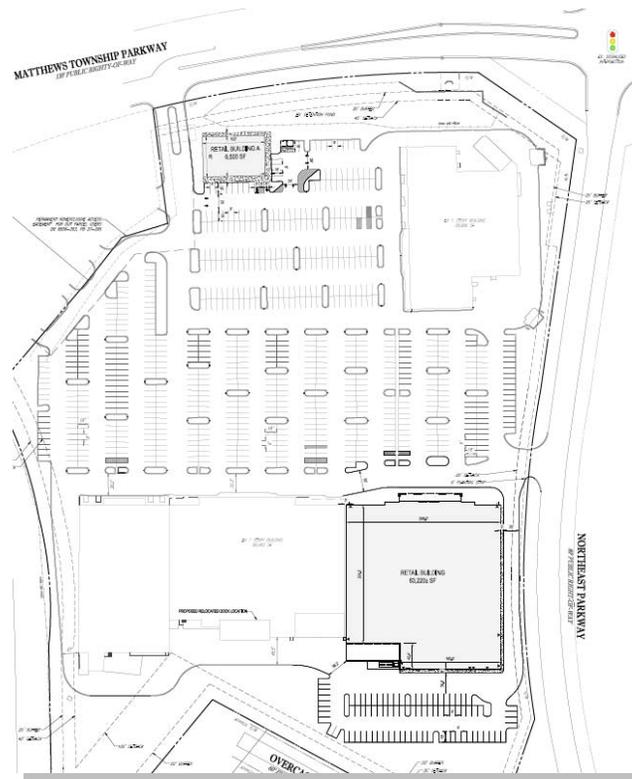


# TRAFFIC IMPACT ANALYSIS

## MATTHEWS CORNERS

Matthews Township Parkway (NC 51) & Northeast Parkway  
Matthews, North Carolina

Zoning Application # TBD



for

Phillips Edison & Company

December 2016

663-001 (C-2165)



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## **EXECUTIVE SUMMARY**

Phillips Edison & Company proposes to rezone (Zoning Application #TBD) the existing Matthews Corners Shopping Center in order to raze 39,110 SF of retail space and construct 69,720 SF of new retail (an increase of 30,610 SF [167,459 SF to 198,069 SF]). The site is located on the southwest quadrant of Matthews Township Parkway & Northeast Parkway in Matthews, NC. The site is expected to be fully developed in 2018.



**Matthews Township Parkway  
Facing West Along Site**

This report provides analysis of the traffic operations within the area of influence, according to the standards set by the Town of Matthews (which follows the North Carolina Department of Transportation's (NCDOT) "Policy on Street and Driveway Access to North Carolina Highways, Chapter 4 Part C" guidelines). It provides intersection improvements needed for mitigating traffic impacts. This study evaluates the following scenarios:

- 2016 Existing Conditions
- 2018 No Build
- 2018 Buildout

The area of influence of the study site as indicated by the Town of Matthews staff includes the following one existing signalized intersection:

1. Matthews Township Parkway (NC 51) & Northeast Parkway

According to the site plan, access to the development will occur via the two existing unsignalized locations:

- Full Movement Access on Northeast Parkway located on the east side of the site, approximately 700 feet south of Matthews Township Parkway
- Directional cross-over on Matthews Township Parkway located on the north side of the site, approximately 725 west of Northeast Parkway

The existing development trip generation results indicate that the site currently generates a total of 182 AM peak hour trips and 708 PM peak hour trips; the proposed buildout trip generation results indicate that the site is expected to generate a total of 237 AM peak hour trips and 947 PM peak hour trips. This equates to a difference of 55 additional AM peak hour trips and 239 additional PM peak hour trips (before passby reductions).

Per Matthews and NCDOT, a 2% per year growth rate was used for the 2018 background volumes in lieu of including nearby approved (offsite) developments.

Currently, the signalized intersection operates at a LOS "D" or better during both peak hours. Typically, an intersection is said to be operating at capacity at a volume-to-capacity (v/c) ratio of 1.00 and acceptable at a LOS "D" or better.



**ANALYSIS REQUIREMENTS** - In order to determine the mitigation responsibility of the developer, this study compares 2018 Build results to the 2018 No Build results.

Chapter 5, Section J of the *July 2003 NCDOT Policy on Street and Driveway Access to North Carolina Highways*, the applicant shall be required to identify mitigation improvements to the roadway network if at least one of the following conditions exists when comparing base network conditions to project conditions:

- *The total average delay at an intersection or an individual approach increases by 25% or greater, while maintaining the same level of service,*
- *The Level of Service (LOS) degrades by at least one level at an intersection or an individual approach,*
- *Or the Level of Service is “F” for an intersection or an individual approach.*

This section of the access policy also states that, *mitigation improvements shall be identified when the analysis indicates that the 95<sup>th</sup> percentile queue exceeds the storage capacity of the existing lane.*

### **2018 Build Results:**

#### **1. Matthews Township Parkway (NC 51) & Northeast Parkway (signalized)**

When comparing the impact of the 2018 Build to the 2018 No Build conditions the intersection LOS remains a “C” in the AM peak hour and a “D” in the PM peak hour (all of the approaches remained the same LOS and were within the allowable increase in delay during both peak hours). The increase in intersection delay between the No Build and Build scenario is 4% in the AM peak hour and 14% in the PM peak hour. **Based on the results no roadway improvements should be deemed necessary.**

**The proposed Matthews Corners retail expansion is not expected to create extensive roadway/intersection issues, especially given the minimal amount of additional traffic associated with the expansion.**



## **PROPOSED DEVELOPMENT**

Phillips Edison & Company proposes to rezone (Zoning Application #TBD) the existing Matthews Corners Shopping Center in order to raze 39,110 SF of retail space and construct 69,720 SF of new retail (an increase of 30,610 SF [167,459 SF to 198,069 SF]). The site is located on the southwest quadrant of Matthews Township Parkway & Northeast Parkway in Matthews, NC (see Figure 1). The site is expected to be fully developed in 2018.



**Northeast Parkway Facing  
North Along Site**

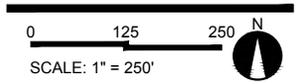
According to the latest site plan (by Bohler Engineering), access to the development is expected to occur via the two existing unsignalized locations (see Concept B Overall Site):

- Full Movement Access on Northeast Parkway located on the east side of the site, approximately 700 feet south of Matthews Township Parkway
- Directional cross-over on Matthews Township Parkway located on the north side of the site, approximately 725 west of Northeast Parkway



**MATTHEWS CORNERS TIA**  
 MATTHEWS, NC

**AREA of  
 INFLUENCE MAP**



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**LEGEND**

-  Traffic Signal
-  Stop Sign Control

**Figure 1**





## **AREA CONDITIONS**

The area of influence of the study site as indicated by the Town of Matthews staff includes the following one existing signalized intersection:

1. Matthews Township Parkway (NC 51) & Northeast Parkway



**Matthews Township Parkway  
Facing East Toward Access**



**Northeast Parkway Facing  
North at Access**

As indicated on the most current Charlotte Regional Transportation Planning Organization (CRTPO) Thoroughfare Plan, Matthews Township Parkway (NC 51) is a major thoroughfare (principal arterial functional classification) with a posted speed limit of 45 mph (located on the north side of the site). NC 51 is a two-way median-divided roadway four lanes wide (two lanes in each direction) with appropriate left and occasional right turn lanes. The roadway includes curb/gutter on both sides; planting strip and sidewalk is present on the north side and on the south side east of Northeast Parkway. Sight distance at the existing access location is adequate, meeting or exceeding normal NCDOT requirements for a 45 mph posted roadway (50 mph design speed = 500 feet of sight distance).

According to the CRTPO Thoroughfare Plan, Northeast Parkway is a minor thoroughfare with a posted speed limit of 35 mph (located on the east side of the proposed site). On the north side of Matthews Township Parkway, Northeast Parkway is a two-way median-divided roadway four lanes wide (two lanes in each direction) with appropriate left turn lanes – curb/gutter, planting strip, and sidewalk is present on both sides. On the south (site) side of Matthews Township Parkway, Northeast Parkway is a two-way roadway two lanes wide (one lane in each direction) with a northbound left turn lane with 255 feet of storage – curb/gutter, planting strip, and sidewalk is present on the east side. Northeast Parkway currently dead ends to the south (beyond the existing site driveway) - a future project by the Town of Matthews extends Northeast Parkway to the south to Matthews-Mint Hill Road. For purposes of this report this roadway extension was not assumed to be in place.

Morning (7:00-9:00 AM) and afternoon (4:00-6:00 PM) peak period turning movement counts were conducted at the existing signalized intersection on Tuesday November 15, 2016 (while school was in session).



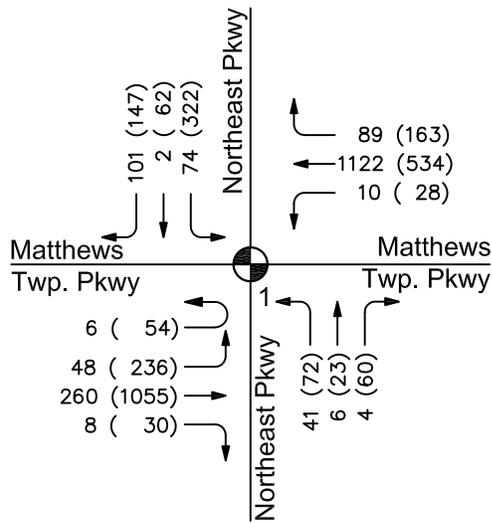
In addition to the intersection turning movement counts, NCDOT is the source for average annual two-way daily traffic (AADT) volumes within the area of influence. The latest (2014) AADT data indicates the Matthews Township Parkway corridor along the site is 24,000 vehicles per day (vpd).

According to the latest high frequency crash data collected by NCDOT for 2007-2011, there were 38 accidents reported at the intersection of Matthews Township Parkway & Northeast Parkway and 20 reported accidents on Matthews Township Parkway between Northeast Parkway and US Hwy. 74 (west of the site).

Figure 2 shows the 2016 existing traffic volumes for the AM and PM peak hours as well as the directional distribution for the site traffic. These directional distribution percentages were approved by Matthews/NCDOT.

EXISTING PEAK HOUR TRAFFIC VOLUMES

-Counts collected Tuesday  
November 15, 2016

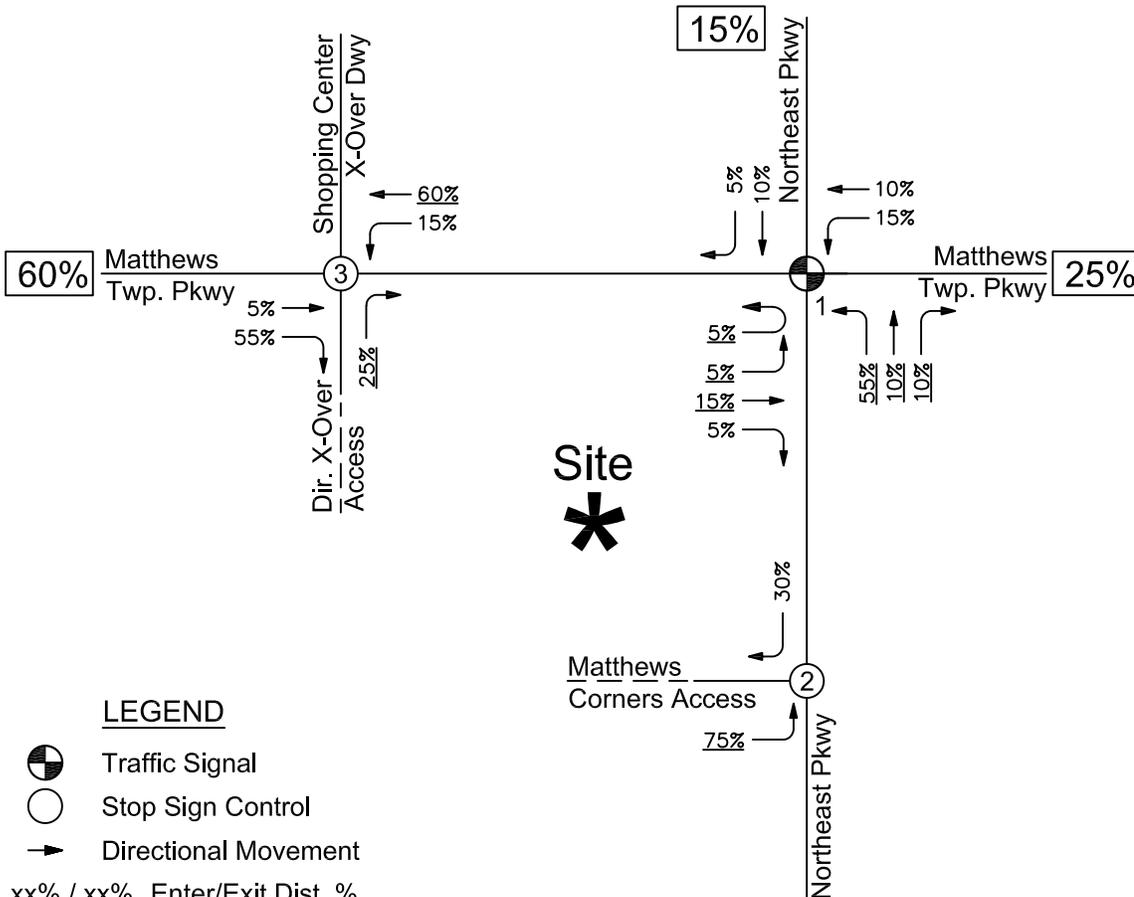


LEGEND

- Traffic Signal
- Directional Movement

VOLUMES: AM (PM)

SITE DIRECTIONAL DISTRIBUTION



LEGEND

- Traffic Signal
- Stop Sign Control
- Directional Movement

xx% / xx% Enter/Exit Dist. %



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EXISTING TRAFFIC VOLUMES & SITE DIRECTIONAL DISTRIBUTION



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REVISIONS:

Figure 2



## PROJECTED TRAFFIC

The projected background traffic volumes used in the analyses were developed from existing (year 2016) peak-hour-turning-movement-count data. These volumes were increased using a 2 percent per year growth rate to obtain 2018 background volumes, which was approved by NCDOT/Matthews.

The daily and peak-hour-trip-generation data for the site is presented in Table 1. The values for the trips generated by the retail land uses are obtained from the Institute of Transportation Engineers, Trip Generation Manual, 9<sup>th</sup> Edition, 2012.

**Table 1: Site Trip Generation**

Land Use [ITE Code 820]			Daily	AM Peak Hour			PM Peak Hour		
				Enter	Exit	Total	Enter	Exit	Total
<b>Existing Development (Currently Generating Trips)</b>									
Retail	128,349	SF	7,987	113	69	182	340	368	708
<b>Total Proposed Development</b>									
Retail *	198,069	SF	10,589	147	90	237	455	492	947
<b>Difference Between Total Prop. Dev. &amp; Existing Operating Dev. - Total Trips for Prop. 69,720 SF Retail</b>			2,602	34	21	55	115	124	239
<i>NCDOT/ITE Passby Reduction (34%)**</i>			-94	0	0	0	-39	-55	-94
<b>Proposed Retail Total New Trips</b>			2,508	34	21	55	76	69	145

References:

Trip Generation, 9th Edition, Institute of Transportation Engineers, Washington, DC. 2012.

\* Total existing development = 167,459 SF, of which 39,110 SF of retail is vacant and will be razed. The site will include 69,720 SF of new retail space.

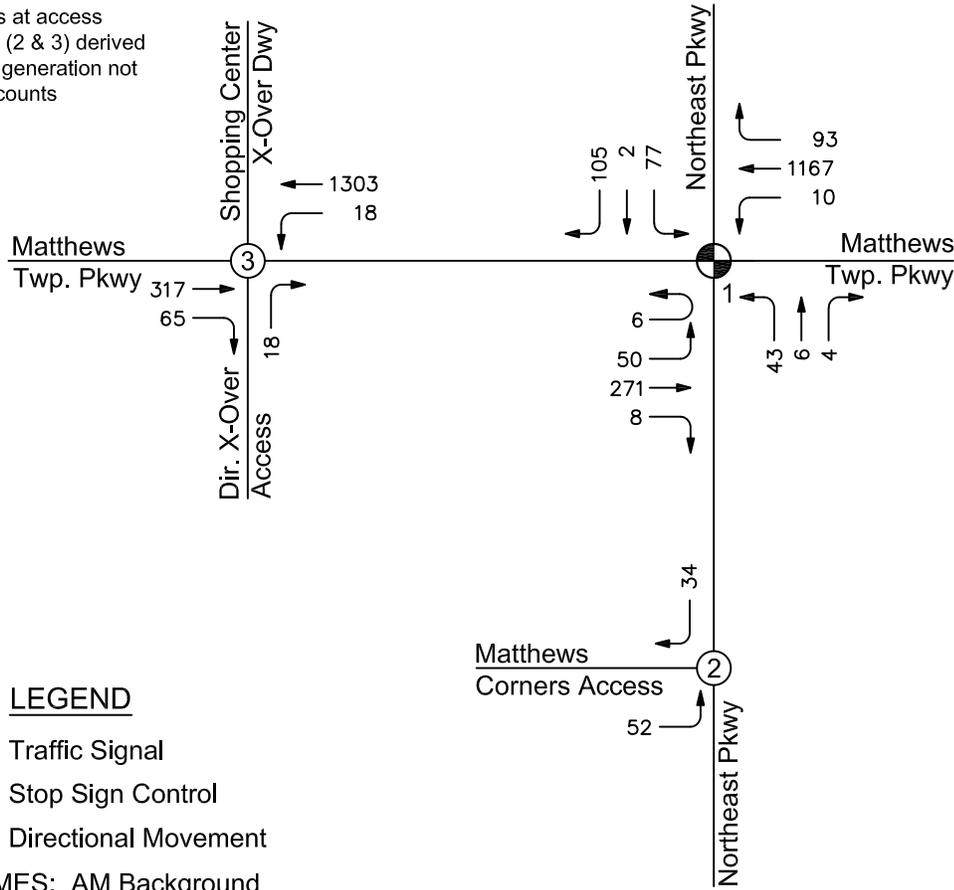
\*\* Passby reduction only for new retail - passby for existing development is currently included in background traffic

The existing development trip generation results indicate that the site currently generates a total of 182 AM peak hour trips and 708 PM peak hour trips; the proposed buildout trip generation results indicate that the site is expected to generate a total of 237 AM peak hour trips and 947 PM peak hour trips. This equates to a difference of 55 additional AM peak hour trips and 239 additional PM peak hour trips (before passby reductions).

The trip assignments for the 2018 morning and afternoon peak hour traffic volumes are presented in Figures 3 and 4 (depending on scenario). The background traffic is indicated to the far left of the movement arrows, followed by the site traffic in parentheses. The one or two volumes (depending on scenario) are added to obtain the projected total traffic for that movement: Background + (Site) = Total.

## 2018 NO BUILD AM PEAK HOUR TRAFFIC VOLUMES

-Volumes at access locations (2 & 3) derived from trip generation not existing counts



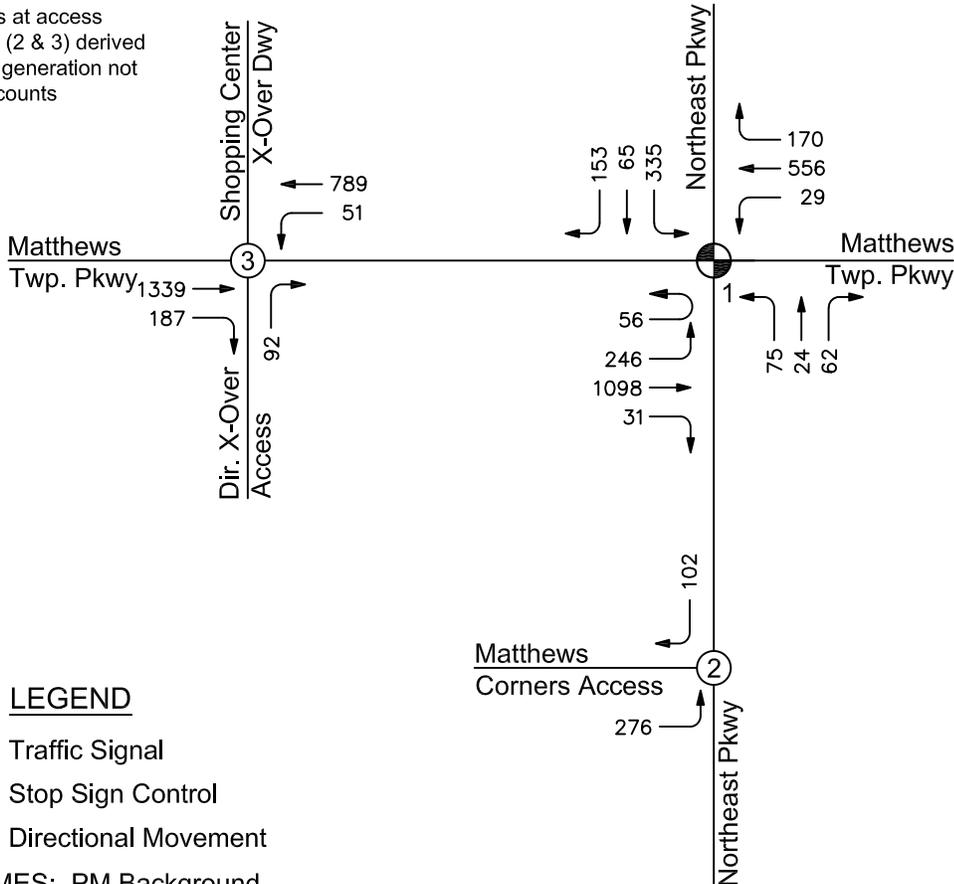
### LEGEND

- Traffic Signal
- Stop Sign Control
- Directional Movement

VOLUMES: AM Background

## 2018 NO BUILD PM PEAK HOUR TRAFFIC VOLUMES

-Volumes at access locations (2 & 3) derived from trip generation not existing counts



### LEGEND

- Traffic Signal
- Stop Sign Control
- Directional Movement

VOLUMES: PM Background



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2018 NO BUILD  
AM/PM PEAK HOUR  
TRAFFIC VOLUMES



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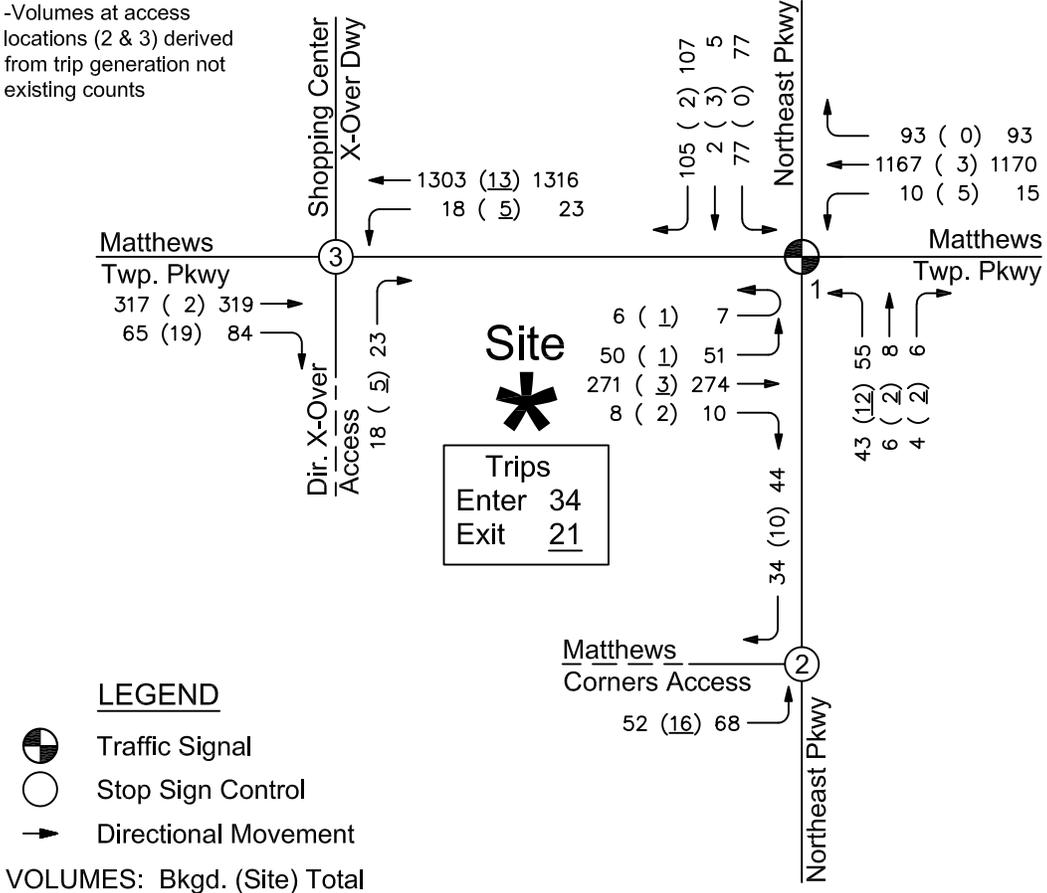
DECEMBER 2016

REVISIONS:

Figure 3

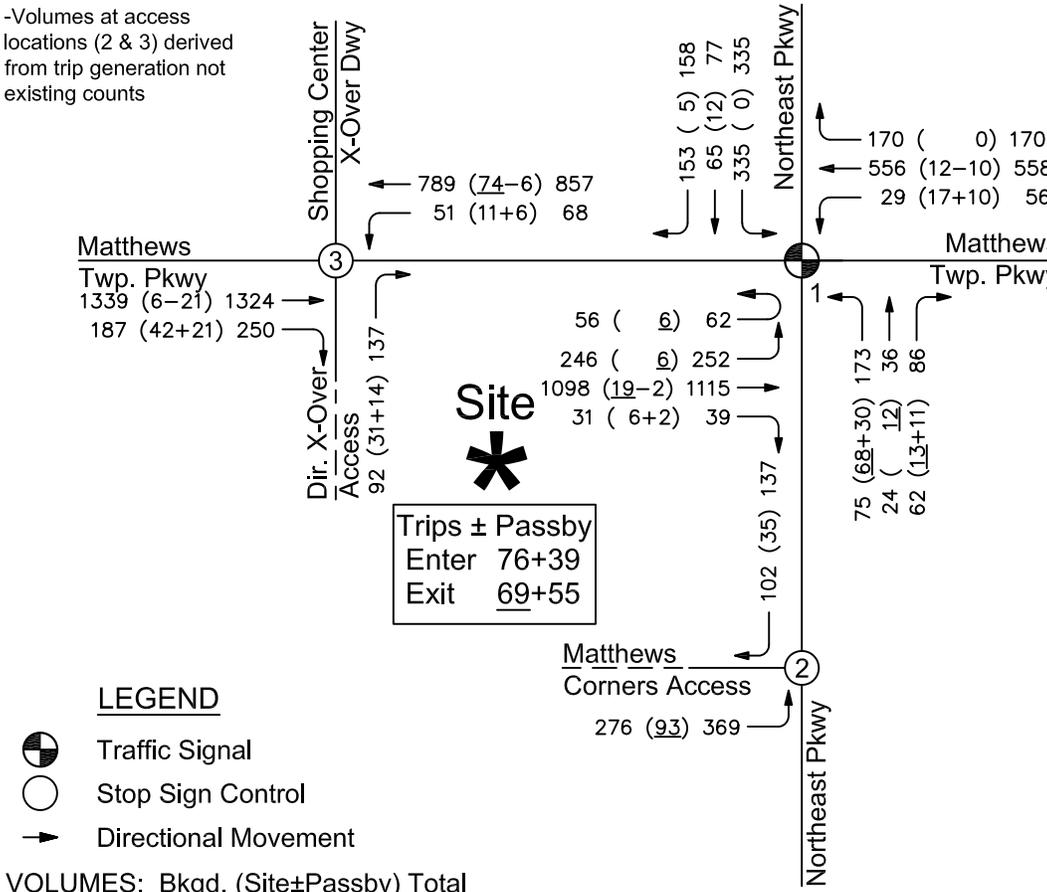
## 2018 BUILD AM PEAK HOUR TRAFFIC VOLUMES

-Volumes at access locations (2 & 3) derived from trip generation not existing counts



## 2018 BUILD PM PEAK HOUR TRAFFIC VOLUMES

-Volumes at access locations (2 & 3) derived from trip generation not existing counts



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2018 BUILD AM/PM  
PEAK HOUR  
TRAFFIC VOLUMES



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Figure 4



## **TRAFFIC ANALYSIS**

The intersection identified within the area of influence was analyzed to identify the traffic impact that the site development has under the build scenario. The traffic analysis is based on the LOS analysis at the identified intersection. The intersection was analyzed assuming buildout of the site in 2018.

LOS is a qualitative measurement of traffic operations. It is a measure of delay time. The Transportation Research Board's Highway Capacity Manual<sup>1</sup> (HCM) defines six levels of service for intersections with LOS "A" representing the best operating condition and LOS "F" the worst. The table below gives the criteria for both signalized and unsignalized intersections.

<b>Intersection LOS</b>	<b>Signalized Intersection Control Delay per Vehicle (sec/vehicle)</b>	<b>Unsignalized Intersection Control Delay per Vehicle (sec/vehicle)</b>
A	≤10.0	≤ 10.0
B	> 10.0 and ≤ 20.0	> 10.0 and ≤ 15.0
C	> 20.0 and ≤ 35.0	> 15.0 and ≤ 25.0
D	> 35.0 and ≤ 55.0	> 25.0 and ≤ 35.0
E	> 55.0 and ≤ 80.0	> 35.0 and ≤ 50.0
F	>80.0	> 50.0

SYNCHRO 9.1 was the software tool used in determining the delay, capacity and corresponding level of service at the study intersection. The intersection worksheet reports are provided in the Appendix.

This report provides analysis of the traffic operations within the area of influence, according to the standards set by the Town of Matthews (which follows the North Carolina Department of Transportation's (NCDOT) "Policy on Street and Driveway Access to North Carolina Highways, Chapter 4 Part C" guidelines). It provides intersection improvements needed for mitigating traffic impacts. This study evaluates the following scenarios:

- 2016 Existing Conditions
- 2018 No Build
- 2018 Buildout

Currently, the signalized intersection operates at a LOS "D" or better during both peak hours. Typically, an intersection is said to be operating at capacity at a volume-to-capacity (v/c) ratio of 1.00 and acceptable at a LOS "D" or better. The results of the analysis scenarios are presented in Table 2.

---

<sup>1</sup> National Research Council. Transportation Research Board. Highway Capacity Manual, Washington, DC. 2002. Chapters 2, 16, and 17.



**Table 2: Levels of Service**

Intersection	Intersection/ Approach	AM Peak			PM Peak		
		Delay (sec/veh)	Capacity (v/c)	LOS	Delay (sec/veh)	Capacity (v/c)	LOS
<b>2016 Existing Conditions</b>							
1. NC 51 & Northeast Pkwy.		<b>20.2</b>	<b>0.73</b>	<b>C</b>	<b>37.5</b>	<b>0.76</b>	<b>D</b>
<b>2018 No Build</b>							
1. NC 51 & Northeast Pkwy.	<b>Intersection</b>	<b>25.0</b>	<b>0.74</b>	<b>C</b>	<b>41.3</b>	<b>0.83</b>	<b>D</b>
	Northbound	53.1	-	D	65.3	-	E
	Southbound	47.6	-	D	49.6	-	D
	Eastbound	16.4	-	B	36.6	-	D
	Westbound	22.8	-	C	38.9	-	D
<b>2018 Build</b>							
1. NC 51 & Northeast Pkwy.	<b>Intersection</b>	<b>26.0</b>	<b>0.75</b>	<b>C</b>	<b>47.2</b>	<b>0.87</b>	<b>D</b>
	Northbound	54.0	-	D	68.2	-	E
	Southbound	49.9	-	D	54.7	-	D
	Eastbound	17.9	-	B	42.5	-	D
	Westbound	23.2	-	C	42.6	-	D

Tables 3 shows the 2018 maximum queue lengths calculated by SimTraffic 9, a traffic simulation software application for unsignalized and signalized intersections (results are based on an average of four corridor simulations), or the calculated 95<sup>th</sup> % queue in Synchro 9, - whichever produced the higher length.

**Table 3: 2018 Vehicle Queue Lengths**

Intersection/Approach		Exist. (Prop.) Storage		AM Peak Queue Length (ft)			PM Peak Queue Length (ft)		
		Left	Right	Left	Thru	Right	Left	Thru	Right
<b>2018 No Build</b>									
1. NC 51 & Northeast Pkwy.	NB	255'	-	113'	42'		121'	165'	
	SB	105'	Term.	#119'	31'	165'	#423'	353'	213'
	EB	180'/280'	-	61'x2	85'x2		#246'x2	553'x2	
	WB	150'	-	47'	505'x2		67'	354'x2	
2. Northeast Pkwy. & Access	NB	-	-	0'		-	0'		-
	SB	-	-	-	0'		-	0'	
	EB	-	-	60'			83'		
3. NC 51 & Dir. X-over (site leg of int. only)	NB	-	Term.	-	-	22'	-	-	111'
	EB	-	150'	-	0'x2	0'	-	0'x2	0'
	WB	315'	-	42'	0'x2	-	89'	0'x2	-
<b>2018 Build</b>									
1. NC 51 & Northeast Pkwy.	NB	255'	-	110'	58'		229'	216'	
	SB	105'	Term.	#120'	58'	192'	#423'	499'	214'
	EB	180'/280'	-	72'x2	87'x2		#263'x2	628'x2	
	WB	150'	-	47'	507'x2		100'	370'x2	
2. Northeast Pkwy. & Access	NB	-	-	0'		-	0'		-
	SB	-	-	-	0'		-	0'	
	EB	-	-	61'			106'		
3. NC 51 & Dir. X-over (site leg of int. only)	NB	-	Term.	-	-	22'	-	-	108'
	EB	-	150'	-	0'x2	0'	-	0'x2	0'
	WB	315'	-	36'	0'x2	-	97'	0'x2	-

# Queue extends into adjacent thru lane



### **2018 Build Results:**

When comparing the results of the 2018 No Build traffic and the 2018 Build traffic, the study intersection is within the allowable parameters during both of the peak hours.

**ANALYSIS REQUIREMENTS** - In order to determine the mitigation responsibility of the developer, this study compares 2018 Build results to the 2018 No Build results.

Chapter 5, Section J of the *July 2003 NCDOT Policy on Street and Driveway Access to North Carolina Highways*, the applicant shall be required to identify mitigation improvements to the roadway network if at least one of the following conditions exists when comparing base network conditions to project conditions:

- *The total average delay at an intersection or an individual approach increases by 25% or greater, while maintaining the same level of service,*
- *The Level of Service (LOS) degrades by at least one level at an intersection or an individual approach,*
- *Or the Level of Service is “F” for an intersection or an individual approach.*

This section of the access policy also states that, *mitigation improvements shall be identified when the analysis indicates that the 95<sup>th</sup> percentile queue exceeds the storage capacity of the existing lane.*

### **1. Matthews Township Parkway (NC 51) & Northeast Parkway (signalized)**

When comparing the impact of the 2018 Build to the 2018 No Build conditions the intersection LOS remains a “C” in the AM peak hour and a “D” in the PM peak hour (all of the approaches remained the same LOS and were within the allowable increase in delay during both peak hours). The increase in intersection delay between the No Build and Build scenario is 4% in the AM peak hour and 14% in the PM peak hour. **Based on the results no roadway improvements should be deemed necessary.**

Two of the four legs of the intersection already include pedestrian amenities such as crosswalks, pedestrian signal heads and pushbuttons. Due to the lack of sidewalk on either leg of the southwest quadrant of the intersection we suggest leaving these south and west legs of the intersection as is.

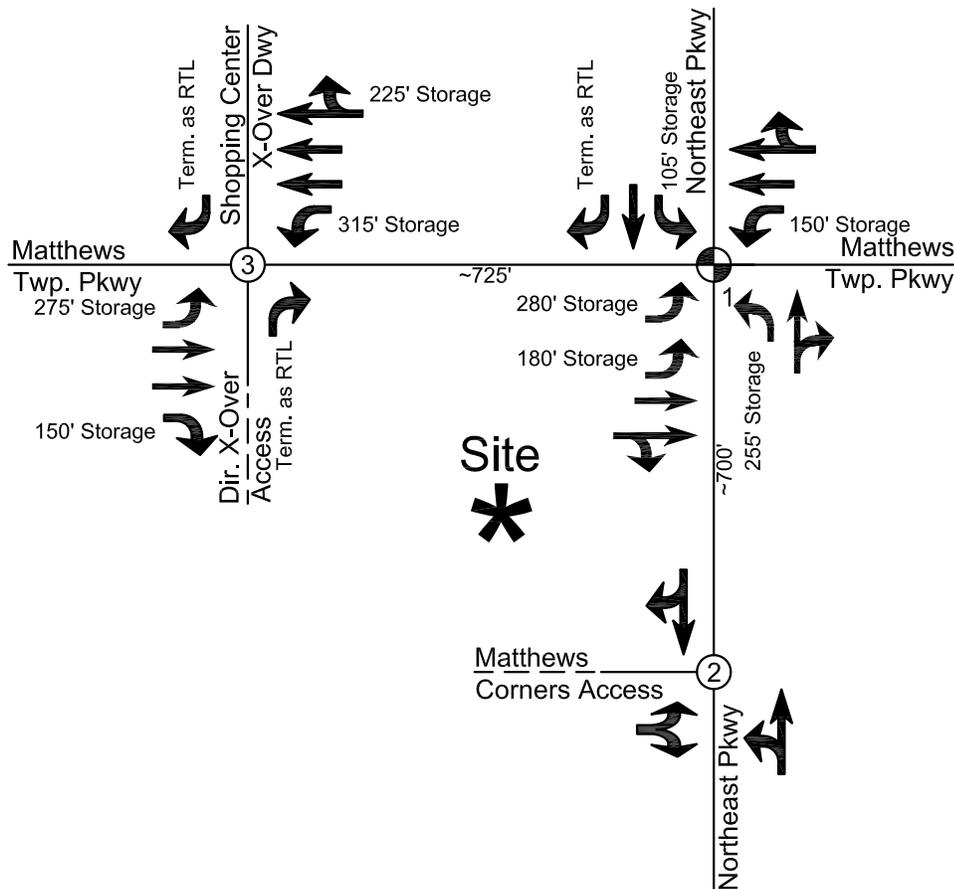
It should be noted that some of the calculated vehicle queues exceeded their existing storage lengths; however, these conditions occurred initially in the No Build scenario (the site produced minimal increases in these calculated queue lengths):

- **Due to the presence of the existing westbound left turn lane at the cross-over immediately adjacent to the dual eastbound left turn lanes on Matthews Township Parkway at Northeast Parkway it is not feasible to extend these dual eastbound left turn lanes. In addition, the site only contributes 2 left turn movements in the AM peak hour and 12 in the PM peak hour (which is minimal). Therefore we feel the developer should not be responsible for mitigating this existing deficiency.**



- **The site contributes no traffic volume to the southbound left turn maneuver on Northeast Parkway at Matthews Township Parkway, therefore we feel the developer should not be responsible for mitigating this existing deficiency.**

The existing laneage is shown on Figure 5.



**LEGEND**

- Traffic Signal
- Stop Sign Control
- Existing Laneage

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MATTHEWS, NC

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**EXISTING LANEAGE**



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DRAWN BY: MWW  
CHECKED BY: REG

NOVEMBER 2016

REVISIONS:

**Figure 5**



## **CONCLUSION**

**In conclusion, the proposed Matthews Corners retail expansion is not expected to create extensive roadway/intersection issues, especially given the minimal amount of additional traffic associated with the expansion.**



**APPENDIX**