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: August 16, 2019

Re: PD #2019-3
Ryan Companies US, Inc., applicant
Parcel ID# 32630, 78190 and 93419

The following information is for use by the Lincoln County Board of Commissioners and Planning Board at their joint meeting/public hearing on September 9, 2019.

REQUEST

The applicant is requesting the rezoning of 26 acres from CU PD-MU (Conditional Use Planned Development-Mixed Use) to PD-MU (Planned Development-Mixed Use) to amend the master plan for The Villages of Cowans Ford planned mixed-use development to permit a charter school for grades K-8 and an early childhood learning center.

A site plan, a traffic impact analysis and minutes from a community involvement meeting have been submitted as part of this application.

The proposed school and day care center would be accessed off Club Drive via an existing road, Rivers Edge Drive. A new exit-only driveway to return to Club Drive would be located between Rivers Edge Drive and N.C. 73.

The proposed amended plan does not specify a use for a 4.35-acre portion of the property that fronts on N.C. 73. Future use of this area would have to be approved through a plan amendment/public hearing process.

Under the master plan for The Villages of Cowans Ford that was approved in a parallel conditional use rezoning (PCUR #89) in 2003, the subject property is currently zoned for up to 90,000 square feet of commercial space, including a 60,000-square-foot center and six outparcels. Residential portions of the planned mixed-use development have been completed, but only a small portion of the commercial area has been developed. It contains a self-storage facility.

In addition to the commercial area, The Villages of Cowans Ford development was approved for 201 single-family homes and 30 town houses. The completed residential areas include the Treetops and Ballentrae subdivisions. The Villas of Cowans Ford town houses are under construction now.

Instead of applying to amend the master plan under the same process in which it was approved, the applicant agreed to request a rezoning in order to make the process legislative instead of quasi-judicial.

SITE AREA AND DESCRIPTION

The subject property is located on the northwest corner of N.C. 73 and Club Drive. A portion of the property is located within a Duke Energy transmission right-of-way and is not proposed for development. This property is located in the WS-IV Protected Area of the Mountain Island Lake watershed. The applicant is proposing to develop it under the low-density option, which allows up to 36% impervious surface.

The subject property is adjoined by property zoned CU PD-MU, R-T (Transitional Residential), R-SF (Residential Single-Family) and I-G (General Industrial). Land uses in this area include residential, recreational and commercial. The Lincoln County Land Use Plan designates the subject property as part of a Suburban Commercial Center, which is described as a shopping center that serves the daily needs of surrounding residential areas.

ADDITIONAL INFORMATION

Permitted uses
Under current CU PD-MU: up to 90,000 square feet of commercial space.
Under proposed PD-MU zoning: K-8 charter school, early childhood learning center

Adjoining zoning and uses
East: zoned CU PD-MU, patio homes and town homes.
South (opposite side of Club Drive): zoned I-G (General Industrial), multi-tenant commercial building and self-storage facility.
South (opposite side of N.C. 73): zoned R-T (Transitional Residential), residence and undeveloped property.
West: zoned R-T, residence and undeveloped properties.
North: zoned CU PD-MU and R-SF (Residential-Single Family), self-storage facility and golf course.

STAFF'S RECOMMENDATION

Staff recommends approval of the proposed rezoning. See proposed statement on following page.

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

Zoning Amendment

Staff's Proposed Statement of Consistency and Reasonableness

Case No. **PD #2019-3**

Applicant **Ryan Companies US, Inc.**

Parcel ID# **32630, 78190 and 93419**

Location **northwest corner of N.C. 73 and Club Drive**

Proposed amendment **rezone from CU PD-MU to PD-MU to amend the master plan for The Villages of Cowans Ford planned mixed-use development to permit a charter school for grades K-8 and an early childhood learning center**

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

This property is part of an area designated by the Land Use Plan as a Suburban Commercial Center, which is described as a shopping center that serves the daily needs of surrounding residential neighborhoods. The nonresidential uses specified in the rezoning plan will generate similar traffic volumes as a shopping center and will serve the educational and child care needs of surrounding residential neighborhoods.

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

This property is located along a main highway at a signalized intersection. Adequate stacking for dropping off and picking up students will be provided on the school site. A charter school will offer another educational option for families and reduce the need for the county to provide additional classrooms. An early childhood learning center at this location will provide a convenience for families who live in the area.

Planned Development Rezoning 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: Ryan Companies US, Inc

Applicant Address: 201 N. Franklin St, Suite 3500, Tampa, FL 33602

Applicant Phone Number: 813-204-5025

Property Owner Name:
A: The Denver Group, LLC
B: James and Barbara Sifford
C: The Denver Group, LLC

Property Owner Address:
A: PO BOX 587, Denver, NC 28037
B: 2972 Reynolds Sq, Winston Salem, NC 27106
C: PO BOX 587, Denver, NC 28037

Property Owner Phone Number: _____

PART II

Property Location: Northwest Corner of NC Hwy 73 and Club Dr

Property ID (10 digits):
A: 4611297468
B: 4611292759
C: 4611393623

Property size:
A: 10.834 Acres
B: 11.205 Acres
C: 4.327 Acres

Parcel # (5 digits):
A: 78190
B: 32630
C: 93419

Deed Book(s):
A: 1289
B: 515
C: 1289

Page(s):
A: 791
B: 62
C: 791

PART III

Existing Zoning District:
A: CU PD-MU
B: CU PD-MU
C: PD-MU

Proposed Zoning District:
A: PD-MU
B: PD-MU
C: PD-MU

Briefly describe how the property is being used and any existing structures.
All parcels are currently undeveloped, wooded area

Briefly described the proposed planned development.
Proposed K-8 charter school, early learning center and associated infrastructure

***SEE PLANNING DEPT. FOR PLANNED DEVELOPMENT FEES.**

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

Applicant's Signature _____ Date 07-08-19

Summary of neighborhood meeting for rezoning application

for a proposed Charter School and ELC

Date: 2019-08-01

Location: East Lincoln Community Center

8160 Optimist Club Road, Denver, NC

Meeting started at 7:00 pm

Attendees:

Presenters and/or answering questions:

Nick Diamond (Nick) – Red Apple Development

Max Bosso (Max) – Ryan Companies

Chris Bostic (Chris) -Kimley Horn

Dillon Turner (Dillon) – Kimley Horn

Randy Hawkins (Randy) – Lincoln County

In addition, approximately 100 residents attended the meeting (list of attendees attached)

Also, in attendance where the following County Commissioners:

Commissioner Bud Cesena

Commissioner Milton Sigmon

Commissioner Richard Permenter

Following is a list of questions and comments made during the meeting:

Nick – General Introduction

Ryan Companies US, Inc.
201 North Franklin Street, Suite 3500
Tampa, FL 33602

p: 813-204-5000
ryancompanies.com

Max – Introduction of project as a whole and introduced consultants

Dillon – explained in general the proposed NCDOT project along 73.

Opened the floor to questions:

Q1 – Why have the project entrance through Rivers edge?
Response Max - As directed by NCDOT after first 2 options were turned down.
Dillon – Explained traffic as a whole, including proposed improvements by NCDOT

Q2 – Will NCDOT improvements be done regardless of the school coming online?
Response - Dillon -YES

Q3 – Where is the U-turn on 73?
Response - Dillon - Just east of Treetops Drive

Q4 – What can be done about people speeding along Club Drive?
Response – Max – Perhaps you want to get the Police department involved

Q5 – Why was this particular property chosen for the Charter School?
Response - Nick – We looked at several properties in the area, at least 10-12; and after internal meetings, this was the parcel that made the most sense

Q6- Why 40% of students from Mecklenburg County, will Mecklenburg contribute taxes into the project?
Response - Nick - This is a charter school not private and it is open to all students in NC.
NOTE – Following the neighborhood meeting, CSUSA reviewed the enrollment of the West Lake Temporary school facility and it revealed 83% of the students are from Lincoln County. The balance is equally distributed between Mecklenburg, Gaston, and Catawba Counties. Most likely the families that are coming from outside the county work in Lincoln County. Additionally, 50% of the enrollment are siblings making a difference in estimated traffic.

Statement/Q7 – A resident spoke about traffic in the general area. Also asked about existing zoning
Response – Randy – Existing zoning allows for up to 90,000 SF of retail/commercial

Q8 – How are people going to be able to exit Ballentrae?
Response - Dillon – Explained the outcome of the study and how peak hour traffic works and its comparison to the acceptable LOS

Q9 – Where can I get a copy of the traffic study?
Response - Max – From NCDOT, the traffic study is now public record

Q10- Similar Question as Q7

Q11 – Similar Question as Q7, including a comment about the power lines.

Q12 – Why this site? – Similar to question Q5– Why not go in the highway NC 16 area?
Response - Nick – Similar answer as Q5, We looked at about 10 sites in the area you mentioned, but none worked out for various reasons

Q13 – Is the sheriff going to be building in the empty parcel?
Response - Nick – No, not that we know of, the corner parcel has not been put for sale.

Q14 – Can you use the land under the power lines for development?
Response - Chris – No, not even for parking

Q15 – What can we do to prevent the school from happening?
Response - Randy – Talk to your County Commissioners, they are the ones who ultimately will approve or deny the rezoning application.

Statement - Commissioner Cesena spoke and made a statement on how the process works, explained about the public hearing (Lincoln County BOCC) on September 9 at 6:30pm. Also explained how charter schools work, how they are built, and how they function financially

Q16 – What are the peak times, when does the school start and stop; is it year-round?
Response - Nick – School does not operate year-round, only operates during standard Lincoln County school year and start. Pick up and drop off times will be staggered by 30 minutes. Actual times will be determined by the Principal. We also have early drop off as well as after care facilities, therefore, not everyone will be there at the same time.

Statement – A resident stated schools are needed and you have to have a school for the children.

Q17 – A resident read a paragraph form the Traffic Impact Analysis (TIA) related to trip generation and asked where we are in the process?
Response - Dillon – responded with were current status is indicating it has been submitted to NCDOT for their review and we are currently waiting for comments

Q18 – Asked about the widening of the bridge on 73?
Response - Max – directed them to NCDOT and reiterated we are not involved with NCDOT project, or its design/construction

Q19 - Asked if the NC CSUSA board president is Danny Hester.
Response - Nick – Confirmed, yes, Danny Hester is CSUSA NC board president

Q20 – What happens if the rezoning is not approved and will the school would no longer going to be built with a denial of the rezoning?
Response – Nick – Correct, without rezoning, there will not be a school built at this location

Q21 – How many students the school opens with and can eventually become a high school?
Response - Nick -k-6 will only be open during the first year. Number of students will vary depending on enrollment. Typically, that number varies between 300 students to 550 students. As far as expanding this school to be a high school, there is not enough space on this property to expand this project to be a high school.

Q22 – What is the exact boundary of the property?

Response - Max showed on the screen where the overall boundary is

Q23 – What is the total amount of traffic for the school.
Response - Dillon –

Q24 – what are the benefits to have the school in the neighborhood?
Response - Commissioner Sigmon – The charter school will alleviate the county's need to spend taxpayers' money to build additional classrooms.

Q25 – Is the number of student population provided for both the Charter School and the ELC or for the Charter School only, also what happens with stormwater runoff from this site?
Response - Chris - Explained that the site drains in two directions. The western half drains to the creek to the west and the eastern half drains under Club Drive. The overall impervious coverage on the site is considered low density per County regulations and does not require storm water treatment devices.

Q26 – Similar Question as Q6
Response – Commissioner Cesena - If this school is not built, the Lincoln County School Board will need to build another school in the very near future.

Comment – Resident - Thanking us for being here along with commissioners present and Randy H. Also made a comment about traffic bottle neck and another comment about the need for more schools in Lincoln County. HE also commented on the location chose for the school and the proximity to the nuclear plant.

Comment – Resident - About how long and how much this proposed school does really help the Lincoln County School system

Comment – Resident - about public schools Vs public charter school

Q27 – How does CSUSA get their funding?
Response - Nick – Explained the funding for the development/construction is 100% private; while operation funding for the child's education is funded by the state.

Q28 – another similar traffic questions as previously asked.
Response - Dillon - explained again how the TIA works

Q29 – How does the school affect surrounding property values
Response – Nick – typically families want to move and live near K-8 schools.

Q30 – Does the school have an emergency plant should something happen to the nuclear plant?
Response – Max – All CSUSA schools have an emergency preparedness plan

Meeting adjourned at approximately 9:10 pm

PD #2019-3 Ryan Companies US, Inc., applicant
proposed charter school and early children development center
08/01/2019 community involvement meeting

Attendees	Please Print		
Name:	**Address:**	**Phone #:**	**E-Mail:**
Tom CAMPBELL	7939 LAKE VISTA DR	704 596 4164	JTOMCAMPBELL@GMAIL.COM
Jim SIFFORD	2972 Reynolda Rd Winston Salem	336-413-1585	JSIFFORD@TRIAD.RR.COM
Frank Sifford	6138 Carriagehouse Ln. Charlotte 28226	704-365-8540	siffordfr@att.net
Joe & Maureen Collins	7864 BALLENTRAE PL.	704-918-7372	Tmcollins8@yahoo.com
Taylor Vasek	832 Lemond Ln	843-810-3609	
Steve Marinelli	8152 Waterford Dr	7046219312	STEVEE.MARINELLI@GMAIL.COM
MARILYN & WAYNE GWYN	7882 BALLENTRAE P	704-576 3251	MAGWYN48@GMAIL.COM
Beattie Armstrong	7748 Turnberry LN	704-852-3850	YACHTHPA@AOL.COM
Cindy Forlines	8020 Sandustin Ln	980-253-0428	CYCLIDAS@Roadrunner.com
[illegible]	7964 Salt Springs Dr	-0-	-0-
TERESA & KARL Beardsley	8879 Hagers Ferry Rd.	704-489-8283	tdbeardsley@yahoo.com
WAYNE & MARGIE LEWIS	8008 BROADMOOR LN	(704)363-7918	WLEWIS@REAGAN.COM
Jeff & Pam Bundy	7712 Turnberry Lane	704-577-4960	bundy1jl@charter.net
John Anderson	OWNER - BALLENTRAE	7047408008	johnd@andersonproperties
Glenn Jones	7996 NC 73 Hwy	704-617-568	
KELLIN & SHARON RYAN	7540 TURNBERRY LN	704-820-0936	KRYAN@USASOFTBALL.COM
Nathen & Kariann Ellis	7924 Glen Abbey Circle Stanley	704-534-4466	nathen.ellis@gmail.com
Joe & Christy Kielbasa	1335 Strawberry Lane Denver 28037	704-473-2658	jckielbasa26@charter.net
Mark & Cindy Lingerfelt	7899 Ballentrae Pl Stanley	704-996-6352	cflingerfelt@gmail.com

PD #2019-3 Ryan Companies US, Inc., applicant
proposed charter school and early children development center
08/01/2019 community involvement meeting

Attendees	Please Print		
Name:	**Address:**	**Phone #:**	**E-Mail:**
James Dean	7692 Bermuda Hills	—	[illegible]@yahoo.com
Sharlee Boyte	7897 Ballentrae PL		ksboyte@gmail.com
Susan A. Hess	7891 Ballentrae PL	—	asakhit@aol.com
Peggy Cavin	7988 Sandestin Lane		pnc8701@aol.com
Mike Rink	7988 Sandestin Lane		mikesmail@mindspring.com
Keith Sipe	8021 Turnberry Lane		Dermanksipe@gmail.com
Gwtha + Andy Strand	3033 Three Wood Dr.		
Rocky Mehlig	1170 eaglecrest Dr		
Okendh Stevens	250 Mulligan		hstevens2816@gmail
Buddy Foster	250 Mulligan Ln		Buddy@Smoke-ez.com
JOHN FORNDAS	8020 SANDESTIN LANE		J4LIDAS@OUTLOOK.COM
Mark Keener	7871 Ballentrae PL		rmkeener57@gmail.com
Patti Keener	✓	✓	pkeener60@gmail.com
Heather Jordan	8150 NC 73 Hwy	704-996-5509	Heather Jordan 2014@hotmail.co
Madlin Cable	8057 LUCKY CREEK	704 277 3226	MACABLE@CHARTER.NET
Margie & John Hedley	8890 Hagers Ferry Rd		margiehedley@bellsouth.net
Perry : Karen Clark	7735 Turnberry Ln.		cperrykaren@bellsouth.net
Ron & Ann Scudder	7901 Ballentrae	704 2016609	AFS0930@gmail.com
Mike + Lisa Smith	7758 Turnberry Lane	704-822-9533	MAJOR6405@Bellsouth.net
Terry Tunbyfill	221 Cowans Ford Rd	704-827-0766	dlisenvicesinc@yahoo.com
Gary Peterson	1082 Shoreline Dr	704 516 0095	petersongandl@bellsouth.net

PD #2019-3 Ryan Companies US, Inc., applicant
proposed charter school and early children development center
08/01/2019 community involvement meeting

Attendees

Please Print

Name:	Address:	Phone #:	E-Mail:
Michelle Lucas-Hood	7854 Ballentrae PL	832 240 6755	MLUCASHOOD@ yahoo.com
Keith Hood	" "	346-9006870	KEITHHOOD5@yahoo.com
Robin & Jim Konieczny	1022 Shoreline Dr. Stanley NC	704 651 2452	JimJKonieczny@Gmail.com
Charles McDonald	7686 Turnberry Lane	704-822-8104	McDonald9152@bellsouth.net
Tim Holder	2998 Lakeshore Rd S		timholder@gmail.com
Kay Killian	1624 Killian Rd S	704-827-4211	Killianfarm@gmail.com
Rick Hampton	8121 Hwy 27, Stanley	704/614-0592	richard.h.hampton@[illegible]
Crystal Glenn	1013 Club Dr Stanley	(704) 483-4985	clglenn@mindspring.com
Jimmy Glenn	1013 Club Dr Stanley	704 483 4985	jiglenn@earthlink.net
Scott Brannan	761 Club Dr. Stanley 28164	(704) 576-5434	scott@cowansford.com

PD #2019-3 Ryan Companies US, Inc., applicant
proposed charter school and early children development center
08/01/2019 community involvement meeting

Attendees	Please Print		
Name:	**Address:**	**Phone #:**	**E-Mail:**
E. + K. Davidson	8044 Sandestin Ln	980 304-4352	Eric@2020leadership.com
Jill Martin	1338 Strawberry Ln	704-619-6970	DJilla71@hotmail.com
Debbie Tesso	7767 Turnberry Ln	301-465-0541	thejesses@msn.com
Jamie Hoaser			
Doug Talbert		704-884-4401	
Milton Sigmon	L C Comm		
Anne Bias	7934 Ravenwood Ln	704-894-0997	-
Meredith Berry	7991 Prestwick Ln	704-827-5554	
Darren Smith	7654 Turnberry Ln	704-458-4005	

Lincoln County, NC

Office of the Tax Administrator, GIS Mapping Division

Date: 8/1/2019 Scale: 1 Inch = 400 Feet

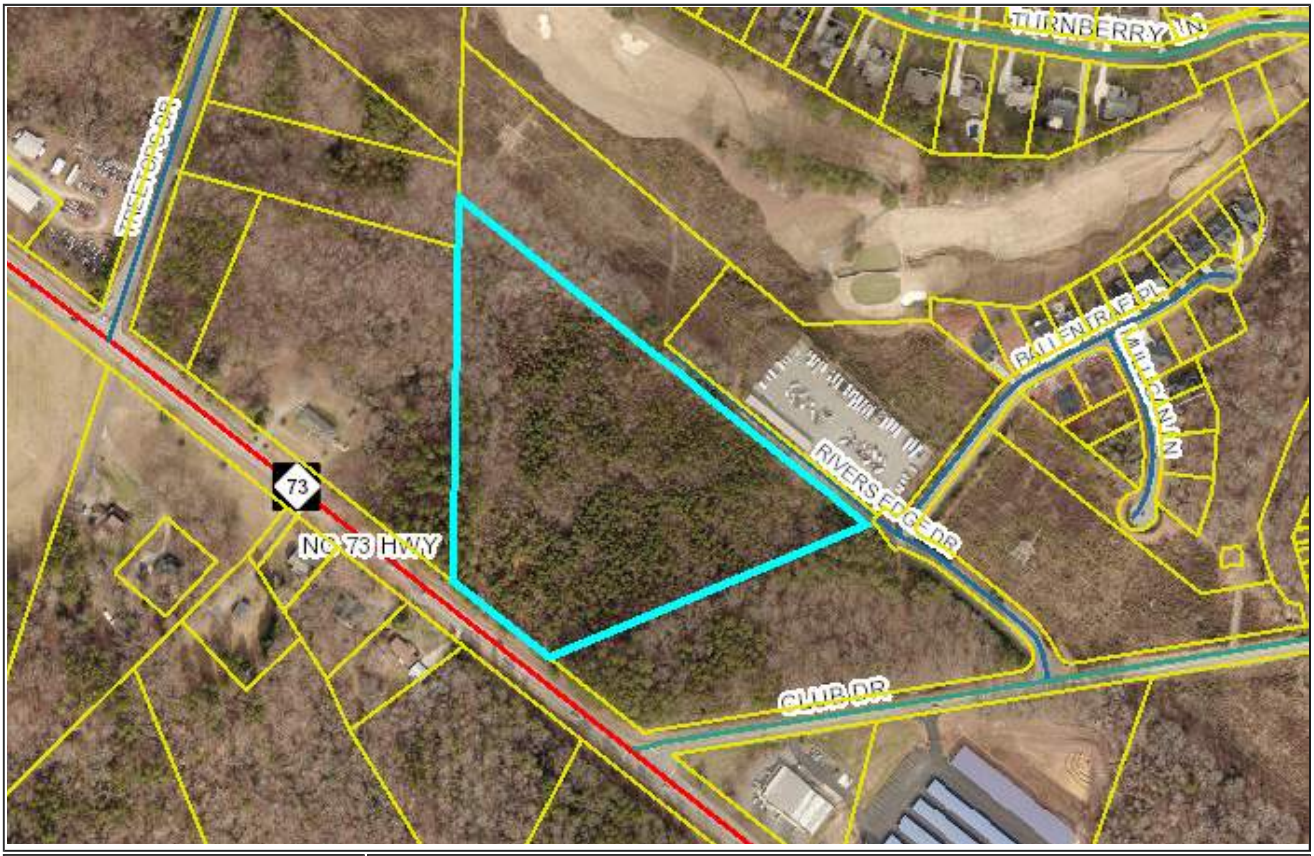


Photo Not Available

Parcel ID	32630	**Owner**	SIFFORD JAMES C SIFFORD BARBARA S		
Map	4611	**Mailing**	2972 REYNOLDS SQ		
Account	19818	**Address**	WINSTON SALEM, NC 27106-5545		
Deed	515 62	**Last Transaction Date**	01/01/1992	**Sale Price**	$0
Plat		**Subdivision**		**Lot**	
Land Value	$227,936	**Improvement Value**	$0	**Total Value**	$227,936
Previous Parcel					

-----All values for Tax Year 2019 -----

Description	SIFFORD LD			**Deed Acres**	11.5
Address	NC 73 HWY			**Tax Acres**	11.205
Township	CATAWBA SPRINGS		**Tax/Fire District**	EAST LINCOLN	
Main Improvement				**Value**	
Main Sq Feet		**Stories**		**Year Built**	

Zoning District	**Calc Acres**	**Voting Precinct**	**Calc Acres**
PD-MU	11.21	CF19	11.21

Watershed	**Sewer District**
11.21	11.21

Census County	**Tract**	**Block**	
109	071102	2017	11.21

Flood	**Zone Description**	**Panel**	
X	NO FLOOD HAZARD	3710461200	3.02
X	NO FLOOD HAZARD	3710461100	8.19

Lincoln County, NC

Office of the Tax Administrator, GIS Mapping Division

Date: 8/1/2019 Scale: 1 Inch = 400 Feet

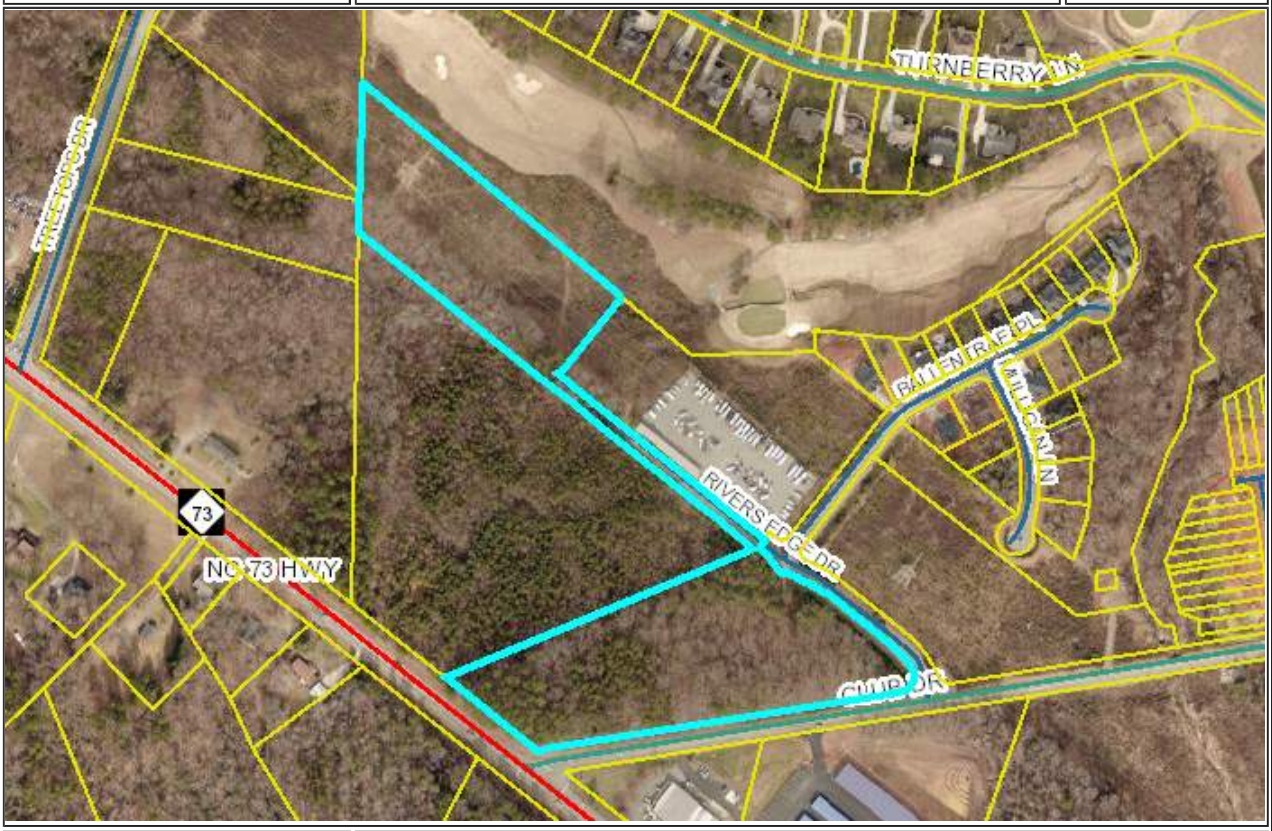


Photo Not Available

Parcel ID	78190	**Owner**	DENVER GROUP LLC THE		
Map	4611	**Mailing**	P O BOX 587		
Account	0155378	**Address**	DENVER, NC 28037		
Deed	1289 791	**Last Transaction Date**	11/07/2001	**Sale Price**	$0
Plat	11 242	**Subdivision**	CLUB ROAD	**Lot**	3
Land Value	$303,464	**Improvement Value**	$0	**Total Value**	$303,464
Previous Parcel	56212				

-----All values for Tax Year 2019 -----

Description	PT#3 TRACT CLUB ROAD SUB	**Deed Acres**	0
Address	CLUB DR	**Tax Acres**	10.834
Township	CATAWBA SPRINGS	**Tax/Fire District**	EAST LINCOLN
Main Improvement		**Value**	
Main Sq Feet	**Stories**	**Year Built**	

Zoning District	Calc Acres	Voting Precinct	Calc Acres
PD-MU	10.83	CF19	10.83

Watershed		Sewer District	
	10.83	SEWER	10.83

Census County	Tract	Block	
109	071102	2021	0.1
109	071102	2017	9.55
109	071102	2018	1.18

Flood	Zone Description	Panel	
X	NO FLOOD HAZARD	3710461200	4.26
X	NO FLOOD HAZARD	3710461100	6.58

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: 8/1/2019 Scale: 1 Inch = 400 Feet

Photo Not Available

Parcel ID	93419	**Owner**	DENVER GROUP LLC THE		
Map	4611	**Mailing**	P O BOX 587		
Account	0155378	**Address**	DENVER, NC 28037		
Deed	1289 791	**Last Transaction Date**	11/07/2001	**Sale Price**	$0
Plat	17 37	**Subdivision**	THE DENVER GROUP LLC	**Lot**	2
Land Value	$21,527	**Improvement Value**	$0	**Total Value**	$21,527
Previous Parcel	84462				

-----All values for Tax Year 2019 -----

Description	#2 THE DENVER GROUP LLC			**Deed Acres**	4.325
Address	CLUB DR			**Tax Acres**	4.327
Township	CATAWBA SPRINGS	**Tax/Fire District**	EAST LINCOLN		
Main Improvement				**Value**	
Main Sq Feet		**Stories**		**Year Built**	

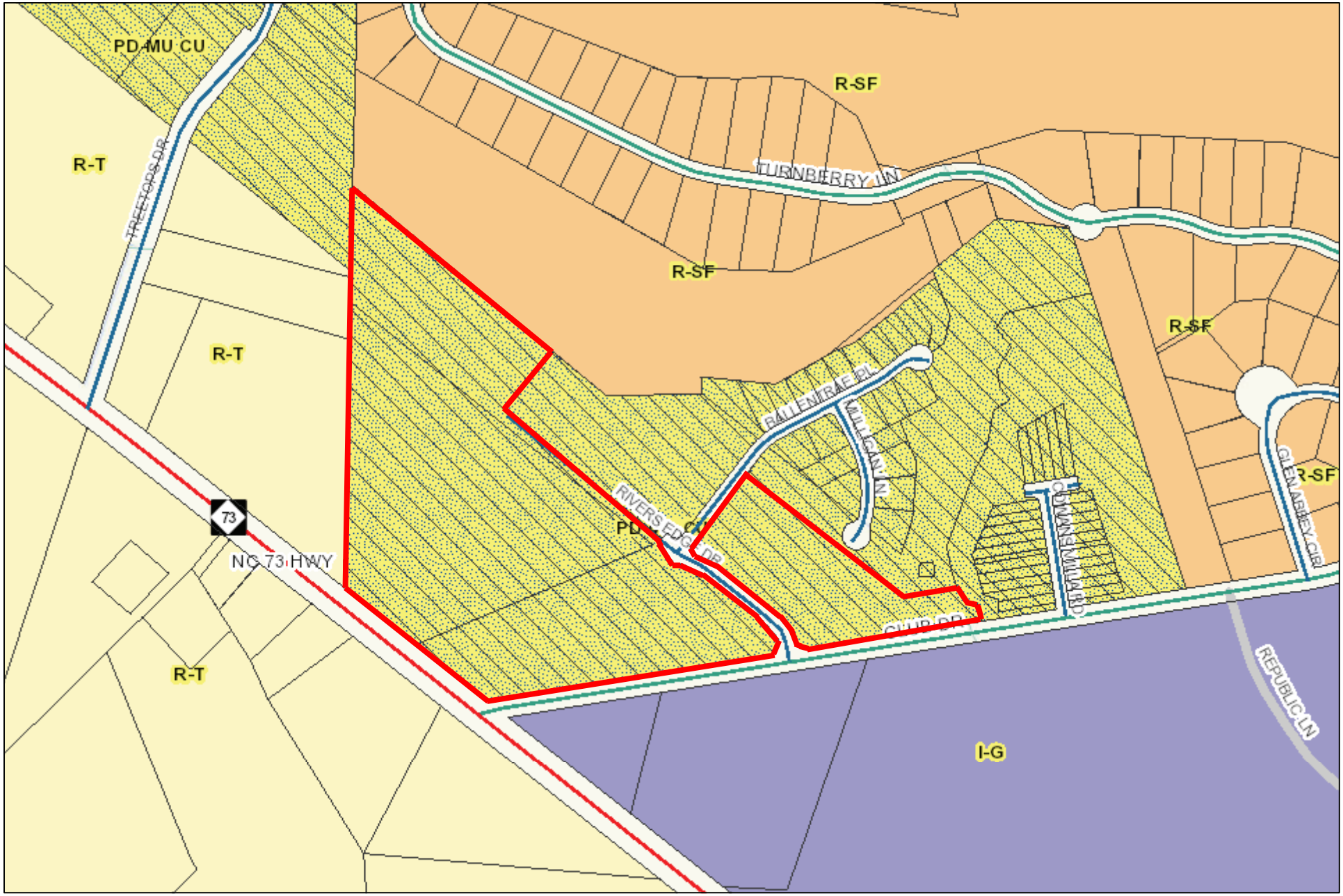
Zoning District	Calc Acres	Voting Precinct	Calc Acres
PD-MU	4.33	CF19	4.33

Watershed		Sewer District	
	4.19	SEWER	4.33
	0.14		

Census County	Tract	Block	
109	071102	2021	1.72
109	071102	2017	0.01
109	071102	2018	2.6

Flood Zone	Description	Panel	
AE	SPECIAL FLOOD HAZARD AREA BASE ELEVATION DETERMINED - 100 YEAR	3710461100	0.45
X	NO FLOOD HAZARD	3710461100	3.87

PD #2019-3
subject property is outlined in red



July 12, 2019

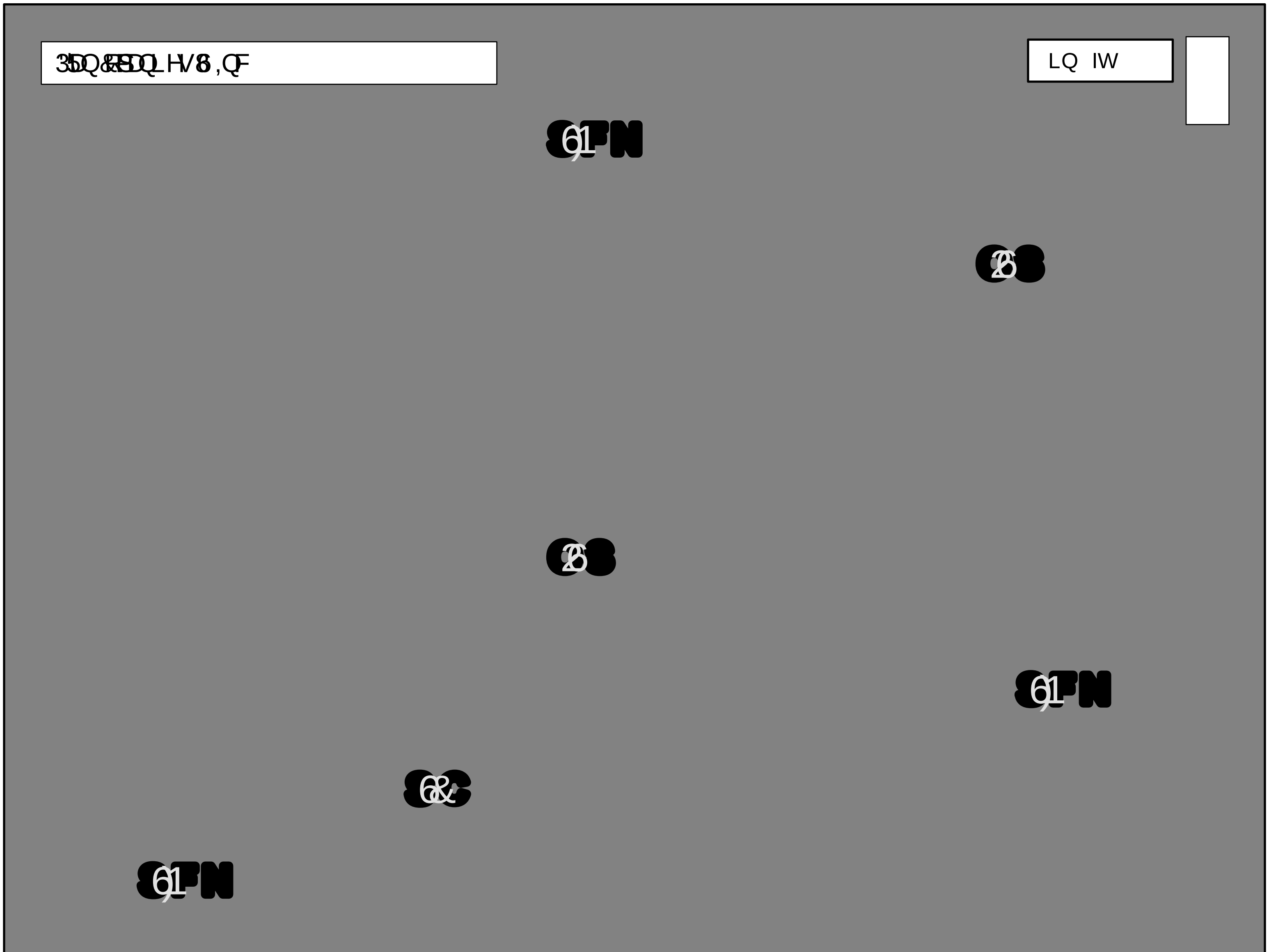
Esri., Inc., Lincoln County, NC

0 100 200 Feet

1 inch = 400 feet

3ODQ&RPSDQLHV8 ,QF

LQ IW



/DQG8VH3ODQ

- 2SHQ6SDFH 6
- 5XUDO LYLQJ 5
- ,QGXVWULDO &HQWHU ,&
- DUJHORW 5HVLGHQWLDO 5
- 6LQJOHIDPLO\1HLJKERUKRRG 61
- 0XOWLIDPLO\1HLJKERUKRRG 10
- 5XUDO &RUULGRUV 5&
- 6XEXUEDQ&RPPHUFLDO 6&
- 6XEXUEDQ2IILFH 62
- 6SHFLDO'LVWULFW 6
- DONDEOH1HLJKERUKRRG1:
- DONDEOH$FWLYLW\&HQWHU&

6D

3DUFHO ,'

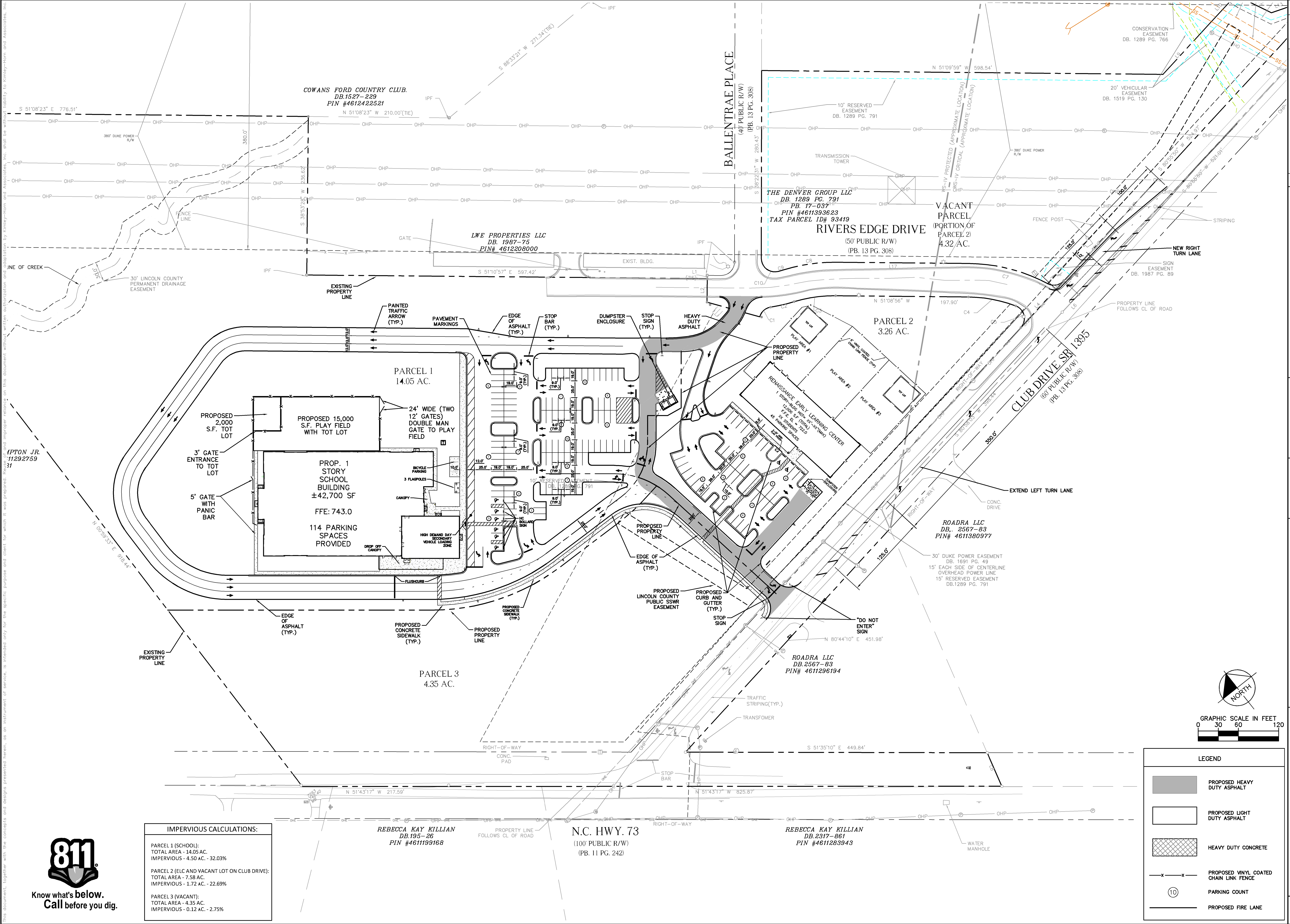
3URSHUW\ORFDWLRQV

/LQFROQ&RXQW\
3ODQQLQJ,QVSHFWLRQV
1 $GDPV6W
6LWH$
/LQFROQWRQ 1&

6HH$WWDFKHG$SSOLFDWLRQ IRU 3DUFHO ,QIRUPDWLRQ

3URSHUW\ORFDWLRQV 2XWOLQHG LQ *UHHQ

3URSHUW\ORFDWLRQV



IMPERVIOUS CALCULATIONS:
PARCEL 1 (SCHOOL): TOTAL AREA - 14.05 AC. IMPERVIOUS - 4.50 AC. - 32.03%
PARCEL 2 (ELC AND VACANT LOT ON CLUB DRIVE): TOTAL AREA - 7.58 AC. IMPERVIOUS - 1.72 AC. - 22.69%
PARCEL 3 (VACANT): TOTAL AREA - 4.35 AC. IMPERVIOUS - 0.12 AC. - 2.75%

LEGEND

- PROPOSED HEAVY DUTY ASPHALT
- PROPOSED LIGHT DUTY ASPHALT
- HEAVY DUTY CONCRETE
- PROPOSED VINYL COATED CHAIN LINK FENCE
- PARKING COUNT
- PROPOSED FIRE LANE

No.	REVISIONS	DATE	BY

Kimley-Horn

421 FAYETTEVILLE STREET, SUITE 600, RALEIGH, NC 27601
PHONE: 919-677-2000 FAX: 919-677-2050
WWW.KIMLEY-HORN.COM
#F-0102

KHA PROJECT 012587030
DATE 07/31/2019
SCALE AS SHOWN
DESIGNED BY ---
DRAWN BY ---
CHECKED BY ---

SITE PLAN

WEST LAKE PREP. ACADEMY
PREPARED FOR
RYAN COMPANIES US, INC.
LINCOLN COUNTY NORTH CAROLINA

SHEET NUMBER
C2.0

Traffic Impact Analysis Update for
Lincoln Charter School
Lincoln County, North Carolina

Prepared for:

Ryan Companies US, LLC
Tampa, Florida

Prepared by:

Kimley-Horn and Associates, Inc.
200 South Tryon Street
Suite 200
Charlotte, North Carolina 28202
#F-0102

July 2019
012587030

TABLE OF CONTENTS

List of Figures

List of Tables

1.0 Executive Summary

The purpose of this Traffic Impact Analysis (TIA) is to review vehicular traffic impacts as a result of the proposed Lincoln Charter School. The primary objectives of the study are:

- To estimate trip generation and distribution for the proposed development.
- To perform intersection capacity analyses for the identified study area.
- To determine the potential traffic impacts of the proposed development.
- To develop recommendations for needed roadway and operational improvements to accommodate the proposed development's traffic impacts.

The proposed Lincoln Charter School site is planned to be located in the northeast quadrant of the Club Drive at NC 73 intersection in Denver, North Carolina. As currently envisioned, the proposed charter school will ultimately consist of 765 students for grades K-8 with a 12,000 square foot early learning center outparcel. The owner of the site desires to stagger the start times for grades K-5 and 6-8 for the school. For the purposes of this TIA, a student population of 510 students was analyzed for grades K-5, because that would be the heaviest loading of students in the hour. The teachers for grades K-8 were included in the K-5 analysis as well as the 12,000 square foot early learning center.

This traffic study analyzes the impact of the proposed Lincoln Charter School on the study area network.

The development is anticipated to be completed (built-out) in 2020. Based on the site layout, the proposed development will be accessed via the following driveways:

- Site Access #1 - One ingress only located off of Rivers Edge Drive
- Site Access #2 - One egress only located on Club Drive

This TIA evaluates the traffic operations under 2019 existing conditions, 2020 no-build conditions, and 2020 build-out conditions during the AM and PM peak hours at the following intersections in addition to the proposed access points discussed above:

- Hagers Ferry Road at N Pilot Knob Road
- Hagers Ferry at NC 16 Business
- NC 73 at Pilot Knob Road
- NC 73 at Club Drive
- Club Drive at Rivers Edge Drive
- Rivers Edge Drive at proposed Site Access #1
- Club Drive at proposed Site Access #2

Per the attached NCDOT scoping document improvements from NCDOT projects W-5601 Q and R-5721A were included in the 2020 background and 2020 build-out conditions.

Kimley-Horn and Associates, Inc. was retained to determine the potential traffic impacts of this development and recommendations for transportation improvements required to meet anticipated traffic demands in conjunction with the development. This TIA was developed according to NCDOT MSTA Guidelines.

Based on the capacity analyses and turn-lane warrants, the following improvements are recommended to mitigate the impacts associated with the school:

N. Pilot Knob Road at Hagers Ferry Road

- Construction of a roundabout
- Construction of a southbound left-turn lane for the roundabout
  - This improvement allows for a project v/c of less than 0.85 for 20 or more years
- This roundabout should be coordinated with the NCDOT project team for W-5601Q.

NC 73 at Club Drive

- If right-turn on red is not allowed for the southbound right-turn movement for NCDOT project R-5721A, dual southbound right-turn lanes are recommended so that the spillback from the southbound right-turn volume does not block the egress only (Access #2) for the site.

Club Drive at Rivers Edge Drive

- Extend the northbound left-turn lane from 125' to 350' with an appropriate taper length
- Construction of southbound right-turn lane with a minimum storage of 125' with an appropriate taper length.

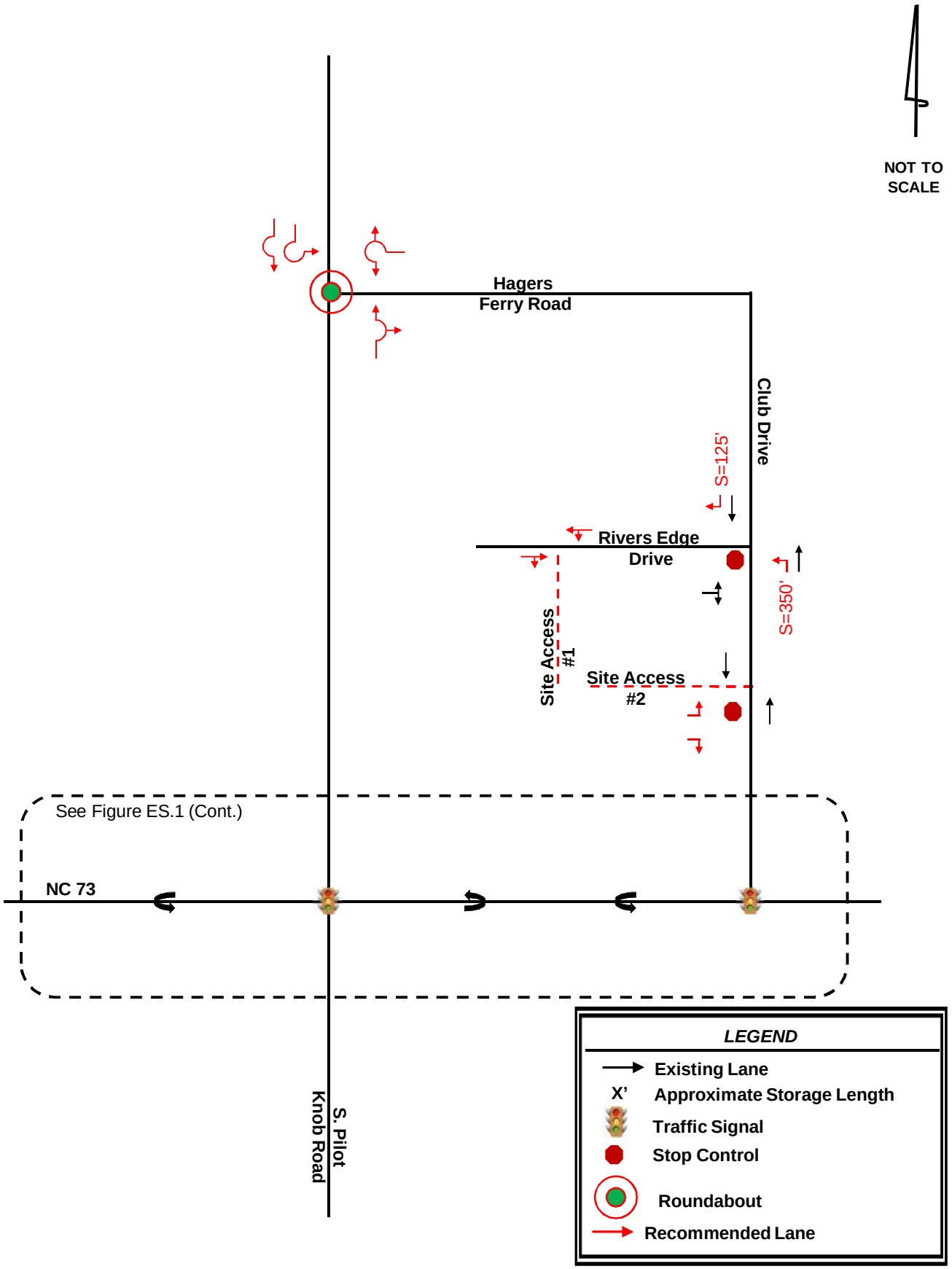
Club Drive at Site Access #2

- Construction of two egress lanes exiting the proposed site.

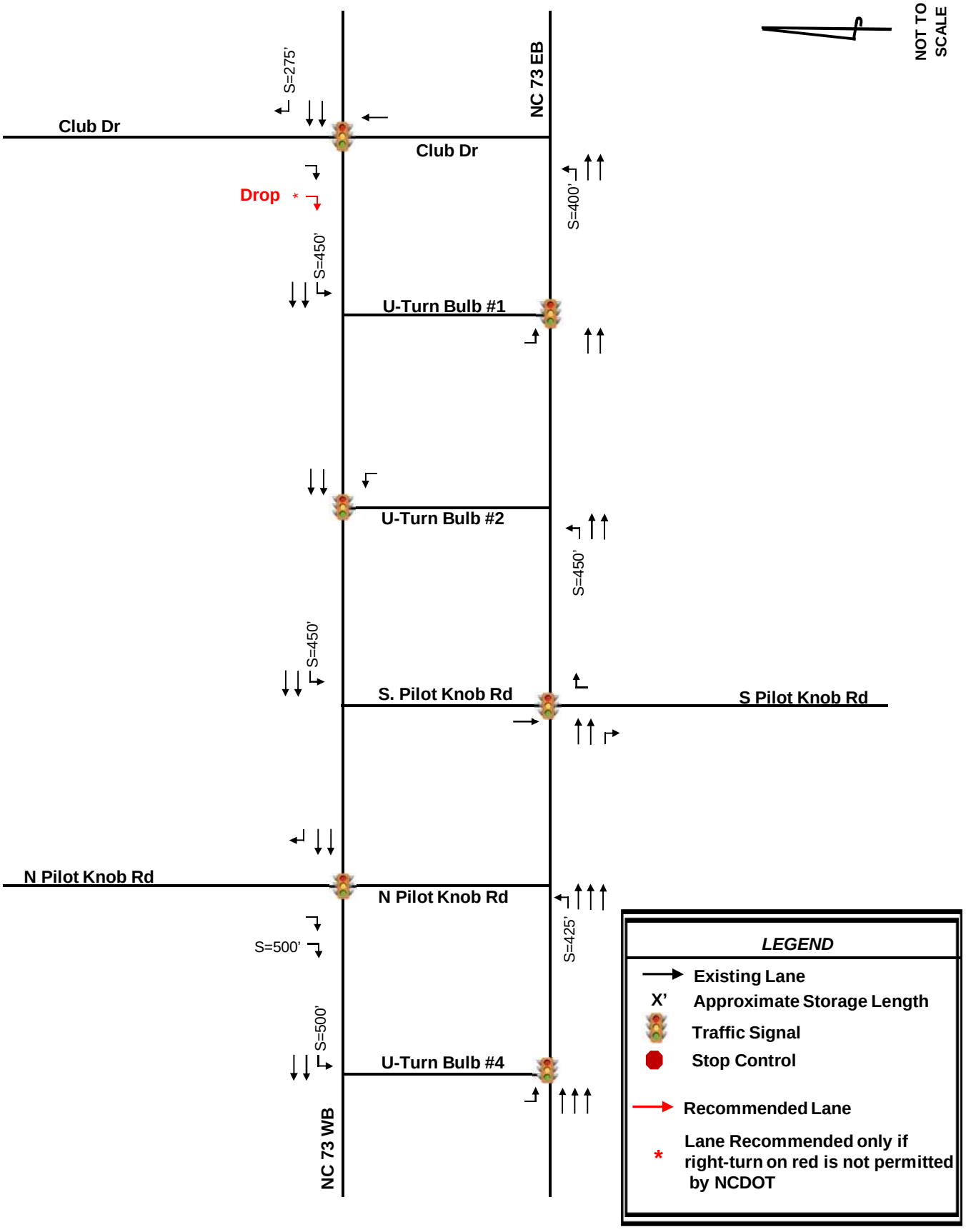
Per NCDOT MSTA guidelines the total onsite queuing should accommodate 4,241 feet for the high demand volume for grades K-8 for 765 students. Please note the high demand is for 765 students (full enrollment) and not 510 students (staggered start) in the situation that there is an event for the entire school.

The 2020 build-out recommendations at the study intersections are shown in Figure ES-1. The transportation improvements shown on this figure are subject to approval by NCDOT. All additions and attachments to the State and County roadway system shall be properly permitted, designed and constructed in conformance to standards maintained by the agencies.

The site operational plan, which shows the desired school drop-off, pick-up, high demand queues, total onsite queuing, operation restrictions, and proposed improvements for the offsite roadways is shown in Figure ES-2.



Kimley»Horn	Lincoln Charter School Traffic Impact Analysis	2020 Build-Out Improvements	Figure ES-1



Kimley»Horn	Lincoln Charter School Traffic Impact Analysis	2020 Build-Out Improvements	Figure ES-1 (Cont.)

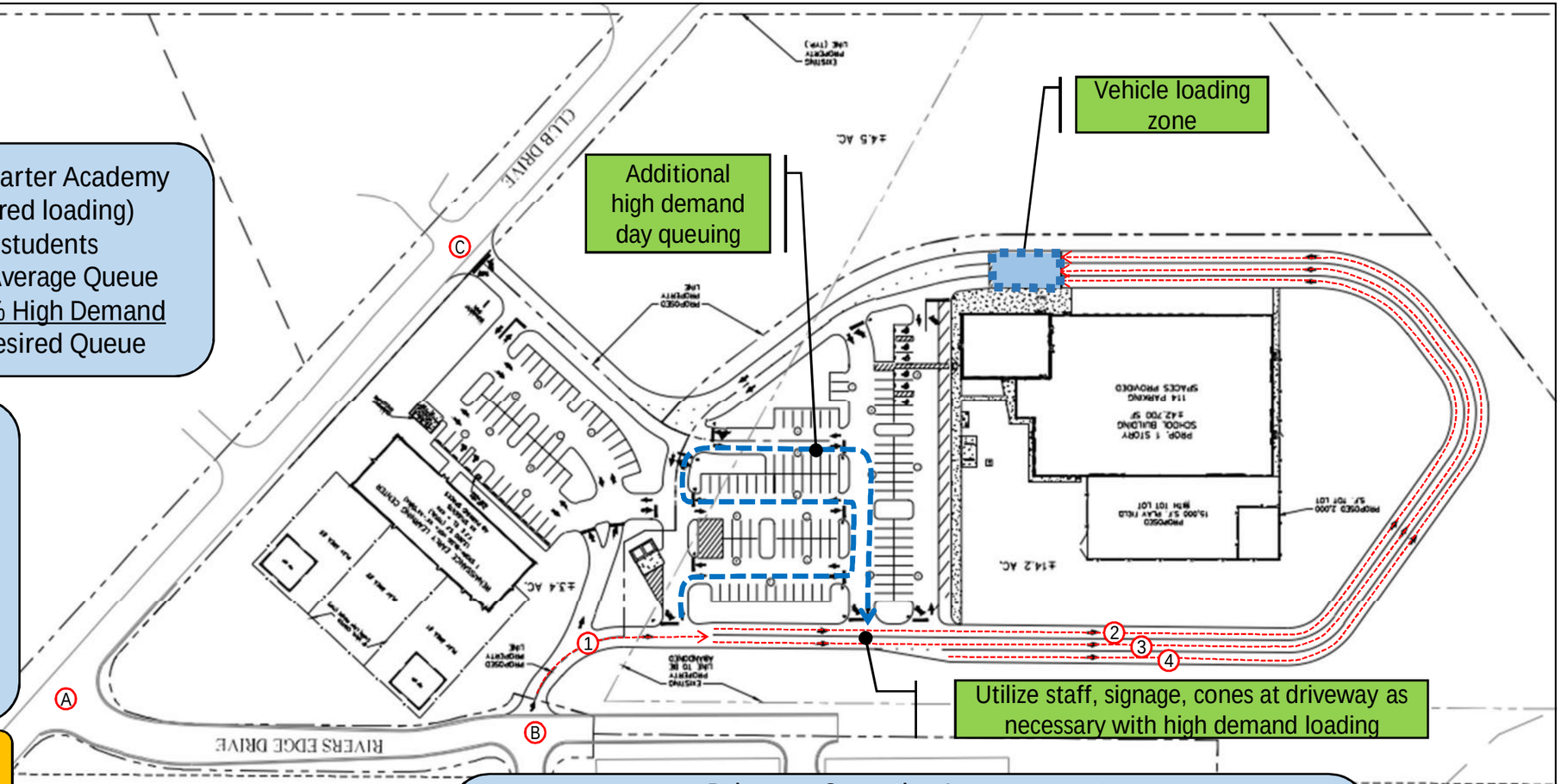
Lincoln Charter Academy
(full site loading)
765 Student Population
3,262 Feet Average Queue
979 Feet 30% High Demand
4,241 Desired Queue

Lincoln Charter Academy
(staggered loading)
510 students
2,175 ft Average Queue
652 ft 30% High Demand
2,827 Desired Queue

Average Day Queuing
The site layout provides:
Lane 1 – 200 ft
Lane 2 – 1,275 ft
Lane 3 – 1,275 ft
Lane 4 – 1,125 ft
3,875 ft Average Day Queue Provided

High Demand Day Queuing
The site layout provides:
Lane 1 – 810 ft additional queuing

Total on-site provided stacking (average + high demand) = 4,660 feet



Campus Operations Restrictions

- 30 minute staggered schedule:
  - Grades k-5 with 510 maximum students starting at 8:00 am
  - Grades 6-8 with 255 maximum students starting at 8:30 am
- Operator will provide before and after school program to accommodate the staggered schedule
- Vehicle Loading zone will load a maximum of 6 cars at one time (3 lanes by 2 vehicles deep)
- Appropriate on-campus traffic control will be utilized (staff, cones, signage) to handle high demand day operations

Driveway Operation Improvements

Ⓐ Northbound left-turn lane with 350 feet of storage and appropriate taper
Southbound right-turn lane with 125 ft of storage and appropriate taper

Ⓑ Entrance only driveway

Ⓒ Dedicated right and left-turn exiting lanes

Kimley»Horn	Lincoln County Charter School Traffic Impact Analysis	Site Operational Plan	Figure ES-2

2.0 Introduction

The proposed Lincoln Charter School site is planned to be located in the northeast quadrant of the Club Drive at NC 73 intersection in Denver, North Carolina. As currently envisioned, the proposed charter school will ultimately consist of 765 students for grades K-8 with a 12,000 square foot early learning center outparcel. The owner of the site desires to stagger the start times for grades K-5 and 6-8 for the school. For the purposes of this TIA, a student population of 510 students was analyzed for grades K-5, because that would be the heaviest loading of students in the hour. The teachers for grades K-8 were included in the K-5 analysis as well as the 12,000 square foot early learning center.

The development is anticipated to be completed (built-out) in 2020. Based on the site layout, the proposed development will be accessed via the following driveways:

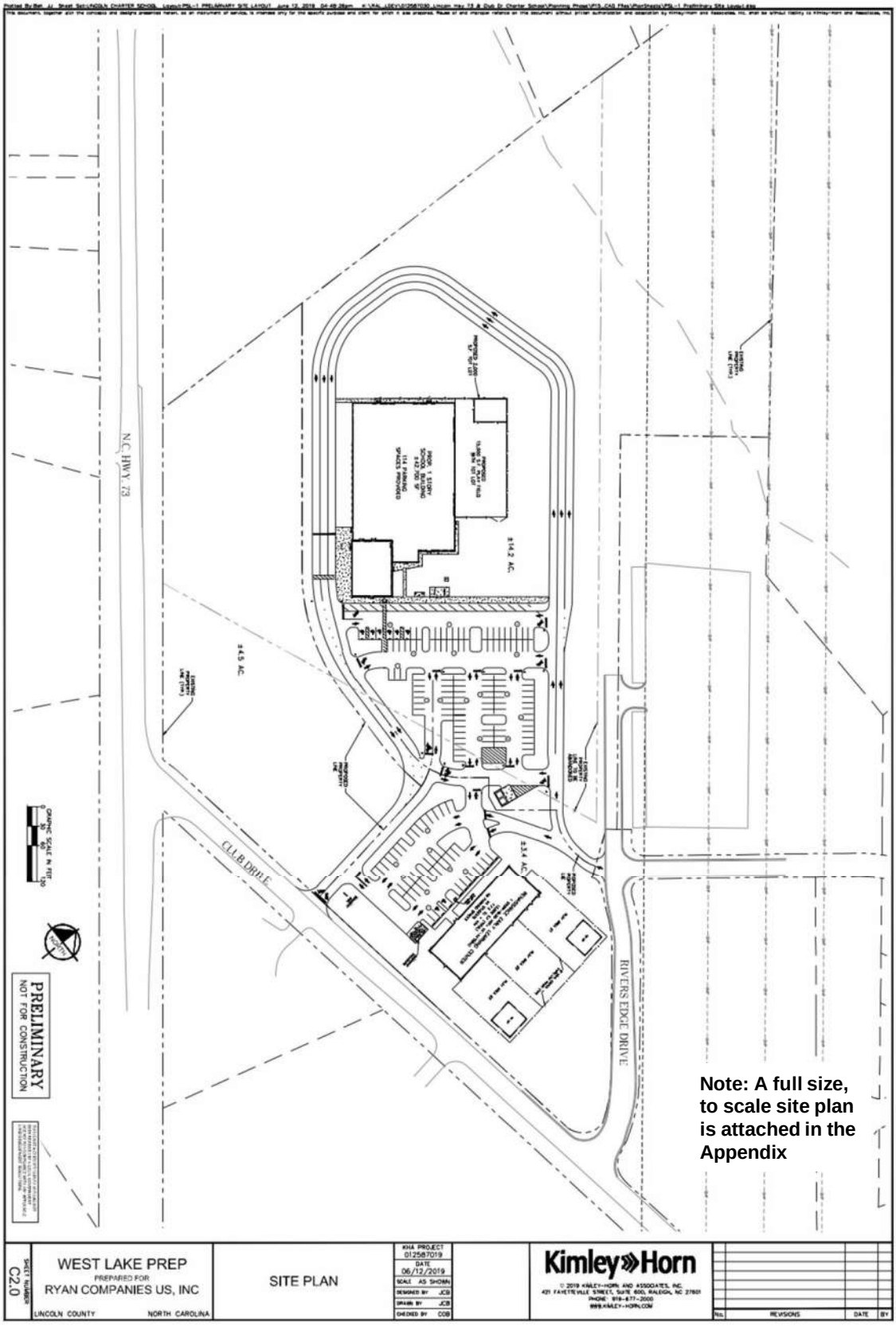
- Site Access #1 - One ingress only located off of Rivers Edge Drive
- Site Access #2 - One egress only located on Club Drive

This TIA evaluates the traffic operations under 2019 existing conditions, 2020 no-build conditions, and 2020 build-out conditions during the AM and PM peak hours at the following intersections in addition to the proposed access points discussed above:

- Hagers Ferry Road at N Pilot Knob Road
- Hagers Ferry at NC 16 Business
- NC 73 at Pilot Knob Road
- NC 73 at Club Drive
- Club Drive at Rivers Edge Drive
- Rivers Edge Drive at proposed Site Access #1
- Club Drive at proposed Site Access #2

Per the attached NCDOT scoping document improvements from NCDOT projects W-5601 Q and R-5721A were included in the 2020 background and 2020 build-out conditions.

Kimley-Horn was retained to determine the potential traffic impacts of this development and identify transportation improvements that may be required to accommodate these impacts in accordance with the traffic study guidelines in the *NCDOT Congestion Management Guidelines, NCDOT MSTA Guidelines,* and *NCDOT Policy on Street and Driveway Access*. This report presents trip generation, distribution, capacity analyses, and recommendations for transportation improvements required to mitigate anticipated traffic demands produced by the subject development. The specific TIA scope and methodologies are based on the NCDOT TIA Need Screening and NCDOT TIA Scoping Checklist signed on 6/3/2019 by NCDOT Division 12, District 3.



Kimley»Horn	**Lincoln Charter School Traffic Impact Analysis**	**Site Plan**	**Figure 2.1**

3.0 Existing Traffic Conditions

3.1 STUDY AREA

Figure 3.1 shows the site location map, and **Figure 3.2** shows the existing roadway geometry at the study intersections.

The primary existing roadways in the vicinity of the site are NC 16 Business, NC 73, Hagers Ferry Road/Club Drive, and Pilot Knob Road.

NC 16 Business is a three-lane roadway classified by NCDOT as a minor arterial, with a posted speed limit of 45 miles per hour (mph) in the vicinity of the site. NC 16 Business has a 2017 average annual daily traffic (AADT) volume of 21,000 vehicles per day (vpd) at NCDOT Count Station 5400010, located North of N Pilot Knob Road.

NC 73 is a two-lane roadway classified by NCDOT as a principal arterial, with a posted speed limit of 45 miles per hour (mph) in the vicinity of the site. NC 73 has the following 2017 average annual daily traffic (AADT) volumes:

- 28,000 vpd west of NC 16 (NCDOT Count Station 540012)
- 17,000 vpd east of NC 16 (NCDOT Count Station 5400014)
- 20,000 vpd west of Club Drive (NCDOT Count Station 5400015)

Hagers Ferry Road turns into Club Drive approximately 900' north of Waterford Drive. Both Hagers Ferry Road and Club Drive are two-lane local roadways with posted speed limits of 45 mph. Hagers Ferry Road has a 2017 NCDOT AADT of 3,800 vpd at NCDOT Count Station 5401620 east of N. Pilot Knob Road. Club Drive has a 2016 NCDOT AADT of 2,500 vpd north of NC 73 at NCDOT Count Station 5401625.

Pilot Knob Road is a two-lane roadway classified by NCDOT as local roadway, with a posted speed limit of 45 mph in the vicinity of the site. Pilot Knob Rod has a 2015 AADT of 5,800 vpd south of Hagers Ferry Road at station number 5401621 and a 2016 AADT of 4,600 vpd south of NC 73 at station number 5401623.

3.2 EXISTING TRAFFIC CONDITIONS

Existing traffic counts were collected on Thursday, May 16, 2019 from 7:00-9:00 AM and 2:00-4:00 PM at the intersections of:

- NC 73 at Club Drive
- NC 73 at Pilot Knob Road
- NC 16 Business at Pilot Knob Road (not in study area)

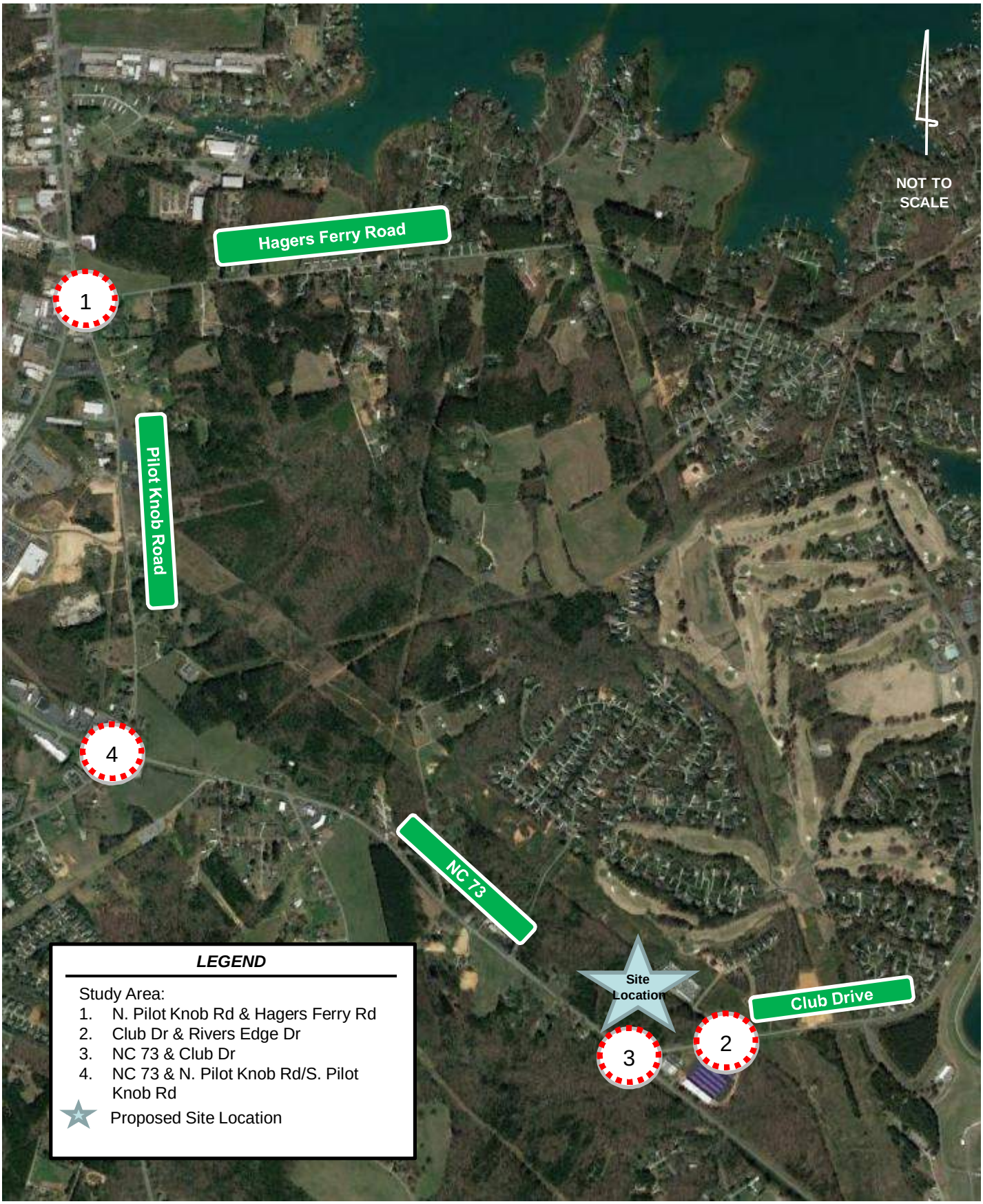
Additional existing traffic counts were collected on Tuesday, June 4, 2019 from 7:00-9:00 AM and 4:00 PM at the intersections of:

- Club Drive at Rivers Edge Drive
- N Pilot Knob Road at Hagers Ferry Road
- NC 16 Business at Hagers Ferry Road
- NC 16 Business at Pilot Knob Road (not in study area)

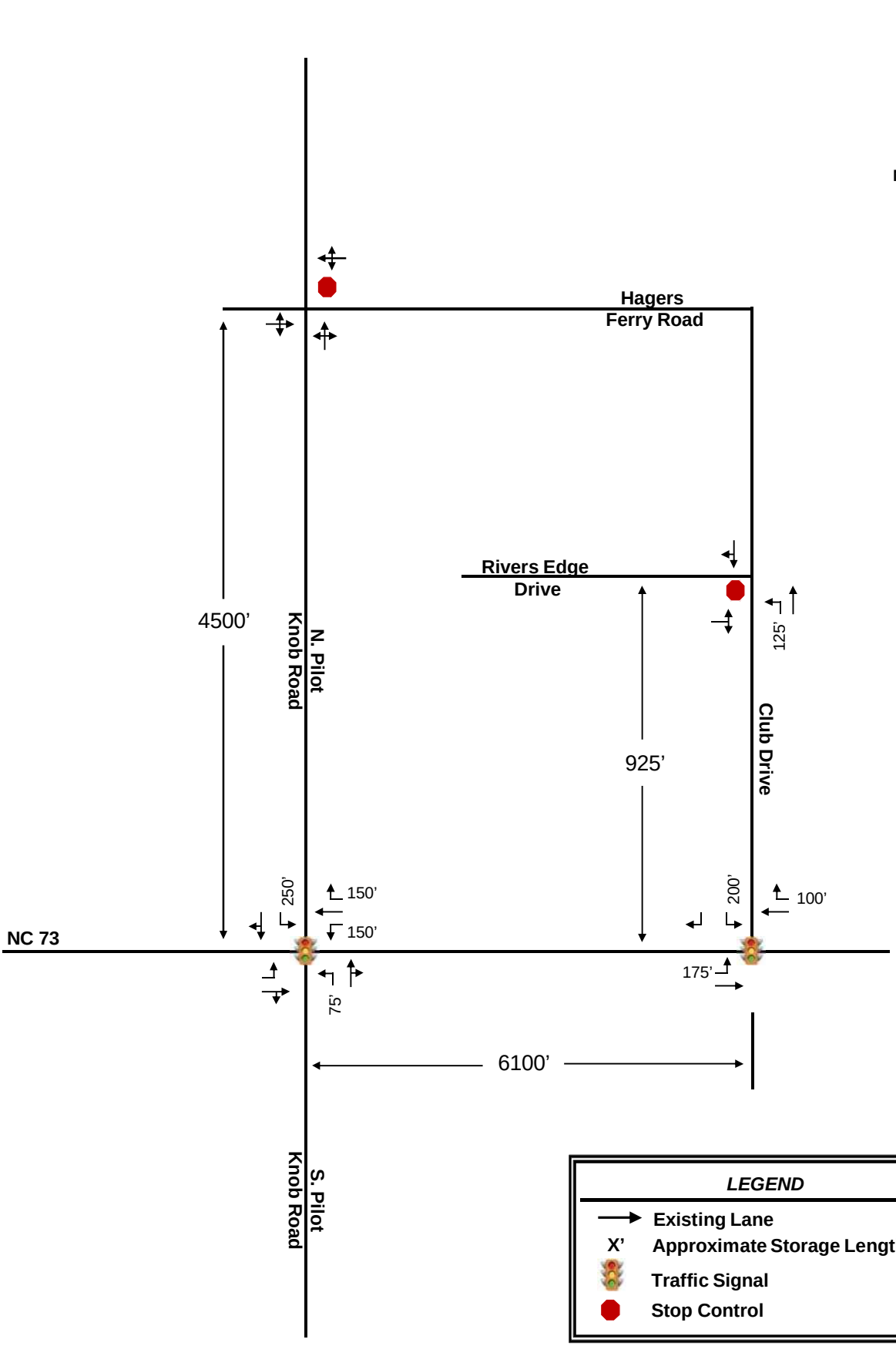
The intersection of NC 16 Business at Pilot Knob Road was used to normalize the intersection counts collected on June 4, 2019 since the June 4,2019 counts were close to school being out. The counts at the intersection of NC 16 Business at Pilot Knob Road were 5% higher on May 16, 2019 than on June 4, 2019; therefore, all the counts collected on June 4, 2019 were grown by 5% to account for school traffic. This methodology was approved via a conference call on May 23, 2019 by NCDOT Division 12, District 3 and NCDOT MSTA before proceeding with this analysis.

Since the counts for this site were collected for another study, NCDOT MSTA agreed they did not need to be in 5-minute intervals on the May 23, 2019 conference call.

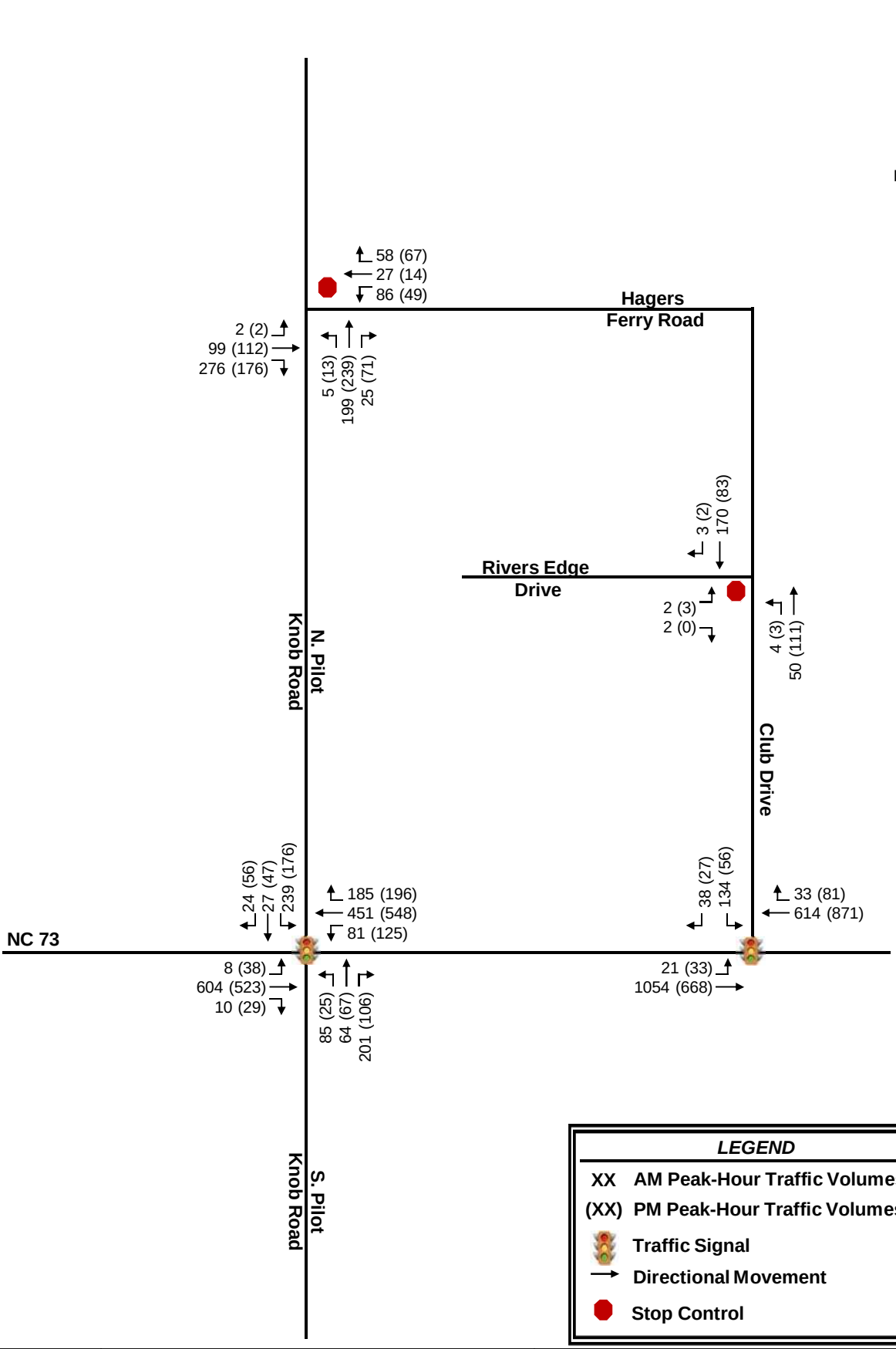
Figure 3.3 illustrates the 2019 existing AM and PM peak-hour traffic volumes.



Kimley»Horn	**Lincoln Charter School Traffic Impact Analysis**	**Study Area/ Site Location**	**Figure 3.1**



Kimley»Horn	**Lincoln Charter School Traffic Impact Analysis**	**Existing Roadway Laneage**	**Figure 3.2**



Kimley»Horn	**Lincoln Charter School Traffic Impact Analysis**	**2019 Existing Peak-Hour Traffic Volumes**	**Figure 3.3**

4.0 No-Build Traffic Conditions

Projected no-build (non-project) traffic is defined as the expected growth or change in traffic volumes on the surrounding roadway network between the year the existing counts were collected and the expected build-out year absent the construction and opening of the proposed project. This includes both non-specific general growth based on historical increase in local traffic volumes (historical no-build growth) and specific growth in traffic volumes caused by specific approved developments within the relative vicinity of the proposed development. The specific TIA scope and methodologies are based on the NCDOT TIA Need Screening and NCDOT TIA Scoping Checklist signed on 6/3/2019 by NCDOT Division 12, District 3.

4.1 HISTORICAL GROWTH TRAFFIC

A 2% annual growth rate was used to develop the 2020 no-build peak hour traffic volumes based on NCDOT AADT counts at NCDOT Count Station 5400015 along NC 73.

4.2 APPROVED OFFSITE DEVELOPMENT TRAFFIC

No approved developments were analyzed for this TIA per the direction of NCDOT.

4.3 PLANNED TRANSPORTATION PROJECTS

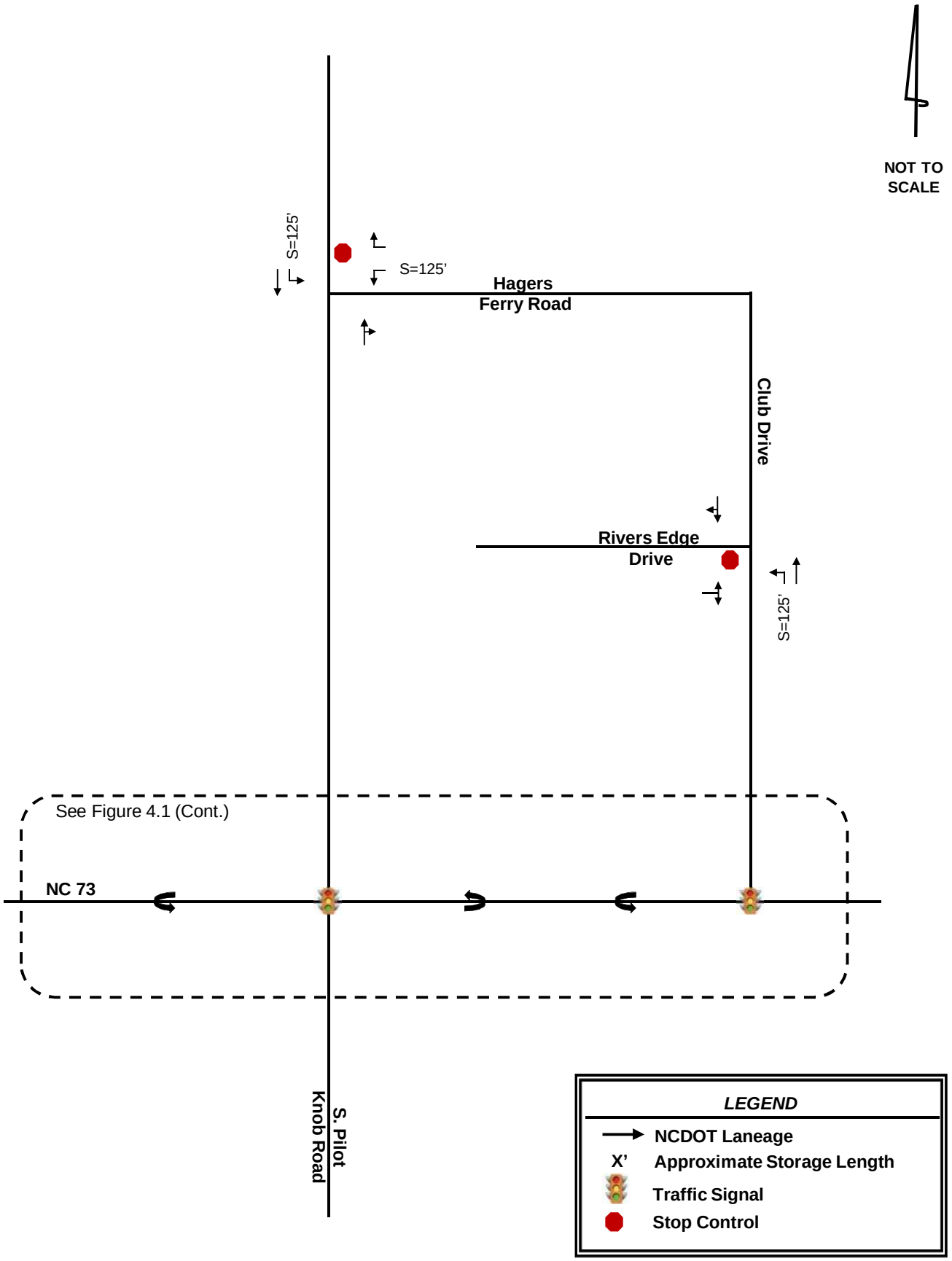
There are two TIP projects that were considered in the 2020 no-build and 2020 build analysis.

1. W-5601Q - Reconfigure the intersection of Hagers Ferry Road at NC 16 Business. The project is anticipated to let in the Spring of 2019.
2. R-5712A – Convert NC 73 into a reduced conflict street (previously called a super street).

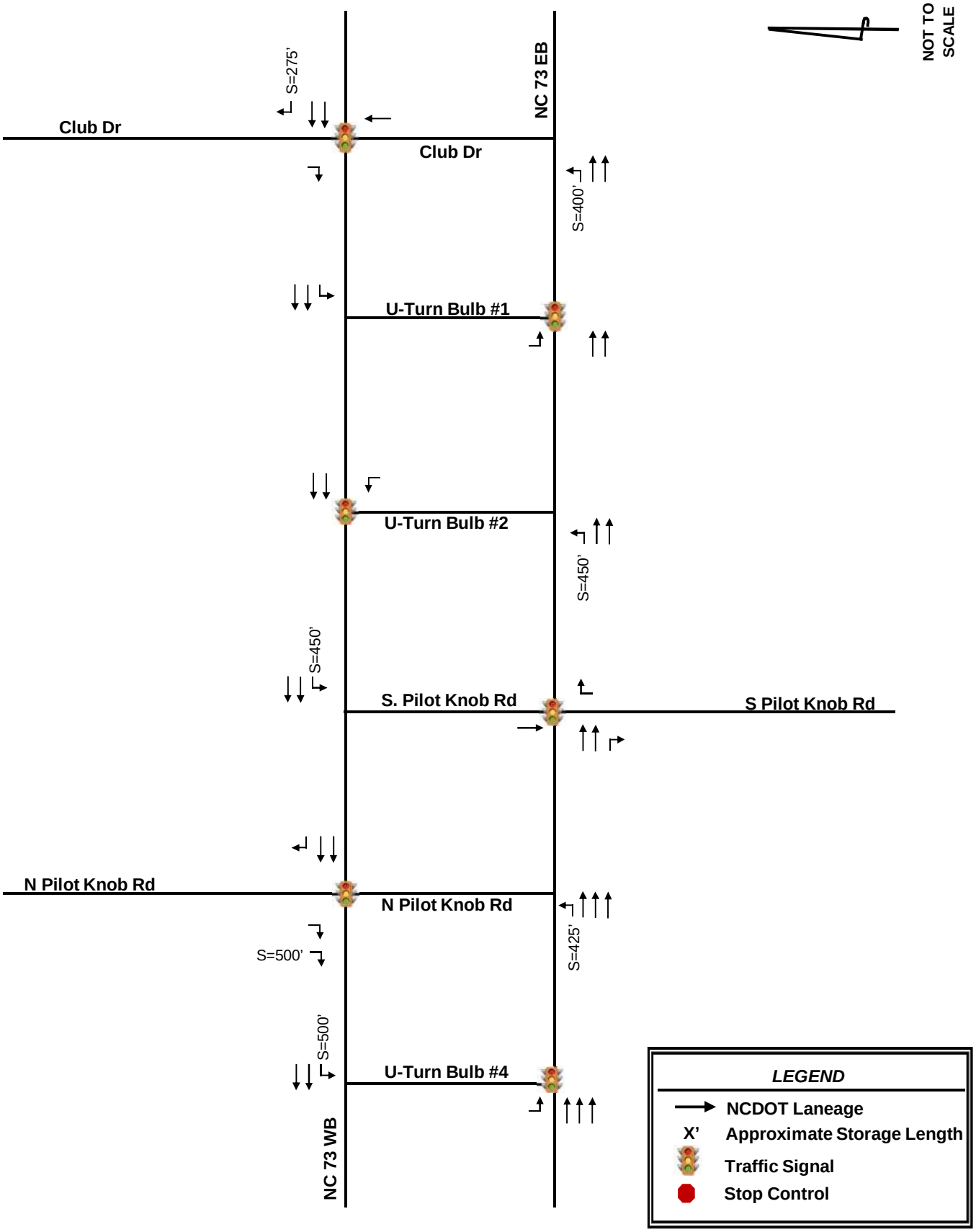
Plans for these projects are included in the Appendix. Figure 4.1 shows the anticipated background laneage with these two projects.

4.4 2020 NO-BUILD TRAFFIC

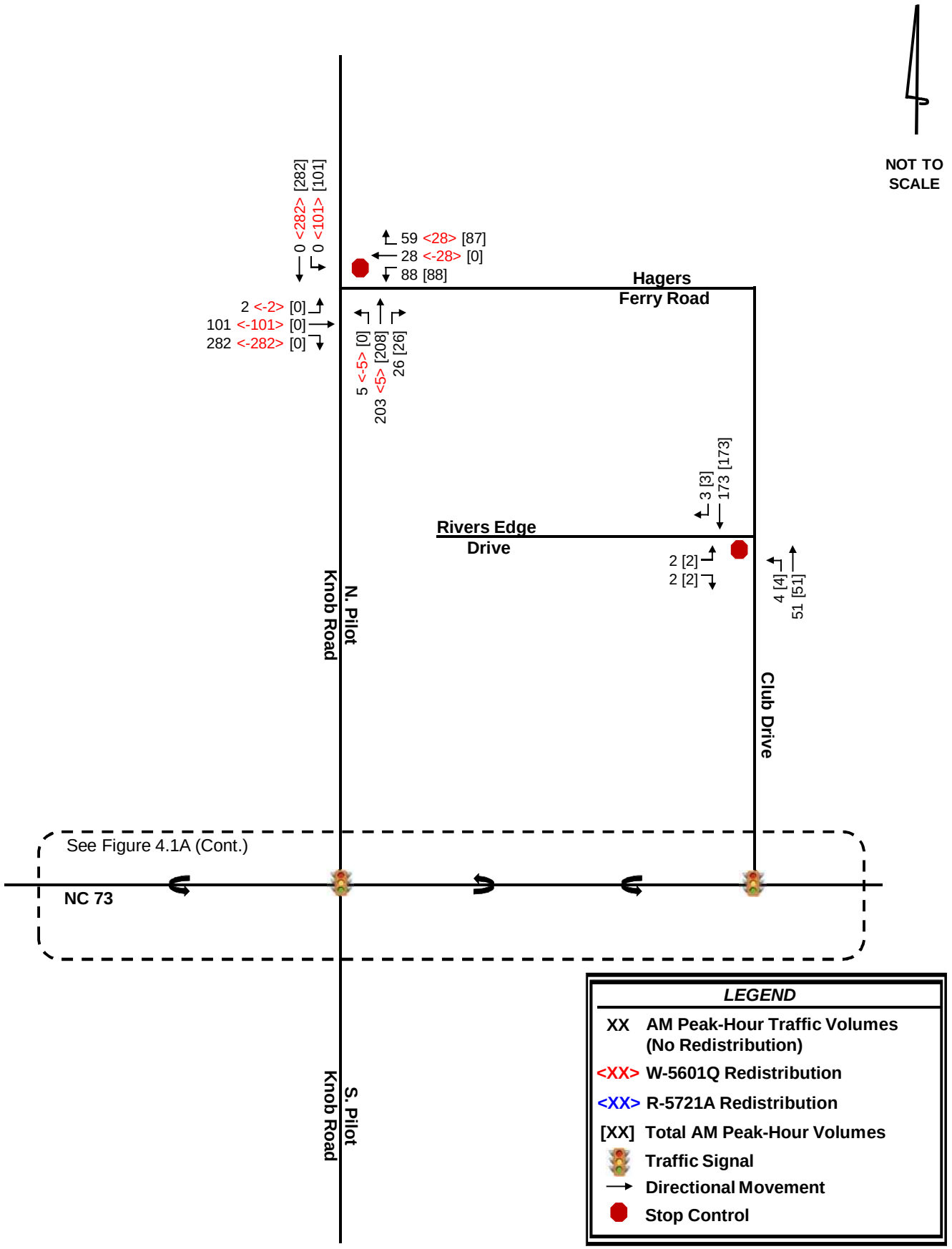
Figure 4.2A shows the 2020 no-build AM peak-hour traffic volumes and **Figure 4.2B** shows the PM peak-hour traffic volumes, which include the historical growth, approved development traffic, and planned transportation projects.



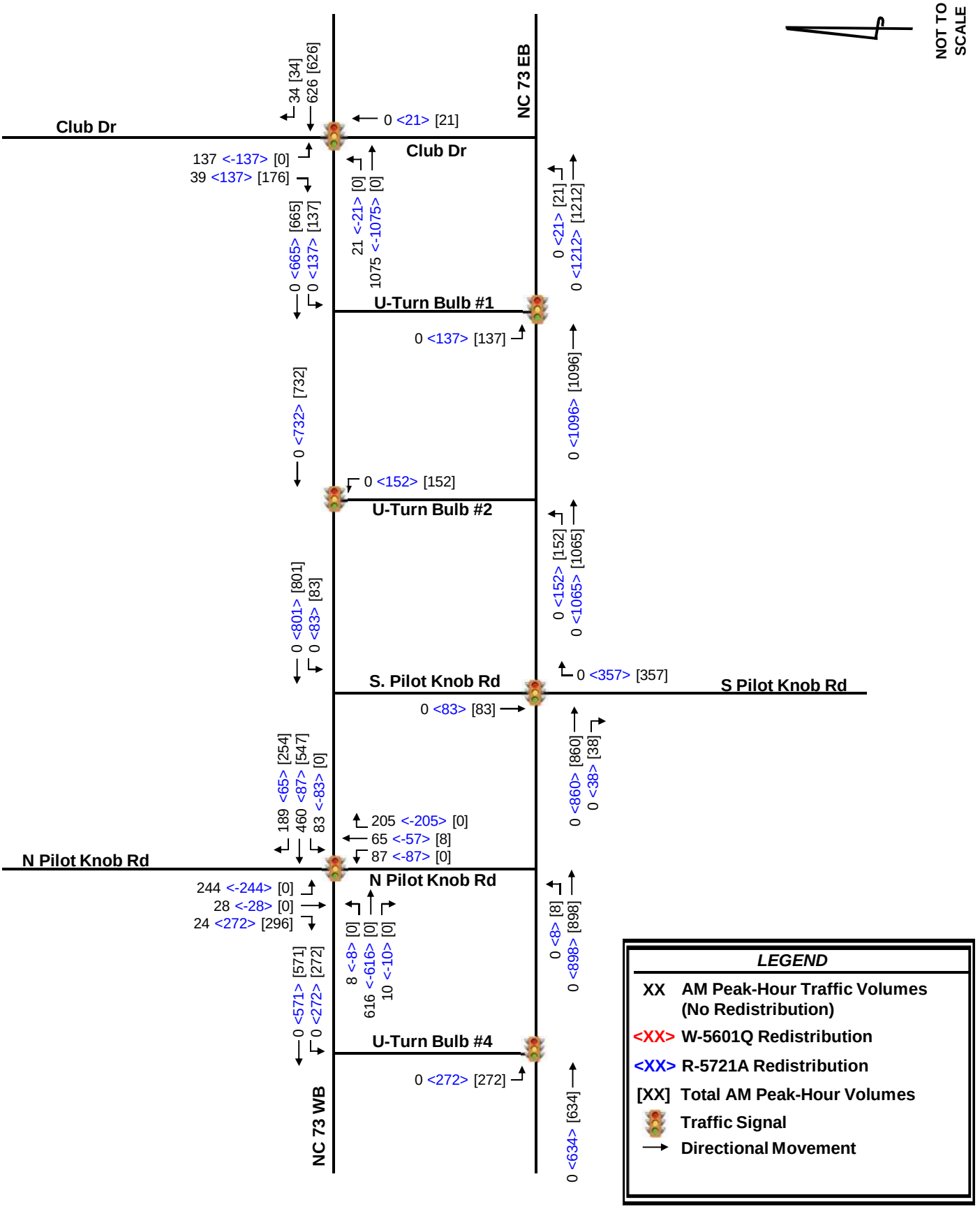
Kimley»Horn	Lincoln Charter School Traffic Impact Analysis	Background Laneage with NCDOT Projects	Figure 4.1



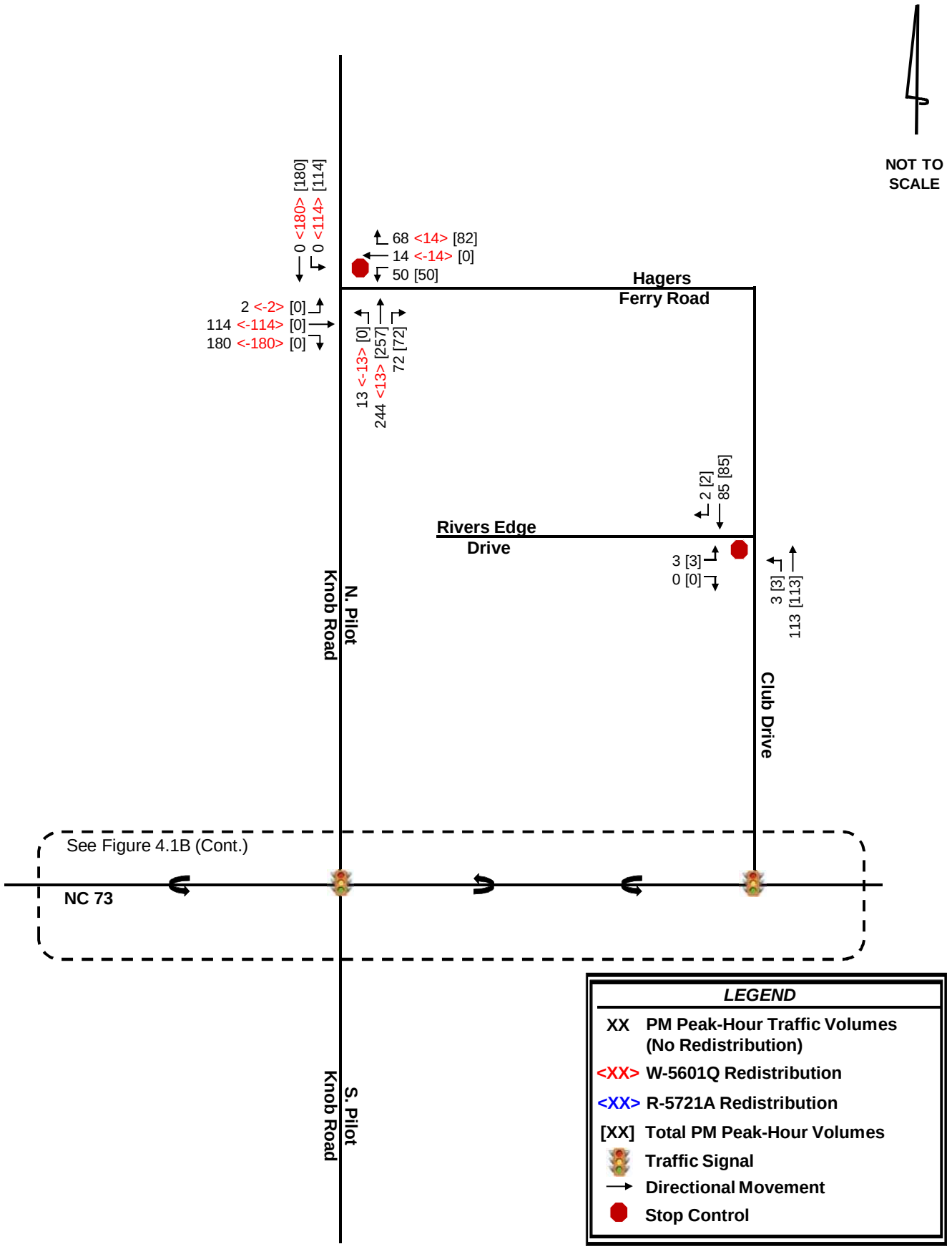
Kimley»Horn	Lincoln Charter School Traffic Impact Analysis	2020 Build-Out Improvements	Figure 4.1 (Cont.)



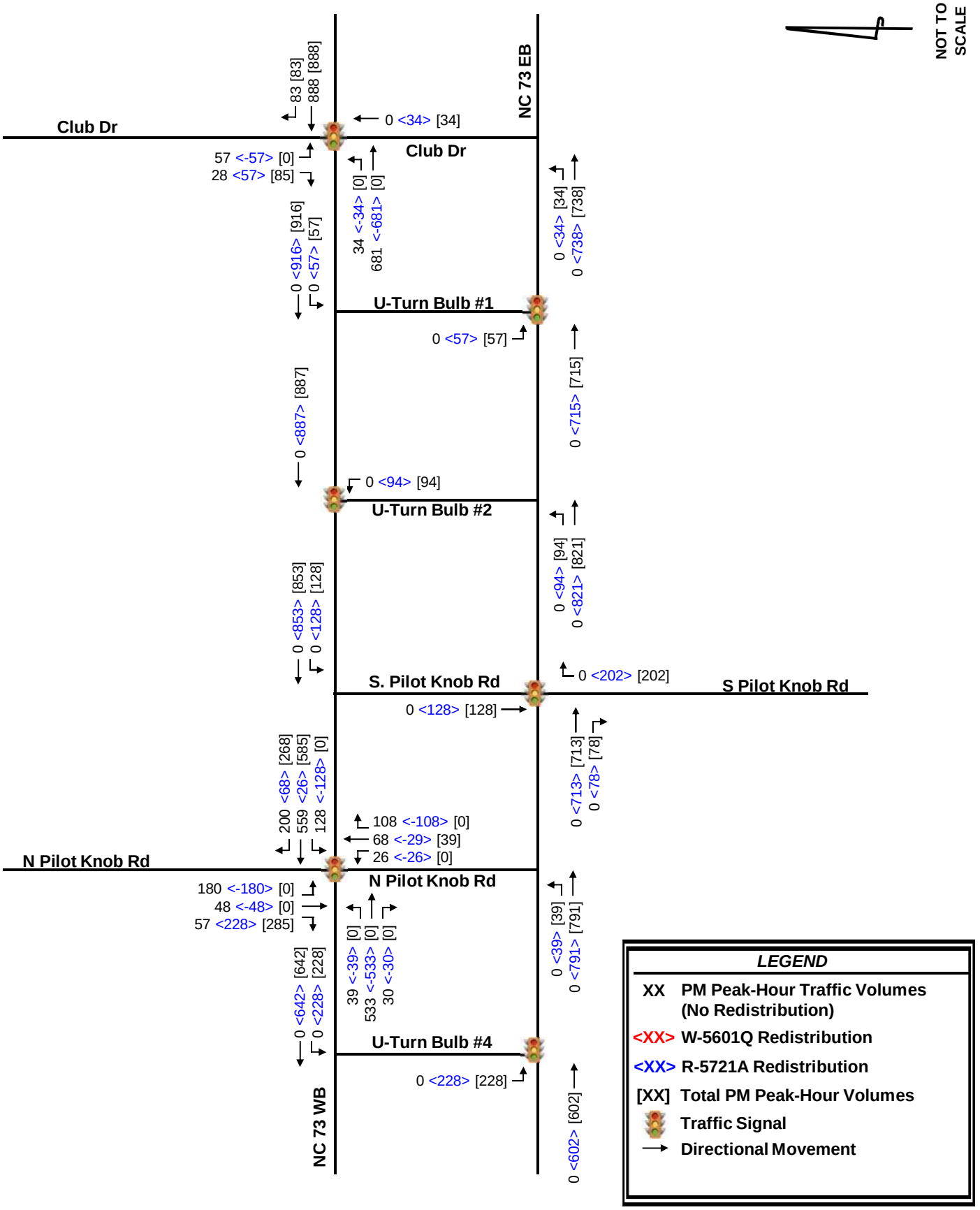
Kimley»Horn	Lincoln Charter School Traffic Impact Analysis	2020 Background AM Peak Hour Traffic Volumes	Figure 4.2A



Kimley»Horn	Lincoln Charter School Traffic Impact Analysis	2020 Background AM Peak Hour Traffic Volumes	Figure 4.2A (Cont.)



Kimley»Horn	Lincoln Charter School Traffic Impact Analysis	2020 Background PM Peak Hour Traffic Volumes	Figure 4.2B



Kimley»Horn	Lincoln Charter School Traffic Impact Analysis	2020 Background PM Peak Hour Traffic Volumes	Figure 4.2B (Cont.)

5.0 Site Traffic Volume Development

Site traffic developed for this TIA is defined as the vehicle trips expected to be generated and added to the study area by the construction of the proposed development, and the distribution and assignment of that traffic throughout the surrounding network.

5.1 SITE ACCESS

Based on the current site plan, the proposed development will be accessed via the following proposed driveways:

- Site Access #1 - One ingress only located off of Rivers Edge Drive
- Site Access #2 - One egress only located on Club Drive

5.2 TRAFFIC GENERATION

The proposed Rivercross Charter School temporary site is planned to be located at the Holy Spirit Carolina. As currently envisioned, the proposed charter school will ultimately consist of 765 students for grades K-8 with a 12,000 square foot early learning center outparcel. The owner of the site desires to stagger the start times for grades K-5 and 6-8 for the school. For the purposes of this TIA, a student population of 510 students was analyzed for grades K-5, because that would be the heaviest loading of students in the hour. The teachers for grades K-8 were included in the K-5 analysis as well as the 12,000 square foot early learning center.

As shown in **Tables 5.1A and 5.1B**, the MSTA "School Traffic Calculator" indicates that this K-8 charter school with a staggered start (grades K-5) has the potential to generate approximately 232 total new daily trips, with 81 new trips entering and 56 new trips exiting in the AM peak hour and 40 new trips entering and 65 new trips exiting in the PM school peak hour.

Table 5.1A summarizes the projected MSTA trip generation for the full 765 students of the proposed charter school. Table 5.1A should be used to show the high demand queue length.

Table 5.1B summarizes the projected MSTA trip generation for the staggered start for grades K-5, for 510 students.

Table 5.1C summarizes the projected MSTA trip generation for the staggered start for grades K-5, for 510 students as well as the 12,000 square foot early learning center (daycare). This trip generation was used in the Synchro analysis for the site.

Table 5.1A – 765 Students MSTA Trip Generation for High Demand Length

School Name: Lincoln County Charter School

Type: **Urban Charter**

Version: 102816

MSTA School Queue Input					Calculations					
Grade Level	Student Population	Number of Buses	Staff Members	Student Drivers	PM Total Vehicles	PM Peak Vehicles	Average Queue Length	Total AM Trips	Total PM Trips	High Demand Length
										30%
K - 10	765		106		300	147	3262	962	706	4241
11th										
12th										
Sum >>	765		106		300	147	3262	962	706	4241
										979

Grade K-10

Direction	AM Trips Generated Parents	Buses	Staff	Trips	PM Trips Generated Parents	Buses	Staff	Trips
IN	428		106	534	300			300
OUT	428			428	300		106	406
		AM K-10 Trips		**962**		PM K-10 Trips		**706**

Direction	AM Trips Generated Parents	Buses	Staff		Trips	PM Trips Generated Parents	Buses	Staff		Trips
IN										
OUT										
			AM 11th Trips					PM 11th Trips		

Direction	AM Trips Generated Parents	Buses	Staff		Trips	PM Trips Generated Parents	Buses	Staff		Trips
IN										
OUT										
			AM 12th Trips					PM 12th Trips		

All AM TRIPS	In	534	All PM TRIPS	In	300
	Out	428		Out	406
	Total	962		Total	706

ADT
1668
1668

Table 5.1B – 510 Student Staggered Start Analysis

School Name: Lincoln County Charter School Staggred

Type: **Urban Charter**

Version: 102816

MSTA School Queue Input					Calculations					
Grade Level	Student Population	Number of Buses	Staff Members	Student Drivers	PM Total Vehicles	PM Peak Vehicles	Average Queue Length	Total AM Trips	Total PM Trips	High Demand Length
										30%
K - 10	510		106		200	98	2175	677	506	2827
11th										
12th										
Sum >>	510		106		200	98	2175	677	506	2827
										652

Grade K-10

Direction	AM Trips Generated Parents	Buses	Staff	Trips	PM Trips Generated Parents	Buses	Staff	Trips
IN	285		106	391	200			200
OUT	285			285	200		106	306
		AM K-10 Trips		**677**		PM K-10 Trips		**506**

Direction	AM Trips Generated Parents	Buses	Staff		Trips	PM Trips Generated Parents	Buses	Staff		Trips
IN										
OUT										
			AM 11th Trips					PM 11th Trips		

Direction	AM Trips Generated Parents	Buses	Staff		Trips	PM Trips Generated Parents	Buses	Staff		Trips
IN										
OUT										
			AM 12th Trips					PM 12th Trips		

All AM TRIPS	In	391	All PM TRIPS	In	200
	Out	285		Out	306
	Total	677		Total	506

ADT
1183
1183

Table 5.1 C - Trip Generation									
Land Use	Intensity	Daily	AM Peak Hour			PM Peak Hour		
			Total	In	Out	Total	In	Out
Urban Charter	510 ST	1,646	676	391	285	506	200	306
Daycare Center	12,000 SF	571	132	70	62	133	62	71
Subtotal		**2,217**	**808**	**461**	**347**	**639**	**262**	**377**
Internal Capture		**285**	**66**	**35**	**31**	**66**	**31**	**35**
Pass-By		**0**	**0**	**0**	**0**	**0**	**0**	**0**
Net New External Trips		**1,932**	**742**	**426**	**316**	**573**	**231**	**342**

As shown in **Table 5.1C** the proposed development is anticipated to have 1,932 daily trips with 742 AM peak hour trips and 573 PM peak hour trips. The PM peak hour is for the school dismissal period. A 50% internal capture rate was assumed for the early learning center (Daycare center) since several of the early learning center students are assumed to have older siblings at the urban charter school. This methodology was approved by NCDOT Division 12 District 3.

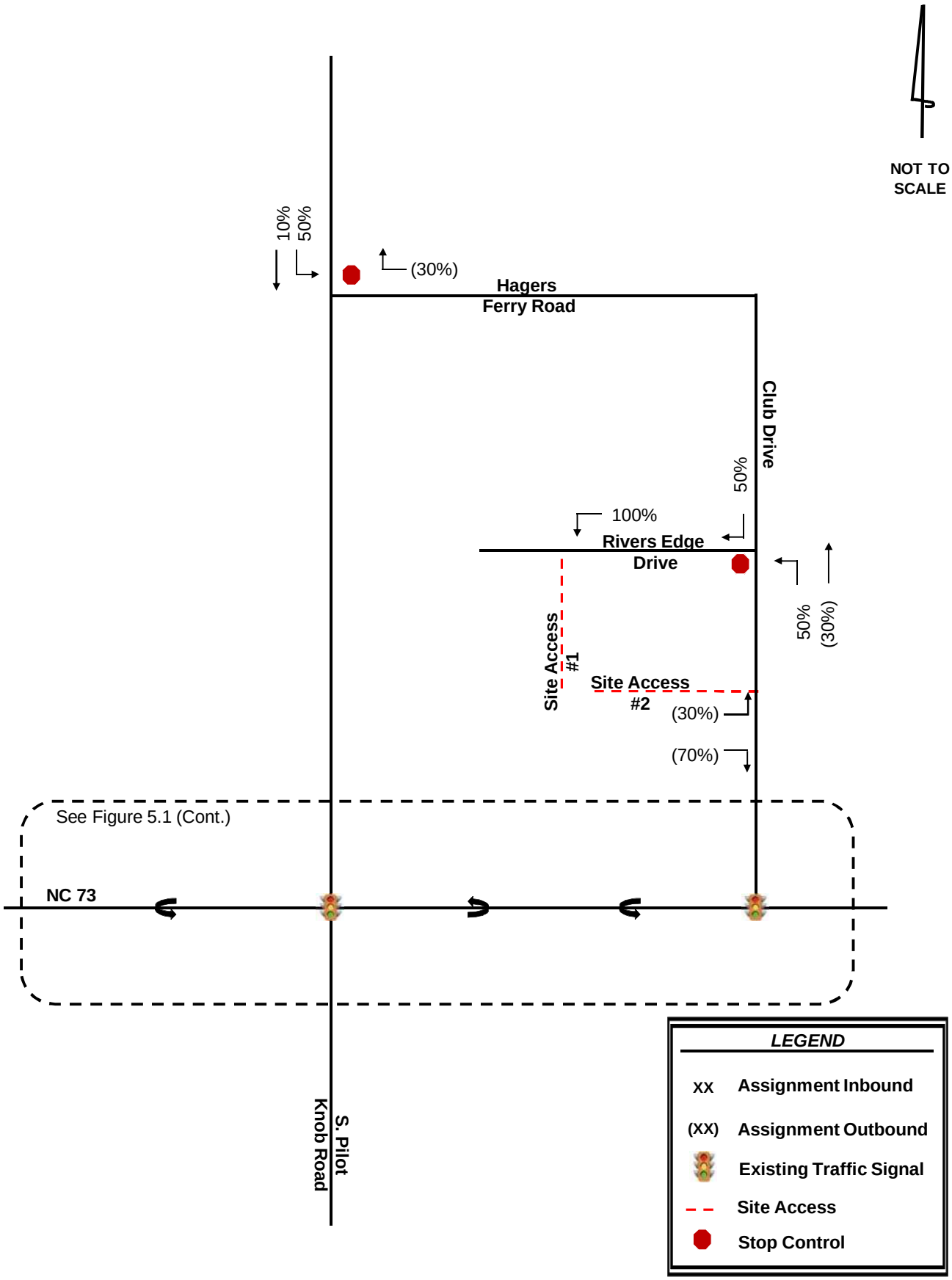
5.3 SITE TRAFFIC DISTRIBUTION AND ASSIGNMENT

The proposed development's net new external trips were assigned to the surrounding network based on existing peak-hour turning movements, surrounding land uses, population densities in the area, and the proposed site layout. The overall site traffic distribution and assignment are shown in **Figure 5.1.**

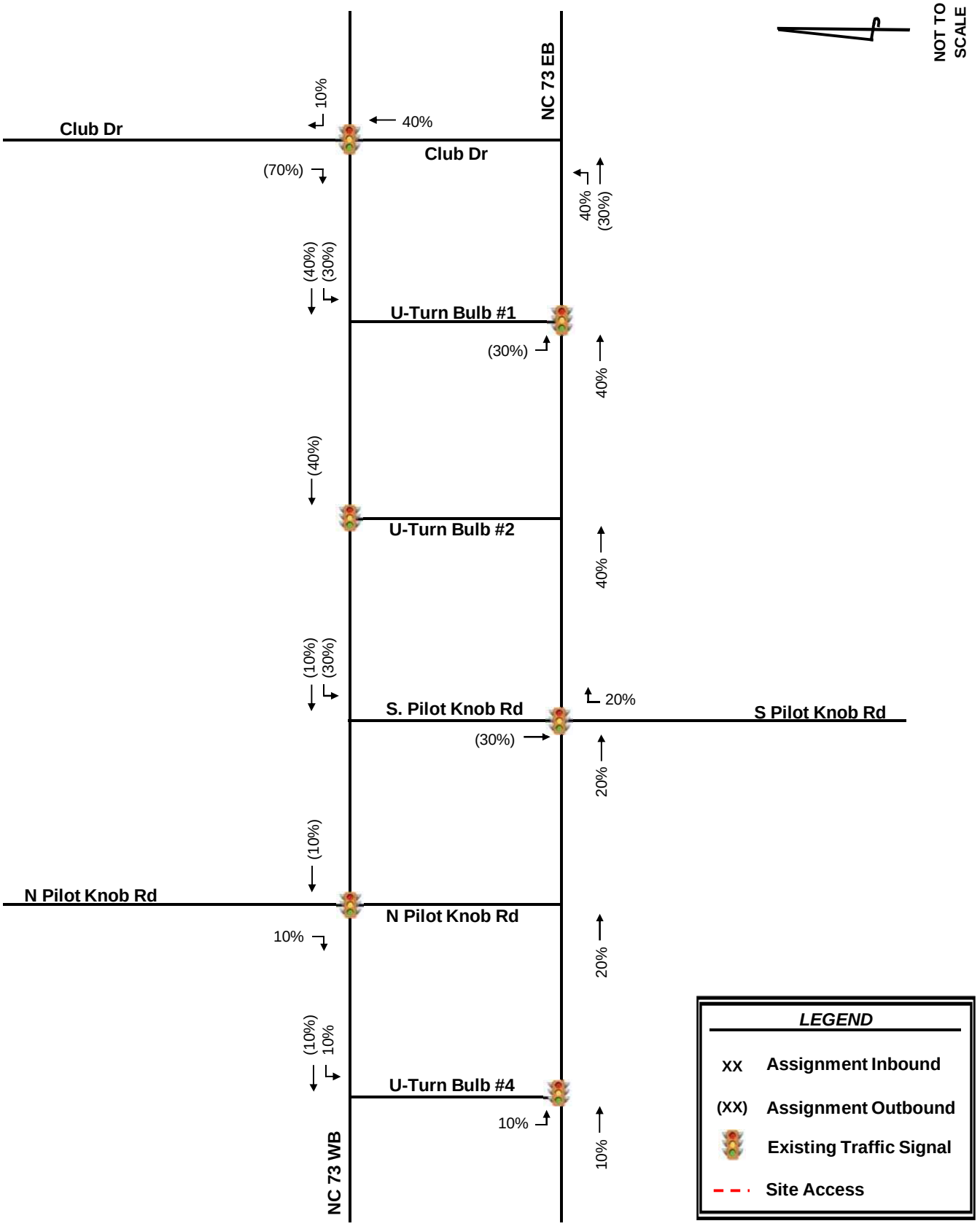
5.4 2020 BUILD-OUT TRAFFIC VOLUMES

The 2020 build-out traffic volumes include the assignment of the projected site traffic generation, redistribution, and 2020 no-build traffic volumes. **Figures 5.2A and 5.2B** show the projected 2020 build-out traffic volumes for the AM and PM peak-hours, respectively. The build analysis used a 0.5 peak hour factor for the proposed site movements. A weighted peak hour factor between existing movements and school movements was also used in the analysis.

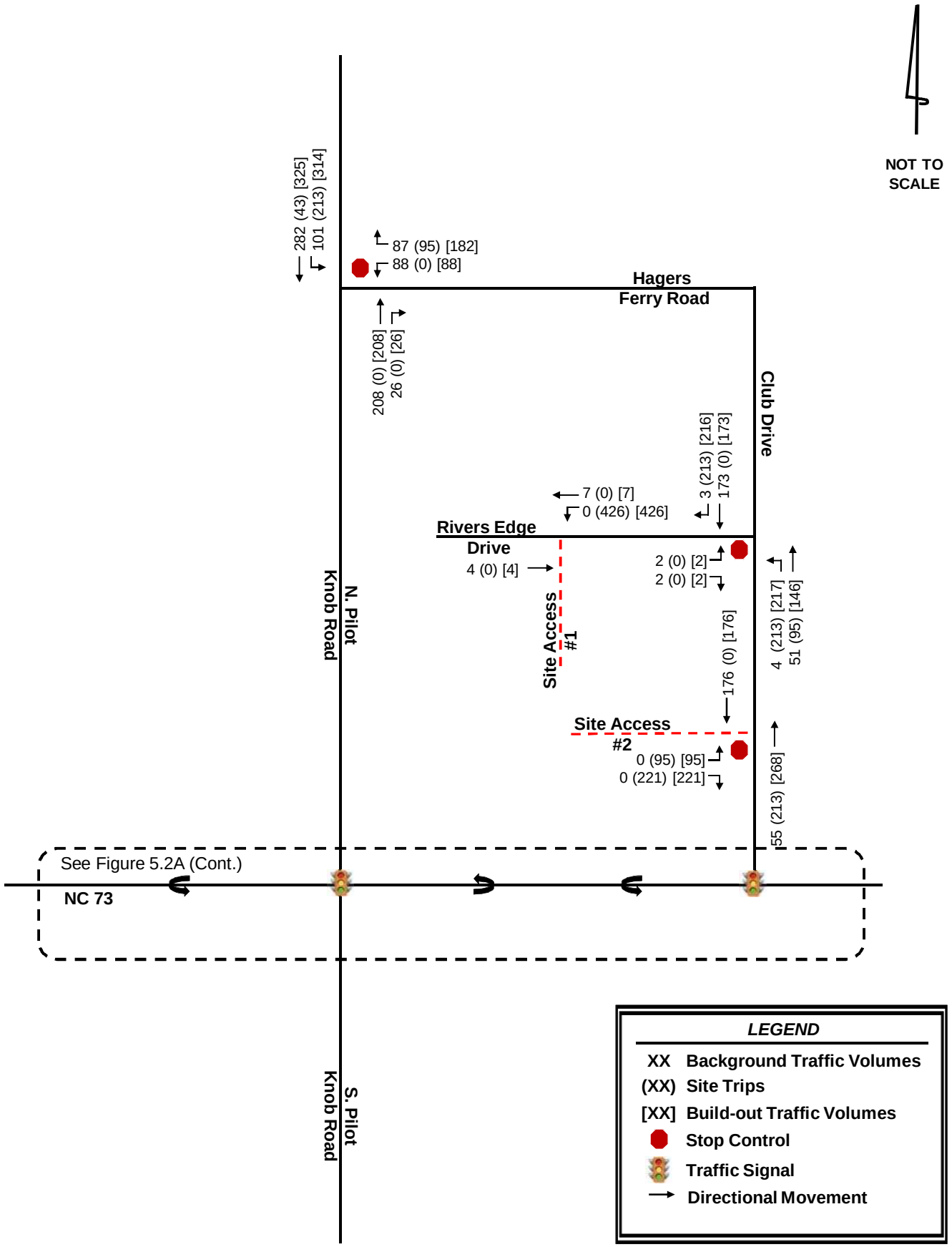
Intersection volume development worksheets for study area intersections are provided in the **Appendix.**



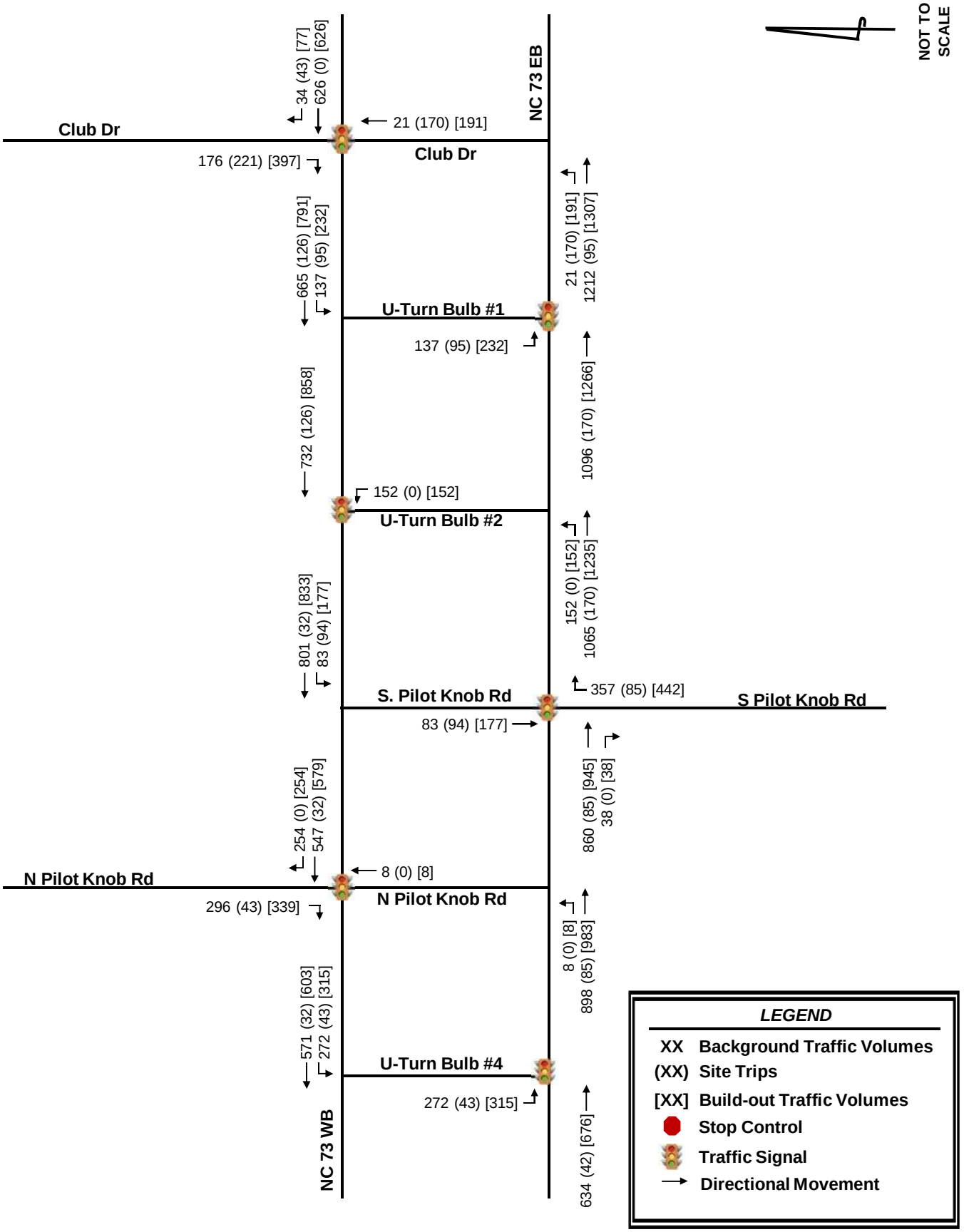
Kimley»Horn	**Lincoln Charter School Traffic Impact Analysis**	**Site Traffic Distribution and Assignment**	**Figure 5.1**



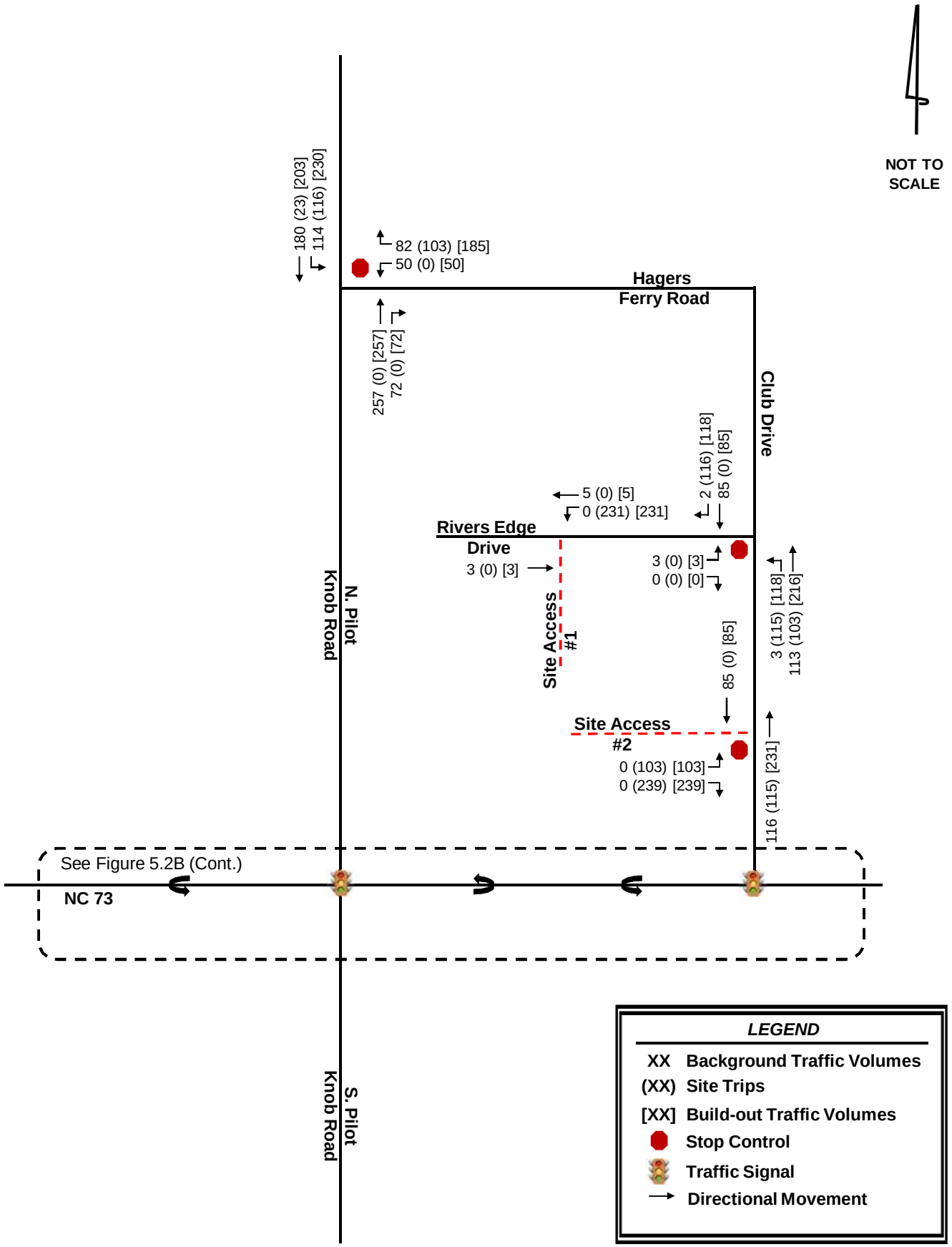
Kimley»Horn	**Lincoln Charter School Traffic Impact Analysis**	**Site Traffic Distribution and Assignment**	**Figure 5.1 (Cont.)**



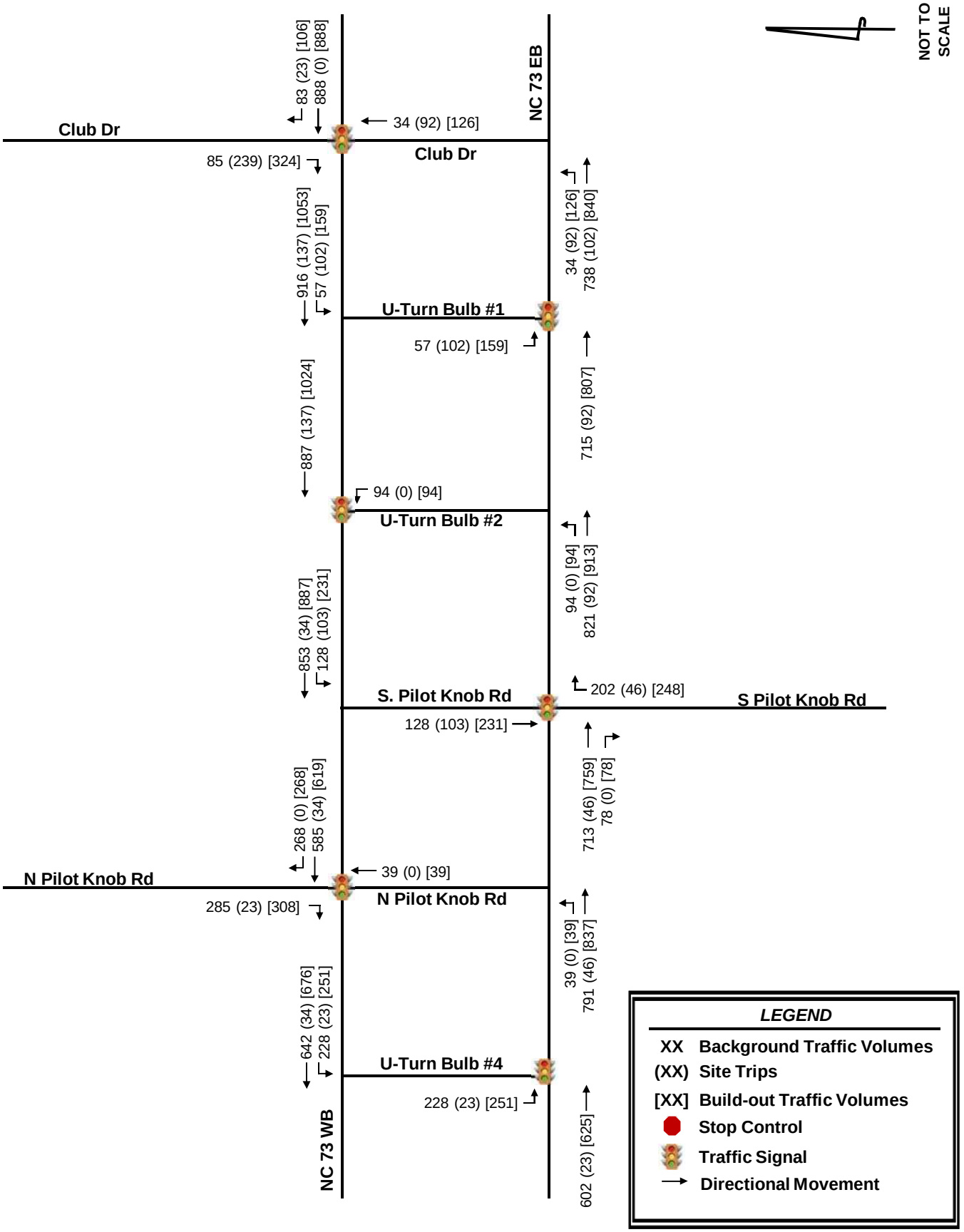
Kimley»Horn	Lincoln Charter School Traffic Impact Analysis	2020 Build-Out AM Peak Hour Traffic Volumes	Figure 5.2A



Kimley»Horn	**Lincoln Charter School Traffic Impact Analysis**	**2020 Build-Out AM Peak Hour Traffic Volumes**	**Figure 5.2A (Cont.)**



Kimley»Horn	Lincoln Charter School Traffic Impact Analysis	2020 Build-Out PM Peak Hour Traffic Volumes	Figure 5.2B



Kimley»Horn	**Lincoln Charter School Traffic Impact Analysis**	**2020 Build-Out PM Peak Hour Traffic Volumes**	**Figure 5.2B (Cont.)**

6.0 Capacity Analysis

Capacity analyses were performed for the AM and PM peak hours using the Synchro Version 10 software to determine the operating characteristics at the signalized and stop-controlled intersections of the adjacent street network and to evaluate the impacts of the proposed development. Capacity is defined as the maximum number of vehicles that can pass over a particular road segment, or through a particular intersection, within a specified period of time under prevailing operational, geometric and controlling conditions within a set time duration. The software program uses methodologies contained in the *Highway Capacity Manual (HCM)* to determine the operating characteristics of an intersection.

The Highway Capacity Manual (HCM) defines LOS as a "quantitative stratification of a performance measure or measures representing quality of service", and is used to "translate complex numerical performance results into a simple A-F system representative of travelers' perceptions of the quality of service provided by a facility or service". The HCM defines six levels of service, LOS A through LOS F, with A having the best operating conditions from the traveler's perspective and F having the worst. However, it must be understood that "the LOS letter result hides much of the complexity of facility performance", and that "the appropriate LOS for a given system element in the community is a decision for local policy makers". According to the HCM, "for cost, environmental impact, and other reasons, roadways are typically designed not to provide LOS A conditions during peak periods but instead to provide some lower LOS that balances individual travers' desires against society's desires and financial resources. Nevertheless, during low-volume periods of the day, a system element may operate at LOS A."

LOS for a two-way stop-controlled (TWSC) intersection is determined by the control delay at the side-street approaches, typically during the highest volume periods of the day, the AM and PM peak periods. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. With respect to field measurements, control delay is defined as the total elapsed time from the time a vehicle stops at the end of the queue to the time the vehicle departs from the stop line. It is typical for stop sign-controlled side-streets and driveways intersecting major streets to experience long delays during peak hours, particularly for left-turn movements. The majority of the traffic moving through the intersection on the major street experiences little or no delay.

LOS for signalized intersections is reported for the intersection as a whole, also typically during the highest volume periods of the day, the AM and PM peak periods. One or more movements at an intersection may experience a low level-of-service, while the intersection as a whole may operate acceptably.

Table 6.0-A and 6.0-B list the LOS control delay thresholds published in the HCM for unsignalized and signalized intersections, respectively, as well as the unsignalized operational descriptions assumed herein.

Table 6.0-A Level-of-Service Control Delay Thresholds for Unsignalized Intersections		
Level-of-Service	**Average Control Delay per Vehicle [sec/veh]**	
A	≥ 10	Short Delays
B	> 10 – 15	
C	> 15 – 25	
D	> 25 – 35	Moderate Delays
E	> 35 – 50	
F	> 50	Long Delays

Table 6.0-B Level-of-Service Control Delay Thresholds for Signalized Intersections	
Level-of-Service	**Control Delay per Vehicle [sec/veh]**
A	≥ 10
B	> 10 – 20
C	> 20 – 35
D	> 35 – 55
E	> 55 – 80
F	> 80

Signal plans for existing and future conditions were provided by NCDOT and are in the Appendix.

Capacity analyses were performed for the 2019 existing traffic conditions, 2020 no-build traffic conditions, and 2020 build-out traffic conditions. Mitigation for traffic impacts caused by the proposed development were noted and recommended based on guidance provided in the *NCDOT Congestion Management Guidelines*. When determining the proposed development's traffic impact to the study area intersections, the 2020 no-build, and 2020 build-out conditions were compared.

Synchro LOS results and 95th percentile queues are reported in the following subsections. SimTraffic max queues are also summarized in the following subsections. Capacity analysis and SimTraffic queuing/blocking reports are included in the **Appendix**.

Please note the intersection of Hagers Ferry Road at NC 16 Business is not included in the Synchro analysis because it will be removed as part of NCDOT Project W-5601Q.

Signal splits were optimized for each condition analyzed.

Per NCDOT Congestion Management guidelines, the following considerations were made in this analysis:

- Right-turn on red (RTOR) operations were not allowed in this analysis.
- Permitted-protected left-turn movements were modeled as protected-only in future years.
- Lost time adjust was added to the yellow and red times provided in the signal plans to maintain a total lost time of 5 seconds for each movement for future year analysis.

6.1 HAGERS FERRY ROAD AT N. PILOT KNOB ROAD

Table 6.1 summarizes the LOS, control delay and 95th percentile queue lengths at the unsignalized intersection of Hagers Ferry Road at N. Pilot Knob Road.

Table 6.1 - Hagers Ferry Road at N Pilot Knob Road

Condition	Measure	EB	WB			NB			SB			Intersection
		EBLTR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
AM Peak Hour												
2019 Existing	LOS (Delay)	B (13.2)	E (46.6)			A (0.4)			-			-
	Synchro 95th Q	73'	-	155'	-	-	1'	-				
	SimTraffic Max Q	75'		419'			249'					
2020 Background	LOS (Delay)	-	C (15.3)			A (0.0)			A (2.1)			-
	Synchro 95th Q		31'	-	0'	-	0'	-	7'	0'	-	
	SimTraffic Max Q		72'		40'		6'		52'	0'		
2020 Build	LOS (Delay)	-	F (275.2)			A (0.0)			A (5.3)			-
	Synchro 95th Q		529'	-	0'	-	0'	-	45'	0'	-	
	SimTraffic Max Q		111'		84'		12'		142'	0'		
2020 Build Improved (Roundabout)	LOS (Delay)	-	A (6.8)			A (8.2)			B (13.7)			B (11.1)
	Sidra 95th Q		47'	-		-		39'	206'	-		v/c=0.72, 8 years until v/c = 0.85
2020 Build Improved (Roundabout, V/C Threshold Analysis)	LOS (Delay)	-	A (6.8)			A (7.0)			A (6.1)			A (6.5)
	Sidra 95th Q		47'	-		-		31'	58'	40'	-	v/c=0.39, 20 year v/c = 0.57
PM Peak Hour												
2019 Existing	LOS (Delay)	B (14.6)	C (20.5)			A (0.5)			-			-
	Synchro 95th Q	71'	-	51'	-	-	1'	-				
	SimTraffic Max Q	72'		360'			455'					
2020 Background	LOS (Delay)	-	B (13.7)			A (0.0)			A (3.3)			-
	Synchro 95th Q		15'	-	0'	-	0'	-	9'	0'	-	
	SimTraffic Max Q		52'		57'		12'		84'	0'		
2020 Build	LOS (Delay)	-	C (18.6)			A (0.0)			A (5.3)			-
	Synchro 95th Q		47'	-	0'	-	0'	-	28'	0'	-	
	SimTraffic Max Q		71'		116'		41'		160'	0'		
2020 Build Improved (Roundabout)	LOS (Delay)	-	A (6.9)			A (7.9)			A (7.3)			A (7.4)
	Sidra 95th Q		43'	-		-		52'	79'	-		v/c=0.44, 20 year v/c = 0.64
2020 Build Improved (Roundabout, V/C Threshold Analysis)	LOS (Delay)	-	A (6.9)			A (7.0)			A (4.6)			A (5.9)
	Sidra 95th Q		43'	-		-		41'	31'	21'	-	v/c=0.35, 20 year v/c = 0.55
	Existing Storage	-	-	-	-	-	-	-	-	-	-	-

As shown in **Table 6.1**, the stop-controlled eastbound approach currently operates with short delays during the 2019 existing AM and PM peak hours. The stop controlled westbound approach currently operates with moderate delays during the AM peak hour and short delays during the PM peak hour.

NCDOT project W-5601Q proposes to remove the eastbound approach, modify the westbound approach to have separate left and right turn lanes, an exclusive southbound left-turn lane, an

exclusive southbound through lane and a shared northbound through-right lane. With these improvements in place, the westbound approach is anticipated to operate with short delays during the AM and PM peak hour.

Upon build-out of the site in 2020, the westbound approach is anticipated to operate over capacity with delays over 275.2 seconds per vehicle during the AM peak hour and short delays during the PM peak hour.

To mitigate the impact of the site at this intersection an exclusive northbound right-turn lane was analyzed, however, it did not provide a substantial capacity improvement. This intersection is approximately 520' from the proposed new signalized intersection of N. Pilot Knob Road at NC 16 Business, therefore a traffic signal at this intersection would be too close to proposed signal at N. Pilot Knob Road at NC 16 Business. This intersection is also not likely to meet MUTCD 8-hour traffic signal warrants, the highest vehicular loading is anticipated to be for school drop off and pick-up.

A single lane roundabout is recommended at this intersection to provide capacity improvements for the eastbound approach in the AM peak hour. With a roundabout, the eastbound delay is anticipated to be 6.8 seconds/vehicle during the AM peak hour. The roundabout is anticipated to operate at LOS B during the AM peak hour and LOS A during the PM peak hour in 2020 build conditions. The v/c is anticipated to be below 0.85 for eight years during the AM peak hour and over 20 years during the PM peak hour.

A sensitivity analysis was done to determine a laneage configuration to make the roundabout design life 20 years (v/c less than 0.85) or more for the AM peak hour. To achieve a design life of 20 or more years the southbound laneage can be an exclusive southbound through lane and an exclusive southbound left-turn lane. With this laneage in place, the 20-year v/c ratio for the AM peak hour is 0.57 and 0.55 for the PM peak hour. The results of the supplemental analysis are included in the **Appendix**.

This roundabout should be coordinated with the NCDOT project team for W-5601Q.

6.2 CLUB DRIVE AT RIVERS EDGE DRIVE

Table 6.2 summarizes the LOS, control delay and 95th percentile queue lengths at the unsignalized intersection of Club Drive at Rivers Edge Drive.

Table 6.2 - Club Drive at Rivers Edge Drive

Condition	Measure	EB	NB		SBT	
		EBLR	NBL	NBT	SBT	SBR
AM Peak Hour						
2019 Existing	LOS (Delay)	B (10.1)	A (0.9)		A (0.0)	
	Synchro 95th Q	1'	0'	0'	0'	-
	SimTraffic Max Q	25'	18'	0'	0'	
2020 Background	LOS (Delay)	A (9.6)	A (0.5)		A (0.0)	
	Synchro 95th Q	0'	0'	0'	0'	-
	SimTraffic Max Q	18'	9'	0'	0'	
2020 Build	LOS (Delay)	C (24.9)	A (7.6)		A (0.0)	
	Synchro 95th Q	2'	57'	0'	0'	0'
	SimTraffic Max Q	22'	346'	67'	0'	65'
2020 Build Improved	LOS (Delay)	C (24.9)	A (7.6)		A (0.0)	
	Synchro 95th Q	2'	57'	0'	0'	0'
	SimTraffic Max Q	23'	323'	247'	0'	54'
PM Peak Hour						
2019 Existing	LOS (Delay)	A (9.6)	A (0.2)		A (0.0)	
	Synchro 95th Q	1'	0'	0'	0'	-
	SimTraffic Max Q	24'	3'	0'	-	
2020 Background	LOS (Delay)	A (9.2)	A (0.2)		A (0.0)	
	Synchro 95th Q	1'	0'	0'	0'	-
	SimTraffic Max Q	24'	3'	0'	0'	
2020 Build	LOS (Delay)	B (13.3)	A (4.0)		A (0.0)	
	Synchro 95th Q	1'	20'	0'	0'	0'
	SimTraffic Max Q	27'	172'	0'	0'	29'
2020 Build Improved	LOS (Delay)	B (13.3)	A (4.0)		A (0.0)	
	Synchro 95th Q	1'	20'	0'	0'	0'
	SimTraffic Max Q	27'	151'	22'	5'	29'
	Existing Storage	-	125'	-	-	-

As shown in **Table 6.2**, the eastbound, stop-controlled approach delay is currently short during the AM and PM peak hours. The eastbound, stop-controlled approach delay is anticipated to remain short during the 2020 background, 2020 build, and 2020 build improved conditions. However, during the 2020 build AM and PM conditions, the northbound left-turn queue is anticipated to queue beyond the available storage. It is recommended to increase the existing northbound left-turn storage from 125' to 350'.

A southbound right-turn lane is warranted based on a review of the figure titled 'Warrant for Left and Right-Turn Lanes' found on page 80 in the NCDOT Policy On Street And Driveway Access to North Carolina Highways. The southbound right-turn lane was included in the build and build improved analysis and is recommended to be constructed.

6.3 NC 73 WB AT CLUB DRIVE

Table 6.3 summarizes the LOS, control delay and 95th percentile queue lengths at the signalized intersection of NC 73 at Club Drive.

Table 6.3 - NC 73 at Club Drive														
Condition	Measure	EB			WBT		NB			SB			Intersection
		EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
AM Peak Hour														
2019 Existing	LOS (Delay)	B (18.2)			A (6.1)			-		D (51.1)			B (17.5)
	Synchro 95th Q	6'	#563'	-	166'	9'				#160'	-	46'	
	SimTraffic Max Q	65'	289'		160'	42'				132'		50'	
2020 Background	LOS (Delay)	-			A (6.7)		C (26.6)			D (45.1)			B (15.1)
	Synchro 95th Q				124'	20'	-	m26'	-	-		162'	
	SimTraffic Max Q				151'	39'		53'				167'	
2020 Build	LOS (Delay)	-			C (23.9)		B (16.8)			C (27.1)			C (23.5)
	Synchro 95th Q				242'	67'	-	97'	-	-		205'	
	SimTraffic Max Q				225'	116'		161'				309'	
2020 Build (RTOR Allowed)	LOS (Delay)	-			C (22.9)		B (17.6)			C (25.9)			C (22.8)
	Synchro 95th Q				242'	67'	-	97'	-	-		184'	
	SimTraffic Max Q				249'	128'		163'				232'	
2020 Build Improved (Dual Southbound Rights)	LOS (Delay)	-			B (13.4)		C (26.6)			C (29.7)			C (21.5)
	Synchro 95th Q				187'	52'	-	118'	-	-		130'	
	SimTraffic Max Q				184'	111'		164'				170'	
PM Peak Hour														
2019 Existing	LOS (Delay)	A (5.8)			A (9.6)			-		C (30.9)			A (9.7)
	Synchro 95th Q	11'	164'	-	309'	18'				58'	-	28'	
	SimTraffic Max Q	69'	160'		176'	47'				86'		53'	
2020 Background	LOS (Delay)	-			A (4.3)		D (36.5)			D (45.1)			A (8.5)
	Synchro 95th Q				136'	28'	-	51'	-	-		95'	
	SimTraffic Max Q				125'	47'		60'				87'	
2020 Build	LOS (Delay)	-			C (21.6)		B (19.6)			C (33.4)			C (24.8)
	Synchro 95th Q				326'	81'	-	92'	-	-		184'	
	SimTraffic Max Q				287'	120'		159'				309'	
2020 Build (RTOR Allowed)	LOS (Delay)	-			B (19.8)		C (21.0)			C (33.1)			C (23.5)
	Synchro 95th Q				313'	78'	-	95'	-	-		170'	
	SimTraffic Max Q				262'	108'		156'				256'	
2020 Build Improved (Dual Southbound Rights)	LOS (Delay)	-			B (12.9)		C (29.1)			C (32.1)			C (20.2)
	Synchro 95th Q				261'	65'	-	108'	-	-		111'	
	SimTraffic Max Q				240'	96'		156'				174'	
	Existing Storage	175'	-	-	-	100'	-	-	-	200'	-	-	-

As shown in **Table 6.3**, the intersection of NC 73 at Club Road currently operates at LOS B during the AM peak hour and LOS during the PM peak hour.

NCDOT project R-5721A plans to make NC 73 a reduced conflict street (formally called a super street). To model a reduced conflict street the eastbound direction of NC 73 and westbound direction of NC 73 were modeled as separate links, connected by U-turn links. With this modeling technique recommended by NCDOT, the eastbound direction of NC 73 is removed from this intersection and is modeled in a separate link. The northbound through volume is actually the eastbound left from NC 73 onto Club Drive.

With NCDOT project R-5721A in place, the intersection is anticipated to operate at LOS B during the AM peak hour and LOS A during the PM peak hour for 2020 background conditions.

During the 2020 build conditions the intersection is anticipated to operate at LOS C during the AM and PM peak hours. The proposed site traffic is anticipated to increase the overall intersection delay during the AM and PM peak hours; however, all approaches are anticipated to operate at LOS C or better which is typically recognized as acceptable operations during peak hour conditions.

The southbound right-turn queue is anticipated to encroach on Site Access #2 (egress only access), which is located approximately 300' away from this intersection during 2020 build AM and PM conditions. Right-turn on red (RTOR) is not allowed by NCDOT Congestion Management for Synchro and SimTraffic analysis. However, if right-turn on red was allowed at this intersection, the southbound right-turn queue is not anticipated to encroach on Site Access #2. If NCDOT decides not to allow right-turn on red at this intersection, dual southbound right-turn lanes are recommended so the anticipated southbound right-turn queue does not encroach on Site Access #2. The use of RTOR should be discussed with NCDOT MSTA since it relates to the operations for intersection with the charter school loading.

6.4 NC 73 WB AT PILOT KNOB ROAD

Table 6.4A summarizes the LOS, control delay and 95th percentile queue lengths at the signalized intersection of NC 73 at Pilot Knob Road.

Table 6.4A - NC 73 WB at Pilot Knob Road												
Condition	Measure	EB		WB			NB		SB			Intersection
		EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR	
AM Peak Hour												
2019 Existing	LOS (Delay)	D (36.9)		C (27.6)			C (20.7)		D (45.7)			C (31.9)
	Synchro 95th Q	8'	#429'	#113'	263'	99'	57'	187'	#239'	47'	-	
	SimTraffic Max Q	84'	467'	185'	360'	222'	140'	243'	425'	2091'		
2020 Background	LOS (Delay)	-		A (8.8)			C (27.4)		D (36.5)			B (16.4)
	Synchro 95th Q			-	103'	104'	-	m16'	-		133'	
	SimTraffic Max Q				139'	150'		19'			167'	
2020 Build	LOS (Delay)	-		A (7.8)			C (23.0)		C (33.9)			B (15.6)
	Synchro 95th Q			-	121'	122'	-	14'	-		138'	
	SimTraffic Max Q				142'	167'		20'			156'	
PM Peak Hour												
2019 Existing	LOS (Delay)	B (16.3)		B (15.9)			C (21.3)		C (28.7)			B (18.5)
	Synchro 95th Q	18'	230'	65'	216'	67'	25'	117'	#162'	71'	-	
	SimTraffic Max Q	103'	238'	213'	271'	152'	94'	191'	418'	1254'		
2020 Background	LOS (Delay)	-		A (8.2)			C (29.9)		D (36.2)			B (15.7)
	Synchro 95th Q			-	123'	160'	-	50'	-		130'	
	SimTraffic Max Q				131'	136'		73'			150'	
2020 Build	LOS (Delay)	-		A (8.0)			C (28.2)		D (35.5)			B (15.6)
	Synchro 95th Q			-	165'	162'	-	49'	-		134'	
	SimTraffic Max Q				175'	154'		52'			148'	
	Existing Storage	-	-	150'	-	150'	75'	-	250'	-	-	-

As shown in **Table 6.4A**, the intersection of NC 73 at Pilot Knob Road currently operates at LOS C during the AM peak hour and LOS B during the PM peak hour.

NCDOT project R-5721A plans to make NC 73 a reduced conflict street (formally called a super street). To model a reduced conflict street, the eastbound direction of NC 73 and westbound direction of NC 73 were modeled as separate links, connected by U-turn links. With this modeling technique recommended by NCDOT, the eastbound direction of NC 73 is removed from this intersection and is modeled in a separate link. The northbound through volume is actually the eastbound left from NC 73 onto N. Pilot Knob Road. The eastbound direction of NC 73 at Pilot Knob Road is show in **Table 6.4B.** The intersection is broken out into two tables because it is currently a four-leg intersection, unlike NC 73 at Club Drive.

With NCDOT project R-5721A in place, the intersection is anticipated to operate at LOS B during the AM and PM peak hours for 2020 background conditions.

During the 2020 build conditions the intersection is anticipated to continue to operate at LOS B during the AM and PM peak hours. There is no mitigation recommended at this intersection due to the impact of the proposed Lincoln Charter School.

Table 6.4B summarizes the LOS, control delay and 95th percentile queue lengths at the signalized intersection of NC 73 at Pilot Knob Road.

Table 6.4B - NC 73 EB at N Pilot Knob Road						
Condition	Measure	EB		NB	SB	Intersection
		EBT	EBR	NBR	SBT	
AM Peak Hour						
2020 Background	LOS (Delay)	B (11.5)		C (33.5)	C (20.3)	B (17.9)
	Synchro 95th Q	172'	26'	253'	64'	
	SimTraffic Max Q	180'	44'	280'	83'	
2020 Build	LOS (Delay)	B (17.5)		C (31.7)	B (12.0)	C (20.7)
	Synchro 95th Q	195'	27'	302'	53'	
	SimTraffic Max Q	209'	57'	418'	147'	
PM Peak Hour						
2020 Background	LOS (Delay)	A (5.8)		D (38.1)	C (30.9)	B (14.5)
	Synchro 95th Q	126'	31'	170'	107'	
	SimTraffic Max Q	112'	64'	198'	144'	
2020 Build	LOS (Delay)	A (8.3)		C (34.2)	C (28.6)	B (17.4)
	Synchro 95th Q	146'	40'	182'	129'	
	SimTraffic Max Q	156'	66'	218'	166'	
	Existing Storage	-	-	-	-	-

NCDOT project R-5721A plans to make NC 73 a reduced conflict street (formally called a super street). To model a reduced conflict street the eastbound direction of NC 73 and westbound direction of NC 73 were modeled as separate links, connected by U-turn links. With this modeling technique recommended by NCDOT, the westbound direction of NC 73 is removed from this intersection and is modeled in a separate link. The southbound through volume is actually the westbound left from NC 73 onto S. Pilot Knob Road.

With NCDOT project R-5721A in place, the intersection is anticipated to operate at LOS B during the AM and PM peak hours for 2020 background conditions.

During the 2020 build conditions the intersection is anticipated to operate at LOS C during the AM peak hour and continue to operate at LOS B PM peak hour. Even though there is a drop in the overall intersection delay during the AM peak hour from build to background conditions, there is no mitigation recommended at this intersection due to the impact of the proposed Lincoln Charter School because the AM delay is 0.7 seconds from operating at LOS B.

6.5 RIVERS EDGE ROAD AT SITE ACCESS #1 (INGRESS ONLY)

Table 6.5 summarizes the LOS, control delay and 95th percentile queue lengths at the proposed unsignalized intersection of Rivers Edge Drive at Site Access #1 (ingress only).

Table 6.5 - Rivers Edge Drive at Site Access #1			
Condition	Measure	EB	WB
		EBT	WBLR
AM Peak Hour			
2020 Build	LOS (Delay)	A (0.0)	A (9.6)
	Synchro 95th Q	0'	81'
	SimTraffic Max Q	17'	143'
PM Peak Hour			
2020 Build	LOS (Delay)	A (0.0)	A (8.0)
	Synchro 95th Q	0'	30'
	SimTraffic Max Q	10'	68'
	Existing Storage	-	-

As shown in **Table 6.5,** the mainline (Rivers Edge Drive) is anticipated to operate with short delays during the AM and PM peak hours. There is no minor street delay at this intersection because the minor street is ingress only. There is no mitigation recommended at this intersection due to the impact of the proposed Lincoln Charter School.

6.6 CLUB DRIVE AT SITE ACCESS #2 (EGRESS ONLY)

Table 6.6 summarizes the LOS, control delay and 95th percentile queue lengths at the proposed unsignalized intersection of Club Drive at Site Access #2 (egress only).

Table 6.6 - Club Drive at Site Access #2					
Condition	Measure	EB		NBT	SB
		EBL	EBR	NBT	SBT
AM Peak Hour					
2020 Build	LOS (Delay)	C (15.5)		A (0.0)	A (0.0)
	Synchro 95th Q	53'	77'	0'	0'
	SimTraffic Max Q	132'	152'	7'	21'
PM Peak Hour					
2020 Build	LOS (Delay)	B (12.9)		A (0.0)	A (0.0)
	Synchro 95th Q	38'	71'	0'	0'
	SimTraffic Max Q	118'	141'	0'	12'
	Existing Storage	-	-	-	-

As shown in **Table 6.6,** the minor street eastbound approach, is anticipated to operate with short delays during the AM and PM peak hours. As analyzed in Section 6.3, the southbound queue from the intersection of NC 73 at Club Drive is not anticipated to reach Site Access #2 if right-turn on red is allowed for the southbound right or if there are dual southbound right-turn lanes on Club Drive at NC 73. The eastbound approach was assumed to have exclusive left and right turn lanes.

7.0 Auxiliary Turn Lane Warrants

Warrants for additional turn-lane improvements for unsignalized intersections beyond those necessary for capacity were determined based on a review of the figure titled 'Warrant for Left and Right-Turn Lanes' found on page 80 in the *NCDOT Policy On Street And Driveway Access to North Carolina Highways*. The results of the warrants for left and right-turn lanes under build-out conditions are summarized by intersection below and included in the Appendix.

Hagers Ferry Road at N. Pilot Knob Road

- A southbound left-turn lane is planned for NCDOT Project W-5601Q.
- A northbound right-turn lane with a minimum storage of 75' is warranted
  - If a roundabout is constructed at this intersection, this turn lane may not be necessary
  - The proposed site is not anticipated to add northbound right-turn traffic volume to this intersection.

Club Drive at Rivers Edge Drive

- A northbound right-turn lane already exists at this intersection
- A southbound right-turn lane with a minimum storage of 125' is warranted

8.0 Conclusions

Kimley-Horn and Associates, Inc. was retained to determine the potential traffic impacts of this development and recommendations for transportation improvements required to meet anticipated traffic demands in conjunction with the development.

Based on the capacity analyses and turn-lane warrants, the following improvements are recommended to mitigate the impacts associated with the school:

N. Pilot Knob Road at Hagers Ferry Road

- Construction of a roundabout
- Construction of a southbound left-turn lane for the roundabout
  - This improvement allows for a project v/c of less than 0.85 for 20 or more years
- This roundabout should be coordinated with the NCDOT project team for W-5601Q.

NC 73 at Club Drive

- If right-turn on red is not allowed for the southbound right-turn movement for NCDOT project R-5721A, dual southbound right-turn lanes are recommended so that the spillback from the southbound right-turn volume does not block the egress only (Access #2) for the site.

Club Drive at Rivers Edge Drive

- Extend the northbound left-turn lane from 125' to 350' with an appropriate taper length
- Construction of southbound right-turn lane with a minimum storage of 125' with an appropriate taper length.

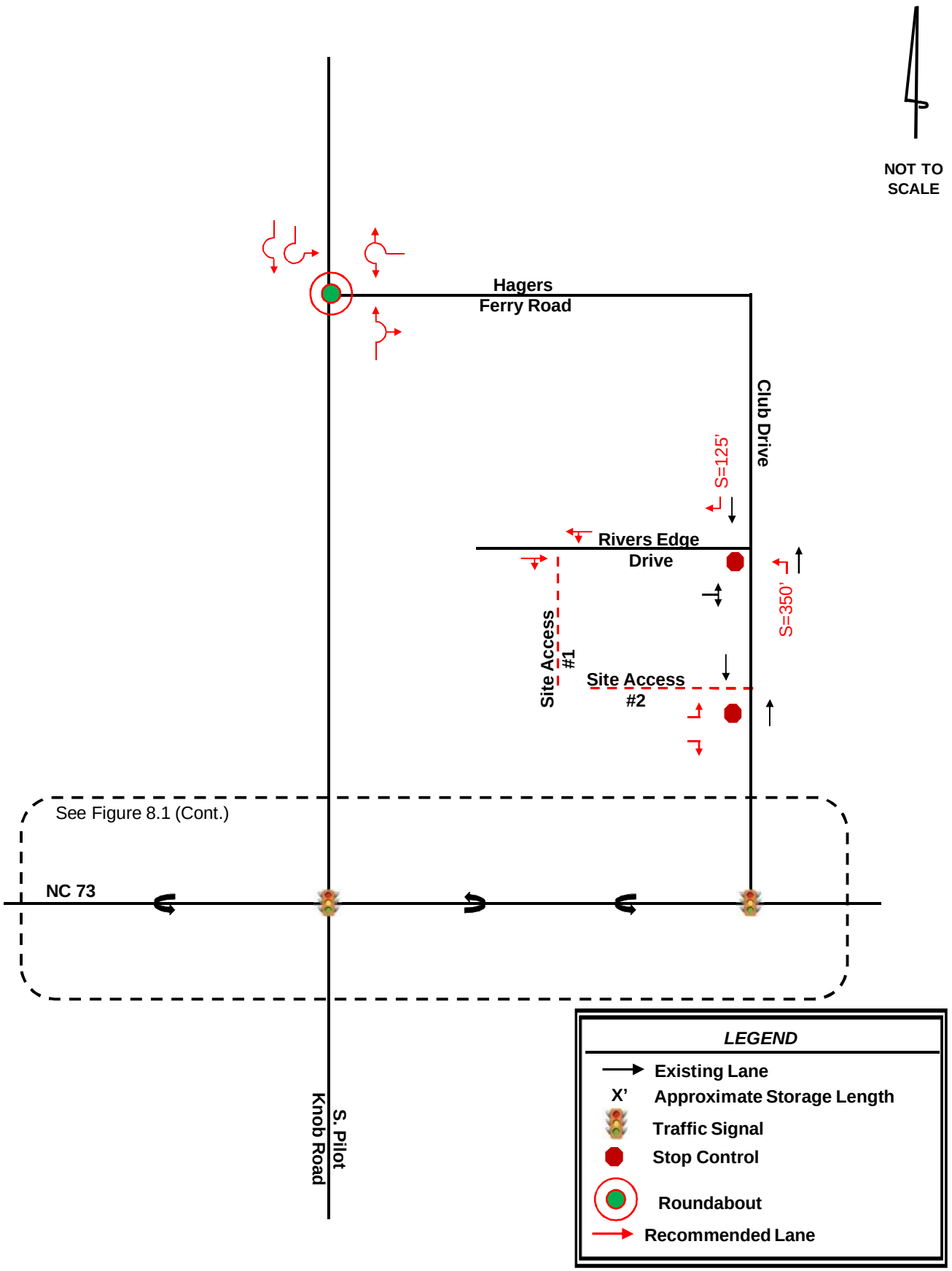
Club Drive at Site Access #2

- Construction of two egress lanes exiting the proposed site.

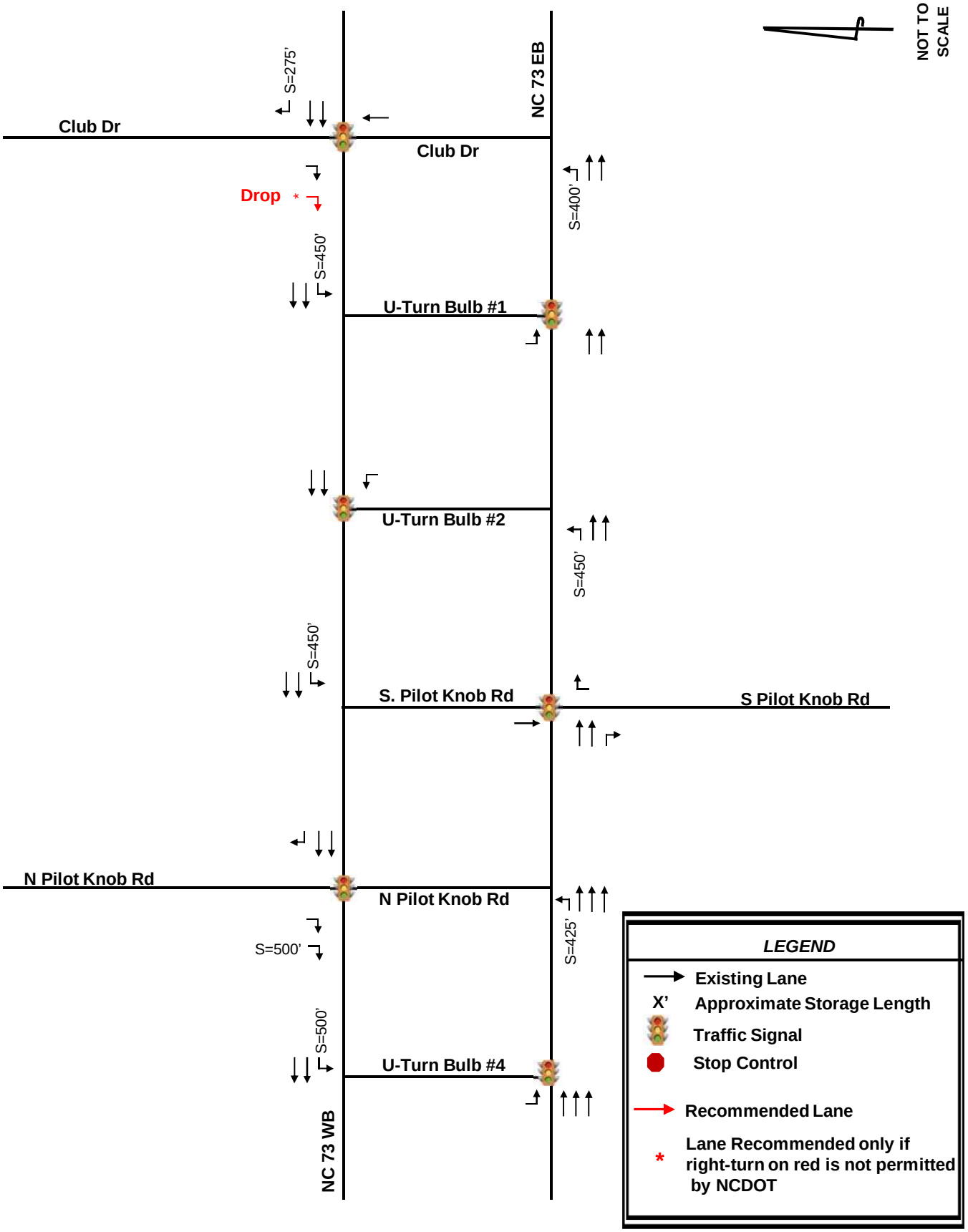
Per NCDOT MSTA guidelines the total onsite queuing should accommodate 4,241 feet for the high demand volume for grades K-8 for 765 students. Please note the high demand is for 765 students (full enrollment) and not 510 students (staggered start) in the situation that there is an event for the entire school.

The 2020 build-out recommendations at the study intersections are shown in Figure 8.1. The transportation improvements shown on this figure are subject to approval by NCDOT. All additions and attachments to the State and County roadway system shall be properly permitted, designed and constructed in conformance to standards maintained by the agencies.

The site operational plan, which shows the desired school drop-off, pick-up, high demand queues, total onsite queuing, operation restrictions, and proposed improvements for the offsite roadways is shown in Figure 8.2.



Kimley»Horn	Lincoln Charter School Traffic Impact Analysis	2020 Build-Out Improvements	Figure 8.1



Kimley»Horn	Lincoln Charter School Traffic Impact Analysis	2020 Build-Out Improvements	Figure 8.1 (Cont.)

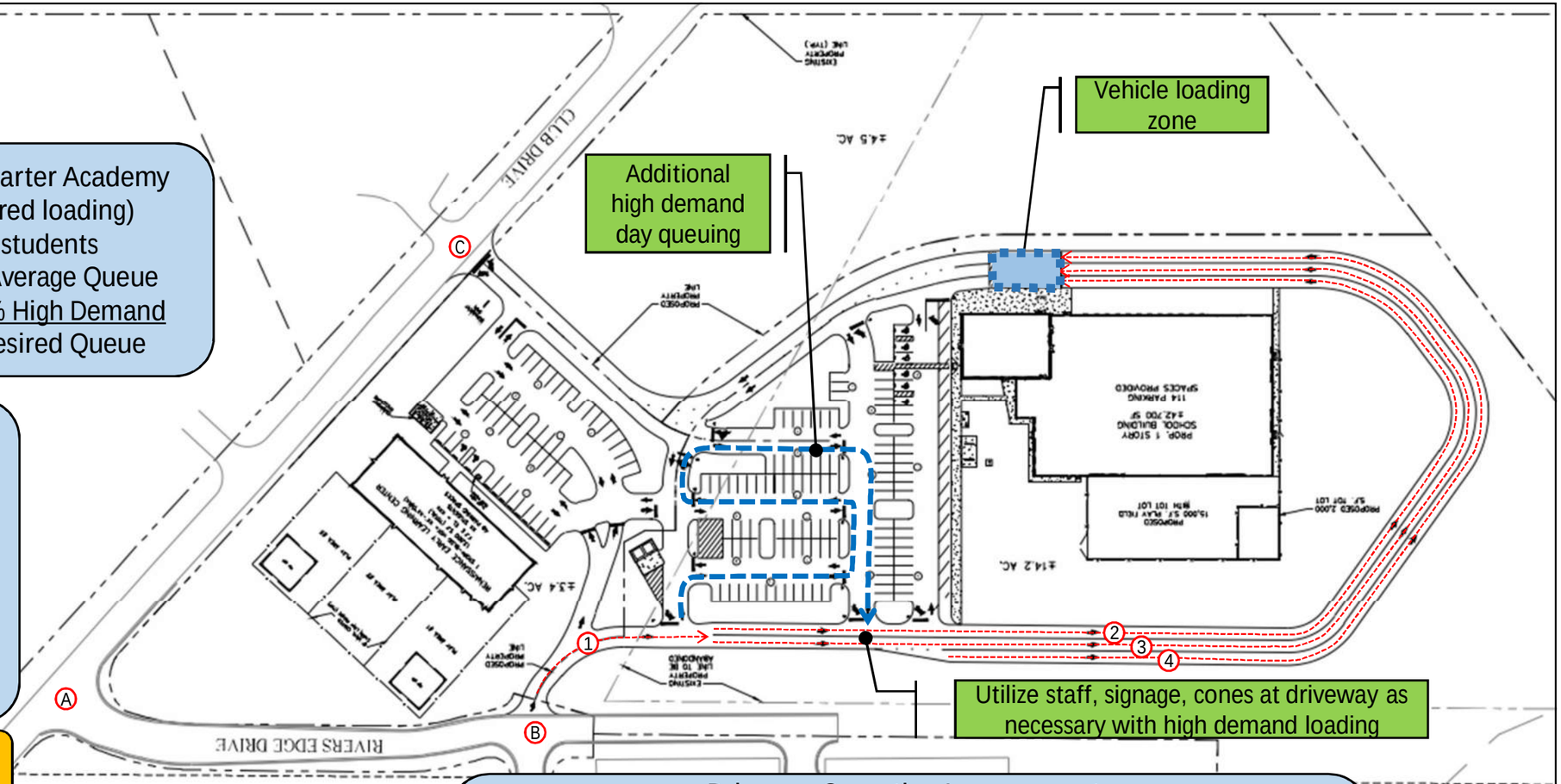
Lincoln Charter Academy
(full site loading)
765 Student Population
3,262 Feet Average Queue
979 Feet 30% High Demand
4,241 Desired Queue

Lincoln Charter Academy
(staggered loading)
510 students
2,175 ft Average Queue
652 ft 30% High Demand
2,827 Desired Queue

Average Day Queuing
The site layout provides:
Lane 1 – 200 ft
Lane 2 – 1,275 ft
Lane 3 – 1,275 ft
Lane 4 – 1,125 ft
3,875 ft Average Day Queue Provided

High Demand Day Queuing
The site layout provides:
Lane 1 – 810 ft additional queuing

Total on-site provided stacking (average + high demand) = 4,660 feet



Driveway Operation Improvements

Ⓐ Northbound left-turn lane with 350 feet of storage and appropriate taper
Southbound right-turn lane with 125 ft of storage and appropriate taper

Ⓑ Entrance only driveway

Ⓒ Dedicated right and left-turn exiting lanes

Campus Operations Restrictions

- 30 minute staggered schedule:
  - Grades k-5 with 510 maximum students starting at 8:00 am
  - Grades 6-8 with 255 maximum students starting at 8:30 am
- Operator will provide before and after school program to accommodate the staggered schedule
- Vehicle Loading zone will load a maximum of 6 cars at one time (3 lanes by 2 vehicles deep)
- Appropriate on-campus traffic control will be utilized (staff, cones, signage) to handle high demand day operations

Kimley»Horn	Lincoln County Charter School Traffic Impact Analysis	Site Operational Plan	Figure 8.2