



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

NICOLE MAJESKI
SECRETARY

April 10, 2023

Ms. Nicole Kline-Elsier, PE, PTOE
McMahon Associates, Inc.
835 Springdale Drive, Suite 200
Exton, PA 19341

Dear Ms. Kline-Elsier,

The enclosed Traffic Impact Study (TIS) review letter for the proposed **Royal Farms #369 Bear** (Tax Parcels: 10-034.00-012, -013, and -097) 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 (302) 760-2124.

Sincerely,

Claudy Joinville
Project Engineer

CJ:km
Enclosures
cc with enclosures:

Mr. Jeff Bainbridge, Royal Farms
Mr. Gunther Chase, Zommick McMahon
Mr. Jose Lazo, BL Companies
Mr. Edward Farrell, BL Companies
Mr. Shawn Tucker, Barnes & Thornburg LLP
Mr. David L. Edgell, Office of State Planning Coordination
Mr. George Haggerty, New Castle County Department of Land Use
Mr. Mark Wolanski, New Castle County Department of Land Use
Mr. Owen C. Robatino, New Castle County Department of Land Use
Ms. Joanne M. Arellano, Johnson, Mirmiran, & Thompson, Inc.
Mr. Mir Wahed, Johnson, Mirmiran, & Thompson, Inc.
DelDOT Distribution

DelDOT Distribution

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Shanté Hastings, Director, Deputy Secretary, Transportation Solutions (DOTS)
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John Pietrobono, New Castle County Review Coordinator, Development Coordination, Planning
Ryan Schroder, New Castle County Subdivision Reviewer, Development Coordination, Planning
Sireen Muhtaseb, TIS Group Manager, Development Coordination, Planning
Annamaria Fumato, TIS Group Project Engineer Development Coordination, Planning
Philip Lindsey, TIS Group Project Engineer, Development Coordination, Planning
Anthony Aglio, Planning Supervisor, Statewide & Regional Planning, Planning
Jared Kauffman, Service Development Planner, Delaware Transit Corporation
Tremica Cherry, Service Development Planner, Delaware Transit Corporation



April 10, 2023

Mr. Claudy Joinville
Project Engineer
Delaware Department of Transportation
Development Coordination, Division of Planning
800 Bay Road
Dover, DE 19901

RE: Agreement No. 1945F
Project Number T202069012
Traffic Impact Study Services
Task 5-4A –Royal Farms #369 Bear TIS

Dear Mr. Joinville:

Johnson, Mirmiran, and Thompson (JMT) has completed a review of the Traffic Impact Study (TIS) for the Bear Royal Farms #369, which was prepared by McMahon Associates, Inc., dated January 25, 2022. This review was assigned as Task Number 5-4A. The report is prepared in a manner generally consistent with DelDOT's *Development Coordination Manual*.

The TIS evaluates the impacts of a proposed 4,649 square-foot super convenience store with gas pumps in New Castle County, Delaware. The site is located on the north side of US Route 40, approximately 250 feet west of the intersection with School Bell Road (New Castle Road 344). The subject property is on an approximately 2.80-acre assemblage of parcels that is currently split-zoned as NC6.5 (Single Family 6,500 SF) and CR (Commercial Regional). The developer plans to rezone the NC6.5 portion of the land to CR. Construction for the development is anticipated to be completed in 2023.

Two access points are proposed: one full access along School Bell Road and a rights-in/rights-out access along US Route 40. Per the October 12, 2021 Scoping Meeting Memorandum by DelDOT, two future build scenarios were requested to be evaluated. The first scenario (Case 3a) incorporates a rights-in/rights-out access along US Route 40 and the second scenario (Case 3b) incorporates a rights-out only access along US Route 40. Both scenarios incorporate a full access along School Bell Road.

There are two active DelDOT projects within the study area: the *Route 40 Corridor Improvements Project* and the *US 13, US 40 to Memorial Drive Pedestrian Improvements Project* (T201601102). The *Route 40 Corridor Improvements Project* was initiated by the Delaware Department of Transportation in partnership with New Castle County and WILMAPCO in September 1998 and created the community-supported 20-year transportation plan previously known as the *Route 40 Corridor 20-Year Transportation Plan*. The Plan addresses the conditions that are expected to result from projected growth in housing, employment, and traffic over 20 years. The Plan contains projects that address the projected transportation problems. An annual Corridor Monitoring and Triggering Report is generated by DelDOT, WILMAPCO, New Castle County, and DART to determine the need for further evaluation of transportation, safety, and transit improvements based



on land development, traffic, corridor preservation, highway safety, transit service, and projects in the area. The Plan proposed shared use paths along US Route 40 in the study area, however, no capital projects are proposed to implement the recommendations at this time. More information regarding the project and study can be found at the following website:

<https://deldot.gov/projects/index.shtml?dc=corridor&name=us-40>

The *US 13, US 40 to Memorial Drive Pedestrian Improvements Project* (T201601102) started in 2020 and is anticipated to be complete in 2025. The project aims to improve pedestrian facilities and safety along the US Route 13 and US Route 40 corridors, with improvements identified in the *US 13/40 Pedestrian Audit* studies. The pedestrian audit studies identified potential improvements along the site frontage on US Route 40. However, the improvements as part of the *US 13, US 40 to Memorial Drive Pedestrian Improvements* project do not include the site frontage and are for locations north of the TIS study area. The project website and study website can be found below:

<https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T201601102>

<https://deldot.gov/Programs/DSHSP/index.shtml?dc=project-pedestrian-safety-audit>

A pavement and rehabilitation project along US Route 40 from SR 72 to US Route 13 (DelDOT Contract No. T201606119) was completed within the past year. The project involved milling and paving with ADA upgrades to non-compliant curb ramps. Bicycle lane pavement markings were also installed. The project included the study intersections of US Route 40 with US Route 40 Cross-over (U-turn), Appleby Road, School Bell Road/Vandyke Road, Fir Avenue, Crossover 160 feet east of Contractors Way, and Holly Avenue/Shorewind Road. It should be noted that the project also reinstalled the recommended signing upgrades at the US Route 40/School Bell Road intersection associated with the *Signalized Median Crossover* project (DelDOT Contract No. T201508305) which included Wrong Way, Do Not Enter, Divided Highway, One Way, and Yield signage.

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, none of them will require the implementation of physical roadway and/or traffic control improvements.

Additionally, separate from the UDC but based on the LOS evaluation criteria as stated in DelDOT's *Development Coordination Manual*, four of the stop-controlled study intersections exhibit LOS deficiencies.



Intersection	LOS Deficiencies Occur			Case
	AM	PM	SAT	
US Route 40/Appleby Road (New Castle Road 343)		X		Case 3a – 2023 with Development
		X		Case 3b – 2023 with Development
US Route 40/US Route 40 Crossover (U-turn)		X		Case 1 – 2021 Existing
	X	X	X	Case 2 – 2023 without Development
	X	X	X	Case 3a – 2023 with Development
	X	X	X	Case 3b – 2023 with Development
US Route 40/Fir Avenue			X	Case 2 – 2023 without Development
			X	Case 3a – 2023 with Development
			X	Case 3b – 2023 with Development
US Route 40/Crossover 160 ft East of Contractors Way		X		Case 3a – 2023 with Development
		X		Case 3b – 2023 with Development

The US Route 40 intersection with Appleby Road exhibits LOS deficiencies during the PM peak hour under future conditions with the development. Specifically, the southbound Appleby Road right turn would operate at LOS E with a delay of 35.2 seconds per vehicle and a calculated 95th percentile queue length of approximately 115 feet. However, with the construction of the School Bell Crossing development as a fourth leg to the US Route 40/School Bell Road intersection, the projected exiting volumes from the School Bell Crossing development utilizing the US Route 40 Crossover would be reduced. As a result, the eastbound and westbound through volumes would be reduced at the Appleby Road intersection and the intersection would improve to operate at acceptable LOS D with a delay of 27.3 seconds per vehicle and a calculated 95th percentile queue length of approximately 90 feet. As such, we do not recommend the developer implement improvements at this intersection.

The US Route 40 Crossover approximately 1,170 feet east of Appleby Road exhibits LOS deficiencies along the eastbound left turn/U-turn during the PM peak hour under existing conditions, and during the AM, PM, and Saturday peak hours under future conditions, with or without the proposed development. The deficiencies along the eastbound left turn would occur with up to 584.1 seconds of delay per vehicle and a projected 95th percentile queue of approximately 725 feet during the PM peak hour under Case 3 conditions. Additionally, the intersection exhibits LOS deficiencies along the northbound approach during the PM and Saturday peak hours under future conditions with or without the proposed development. The deficiencies along the northbound approach would occur with over 1,000 seconds of delay per vehicle during the PM and Saturday peak hours under Case 3 conditions. The intersection also exhibits LOS deficiencies along the southbound approach during the AM, PM, and Saturday peak hours under future conditions, with or without the proposed development. The deficiencies along the



southbound approach would occur with over 1,000 seconds of delay per vehicle during the PM and Saturday peak hours under Case 3 conditions.

The deficiencies at the US Route 40 Crossover approximately 1,170 feet east of Appleby Road could be mitigated by the provision of a traffic signal. However, as traffic signals exist within approximately 2,000 feet of this intersection, a larger study (including a signal warrant evaluation) outside the scope of this TIS should be conducted to determine the impacts of a new signalized intersection to the US Route 40 corridor. Therefore, a signal is not recommended to be implemented by the developer at this intersection.

It should be noted that with the construction of the School Bell Crossing development as a fourth leg to the US Route 40/School Bell Road intersection, volumes would be reduced at the US Route 40 Crossover intersection. As a result, the eastbound US Route 40 left turn/U-turn movement delay would reduce to 184.4 seconds of delay per vehicle with a calculated 95th percentile queue of approximately 270 feet under Case 3 conditions. Although the existing eastbound US Route 40 left turn/U-turn movement storage length of approximately 260 feet would not accommodate the projected 95th percentile queue length of 270 feet, we do not recommend the developer implement any improvements at the intersection as this is a minimal increase. Furthermore, the projected development would add a maximum of 6 peak hour vehicles to the eastbound US Route 40 left turn/U-turn lane.

The US Route 40 intersection with Fir Avenue exhibits LOS deficiencies during the Saturday peak hour under future conditions, with or without the proposed development. The deficiencies occur along the northbound Driveway approach and southbound Fir Avenue approach, with delays of 41.2 and 45.3 seconds per vehicle, respectively, and a projected 95th percentile queue of approximately 45 and 75 feet, respectively.

The deficiencies at the US Route 40 intersection with Fir Avenue could be mitigated by the provision of a traffic signal. However, the intersection is located approximately 800 feet west of the US Route 40 signalized intersection with School Bell Road. Additionally, a larger study (including a signal warrant evaluation) outside the scope of this TIS should be conducted to determine the impacts of a new signalized intersection to the US Route 40 corridor. As such, we do not recommend the developer implement capacity improvements at this intersection.

The US Route 40 Crossover 160 feet East of Contractors Way exhibits LOS deficiencies along the southbound approach during the PM peak hour under future conditions with the proposed development (Case 3a and 3b). Although the approach would exhibit LOS deficiencies, the volumes along the southbound approach are less than 10 vehicles per hour. Per Section 2.2.8.12.5 of the DelDOT *Development Coordination Manual*, the LOS non-conformity may be disregarded. As such, we do not recommend the developer implement any improvements at this intersection.

Although the Site Entrances operate at acceptable LOS, DelDOT requested two future build scenarios as part of this TIS: one with the US Route 40 Site Entrance B access to be rights-in/rights-out (Case 3a) and one with the proposed US Route 40 Site Entrance B access to be rights-out only (Case 3b). Both scenarios incorporate a full access along School Bell Road. In coordination with



DelDOT, the provision of a rights-in/rights-out along US Route 40 is recommended. As the proposed Site Entrance B would be located adjacent to the US Route 40/Fir Avenue intersection, a narrow concrete median should be provided between the westbound US Route 40 leftmost through lane and the westbound US Route 40 U-turn/left turn lane at the US Route 40/Fir Avenue intersection to minimize weaving movements from the proposed site access.

The proposed Site Entrance A is located along School Bell Road, approximately 375 feet north of the northwest point of tangency of the intersection with US Route 40. Approximately 450 feet of storage is available between the stop bar along the southbound School Bell Road approach to US Route 40 and the proposed Site Entrance A. The projected 95th percentile queue length along the southbound School Bell Road approach to the US Route 40 intersection would be 490 feet during the AM peak hour under Case 3A and 3B conditions with the existing lane configurations at the intersection. As such, Site Entrance A may be blocked during the AM peak hour under future conditions with the proposed development. However, the US Route 40/School Bell Road intersection would operate at acceptable LOS and queues are expected to quickly clear. To minimize impacts from queueing at the adjacent US Route 40 intersection, it is recommended that Site Entrance A be located at the northernmost limits along School Bell Road.

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. The developer shall improve US Route 40 and School Bell Road within the limits of their frontage to meet DelDOT's standards for their Functional Classification as found in Section 1.1 of the *Development Coordination Manual* and elsewhere therein. The improvements shall include both directions of travel, regardless of whether the developer's lands are on one or both sides of the road. Frontage is defined in Section 1 of the *Development Coordination Manual*, which states "This length includes the length of roadway perpendicular to lines created by the projection of the outside parcel corners to the roadway." Questions on or appeals of this requirement should be directed to the DelDOT Subdivision Review Coordinator in whose area the development is located.
2. The developer should construct an unsignalized rights-in/rights-out only access for the proposed Royal Farms development along US Route 40, approximately 380 feet west of the northwest point of tangency of the intersection with School Bell Road. A narrow concrete median should be provided between the westbound US Route 40 leftmost through lane and the westbound US Route 40 U-turn/left turn lane at the US Route 40/Fir Avenue intersection to minimize weaving movements from the proposed site access. The exact design of the median will be determined during the Plan review process. The intersection should be consistent with the lane configurations shown in the table below.



Approach	Current Configuration	Proposed Configuration
Westbound US Route 40	Two through lanes	Two through lanes and one right turn lane
Southbound Site Entrance	Approach does not exist	One right turn lane

Based on DelDOT’s *Development Coordination Manual* as well as the locations of the adjacent Bear Diner access and the School Bell Road signalized intersection, the recommended minimum storage length (excluding taper) of the westbound US Route 40 right turn lane is 175 feet. The entrance should be designed to accommodate a pedestrian crossing and prohibit left out movements.

- The developer should construct an unsignalized full access site entrance for the proposed Royal Farms development on School Bell Road, a minimum of approximately 375 feet north of the northwest point of tangency of the intersection with US Route 40. To minimize impacts from queuing at the adjacent US Route 40 intersection, it is recommended that Site Entrance A be located at the northernmost limits along School Bell Road. The intersection should be consistent with the lane configurations shown in the table below:

Approach	Current Configuration	Proposed Configuration
Eastbound Site Entrance	Approach does not exist	One shared left turn/right turn lane
Northbound School Bell Road	One through lane	One left turn lane and one through lane
Southbound School Bell Road	One through lane	One through lane and one right turn lane

Based on DelDOT’s *Development Coordination Manual*, the recommended minimum storage length (excluding taper) of the southbound School Bell Road right turn lane is 145 feet. Based on DelDOT’s *Development Coordination Manual*, the recommended minimum storage length (excluding taper) of the northbound School Bell Road left turn lane is 120 feet. The projected queues from the HCS analysis can be accommodated within the recommended storage lengths. The stop bar along the entrance approach to School Bell Road should be positioned outside of the pedestrian crossing.

- The developer should provide a cross access easement to the adjacent lot to the east (Garyantes property). The developer should coordinate with DelDOT’s Development Coordination Section to determine the location and feasibility of the interconnection.
- 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 40 and School Bell Road site frontages. Within the easement, the developer should construct a ten-foot wide shared-use path (SUP) along US Route 40 and maintain the existing sidewalk along School Bell Road. 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. At least one internal connection of a sidewalk or SUP from the SUP along US Route 40 and the sidewalk along School Bell Road is required.
- c. An internal connection of a sidewalk or SUP should be provided from the site to Ellen Drive.
- d. Where internal sidewalks are located alongside of parking spaces, a buffer, physical barrier, or signage should be added to eliminate vehicular overhang onto the sidewalk.
- e. Internal bicycle racks should be provided.
- f. ADA compliant curb ramps and marked crosswalks should be provided along the site entrances.
- g. Minimum five-foot wide bicycle lanes should be incorporated in the right turn lane and shoulder along the northbound and southbound School Bell Road approaches to the site entrance.
- h. Utility covers should be moved outside of any designated bicycle lanes and any proposed sidewalks/SUP or should be flush with the pavement.
- i. The developer should provide a Type 2 bus stop with an ADA compliant 5 feet by 8 feet concrete pad approximately 40 feet west of the Bear Diner Entrance on US Route 40. The developer should coordinate with DART during the plan review process to determine the bus stop location and design.

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. Jeff VanHorn, Assistant Director for Traffic Operations and Management. Mr. VanHorn can be reached at (302) 659-4606 or by email at Jeffrey.VanHorn@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', is written above the printed name.

Joanne M. Arellano, P.E., PTOE

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

Enclosure

General Information

Report date: January 25, 2022

Prepared by: McMahon Associates, Inc.

Prepared for: Two Farms, Inc.

Tax Parcels: 10-034.00-012, -013, and -097

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

Project Description and Background

Description: The proposed development consists of a 4,649 square-foot convenience store with gas pumps.

Location: The subject site is located on the north side of US Route 40 approximately 250 feet west of the intersection of US Route 40 and School Bell Road in New Castle County, Delaware.

Amount of Land to be developed: An approximately 2.80-acre assemblage of parcels.

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

Proposed completion date: 2023.

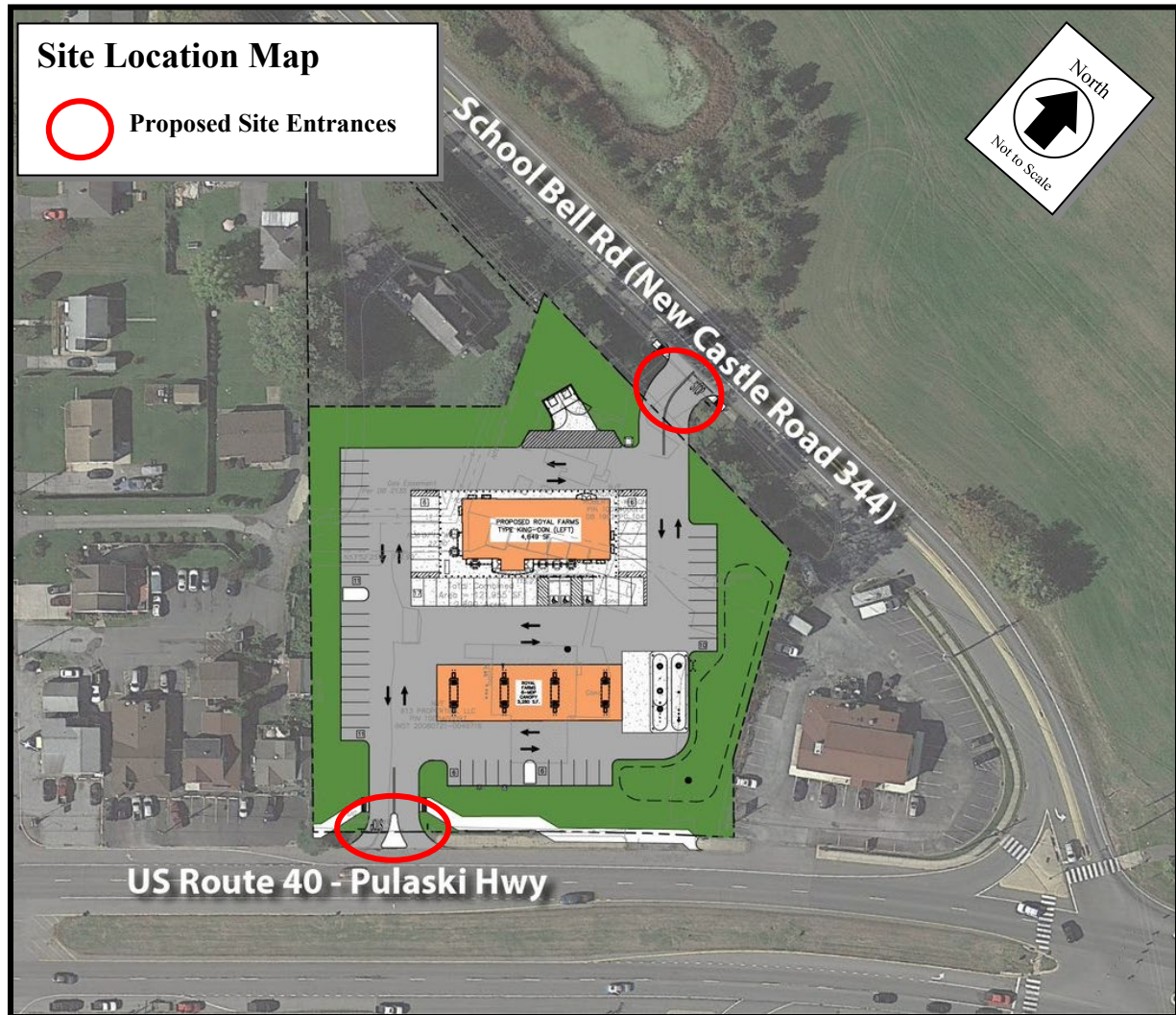
Proposed access locations: One full access entrance on School Bell Road and one rights-in/rights-out access along US Route 40.

Daily Traffic Volumes:*

- 2021 Average Annual Daily Traffic on US Route 40: 17,541
- 2021 Average Annual Daily Traffic on School Bell Road: 4,349

*AADT is sourced from ATR data provided by TIS Report. Data taken from seven full days starting 10/23/2021.

Site Map



**Graphic is an approximation based on the Exploratory Plan prepared by BL Companies last revised January 12, 2022.*

Relevant and On-going Projects

There are two active DelDOT projects within the study area: the *Route 40 Corridor Improvements Project* and the *US 13, US 40 to Memorial Drive Pedestrian Improvements Project* (T201601102). The *Route 40 Corridor Improvements Project* was initiated by the Delaware Department of Transportation in partnership with New Castle County and WILMAPCO in September 1998 and created the community-supported 20-year transportation plan previously known as the *Route 40 Corridor 20-Year Transportation Plan*. The Plan addresses the conditions that are expected to result from projected growth in housing, employment, and traffic over 20 years. The Plan contains projects that address the projected transportation problems. An annual Corridor Monitoring and Triggering Report is generated by DelDOT, WILMAPCO, New Castle County, and DART to determine the need for further evaluation of transportation, safety, and transit improvements based

on land development, traffic, corridor preservation, highway safety, transit service, and projects in the area. The Plan proposed shared use paths along US Route 40 in the study area, however, no capital projects are proposed to implement the recommendations at this time. More information regarding the project and study can be found at the following website:

<https://deldot.gov/projects/index.shtml?dc=corridor&name=us-40>

The *US 13, US 40 to Memorial Drive Pedestrian Improvements Project* (T201601102) started in 2020 and is anticipated to be complete in 2025. The project aims to improve pedestrian facilities and safety along the US Route 13 and US Route 40 corridors, with improvements identified in the *US 13/40 Pedestrian Audit* studies. The pedestrian audit studies identified potential improvements along the site frontage on US Route 40. However, the improvements as part of the *US 13, US 40 to Memorial Drive Pedestrian Improvements* project do not include the site frontage and are for locations north of the TIS study area. The project website and study website can be found below:

<https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T201601102>

<https://deldot.gov/Programs/DSHSP/index.shtml?dc=project-pedestrian-safety-audit>

A pavement and rehabilitation project along US Route 40 from SR 72 to US Route 13 (DelDOT Contract No. T201606119) was completed within the past year. The project involved milling and paving with ADA upgrades to non-compliant curb ramps. Bicycle lane pavement markings were also installed. The project included the study intersections of US Route 40 with US Route 40 Cross-over (U-turn), Appleby Road, School Bell Road/Vandyke Road, Fir Avenue, Crossover 160 feet east of Contractors Way, and Holly Avenue/Shorewind Road. It should be noted that the project also reinstalled the recommended signing upgrades at the US Route 40/School Bell Road intersection associated with the *Signalized Median Crossover* project (DelDOT Contract No. T201508305) which included Wrong Way, Do Not Enter, Divided Highway, One Way, and Yield signage.

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 the Investment Level 1.

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 a variety of transportation options, foster efficient use of existing public and private investments, and enhance community identity and integrity. Overall, it is the state's intent to use its spending and management tools to maintain and enhance community character, and to promote well-designed and efficient new growth 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. Investment Level 1 Areas are ideal locations for Transportation Improvement Districts as well as Complete Community Enterprise Districts. Further, Level 1 areas are the first priority for planning projects and studies, bicycle facilities, signal-system enhancements, and the promotion of interconnectivity of neighborhoods and public facilities.

Proposed Development’s Compatibility with Livable Delaware:

The proposed site would be located in Investment Level 1. Investment Level 1 areas encourage a wide range of uses, densities, transportation options, and foster efficient use of existing public and private investments to enhance community identity and integrity. The existing land use along the School Bell Road corridor is primarily residential and the proposed development of a super convenience store with gas pumps will diversify the land utilization, which will support ongoing development in the surrounding area. Therefore, the proposed development is generally consistent with the 2020 update of the Livable Delaware “Strategies for State Policies and Spending.”

Comprehensive Plan

(Source: New Castle County 2012 Comprehensive Plan)

New Castle County Comprehensive Plan:

Per the *New Castle County Comprehensive Plan Zoning Map*, the proposed development is currently split-zoned as NC6.5 (Single-Family 6,500SF) and CR (Commercial Regional). The developer plans to rezone the NC6.5 land as CR. Per the *New Castle County Comprehensive Plan Future Land Use Map*, the proposed development is in an area designated as Office/Commercial/Industrial Development Area (OCI) and Medium Density Residential.

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

The *New Castle County Comprehensive Plan* encourages "redevelopment and infill projects that complement and enhance existing neighborhoods and restore older commercial centers as vital components in the community". As the proposed development is in close proximity to residential neighborhoods and will redevelop a commercial facility, the development is generally consistent with the *New Castle 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, 10th Edition: An ITE Informational Report*, published by the Institute of Transportation Engineers (ITE) for ITE Land Use Code 960 (Super Convenience Market/Gas Station). Trip generation was reviewed by DelDOT as part of the Preliminary TIS (PTIS) submission.

Table 1
Royals Farms #369 Bear Trip Generation

Land Use	ADT	AM Peak Hour			PM Peak Hour			Saturday Peak Hours		
		In	Out	Total	In	Out	Total	In	Out	Total
4,649 SF Super Convenience Store with Gas (ITE Code 960)	3,895	187	187	374	161	161	322	141	142	283
Pass-by Trips*	0	142	142	284	122	122	244	85	85	170
Total New Trips	3,895	45	45	90	39	39	78	56	57	113

*Based on the August 2001 ITE publication Trip-Generation Characteristics for Convenience Stores for the weekday morning and weekday afternoon peak hours. Assumed to be 60 percent for the Saturday midday peak hour.

Overview of TIS

Intersections examined:

1. School Bell Road (New Castle Road 344)/Site Entrance A
2. US Route 40/Site Entrance B
3. US Route 40/School Bell Road/Vandyke Road
4. US Route 40/Appleby Road (New Castle Road 343)
5. US Route 40/US Route 40 Cross-over (U-turn)
6. Appleby Road/Old Forge Road
7. School Bell Road/Fir Avenue
8. School Bell Road/Cardinal Avenue
9. School Bell Road/Nursery Drive
10. US Route 40/Fir Avenue
11. US Route 40/Crossover 160 feet east of Contractors Way
12. US Route 40/Holly Avenue & Shorewind Road

Conditions examined:

1. Case 1 – 2021 Existing
2. Case 2 – 2023 without Development
3. Case 3 – 2023 with Development
 - a. With full access along School Bell Road and rights-in/rights-out along US Route 40
 - b. With full access along School Bell Road and rights-out only along US Route 40

Committed Developments considered:

1. School Bell Crossing Shopping Center (US 40 south side, across from School Bell Road): 5,585 SF convenience market with fueling positions, a 2,125 SF coffee/donut shop with drive through, and 127,475 SF of warehouse space.
2. School Bell Center; (US 40 north side, east of School Bell Road): 19,998 SF retail building.
3. Dasher Farm (School Bell Road west side, north of Nursery Drive): 48 single-family detached houses.
4. Dover Federal Credit Union (Appleby Road east side and Route 40 north side): 24,000 SF shopping center.
5. Soneji Property (Appleby Road east side, north of Route 40): 20 low rise apartments.
6. 504 (498) Pulaski Highway (Prices Toyota) (Route 40 south side, across from Appleby Road): 19,600 SF used car sales and repair building.
7. Delaware Auto Court (US Route 13 / US Route 40 split, north side): 71-room hotel, 19,125 SF shopping center.

*Note: Committed development information provided in the TIS supersedes the information provided in the October 12, 2021 DelDOT Scoping Meeting Memorandum.

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

Intersection Descriptions

1. School Bell Road (New Castle Road 344)/Site Entrance A

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

Eastbound Approach: (Site Entrance A) Proposed one shared left turn/right turn lane, stop controlled.

Northbound Approach: (School Bell Road) Existing one through lane; Proposed one through lane and left turn lane.

Southbound Approach: (School Bell Road) Existing one through lane; Proposed one through lane and one right turn lane.

2. US Route 40/Site Entrance B

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

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

Southbound Approach: (Site Entrance B) Proposed one right turn lane, stop controlled.

3. US Route 40/School Bell Road/Vandyke Road

Type of Control: Existing signalized intersection (T-intersection); Proposed signalized intersection (four-legged)

Eastbound Approach: (US Route 40) Existing one left turn lane, and two through lanes; Proposed 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: (Vandyke Road) Proposed one left turn lane, one shared left turn/through lane, and one channelized right turn lane.

Southbound Approach: (School Bell Road) Existing one left turn lane and one channelized right turn lane; Proposed one shared left turn/through lane and one channelized right turn lane.

Note: Proposed lane configurations are to be constructed as part of the School Bell Crossing development.

4. US Route 40/Appleby Road (New Castle Road 343)

Type of Control: Two-way stop controlled intersection

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

Southbound Approach: (Appleby Road) Existing one channelized right turn lane, stop-controlled.

5. US Route 40/US Route 40 Cross-over (U-turn)

Type of Control: Two-way stop controlled intersection

Eastbound Approach: (US Route 40) Existing one left turn/U-turn lane, one through lane, and one shared through/right turn lane.

Westbound Approach: (US Route 40) Existing one left turn/U-turn lane, one through lane, and one shared through/right turn lane.

Northbound Approach: (Driveway) Existing one shared left turn/through/right turn lane, stop-controlled.

Southbound Approach: (Driveway) Existing one shared left turn/through/right turn lane, stop-controlled.

6. Appleby Road/Old Forge Road

Type of Control: Two-way stop controlled intersection

Eastbound Approach: (Old Forge Road) Existing one shared left turn/through lane, stop controlled, and one channelized right turn lane, yield controlled.

Westbound Approach: (Old Forge Road) Existing one shared left turn/through lane, stop controlled, and one channelized right turn lane, yield controlled.

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

Southbound Approach: (Appleby Road) Existing one left turn lane, one through lane, and one channelized right turn lane.

7. School Bell Road/Fir Avenue

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

Eastbound Approach: (Fir Avenue) Existing one shared left turn/right turn lane, stop controlled.

Northbound Approach: (School Bell Road) Existing one shared left turn/through lane.

Southbound Approach: (School Bell Road) Existing one shared through/right turn lane.

8. School Bell Road/Cardinal Avenue

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

Eastbound Approach: (Cardinal Avenue) Existing one shared left turn/right turn lane, stop-controlled.

Northbound Approach: (School Bell Road) Existing one shared left turn/through lane.

Southbound Approach: (School Bell Road) Existing one shared through/right turn lane.

9. School Bell Road/Nursery Drive

Type of Control: Two-way stop controlled intersection

Eastbound Approach: (Nursery Drive) Existing one shared left turn/through/right turn lane, stop-controlled.

Westbound Approach: (Church Driveway) Existing one shared left turn/through/right turn lane, stop-controlled.

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

Southbound Approach: (School Bell Road) Existing one shared left turn/through/right turn lane.

Note: Nursery Drive and Church Driveway intersect School Bell Road at offset locations.

10. US Route 40/Fir Avenue

Type of Control: Two-way stop controlled intersection

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

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

Northbound Approach: (Driveway) Existing one shared left turn/through/right turn lane, stop-controlled.

Southbound Approach: (Fir Avenue) Existing one shared left turn/through/right turn lane, stop-controlled.

11. US Route 40/Crossover 160 feet east of Contractors Way

Type of Control: Two-way stop controlled intersection

Eastbound Approach: (US Route 40) Existing one left turn/U-turn lane, one through lane, and one shared through/right turn lane.

Westbound Approach: (US Route 40) Existing one left turn/U-turn lane, one through lane, and one shared through/right turn lane.

Northbound Approach: (Driveway) Existing one shared left turn/through/right turn lane, stop-controlled.

Southbound Approach: (Driveway) Existing one shared left turn/through/right turn lane, stop-controlled.

12. US Route 40/Holly Avenue/Shorewind Road

Type of Control: Two-way stop controlled intersection

Eastbound Approach: (US Route 40) Existing one left turn/U-turn lane, one through lane, and one shared through/right turn lane.

Westbound Approach: (US Route 40) Existing one left turn/U-turn lane, one through lane, and one shared through/right turn lane.

Northbound Approach: (Shorewind Road) Existing one shared left turn/through/right turn lane, stop controlled.

Southbound Approach: (Holly Avenue) Existing one shared left turn/through/right turn lane, stop-controlled.

Note: Holly Avenue and Shorewind Road intersect US Route 40 at offset locations.

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: Per DelDOT Gateway, Delaware Transit Corporation (DTC) currently provides existing services through the study area via DART Routes 40, 54, 64, and 13. DART Route 40 provides service along US Route 40 within the study area, providing 33 round trips from 4:36 AM to 11:47 PM on weekdays, 16 round trips from 6:19 AM to 11:20 pm on Saturdays, and 13 round trips from 6:55 AM to 8:03 PM on Sunday. DART Routes 54 and 64 traverse the study

area along Appleby Road and US Route 40 west of Appleby Road. Route 54 provides 22 round trips from 5:20 AM to 10:34 PM on weekdays, and 9 round trips from 7:15 AM to 8:50 PM on Saturday. DART Route 64 provides 21 round trips from 5:15 AM to 11:25 PM on weekdays, 16 round trips from 6:08 AM to 10:52 PM on Saturdays, and 12 round trips from 7:32 AM to 7:05 PM on Sundays. DART Route 13 traverses the intersection of Appleby Road/Old Forge Road, providing service north and east of the intersection. Route 13 provides 45 round trips from 4:20 AM to 12:08 AM on weekdays, 30 round trips from 6:25 AM to 11:02 PM on Saturdays, and 13 round trips from 7:15 AM to 8:56 PM on Sundays.

Three DART bus stops exist within the study area. Two bus stops exist on the northeast and southeast corners of the intersection of US Route 40/Fir Avenue, which service DART Routes 40 and 54. One bus stop exists on the southeast corner of the intersection of Appleby Road/Old Forge Road, which services DART Route 13.

Planned transit service: Per email correspondence on February 15, 2022, with Mr. Jared Kauffman, Planner for DART, it is requested that a Type 2 5'x8' bus stop be placed 40 feet west of the Bear Diner Entrance on US 40. Furthermore, pedestrian accessways were requested along both US Route 40 and School Bell Road.

Existing bicycle and pedestrian facilities: According to DelDOT's New Castle County On-Road Bicycle Map, School Bell Road, US Route 40, and Appleby Road are considered Connector Bicycle Routes throughout the study area.

Planned bicycle and pedestrian facilities: Per email correspondence dated March 1, 2022, from Mr. John Fiori, DelDOT's Bicycle Coordinator and Ms. Linda Osiecki, DelDOT's Pedestrian Coordinator, the following improvements were recommended:

- Per the DelDOT SUP/Sidewalk Policy, a non-motorized facility is required unless a physical impossibility exists. It is recommended to install a 10' wide shared-use path (SUP) along the property frontage of US Route 40. School Bell Road already has an existing sidewalk.
- It is required that an internal connection from the SUP along US Route 40 and the existing sidewalk along School Bell Road be installed.
- It is requested that internal bicycle racks be installed.
- Per the Development Coordination Manual (DCM) the site shall dedicate right-of-way per the roadway classification and establish a 15' wide permanent easement along all property roadway frontages.
- The ramps along US Route 40 needs to be closer to the roadway. Depending on if the island is concrete or painted will determine the required design.
- The SUP needs to maintain a consistent parallel distance from the roadway as much as possible.
- Where the SUP ties into the existing concrete island at the adjoining northern property (a.k.a. Bear Diner), there appears to be existing manholes that will be impacted and may need to be adjusted.
- Since the SUP is tying into the existing concrete island at the adjoining northern property (a.k.a. Bear Diner), where the curb is vertical on the egress side of the diner entrance, a

ramps will need to be installed since there is an existing ramp on the ingress side of the diner entrance.

- Crosswalks need to be striped across both entrances.
- All entrance, roadway and/or intersection improvements required shall incorporate bicycle and pedestrian facilities. Per the DCM, if the right turn lane is warranted, then a separate bike lane shall be incorporated along the right turn lane; if a left turn lane is required any roadway improvements shall include a shoulder matching the roadway functional classification or existing conditions (minimum 5-feet).

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 a map developed by the University of Delaware.

- US Route 40 LTS: 3
- School Bell Road LTS: 4

Crash Evaluation

Per the crash data included in the TIS from January 1, 2019, to December 31, 2021, and provided by the Delaware Department of Transportation (DelDOT), 84 crashes were reported within the study area, 24 included injuries, and two reported crashes involved fatalities. A total of 72 crashes were reported along US Route 40, five along School Bell Road, and seven on Appleby Road. Of the seventy-two crashes reported on US Route 40, 32 were rear-end, four were head-on, 13 were angle, two were sideswipes, four were animal, ten involved hitting a fixed object, two were involving a pedestrian, and five unknowns. Of the five crashes reported on School Bell Road, four were angle and one involved hitting a fixed object. Of the seven crashes reported on Appleby Road, one was head-on, two were angle, one was a sideswipe, one involved a pedestrian, and two were unknowns. There were two fatal pedestrian crashes along US 40 at the Contractors Way crossover. Both involved alcohol and occurred after 10:00 PM when it was dark.

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 site entrances per a field visit conducted on February 22, 2022.

General HCS Analysis Comments

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

- 1) JMT used version 7.9.6 of HCS7 to complete the analysis, whereas the TIS utilized version 7.6.
- 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 did not.
- 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 and site entrances in the analyses, whereas the TIS did not.
- 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 utilized existing PHF for all cases.
- 5) Two different build scenarios were analyzed:
 - Case 3a – one full access along School Bell Road and one rights-in/rights-out access along US Route 40
 - Case 3b – one full access along School Bell Road and one rights-out only access along US Route 40

Table 2
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for Bear Royal Farms #369
Report Dated: January 25, 2022
Prepared by: McMahon Associates, Inc.

Unsignalized Intersection Two-Way Stop Control (T-Intersection) ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Summer SAT	Weekday AM	Weekday PM	Summer SAT
Site Entrance A / School Bell Road (New Castle Road 344) ²						
2022 with Development (Case 3a)						
Eastbound Site Entrance A Approach	B (12.0)	B (11.0)	B (11.1)	B (12.5)	B (11.4)	B (11.4)
Northbound School Bell Road Left Turn	A (8.2)	A (7.8)	A (7.8)	A (8.2)	A (7.8)	A (7.9)
2022 with Development (Case 3b)						
Eastbound Site Entrance A Approach	B (12.8)	B (12.2)	B (11.9)	B (13.5)	B (12.7)	B (12.4)
Northbound School Bell Road Left Turn	A (8.4)	A (8.0)	A (8.0)	A (8.5)	A (8.1)	A (8.0)

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

² JMT configured the northbound and southbound School Bell Road approaches with shared through/turn lanes, whereas the TIS modeled the approaches with separate turn lanes.

Table 3
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for Bear Royal Farms #369
Report Dated: January 25, 2022
Prepared by: McMahon Associates, Inc.

Unsignalized Intersection Two-Way Stop Control (T-Intersection) ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Summer SAT	Weekday AM	Weekday PM	Summer SAT
Site Entrance B / US Route 40						
2022 with Development (Case 3a)						
Southbound Site Entrance B Approach	B (11.1)	C (16.3)	B (14.8)	B (11.1)	C (16.3)	B (14.8)
2022 with Development (Case 3b)						
Southbound Site Entrance B Approach	B (11.1)	C (16.3)	B (14.8)	B (11.1)	C (16.3)	B (14.8)

Table 4
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for Bear Royal Farms #369
Report Dated: January 25, 2022
Prepared by: McMahon Associates, Inc.

Signalized Intersection ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Summer SAT	Weekday AM	Weekday PM	Summer SAT
US Route 40 / School Bell Road / Vandyke Road						
2021 Existing (Case 1) with DelDOT Timing ³	-	-	-	A (7.5)	B (10.8)	A (7.5)
2021 Existing (Case 1) with Optimization ⁴	A (9.7)	B (11.2)	A (9.9)	A (7.3)	A (7.4)	A (6.5)
2022 without Development (Case 2) with Optimization ⁴	C (23.5)	B (18.0)	B (18.2)	C (23.2)	B (15.9)	B (17.2)
2022 without Development (Case 2) with School Bell Crossing Entrance ⁵	-	-	-	D (40.0)	C (27.0)	C (34.0)
2022 with Development (Case 3a) with Optimization ⁴	C (30.3)	C (21.4)	C (21.4)	C (33.1)	C (21.3)	C (22.5)
2022 with Development (Case 3a) with School Bell Crossing Entrance ⁵	-	-	-	D (51.2)	C (33.5)	D (37.3)
2022 with Development (Case 3b) with Optimization ⁴	C (30.2)	C (20.9)	C (21.2)	C (32.9)	C (20.9)	C (22.3)
2022 with Development (Case 3b) with School Bell Crossing Entrance ⁵	-	-	-	D (48.7)	D (35.2)	D (41.1)

³ JMT utilized field measured phase timing and the cycle lengths from the DelDOT timing sheets, whereas the TIS did not.

⁴ Signal optimization scenario includes optimizing splits and maintaining a cycle length of 150 seconds during the AM and Saturday peak hour and 120 seconds during the PM peak hour.

⁵ JMT completed an analysis incorporating the entrance to the School Bell Crossing development at the southern leg of the intersection. The approach was modeled as one left turn lane, one shared left turn/through lane, and one right turn lane with split phasing along the northbound and southbound approaches. 40% of traffic was assumed to utilize the shared left turn/through lane.

Table 5
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for Bear Royal Farms #369
Report Dated: January 25, 2022
Prepared by: McMahon Associates, Inc.

Unsignalized Intersection Two-Way Stop Control (T-Intersection) ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Summer SAT	Weekday AM	Weekday PM	Summer SAT
US Route 40 / Appleby Road (New Castle Road 343)						
2021 Existing (Case 1)						
Southbound Appleby Road Right Turn	B (11.0)	C (18.6)	B (14.5)	B (11.0)	C (18.6)	B (14.5)
2023 without Development (Case 2)						
Northbound Price Toyota Right Turn	C (16.8)	C (15.3)	C (16.4)	C (16.7)	C (15.4)	C (16.6)
Southbound Appleby Road Right Turn	C (15.4)	C (33.2)	C (22.9)	C (15.1)	D (33.7)	C (23.3)
2023 without Development (Case 2) <i>with School Bell Crossing Fourth Leg</i> ⁶						
Northbound Price Toyota Right Turn	-	-	-	C (15.2)	B (14.0)	C (15.1)
Southbound Appleby Road Right Turn	-	-	-	B (13.4)	D (26.4)	C (19.7)
2023 with Development (Case 3)						
Northbound Price Toyota Right Turn	C (17.0)	C (15.4)	C (16.6)	C (16.8)	C (15.5)	C (16.8)
Southbound Appleby Road Right Turn	C (15.8)	D (34.7)	C (23.8)	C (15.4)	E (35.2)	C (24.3)
2023 with Development (Case 3) <i>with School Bell Crossing Fourth Leg</i> ⁶						
Northbound Price Toyota Right Turn	-	-	-	C (15.3)	B (14.1)	C (15.3)
Southbound Appleby Road Right Turn	-	-	-	B (13.6)	D (27.3)	C (20.4)

⁶ JMT conducted an additional analysis with the entrance to School Bell Crossing on US Route 40 located directly across from School Bell Road.

Table 6
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for Bear Royal Farms #369
Report Dated: January 25, 2022
Prepared by: McMahon Associates, Inc.

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Summer SAT	Weekday AM	Weekday PM	Summer SAT
US Route 40 / US Route 40 Cross Over (U-Turn) ⁷						
2021 Existing (Case 1)						
Eastbound US Route 40 U-Turn/Left Turn	B (11.9)	D (34.7)	C (21.4)	B (12.1)	E (37.3)	C (22.4)
Westbound US Route 40 U-Turn/Left Turn	B (12.1)	A (9.4)	B (10.3)	B (12.4)	A (9.6)	B (11.9)
Northbound Driveway Approach	-	B (13.9)	B (12.2)	B (12.1)	B (14.2)	B (12.4)
Southbound Driveway Approach	C (18.1)	B (13.6)	F (*)	C (15.6)	B (13.9)	B (12.7)
2023 without Development (Case 2)						
Eastbound US Route 40 U-Turn/Left Turn	E (38.5)	F (528.5)	F (305.7)	E (40.2)	F (558.1)	F (326.1)
Westbound US Route 40 U-Turn/Left Turn	B (13.8)	B (10.0)	B (11.2)	B (14.3)	B (12.1)	B (13.5)
Northbound Driveway Approach	-	F (*)	F (*)	B (13.2)	F (*)	F (*)
Southbound Driveway Approach	F (139.6)	F (*)	F (*)	F (95.2)	F (*)	F (*)
2023 without Development (Case 2) <i>with School Bell Crossing Fourth Leg ⁶</i>						
Eastbound US Route 40 U-Turn/Left Turn	-	-	-	C (19.2)	F (168.7)	F (75.5)
Westbound US Route 40 U-Turn/Left Turn	-	-	-	B (14.3)	B (12.1)	B (11.6)
Northbound Driveway Approach	-	-	-	B (13.2)	F (*)	F (221.0)
Southbound Driveway Approach	-	-	-	D (25.8)	F (*)	F (*)

⁷ JMT incorporated one northbound right turn volume during the AM peak hour to generate LOS results for the movement, whereas the TIS did not.

Table 6 (continued)
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for Bear Royal Farms #369
Report Dated: January 25, 2022
Prepared by: McMahon Associates, Inc.

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Summer SAT	Weekday AM	Weekday PM	Summer SAT
US Route 40 / US Route 40 Cross Over (U-Turn) ⁷						
2023 with Development (Case 3)						
Eastbound US Route 40 U-Turn/Left Turn	E (42.0)	F (553.3)	F (333.0)	E (44.1)	F (584.1)	F (356.4)
Westbound US Route 40 U-Turn/Left Turn	B (13.9)	B (10.1)	B (11.3)	B (14.4)	B (12.2)	B (13.6)
Northbound Driveway Approach	-	F (*)	F (*)	B (13.3)	F (*)	F (*)
Southbound Driveway Approach	F (173.5)	F (*)	F (*)	F (116.8)	F (*)	F (*)
2023 with Development (Case 3) with School Bell Crossing Fourth Leg ⁶						
Eastbound US Route 40 U-Turn/Left Turn	-	-	-	C (19.9)	F (184.4)	F (86.4)
Westbound US Route 40 U-Turn/Left Turn	-	-	-	B (14.4)	B (12.2)	B (13.6)
Northbound Driveway Approach	-	-	-	B (13.3)	F (*)	B (13.7)
Southbound Driveway Approach	-	-	-	D (26.9)	F (*)	B (13.9)

Table 6 (continued)
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for Bear Royal Farms #369
Report Dated: January 25, 2022
Prepared by: McMahon Associates, Inc.

Signalized Intersection ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Summer SAT	Weekday AM	Weekday PM	Summer SAT
US Route 40 / US Route 40 Crossover (U-Turn) ^{7, 8}						
2022 without Development (Case 2)	-	-	-	A (5.7)	B (10.0)	A (6.1)
2022 with Development (Case 3)	-	-	-	A (6.5)	B (10.2)	A (6.5)

⁸ JMT conducted an additional analysis of the intersection as a signalized intersection along the US Route 40 corridor. The Fir Avenue, School Bell Road, and US 40 Crossover intersections were included in the coordinated corridor.

Table 7
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for Bear Royal Farms #369
Report Dated: January 25, 2022
Prepared by: McMahon Associates, Inc.

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Summer SAT	Weekday AM	Weekday PM	Summer SAT
Appleby Road / Old Forge Road						
2021 Existing (Case 1)						
Eastbound Old Forge Road Approach	B (11.2)	B (13.1)	B (12.2)	B (11.1)	B (13.0)	B (12.3)
Westbound Old Forge Road Approach	A (9.6)	B (10.7)	B (10.0)	A (9.6)	B (10.7)	B (10.0)
Northbound Appleby Road Left Turn	A (7.6)	A (7.7)	A (7.6)	A (7.5)	A (7.7)	A (7.7)
Southbound Appleby Road Left Turn	A (7.5)	A (7.6)	A (7.5)	A (7.5)	A (7.6)	A (7.5)
2023 without Development (Case 2)						
Eastbound Old Forge Road Approach	B (12.8)	B (14.5)	B (14.0)	B (12.8)	B (14.3)	B (14.2)
Westbound Old Forge Road Approach	A (10.3)	B (11.4)	B (10.7)	A (10.3)	B (11.4)	B (10.8)
Northbound Appleby Road Left Turn	A (7.8)	A (7.9)	A (7.8)	A (7.7)	A (7.8)	A (7.8)
Southbound Appleby Road Left Turn	A (7.6)	A (7.8)	A (7.7)	A (7.6)	A (7.7)	A (7.6)
2023 with Development (Case 3)						
Eastbound Old Forge Road Approach	B (13.0)	B (14.6)	B (14.2)	B (13.0)	B (14.4)	B (14.4)
Westbound Old Forge Road Approach	A (10.4)	B (11.5)	B (10.8)	A (10.4)	B (11.5)	B (10.9)
Northbound Appleby Road Left Turn	A (7.8)	A (7.9)	A (7.8)	A (7.7)	A (7.8)	A (7.9)
Southbound Appleby Road Left Turn	A (7.6)	A (7.8)	A (7.7)	A (7.6)	A (7.7)	A (7.7)

Table 8
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for Bear Royal Farms #369
Report Dated: January 25, 2022
Prepared by: McMahon Associates, Inc.

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Summer SAT	Weekday AM	Weekday PM	Summer SAT
School Bell Road / Fir Avenue						
2021 Existing (Case 1)						
Eastbound Fir Avenue Approach	B (11.0)	B (11.6)	B (11.1)	B (10.8)	B (11.4)	B (11.0)
Northbound School Bell Road Left Turn	A (7.8)	A (7.8)	A (7.6)	A (7.8)	A (7.7)	A (7.7)
2023 without Development (Case 2)						
Eastbound Fir Avenue Approach	B (12.5)	B (13.0)	B (12.8)	B (12.1)	B (12.7)	B (12.7)
Northbound School Bell Road Left Turn	A (8.0)	A (8.0)	A (7.8)	A (8.1)	A (7.9)	A (7.9)
2023 with Development (Case 3)						
Eastbound Fir Avenue Approach	B (12.8)	B (13.3)	B (13.3)	B (12.4)	B (13.0)	B (13.1)
Northbound School Bell Road Left Turn	A (8.0)	A (8.0)	A (7.8)	A (8.1)	A (7.9)	A (7.9)

Table 9
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for Bear Royal Farms #369
Report Dated: January 25, 2022
Prepared by: McMahon Associates, Inc.

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Summer SAT	Weekday AM	Weekday PM	Summer SAT
School Bell Road / Cardinal Avenue						
2021 Existing (Case 1)						
Eastbound Cardinal Avenue Approach	B (11.2)	B (12.2)	B (11.4)	B (10.9)	B (12.0)	B (11.3)
Northbound School Bell Road Left Turn	A (7.8)	A (7.7)	A (7.6)	A (7.9)	A (7.7)	A (7.7)
2023 without Development (Case 2)						
Eastbound Cardinal Avenue Approach	B (12.5)	B (13.6)	B (13.2)	B (12.2)	B (13.4)	B (13.0)
Northbound School Bell Road Left Turn	A (8.0)	A (7.8)	A (7.8)	A (8.1)	A (7.9)	A (7.9)
2023 with Development (Case 3)						
Eastbound Cardinal Avenue Approach	B (12.9)	B (14.0)	B (13.7)	B (12.5)	B (13.7)	B (13.5)
Northbound School Bell Road Left Turn	A (8.1)	A (7.9)	A (7.9)	A (8.1)	A (7.9)	A (7.9)

Table 10
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for Bear Royal Farms #369
Report Dated: January 25, 2022
Prepared by: McMahon Associates, Inc.

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Summer SAT	Weekday AM	Weekday PM	Summer SAT
School Bell Road / Nursery Drive ⁹						
2021 Existing (Case 1)						
Eastbound Nursery Drive Approach	B (10.9)	B (11.0)	B (10.2)	B (11.1)	B (11.2)	B (10.2)
Westbound Church Driveway Approach	-	A (9.6)	B (11.2)	A (9.0)	A (9.7)	B (11.3)
Northbound School Bell Road Left Turn	A (7.8)	A (7.7)	A (7.6)	A (7.9)	A (7.8)	A (7.7)
Southbound School Bell Road Left Turn	A (7.5)	A (7.8)	A (7.6)	A (7.5)	A (7.8)	A (7.7)
2023 without Development (Case 2)						
Eastbound Nursery Drive Approach	B (12.1)	B (11.9)	B (11.1)	B (12.4)	B (12.2)	B (11.2)
Westbound Church Driveway Approach	-	B (10.1)	B (12.8)	A (9.3)	B (10.2)	B (12.9)
Northbound School Bell Road Left Turn	A (8.0)	A (7.8)	A (7.8)	A (8.1)	A (7.9)	A (7.8)
Southbound School Bell Road Left Turn	A (7.6)	A (7.9)	A (7.8)	A (7.7)	A (8.0)	A (7.9)
2023 with Development (Case 3)						
Eastbound Nursery Drive Approach	B (12.4)	B (12.1)	B (11.3)	B (12.7)	B (12.5)	B (11.4)
Westbound Church Driveway Approach	-	B (10.2)	B (13.2)	A (9.4)	B (10.3)	B (13.4)
Northbound School Bell Road Left Turn	A (8.1)	A (7.9)	A (7.8)	A (8.2)	A (7.9)	A (7.9)
Southbound School Bell Road Left Turn	A (7.6)	A (8.0)	A (7.9)	A (7.7)	A (8.0)	A (7.9)

⁹ JMT included one volume along the westbound right turn to generate LOS output for the AM peak hour, whereas the TIS did not.

Table 11
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for Bear Royal Farms #369
Report Dated: January 25, 2022
Prepared by: McMahon Associates, Inc.

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Summer SAT	Weekday AM	Weekday PM	Summer SAT
US Route 40 / Fir Avenue						
2021 Existing (Case 1)						
Eastbound US Route 40 U-turn/Left Turn	A (9.4)	C (16.2)	C (15.7)	A (9.3)	C (16.5)	C (16.2)
Westbound US Route 40 U-turn/Left Turn	B (14.0)	B (11.0)	B (11.8)	B (14.4)	B (11.2)	B (12.1)
Northbound Driveway Approach	C (22.5)	C (19.5)	D (26.3)	C (23.2)	C (20.2)	D (27.0)
Southbound Fir Avenue Approach	B (14.4)	C (21.6)	D (26.0)	C (15.0)	C (23.5)	D (28.9)
2023 without Development (Case 2)						
Eastbound US Route 40 U-turn/Left Turn	B (10.3)	C (19.3)	C (19.5)	B (10.1)	C (19.7)	C (20.4)
Westbound US Route 40 U-turn/Left Turn	C (17.3)	B (12.2)	B (13.5)	C (17.7)	B (12.5)	B (14.0)
Northbound Driveway Approach	D (29.5)	C (23.7)	E (37.8)	D (30.0)	C (24.8)	E (39.3)
Southbound Fir Avenue Approach	C (17.1)	D (26.4)	E (36.7)	C (17.9)	D (29.3)	E (43.0)
2023 with Development (Case 3)						
Eastbound US Route 40 U-turn/Left Turn	B (10.4)	C (19.6)	C (20.1)	B (10.2)	C (20.0)	C (21.0)
Westbound US Route 40 U-turn/Left Turn	C (17.6)	B (12.3)	B (13.8)	C (18.0)	B (12.7)	B (14.2)
Northbound Driveway Approach	D (30.1)	C (24.2)	E (39.6)	D (30.6)	D (25.3)	E (41.2)
Southbound Fir Avenue Approach	C (17.4)	D (26.9)	E (38.3)	C (18.2)	D (29.9)	E (45.3)

Table 11 (continued)
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for Bear Royal Farms #369
Report Dated: January 25, 2022
Prepared by: McMahon Associates, Inc.

Signalized Intersection ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Summer SAT	Weekday AM	Weekday PM	Summer SAT
US Route 40 / Fir Avenue ⁹						
2022 without Development (Case 2)	-	-	-	B (11.5)	B (11.7)	B (11.6)
2022 with Development (Case 3a)	-	-	-	B (11.6)	B (11.9)	B (12.3)

Table 12
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for Bear Royal Farms #369
Report Dated: January 25, 2022
Prepared by: McMahon Associates, Inc.

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Summer SAT	Weekday AM	Weekday PM	Summer SAT
US Route 40 / Crossover 160 feet east of Contractors Way¹⁰						
2021 Existing (Case 1)						
Eastbound US Route 40 U-turn/Left Turn	B (12.5)	B (11.8)	C (18.2)	B (11.9)	C (23.3)	C (18.8)
Westbound US Route 40 U-turn/Left Turn	B (10.4)	A (9.8)	C (17.1)	B (10.7)	A (10.0)	C (17.7)
Northbound Contractors Way Approach	B (12.3)	B (11.5)	B (12.2)	B (12.4)	B (11.7)	B (12.4)
Southbound Driveway Approach	B (10.4)	D (27.7)	C (18.6)	B (10.5)	D (28.9)	C (19.1)
2023 without Development (Case 2)						
Eastbound US Route 40 U-turn/Left Turn	B (14.7)	B (12.8)	C (22.3)	B (13.8)	D (28.5)	C (23.2)
Westbound US Route 40 U-turn/Left Turn	B (11.6)	B (10.4)	C (21.6)	B (11.9)	B (10.6)	C (22.4)
Northbound Contractors Way Approach	B (13.6)	B (12.3)	B (13.3)	B (13.8)	B (12.5)	B (13.6)
Southbound Driveway Approach	B (11.1)	D (33.3)	C (22.2)	B (11.3)	D (35.0)	C (22.9)
2023 with Development (Case 3)						
Eastbound US Route 40 U-turn/Left Turn	B (14.9)	B (12.9)	C (22.9)	B (14.0)	D (29.0)	C (23.8)
Westbound US Route 40 U-turn/Left Turn	B (11.7)	B (10.4)	C (22.1)	B (12.0)	B (10.7)	C (23.0)
Northbound Contractors Way Approach	B (13.7)	B (12.4)	B (13.4)	B (13.9)	B (12.6)	B (13.7)
Southbound Driveway Approach	B (11.2)	D (33.9)	C (22.6)	B (11.3)	E (35.6)	C (23.4)

¹⁰ JMT incorporated u-turns, whereas the TIS did not.

Table 13
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for Bear Royal Farms #369
Report Dated: January 25, 2022
Prepared by: McMahon Associates, Inc.

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS			LOS per JMT		
	Weekday AM	Weekday PM	Summer SAT	Weekday AM	Weekday PM	Summer SAT
US Route 40 / Holly Avenue / Shorewind Road						
2021 Existing (Case 1)						
Eastbound US Route 40 U-turn/Left Turn	B (11.3)	C (18.6)	C (16.4)	B (11.4)	C (19.4)	C (17.0)
Westbound US Route 40 U-turn/Left Turn	B (14.9)	B (10.5)	B 10.4)	B (14.4)	B (10.7)	B (12.4)
Northbound Shorewind Road Approach	C (20.7)	C (18.7)	C (21.0)	C (21.0)	C (17.1)	C (18.8)
Southbound Holly Avenue Approach	C (15.2)	F (59.7)	D (29.2)	B (14.6)	C (18.9)	C (16.7)
2023 without Development (Case 2)						
Eastbound US Route 40 U-turn/Left Turn	B (13.2)	C (22.4)	C (20.1)	B (12.8)	C (23.5)	C (21.0)
Westbound US Route 40 U-turn/Left Turn	C (18.8)	B (11.4)	B (11.4)	C (17.0)	B (11.7)	B (14.4)
Northbound Shorewind Road Approach	D (28.5)	C (23.4)	D (28.7)	D (25.9)	C (20.9)	C (23.3)
Southbound Holly Avenue Approach	C (18.1)	F (103.7)	E (45.9)	C (16.3)	C (21.9)	C (19.6)
2023 with Development (Case 3)						
Eastbound US Route 40 U-turn/Left Turn	B (13.4)	C (22.8)	C (20.7)	B (13.0)	C (24.0)	C (21.6)
Westbound US Route 40 U-turn/Left Turn	C (19.1)	B (11.5)	B (11.6)	C (17.2)	B (11.8)	B (14.6)
Northbound Shorewind Road Approach	D (29.3)	C (23.9)	D (29.8)	D (26.5)	C (21.2)	C (23.9)
Southbound Holly Avenue Approach	C (18.4)	F (109.5)	E (48.6)	C (16.5)	C (22.2)	C (19.9)