



STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION

800 BAY ROAD
P.O. BOX 778
DOVER, DELAWARE 19903

November 26, 2013

SHAILEN P. BHATT
SECRETARY

Ms. Nicole Kline
McMahon Associates, Inc.
840 Springvale Drive
Exton, Pennsylvania 19341

Dear Ms. Kline:

The enclosed Traffic Impact Study (TIS) review letter for the **Wilmington FedEx Facility** (Tax Parcel 10-011.00-013) 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 Standards and Regulations for Subdivision Streets and State Highway Access and other accepted practices and procedures for such studies. DelDOT accepts this review letter and concurs with the recommendations. If you have any questions concerning this letter or the enclosed review letter, please contact me at (302) 760-2167.

Sincerely,

Troy Brestel
Project Engineer

TEB:km
Enclosures
cc with enclosures:

Mr. Shawn Tucker, Drinker, Biddle & Reath, LLC
Ms. Constance C. Holland, Office of State Planning Coordination
Ms. Eileen Fogarty, New Castle County Department of Land Use
Mr. Andrew Parker, McCormick Taylor, Inc.
DelDOT Distribution

DelDOT Distribution

John Janowski, New Castle County Department of Land Use
Owen Robatino, New Castle County Department of Land Use
Antoni Sekowski, New Castle County Department of Land Use
Frederick H. Schranck, Deputy Attorney General
Robert McCleary, Director, Transportation Solutions (DOTS)
Drew Boyce, Director, Planning
Mark Luszczyk, Chief Traffic Engineer, Traffic, DOTS
Mark Tudor, Assistant Director, Project Development North, DOTS
J. Marc Coté, Assistant Director, Development Coordination
T. William Brockenbrough, Jr., County Coordinator, Development Coordination
Thomas E. Meyer, Traffic Studies Manager, Traffic, DOTS
Donald Weber, North District Engineer, North District
Kevin Canning, Canal District Public Works Engineer, Canal District
Semia Hackett, Service Development Planner, Delaware Transit Corporation
John Garcia, New Castle Subdivision Coordinator, Development Coordination
Cliff Mumford, Subdivision Manager, Development Coordination
Ahmed Abdelmoteleb, New Castle Traffic Engineer, Traffic, DOTS
Marco Boyce, Planning Supervisor, Statewide & Regional Planning
Claudy Joinville, Project Engineer, Development Coordination

November 26, 2013

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

RE: Agreement No. 1529
Traffic Impact Study Services
Task No. 19A Subtask 7A – Wilmington FedEx

Dear Mr. Brestel,

McCormick Taylor has completed its review of the Traffic Impact Study (TIS) for the Wilmington Federal Express (FedEx) facility prepared by McMahan Associates, Inc. (McMahan), dated September 27, 2013. This review was assigned as Task Number 19A (Subtask 7A). McMahan prepared the report in a manner generally consistent with DelDOT's *Standards and Regulations for Subdivision Streets and State Highway Access*.

The TIS evaluates the impacts of the Wilmington FedEx facility, proposed to be located at the southern terminus of Davidson Lane, an industrial park street on Lambson Lane (New Castle Road 370) near the Port of Wilmington, within New Castle County, Delaware. The proposed development would consist of a 182,815 square-foot FedEx ground distribution facility. The facility is to be developed on approximately 72 acres of land. One access point is proposed, via an extension of Davidson Lane (currently a dead-end street) into the site. Construction is anticipated to be complete by 2019.

The land is currently zoned as HI (Heavy Industrial) within New Castle County, and the developer does not propose to change the zoning.

DelDOT currently has one relevant project in the study area: the Pavement & Rehabilitation, North I, 2012 project (State Contract No. T201206101). This project will improve more than five miles of Delaware Route 9 (New Castle Avenue / New Castle Road 19) and US Route 13 (Heald Street / New Castle Road 28) including improvements to roadway, intersection, and pedestrian facilities. Within the study area of the Wilmington FedEx TIS, the Pave & Rehab project includes the intersection of Delaware Route 9 & Lambson Lane / Church Driveway, which will receive pavement, signing and striping improvements along with new crosswalks, countdown pedestrian signals with pushbuttons, and ADA upgrades. This Pave & Rehab project is scheduled for construction in Spring 2014.

Regarding DelDOT's Hazard Elimination Program (HEP), three intersections in the study area are within Site W of the 2009 HEP: Terminal Avenue (New Castle Road 359) & Pigeon Point Road (New Castle Road 377), Terminal Avenue & I-495 Northbound Ramps, and Terminal Avenue & I-495 Southbound Ramps. The HEP committee noted various safety concerns along

the Terminal Avenue corridor and they recommended numerous remedial improvements including adding or replacing many signs and pavement markings. These remedial improvements have since been addressed in the field. No additional studies were recommended.

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

The proposed development would meet the New Castle County Level of Service (LOS) Standards as stated in Section 40.11.210 of the Unified Development Code (UDC).

However, based on DeIDOT's evaluation criteria, the stop-controlled minor street approaches at the following intersections exhibit LOS deficiencies without the implementation of physical roadway and/or traffic control improvements:

<i>Intersection</i>	<i>Existing Traffic Control</i>	<i>Situations for which deficiencies occur</i>
Terminal Avenue and Pigeon Point Road	Unsignalized	2019 AM with FedEx
Terminal Avenue and I-495 Northbound Ramps	Unsignalized	2019 AM without and with FedEx
Terminal Avenue and I-495 Southbound Ramps	Unsignalized	2015 AM and PM without and with FedEx

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

1. The developer should improve Davidson Lane from Lambson Lane to the FedEx site entrance at the end of the existing dead-end street (a distance of approximately 1,500 feet). Improvements should include but are not limited to reconstructing or resurfacing the road and striping a centerline. If resurfacing, the developer should provide a bituminous concrete overlay to the existing travel lanes, at DeIDOT's discretion. DeIDOT should analyze the existing lanes' pavement section and recommend an overlay thickness to the developer's engineer if necessary.
2. The developer should improve the intersection of Terminal Avenue and Pigeon Point Road. The proposed configuration is shown in the table below. If it is determined that additional proposed developments would contribute traffic to this intersection, those developers should be responsible for sharing the cost of this improvement. The developer should coordinate with DeIDOT to determine design details, implementation, and/or contribution towards this improvement.

Approach	Current Configuration	Proposed Configuration
Northbound Pigeon Point Road	One shared left/right-turn lane	One shared left/right-turn lane
Eastbound Terminal Avenue	One exclusive through lane and one shared through/right-turn lane	One through lane and one right-turn lane
Westbound Terminal Avenue	One left-turn lane and two through lanes	One left-turn lane and two through lanes

Initial recommended minimum turn-lane lengths (excluding tapers) of the separate turn lanes are listed below. The developer should coordinate with DelDOT's Subdivision Section to determine final turn-lane lengths.

Approach	Left-Turn Lane(s)	Right-Turn Lane
Northbound Pigeon Point Road	N/A	N/A
Eastbound Terminal Avenue	N/A	200 feet*
Westbound Terminal Avenue	200 feet**	N/A

* turn-lane length based on 200-foot deceleration length per DelDOT's *Road Design Manual*, but if this exclusive right-turn lane is a conversion of the existing shared through/right-turn lane it should extend to the upstream intersection (distance of approx. 500 feet, same as the existing lane)

** turn-lane length based on storage length per queuing analysis plus 200-foot deceleration length per DelDOT's *Road Design Manual*, but existing turn-lane length is adequate

- The developer should improve the intersection of Terminal Avenue and I-495 Northbound Ramps. The proposed configuration is shown in the table below. If it is determined that additional proposed developments would contribute traffic to this intersection, those developers should be responsible for sharing the cost of this improvement. The developer should coordinate with DelDOT to determine design details, implementation, and/or contribution towards this improvement.

Approach	Current Configuration	Proposed Configuration
Northbound I-495 NB Off-Ramp	One shared left/right-turn lane	One left-turn lane and one right-turn lane
Eastbound Terminal Avenue	One exclusive through lane and one shared through/right-turn lane	One exclusive through lane and one shared through/right-turn lane
Westbound Terminal Avenue	One left-turn lane and two through lanes	One left-turn lane and two through lanes

Initial recommended minimum turn-lane lengths (excluding tapers) of the separate turn lanes are listed below. The developer should coordinate with DelDOT's Subdivision Section to determine final turn-lane lengths.

Approach	Left-Turn Lane(s)	Right-Turn Lane
Northbound I-495 NB Off-Ramp	N/A	125 feet*
Eastbound Terminal Avenue	N/A	N/A
Westbound Terminal Avenue	225 feet**	N/A

* turn-lane length based on storage length per queuing analysis

** turn-lane length based on storage length per queuing analysis plus 200-foot deceleration length per DelDOT's *Road Design Manual*, but existing turn-lane length is adequate

4. The developer should improve the intersection of Terminal Avenue and I-495 Southbound Ramps. The proposed configuration is shown in the table below. If it is determined that additional proposed developments would contribute traffic to this intersection, those developers should be responsible for sharing the cost of this improvement. The developer should coordinate with DelDOT to determine design details, implementation, and/or contribution towards this improvement.

Approach	Current Configuration	Proposed Configuration
Southbound I-495 SB Off-Ramp	One shared left/through/right-turn lane	One shared through/left-turn lane and one right-turn lane
Eastbound Terminal Avenue	One exclusive through lane and one shared through/right-turn lane	One exclusive through lane and one shared through/right-turn lane
Westbound Terminal Avenue	One left-turn lane and two through lanes	One left-turn lane and two through lanes

Initial recommended minimum turn-lane lengths (excluding tapers) of the separate turn lanes are listed below. The developer should coordinate with DelDOT's Subdivision Section to determine final turn-lane lengths.

Approach	Left-Turn Lane(s)	Right-Turn Lane
Southbound I-495 SB Off-Ramp	N/A	175 feet*
Eastbound Terminal Avenue	N/A	N/A
Westbound Terminal Avenue	225 feet**	N/A

* turn-lane length based on storage length per queuing analysis

** turn-lane length based on storage length per queuing analysis plus 200-foot deceleration length per DelDOT's *Road Design Manual*, but existing turn-lane length is adequate

5. The developer should enter into one or more railroad grade crossing agreements with DelDOT to fund an equitable portion of any needed improvements for the four (4) at-grade crossings on Pigeon Point Road between Lambson Lane and Pyles Lane. The southernmost crossing is located approximately 1,300 feet north of Lambson Lane while the northernmost crossing is located approximately 2,650 feet north of Lambson Lane. The two southern crossings appear to be abandoned, and the two northern crossings may be active. It is noted that Norfolk Southern made improvements to at least two of these crossings in 2013. Should *additional* improvements be necessary, they may be identified by the Rail-Highway Grade Crossing Safety Program. Other developers may enter into an agreement for this railroad crossing as well. This is a Federally-funded project and as such the developer's equitable portion would be based solely on the State matching funds, which is 10% of the total project cost. The developer should coordinate with DelDOT on the implementation and equitable cost sharing of needed improvements. This railroad grade crossing agreement should expire seven years from the date of execution.
6. To alleviate sight distance problems that can occur when trucks park on the shoulders near the intersection of Terminal Avenue and Pigeon Point Road, the developer should coordinate with DelDOT to evaluate the need for, and to provide the installation of, No Parking signs near this intersection.
7. The developer should coordinate with DelDOT's Subdivision Section regarding the possibility of making geometric improvements to better accommodate large trucks (i.e., WB-67) at the following intersections along the truck route between the site and I-495:
 - Lambson Lane and Davidson Lane
 - Lambson Lane and Pigeon Point Road
 - Terminal Avenue and Pigeon Point Road

Possible geometric improvements include but are not limited to reconstructing pavement, widening roads, providing shoulders, relocating curbs, and modifying existing signing and striping.

8. The developer should coordinate with DelDOT and the Holloway Terrace Civic Association to address increase awareness of the existing truck traffic restriction on Lambson Lane. From Delaware Route 9 to 100 feet east of East Avenue, trucks and commercial traffic of gross weight over 5,000 pounds, except service vehicles making local delivery, are prohibited from using Lambson Lane. Despite the restriction, some heavy truck traffic illegally travels on this section of Lambson Lane, negatively affecting the transportation infrastructure and quality of life in this residential area. Measures to reduce the volume of truck traffic on this section of Lambson Lane, such as replacing and/or adding signage, notifying/reminding nearby industrial businesses of the restriction, and increasing enforcement should be evaluated and implemented.

9. The following pedestrian and transit improvements should be included:
- a. A minimum of a five-foot wide sidewalk (with a minimum of a three-foot buffer from the roadway) that meets current AASHTO and ADA standards should be constructed along the south side of Lambson Lane from opposite Harbor View Drive to Davidson Lane and along the east side of Davidson Lane from the proposed FedEx facility to Lambson Lane.
 - b. ADA compliant curb ramps and crosswalks should be provided at all pedestrian crossings within the site. Type 3 curb ramps are discouraged.
 - c. The developer should coordinate with the Delaware Transit Corporation regarding the possibility of adding an ADA-compliant bus stop pad with a bus pull-off and amenities such as a shelter, trash receptacle, and lighting in the vicinity of the proposed FedEx facility. If such a bus stop pad is built nearby but not within the FedEx facility site, sidewalks should connect from the pad to the proposed FedEx facility, and parking facilities for bicyclists should be included.

Improvements in this TIS may be considered “significant” under DelDOT’s *Work Zone Safety and Mobility Procedures and Guidelines*. These guidelines are available on DelDOT’s website at http://www.deldot.gov/information/pubs_forms/manuals/de_mutcd/index.shtml. For any additional information regarding the work zone impact and mitigation procedures during construction please contact Mr. Adam Weiser of DelDOT’s Traffic Section. Mr. Weiser can be reached at (302) 659-4073 or by email at Adam.Weiser@state.de.us.

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 subdivision review process.

Additional details on our review of this TIS are attached. Please contact me at (302) 738-0203 or through e-mail at ajparker@mtmail.biz if you have any questions concerning this review.

Sincerely,

McCormick Taylor, Inc.



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

Enclosure

General Information

Report date: September 27, 2013

Prepared by: McMahon Associates, Inc. (McMahon)

Prepared for: The Westmoreland Company, Inc.

Tax parcel: 10-011.00-013

Generally consistent with DelDOT's *Standards and Regulations for Subdivision Streets and State Highway Access*: Yes

Project Description and Background

Description: The proposed development would consist of a 182,815 square-foot FedEx ground distribution facility.

Location: The Wilmington Federal Express (FedEx) facility is proposed to be located at the southern terminus of Davidson Lane, an industrial park street on Lambson Lane (New Castle Road 370) near the Port of Wilmington, within New Castle County, Delaware. A site location map is included on Page 8.

Amount of land to be developed: approximately 72 acres of land

Land use approval(s) needed: Subdivision approval. The land is currently zoned as HI (Heavy Industrial) within New Castle County, and will be developed under that zoning.

Proposed completion date: 2019

Proposed access locations: One access point is proposed, via an extension of Davidson Lane (currently a dead-end street) into the site.

Daily Traffic Volumes (per DelDOT Traffic Summary 2012):

- 2012 Average Annual Daily Traffic on Lambson Lane: 2,014 vpd



Delaware Strategies for State Policies and Spending – 2010 Update

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

The proposed Wilmington FedEx facility is located within Investment Level 1 and Level 2 areas. A portion of the site is also located within an Out of Play area. Based on the Site Plan for the proposed FedEx facility, no buildings or roads will be constructed within the Out of Play area.

Investment Level 1

Investment Level 1 Areas are areas of the state that are most prepared for growth and where the state can make cost-effective infrastructure investments for schools, roads, and public safety. In these 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. Investment Level 1 Areas are often municipalities, towns, or urban/urbanizing places in counties. Density is generally higher than in the surrounding areas. 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.

Investment Level 2

Investment Level 2 Areas, like Investment Level 1 Areas, are areas prepared for growth and where the state can make cost-effective infrastructure investments for schools, roads, and public safety. In these 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. Investment Level 2 Areas serve as transition areas between Level 1 and the state's more open, less populated areas.

Out of Play

These lands which are not at all available for development include publicly-owned lands, lands for which serious legal and/or environmental constraints on development are identified, and lands in some form of permanent open-space protection.

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

The proposed FedEx facility is located within Investment Level 1 and Level 2 areas, and is to be developed as a 182,815 square-foot distribution facility. This type of development is consistent with the character of Investment Level 1 and Level 2 areas, and with the surrounding industrial park area. It is therefore concluded that the proposed development generally complies with the policies stated in the 2010 update of the "Strategies for State Policies and Spending."

Comprehensive Plan

New Castle County Comprehensive Plan:

(Source: New Castle County Comprehensive Plan Update, April 2012)

The proposed FedEx facility is located in an area with future land use designated as HI Zoned Land.

The parcel is currently zoned HI (Heavy Industrial), and the developer does not plan to rezone the parcel. According to Section 40.02.242 of the New Castle County Unified Development Code (UDC), characteristics of HI zoning are as follows:

- The Heavy Industry District is to be used principally for larger heavy industrial developments not suited to other industrial districts and the uses that support those types of developments.
- Location of such districts typically has access to rail lines or navigable marine waterways in addition to roadway access.
- Districts shall be located to minimize adverse effects from neighboring districts such as noise, air pollution, and unsightly structures.
- This district shall be permitted in coastal zones provided that any use prohibited by the Delaware Coastal Zone Act shall remain prohibited, and provided that such districts were zoned M-3 under the former New Castle County zoning maps. No new HI districts shall be created in a coastal zone.

Proposed Development's Compatibility with Comprehensive Plan: The proposed FedEx facility is planned as a 182,815 square-foot distribution facility. Given the site's current HI zoning and future land use designation of HI Zoned Land, this development appears to be compatible with the New Castle County Comprehensive Plan.

Transportation Analysis Zones (TAZ)

Transportation Analysis Zones (TAZ) where development would be located: 101

TAZ Boundaries:



- Current employment estimate for TAZ:** 3,181 jobs in 2010
- Future employment estimate for TAZ:** 3,224 jobs in 2035
- Current population estimate for TAZ:** 2,618 people in 2010
- Future population estimate for TAZ:** 2,478 people in 2035
- Current household estimate for TAZ:** 995 houses in 2010
- Future household estimate for TAZ:** 1,033 houses in 2035
- Relevant committed developments in TAZ:** New Castle Industrial Park, Delaware River Industrial Park, Shamrock Enterprises, Castlewood Industrial Park
- Would the addition of committed developments to current estimates exceed future projections:** Yes for employment, no for households and population
- Would the addition of committed developments and the proposed development to current estimates exceed future projections:** Yes for employment, no for households and population

Relevant Projects in the DelDOT Capital Transportation Program (FY 2014 – FY 2019)

DelDOT currently has one relevant project in the study area: the Pavement & Rehabilitation, North I, 2012 project (State Contract No. T201206101). This project will improve more than five miles of Delaware Route 9 (New Castle Avenue / New Castle Road 19) and US Route 13 (Heald Street / New Castle Road 28) including improvements to roadway, intersection, and

pedestrian facilities. Within the study area of the Wilmington FedEx TIS, the Pave & Rehab project includes the intersection of Delaware Route 9 & Lamsbson Lane / Church Driveway, which will receive pavement, signing and striping improvements along with new crosswalks, countdown pedestrian signals with pushbuttons, and ADA upgrades. This Pave & Rehab project is scheduled for construction in Spring 2014.

Regarding DelDOT's Hazard Elimination Program (HEP), three intersections in the study area are within Site W of the 2009 HEP: Terminal Avenue (New Castle Road 359) & Pigeon Point Road (New Castle Road 377), Terminal Avenue & I-495 Northbound Ramps, and Terminal Avenue & I-495 Southbound Ramps. The HEP committee noted various safety concerns along the Terminal Avenue corridor and they recommended numerous remedial improvements including adding or replacing many signs and pavement markings. These remedial improvements have since been addressed in the field. No additional studies were recommended.

Trip Generation

Trip generation for the proposed development was computed using site-specific data provided by FedEx. The number of trips that would be generated according to the data provided by FedEx is greater than the number of trips that would be generated for a Warehousing land use according to Trip Generation, Ninth Edition, published by the Institute of Transportation Engineers (ITE). The following are estimates of the amount of new traffic to be generated for this development:

Table 1
WILMINGTON FEDEX PEAK HOUR TRIP GENERATION

Land Use	Vehicle Type	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
182,815 square-foot distribution facility	Passenger Vehicles	107	87	194	94	128	222
	Pickup & Delivery Vans	33	59	92	59	0	59
	Spot Trailers	0	0	0	3	0	3
	Linehaul Trucks	1	0	1	0	0	0
TOTAL TRIPS		141	146	287	156	128	284

Table 2
WILMINGTON FEDEX DAILY TRIP GENERATION

Land Use	Vehicle Type	Weekday ADT		
		In	Out	Total
182,815 square-foot distribution facility	Passenger Vehicles	517	517	1034
	Pickup & Delivery Vans	185	185	370
	Spot Trailers	31	31	62
	Linehaul Trucks	23	23	46
TOTAL TRIPS		756	756	1512

Overview of TIS

Intersections examined:

- 1) Lambson Lane & Davidson Lane
- 2) Lambson Lane & West Avenue (New Castle Road 371)
- 3) Lambson Lane & East Avenue
- 4) Lambson Lane & Simonds Drive
- 5) Lambson Lane & Hillview Avenue
- 6) Delaware Route 9 & Lambson Lane / Church Driveway
- 7) Lambson Lane & Pigeon Point Road
- 8) Pigeon Point Road & Pyles Lane
- 9) Terminal Avenue & Pigeon Point Road
- 10) Terminal Avenue & I-495 Northbound Ramps
- 11) Terminal Avenue & I-495 Southbound Ramps

Conditions examined:

- 1) 2013 existing conditions (Case 1)
- 2) 2019 without FedEx facility (Case 2)
- 3) 2019 with FedEx facility (Case 3)

Peak hours evaluated: Weekday morning and afternoon peak hours.

Committed developments considered:

- 1) New Castle Industrial Park (5,000 square-foot warehouse)
- 2) Delaware River Industrial Park (100,536 square-foot warehouse)
- 3) Shamrock Enterprises (3,738 square-feet of industrial space)
- 4) Castlewood Industrial Park (32.6 acre business/industrial park)

Intersection Descriptions

- 1) **Lambson Lane & Davidson Lane**
Type of Control: two-way stop-controlled (T-intersection)
Northbound approach: (Davidson Lane) one shared left/right-turn lane, stop controlled
Eastbound approach: (Lambson Lane) one shared through/right-turn lane
Westbound approach: (Lambson Lane) one shared through/left-turn lane

- 2) **Lambson Lane & West Avenue**
Type of Control: two-way stop-controlled (T-intersection)
Northbound approach: (West Avenue) one shared left/right-turn lane, stop controlled
Eastbound approach: (Lambson Lane) one shared through/right-turn lane
Westbound approach: (Lambson Lane) one shared through/left-turn lane

- 3) **Lambson Lane & East Avenue**
Type of Control: two-way stop-controlled (four-leg intersection)
Northbound approach: (East Avenue) one shared left/through/right-turn lane, stop controlled
Southbound approach: (Business Driveway) one shared left/through/right-turn lane, stop controlled
Eastbound approach: (Lambson Lane) one shared left/through/right-turn lane
Westbound approach: (Lambson Lane) one shared left/through/left-turn lane

- 4) **Lambson Lane & Simonds Drive**
Type of Control: T-intersection with Simonds Drive as one-way street heading away
Eastbound approach: (Lambson Lane) one shared through/left-turn lane
Westbound approach: (Lambson Lane) one shared through/right-turn lane

- 5) **Lambson Lane & Hillview Avenue**
Type of Control: two-way stop-controlled (T-intersection)
Northbound approach: (Hillview Avenue) one shared left/right-turn lane, stop controlled
Eastbound approach: (Lambson Lane) one shared through/right-turn lane
Westbound approach: (Lambson Lane) one shared through/left-turn lane

- 6) **Delaware Route 9 & Lambson Lane / Church Driveway**
Type of Control: signalized four leg intersection
Northbound approach: (Delaware Route 9) one left-turn lane, one exclusive through lane, and one shared through/right-turn lane
Southbound approach: (Delaware Route 9) one left-turn lane, one exclusive through lane, and one shared through/right-turn lane
Eastbound approach: (Church Driveway) one shared left/through/right-turn lane
Westbound approach: (Lambson Lane) one shared left/through/right-turn lane

- 7) **Lambson Lane & Pigeon Point Road**
Type of Control: two-way stop-controlled (T-intersection)
Southbound approach: (Pigeon Point Road) one shared left/right-turn lane, stop controlled
Eastbound approach: (Lambson Lane) one shared through/left-turn lane
Westbound approach: (Lambson Lane) one shared through/right-turn lane

- 8) **Pigeon Point Road & Pyles Lane**
Type of Control: two-way stop-controlled (T-intersection)
Northbound approach: (Pigeon Point Road) one shared through/left-turn lane
Southbound approach: (Pigeon Point Road) one shared through/right-turn lane
Eastbound approach: (Pyles Lane) one shared left/right-turn lane, stop controlled

- 9) **Terminal Avenue & Pigeon Point Road**
Type of Control: two-way stop-controlled (T-intersection)
Northbound approach: (Pigeon Point Road) one shared left/right-turn lane, stop controlled
Eastbound approach: (Terminal Avenue) one exclusive through lane and one shared through/right-turn lane
Westbound approach: (Terminal Avenue) one left-turn lane and two through lanes
- 10) **Terminal Avenue & I-495 Northbound Ramps**
Type of Control: two-way stop-controlled (T-intersection)
Northbound approach: (I-495 Northbound Off-Ramp) one shared left/right-turn lane, stop controlled
Eastbound approach: (Terminal Avenue) one exclusive through lane and one shared through/right-turn lane
Westbound approach: (Terminal Avenue) one left-turn lane and two through lanes
- 11) **Terminal Avenue & I-495 Southbound Ramps**
Type of Control: two-way stop-controlled (four-leg intersection)
Southbound approach: (I-495 Southbound Off-Ramp) one shared left/through/right-turn lane, stop controlled
Eastbound approach: (Terminal Avenue) one exclusive through lane and one shared through/right-turn lane
Westbound approach: (Terminal Avenue) one left-turn lane and two through lanes

Safety Evaluation

Crash Data: Crash data was obtained for September 2010 through September 2013 for the intersections and roadway segments within the study area. This included a total of 48 crashes. There were 11 injuries but no fatal crashes reported in the study area during this period. The crashes are categorized by roadway and most common crash type as follows:

- Lambson Lane (Delaware Route 9 to Pigeon Point Road)
 - 21 crashes reported (9 fixed-object collisions)
- Pigeon Point Road (Lambson Lane to Terminal Avenue)
 - 9 crashes reported (3 rear-end collisions)
- Terminal Avenue (Pigeon Point Road to I-495 Southbound Ramps)
 - 18 crashes reported (7 angle collisions and 6 rear-end collisions)

Sight Distance: With generally straight and flat roadways, and few potential visual obstructions, sight distance is adequate throughout the study area, especially along the truck route between the site and I-495 via Pigeon Point Road and Terminal Avenue. No problematic sight distance issues have been reported or indicated by crash data, and no major problems were observed during field observations in the area. On-street parking along Lambson Lane (in the residential section west of East Avenue) has the potential to impact sight distance at intersections.

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: The Delaware Transit Corporation (DTC) currently operates two transit routes offering service near the proposed FedEx facility. DART Route 15, which offers service connecting downtown Wilmington to Christiana Mall, travels along Delaware Route 9. The nearest Route 15 bus stop to the proposed development is on Delaware Route 9 at Lambson Lane. Route 15 makes 32 round trips each weekday, 13 on Saturdays, and 9 on Sundays. DART Route 17, which offers service connecting downtown Wilmington to the Delaware Health and Social Services Campus on US Route 13 in Minquadale, travels along Delaware Route 9, West Avenue, Lambson Lane, and Hillview Avenue. The nearest Route 17 bus stop to the proposed development is on Lambson Lane at West Avenue (approximately one-third of a mile west of Davidson Lane). Route 17 makes 24 round trips each weekday and 12 on Saturdays, although several of the weekday trips are express routes that don't travel on West Avenue, Lambson Lane, or Hillview Avenue.

Planned transit service: Ms. Semia Hackett, a Service Development Planner for the DTC, provided the following comments on October 23, 2013 regarding DTC's requests for transit-related improvements in the area of the proposed FedEx facility:

- Installation of ADA-compliant bus stop pad with accessibility to proposed sidewalk.
- To ensure pedestrian and vehicular safety, installation of a bus pull off should be considered; the pull-off may be striped in the shoulder or a curbed facility recessed along the property frontage.
- Developer should also consider installing stop amenities (i.e., bus shelter/bench, trash receptacle, and lighting).

She did not indicate that DTC has any transit service changes planned for this area at this time.

Existing bicycle and pedestrian facilities: According to the bicycle level of service (BLOS) calculator developed by the *League of Illinois Bicyclists*, the section of Lambson Lane near Davidson Lane operates at BLOS F. There are no designated bicycle lanes or other bicycle facilities in the study area. There are sidewalks in the study area along Lambson Lane (in the residential section west of East Avenue), Delaware Route 9, Terminal Avenue, West Avenue, and Simonds Drive. The sidewalks on most of the streets have some gaps in coverage, and in several places there is sidewalk on only one side of the street. There are crosswalks at the three intersections on Terminal Avenue. The signalized intersection of Delaware Route 9 and Lambson Lane does not currently have crosswalks.

Planned bicycle and pedestrian facilities: McCormick Taylor contacted Marco Boyce and Anthony Aglio with DelDOT's Bicycle and Pedestrian Facilities Team via email on October 31, 2013 regarding planned or requested bicycle and pedestrian facilities in the area of this proposed development. Mr. Aglio responded on November 5, 2013 requesting sidewalk across the site frontage. While the site has no actual site frontage, we assume the intent of Mr. Aglio's comment was to add sidewalk along Lambson Lane near Davidson Lane. No bicycle improvements were requested. It is also noted that at the intersection of Delaware Route 9 and Lambson Lane, pedestrian improvements including crosswalks, countdown pedestrian signals

with pushbuttons, and ADA upgrades are planned as part of DelDOT's Pavement & Rehabilitation, North I, 2012 project scheduled for construction in Spring 2014.

Previous Comments

All comments from DelDOT's Scoping Letter, Traffic Count Review, Revised Traffic Count Review, and Preliminary TIS (PTIS) Review were addressed in the Final TIS submission, with the following exception:

- There were no indications that the applicant contacted DelDOT's Statewide and Regional Planning Section for bicycle and pedestrian comments.
- There were no indications that the applicant contacted the Delaware Transit Corporation (DTC) for transit-related comments.

General HCS Analysis Comments

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

- 1) For unsignalized intersections, the TIS and McCormick Taylor applied heavy vehicle (HV) percentages by movement. For signalized intersections, the TIS and McCormick Taylor applied HV percentages by lane group. For future conditions, the TIS and McCormick Taylor generally assumed future HV percentages to be the same as existing HV percentages.
- 2) For existing conditions, the TIS and McCormick Taylor determined and applied, for each intersection, the overall intersection peak hour factor (PHF). For future conditions, the TIS assumed future PHF to be the same as existing PHF, except as noted in the footnotes beneath Tables 11-13 on pages 26-28. For the three intersections shown in those tables (Terminal Avenue & Pigeon Point Road, Terminal Avenue & I-495 Northbound Ramps, and Terminal Avenue & I-495 Southbound Ramps), the TIS assumed greater PHF values for future conditions due to volume increases on Terminal Avenue. McCormick Taylor assumed future PHF to be the same as existing PHF for all intersections.
- 3) The HCS analyses included in the TIS did not always reflect the lane widths observed in the field by McCormick Taylor. McCormick Taylor's HCS analyses incorporated the field-measured lane widths.
- 4) The TIS included percent grade in their analyses for some intersections. McCormick Taylor could not confirm the percent grade and did not take it into consideration.
- 5) The TIS and McCormick Taylor used different signal timings when analyzing the signalized intersections in some cases.
- 6) The TIS input limited Right-Turn-on-Red (RTOR) volumes for only the AM peak hour for the signalized intersection analyses of Delaware Route 9 & Lambson Lane / Church Driveway. McCormick Taylor input no RTOR volumes.

Table 3
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Wilmington FedEx Facility
Report dated September 27, 2013
Prepared by McMahon Associates, Inc.

Unsignalized Intersection ¹ Two-Way Stop Control (T-intersection)	LOS per TIS		LOS per McCormick Taylor ²	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Lambson Lane & Davidson Lane				
2013 Existing (Case 1)				
Northbound Davidson Lane	A (9.6)	A (9.2)	A (9.5)	A (9.2)
Westbound Lambson Lane – Left	A (7.9)	A (7.8)	A (7.9)	A (7.8)
2019 without Wilmington FedEx Facility (Case 2)				
Northbound Davidson Lane	B (10.7)	B (10.3)	B (10.7)	B (10.3)
Westbound Lambson Lane - Left	A (8.3)	A (8.0)	A (8.3)	A (8.0)
2019 with Wilmington FedEx Facility (Case 3)				
Northbound Davidson Lane	C (15.0+)	C (16.2)	C (15.8)	C (16.2)
Westbound Lambson Lane – Left	A (8.8)	A (8.6)	A (9.2)	A (8.8)

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

² For this intersection which is nearest to and most directly affected by traffic from the proposed FedEx facility, McCormick Taylor calculated the expected changes to heavy vehicle percentages and applied those to the Case 3 analyses. The TIS assumed future heavy vehicle percentages to be the same as existing.

Table 4
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Wilmington FedEx Facility
Report dated September 27, 2013
Prepared by McMahon Associates, Inc.

Unsignalized Intersection ³ Two-Way Stop Control (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Lambson Lane & West Avenue				
2013 Existing (Case 1)				
Northbound West Avenue	A (9.7)	B (10.4)	A (9.7)	B (10.4)
Westbound Lambson Lane – Left	A (7.6)	A (7.5)	A (7.6)	A (7.5)
2019 without Wilmington FedEx Facility (Case 2)				
Northbound West Avenue	B (11.1)	B (11.6)	B (11.1)	B (11.6)
Westbound Lambson Lane - Left	A (8.0)	A (7.6)	A (8.0)	A (7.6)
2019 with Wilmington FedEx Facility (Case 3)				
Northbound West Avenue	B (12.0)	B (12.9)	B (12.0)	B (12.9)
Westbound Lambson Lane – Left	A (8.2)	A (7.8)	A (8.2)	A (7.8)

³ For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 5
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Wilmington FedEx Facility
Report dated September 27, 2013
Prepared by McMahon Associates, Inc.

Unsignalized Intersection ⁴ Two-Way Stop Control	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM ⁵	Weekday PM	Weekday AM ⁵	Weekday PM
Lambson Lane & East Avenue				
2013 Existing (Case 1)				
Northbound East Avenue	B (10.2)	B (10.2)	B (10.3)	B (10.2)
Southbound Business Driveway	N/A	A (9.1)	N/A	A (9.2)
Eastbound Lambson Lane – Left	A (7.3)	A (7.6)	A (7.3)	A (7.6)
Westbound Lambson Lane – Left	A (7.3)	A (7.3)	A (8.9)	A (7.3)
2019 without Wilmington FedEx Facility (Case 2)				
Northbound East Avenue	B (12.2)	B (11.8)	B (12.2)	B (11.9)
Southbound Business Driveway	N/A	B (10.0+)	N/A	B (10.1)
Eastbound Lambson Lane – Left	A (7.4)	A (7.9)	A (7.4)	A (7.9)
Westbound Lambson Lane – Left	A (9.7)	A (7.4)	A (9.7)	A (7.4)
2019 with Wilmington FedEx Facility (Case 3)				
Northbound East Avenue	B (13.8)	B (13.7)	B (13.9)	B (13.8)
Southbound Business Driveway	N/A	B (10.7)	N/A	B (10.8)
Eastbound Lambson Lane – Left	A (7.6)	A (8.2)	A (7.6)	A (8.2)
Westbound Lambson Lane – Left	B (10.1)	A (7.6)	B (10.1)	A (7.6)

⁴ For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

⁵ Southbound Business Driveway approach had zero volume during the AM peak hour.

Table 6
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Wilmington FedEx Facility
Report dated September 27, 2013
Prepared by McMahan Associates, Inc.

Unsignalized Intersection ⁶ T-intersection with one-way Simonds Drive	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Lambson Lane & Simonds Drive				
2013 Existing (Case 1)				
Eastbound Lambson Lane – Left	A (7.6)	A (7.4)	A (7.6)	A (7.4)
2019 without Wilmington FedEx Facility (Case 2)				
Eastbound Lambson Lane - Left	A (7.7)	A (7.8)	A (7.7)	A (7.8)
2019 with Wilmington FedEx Facility (Case 3)				
Eastbound Lambson Lane – Left	A (7.8)	A (8.0)	A (7.8)	A (8.0)

⁶ For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 7
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Wilmington FedEx Facility
Report dated September 27, 2013
Prepared by McMahon Associates, Inc.

Unsignalized Intersection ⁷ Two-Way Stop Control (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Lambson Lane & Hillview Avenue				
2013 Existing (Case 1)				
Northbound Hillview Avenue	A (9.8)	A (9.3)	A (9.8)	B (9.3)
Westbound Lambson Lane – Left	A (8.0)	A (7.4)	A (8.0)	A (7.4)
2019 without Wilmington FedEx Facility (Case 2)				
Northbound Hillview Avenue	B (11.5)	A (9.9)	B (11.5)	B (9.9)
Westbound Lambson Lane - Left	A (8.6)	A (7.4)	A (8.6)	A (7.4)
2019 with Wilmington FedEx Facility (Case 3)				
Northbound Hillview Avenue	B (12.7)	B (10.7)	B (12.8)	B (10.7)
Westbound Lambson Lane – Left	A (8.9)	A (7.6)	A (9.0)	A (7.6)

⁷ For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 8
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Wilmington FedEx Facility
Report dated September 27, 2013
Prepared by McMahon Associates, Inc.

Signalized Intersection ⁸	LOS per TIS ⁹		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Delaware Route 9 & Lambson Lane / Church Driveway				
2013 Existing (Case 1)	C (33.6)	D (37.1)	B (16.9)	B (19.2)
2019 without Wilmington FedEx Facility (Case 2)	D (35.9)	D (50.1)	B (18.2)	C (26.1)
2019 with Wilmington FedEx Facility (Case 3)	C (21.6)	C (28.7)	C (21.6)	C (31.7)

⁸ For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

⁹ HCS analyses used existing signal timings with all phases set to maximum green times for Cases 1 and 2, and they used improved timings for Case 3.

Table 9
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Wilmington FedEx Facility
Report dated September 27, 2013
Prepared by McMahon Associates, Inc.

Unsignalized Intersection ¹⁰ Two-Way Stop Control (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Lambson Lane & Pigeon Point Road				
2013 Existing (Case 1)				
Southbound Pigeon Point Road	A (10.0-)	A (9.0)	B (10.2)	A (9.1)
Eastbound Lambson Lane – Left	A (7.5)	A (7.9)	A (7.5)	A (7.9)
2019 without Wilmington FedEx Facility (Case 2)				
Southbound Pigeon Point Road	B (10.7)	A (9.5)	B (11.1)	A (9.7)
Eastbound Lambson Lane - Left	A (7.8)	A (8.0)	A (7.7)	A (8.1)
2019 with Wilmington FedEx Facility (Case 3)				
Southbound Pigeon Point Road	B (11.2)	A (9.9)	B (11.7)	B (10.1)
Eastbound Lambson Lane – Left	A (7.9)	A (8.1)	A (7.9)	A (8.1)

¹⁰ For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 10
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Wilmington FedEx Facility
Report dated September 27, 2013
Prepared by McMahon Associates, Inc.

Unsignalized Intersection ¹¹ Two-Way Stop Control (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Pigeon Point Road & Pyles Lane				
2013 Existing (Case 1)				
Northbound Pigeon Point Road – Left	A (8.6)	A (7.8)	A (8.6)	A (8.5)
Eastbound Pyles Lane	B (11.3)	B (10.8)	B (11.3)	B (11.0)
2019 without Wilmington FedEx Facility (Case 2)				
Northbound Pigeon Point Road- Left	A (9.4)	A (8.0)	A (9.4)	A (8.7)
Eastbound Pyles Lane	B (13.9)	B (12.9)	B (13.9)	B (13.4)
2019 with Wilmington FedEx Facility (Case 3)				
Northbound Pigeon Point Road – Left	A (9.6)	A (8.1)	A (9.6)	A (9.0)
Eastbound Pyles Lane	C (15.4)	B (14.1)	C (15.3)	B (14.6)

¹¹ For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 11
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Wilmington FedEx Facility
Report dated September 27, 2013
Prepared by McMahon Associates, Inc.

Unsignalized Intersection ¹² Two-Way Stop Control (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM ¹³	Weekday PM	Weekday AM ¹³	Weekday PM
Terminal Avenue & Pigeon Point Road				
2013 Existing (Case 1)				
Northbound Pigeon Point Road	C (17.4)	B (13.4)	C (17.4)	B (13.4)
Westbound Terminal Avenue – Left	A (9.1)	A (8.0)	A (9.1)	A (8.0)
2019 without Wilmington FedEx Facility (Case 2)				
Northbound Pigeon Point Road	D (27.2)	C (22.5)	C (31.0)	C (22.5)
Westbound Terminal Avenue – Left	B (10.1)	A (8.2)	B (10.2)	A (8.2)
2019 with Wilmington FedEx Facility (Case 3)				
Northbound Pigeon Point Road	E (45.4)	D (27.6)	F (58.6) ¹⁴	D (27.6)
Westbound Terminal Avenue – Left	B (10.3)	A (8.4)	B (10.5)	A (8.4)
2019 with Wilmington FedEx Facility (Case 3) With Improvement Option 1 ¹⁵				
Northbound Pigeon Point Road	N/A	N/A	D (25.1) ¹⁶	C (20.1)
Westbound Terminal Avenue – Left	N/A	N/A	B (10.5)	A (8.4)
2019 with Wilmington FedEx Facility (Case 3) With Improvement Option 2 ¹⁷				
Northbound Pigeon Point Road	N/A	N/A	D (26.9) ¹⁸	C (20.1)
Westbound Terminal Avenue – Left	N/A	N/A	B (10.5)	A (8.4)

¹² For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

¹³ The TIS analysis of the AM peak hour used a PHF of 0.84 for Case 1 (from the raw count data), and they assumed a PHF of 0.88 for Case 2 and Case 3 due to volume increases on Terminal Avenue. McCormick Taylor used an AM peak hour PHF of 0.84 for all cases.

¹⁴ The 95th percentile queue length for the northbound approach during the Case 3 AM peak hour is approximately 7 vehicles.

¹⁵ Improvement Option 1 includes the addition of a separate right-turn lane on the eastbound Terminal Avenue approach, such that the eastbound approach would have two through lanes and one right-turn lane.

¹⁶ The 95th percentile queue length for the northbound approach during the Case 3 AM peak hour (with Improvement Option 1) is approximately 4 vehicles.

¹⁷ Improvement Option 2 includes converting the shared through/right-turn lane on the eastbound Terminal Avenue approach to an exclusive right-turn lane, such that the eastbound approach would have one through lane and one right-turn lane.

¹⁸ The 95th percentile queue length for the northbound approach during the Case 3 AM peak hour (with Improvement Option 2) is approximately 4 vehicles.

Table 12
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Wilmington FedEx Facility
Report dated September 27, 2013
Prepared by McMahon Associates, Inc.

Unsignalized Intersection ¹⁹ Two-Way Stop Control (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM ²⁰	Weekday PM ²¹	Weekday AM ²⁰	Weekday PM ²¹
Terminal Avenue & I-495 Northbound Ramps				
2013 Existing (Case 1)				
I-495 Northbound Off-Ramp	D (25.2)	C (15.0)	D (25.3)	B (15.0-)
Westbound Terminal Avenue – Left	B (10.9)	A (8.8)	B (11.0)	A (8.6)
2019 without Wilmington FedEx Facility (Case 2)				
I-495 Northbound Off-Ramp	D (33.7)	C (19.4)	F (75.4)	C (20.5)
Westbound Terminal Avenue – Left	B (11.8)	A (9.3)	B (13.1)	A (9.2)
2019 with Wilmington FedEx Facility (Case 3)				
I-495 Northbound Off-Ramp	E (46.3)	C (22.6)	F (126.4) ²²	C (24.2)
Westbound Terminal Avenue – Left	B (12.5)	A (9.7)	B (14.2)	A (9.6)
2019 with Wilmington FedEx Facility (Case 3) With Improvement Option 1 ²³				
I-495 Northbound Off-Ramp	N/A	N/A	D (27.5) ²⁴	C (19.9)
Westbound Terminal Avenue – Left	N/A	N/A	B (14.2)	A (9.6)

¹⁹ For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

²⁰ The TIS analysis of the AM peak hour used a PHF of 0.81 for Case 1 (from the raw count data), and they assumed a PHF of 0.92 for Case 2 and Case 3 due to volume increases on Terminal Avenue. McCormick Taylor used an AM peak hour PHF of 0.81 for all cases.

²¹ The TIS analysis of the PM peak hour used a PHF of 0.89 for Case 1 (from the raw count data), and they assumed a PHF of 0.92 for Case 2 and Case 3 due to volume increases on Terminal Avenue. McCormick Taylor used a PM peak hour PHF of 0.89 for all cases.

²² The 95th percentile queue length for the northbound approach during the Case 3 AM peak hour is approximately 16 vehicles.

²³ Improvement Option 1 includes the addition of a separate right-turn lane on the northbound I-495 Off-Ramp approach, such that there would be one left-turn lane and one right-turn lane on that approach.

²⁴ The 95th percentile queue lengths for the northbound approach during the Case 3 AM peak hour (with Improvement Option 1) are approximately 3 vehicles in the left-turn lane and 4 vehicles in the right-turn lane.

Table 13
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Wilmington FedEx Facility
Report dated September 27, 2013
Prepared by McMahon Associates, Inc.

Unsignalized Intersection ²⁵ Two-Way Stop Control	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM ²⁶	Weekday PM ²⁷	Weekday AM ²⁶	Weekday PM ²⁷
Terminal Avenue & I-495 Southbound Ramps				
2013 Existing (Case 1)				
I-495 Southbound Off-Ramp	C (20.9)	C (21.0)	C (21.1)	C (22.7)
Westbound Terminal Avenue – Left	A (9.8)	A (9.3)	A (9.6)	A (9.0)
2019 without Wilmington FedEx Facility (Case 2)				
I-495 Southbound Off-Ramp	E (35.7)	E (48.6)	F (63.1)	F (66.3)
Westbound Terminal Avenue – Left	B (10.2)	A (9.7)	B (10.3)	A (9.6)
2019 with Wilmington FedEx Facility (Case 3)				
I-495 Southbound Off-Ramp	F (59.1)	F (92.7)	F (114.8) ²⁸	F (126.7) ²⁹
Westbound Terminal Avenue – Left	B (10.4)	A (9.8)	B (10.5)	A (9.7)
2019 with Wilmington FedEx Facility (Case 3) <i>With Improvement Option 1</i> ³⁰				
I-495 Southbound Off-Ramp	C (21.0)	C (23.1)	D (28.6) ³¹	D (25.3) ³²
Westbound Terminal Avenue – Left	B (10.4)	A (9.8)	B (10.5)	A (9.7)

²⁵ For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

²⁶ The TIS analysis of the AM peak hour used a PHF of 0.84 for Case 1 (from the raw count data), and they assumed a PHF of 0.92 for Case 2 and Case 3 due to volume increases on Terminal Avenue. McCormick Taylor used an AM peak hour PHF of 0.84 for all cases.

²⁷ The TIS analysis of the PM peak hour used a PHF of 0.86 for Case 1 (from the raw count data), and they assumed a PHF of 0.92 for Case 2 and Case 3 due to volume increases on Terminal Avenue. McCormick Taylor used a PM peak hour PHF of 0.86 for all cases.

²⁸ The 95th percentile queue length for the southbound approach during the Case 3 AM peak hour is approximately 20 vehicles.

²⁹ The 95th percentile queue length for the southbound approach during the Case 3 PM peak hour is approximately 19 vehicles.

³⁰ Improvement Option 1 includes the addition of a separate right-turn lane on the southbound I-495 Off-Ramp approach, such that there would be one shared through/left-turn lane and one right-turn lane on that approach.

³¹ The 95th percentile queue lengths for the southbound approach during the Case 3 AM peak hour (with Improvement Option 1) are approximately 7 vehicles in the left-turn lane and 2 vehicles in the right-turn lane.

³² The 95th percentile queue lengths for the southbound approach during the Case 3 PM peak hour (with Improvement Option 1) are approximately 4 vehicles in the left-turn lane and 2 vehicles in the right-turn lane.

Table 13 (Continued)
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Wilmington FedEx Facility
Report dated September 27, 2013
Prepared by McMahon Associates, Inc.

Signalized Intersection ³³	LOS per TIS ³⁴		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Terminal Avenue & I-495 Southbound Ramps				
2019 with Wilmington FedEx Facility (Case 3 with one shared lane on SB approach)	C (20.8)	C (22.5)	C (31.8)	C (32.0)

³³ For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

³⁴ The TIS assumed protected-permitted phasing for the westbound Terminal Avenue left-turn movement, while McCormick Taylor assumed protected-prohibited phasing for that movement.