approach	-	-	-	B (13.0)	B (12.5)	B (11.6)
2020 with development (Case 3) <i>and with Signal Optimization</i> ⁸						
Eastbound US Route 40 U-Turn	C (17.8)	D (32.2)	B (14.3)	C (17.5)	D (34.6)	C (23.3)
Westbound US Route 40 Left Turn	B (13.5)	B (14.5)	B (13.6)	C (16.2)	D (33.1)	C (21.0)
Northbound Rockwood Road Approach	C (19.7)	B (13.1)	C (16.5)	C (18.3)	B (11.9)	B (14.0)
2020 with development (Case 3) <i>and with Signal Optimization and Offset Optimization</i> ^{8, 5}						
Eastbound US Route 40 U-Turn	-	-	-	-	D (34.6)	-
Westbound US Route 40 Left Turn	-	-	-	-	D (26.7)	-
Northbound Rockwood Road Approach	-	-	-	-	B (12.1)	-

Table 6
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Lidl, Bear
Report Dated: July 3, 2019
Prepared by The Traffic Group

Signalized Intersection ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
US Route 40/Walther Road (New Castle Road 346)/Glendale Boulevard ⁹						
2019 Existing (Case 1)	B (18.9)	C (32.8)	B (14.9)	D (31.5)	E (50.6)	E (57.5)
2020 without development (Case 2)	B (19.2)	C (31.2)	B (14.9)	C (32.4)	E (56.8)	F (85.7)
2020 without development (Case 2) and with Signal Optimization ⁴	-	-	-	C (23.6)	D (36.3)	D (37.5)
2020 with development (Case 3)	B (19.2)	C (30.9)	B (15.0)	C (32.4)	E (58.2)	F (91.0)
2020 with development (Case 3) and with Signal Optimization ⁴	C (24.3)	C (30.9)	-	C (28.6)	D (37.3)	C (23.7)
2020 with development (Case 3) and with Signal Optimization and Offset Optimization ^{4, 5}	-	-	-	-	D (37.4)	-

⁹ Both the TIS and JMT assumed 50% lane utilization for left turn movements along the southbound Walther Road shared left turn/through lanes.

Table 7
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Lidl, Bear
Report Dated: July 3, 2019
Prepared by The Traffic Group

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
Church Road (NCR 382)/Rockwood Road						
2019 Existing (Case 1)						
Eastbound Grand National Lane Approach	C (15.3)	B (13.1)	B (11.5)	C (15.3)	B (13.1)	B (11.5)
Westbound Rockwood Road Approach	B (11.8)	B (14.6)	B (11.4)	B (11.9)	B (14.6)	B (11.4)
Northbound Church Road Left Turn	A (7.5)	A (7.6)	A (7.5)	A (7.5)	A (7.6)	A (7.6)
Southbound Church Road Left Turn	A (8.3)	A (7.8)	A (7.6)	A (8.3)	A (7.8)	A (7.6)
2020 without development (Case 2)						
Eastbound Grand National Lane Approach	C (17.5)	C (15.4)	B (13.7)	C (17.6)	C (15.5)	B (13.8)
Westbound Rockwood Road Approach	B (14.1)	C (19.0)	B (14.2)	B (14.2)	C (19.2)	B (14.2)
Northbound Church Road Left Turn	A (7.5)	A (7.8)	A (7.7)	A (7.6)	A (7.9)	A (7.8)
Southbound Church Road Left Turn	A (8.5)	A (8.1)	A (7.9)	A (8.6)	A (8.1)	A (7.9)
2020 with development (Case 3)						
Eastbound Grand National Lane Approach	C (17.6)	C (15.7)	B (14.1)	C (17.7)	C (15.9)	B (14.1)
Westbound Rockwood Road Approach	B (14.2)	C (19.8)	B (14.7)	B (14.3)	C (20.0)	B (14.7)
Northbound Church Road Left Turn	A (7.5)	A (7.9)	A (7.8)	A (7.6)	A (7.9)	A (7.8)
Southbound Church Road Left Turn	A (8.6)	A (8.1)	A (7.9)	A (8.6)	A (8.1)	A (8.0)

Table 8
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Lidl, Bear
Report Dated: July 3, 2019
Prepared by The Traffic Group

Signalized Intersection ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
US Route 40/Porter Road/Salem Church Road (New Castle Road 48)						
2019 Existing (Case 1)	D (44.2)	D (51.3)	D (42.9)	F (97.0)	E (72.1)	D (53.9)
2020 without development (Case 2)	D (48.1)	E (57.1)	D (49.4)	F (118.2)	F (82.4)	E (63.2)
2020 without development (Case 2) and with Signal Optimization ⁴	-	-	-	D (46.6)	D (54.3)	D (49.6)
2020 without development (Case 2) and with Signal Optimization and Improvement ¹⁰	-	-	-	D (41.4)	D (49.5)	C (31.4)
2020 with development (Case 3)	D (47.7)	E (59.1)	D (53.7)	F (120.8)	F (87.7)	E (69.6)
2020 with development (Case 3) and with Signal Optimization ⁴	D (47.7)	D (54.6)	-	D (46.6)	E (56.0)	D (40.8)
2020 with development (Case 3) and with Signal Optimization and Improvement ¹⁰	-	-	-	D (41.7)	D (53.9)	D (39.7)
2020 with development (Case 3) and with Signal Optimization and DelDOT Improvement ^{4, 11}	-	-	-	D (39.3)	D (52.1)	D (39.1)
2020 with development (Case 3) and with Signal Optimization and Offset Optimization ^{4 5}	-	-	-	-	D (54.9)	-

¹⁰ Improvement scenario includes providing two left turn lanes along the eastbound US Route 40 approach.

¹¹ DelDOT Improvement scenario incorporates the DelDOT *US Route 40, Salem Church Road to Walther Road* widening project (Contract No. T201611902) which will provide an additional through lane along eastbound and westbound US Route 40 from Salem Church Road to Walther Road.

Table 9
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Lidl, Bear
Report Dated: July 3, 2019
Prepared by The Traffic Group

Signalized Intersection ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
US Route 40/Becks Woods Drive						
2019 Existing (Case 1) ¹²	B (14.5)	B (12.5)	A (9.8)	C (34.8)	C (24.2)	C (29.2)
2020 without development (Case 2)	B (14.6)	B (14.0)	B (13.1)	C (34.2)	C (25.1)	C (29.6)
2020 with development (Case 3)	B (14.6)	B (13.9)	B (13.4)	C (34.3)	C (25.3)	C (29.6)
2020 with development (Case 3) <i>and with Offset Optimization</i> ⁵	-	-	-	-	C (33.6)	-

¹² Both JMT and the TIS configured the southbound Becks Woods Drive left turn lane as a shared left turn/through lane with zero through volume for HCS to calculate the results due to limitation of software.

Table 10
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Lidl, Bear
Report Dated: July 3, 2019
Prepared by The Traffic Group

Signalized Intersection ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
US Route 40/Scotland Drive ¹³						
2019 Existing (Case 1)	C (24.9)	C (21.5)	C (20.4)	D (46.1)	C (27.6)	F (83.0)
2020 without development (Case 2)	C (25.7)	C (21.0)	B (19.6)	D (44.7)	C (29.8)	F (115.7)
2020 without development (Case 2) and with Signal Optimization ⁴	-	-	-	C (28.5)	B (16.7)	D (38.7)
2020 with development (Case 3)	C (25.7)	C (20.9)	B (19.5)	D (44.8)	C (30.0)	F (119.0)
2020 with development (Case 3) and with Signal Optimization ⁴	C (25.7)	C (20.9)	-	C (31.4)	B (17.0)	C (23.8)
2020 with development (Case 3) and with Signal Optimization and Offset Optimization ^{4, 5}	-	-	-	-	B (17.0)	-

¹³ Both the TIS and JMT assumed 40% lane utilization for left turn movements along the northbound and southbound Scotland Drive shared left turn/through lanes.

Table 11
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Lidl, Bear
Report Dated: July 2019
Prepared by The Traffic Group

Signalized Intersection ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
Porter Road/Caledonia Way/Joan Drive ¹⁴						
2019 Existing (Case 1)	B (16.8)	B (12.3)	B (12.6)	F (101.3)	D (51.2)	D (42.8)
2020 without development (Case 2)	B (18.6)	B (13.7)	B (14.0)	F (98.0)	D (51.7)	D (43.1)
2020 without development (Case 2) and with Signal Optimization ⁴	-	-	-	D (37.7)	C (31.0)	C (27.5)
2020 with development (Case 3)	B (18.7)	B (13.7)	B (14.0)	F (99.3)	D (53.4)	D (43.8)
2020 with development (Case 3) and with Signal Optimization ⁴	-	-	-	D (38.4)	C (32.3)	C (27.9)

¹⁴ For Cases 1, 2 and 3, JMT utilized splits consistent with the MAX 1 timings from the DelDOT Timing Plan whereas the TIS used optimized timings.

Table 12
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Lidl, Bear
Report Dated: July 3, 2019
Prepared by The Traffic Group

Unsignalized Intersection Two-Way Stop Control (T-intersection) ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
Porter Road/Huckleberry Avenue						
2019 Existing (Case 1)						
Eastbound Huckleberry Avenue Approach	C (15.7)	B (14.5)	B (11.3)	C (15.7)	B (14.6)	B (11.3)
Southbound Porter Road Left Turn	A (8.7)	A (8.2)	A (7.9)	A (8.7)	A (8.2)	A (7.9)
2020 without development (Case 2)						
Eastbound Huckleberry Avenue Approach	C (16.1)	C (15.1)	B (11.6)	C (16.2)	C (15.3)	B (11.7)
Southbound Porter Road Left Turn	A (8.7)	A (8.3)	A (7.9)	A (8.8)	A (8.3)	A (8.0)
2020 with development (Case 3)						
Eastbound Huckleberry Avenue Approach	C (16.2)	C (15.4)	B (11.9)	C (16.3)	C (15.6)	B (12.0)
Southbound Porter Road Left Turn	A (8.7)	A (8.3)	A (8.0)	A (8.8)	A (8.4)	A (8.0)

Table 13
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Lidl, Bear
Report Dated: July 3, 2019
Prepared by The Traffic Group

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
Salem Church Road/Salem Center Driveway ¹⁵						
2019 Existing (Case 1)						
Eastbound Salem Center Driveway Approach	A (9.9)	B (11.4)	A (9.8)	A (9.9)	B (11.4)	A (9.8)
Westbound Salem Center Driveway Approach	C (15.8)	B (14.3)	B (13.6)	C (15.9)	B (14.2)	B (13.5)
Southbound Salem Church Road Left Turn	A (10.0)	A (9.6)	A (9.2)	B (10.0)	A (9.5)	A (9.1)
2020 without development (Case 2)						
Eastbound Salem Center Driveway Approach	B (10.1)	B (11.6)	A (10.0)	B (10.1)	B (11.6)	B (10.0)
Westbound Salem Center Driveway Approach	C (16.6)	C (15.1)	B (14.5)	C (16.6)	C (15.0)	B (14.3)
Southbound Salem Church Road Left Turn	B (10.2)	A (9.8)	A (9.4)	B (10.2)	A (9.8)	A (9.3)
2020 with development (Case 3)						
Eastbound Salem Center Driveway Approach	B (10.1)	B (11.7)	B (10.1)	B (10.2)	B (11.7)	B (10.1)
Westbound Salem Center Driveway Approach	C (16.6)	C (15.5)	B (14.8)	C (16.7)	C (15.4)	B (14.6)
Southbound Salem Church Road Left Turn	B (10.2)	A (9.9)	A (9.5)	B (10.2)	A (9.9)	A (9.4)

¹⁵ Left turns and through movements are prohibited along the eastbound and westbound Salem Center Driveway approaches. Count data included illegal left turns and through movements, which JMT incorporated in analyses as right turning vehicles.

Table 14
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Lidl, Bear
Report Dated: July 3, 2019
Prepared by The Traffic Group

Unsignalized Intersection Two-Way Stop Control (T-intersection) ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
Salem Church Road/Cornell Drive						
2019 Existing (Case 1)						
Westbound Cornell Drive Approach	E (36.6)	F (54.5)	D (31.1)	E (36.9)	F (55.0)	D (31.7)
Southbound Salem Church Road Left Turn	A (9.0)	A (8.5)	A (8.4)	A (9.0)	A (8.5)	A (8.5)
2020 without development (Case 2)						
Westbound Cornell Drive Approach	E (44.6)	F (72.8)	E (40.1)	E (43.2)	F (76.5)	E (38.0)
Southbound Salem Church Road Left Turn	A (9.1)	A (8.7)	A (8.6)	A (9.1)	A (8.7)	A (8.7)
2020 without development (Case 2) <i>with improvement</i> ¹⁶						
Westbound Cornell Drive Approach	-	-	-	D (32.9)	F (62.7)	D (33.4)
Southbound Salem Church Road Left Turn	-	-	-	A (9.1)	A (8.7)	A (8.7)
2020 with development (Case 3)						
Westbound Cornell Drive Approach	E (45.3)	F (80.9)	E (44.5)	E (43.9)	F (85.1)	E (41.9)
Southbound Salem Church Road Left Turn	A (9.1)	A (8.7)	A (8.7)	A (9.1)	A (8.8)	A (8.7)
2020 with development (Case 3) <i>with improvement</i> ¹⁶						
Westbound Cornell Drive Approach	-	-	-	D (33.4)	F (69.0)	E (36.5)
Southbound Salem Church Road Left Turn	-	-	-	A (9.1)	A (8.8)	A (8.7)

¹⁶ JMT improvement includes providing a left turn lane and a right turn lane along the westbound Cornell Drive Approach.

Table 14 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Lidl, Bear
Report Dated: July 3, 2019
Prepared by The Traffic Group

Unsignalized Intersection All-Way Stop Control (T-intersection) ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
Salem Church Road/Cornell Drive ¹⁷						
2020 without development (Case 2)						
Westbound Cornell Drive Approach	-	-	-	B (12.3)	B (12.1)	B (12.2)
Northbound Salem Church Road Approach	-	-	-	F (74.2)	D (29.6)	D (28.5)
Southbound Salem Church Road Approach	-	-	-	D (30.3)	F (157.2)	D (32.5)
Overall	-	-	-	F (50.9)	F (93.1)	D (28.5)
2020 with development (Case 3)						
Westbound Cornell Drive Approach	-	-	-	B (12.3)	B (12.1)	B (12.3)
Northbound Salem Church Road Approach	-	-	-	F (75.6)	D (32.7)	D (32.6)
Southbound Salem Church Road Approach	-	-	-	D (31.1)	F (169.2)	E (37.7)
Overall	-	-	-	F (51.9)	F (100.4)	D (32.7)

¹⁷ JMT modeled the intersection as an all-way stop control with the existing lane configurations.

Table 14 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Lidl, Bear
Report Dated: July 3, 2019
Prepared by The Traffic Group

Unsignalized Intersection Single Lane Roundabout ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
Salem Church Road/Cornell Drive ¹⁸						
2020 without development (Case 2)						
Westbound Cornell Drive Approach	-	-	-	A (8.2)	A (6.6)	A (6.7)
Northbound Salem Church Road Approach	-	-	-	A (8.9)	A (8.9)	A (8.0)
Southbound Salem Church Road Approach	-	-	-	A (7.6)	B (13.3)	A (8.1)
Overall	-	-	-	A (8.3)	B (11.0)	A (7.9)
2020 with development (Case 3)						
Westbound Cornell Drive Approach	-	-	-	A (8.2)	A (6.8)	A (6.8)
Northbound Salem Church Road Approach	-	-	-	A (9.0)	A (9.1)	A (8.2)
Southbound Salem Church Road Approach	-	-	-	A (7.6)	B (13.8)	A (8.3)
Overall	-	-	-	A (8.4)	B (11.3)	A (8.1)

¹⁸ JMT modeled the intersection as a single lane roundabout.

Table 14 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Lidl, Bear
Report Dated: July 3, 2019
Prepared by The Traffic Group

Signalized Intersection ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
Salem Church Road/Cornell Drive ^{19, 20}						
2020 without development (Case 2)	-	-	-	B (13.1)	B (10.8)	B (11.5)
2020 with development (Case 3)	-	-	-	B (13.1)	B (10.9)	B (11.5)

¹⁹ JMT analyzed the intersection as a signalized intersection with a 90 second cycle length and protected and permissive left turn phasing along southbound Salem Church Road.

²⁰ JMT modeled westbound Cornell Drive as a shared left/through/right turn lane with zero through volume for HCS to calculate the results due to limitations of the software.