LINCOLN COUNTY PLANNING & INSPECTIONS DEPARTMENT
302 NORTH ACADEMY STREET, SUITE A, LINCOLNTON, NORTH CAROLINA 28092
704-736-8440 OFFICE 704-736-8434 INSPECTION REQUEST LINE 704-732-9010 FAX

To: Board of Commissioners
Planning Board

From: Randy Hawkins, Zoning Administrator

Date: May 20, 2016

Re: PD #2016-3
NLA JKS Lincoln, LLC, applicant
Parcel ID# 30725

The following information is for use by the Lincoln County Board of Commissioners and Planning Board at their joint meeting/public hearing on June 6, 2016.

REQUEST

The applicant is requesting the rezoning of 16.7 acres from R-T (Transitional Residential) and B-G (General Business) to PD-C (Planned Development Commercial) to permit a commercial complex with a total building area of 87,460 square feet. Under the Lincoln County Unified Development Ordinance, any proposed commercial development in excess of 50,000 square feet is subject to review through the planned development process.

A site plan for the proposed development has been submitted as part of the rezoning application and would serve as the master plan for the development if the rezoning request is approved. A traffic study has also been submitted, recommending road improvements to mitigate the impact of the proposed development.

SITE AREA AND DESCRIPTION

The property is located on north side of N.C. 73 and east side of N.C. 16 bypass. It is adjoined by property zoned CU B-G (Conditional Use General Business), B-G, R-T and I-G (General Industrial). A Walmart store is located on the east side of this property. (The proposed development would be accessed by existing driveways that serve the Walmart store and by driveway connections to the Walmart site.) Land uses in this area include business and residential. Public water and sewer are available at this location.

ENVIRONMENTAL

This property is not located in a water-supply watershed. This site was graded when the Walmart site was developed. The Walmart project included a stormwater detention basin that was designed to also serve this site upon its development.

PLAN CONFORMANCE

This property is part of an area designated by the Lincoln County Land Use Plan as Regional Business, suitable for larger sized stores and other businesses that rely on large customer bases. Guiding Principle 6 of the Land Use Plan calls for well-designed and well-integrated developments in terms of internal connectivity and access to adjoining tracts.

STAFF'S RECOMMENDATION

Staff recommends that the rezoning request be approved. See proposed statement on following page for rationale.

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302 NORTH ACADEMY STREET, SUITE A, LINCOLNTON, NORTH CAROLINA 28092
704-736-8440 OFFICE 704-736-8434 INSPECTION REQUEST LINE 704-732-9010 FAX

Zoning Amendment
Staff's Proposed Statement of Consistency and Reasonableness

Case No. **PD #2016-3**

Applicant **NLA JKS Lincoln, LLC**

Parcel ID# **30725**

Location **north side of N.C. 73 and east side of N.C. 16 bypass**

Proposed amendment **rezone from R-T and B-G to PD-C to permit a commercial complex with a total building area of 87,460 square feet**

This proposed amendment **is consistent** with the Lincoln County Comprehensive Land Use Plan and other adopted plans in that:

This property is located in an area designated by the Land Use Plan as Regional Business. The rezoning plan is in conformance with Guiding Principle 6 of the Land Use Plan, which calls for well-integrated developments.

This proposed amendment **is reasonable and in the public interest** in that:

This property is located in an area that is largely commercial. The proposed development will attract new businesses, create jobs and increase the county's tax base. The plan includes driveway connections to Walmart and other businesses. The project will include improvements to mitigate the traffic impact.

Zoning Map Change Application

Lincoln County Planning and Inspections Department
Zoning Administrator
302 N. Academy St., Lincolnton, NC 28092
Phone: (704)736-8440 FAX: (704)732-9010

Part I

Applicant Name: NLA JKS Lincoln, LLC

Applicant Address: 725 Cool Springs Blvd, Suite 600, Franklin, TN 37067

Applicant Phone Number: 615-815-1465

Property Owner's Name: Wal-Mart Stores East, LP

Property Owner's Address: 2001 SE 10th Street, Bentonville, AR 72716-5535

Property Owner's Phone Number: 1-479-204-0258

Part II

Property Location: North East of the intersection of NC Hwy 16 & NC Hwy 73

Property ID # (10 digits): 4602-35-0203 Property Size: 16.742 AC

Parcel # (5 digits): 30725 Deed Book(s): 1822 Page(s): 803

Part III

Existing Zoning District: R-T, B-G Proposed Zoning District: PD-C

Briefly describe how the property is currently being used and any existing structures.

The lot is vacant and is a out lot to the existing Walmart.

Briefly explain the proposed use and/or structure which would require a rezoning.

Proposed use is retail / commercial shopping center development.

APPLICATION FEE (up to 2 acres $300, 2-5 acres $500, 5+ acre $1,000) MUST BE RECEIVED BEFORE PROCESSING.

I hereby certify that all of the information provided for this application and attachments is true and correct to the best of my knowledge.

Applicant

04-13-16
Date

Meeting Minutes Summary

Date/Time:	**Thursday, May 12, 2016 – 7:00PM**
Location:	**East Lincoln Community Center, 8160 Optimist Club Rd. Denver, NC**
Purpose:	**Lincoln County Community Involvement Meeting to provide information Regarding NLS JKS Lincoln, LLC proposed retail development known as Lowesville Commons and to receive comments prior to the public hearing.**
Presenters:	**Chad Williams – Net Lease Alliance, John Shirley – JKS Retail Development, LLC**

Introduction:

Mr. Chad Williams opened the meeting by welcoming those in attendance and introduced himself as part of the development team and with Net Lease Alliance. Mr. Williams introduced the representatives of Lincoln County including Randy Hawkins with the Planning Board and Commissioner Martin Oakes who were in attendance. Mr. Williams then introduced John Shirley with JKS Retail Development as the developer of the proposed retail development. Mr. Williams identified the location of the proposed rezoning, along Highway 73 and Highway 16 adjacent to the Walmart Supercenter and explained that the property is being proposed for a commercial development.

Mr. Williams used two presentation boards to show the conceptual site plan and conceptual elevations of the proposed retail development. The conceptual site plan included its proximity to the current Walmart Supercenter and access points. Mr. Williams explained that the current zoning was RT – GB and the proposed rezoning was PD-C or Planned Development – Commercial. Mr. Williams also explained that the proposed retail development included retail shop space, restaurant space and one outparcel which may include a restaurant with a drive-thru or other complimentary user.

The site plan also showed the two access points located within the adjacent Walmart Supercenter parking field at the west signalized entrance to the center located on Highway 73 and new turn lanes that would be added to the access points based on the TIA recommended improvements.

Mr. Williams discussed the TIA road improvements which he stated have been submitted to NCDOT and Lincoln County and the recommendations are subject to final approval. The current recommendations are: 1) a new 350’ dedicated right turn lane would be constructed on the north side of Highway 73 from the signalized access point to the intersection of Highway 16; 2) a new 100’ dedicated right turn lane would be added to the existing signalized access point into the Walmart Supercenter.

Mr. Williams then welcomed questions.

Questions were asked about the traffic and specifically the left turn lanes at the signalized intersection to the Walmart Supercenter and Lowes Home Improvement and they were addressed by Mr. Williams and Mr. Shirley.

Would a protected left turn arrow be added to the signalized intersection when exiting the Walmart Supercenter and the Lowes Home Improvement center to help alleviate the back-up that occurs when trying to make a left hand turn? Mr. Williams replied that NCDOT recommendations did not included a dedicated left turn signal. Mr. Williams also explained that the TIA was reviewed by the Congestion Management Committee in Raleigh, NC and the signal was not identified to be changed from its current operation.

What times were the traffic counts studied? Mr. Williams replied that the studies were conducted during AM and PM peak hours during the week.

Can Lincoln County require that a dedicated left turn arrow be required? Commissioner Oats stated that legally, the county can't dictate a left turn arrow. Mr. Hawkins also explained that the TIA addressed the traffic counts and that the signal was a separate issue. Mr. Shirley and Mr. Williams also added that they would review the matter with the traffic engineer.

Did the traffic study include the new Chick-Fil-A? Mr. Williams replied yes.

A question was asked if the signal could be reworked and the developer could contribute to the cost to solve the signal issue. Mr. Shirley replied that he would investigate the signal concern and consult the traffic engineer.

What was the current zoning on the property? Mr. Williams replied RT – GB.

A question was asked about the orientation of the proposed retail development to Walmart. Mr. Williams used the conceptual site plan to show the location of the proposed retail development to the Walmart.

Can you tell us who the tenants are for the proposed retail development? Mr. Shirley replied that he could not announce any tenants at this time but that the proposed retail uses along Highway 73 and proposed Building C retail may include restaurants and the proposed Building B would be retail/soft good users. Mr. Shirley also stated that the proposed outparcel may include a user with a drive-thru.

A question was asked about the access into the proposed retail development. Mr. Shirley used the conceptual to show where the two existing access points are located.

A follow-up question was asked about the traffic study and the recommendations and why the left turn congestion leaving the center was not addressed. Mr. William replied that the TIA included a review of the intersection and rating on a scale of A - F.

What level of service is provided? Mr. Williams replied that they will review the TIA report and discuss it with Mr. Hawkins.

When will we get feedback on the signal? Mr. Hawkins replied it would be at the Public Hearing.

How does Lincoln County communicate with the public? Mr. Hawkins replied that they publish hearings in the Denver Weekly and website.

A comment was made that the proposed retail development was terrific and when would the development open? Mr. Williams replied if the proposed retail development is approved, construction would begin in September or October 2016 and space would be turned over to tenants in May 2017.

A question was asked what other developments has Mr. Shirley developed? Mr. Shirley replied retail developments in Mebane NC, New Bern Rd in Raleigh, NC, Oak Summit in north Winston Salem and Mocksville, NC as well as numerous retail projects in other states.

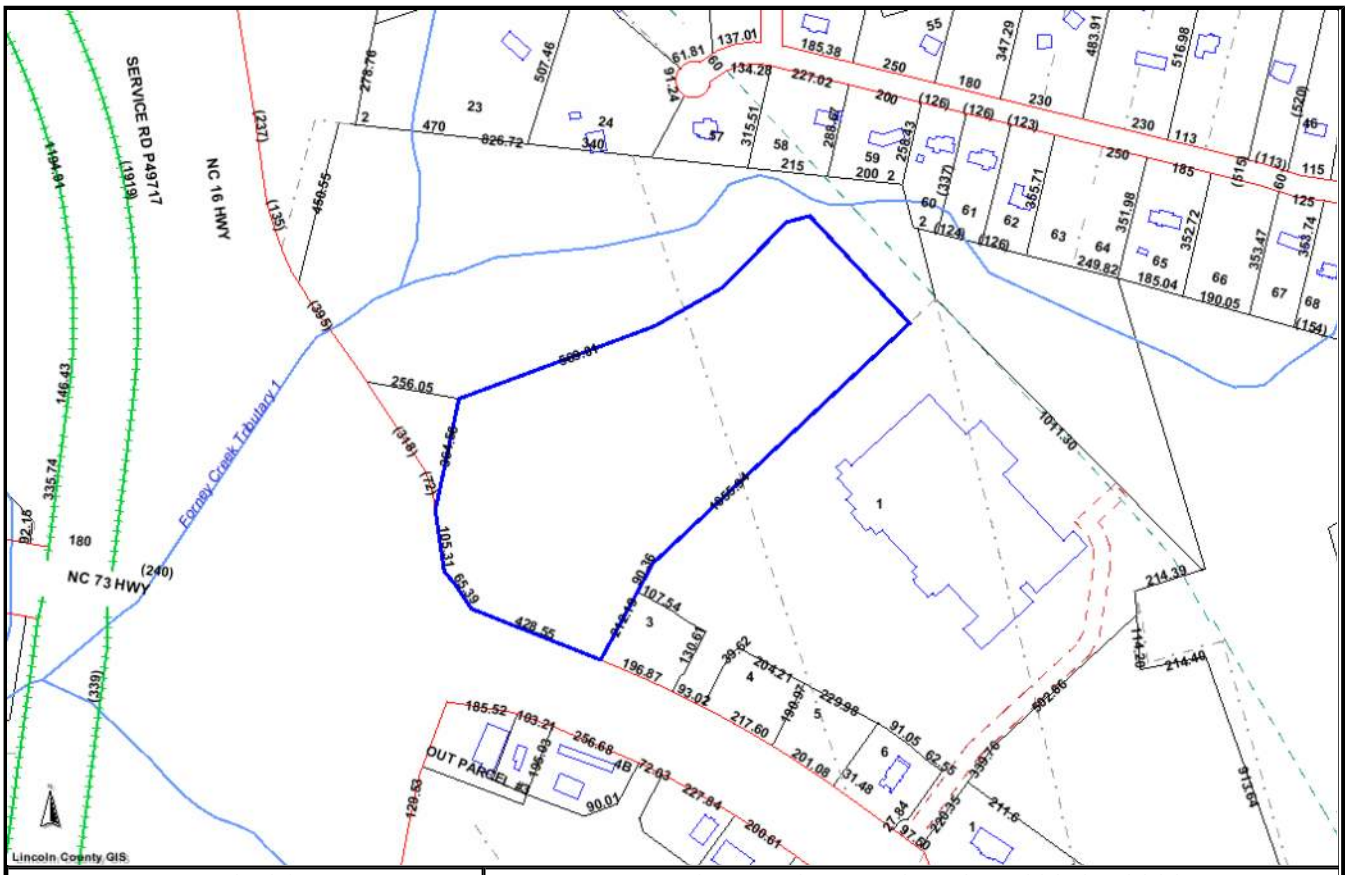
Mr. Williams and Mr. Shirley thanked those who attended the meeting and the excellent questions that were asked. Mr. Shirley stated that he and Mr. William would stay to answer any additional questions.

Lincoln County, NC

Office of the Tax Administrator, GIS Mapping Division

Lincoln County and its mapping contractors assume no legal responsibility for the information contained on this map. This map is not to be used for land conveyance. The map is based on NC State Plane Coordinate System 1983 NAD.

Date: 4/22/2016 Scale: 1 Inch = 500 Feet



PHOTOS	PARCEL INFORMATION FOR 4602-35-0203

Photo Not Available

Parcel ID	**30725**	**Owner**	WAL MART STORES EAST LP USO3960 ***		
Map	**4602-01**	**Mailing**	PO BOX 8050 MS0555		
Account	0166263	**Address**	BENTONVILLE AR 72716-0555		
Deed	1822-803	**Recorded**	6/9/2006	**Sale Price**	$4,661,000
Land Value	$1,885,300	**Total Value**	$1,885,300	**Previous Parcel**	30725
		----- All values are for tax year 2016. -----			
Subdivision	Lot 2 WAL MART STORES EAST			**Plat**	14-81
Description	#2 LT WALMART STORES EAST			**Deed Acres**	16.74
Address	NC 73 HWY			**Tax Acres**	16.74
Township	CATAWBA SPRINGS		**Tax/Fire District**	EAST LINCOLN / EL SEWER	
Improvement	No Improvements				

Zoning District	Calculated Acres	Voting Precinct	Calculated Acres
R-T	11.53	TRIANGLE (TR30)	16.74
B-G	5.21		
Watershed Class		**Sewer District**	
Not in a watershed	16.74	In the sewer District	16.74

2000 Census County	Tract	Block	
37109	071100	2016	16.74

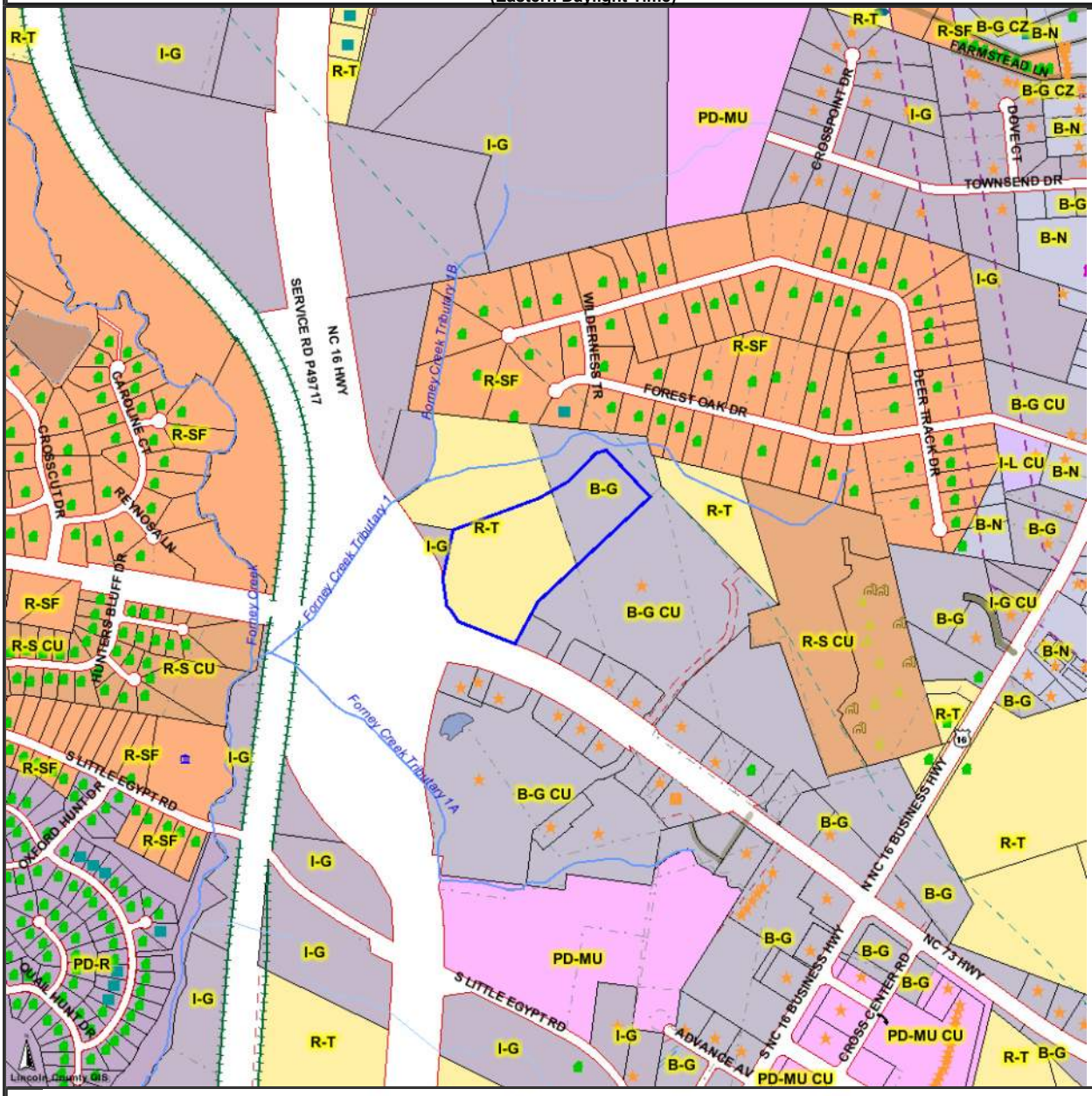
Flood	Zone Description	Panel	
X	NO FLOOD HAZARD	3710460200	16.74

Scale: 1 Inch = 1000 Feet

LINCOLN COUNTY GIS

(Eastern Daylight Time)

Mon Apr 25 2016 09:52:08 GMT-0400



Structures
Outbuilding
Site-built Home
Business
Industry
Utility Service
Church
Government, School
Fire Department
Mobile Home
Apartment, Condominium
Manufactured Home
Cellular Tower
(cont)

Mobile Home Space
UnAddressed Mobile Home
Child Facility
Active Poultry House
Inactive Poultry House
Home Site

Map Features
Road Easement
Conflict Line
Major Rivers, Creeks
Creeks
Interior Lot Line
(cont)

Drainage Easement
Utility Easement

Right-of-Ways
Roads
Railroads
Public Walkway

Parcels
Private Roads

City Jurisdictions
City of Lincolnton
ETJ
Town of Maiden

Zoning Districts
(cont)
B-C
B-G
B-N
C-B
CBT
G-B
GMC
I-G
I-L
N-B
O-I
O-R
P-B
(cont)
PD-C
PD-I
PD-MU
PD-R
P-MU
R-10
R-14
R-15
R-20
R-25
R-8
R-CR
RMF
(cont)
R-MF
R-MR
R-O
ROS
R-R
R-S
R-SF
R-T
Lake Norman

Scale: 1 Inch = 600 Feet

LINCOLN COUNTY GIS

Wed May 18 15:48:29 EDT 2016

Map Features
- Road Easement
- Conflict Line
- Major Rivers, Creeks (cont)

Creeks
- Interior Lot Line
- Drainage Easement
- Utility Easement

Right-of-Ways
- Roads
- Railroads
- Public Walkway

Parcels
Private Roads
City Jurisdictions (cont)

- City of Lincolnton
- ETJ
- Town of Maiden
- 2015 State Ortho

SITE DATA

NET LEASE ALLIANCE — Ñ16.74 AC.

LAND USE CLASSIFICATION: RESIDENTIAL / COMMERCIAL
ZONING CLASSIFICATION: R-T / B-G
LOCAL JURISDICTION: LINCOLN COUNTY, NC

BUILDING SETBACKS REQ'D:
20' FRONT YARD
20' SIDE YARD
20' REAR YARD

BUILDING HEIGHT:
MAXIMUM BY CODE
60' LINCOLN COUNTY UDO
25' / 35' WAL-MART'S DECLARATION

BUILDING ARTICULATION:
REQUIRED BY LINCOLN COUNTY UDO

PARKING DATA

LOWESVILLE CENTER	+/-87,460 S.F.
STANDARD SPACES	512 SPACES
INCL. - CARPOOL/ALTERNATIVE FUEL	
ACCESSIBLE SPACES	10 SPACES
TOTAL PARKING	522 SPACES

NOTES:
1. ALL CALCULATIONS BASED ON TOTAL GROSS SQUARE FOOTAGE OF BUILDING.
2. PARKING SHOWN CONTAINS 90° PARKING SPACES.
TYPICAL DIMENSIONS WIDTH: 9'
DEPTH: 19'
DRIVE AISLES: 24'

BUILDING DATA / PARKING SPACES

TOTAL GROSS BUILDING AREA:	+/- 87,460 S.F.	ACTUAL 522 SPACES
SHOPS "A" RESTAURANTS:	+/- 6,000 S.F.	ACTUAL 60 SPACES
SHOPS "B" RETAIL:	+/- 34,960 S.F.	ACTUAL 180 SPACES
SHOPS "C" RETAIL:	+/- 4,800 S.F.	ACTUAL 25 SPACES
SHOPS "D" RETAIL:	+/- 32,500 S.F.	ACTUAL 167 SPACES
OUTPARCEL #1 RESTAURANT:	+/- 3,000 S.F.	ACTUAL 30 SPACES
OUTPARCEL #2 RESTAURANTS:	+/- 6,200 S.F.	ACTUAL 60 SPACES

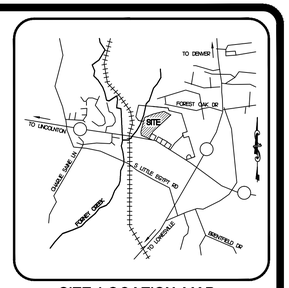
WAL-MART'S DECLARATION
15,200 SF RESTRAURANT @ 10 SPACES TO 1000 SF - REQUIRED 152 SPACES
72,260 SF RETAIL @ 5 SPACES TO 1000 SF - REQUIRED 362 SPACES
TOTAL SPACES REQUIRED 514

LINCOLN COUNTY UDO
15,200 SF RESTRAURANT @ 10 SPACES TO 1000 SF - REQUIRED 152 SPACES
72,260 SF RETAIL @ 3.33 SPACES TO 1000 SF - REQUIRED 241 SPACES
TOTAL SPACES REQUIRED 393
110% ALLOWABLE TOTAL SPACES 433

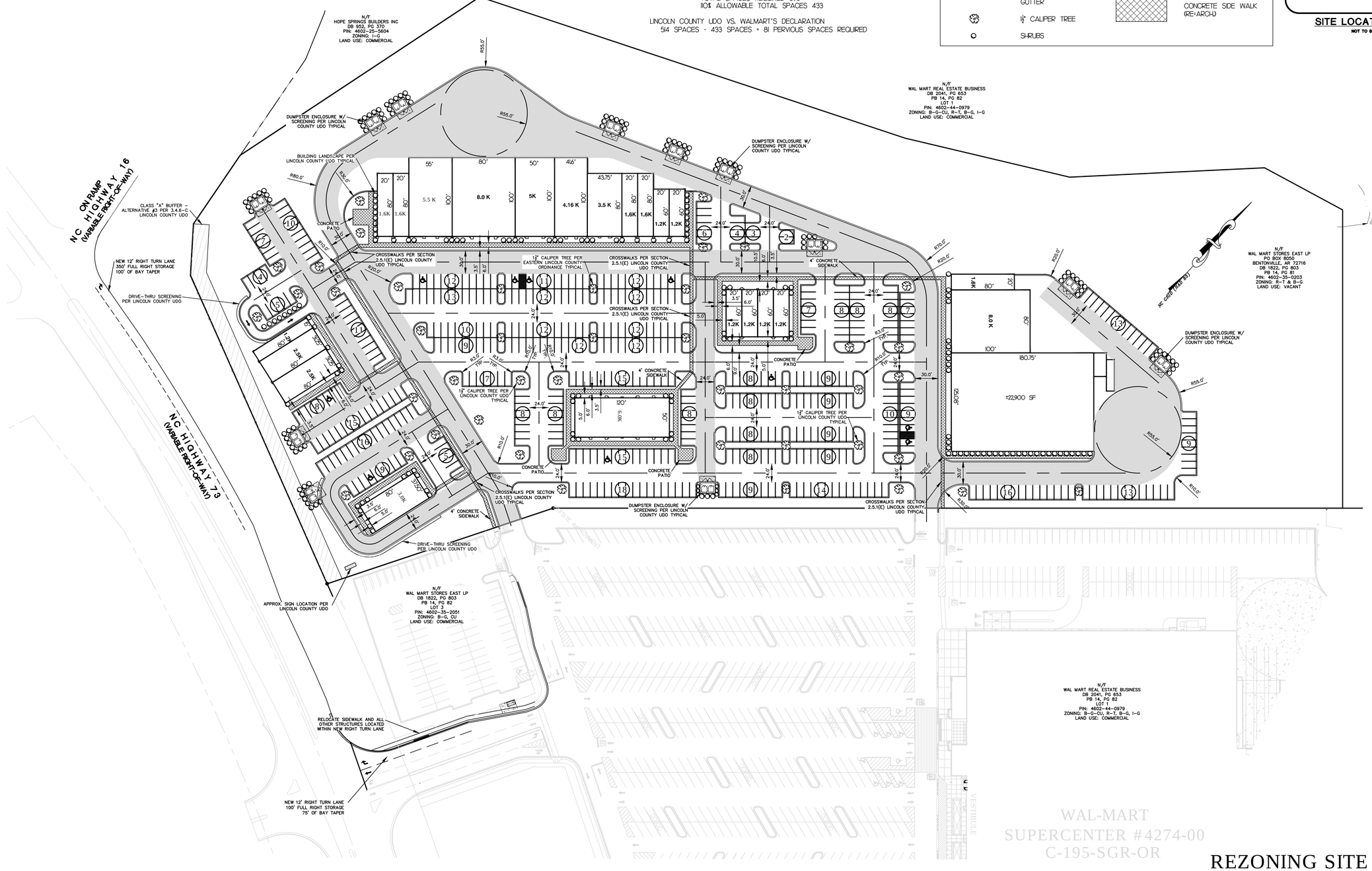
LINCOLN COUNTY UDO VS. WALMART'S DECLARATION
514 SPACES - 433 SPACES = 81 PERVIOUS SPACES REQUIRED

LEGEND

PROPOSED	DESCRIPTION	PROPOSED	DESCRIPTION
(5)	NUMBER OF SPACES		HEAVY DUTY PAVEMENT
	SIGN		REGULAR PAVEMENT
	HANDICAP SYMBOL		REINFORCED TURF/PAVER DRIVE
	PAINTED STOP BAR		CONCRETE SIDE WALK (RE-ARCH.)
	CONCRETE PAVEMENT		
	CURB AND GUTTER		
	1½" CALIPER TREE		
	SHRUBS		



SITE LOCATION MAP
NOT TO SCALE



REZONING SITE PLAN

60 0 30 60 120 240
SCALE : 1 inch = 60 ft.

REVISIONS	BY

ENGINEERING, INC.
3 Marcus Drive
Greenville, SC 29615
Ph. (864) 288-0553
Fax. (864) 288-0559

NET LEASE
LOWESVILLE, NORTH CAROLINA

N.A. JKS LINCOLN, LLC
725 COOL SPRINGS BLVD. SUITE 600
FRANKLIN, TENNESSEE 37067
615-815-1465

DRAWN	KRK
CHECKED	DCA
DATE	04/19/16
SCALE	AS SHOWN
JOB No.	XXXXXX
SHEET	C-2.0

Traffic Impact Analysis
NC 73 Retail Center

Lincoln County, NC

May 2016

RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

TRAFFIC IMPACT ANALYSIS

FOR

NC 73 RETAIL CENTER

LOCATED

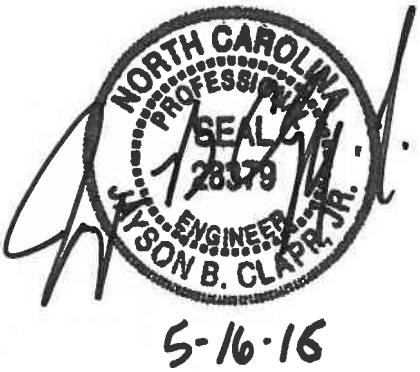
IN

LINCOLN COUNTY, NORTH CAROLINA

Prepared For:
NLA JKS Lincoln, LLC
725 Cool Springs Boulevard, Suite 600
Franklin, Tennessee

Prepared By:
Ramey Kemp & Associates, Inc.
621 Jonestown Road, Suite 221
Winston-Salem, North Carolina 27103
License #C-0910

May 2016



5-16-16

RKA Project No. 15267 000

Prepared By: CTS

Reviewed By: JBC & KAD

EXECUTIVE SUMMARY

This report summarizes the findings of the Traffic Impact Analysis (TIA) that was performed for the NC 73 Retail Center that is proposed on the north side of NC 73 east of the NC 16 interchange in Lincoln County, North Carolina. The subject site is proposed to consist of 70,000 square feet of retail space, 30,000 square feet of medical office space, a 7,000 square foot high-turnover (sit-down) restaurant, and two (2) 3,500 square foot fast-food restaurants with drive-through windows. The development is anticipated to be fully built out in 2017.

The purpose of this analysis is to determine the potential impact to the adjacent transportation system caused by the traffic generated by the proposed retail development. In order to accomplish this objective, the study analyzed existing (2015), and future (2017) 'no-build' and 'build' traffic conditions during the weekday Midday, weekday PM, and Saturday Midday peak hours. In addition to site-generated traffic, this study also considered the impact of background traffic growth within the study area and three (3) approved adjacent developments (Trilogy Lake Norman, Cottonwood Village, and Carrington Subdivision).

Existing Traffic Conditions

The signalized intersections operate at an overall LOS D or better during the AM and PM peak hours. In addition, all intersection approaches operate at LOS D or better with the exceptions of the westbound approach of NC 73 at the NC 16 Northbound Ramps and the northbound approach of NC 16 Business at NC 73. However, greater delays and poorer levels of operation are not uncommon for side street approaches at traffic signals located in a coordinated signal system where precedence is typically given to the mainline traffic in order to maximize progression on the mainline.

Future 'No-Build' Traffic Conditions

The signalized intersections are expected to operate at an overall LOS D or better during the AM and PM peak hours with the exception of the intersections of the NC 16 Northbound Ramps and NC 16 Business on NC 73 during the PM peak hour. In addition, all intersection approaches are expected to operate at LOS E or better with the exceptions of the westbound approach of NC 73 at the NC 16 Northbound Ramps, the northbound approach of the NC 16 Northbound Ramps at NC 73, and the northbound approach of NC 16 Business at NC 73 during the PM peak hour. As previously mentioned, greater delays and poorer levels of operation are not uncommon for side street approaches at traffic signals located in a coordinated signal system where precedence is typically given to the mainline traffic in order to maximize progression on the mainline.

Future 'Build' Traffic Conditions

The signalized intersections are expected to operate at an overall LOS D or better during the AM and PM peak hours with the exception of the intersections of the NC 16 Northbound Ramps and NC 16 Business on NC 73 during the PM peak hour. In addition, all intersection approaches are expected to operate at LOS E or better with the exceptions of the westbound approach of NC 73 at the NC 16 Northbound Ramps, the northbound approach of the NC 16 Northbound Ramps at NC 73, the northbound approach of the

Lowe's West Access at NC 73, and the northbound approach of NC 16 Business at NC 73 during the PM peak hour. As mentioned previously, greater delays and poorer levels of operation are not uncommon for side street approaches at traffic signals located in a coordinated signal system where precedence is typically given to the mainline traffic in order to maximize progression on the mainline.

In to accommodate the additional traffic generated by the proposed development while also improving an unacceptable LOS F, mitigation improvements were identified at the intersection of NC 73 and the NC 16 Northbound Ramps as well as the intersection of NC 73 and the Lowe's/Wal-Mart West Access. With the addition of an exclusive westbound right turn lane on NC 73 at the NC 16 Northbound Ramps as well as the addition of an exclusive southbound right turn lane on the Wal-Mart West Access at NC 73, the intersections and approaches are expected to operate at acceptable levels of operation, or have been mitigated to 'no-build' levels of operation or better.

Queuing Results

It appears that the existing and proposed turn lane storage and taper is adequate to accommodate anticipated queues during the peak hours. If it is expected to be exceeded, the difference is less than 50 feet (approximately 2 vehicles) when the 'build' conditions with improvements are compared to the 'no-build' conditions. However, there were some anomalies observed for the eastbound and westbound free-flowing right turn movements at the Lowe's/Wal-Mart accesses. As for the eastbound and westbound queues, the queues are not expected to extend back into adjacent signalized intersections on NC 73.

Based on the findings of this traffic impact analysis, the following geometric improvements have been identified to mitigate potential traffic impacts associated with the traffic generated by the proposed retail development.

Intersection of NC 73 and the NC 16 Northbound Ramps

- Construct an exclusive right turn lane on the westbound approach of NC 73. Provide a minimum of 375 feet of full right turn storage and 100 feet of bay taper.

Intersection of NC 73 and Lowe's/Wal-Mart West Access

- Construct an exclusive right turn lane on the southbound approach of the Wal-Mart access. Provide 100 feet of full right turn storage and 75 feet of bay taper.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

TECHNICAL APPENDIX

TRAFFIC IMPACT ANALYSIS REPORT
NC 73 RETAIL CENTER
LINCOLN COUNTY, NORTH CAROLINA

1. INTRODUCTION

1.1. Purpose of Report

This report summarizes the findings of the Traffic Impact Analysis (TIA) that was performed for the NC 73 Retail Center that is proposed on the north side of NC 73 east of the NC 16 interchange in Lincoln County, North Carolina. The purpose of this analysis is to determine the potential impact to the adjacent transportation system caused by the traffic generated by the proposed commercial development. In order to accomplish this objective, the study analyzed existing (2016), and future (2018) 'no-build' and 'build' traffic conditions during the weekday AM and PM peak hours.

1.2. Project Description

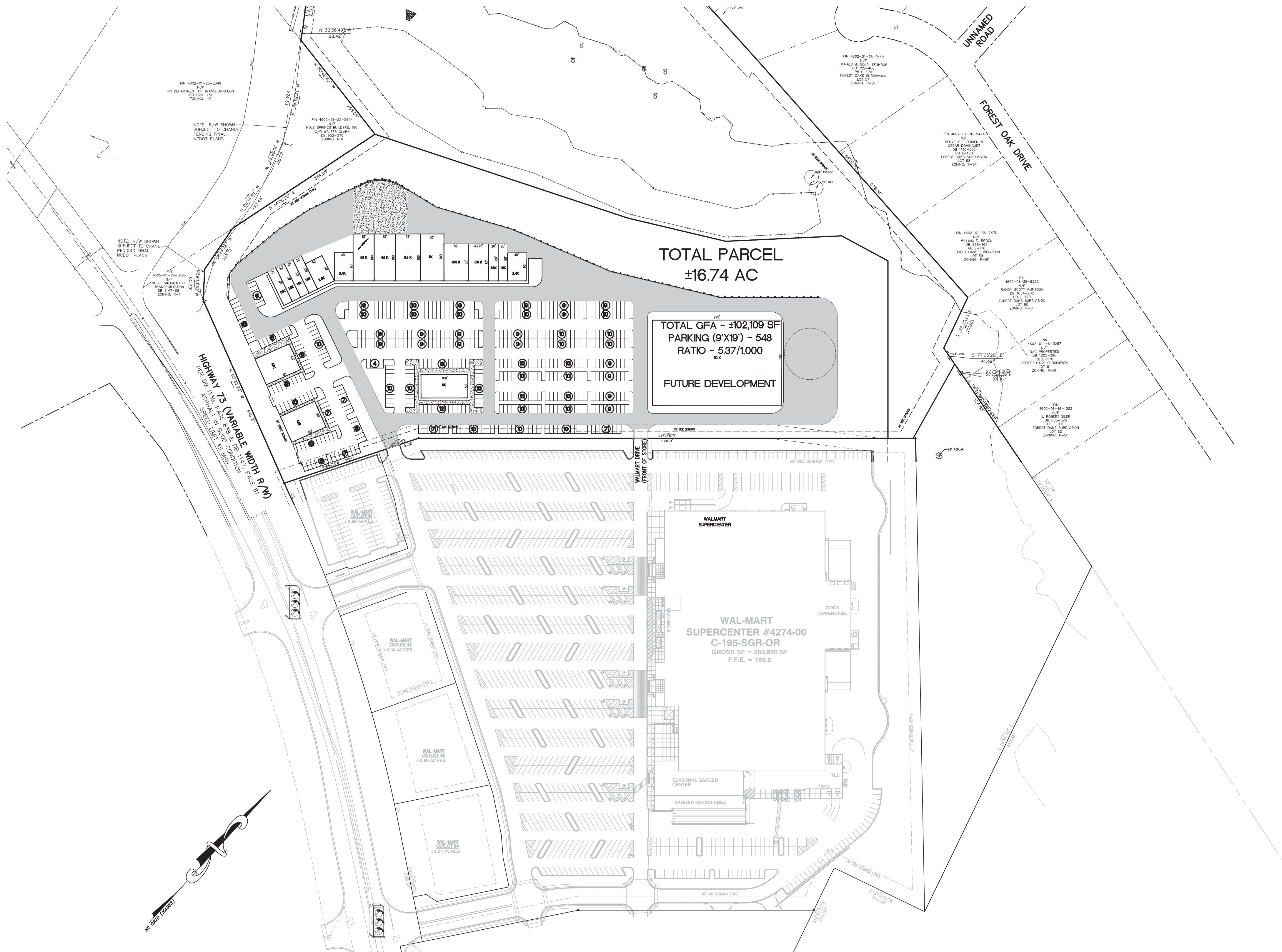
The subject site is proposed to consist of 70,000 square feet of retail space, 30,000 square feet of medical office space, a 7,000 square foot high-turnover (sit-down) restaurant, and two (2) 3,500 square foot fast-food restaurants with drive-through windows. The development is anticipated to be fully built out in 2017. Refer to Figure 1 for the site plan.

1.3. Site Description

The site is proposed to be located west of the existing Wal-Mart development, and is bordered by NC 73 to the south and NC 16 to the west. The site is currently vacant.

1.4 Site Access

Access to the proposed development is provided via two (2) existing signalized full movement drives on NC 73 (located approximately 750 feet and 1,465 feet east of the NC 16 interchange, respectively). Access to the site is also provided via one (1) existing unsignalized right-in/right-out drive on NC 16 Business (located approximately 200 feet north of NC 73). No geometric sight distance restrictions were observed at any of the site drive locations in the field.



RAMEY KEMP & ASSOCIATES TRANSPORTATION ENGINEERS	NC 73 Retail Center Lincoln County, North Carolina	Site Plan
		Scale: Not to Scale | Figure 1

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

2. STUDY AREA

The study area for the TIA was determined through coordination with the North Carolina Department of Transportation (NCDOT) and Lincoln County, and consists of the following intersections:

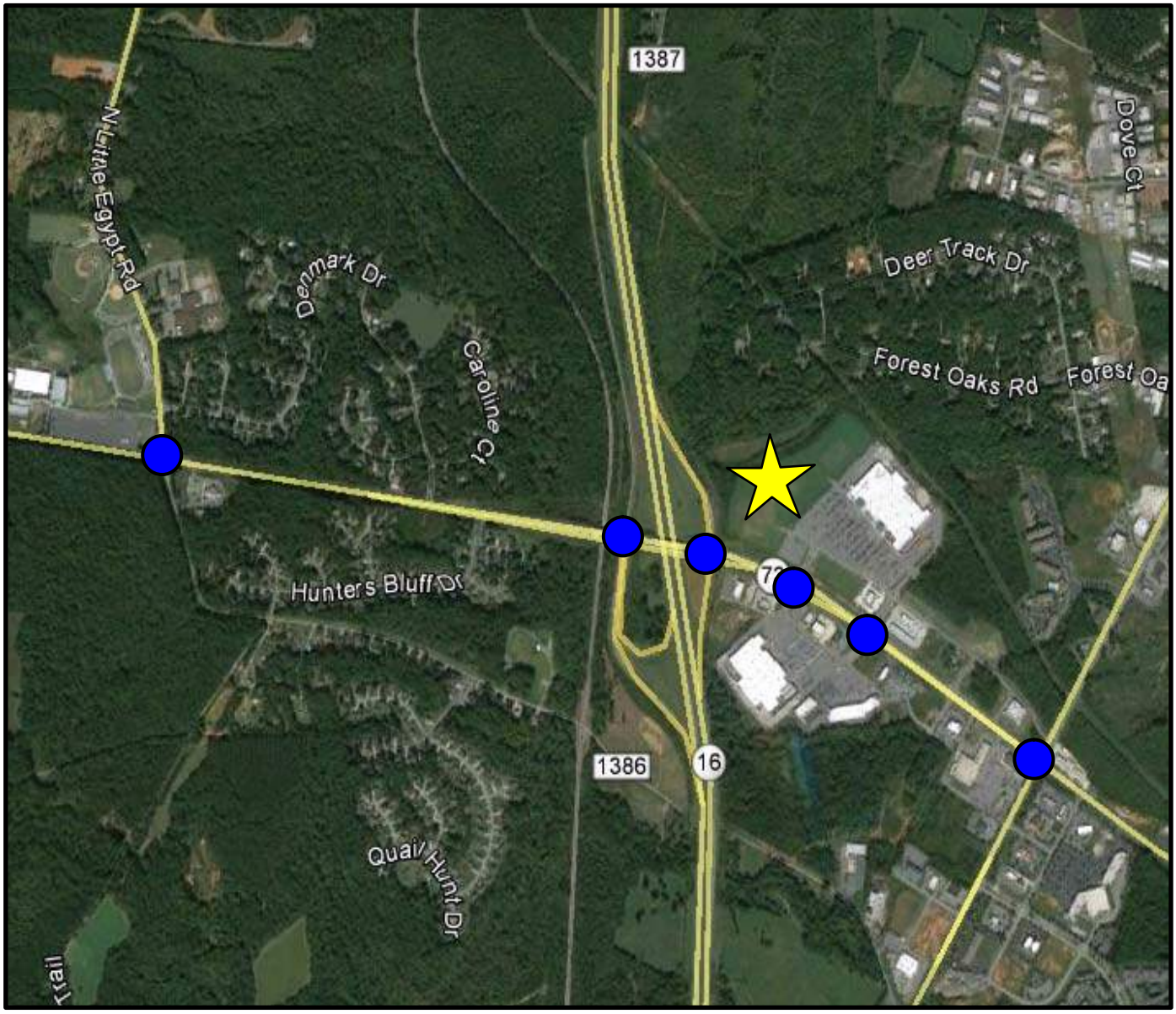
1) NC 73 and Little Egypt Road – Signalized
2) NC 73 and the NC 16 Southbound Ramps – Signalized
3) NC 73 and the NC 16 Northbound Ramps – Signalized
4) NC 73 and Wal-Mart/Lowe's West Access – Signalized
5) NC 73 and Wal-Mart/Lowe's East Access – Signalized
6) NC 73 and NC 16 Business – Signalized

Refer to Figure 2 for a site location map.

3. EXISTING CONDITIONS

3.1 Existing (2016) Traffic Volumes

Existing peak hour traffic volumes were obtained from traffic counts conducted at the study intersections during the first week of January 2016, while school was in session. All traffic counts were conducted during the AM peak period from 7:00 to 9:00, and during the PM peak period from 4:00 to 6:00. Traffic volumes were balanced upwards between all study intersections with the exception of the segment of NC 73 between Little Egypt Road and the NC 16 Southbound Ramps as well as the segment of NC 73 between the Wal-Mart/Lowe's East access and NC 16 Business. Volumes were not balanced between these study intersections due to multiple connections located between them. However, the volumes between these intersections were adjusted so that the difference between them was within approximately 5%. Refer to Figure 3 for an illustration of the existing traffic volumes. A copy of the traffic count data can be found in Appendix A of this report. Traffic counts were also conducted during the AM and PM peak periods at the intersection of the east Wal-Mart access and the connector road that provides access to NC 16 Business. Existing peak hour traffic volumes at this intersection were utilized for trip generation purposes only.



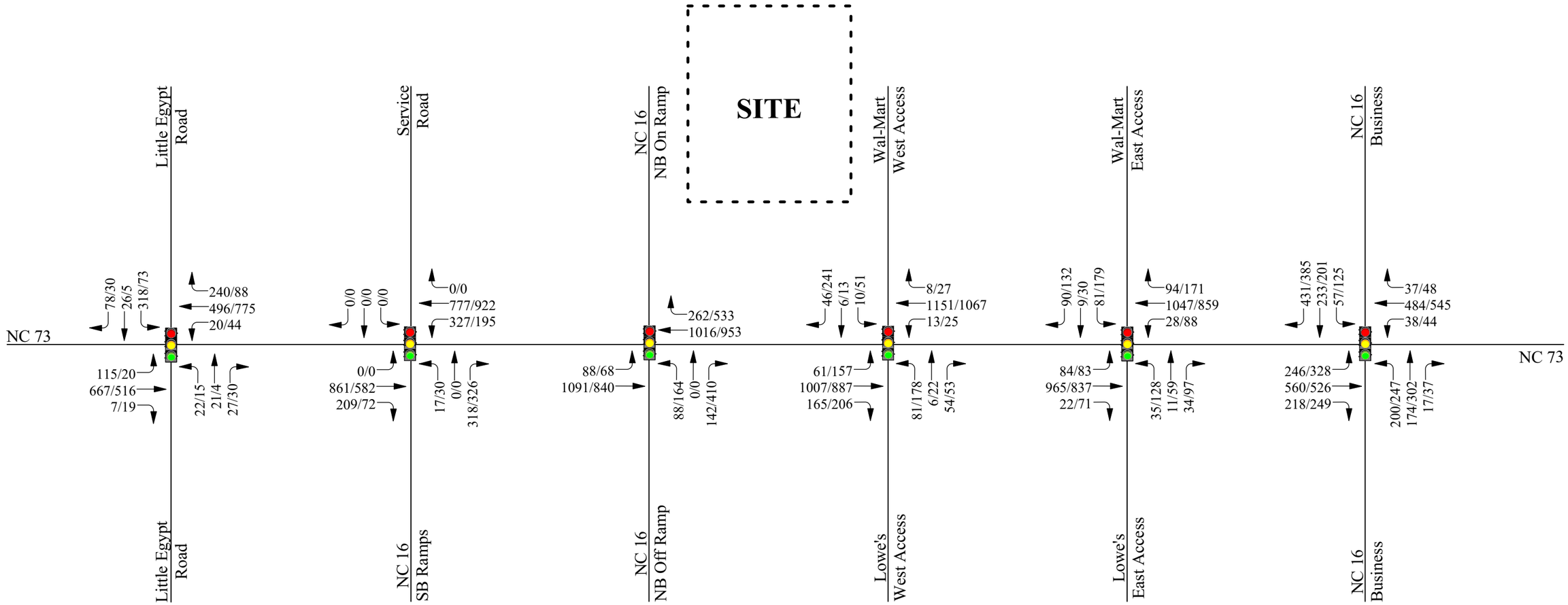
LEGEND

Site Location

Existing Study Intersection

N

RAMEY KEMP & ASSOCIATES TRANSPORTATION ENGINEERS	NC 73 Retail Center Lincoln County, North Carolina	Site Location Map Scale: Not to Scale | Figure 2



LEGEND

Signalized Intersection

X/Y → AM/PM Peak Hour Traffic

N

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TRANSPORTATION ENGINEERS

NC 73 Retail Center
Lincoln County, NC

Existing (2016)
Traffic Volumes

Not to Scale | Figure 3

3.2. Existing Transportation System

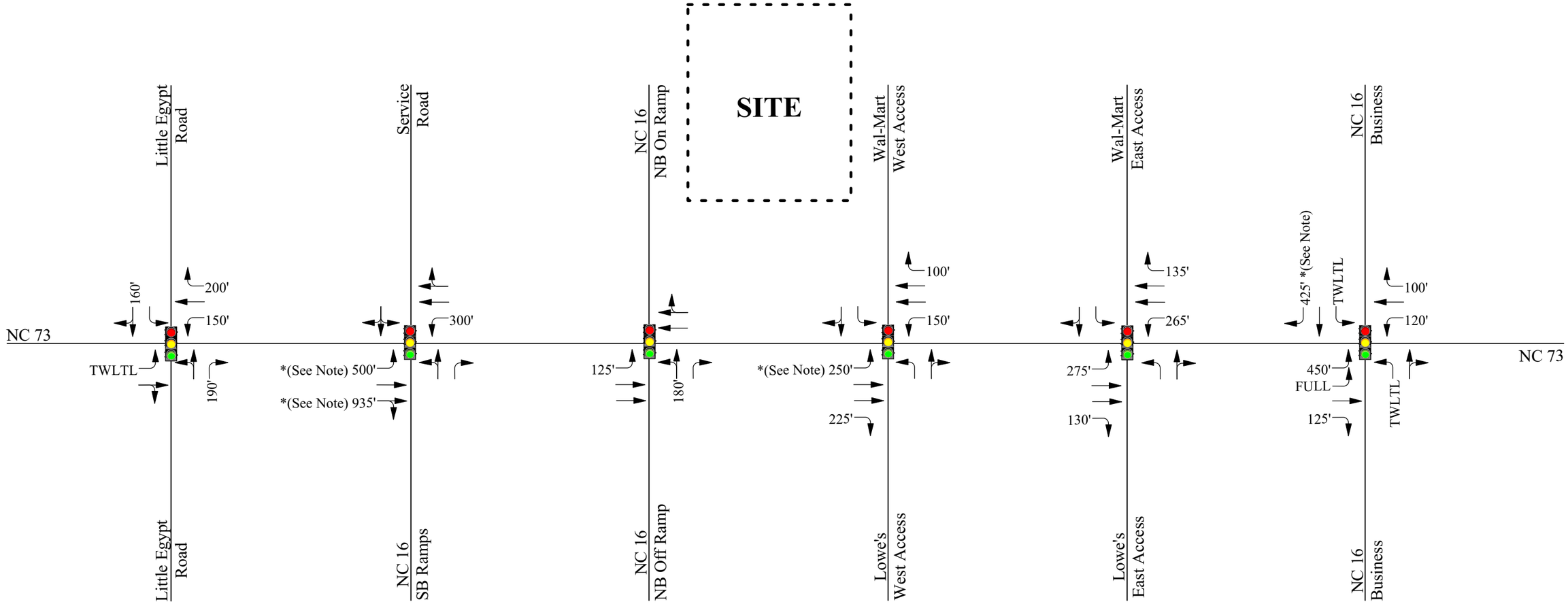
The project study area for this TIA was determined through coordination with NCDOT and Lincoln County, and consists primarily of the following facilities: NC 73, NC 16 Business, and Little Egypt Road.

NC 73 is a four-lane divided facility with a posted speed limit of 45 miles per hour (mph) within the vicinity of the site. It carries approximately 27,000 vehicles per day (vpd) between NC 16 and NC 16 Business based on 2014 NCDOT Annual Average Daily Traffic (AADT) data, which is the most recent available.

NC 16 Business is a multi-lane facility with a posted speed limit of 45 mph within the immediate vicinity of NC 73. It carries approximately 8,000 vpd north of NC 73 and approximately 12,000 vpd south of NC 73 Road based on 2014 NCDOT AADT data.

Little Egypt Road is a two-lane facility with a posted speed limit of 45 mph within the study area. It carries approximately 3,400 vehicles north of NC 73 based on 2014 NCDOT AADT.

Existing lane configurations (number of traffic lanes on the intersection approach), lane widths, storage capacities, and other intersection and roadway information within the study area was collected through field reconnaissance by Ramey Kemp and Associates, Inc. (RKA). Refer to Figure 4 for the existing geometrics and traffic control at study intersections.



*Note:
Due to limitations of Synchro software, the maximum input for taper lengths is 300'; therefore any taper length over 300' was added to the storage length.

LEGEND

- Signalized Intersection
- X' → Lane Configuration and Storage Lengths (in feet)
- TWLTL Two-Way Left Turn Lane

N

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TRANSPORTATION ENGINEERS

NC 73 Retail Center
Lincoln County, NC

Existing Geometrics and Traffic Control

Not to Scale | Figure 4

4. FUTURE CONDITIONS

4.1. Future Transportation System

Per discussions with NCDOT, it is understood that improvements identified as part of the NC 73 Corridor Study (Segment 1) completed by Congestion Management could be provided under future NCDOT State Transportation Improvement Program (STIP) projects R-5710 and R-5721; however, construction of these projects are not planned to begin prior to the anticipated build out of the proposed development. The Corridor Study proposes improvements along an approximately 13 mile stretch of NC 73 (including the segment between Little Egypt Road and NC 16 Business) which includes converting all-movement intersections to superstreet intersections. Although none of the improvements from the Corridor Study were included as part of this analysis, it was considered when identifying mitigation measures to accommodate proposed development traffic. The following geometric improvement was assumed as part of the Trilogy Lake Norman (formerly Carolina Ridge) development:

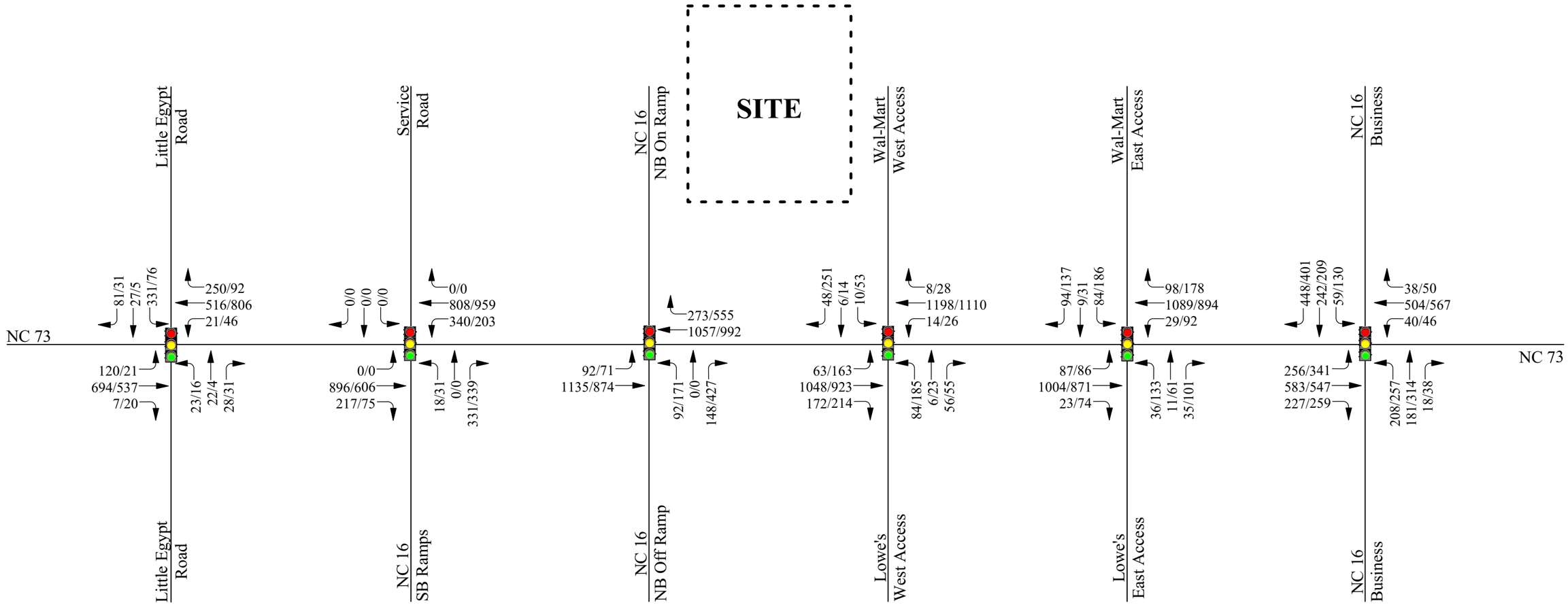
<u>NC 73 and the NC 16 Northbound Ramps</u>

- Restripe the northbound shared left-through lane to a shared left-through-right turn lane.

4.2. Future 'No-Build' Traffic

In order to account for the growth of traffic and subsequent traffic conditions at a future year, traffic projections are needed. Future 'no-build' traffic is the component of traffic due to the growth of the community and surrounding area that is anticipated to occur regardless of whether the proposed site is developed.

To account for the growth of traffic that is anticipated to occur, the existing traffic volumes were projected to the future horizon year 2018 (one year beyond development build out) by applying a compounded annual growth rate to traffic volumes at the study intersections. Per NCDOT, a 2% growth rate was utilized. Refer to Figure 5 for an illustration of the projected (2018) peak hour traffic volumes.



LEGEND

Signalized Intersection

X/Y → AM/PM Peak Hour Traffic

N

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TRANSPORTATION ENGINEERS

NC 73 Retail Center
Lincoln County, NC

Projected (2018)
Traffic Volumes

Not to Scale | Figure 5

Per discussions with NCDOT and Lincoln County, it is understood that there are three approved adjacent developments that are expected to impact the study area; Trilogy Lake Norman (formerly Carolina Ridge), Cottonwood Village, and Carrington Subdivision. For the purpose of this study, phases one through four of Trilogy Lake Norman were assumed to impact the proposed development, while Cottonwood Village and Carrington Subdivision were assumed to be fully built out by the time the proposed development was completed. Trilogy at Lake Norman is a proposed residential development that is expected to consist of 300 single-family homes, and 290 detached senior housing units upon the build out of its fourth phase. Under existing conditions, it was assumed that 75 single-family homes were already occupied; therefore, it was assumed that 225 additional single-family homes will be completed by the end of the fourth phase. Trilogy Lake Norman is expected to generate 237 new trips (67 entering and 170 exiting) during the AM peak hour and 301 new trips (188 entering and 113 exiting) during the PM peak hour. Based on a review of the phasing study that was prepared for this site, it was determined that 78% of the entering and exiting development traffic would impact the study area.

Cottonwood Village is a mixed-use development that is proposed to consist of 254 apartments, 60,000 square feet of office space, and a 144-room hotel when completed. It is expected to generate 331 new trips (183 entering and 148 exiting) during the AM peak hour and 385 new trips (169 entering and 216 exiting) during the PM peak hour. Based on a review of the TIA that was prepared for this site, it was determined that 81% of the entering development traffic and 87% of the exiting development traffic would impact the study area.

Carrington Subdivision is a proposed residential development that is expected to consist of 302 single-family homes when completed. It is expected to generate 227 trips (57 entering and 170 exiting) during the AM peak hour and 302 trips (190 entering and 112 exiting) during the PM peak hour. Based on a review of the TIA that was prepared for this site, it was determined that 40% of the entering and exiting development traffic would impact the study area.

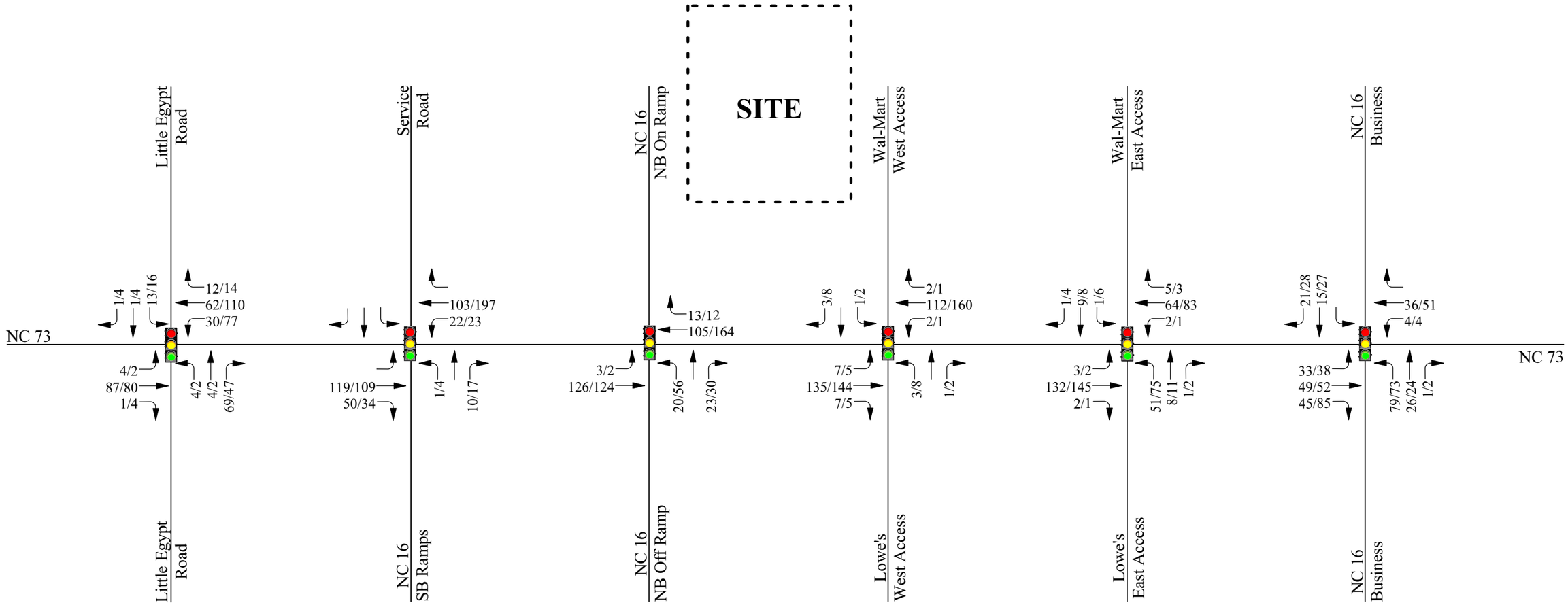
Please note that approved development traffic was distributed based on existing traffic patterns at the study intersections that were not included in their respective TIAs. Refer to Figure 6 for illustrations of the approved development traffic volumes that will affect the study area, and Appendix B for a detailed breakdown of the traffic volumes for all approved developments, which were obtained from the previously prepared Carolina Ridge Development Study for Off-Site Improvements (dated 01-24-2014 and submitted by WSP), Cottonwood Village Land Use Changes and Trip Estimates Memorandum (dated 12-11-2014 and submitted by WSP), and Carrington Subdivision TIA (sealed on 11-6-15 and submitted by Accelerate Engineering, PLLC).

Approved development traffic (Figure 6) was added to the projected traffic volumes (Figures 5) to determine future (2018) 'no-build' traffic volumes. Refer to Figure 7 for an illustration of the future (2018) 'no-build' peak hour traffic volumes. Refer to Appendix C for a summary of the turning movement development data in tabular format.

5. PROJECT TRAFFIC

5.1. Trip Generation

In order to determine the future traffic conditions after the development is built out, an estimate of traffic projected to travel to/from the retail development is required. The average weekday daily trips as well as AM and PM peak hour site trips for this analysis were calculated utilizing the 9th Edition of the Institute of Transportation Engineers (ITE) *Trip Generation* Manual. The anticipated development is proposed to consist of 70,000 square feet of retail space, 30,000 square feet of medical office space, a 7,000 square foot high-turnover (sit-down) restaurant, and two (2) 3,500 square foot fast-food restaurants with drive-through windows. The existing retail development north of NC 73 consists of a Wal-Mart Supercenter [202,357 square feet of retail space] and two (2) outparcels: a QuikTrip [convenience market with 18 fueling positions], and a Zaxby's [3,222 square foot fast-food restaurant with drive-through window]. In order to calculate the trips generated by the proposed retail development, the existing entering and exiting traffic volumes collected at the signalized intersection of NC 73 and the Lowe's/Wal-Mart West Access and the unsignalized intersection of the Wal-Mart East Access and the service road that provides access to NC 16 Business were subtracted from the expected external trips



LEGEND

Signalized Intersection

X/Y → AM/PM Peak Hour Traffic

N

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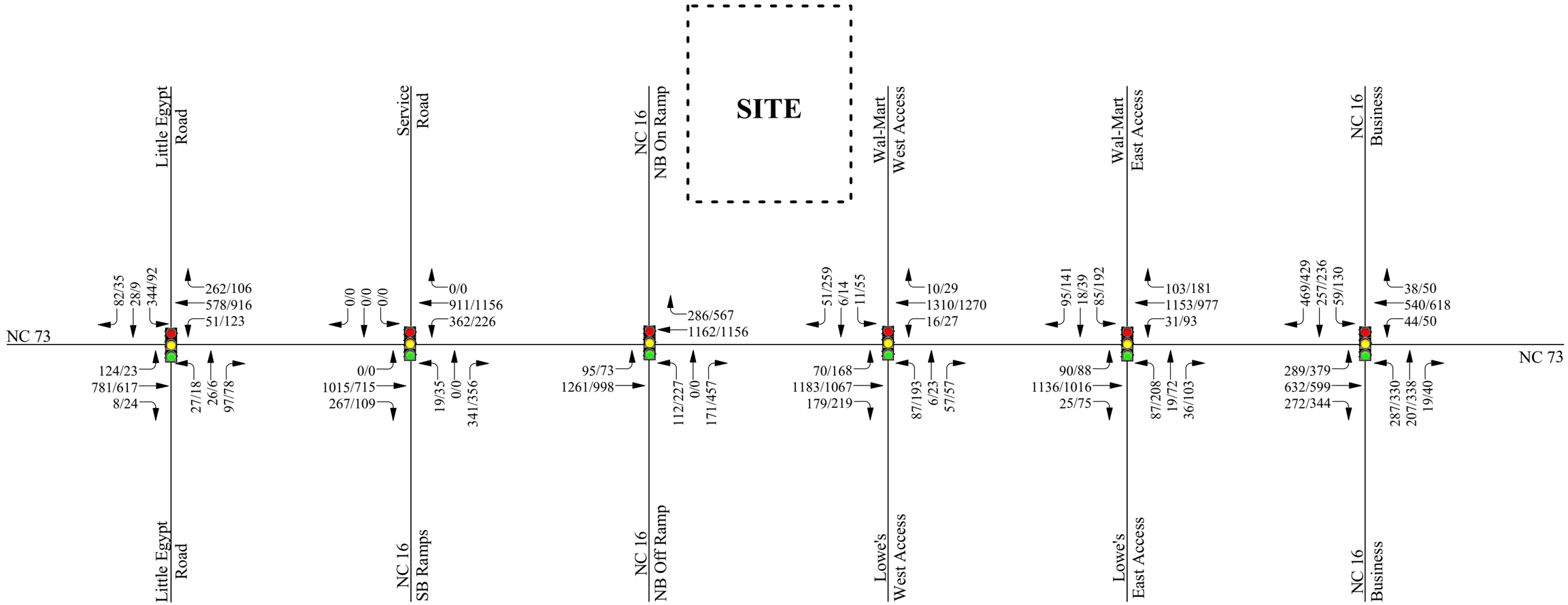
TRANSPORTATION ENGINEERS

NC 73 Retail Center
Lincoln County, NC

Approved Development
Traffic Volumes

Not to Scale | Figure 6



LEGEND

Signalized Intersection

X/Y → AM/PM Peak Hour Traffic

N

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TRANSPORTATION ENGINEERS

NC 73 Retail Center
Lincoln County, NC

Future (2018) 'No-Build' Traffic Volumes

Not to Scale | Figure 7

generated by the existing and proposed land uses and combined square footages (existing + proposed developments) per discussions with NCDOT.

All trips were calculated based on the AM and PM peak hours of adjacent street traffic. The ITE rates were utilized for the following land uses:

- Medical-Dental Office Building (ITE Code 720)
- Convenience Market with Gas Pumps (ITE Code 853)
- High-Turnover (Sit-Down) Restaurant (ITE Code 932)
- Fast-Food Restaurant with Drive-Through Window (ITE Code 934)

The ITE equations were utilized for the following land use:

- Retail (ITE Code 820)

With the additional land uses, and square footages proposed via the new retail development, the combined developments could generate 29,837 trips (entering and exiting) during a typical weekday, with 1,197 trips (663 entering and 534 exiting) generated during the AM peak hour and 2,027 trips (980 entering and 1,047 exiting) generated during the PM peak hour. However, not all of the trips generated by the development will impact the transportation network. A portion of these trips will be captured internally between the two developments.

Internally captured trips are those that are completed within a development such that they do not impact the adjacent external roadway system. In this particular study, internal capture is anticipated as interaction between the retail space, medical office space, and restaurant land uses. An example of an internally captured trip is retail shopper that visits a restaurant. With adjustments made to account for internal capture within the developments, the combination of the existing and proposed developments is expected to generate 1,027 external trips (578 entering and 449 exiting) during the AM peak hour and 1,683 external trips (808 entering and 875 exiting) during the PM peak hour. Refer to Appendix D for more detailed information regarding the internal capture adjustments.

Based on the difference between the expected external trips generated by the combination of the proposed and existing developments and the existing traffic counts at the two intersections mentioned previously, the proposed development could generate up to 462 external trips (281 entering and 181 exiting) during the AM peak hour and 388 external trips (192 entering and 196 exiting) during the PM peak hour. However, a portion of these trips will be attracted from adjacent facilities and are referred to as pass-by trips.

The ITE Trip Generation Handbook defines pass-by trips as intermediate stops on the way from an origin to a primary trip destination. Pass-by trips are attracted from the traffic passing the site on an adjacent street, when the adjacent street provides direct access to the generator. These trips will not add to the overall traffic volumes on the roadway, but will add to the turning traffic at the site's access. An example of a pass-by trip is a stop at the proposed development by a vehicle on the way home from work. Pass-by trips do not add to the overall traffic volumes on the adjacent roadways, but do add to the turning traffic at the site's driveway connections. Based on methodology contained within the 3rd Edition of the ITE Trip Generation Handbook, the following pass-by rates were applied to the corresponding land uses:

- Retail – 34% [PM peak only]
- Convenience Market with Gas Pumps – 63% [AM peak], 66% [PM peak]
- High-Turnover (Sit-Down) Restaurant – 43% [PM peak only]
- Fast-Food Restaurant with Drive-Through Window – 49% [AM peak], 50% [PM peak]

However, the total pass-by trips were capped at 10% of the adjacent existing traffic volumes. With adjustments made to account for pass-by trips, the proposed development is anticipated to generate 270 new trips (185 entering and 85 exiting) during the AM peak hour and 220 new trips (108 entering and 112 exiting) during the PM peak hour. Refer to Appendix D for more detailed information regarding the trip generation breakdown for the proposed development.

The trip generation results summarized in Tables 1A and 1B were submitted to NCDOT for review and approval prior to completing the TIA.

TABLE 1A
TRIP GENERATION – EXISTING + PROPOSED DEVELOPMENTS

ITE LAND USE (ITE CODE)	DENSITY	AVERAGE DAILY TRAFFIC (vpd)	AM PEAK HOUR (vph)		PM PEAK HOUR (vph)	
			Enter	Exit	Enter	Exit
EXISTING + PROPOSED DEVELOPMENTS						
Medical-Dental Office Building (720)	30,000 square feet	1,084	57	15	44	26
Retail (820)	272,357 square feet	13,025	178	109	563	610
Convenience Market with Gas Pumps (853)	18 fueling positions	9,767	149	149	172	172
High-Turnover (Sit-Down) Restaurant (932)	7,000 square feet	890	42	34	41	28
Fast-Food Restaurant with Drive-Through Window (934)	10,222 square feet	5,071	237	227	174	160
Sub-Total		29,837	663	534	980	1,047
Internal Capture[1]			*85*	*85*	*172*	*172*
External Trips			578	449	808	875

1. Based on National Cooperative Highway Research Program (NCHRP) Report 684.

TABLE 1B
TRIP GENERATION – PROPOSED DEVELOPMENT

ITE LAND USE (ITE CODE)	DENSITY	AVERAGE DAILY TRAFFIC (vpd)	AM PEAK HOUR (vph)		PM PEAK HOUR (vph)	
			Enter	Exit	Enter	Exit
External Trips (Existing + Proposed Developments)			578	449	808	875
Existing Traffic Counts			*297*	*268*	*616*	*679*
Proposed Development External Trips[1]			281	181	192	196
Proposed Development Pass-By Trips (Capped at 10% of Existing Peak Hour Traffic)			*96*	*96*	*84*	*84*
Proposed Development Primary (New) Trips			**185**	**85**	**108**	**112**

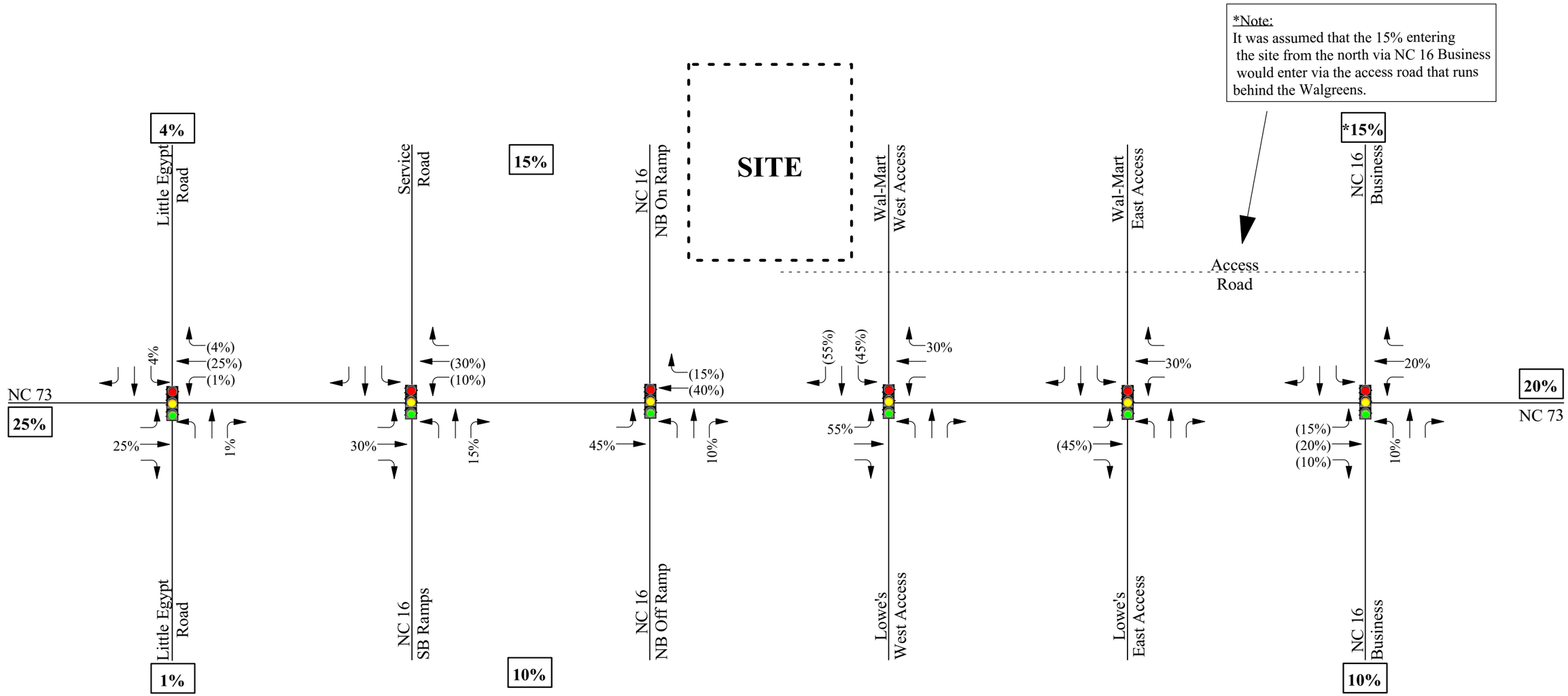
1. Existing Traffic Counts subtracted from the Existing + Proposed Developments External Trips.

5.2. Trip Distribution and Assignment

For this analysis, the site trip distribution percentages were developed based on existing traffic patterns and engineering judgment. Trip distributions are summarized below:

- 25% to/from the west via NC 73
- 20% to/from the east via NC 73
- 15% to/from the north via NC 16
- 10% to/from the south via NC 16
- 15% to/from the north via NC 16 Business
- 10% to/from the south via NC 16 Business
- 4% to/from the north via Little Egypt Road
- 1% to/from the south via Little Egypt Road

Refer to Figure 8 for an illustration of the primary trip distribution for the proposed development. Please note that the same primary trip distribution was used for the AM and PM peak hours. Primary trip distribution percentages were approved by NCDOT prior to completion of the traffic analysis. Pass-by trips were distributed based on existing peak hour travel patterns, and are illustrated in Figure 9. Refer to Figure 10 for an illustration of



LEGEND

Signalized Intersection

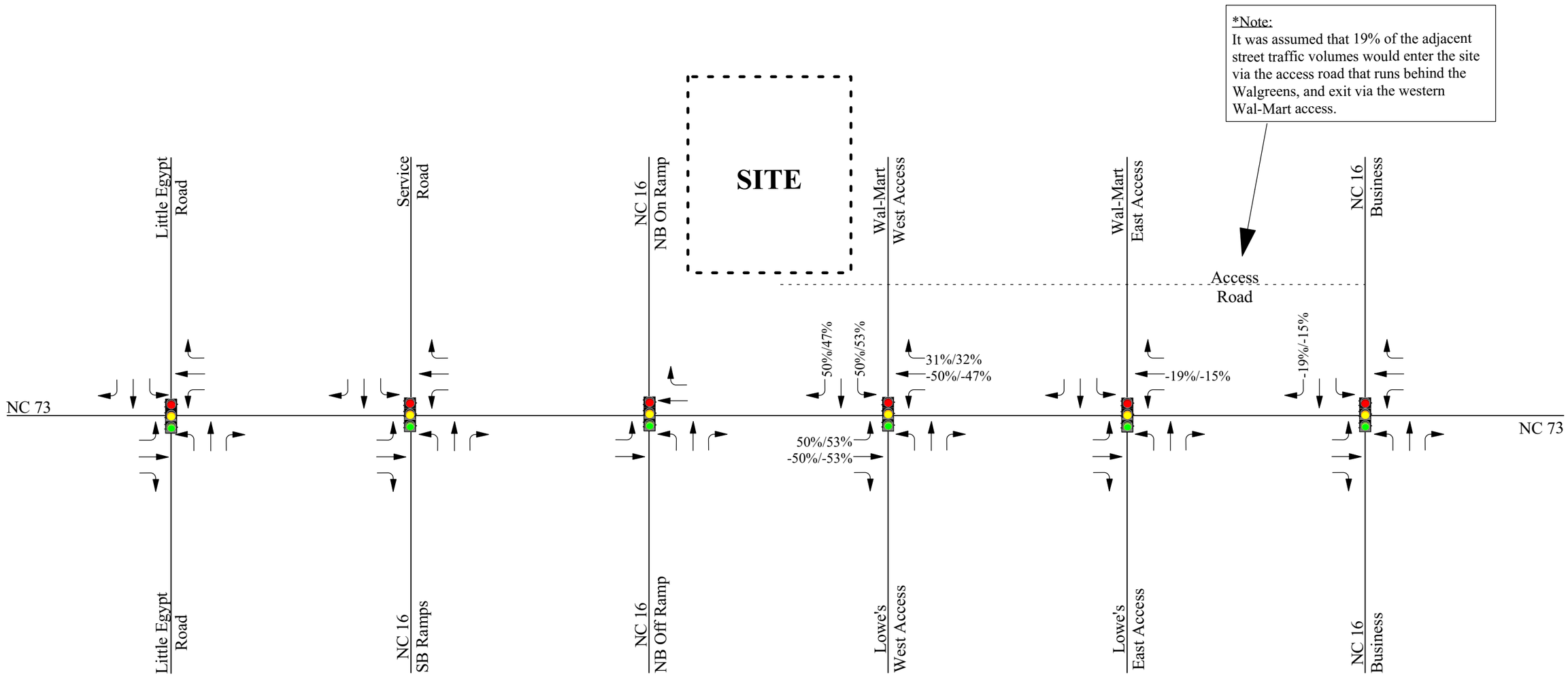
X% (Y%) → Entering (Exiting) Trips

RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

NC 73 Retail Center
Lincoln County, NC

Primary Site Trip Distribution

Not to Scale | Figure 8



LEGEND

Signalized Intersection

N

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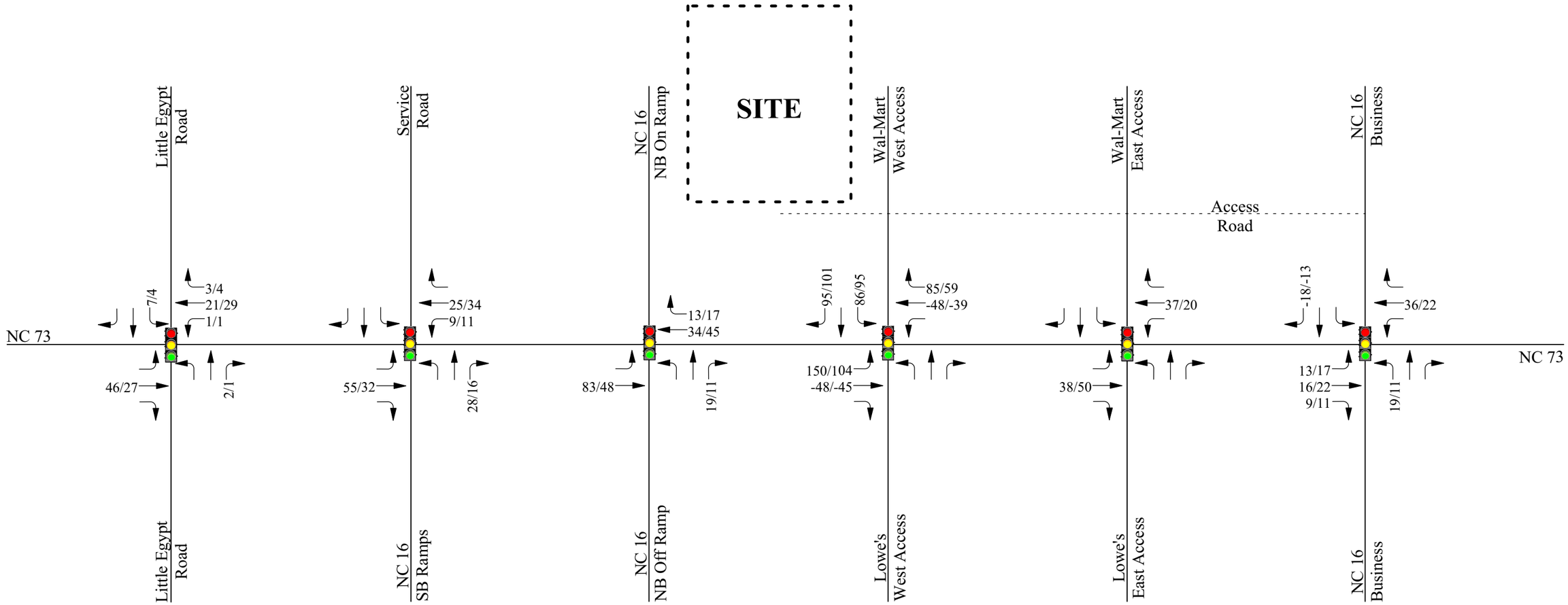
NC 73 Retail Center
Lincoln County, NC

Pass-By Site Trip Distribution

Not to Scale | Figure 9



LEGEND

Signalized Intersection

X/Y → AM/PM Peak Hour Site Traffic

N

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NC 73 Retail Center
Lincoln County, NC

Total Site Trip Assignment

Not to Scale | Figure 10

the total site trip assignment for the proposed development. Refer to Appendix C for a summary of the site trip distribution and assignment in tabular format.

5.3. Future 'Build' Traffic

In order to determine peak hour traffic volumes with the development built out, the proposed development traffic was combined with the future 'no-build' traffic volumes (Figure 7) to determine future peak hour traffic volumes with the proposed retail development. The future (2018) 'build' peak hour traffic volumes are illustrated in Figure 11. Refer to Appendix C for a summary of the turning movement development data in tabular format.

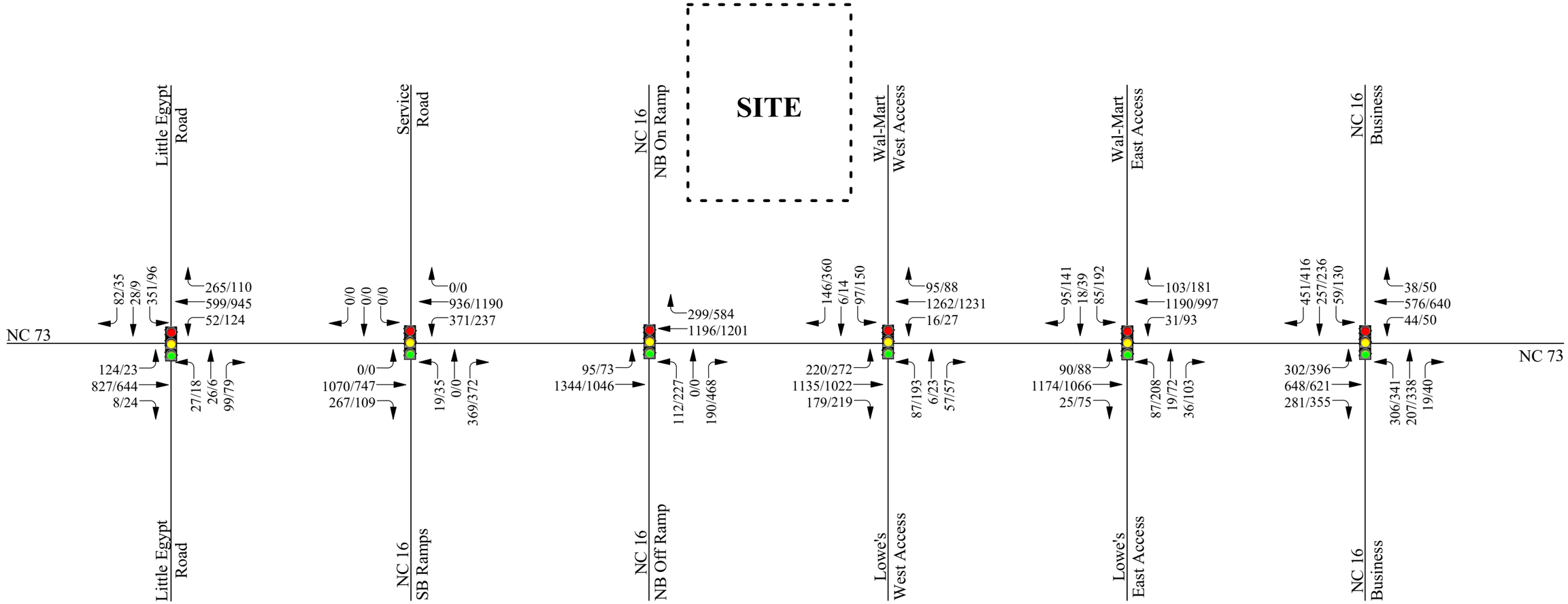
6. CAPACITY ANALYSIS

6.1. Analysis Procedure

All study intersections were analyzed using the methodology outlined in the Highway Capacity Manual (HCM) published by the Transportation Research Board. The computer software package, Synchro (Version 9.1), was used to complete all analysis. Synchro was developed by Trafficware Corporation and allows the user to input data into the Synchro software and calculate the output based on methodologies in the HCM.

Analysis results for signalized intersections provide level of service calculations for all approaches and an overall resulting level of service. The capacity analysis for an unsignalized intersection does not provide an overall level of service for the intersection, but rather a level of service for movements and/or approaches that have a conflicting movement.

The HCM defines capacity as "the maximum hourly rate at which persons or vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time period under prevailing roadway, traffic, and control conditions". Level of service (LOS) is a term used to represent different driving conditions, and is defined as a "qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers". Level of service varies from Level "A" representing free flow, to Level "F" where greater vehicle delays are evident.



LEGEND

Signalized Intersection

X/Y → AM/PM Peak Hour Traffic

N

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NC 73 Retail Center
Lincoln County, NC

Future (2018) 'Build'
Traffic Volumes

Not to Scale | Figure 11

Refer to Table 2 for HCM levels of service and related average control delay per vehicle. Control delay as defined by the HCM includes "initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay". As shown in Table 2, an average control delay of 40 seconds at a signalized intersection results in a LOS D operation.

TABLE 2
HIGHWAY CAPACITY MANUAL - LEVELS OF SERVICE AND DELAY

SIGNALIZED INTERSECTION		UNSIGNALIZED INTERSECTION	
LEVEL OF SERVICE	AVERAGE CONTROL DELAY PER VEHICLE (SECONDS)	LEVEL OF SERVICE	AVERAGE CONTROL DELAY PER VEHICLE (SECONDS)
A	0-10	A	0-10
B	10-20	B	10-15
C	20-35	C	15-25
D	35-55	D	25-35
E	55-80	E	35-50
F	>80	F	>50

6.2. Capacity and Level of Service at Study Intersections

Existing traffic conditions were analyzed to determine how the study intersections currently operate. A peak hour factor (PHF) of 0.90 was utilized for all analysis. Since all the study intersections are located in the NC 73 Closed Loop System with the exception of NC 73 and Little Egypt Road, existing signal phasing and timing information was obtained from NCDOT. Refer to Appendix E for a copy of the signal plans and timing data. The cycle length for the intersection of NC 73 and Little Egypt Road was optimized under all peak hour analyses assuming a minimum cycle length of 120 seconds for the six-phase signal. The cycle lengths, phase splits, and offsets obtained from the coordination plans for the NC 73 Closed Loop System were utilized for the remaining intersections under existing traffic analysis. While existing cycle lengths were utilized for the future 'no-build' and 'build' traffic analyses, the splits and offsets for each intersection were optimized and may differ between existing and future traffic conditions.

Based on the signal plans obtained from NCDOT (located in Appendix E) and field observations, protected-permissive left turn phasing is provided for all left turns on NC 73 with the exception of the eastbound left turn movement (permissive) at the Service Road located opposite the NC 16 Southbound Ramps and the eastbound and westbound left turn

movements (protected) at NC 16 Business. Because dual lefts are provided on the eastbound approach of NC 73 at the NC 16 Business intersection, the eastbound and westbound left turn movements operate under protected conditions only. Permissive left turn phasing is provided for all side street approaches with the exception of the southbound left turn movement from Little Egypt Road and the northbound and southbound left turn movements from NC 16 Business. The left turn movement on the southbound approach of Little Egypt Road operates under protected-permissive phasing, while the left turn movements on the northbound and southbound approaches of NC 16 Business operate under protected phasing only. In addition, right turns on red are currently permitted on all intersection approaches based on the signal plans and field observations. Please note that for movements in which 'zero' volumes exist, a peak hour volume of 4 vehicles (1 vehicle per 15 minute period) was assumed for the analysis.

The purpose of the future 'no-build' analysis is to establish a base line scenario for a comparative analysis with the future 'build' scenario. The relative difference between the two scenarios can be characterized as the site impact. The analysis of the future 'no-build' traffic conditions was performed using the same methodology as previously discussed under existing conditions; however, rights turns on red were not permitted under all future traffic analysis for comparative purposes. All future analyses include the following improvement as recommended as part of the Trilogy Lake Norman (formerly Carolina Ridge) development TIA:

<u>NC 73 and the NC 16 Northbound Ramps</u>

- Restripe the northbound shared left-through lane to a shared left-through-right turn lane.

The future 'build' analysis with the proposed development built out allows a determination of impacts created by the site by comparing the analysis results of the future 'no-build' and 'build' traffic conditions. The analysis of the future 'build' traffic conditions was performed using the same traffic control and methodology as discussed under future 'no-build' conditions.

6.2.1. Existing Conditions

Refer to Table 3 for a summary of the capacity analysis results for the existing (2016) traffic conditions. Capacity analysis indicates that the signalized intersections operate at an overall LOS D or better during the AM and PM peak hours. In addition, all intersection approaches operate at LOS D or better with the exceptions of the westbound approach of NC 73 at the NC 16 Northbound Ramps and the northbound approach of NC 16 Business at NC 73. Greater delays and poorer levels of operation are not uncommon for side street approaches at traffic signals located in a coordinated signal system where precedence is typically given to the mainline traffic in order to maximize progression on the mainline. Refer to Appendix F for more detailed capacity analysis reports.

TABLE 3
ANALYSIS SUMMARY FOR EXISTING (2016) CONDITIONS

INTERSECTION	APPROACH	AM PEAK HOUR				PM PEAK HOUR			
		Approach		Overall		Approach		Overall	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
NC 73 & Little Egypt Road [Signalized]	EB WB NB SB	27.0 20.7 34.7 32.6	C C C C	**26.1**	**C**	14.5 16.1 19.5 30.6	B B B C	**16.6**	**B**
NC 73 & NC 16 Southbound Ramps [Signalized]	EB WB NB SB	13.0 7.3 33.2 37.9	B A C D	**13.3**	**B**	9.9 2.7 15.2 20.0	A A B C	**7.1**	**A**
NC 73 & NC 16 Northbound Ramps [Signalized]	EB WB NB	4.7 9.6 31.8	A A C	**9.4**	**A**	7.3 56.5 36.3	A E D	**37.5**	**D**
NC 73 & Lowe's/Wal-Mart West Access [Signalized]	EB WB NB SB	4.7 4.0 36.7 19.3	A A D B	**6.5**	**A**	17.4 23.0 41.0 19.1	B C D B	**21.8**	**D**
NC 73 & Lowe's/Wal-Mart East Access [Signalized]	EB WB NB SB	6.3 8.8 30.3 31.3	A A C C	**10.0**	**B**	14.6 15.0 34.4 34.0	B B C C	**19.2**	**B**
NC 73 & NC 16 Business [Signalized]	EB WB NB SB	34.0 37.4 54.4 25.7	C D D C	**35.4**	**D**	42.6 45.4 77.1 34.0	D D E C	**47.8**	**D**

6.2.2. Future 'No-Build' Conditions without Proposed Development

Refer to Table 4 for a summary of the capacity analysis results for the future (2018) 'no-build' traffic conditions. Capacity analysis indicates that the signalized intersections are expected to operate at an overall LOS D or better during the AM and PM peak hours with the exception of the intersections of the NC 16 Northbound Ramps and NC 16 Business on NC 73 during the PM peak hour. In addition, all intersection approaches are expected to operate at LOS D or better with the following exceptions:

- Northbound approach of Little Egypt Road during the AM and PM peak hours.
- Westbound approach of NC 73 at the Northbound NC 16 Ramps during the PM peak hour.
- Northbound approach of the Northbound NC 16 Ramps during the AM and PM peak hours.
- Northbound approaches of the Lowe's West and East Accesses during the PM peak hour.
- Westbound approach of NC 73 at NC 16 Business during the PM peak hour.
- Northbound approach of NC 16 Business during the AM and PM peak hours.

As previously mentioned, greater delays and poorer levels of operation are not uncommon for side street approaches at traffic signals located in a coordinated signal system where precedence is typically given to the mainline traffic in order to maximize progression on the mainline. Refer to Appendix G for more detailed capacity analysis reports.

TABLE 4
ANALYSIS SUMMARY FOR FUTURE (2018) 'NO-BUILD' CONDITIONS

INTERSECTION	APPROACH	AM PEAK HOUR				PM PEAK HOUR			
		Approach		Overall		Approach		Overall	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
NC 73 & Little Egypt Road [Signalized]	EB WB NB SB	41.1 21.5 78.7 52.7	D C E D	**38.4**	**D**	21.7 27.4 67.0 41.8	C C E D	**28.5**	**C**
NC 73 & NC 16 Southbound Ramps [Signalized]	EB WB NB SB	20.8 8.3 41.2 48.5	C A D D	**18.0**	**B**	15.7 0.6 22.1 25.1	B A C C	**8.7**	**A**
NC 73 & NC 16 Northbound Ramps [Signalized]	EB WB NB	5.9 9.2 55.6	A A E	**12.1**	**B**	5.8 116.7 154.1	A F F	**90.0**	**F**
NC 73 & Lowe's/Wal-Mart West Access [Signalized]	EB WB NB SB	4.5 5.1 51.2 44.4	A A D D	**8.0**	**A**	23.6 27.3 77.7 41.6	C C E D	**31.1**	**C**
NC 73 & Lowe's/Wal-Mart East Access [Signalized]	EB WB NB SB	4.1 11.0 50.9 49.3	A B D D	**12.6**	**B**	8.6 12.0 58.2 51.7	A B E D	**20.9**	**C**
NC 73 & NC 16 Business [Signalized]	EB WB NB SB	47.0 46.1 60.7 36.2	D D E D	**46.3**	**D**	47.3 65.8 81.3 55.0	D E F D	**59.6**	**E**

6.2.3. Future 'Build' Conditions with Proposed Development

Refer to Table 5A for a summary of the capacity analysis results for future 'build' traffic conditions upon completion of the proposed development. Capacity analysis indicates that the signalized intersections are expected to operate at LOS D or better during the AM and PM peak hours with the exception of the intersections of the NC 16 Northbound Ramps and NC 16 Business on NC 73 during the PM peak hour. In addition, all intersection approaches are expected to operate at LOS D or better with the following exceptions:

- Northbound approach of Little Egypt Road during the AM and PM peak hours.
- Westbound approach of NC 73 at the Northbound NC 16 Ramps during the PM peak hour.
- Northbound approach of the Northbound NC 16 Ramps during the AM and PM peak hours.
- Northbound approach of the Lowe's West Access during the AM and PM peak hours.
- Northbound approach of the Lowe's East Access during the PM peak hour.
- Westbound approach of NC 73 at NC 16 Business during the PM peak hour.
- Northbound approach of NC 16 Business during the AM and PM peak hours.
- Southbound approach of NC 16 Business during the PM peak hour.

TABLE 5A
ANALYSIS SUMMARY FOR FUTURE (2018) 'BUILD' CONDITIONS

INTERSECTION	APPROACH	AM PEAK HOUR				PM PEAK HOUR			
		Approach		Overall		Approach		Overall	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
NC 73 & Little Egypt Road [Signalized]	EB WB NB SB	51.4 23.0 75.3 52.5	D C E D	**42.6**	**D**	22.1 29.2 68.9 42.5	C C E D	**29.7**	**C**
NC 73 & NC 16 Southbound Ramps [Signalized]	EB WB NB SB	22.4 8.9 42.8 48.6	C A D D	**19.3**	**B**	16.3 0.7 22.5 25.2	B A C C	**9.1**	**A**
NC 73 & NC 16 Northbound Ramps [Signalized]	EB WB NB	6.3 9.0 57.0	A A E	**12.3**	**B**	6.4 131.6 161.4	A F F	**98.5**	**F**
NC 73 & Lowe's/Wal-Mart West Access [Signalized]	EB WB NB SB	10.2 11.2 57.1 54.3	B B E D	**16.1**	**B**	39.1 45.2 84.9 39.8	D D F D	**44.9**	**D**
NC 73 & Lowe's/Wal-Mart East Access [Signalized]	EB WB NB SB	5.0 7.8 50.9 49.3	A A D D	**11.4**	**B**	11.0 12.0 58.7 52.2	B B E D	**21.7**	**C**
NC 73 & NC 16 Business [Signalized]	EB WB NB SB	51.2 51.5 71.2 38.3	D D E D	**51.5**	**D**	50.4 73.0 85.0 55.9	D E F E	**63.1**	**E**

As mentioned previously, greater delays and poorer levels of operation are not uncommon for side street approaches at traffic signals located in a coordinated signal system where precedence is typically given to the mainline traffic in order to maximize progression on the mainline. Refer to Appendix H for more detailed capacity analysis reports.

In order to accommodate the additional traffic generated by the proposed development while also improving an unacceptable LOS F, mitigation improvements were identified at the intersection of NC 73 and the NC 16 Northbound Ramps as well as the intersection of NC 73 and the Lowe's/Wal-Mart West Access. Refer to Table 5B for a summary of the capacity analysis results for future 'build' traffic conditions with improvements. With the addition of an exclusive westbound right turn lane on NC 73 at the NC 16 Northbound Ramps, the intersection is expected to operate at an overall LOS C or better during the AM and PM peak hours while the intersection approaches are expected to operate at LOS E or better. With the addition of an exclusive southbound right turn lane on the Wal-Mart West Access at NC 73, the intersection is expected to operate at an overall LOS C or better during the peak hours while the intersection approaches are expected to operate at LOS E or better. With the identified improvements; the intersections and approaches are expected to operate at acceptable levels of operation, or have been mitigated to 'no-build' levels of operation or better. Refer to Appendix H for more detailed capacity analysis reports.

TABLE 5B
ANALYSIS SUMMARY FOR FUTURE 'BUILD' CONDITIONS WITH IMPROVEMENTS

INTERSECTION	APPROACH	AM PEAK HOUR				PM PEAK HOUR			
		Approach		Overall		Approach		Overall	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
NC 73 & NC 16 Southbound Ramps [Signalized]	EB WB NB SB	22.4 10.4 42.8 48.6	C B D D	**20.0**	**B**	16.3 1.0 22.5 25.2	B A C C	**9.2**	**A**
NC 73 & NC 16 Northbound Ramps [Signalized]	EB WB NB	6.5 7.3 52.6	A A D	**11.2**	**B**	7.8 32.5 76.9	A C E	**33.4**	**C**
NC 73 & Lowe's/Wal-Mart West Access [Signalized]	EB WB NB SB	8.5 8.5 50.4 41.2	A A D D	**12.8**	**B**	16.9 18.4 64.0 42.9	B B E D	**24.7**	**C**
NC 73 & Lowe's/Wal-Mart East Access [Signalized]	EB WB NB SB	5.3 9.5 50.9 49.3	A A D D	**12.3**	**B**	15.3 11.8 58.7 52.2	B B E D	**23.3**	**C**
NC 73 & NC 16 Business [Signalized]	EB WB NB SB	49.6 51.5 71.2 38.3	D D E D	**50.9**	**D**	52.2 73.0 85.0 55.9	D E F E	**63.8**	**E**

7. QUEUING ANALYSIS

Based on the maximum SimTraffic queues, which are based on an average of ten (10) traffic simulation runs, it appears that the existing and proposed turn lane storage and taper is adequate to accommodate anticipated queues during the peak hours. If it is expected to be exceeded, the difference is less than 50 feet (approximately 2 vehicles) when the 'build' conditions with improvements are compared to the 'no-build' conditions. However, there were some anomalies observed for the eastbound and westbound free-flowing right turn movements at the Lowe's/Wal-Mart accesses. As for the eastbound and westbound queues, the queues are not expected to extend back into adjacent signalized intersections on NC 73. Therefore, no additional mitigation was recommended at the study intersections. Refer to Appendix I for a summary of the maximum queues in a tabular format and the SimTraffic queuing reports.

8. CONCLUSIONS

This traffic impact analysis was performed to determine the potential impact to the surrounding transportation system caused by the additional traffic generated by the proposed NC 73 Retail Center in Lincoln County, North Carolina. The site is proposed to consist of 70,000 square feet of retail space, 30,000 square feet of medical office space, a 7,000 square foot high-turnover (sit-down) restaurant, and two (2) 3,500 square foot fast-food restaurants with drive-through windows. In addition to site-generated traffic, this study also considered the impact of background traffic growth within the study area and three (3) approved adjacent developments (Trilogy Lake Norman, Cottonwood Village, and Carrington Subdivision).

Existing Traffic Conditions

The signalized intersections operate at an overall LOS D or better during the AM and PM peak hours. In addition, all intersection approaches operate at LOS D or better with the exceptions of the westbound approach of NC 73 at the NC 16 Northbound Ramps and the northbound approach of NC 16 Business at NC 73. However, greater delays and poorer levels of operation are not uncommon for side street approaches at traffic signals located in a coordinated signal system where precedence is typically given to the mainline traffic in order to maximize progression on the mainline.

Future 'No-Build' Traffic Conditions

The signalized intersections are expected to operate at an overall LOS D or better during the AM and PM peak hours with the exception of the intersections of the NC 16 Northbound Ramps and NC 16 Business on NC 73 during the PM peak hour. In addition, all intersection approaches are expected to operate at LOS E or better with the exceptions of the westbound approach of NC 73 [at the NC 16 Northbound Ramps], the northbound approach of the NC 16 Northbound Ramps [at NC 73], and the northbound approach of NC 16 Business [at NC 73] during the PM peak hour. As previously mentioned, greater delays and poorer levels of operation are not uncommon for side street approaches at traffic signals located in a coordinated signal system where precedence is typically given to the mainline traffic in order to maximize progression on the mainline.

Future 'Build' Traffic Conditions

The signalized intersections are expected to operate at an overall LOS D or better during the AM and PM peak hours with the exception of the intersections of the NC 16 Northbound Ramps and NC 16 Business on NC 73 during the PM peak hour. In addition, all intersection approaches are expected to operate at LOS E or better with the exceptions of the westbound approach of NC 73 [at the NC 16 Northbound Ramps], the northbound approach of the NC 16 Northbound Ramps [at NC 73], the northbound approach of the Lowe's West Access [at NC 73], and the northbound approach of NC 16 Business [at NC 73] during the PM peak hour. As mentioned previously, greater delays and poorer levels of operation are not uncommon for side street approaches at traffic signals located in a coordinated signal system where precedence is typically given to the mainline traffic in order to maximize progression on the mainline.

In to accommodate the additional traffic generated by the proposed development while also improving an unacceptable LOS F, mitigation improvements were identified at the intersection of NC 73 and the NC 16 Northbound Ramps as well as the intersection of NC 73 and the Lowe's/Wal-Mart West Access. With the addition of an exclusive westbound right turn lane on NC 73 [at the NC 16 Northbound Ramps] as well as the addition of an exclusive southbound right turn lane on the Wal-Mart West Access [at NC 73], the intersections and approaches are expected to operate at acceptable levels of operation, or have been mitigated to 'no-build' levels of operation or better.

Queuing Results

It appears that the existing and proposed turn lane storage and taper is adequate to accommodate anticipated queues during the peak hours. If it is expected to be exceeded, the difference is less than 50 feet (approximately 2 vehicles) when the 'build' conditions with improvements are compared to the 'no-build' conditions. However, there were some anomalies observed for the eastbound and westbound free-flowing right turn movements at the Lowe's/Wal-Mart accesses. As for the eastbound and westbound queues, the queues are not expected to extend back into adjacent signalized intersections on NC 73. Therefore, no additional mitigation was recommended at the study intersections.

9. RECOMMENDATIONS

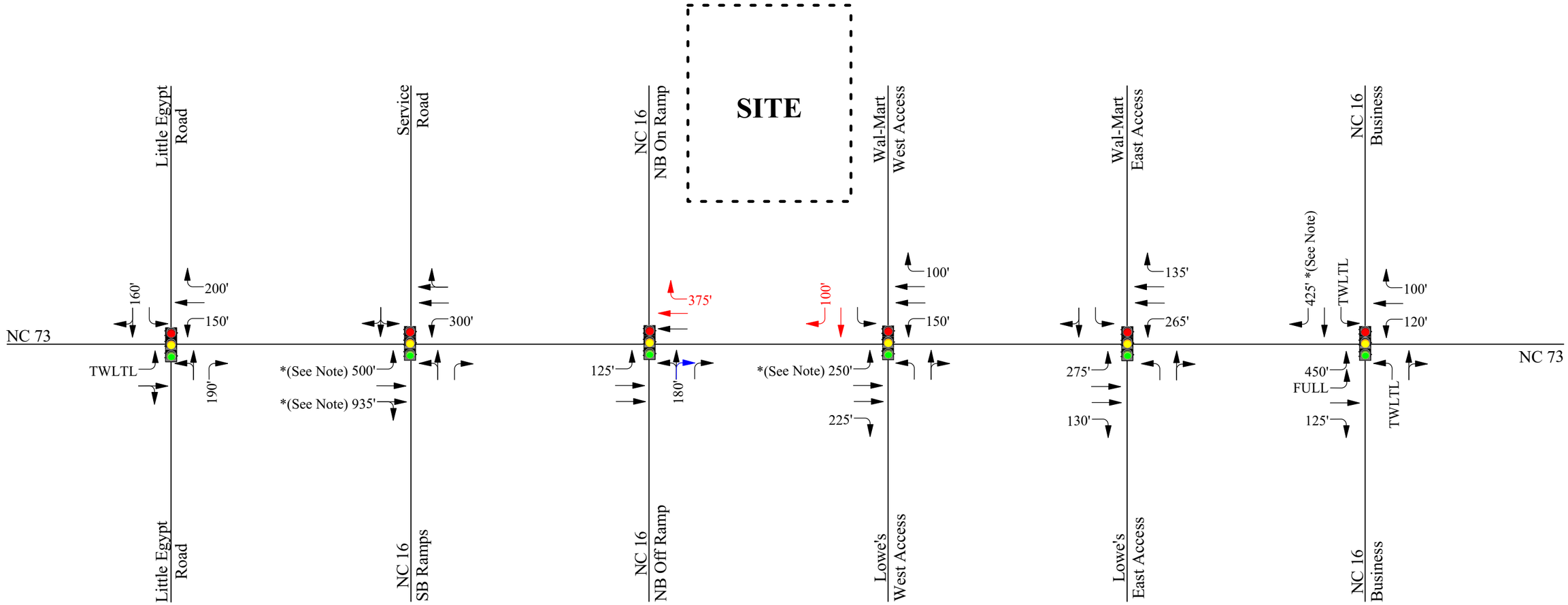
Based on the findings of this traffic impact analysis, the following geometric improvements have been identified to mitigate potential traffic impacts associated with the traffic generated by the proposed retail development. Refer to Figure 12 for an illustration of the recommended improvements.

Intersection of NC 73 and the NC 16 Northbound Ramps

- Construct an exclusive right turn lane on the westbound approach of NC 73. Provide a minimum of 375 feet of full right turn storage and 100 feet of bay taper.

Intersection of NC 73 and Lowe's/Wal-Mart West Access

- Construct an exclusive right turn lane on the southbound approach of the Wal-Mart access. Provide 100 feet of full right turn storage and 75 feet of bay taper.



*Note:
Due to limitations of Synchro software, the maximum input for taper lengths is 300'; therefore any taper length over 300' was added to the storage length.

LEGEND

- Signalized Intersection
- X' → Existing Lane Configuration and Storage Lengths (in feet)
- TWLTL Two-Way Left Turn Lane
- X' → Recommended Improvement based on NC 73 Mitigation Measures
- X' → Recommended Improvement based on Approved Development TIAs

N

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NC 73 Retail Center
Lincoln County, NC

Recommended Improvements

Not to Scale | Figure 12

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