



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: November 17, 2017

Re: PD #2017-5
Essex Homes, applicant
Parcel ID# 51872

The following information is for use by the Lincoln County Board of Commissioners and Planning Board at their joint meeting/public hearing on December 4, 2017.

REQUEST

The applicant is requesting the rezoning of 83 acres from R-T (Transitional Residential) to PD-R (Planned Development-Residential) to permit a subdivision with 215 lots for single-family detached homes. Under the Lincoln County Unified Development Ordinance, any proposed subdivision with 50 or more lots is subject to approval through the planned development process. The applicant is also proposing lots smaller in size than the minimum area permitted in the R-T district.

A concept plan and a PD-R report with terms and conditions for the proposed development have been submitted as part of the rezoning application and would serve as the master plan for the development if the rezoning request is approved. The PD-R report also includes commitments by the applicant to provide certain traffic improvements and to provide a monetary contribution toward a proposed traffic improvement project. The improvements are based on a traffic impact analysis that is included with the application. In addition, the applicant has provided minutes from a community involvement meeting that was held on Nov. 9.

SITE AREA AND DESCRIPTION

The property is located on the east side of Little Egypt Road about 1,500-4,000 feet south of Optimist Club Road. It is adjoined by property zoned R-T, PD-R, CU R-S (Conditional Use Residential Suburban) and I-G (General Industrial). The Windsor Forest subdivision and the site of the planned Canopy Creek subdivision are located on the opposite side of Little Egypt Road. Water and sewer lines are located in this area. Land uses in the area are primarily residential. This property is not located in a water-supply watershed. No portion of the property is located in a 100-year floodplain.

LAND USE PLAN AND UDO CONFORMANCE

This property falls under three different designations in the Lincoln County Land Use Plan. The southern half of the property is designated as Suburban Residential, suitable for densities of 1-2 units per acre, with greater densities achievable with the reservation of additional open space. The northern half is designated as Recreation/Open Space along a stream and as Mixed Residential on both sides of the stream. Mixed Residential calls for densities ranging from 2-8 units per acre, proportional to the amount of space preserved.

The UDO requires that a planned development include a minimum of 12.5% recreation and open space. Approximately 32% of the acreage in this proposed development would be reserved as recreation and open space. The proposed density is approximately 2.6 homes per acre.

The proposed plan complies with the UDO's subdivision standards for external access, internal connectivity, block length and cul-de-sac length.

STAFF'S RECOMMENDATION

Staff recommends that the rezoning request be approved. See staff's proposed statement of consistency and reasonableness.



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Zoning Amendment Staff's Proposed Statement of Consistency and Reasonableness

Case No. **PD #2017-5**

Applicant **Essex Homes**

Parcel ID# **51872**

Location **east side of Little Egypt Road, about 1,500-4,000 feet south of
Optimist Club Road**

Proposed amendment **rezone from R-T to PD-R to permit a subdivision with 215
single-family detached houses**

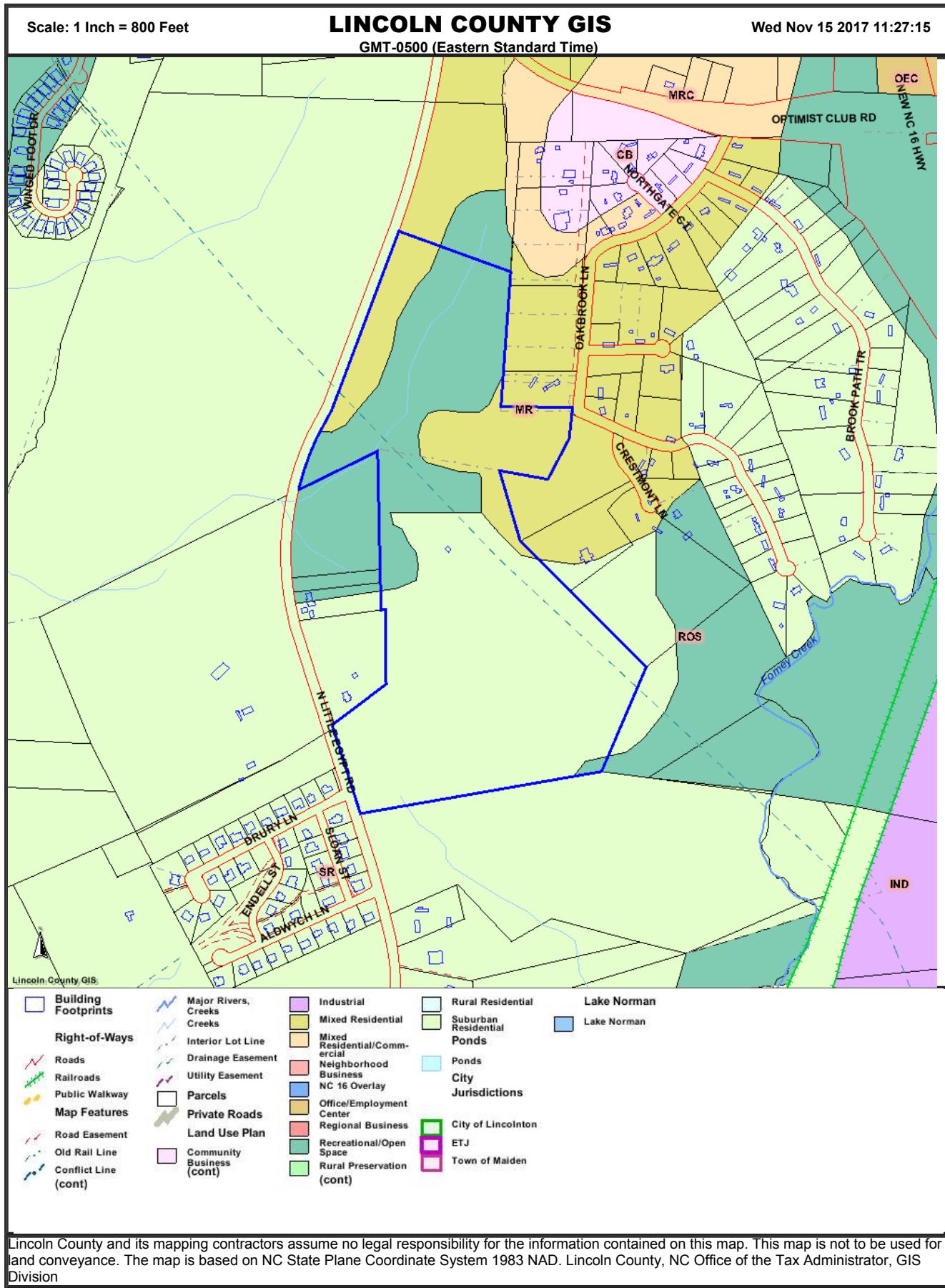
This proposed amendment **is consistent** with the Lincoln County Comprehensive Land Use Plan and other adopted plans in that:

This property is designated under the Land Use Plan partially as Mixed Residential, suitable for densities ranging from 2 to 8 dwellings units per acre, proportional to the amount of open space preserved; partially as Suburban Residential, suitable for densities of 1-2 units per acre, with greater densities achievable with the reservation of additional open space; and partially as Recreation/Open Space. The proposed density is 2.6 homes per acre. Approximately 32% of the site will be reserved as recreation and open space, compared to the minimum requirement of 12.5%.

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

The surrounding area is primarily residential. This property is located less than a mile from a four-lane, divided highway that serves the region. Approximately one third of the site will be set aside as recreation and open space. Amenities will be provided for residents of the development as part of the master plan. As part of the rezoning, road improvements and a monetary contribution toward road improvements will be provided to mitigate the impact of the development.

PD #2017-5
Land Use Plan map for subject property



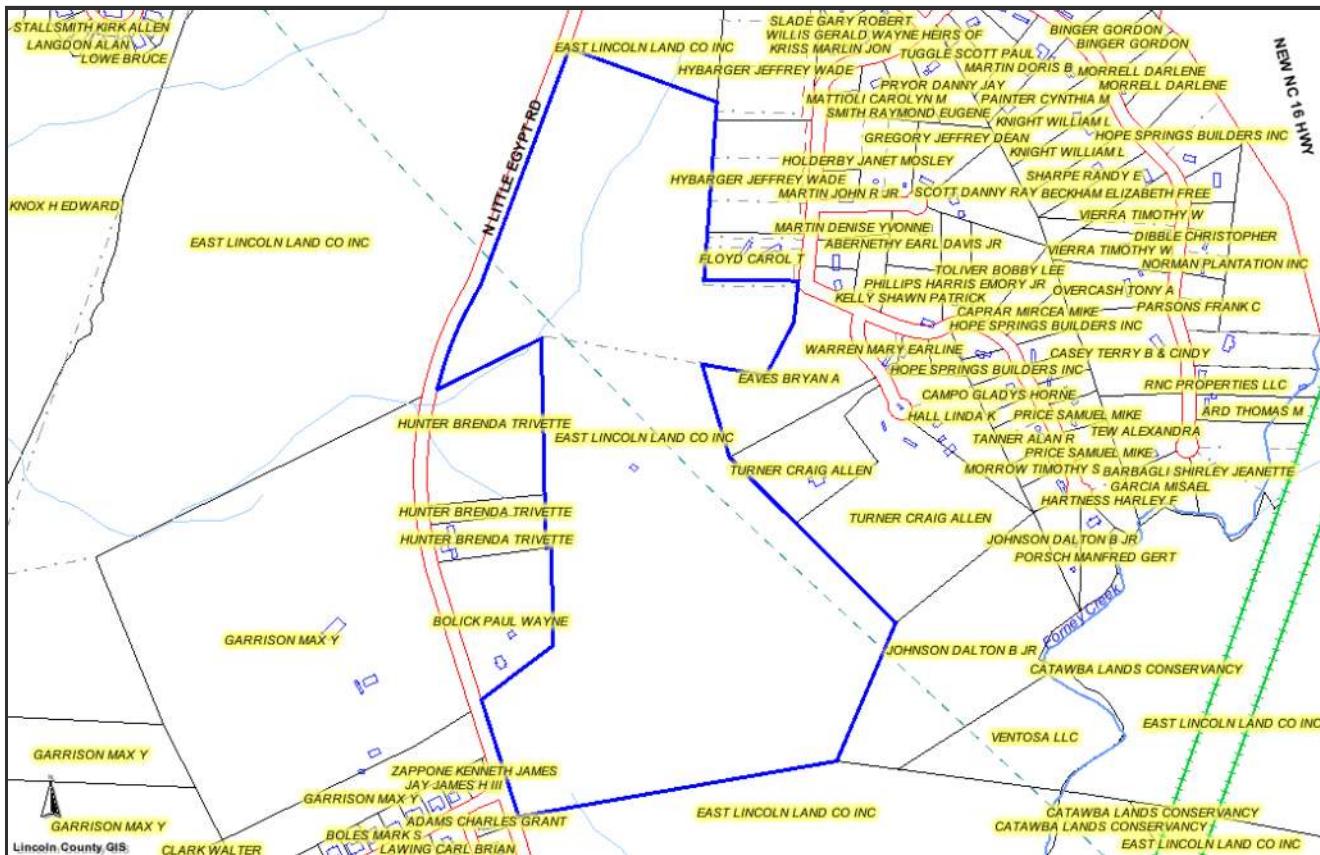


Lincoln County, NC

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: 10/19/2017 Scale: 1 Inch = 800 Feet



PHOTOS

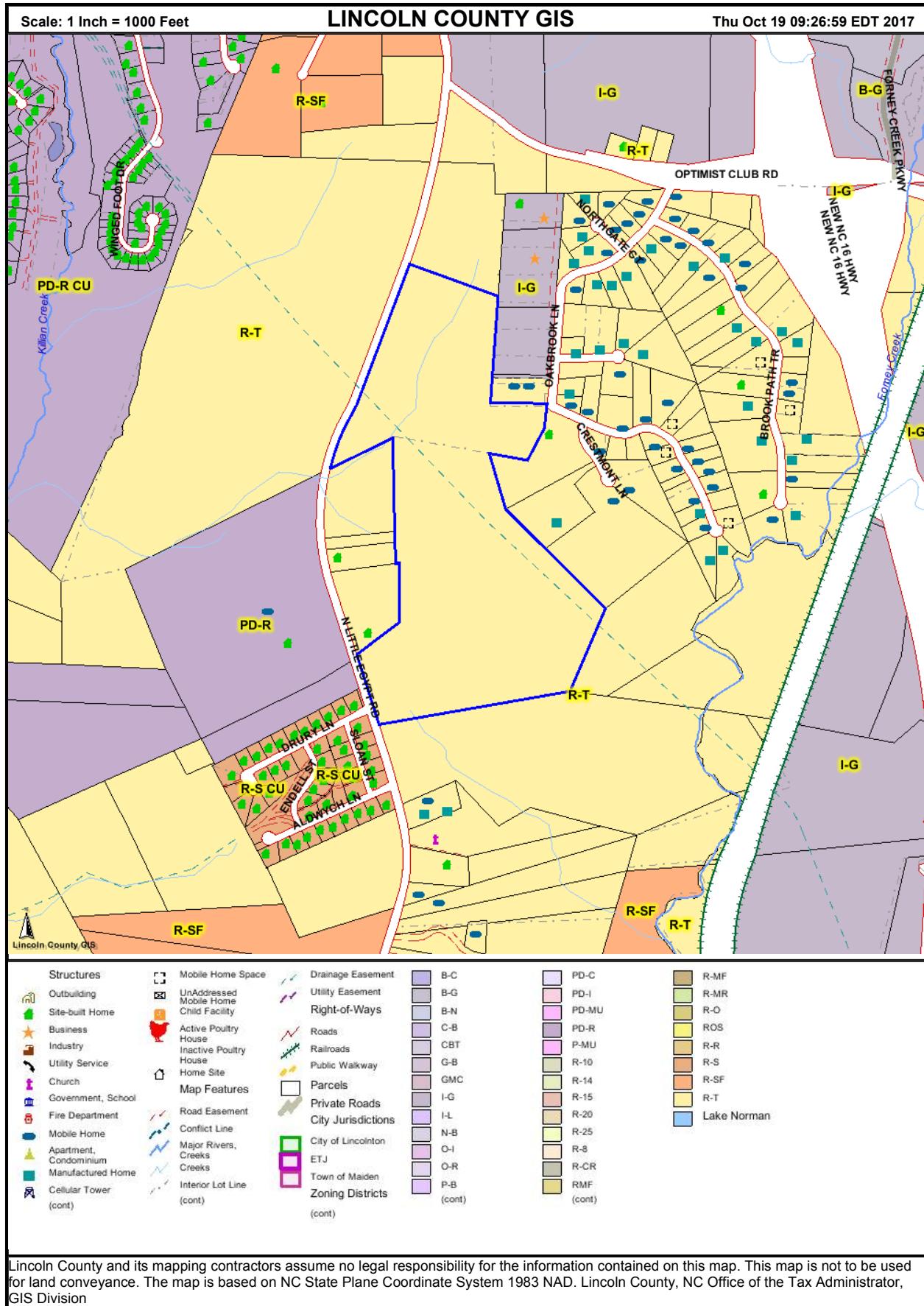


Photo Not Available

PARCEL INFORMATION FOR 3693-82-1361

Parcel ID	51872	Owner	EAST LINCOLN LAND CO INC		
Map	3693-00	Mailing	PO BOX 9		
Account	36276	Address	LINCOLNNTN NC 28093		
Deed	836-796	Last Transaction Date	8/5/1993	Sale Price	\$219,500
Land Value	\$597,888	Total Value	\$597,888	Previous Parcel	
----- All values are for tax year 2016. -----					
Description	H. NIXON RD 1380		Deed Acres	0	
Address	N LITTLE EGYPT RD		Tax Acres	82.94	
Township	CATAWBA SPRINGS		Tax/Fire District	EAST LINCOLN	
Improvement			No Improvements		
Zoning		Calculated	Voting Precinct	Calculated	Acres
District		Acres	TRIANGLE (TR30)		82.95
R-T		82.95			
Watershed Class			Sewer District		
Not in a watershed	82.95		Not in the sewer district		82.95
2000 Census County			Tract	Block	
37109			071100	1035	0.15
37109			071100	1042	82.77
37109			071100	1043	0.03
Flood	Zone Description		Panel		
X	NO FLOOD HAZARD		3710369300		82.95

PD #2017-5
subject property is outlined in blue





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 Essex Homes

Applicant Address 13000 South Tryon St. - F205 Charlotte, NC 28278

Applicant Phone Number 980-293-2684

Property Owner Name East Lincoln Land Co.

Property Owner Address Po Box 9 Lincolnton, NC 28093

Property Owner Phone Number 704-735-9001

PART II

Property Location 938 N. LITTLE EGYPT Rd.

Property ID (10 digits) 3693-82-1361 Property size 82.94

Parcel # (5 digits) 51872 Deed Book(s) 836 Page(s) 796

PART III

Existing Zoning District R-T Proposed Zoning District PD-R

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

CURRENTLY THE PROPERTY IS ALL WOODED WITH A NATURAL GAS EASEMENT RUNNING THROUGH THE PROPERTY. THERE ARE NO EXISTING STRUCTURES ON SITE

Briefly described the proposed planned development.

THE PROJECT WILL INCLUDE 222 SINGLE-FAMILY RESIDENTIAL DWELLINGS. 31% OF THE DEVELOPMENT WILL BE OPEN SPACE.

*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

10/2/17
Date

PLANNED DEVELOPMENT REPORT
FOR
LITTLE EGYPT DEVELOPMENT
LITTLE EGYPT ROAD
LINCOLN COUNTY, NORTH CAROLINA



PREPARED BY:



CES GROUP ENGINEERS, LLP
274 N. Hwy 16, Suite 300
Denver, NC 28037
Phone: 704-489-1500
Firm License #: F-1240

October 02, 2017
REVISED: November 15, 2017

**PLANNED DEVELOPMENT CONDITIONS
LITTLE EGYPT ROAD DEVELOPMENT
LITTLE EGYPT ROAD
LINCOLN COUNTY, NC**

1. PROJECT INFORMATION

Little Egypt Road Development is a proposed multi-family detached building, residential community on approximately 82.94+/- acres, located on the east side of North Little Egypt Road. The property has PID number, # 51872.

Access to the site will be from North Little Egypt Road. Land uses surrounding the site include Residential Suburban-Conditional Use (R-S CU) and Planned Development Residential (PD-R) to the west, Residential Transitional (R-T) and Industrial General (I-G) to the north and south.

The property is currently zoned Residential Transitional (R-T). The proposed zoning is Planned Development Residential (PD-R). The property is not located in a flood zone. The property is not located in a critical or protected watershed.

The proposed development currently shows 215 single family lots with a density of 2.59 units per acre. A key feature of the proposed development will be the ample open space. A minimum of 32.37% of the site will be left as passive and active open space.

2. GENERAL PROVISIONS

The Planned Development (PD) Plan is intended to reflect a generalized arrangement of the site in terms of lot layout, street network, and open space areas. Final lot configuration, placement and size of individual site elements, streets alignments, etc. may be altered or modified within the limits of the Ordinance as described in Section 9.5.13, and the standards established within these conditional notes during the design development (platting) and construction phases. The Petitioner reserves the right to make minor modifications and adjustments to the approved PD Plan, including minor reconfiguring lots and street layouts, subject to staff approval, provided that the total number of residential units does not exceed the maximum permitted. Any major modifications will require resubmittal to the Board of Commissioners.

3. DEVELOPMENT STANDARDS

Pursuant to Sections 2.4.9 and 9.5 of the Lincoln County Unified Development Ordinance Planned Development Districts and Planned Development Standards respectively; the Petitioner seeks to obtain approval of the use of the following Development Standards concurrently with the approval of the Rezoning Petition. These standards, as established both by the conditional notes as set out below and as depicted on the Preliminary Concept Plan shall be followed for development of the property. Unless otherwise approved as part of these conditional notes, the Lincoln County Unified Development Ordinance shall prevail when developing the site.

A. PERMITTED USES

- 1) The project shall be limited to 215 single-family residential dwellings
- 2) Uses on the Common Open Space (COS) may include landscaping, fences, walls, berms, pedestrian trails, recreational uses, entry signage, monuments, and storm water BMPs (as required).

B. DENSITY

Gross residential density for the project will not exceed 2.59 units per acre. Open space areas shall be included in the calculations for gross residential density.

C. LOT STANDARDS

The proposed development includes a Class "B" buffer around the perimeter of the project. Existing vegetation will be used to meet the buffer requirements where possible. Residential lots will have the following setbacks:

Front Setback:	20 feet
Side Setback:	5 feet (10 feet for corner lots)
Rear Setback :	30 feet

Typical lot size will be 60 feet x 120 feet. Building height shall be limited to 30 feet. Lot platting will meet Lincoln County subdivision regulations.

D. GENERAL SITE DESIGN

The following items will be offered as part of this development:

- 1) Streets within the subdivision shall be designed per NCDOT standards. Roadways will be dedicated to NCDOT for maintenance once density requirements are met.
- 2) All fencing shall be consistent in nature and subject to review and approval by the property management association and shall respect all sight triangles. Front yard fencing is prohibited. Rear and side yard fencing, including fencing on corner lots, shall not exceed 5' in height. Fence materials may include wood, metal, or decorative PVC.
- 3) The project will contain the following amenity features. These proposed amenity areas will be installed concurrently with the lots immediately surrounding them.
 - a. Sidewalks along all proposed streets, on one side

- b. Picnic tables with outdoor grills
- c. Pedestrian Trails
- d. Benches
- e. Landscape areas
- f. Park
- g. Enhanced entry
- h. A signage plan shall be submitted for the development at the time construction drawings are prepared for the first section of the development. All signage shall conform to standards of the Lincoln County Unified Development Ordinance. Signage shall be monument style and shall complement the architectural characteristics of the neighborhood.

- 4) Canopy street trees shall be placed at 40 feet on center along both sides of the proposed streets. Any existing trees in excess of 6 caliper inches within the planting strip shall be credited for two required trees to be planted. Williams Transco right-of-way, intersection sight triangles, and proposed driveway locations may vary the placement of street trees.
- 5) Decorative lighting shall be used through the project.
- 6) Mail box kiosks locations will be reviewed by the Postmaster.
- 7) Dry utilities for telephone, cable TV, electricity, and natural gas will be provided by local utility companies. Utilities within the community shall be placed underground. The main feed lines and transformers from the main road may be located above ground.
- 8) Garbage collection will be provided by a private service and included in homeowner association dues.
- 9) Open Space
 - a. The project will offer 30 to 40 % of common open space. Common open space will be provided as generally depicted on the PD Plan.
 - b. A portion of the open space will be active open space.
 - c. The project will offer a Class B perimeter buffer with accordance to the Lincoln County UDO.

E. STORMWATER COMPLIANCE

The development will be subject to Lincoln County's storm water management regulations in place at the time of preliminary plat submittal. Storm water BMPs will be incorporated into the design. Stream buffers shall be provided along all jurisdictional streams in accordance with NC DENR and Lincoln County requirements.

F. ESTABLISHMENT OF A PROPERTY ASSOCIATION

A Property Management Association shall be established and will be responsible for maintaining all rights-of-way landscaping, signs, amenity features, storm water BMPs, and common open space areas. The documents covering the structure of the association shall be filed with the recorded final plat.

G. RESTRICTIVE COVENANTS

Restrictive Covenants will be created and recorded prior to final plat recordation, to establish, among other items, permitted uses and maintenance responsibility of the property management association. Restrictive covenants will include language that ensures stream buffers, perimeter buffers, and setback areas are protected.

H. VEHICULAR ACCESS AND ROAD IMPROVEMENTS

- 1) Vehicular access: Two access locations will be provided from North Little Egypt Road onto the proposed site.
- 2) Improvements to Existing Roads: A Traffic Impact Analysis (TIA) has been prepared for the development. In addition to the improvements listed below, the developer shall contribute \$100,000 toward a proposed NCDOT project to widen N.C. 73 from Little Egypt Road eastward to the existing four-lane section. Payment shall be due no later than one year from the recording of the Phase 1 plat or prior to the recording of the Phase 2 plat, or at such time that NCDOT has an approved project, whichever is sooner. Below is a list of the TIA's recommended improvements. These will be installed per NCDOT requirements based on the timeline determined by NCDOT and the traffic engineer's phasing analysis per NCDOT.

NC 73 at N. Little Egypt Road and South Little Egypt Road

- Construct an exclusive right-turn lane on southbound Little Egypt Road. The exact storage should be determined through roadway design, but the storage should be maximized without interfering with the school driveway to the north. This is estimated to be approximately 120 feet of full width storage and appropriate taper.
- Restripe the southbound shared thru/right turn-lane to an exclusive thru lane.
- The above recommendations may require the modification of the traffic signal at the intersection.

N. Little Egypt Road at Drury Lane/ Road E

- Construct Road E with one (1) ingress lane and one (1) egress lane consisting of a shared left/thru/right-turn lane. The proposed intersection will operate under stop-control.
- Construct an exclusive right-turn lane with 50 feet of full-width storage and appropriate taper on northbound N. Little Egypt Road.
- Construct an exclusive left-turn lane with 50 feet of full-width storage and appropriate taper on southbound N. Little Egypt Road.

N. Little Egypt Road and St. James Church Road at Optimist Club Road

- Construct an exclusive left-turn lane with 50 feet of full-width storage and appropriate taper on westbound Optimist Club Road.

N. Little Egypt Road at Road A

Construct Road A with one (1) ingress lane and one (1) egress lane consisting of a shared left/thru/right-turn lane. The proposed intersection will operate under stop-control.

I. CONSTRUCTION SCHEDULE AND PHASING

The development of the site will be completed in two phases.

J. MODEL HOMES/SALES OFFICES

Model homes may be constructed within residential areas at the developer's discretion. Mobile temporary sales offices shall be allowed at the developer's discretion and shall be subject to any special permits required by Lincoln County. All models shall have an approved all-weather surface (concrete, asphalt, etc.) prior to the issuance of a Certificate of Occupancy.

K. WATER AND SEWER AVAILABILITY

The property is within the Lincoln County Sewer District and Lincoln County Water District. The Petitioner understands that water and sewer availability must be approved by Lincoln County prior to development. It is the Petitioner's responsibility to incur all permit fees, availability fees, infrastructure costs for providing the water and sewer throughout the project for all buildings. The Petitioner will comply with all the County's water and sewer standards.

Water lines are currently near the property running along North Little Egypt Road. Sewer lines are currently running near the property running along Killian Creek.

L. APPLICABLE ORDINANCES

Development will be subject to the standards and requirements of the UDO in effect at the date of approval by the Board of Commissioners of the Conceptual Plan of the application for rezoning.

M. BINDING EFFECT

All conditions applicable to the development of the property approved with this rezoning, unless amended by the manner provided in the UDO, shall be binding to the Petitioner and subsequent owners of the Site and their assigns.

N. AMENDMENTS TO THE APPROVED CONDITIONAL DISTRICT PLAN

It is understood that the owner of the property must apply for any future amendments to the Development Standards, Conditional Notes and in accordance to the provisions of the UDO, Section 9.5.13.

Meeting Minutes

Date/Time: **Thursday November 9, 2017 – 7:00 pm**

Location: **East Lincoln Community Center, 8160 Optimist Club Rd, Denver, NC**

Purpose: **Lincoln County community involvement meeting to provide information regarding Little Egypt Road subdivision proposal and to receive comments prior to public hearing.**

Presenters: **Robert Davis; James Jones, P.E., CES Group Engineers, LLP. Mr. Bob Bennett and Mr. Brian Iagnemma from Essex Homes were present.**

Introduction:

Mr. Martin Oakes, Lincoln County Board of Commissioners Vice Chair spoke about the development review process in the County and how the process is based on the rule of law.

Robert Davis introduced the team and representatives of Lincoln County and the Planning Board. The community which will meet or exceed all sections of the Lincoln County UDO and East Lincoln Development District requirements.

Mr. Jones presented an overview of the community. This request would rezone the property from Residential Transitional (R-T) to Planned Development-Residential (PDR). Little Egypt Road Subdivision is a proposed residential community located in East Lincoln County. Little Egypt Road Subdivision will feature 215 homes on 83 acres with two access entrances off of Little Egypt Road. The proposed density would be 2.59 %. Mr. Jones presented a slideshow describing the proposed development. The development will include 32% open space. The roads are designed along the ridge lines. The development would be developed in two (2) phases with the first phase starting at the southern entrance. A second emergency entrance would have to be constructed after 30 homes were built. After 50 homes were built the entire roadway to the second entrance would have to be constructed. The development will have walking trails, parks, street trees and sidewalks. Essex Homes will develop the site and build the houses. Home prices will start at \$260,000 and go up to \$320,000. The road cross section will be a 50 feet right of way with 22 feet of pavement, curb and gutters and sidewalks.

Following the presentation by Mr. Jones, Mr. Davis pointed out that a Traffic Impact Study had been completed and Essex homes would be installing a right hand turn lane on Little Egypt Road at the intersection of NC 73, a right hand turn lane on Saint James Road at the intersection with North Little Egypt Road and contributing \$100,000 to the North Carolina Department of Transportation for the widening on NC 73 from Bypass 16 to Little Egypt Road. Right and left turn lanes at the southern entrance will also be installed by Essex Homes

Key Features of the Community:

- Essex Homes has a customer service satisfaction rate of 96%.
- Essex Homes utilizes E-Built technology, making their homes 25% - 35% more efficient than today's standard new homes.
- Over 32% open space; more than double the 12.5% that is required.
- Landscaped entrance with decorative entrance monument.
- 5' sidewalk along all proposed streets and canopy trees / decorative lighting along both sides.
- Community cabana with pool, restrooms and picnic area
- Pedestrian access is proposed, open spaces
- Project is proposed in two (2) phases

Items from Slideshow:

1. Homes are expected to range from the mid-200's to 300K+, ranging in size from 1,850 sf - 1 story ranch to 3,500 sf – 2 story homes.
2. Setback requirements – The proposed development includes a Class C buffer around the perimeter of the project. Residential lots will have front setbacks of 20', side setbacks of 5' (10' for corner lots), and a rear setback of 30'.
3. Storm water will be designed in a manner that will keep post flow rates from causing erosion downstream from the site.
5. Roadways will be designed to NCDOT standards and turned over to NCDOT.
6. Offsite roadway improvements, as determined by the TIA, at the subdivision main entrance to Little Egypt Road, Intersection to NC73 and intersection to Saint James Road were described.

Open Discussion

Presentation boards were presented with the site plan, the turn lane improvements, the type of house construction and the amenities.

1. Site plan

Several residents were present that lived adjacent to the property. One property owner indicated he had just started his house construction and it was in line with a road extension. He asked if the cul de sac could be pulled back from the property line and Mr. Hawkins from the County indicated it most likely could be. The development would have to maintain the 1.4 ratio for nodes to links which it does.

Other property owners asked what the buffers were and it was indicated the buffers were 20 to 200 feet wide.

Attendees were made aware of the joint Commissioner and Planning Board meeting scheduled for December 4, 2017 at 6:30pm.

**ESSEX HOMES
LITTLE EGYPT ROAD DEVELOPMENT
LINCOLN COUNTY, NC**

Traffic Impact Analysis

October 4, 2017

PREPARED BY:

Matthew Peach, PE, PTOE
A. Morton Thomas and Associates, Inc.
6131 Falls of Neuse Rd, Suite 106
Raleigh, NC 27609
919-855-9989

AMT Project File 17-0736.001
NC License No: F-1049



**ESSEX HOMES
LITTLE EGYPT ROAD DEVELOPMENT
LINCOLN COUNTY, NC**

Traffic Impact Analysis

October 4, 2017

PREPARED BY:

Matthew Peach, PE, PTOE
A. Morton Thomas and Associates, Inc.
6131 Falls of Neuse Rd, Suite 106
Raleigh, NC 27609
919-855-9989

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EXECUTIVE SUMMARY

The proposed Little Egypt Road Development is located near the intersection of N. Little Egypt Road at Optimist Club Road in eastern Lincoln County, North Carolina. The development is proposed to consist of single family homes to be completed in 2022 with a total of 222 single family units.

This report summarizes the analyses of 2017 Existing conditions, 2022 No-Build conditions (without proposed development and with the Approved Adjacent Developments in place), 2022 Build conditions (with the proposed development in place), and 2022 Build Improved conditions (with proposed development and Recommended Improvements in place) during the AM and PM peak hours.

AMT (A. Morton Thomas and Associates, Inc.) was retained to determine the potential traffic impacts of this development in accordance with the traffic study guidelines set forth by Lincoln County and the North Carolina Department of Transportation (NCDOT) and the transportation improvements that may be required to accommodate these impacts. This report presents trip generation, distribution, capacity analyses, and recommendations for transportation improvements required to meet anticipated traffic demands.

As approved by Lincoln County and NCDOT, the following four (4) intersections are included as part of the area of influence for the development.

- *NC 16 Bypass at Optimist Club Road*
 - *Existing: Unsignalized Restricted Crossing U-Turn (i.e. superstreet) intersection*
 - *Study includes U-turn locations*
 - *Study also includes the future signalization of the intersection and the U-turn locations.*
- *N. Little Egypt Road / St. James Church Road at Optimist Club Road*
 - *Existing: Unsignalized three-legged intersection*
- *N. Little Egypt Road / S. Little Egypt Road at NC 73*
 - *Existing: Signalized four-legged intersection*
- *N. Little Egypt Road at Drury Lane*
 - *Existing: Unsignalized three-legged intersection*

The following two (2) proposed access points are included in the study:

- *N. Little Egypt Road / Drury Lane at Road E*
 - *Proposed: Unsignalized four-legged intersection*
- *N. Little Egypt Road at Road A*
 - *Proposed: Unsignalized three-legged intersection*

Access to the site is proposed to be provided by two (2) access points creating the one new intersection noted above. The first full-movement access point is located approximately 4,800 feet south of the N. Little Egypt Road and Optimist Club Road intersection. This will add a fourth leg to the existing intersection. The second full-movement access point is proposed for N. Little Egypt Road. This full-movement access is located approximately 1,700 feet south of the N. Little Egypt Road and Optimist Club Road intersection. This will create a three-legged intersection.

Data Collection

Traffic counts were performed by National Data & Surveying Services or taken from other traffic studies submitted to Lincoln County. All study area intersections were counted while traditional calendar schools were in session. Where traffic counts were collected in 2016, these counts were grown by two-percent (2%) to reflect 2017 existing traffic volumes.

Traffic Volume Development

The site is envisioned to be completed by year 2022. Per the MOU, existing traffic volumes were increased by two percent (2%) per year to reflect 2022 traffic. Additionally, this study includes traffic generated by the Canopy Creek and Creek Park developments.

Site Trip Generation and Distribution

Trip generation equations are provided in the *ITE Trip Generation Manual, 9th Edition*. The development is proposed to consist of 222 single family homes (ITE Code 210). It was estimated that a total of 167 trips (42 in, 125 out) will be generated from the proposed site in the AM peak hour and 222 trips (140 in, 82 out) will be generated in the PM peak hour.

The site generated trips to and from the proposed site were distributed in accordance with the apparent traffic patterns by the users of the proposed development and the existing traffic patterns and land uses in the vicinity. The resultant trip distribution for the proposed development is as follows:

- 30% to/from the South on NC 16 Bypass
- 10% to/from the North on NC 16 Bypass
- 10% to/from the North on N. Little Egypt Road
- 40% to/from the East on NC 73
- 10% to/from the West on NC 73

Analysis Results

Table ES-1 summarizes the results of the various analyses.

Table ES-1: Analysis Summary

Intersection / Approach LOS (sec. delay/veh.)	2017 Existing		2022 No-Build		2022 Build		2022 Build Improved	
	AM	PM	AM	PM	AM	PM	AM	PM
INTERSECTION 1 – NC 73 at N. Little Egypt Road / S. Little Egypt Road (SIGNALIZED)								
Overall	D (43.8)	C (26.5)	E (75.8)	D (36.7)	F (90.6)	D (38.2)	F (90.2)	D (38.2)
Eastbound Approach	D (43.8)	C (22.0)	E (73.3)	C (27.5)	E (74.1)	C (28.0)	E (71.3)	C (28.0)
Westbound Approach	C (34.5)	C (24.9)	D (45.4)	D (40.8)	D (49.3)	D (42.9)	D (47.7)	D (42.9)
Northbound Approach	E (57.7)	E (57.1)	E (57.8)	E (57.2)	E (57.9)	E (57.2)	E (57.2)	E (57.2)
Southbound Approach	E (63.2)	D (36.0)	F (147.7)	D (35.6)	F (201.7)	D (37.1)	F (207.3)	D (37.1)
INTERSECTION 2 – N. Little Egypt Road at Drury Lane / Road E (UNSIGNALIZED)								
Eastbound Approach	A (9.5)	A (9.1)	B (10.3)	B (10.1)	B (10.7)	B (11.5)	B (10.7)	B (11.3)
Westbound Approach					B (12.3)	B (12.2)	B (12.2)	B (11.9)
Northbound Left-Turn	A (7.6)	A (7.4)	A (7.9)	A (7.6)	A (8.0)	A (7.6)	A (8.0)	A (7.6)
Southbound Left-Turn					A (7.6)	A (7.9)	A (7.6)	A (7.8)
INTERSECTION 3 – N. Little Egypt Road / St. James Church Road at Optimist Club Road (UNSIGNALIZED)								
Westbound Approach	B (13.4)	A (9.9)	C (20.1)	B (11.7)	E (36.2)	B (14.7)	C (17.1)	B (11.6)
Southbound Left-Turn	A (7.9)	A (7.5)	A (8.3)	A (7.7)	A (8.6)	A (7.8)	A (8.6)	A (7.8)
INTERSECTION 4 – NC 16 Bypass at Optimist Club Road (UNSIGNALIZED)								
Eastbound Approach	D (33.5)	B (13.2)						
Westbound Approach	C (20.1)	E (39.4)						
Northbound Left-Turn	F (67.2)	D (34.3)						
Southbound Left-Turn	E (38.4)	F (130.2)						
INTERSECTION 4 – NC 16 Bypass at Optimist Club Road (FUTURE SIGNALIZED)								
Overall			B (16.2) / B (12.5)	A (8.9) / B (11.0)	B (18.4) / B (12.3)	B (10.0) / B (11.0)		
Eastbound Approach			C (31.8)	C (23.2)	D (40.3)	C (24.3)		
Westbound Approach			C (21.5)	C (31.1)	C (21.5)	C (31.1)		
Northbound Approach			B (13.3)	B (17.3)	A (9.6)	A (7.6)		
Southbound Approach			B (10.3)	B (19.0)	B (13.1)	A (6.0)		
INTERSECTION 5 – NC 16 Bypass at North U-Turn (UNSIGNALIZED)								
Westbound Left-Turn	E (44.6)	C (15.4)						
INTERSECTION 5 – NC 16 Bypass at North U-Turn (FUTURE SIGNALIZED)								
Overall			B (17.8)	A (8.6)	B (17.8)	A (8.6)		
Westbound Approach			B (19.4)	B (18.9)	B (19.0)	B (19.0)		
Southbound Approach			B (17.5)	A (7.0)	B (17.6)	A (7.0)		
INTERSECTION 6 – NC 16 Bypass at South U-Turn (UNSIGNALIZED)								
Eastbound Left-Turn	C (15.9)	C (25.2)						
INTERSECTION 6 – NC 16 Bypass at South U-Turn (FUTURE SIGNALIZED)								
Overall			A (8.9)	B (10.7)	B (10.0)	B (11.5)		
Eastbound Approach			C (20.2)	B (18.2)	C (20.9)	C (21.4)		
Northbound Approach			A (7.3)	B (10.4)	A (8.3)	B (11.1)		
INTERSECTION 7 – N. Little Egypt Road at Road A (UNSIGNALIZED)								
Westbound Approach					B (11.2)	B (10.7)		
Southbound Left-Turn					A (7.7)	A (7.7)		

All instances where the overall intersection or approach operate at an unacceptable level of service are highlighted and bolded in the above table.

Conclusions

NC 73 at N. Little Egypt Road / S. Little Egypt Road

The proposed development contributes to unacceptable delays present across all analysis scenarios. As a result, mitigation is proposed at this intersection.

Improvements at the intersection are limited in their constructability due to both NC 73 and Little Egypt Road consisting of two-lane undivided cross sections. NCDOT is planning to widen NC 73, however this widening's western limits are approximately one and a half miles to the east of this intersection.

Therefore, it is recommended to construct a southbound exclusive right-turn lane on Little Egypt Road. There is currently a short-channelized turn-lane on the approach. So this improvement seeks to provide additional storage for vehicles wishing to travel westbound on NC 73. This additional queuing does not result in a reduction in seconds of delay per vehicle on the approach. However, simulation results show reductions to vehicular queuing on the southbound approach of Little Egypt Road at NC 73.

N. Little Egypt Road at Drury Lane / Road E

Per the NCDOT's Policy on Street and Driveway Access to North Carolina Highways, because this proposed access point is off-of a state-maintained facility, the manual's nomograph requires both fifty-foot (50 ft.) left and right-turn lanes on N. Little Egypt Road.

The analysis presented herein found that Road E operates with acceptable levels of service with one egress lane serving both left, thru, and right-turning traffic.

N. Little Egypt Road / St. James Church Road at Optimist Club Road

The traffic analysis indicates that operations on the westbound approach of Optimist Club Road degrade from LOS C in the no-build to LOS E in the build scenario during the AM peak hour. As a result, mitigation is proposed at this intersection.

It should be noted that Lincoln County GIS indicate the right-of-way width to be sixty (60) feet. If this is not accurate and right-of-way is not able to be obtained; this improvement should be waived.

NC 16 Bypass at Optimist Club Road

The traffic analysis indicates that this intersection is projected to operate acceptably during both peak hours with the improvements planned by NCDOT. Therefore, improvements are not recommended at this intersection.

NC 16 Bypass at North U-Turn

The traffic analysis indicates that this intersection is projected to operate acceptably during both peak hours with the improvements planned by NCDOT. Therefore, improvements are not recommended at this intersection.

NC 16 Bypass at South U-Turn

The traffic analysis indicates that this intersection is projected to operate acceptably during both peak hours with the improvements planned by NCDOT. Therefore, improvements are not recommended at this intersection.

N. Little Egypt Road at Road A

The analysis presented herein found that low traffic volumes at this intersection are anticipated when the proposed development is constructed. As such, no additional turn-lanes are proposed at this planned intersection.

Recommendations

Based on the findings of this study, specific improvements have been identified and should be completed as part of the proposed development. The NCDOT *Policy on Street and Driveway Access to North Carolina Highways* manual

was consulted to determine the appropriate storage for the recommended auxiliary lanes; if warranted at the unsignalized site access points.

NC 73 at N. Little Egypt Road / S. Little Egypt Road

- *Construct an exclusive right-turn lane on southbound Little Egypt Road. The exact storage should be determined through roadway design, but the storage should be maximized without interfering with the school driveway to the north. This is estimated to be approximately 120 feet of full width storage and appropriate taper.*
- *Restripe the southbound shared thru-right-turn lane to an exclusive thru lane.*
- *The above recommendation may require the modification of the traffic signal at the intersection.*

N. Little Egypt Road at Drury Lane / Road E

- *Construct Road E with one (1) ingress lane and one (1) egress lanes consisting of a shared left/thru/right-turn lane. The proposed intersection will operate under stop-control.*
- *Construct an exclusive right-turn lane with 50 feet of full-width storage and appropriate taper on northbound N. Little Egypt Road.*
- *Construct an exclusive left-turn lane with 50 feet of full-width storage and appropriate taper on southbound N. Little Egypt Road.*

N. Little Egypt Road / St. James Church Road at Optimist Club Road

- *Construct an exclusive left-turn lane with 50 feet of full-width storage and appropriate taper on westbound Optimist Club Road.*

It should be noted that Lincoln County GIS indicate the right-of-way width to be sixty (60) feet. If this is not accurate and right-of-way is not able to be obtained; this improvement should be waived.

NC 16 Bypass at Optimist Club Road

There are no recommended improvements at this intersection.

NC 16 Bypass at North U-Turn

There are no recommended improvements at this intersection.

NC 16 Bypass at South U-Turn

There are no recommended improvements at this intersection.

N. Little Egypt Road at Road A

- *Construct Road A with one (1) ingress lane and one (1) egress lanes consisting of a shared left/thru/right-turn lane. The proposed intersection will operate under stop-control.*

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INTRODUCTION

The proposed Little Egypt Road Development is located near the intersection of N. Little Egypt Road at Optimist Club Road in eastern Lincoln County, North Carolina. The development is proposed to consist of single family homes to be completed in 2022 with a total of 222 single family units.

This report summarizes the analyses of 2017 Existing conditions, 2022 No-Build conditions (without proposed development and with the Approved Adjacent Developments in place), 2022 Build conditions (with the proposed development in place), and 2022 Build Improved conditions (with proposed development and Recommended Improvements in place) during the AM and PM peak hours.

AMT (A. Morton Thomas and Associates, Inc.) was retained to determine the potential traffic impacts of this development in accordance with the traffic study guidelines set forth by Lincoln County and the North Carolina Department of Transportation (NCDOT) and the transportation improvements that may be required to accommodate these impacts. This report presents trip generation, distribution, capacity analyses, and recommendations for transportation improvements required to meet anticipated traffic demands.

Lincoln County and NCDOT were contacted to obtain background information and to establish the elements to be covered in this traffic impact analysis (TIA). Please refer to Appendix A for a copy of the approved Memorandum of Understanding.

STUDY AREA DESCRIPTION

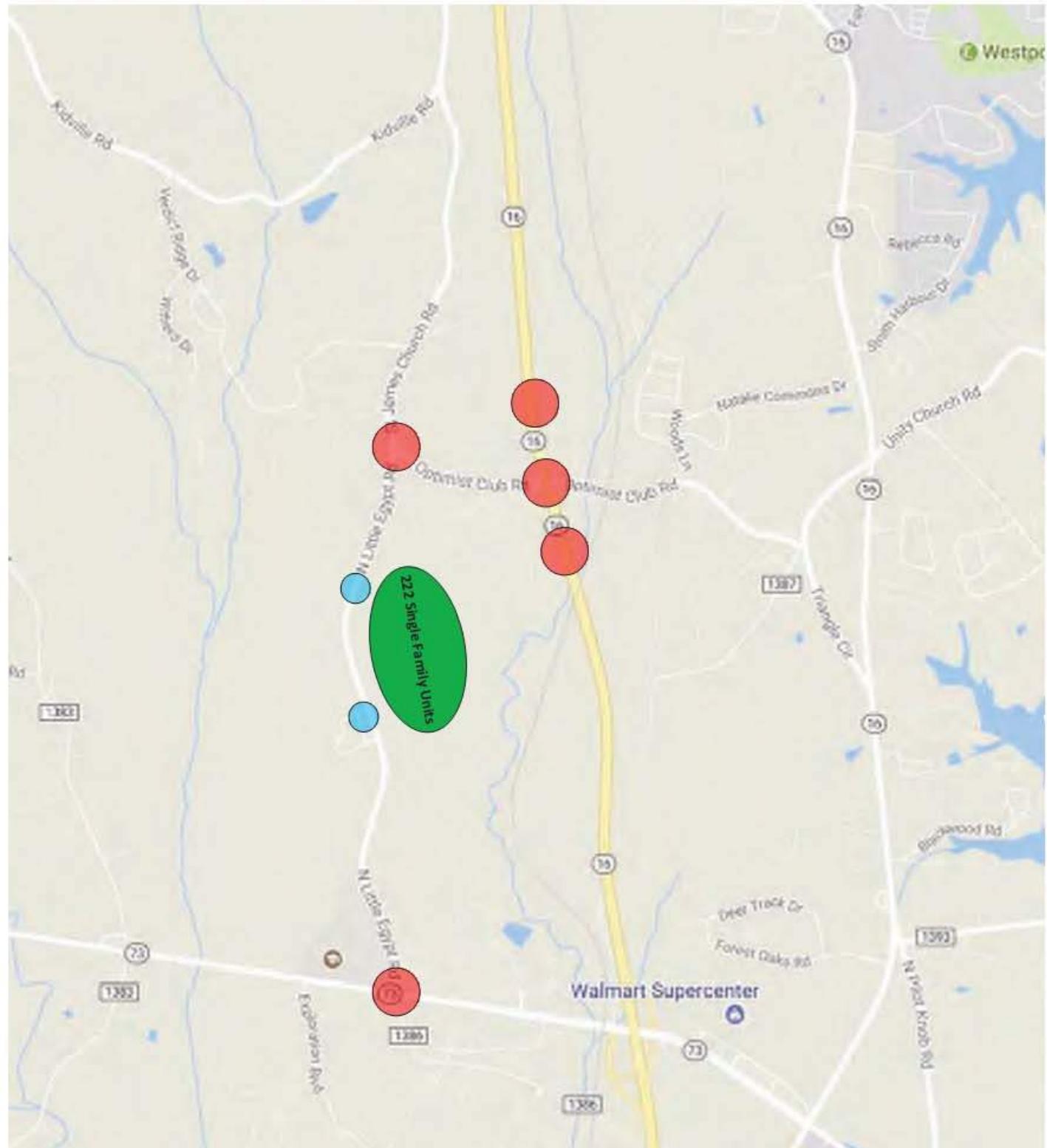
As approved by Lincoln County and NCDOT, the following four (4) intersections are included as part of the area of influence for the development (see Figure 1).

- *NC 16 Bypass at Optimist Club Road*
 - *Existing: Unsignalized Restricted Crossing U-Turn (i.e. superstreet) intersection*
 - *Study includes U-turn locations*
 - *Study also includes the future signalization of the intersection and the U-turn locations.*
- *N. Little Egypt Road / St. James Church Road at Optimist Club Road*
 - *Existing: Unsignalized three-legged intersection*
- *N. Little Egypt Road / S. Little Egypt Road at NC 73*
 - *Existing: Signalized four-legged intersection*
- *N. Little Egypt Road at Drury Lane*
 - *Existing: Unsignalized three-legged intersection*

The following two (2) proposed access points are included in the study:

- *N. Little Egypt Road / Drury Lane at Road E*
 - *Proposed: Unsignalized four-legged intersection*
- *N. Little Egypt Road at Road A*
 - *Proposed: Unsignalized three-legged intersection*

Access to the site is proposed to be provided by two (2) access points creating the one new intersection noted above. The first full-movement access point is located approximately 4,800 feet south of the N. Little Egypt Road and Optimist Club Road intersection. This will add a fourth leg to the existing intersection. The second full-movement access point is proposed for N. Little Egypt Road. This full-movement access is located approximately 1,700 feet south of the N. Little Egypt Road and Optimist Club Road intersection. This will create a three-legged intersection. The proposed site plan is shown for illustrative purposes only in Figure 2.



AMT

LEGEND

● = External Intersections

● Little Egypt Road Residential Development

● = Site Driveways



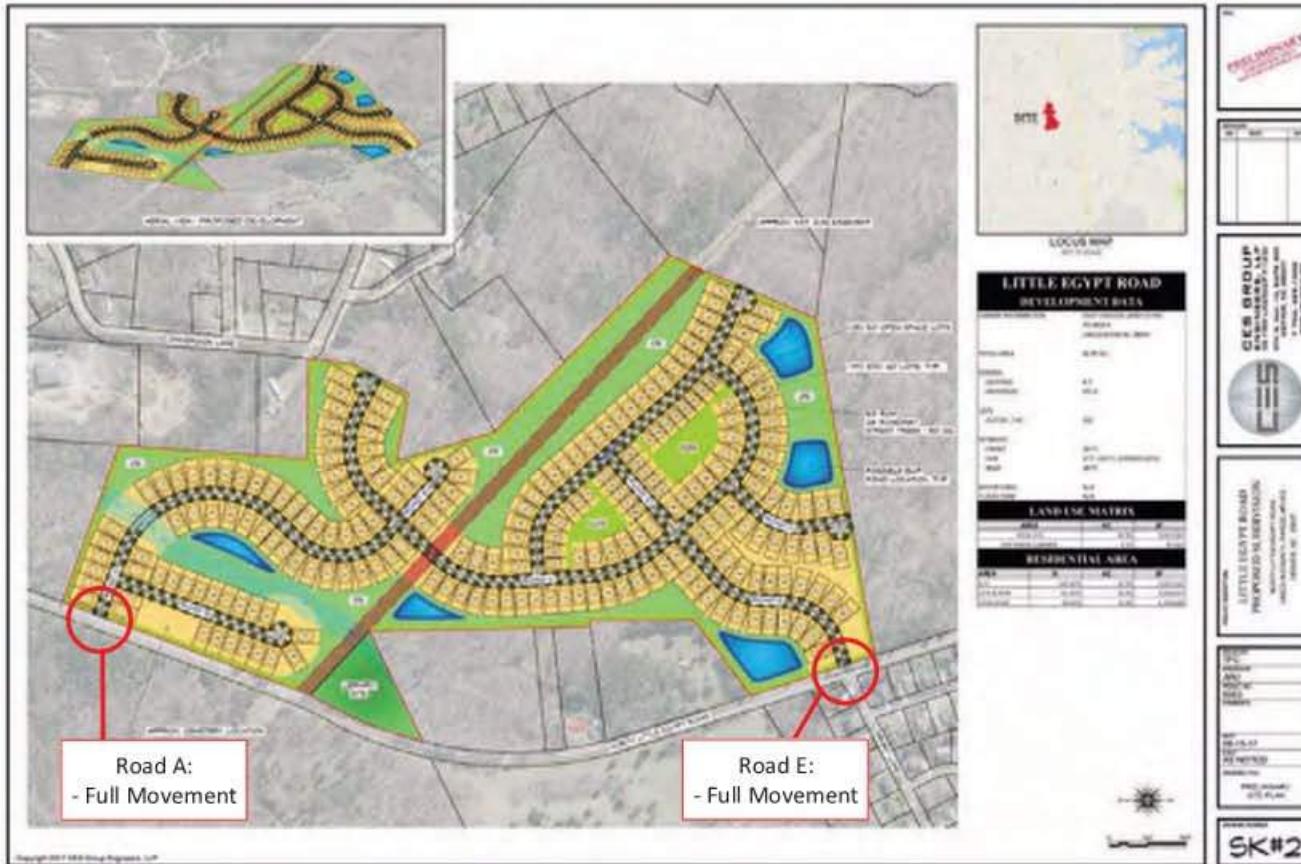
NOT
TO
SCALE

**Little Egypt Road
Residential Development
Traffic Impact Study**

Site Location Map

DATE: October 2017

FIGURE 1



AMT



**Little Egypt Road
Residential Development
Traffic Impact Study**

**NOT
TO
SCALE**

DATE: October 2017

FIGURE 2

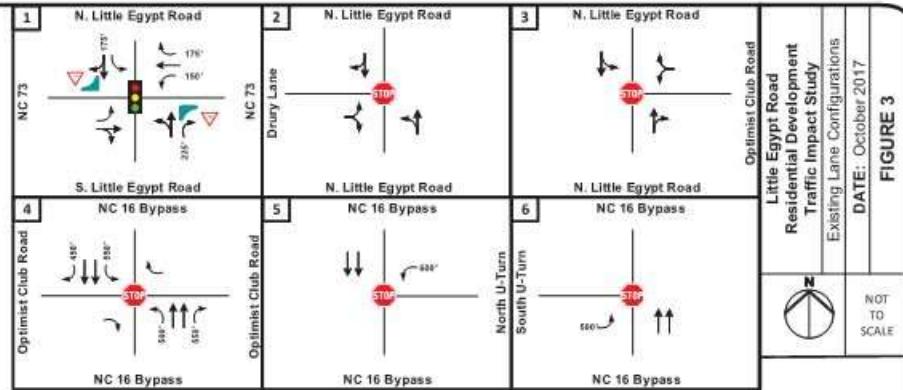
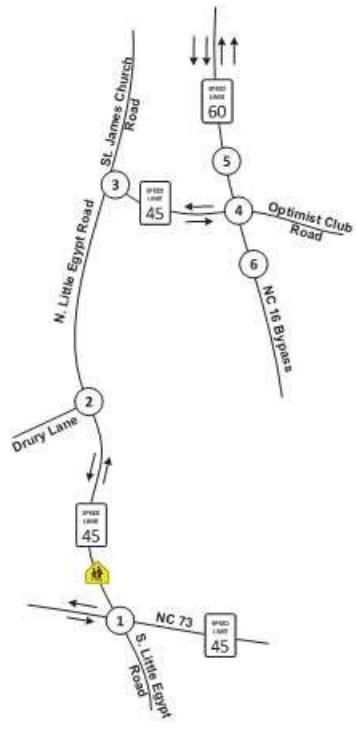
EXISTING ROADWAY CONDITIONS

Table 1 below contains detailed information of the existing study area's roadway network. All average annual daily traffic (AADT) information provided in this table was obtained from NCDOT via the www.ncdot.gov website.

Table 1: Existing Roadway Descriptions

Road Number	Road Name	Cross Section	AADT (VPD)	Functional Classification	Posted Speed Limit (mph)	Maint. Resp.
SR 1386	N. Little Egypt Road	2-Lane Undivided	2,900	Local	45	NCDOT
SR 1386	S. Little Egypt Road	2-Lane Undivided	-	Local	45	NCDOT
NC 16	NC 16 Bypass	4-Lane Divided	27,000	Principal Arterial	60	NCDOT
NC 73	NC 73	2-Lane Undivided	14,000	Principal Arterial	45	NCDOT
SR 1380	Optimist Club Road	2-Lane Undivided	2,300	Local	45	NCDOT
SR 2085	Drury Lane	2-Lane Undivided	-	Local	Non-posted	NCDOT
SR 1386	St. James Church Road	2-Lane Undivided	870	Local	45	NCDOT

The Existing Roadway Laneage is shown in Figure 3.



Little Egypt Road
Residential Development
Traffic Impact Study
Existing Lane Configurations
DATE: October 2017

FIGURE 3

AMT



FUTURE ROADWAY CONDITIONS

Two (2) approved development are included in this analysis. This is the Canopy Creek and Creek Park developments.

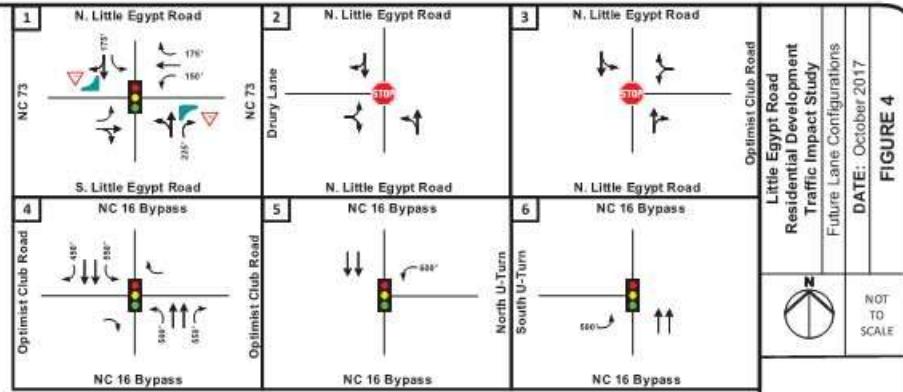
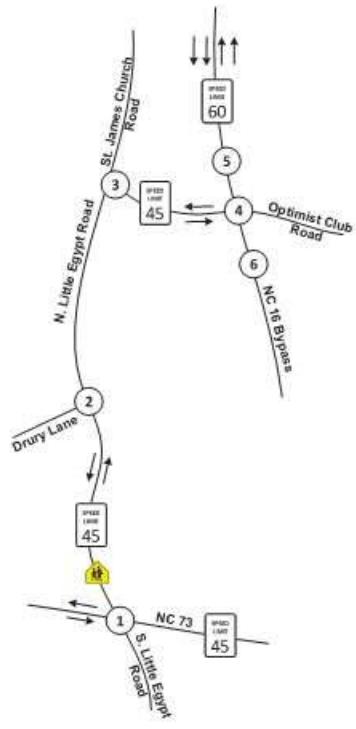
Canopy Creek is a residential development located near the intersection of St. James Church Road and Verdict Ridge Road. A TIA was produced by Progressive Design Group, Inc. in April of 2017 for this development. It was envisioned, and therefore studied, to consist of 165 single-family homes. However, Lincoln County staff has indicated that it has been approved for 152 units. Traffic volumes associated with the Canopy Creek development are discussed in the project traffic volumes section. Pertinent information from the traffic study are contained in Appendix D.

Creek Park is a residential development located along the west side of N. Little Egypt Road near Drury Lane. A TIA was produced by Ramey Kemp & Associates, Inc. in March of 2017. The development is envisioned to consist of 170 single-family homes. Traffic volumes associated with the Creek Park development are discussed in the project traffic volumes section. Pertinent information from the traffic study are contained in Appendix D.

Neither developments have committed to making improvements to the study area intersections presented herein.

NCDOT has indicated that they plan to install traffic signals at the superstreet intersection of NC 16 bypass at Optimist Club Road. This planned improvement seeks will replace the three existing stop-controlled intersections with coordinated traffic signals. NCDOT has not provided the project team with the specifics of the improvements. Therefore, to be conservative, this study assumes that the only improvement to these intersections is the signalization.

Figure 4 illustrates the 2022 lane configurations which is the roadway geometry and traffic control used in the no-build and build traffic scenarios.



AMT



TRIP GENERATION

Trip generation equations are provided in the *ITE Trip Generation Manual, 9th Edition*. The development is proposed to consist of 222 single family homes (ITE Code 210). It was estimated that a total of 167 trips (42 in, 125 out) will be generated from the proposed site in the AM peak hour and 222 trips (140 in, 82 out) will be generated in the PM peak hour. Trip generation results are shown below in Table 2.

Table 2: Trip Generation

ITE LAND USE CODE	LAND USE DESCRIPTION	INTENSITY	DAILY TRIPS (vpd)	AM PEAK HOUR TRIPS (vph)			PM PEAK HOUR TRIPS (vph)		
				TOTAL	IN	OUT	TOTAL	IN	OUT
210	Single Family Homes	222 DU	2,114	167	42	125	222	140	82
	Net New External Trips		2,114	167	42	125	222	140	82

SITE ACCESS

Access to the site is proposed to be provided by two (2) access points creating one new intersection along N. Little Egypt Road and adding a fourth leg to the existing N. Little Egypt Road at Drury Lane intersection.

The first full-movement access point is located approximately 4,800 feet south of the N. Little Egypt Road and Optimist Club Road intersection. The new access road will add a fourth leg to the existing intersection of N. Little Egypt Road at Drury Lane. This new westbound approach will operate under stop-control creating a four-legged two-way stop-controlled intersection. This site access on the site plan is written as a Road E.

The second full-movement access point is proposed for N. Little Egypt Road. This full-movement access is located approximately 1,700 feet south of the N. Little Egypt Road and Optimist Club Road intersection. This will create an unsignalized three-legged intersection. This site access on the site plan is written as a Road A. The proposed site plan is shown for illustrative purposes only in Figure 2.

TRIP DISTRIBUTION

The site generated trips to and from the proposed site were distributed in accordance with the apparent traffic patterns by the users of the proposed development and the existing traffic patterns and land uses in the vicinity. The resultant trip distribution for the proposed development is as follows:

- 30% to/from the South on NC 16 Bypass
- 10% to/from the North on NC 16 Bypass
- 10% to/from the North on N. Little Egypt Road
- 40% to/from the East on NC 73
- 10% to/from the West on NC 73

Trip distribution and trip assignment is shown in Figure 12 and Figure 13; respectively.

PROJECT TRAFFIC VOLUMES

Existing Traffic Volumes

Traffic counts were performed by National Data & Surveying Services for all study area intersections; with one exception. That being that turning movement counts at the intersection of N. Little Egypt Road and Optimist Club Road were collected by Ramey Kemp & Associates and were taken from the Cowans Crossing TIA. The following table lists the locations and dates of each counted intersection.

Table 3: Traffic Counts

Intersection Number	Intersection Name	Counting Agency	Date
1	N. Little Egypt Road at NC 73	National Data & Surveying Services	9/7/2017
2	N. Little Egypt Road at Drury Lane	National Data & Surveying Services	9/7/2017
3	N. Little Egypt Road at Optimist Club Road	Ramey Kemp & Associates	2/21/2017
4	Optimist Club Road at NC 16 Bypass	National Data & Surveying Services	9/28/2016
5	NC 16 Bypass North U-Turn	National Data & Surveying Services	9/28/2016
6	NC 16 Bypass South U-Turn	National Data & Surveying Services	9/28/2016

Traditional calendar schools in Lincoln County were confirmed to be in-session on the dates the data was collected. The traffic counts are located in Appendix B. It should be noted that the 2016 counts were grown by two percent (2%) to reflect the Existing 2017 traffic volumes.

Volume Balancing

Volume balancing was performed to ensure the upstream and downstream traffic volumes are balanced between study intersections. Counts between all study intersections were balanced upward with the following exception:

Traffic volumes were not balanced along N. Little Egypt Road between Drury Lane and NC 73. This can be attributed to multiple driveways for high traffic generators such as East Lincoln High School and Catawba Springs Elementary School. It can be surmised that trips accessing the schools from NC 73 would travel up N. Little Egypt Road, access either school and then travel south to NC 73. A high volume of vehicles potentially making such trips would inflate volumes further north on N. Little Egypt Road if the volumes were balanced.

The balanced count volumes represent the 2017 Existing Traffic Volumes are shown in Figure 5. The volume balancing adjustments and traffic volumes calculations are shown in Appendix C.

Historical Growth Traffic (2022 Background Traffic)

Historical growth traffic is the increase in existing traffic volumes due to general usage increases and non-specific growth throughout the area. As agreed upon in the MOU, existing traffic volumes were increased by two percent (2%) per year to reflect 2022 background traffic volumes.

The 2017 historical growth traffic volumes are shown in Figure 6. The 2022 historical growth traffic volumes are illustrated in Figure 7. The traffic volumes calculations are shown in Appendix C.

Approved Development Traffic

Two (2) approved development are included in this analysis.

Canopy Creek is a residential development located on the west side of St. James Church Road near Verdict Ridge Road. The traffic study for the development included 165 single-family homes. However, it has only been approved for 152 units. As such, trip generation was performed for the development and the resultant traffic was assigned

to the study area intersections using the trip distribution outlined in the TIA produced by Progressive Design Group, Inc. It should be noted that the study area for Canopy Creek did not include the intersection of NC 73 at N. Little Egypt Road. Therefore, trips to/from Canopy Creek were assigned to the intersection using an assumed distribution of twenty percent (20%) to /from the east on NC 73 and the remaining five percent (5%) to/from the west on NC 73. This is consistent with the trip distribution east/west splits at this intersection as was approved for use with the Little Egypt Road development.

The 152 dwelling units of single family homes will generate a total of 114 trips (29 in, 85 out) from the Canopy Creek development in the AM peak hour and 152 trips (96 in, 56 out) will be generated in the PM peak hour. The aforementioned trip distribution and resultant trip assignment of Canopy Creek development are illustrated in [Figure 8](#) and [Figure 9](#), respectively. Traffic volumes calculations are shown in [Appendix C](#) and pertinent pages from the Canopy Creek TIA are located in [Appendix D](#).

Creek Park is a residential development located on the west side of N. Little Egypt Road; south of Optimist Club Road and north of Drury Lane. The site is envisioned to consist of 170 single-family homes; which will be accessed by two full-movement driveways on N. Little Egypt Road. The development is expected to be fully built by 2019. Trip generation from the report stated that the site is anticipated to generate 1,620 daily trips along with a total of 128 trips during the AM peak hour (32 in, 96 out) and 170 trips during the PM peak hour (107 in, 63 out).

As the site driveways are contained within the study area of the Little Egypt Road development, they have been included within the analysis (i.e. synchro) files so that the traffic volumes along N. Little Egypt Road will balance. However, these driveways are not included within the scope of this study. Trips associated with this development are shown in [Figure 10](#). Traffic volume calculations are contained within [Appendix C](#) and pertinent pages from the Creek Park TIA are located in [Appendix D](#).

2022 No-Build Traffic Volumes

The historical growth traffic and approved development traffic volumes were then added to the existing volumes to determine the 2022 No-Build Traffic Volumes. The 2022 No-Build Traffic Volumes are shown in [Figure 11](#).

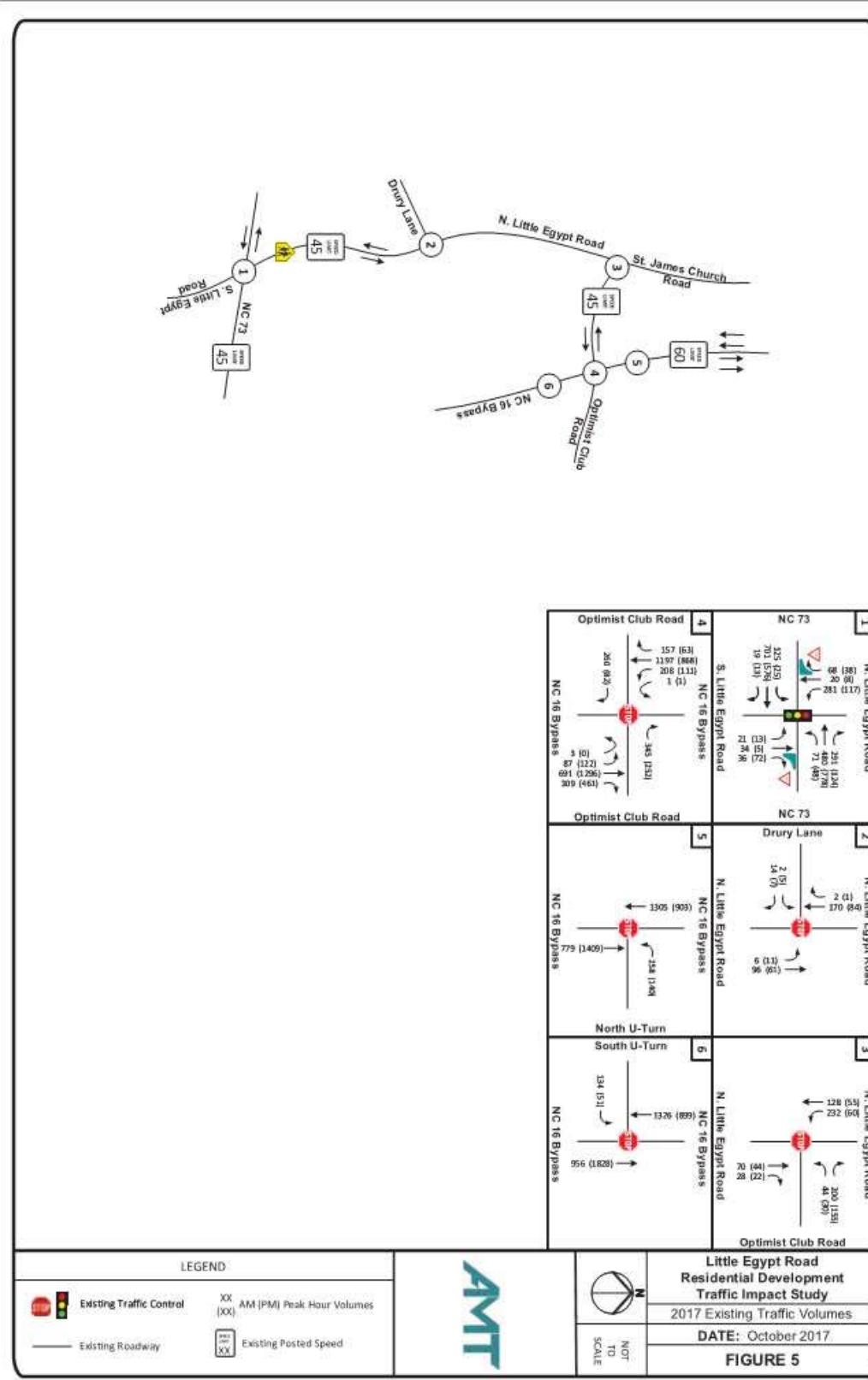
Proposed Development Traffic

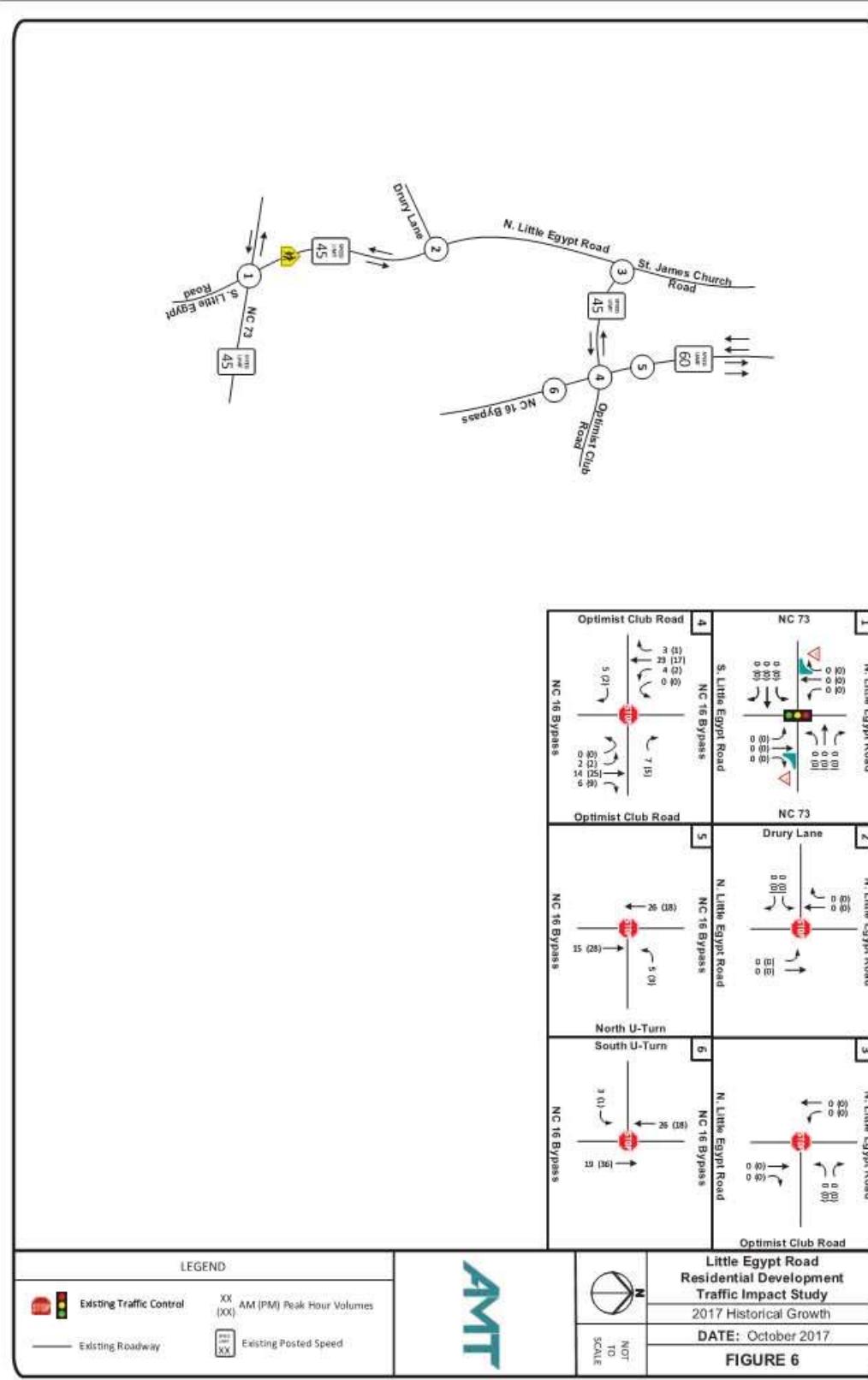
The proposed development traffic was generated, distributed, and assigned to the adjacent roadway network as discussed previously.

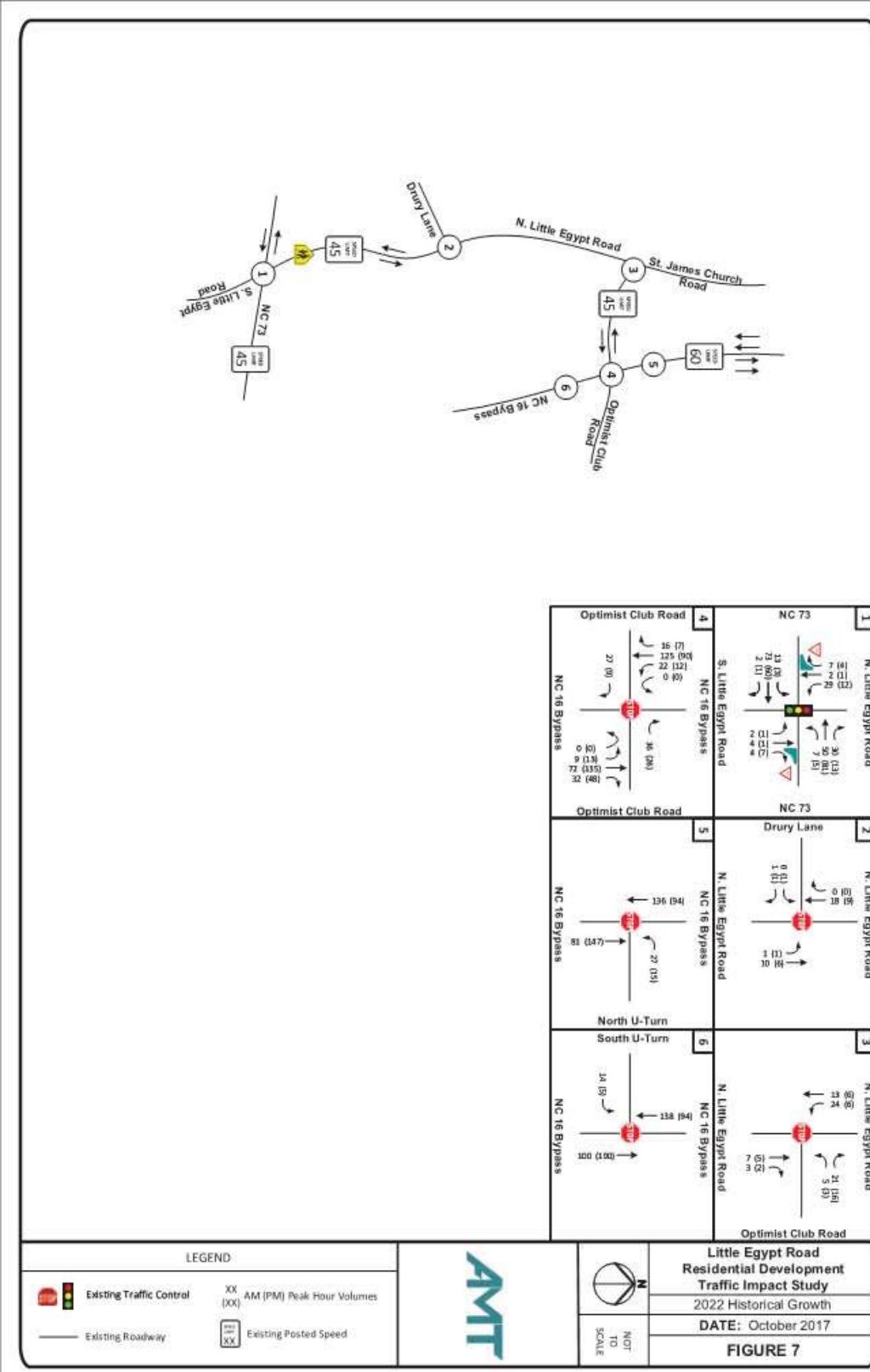
The trip distribution percentages are shown on [Figure 12](#) and the trip assignments are shown on [Figure 13](#). The traffic volumes calculations are shown in [Appendix C](#).

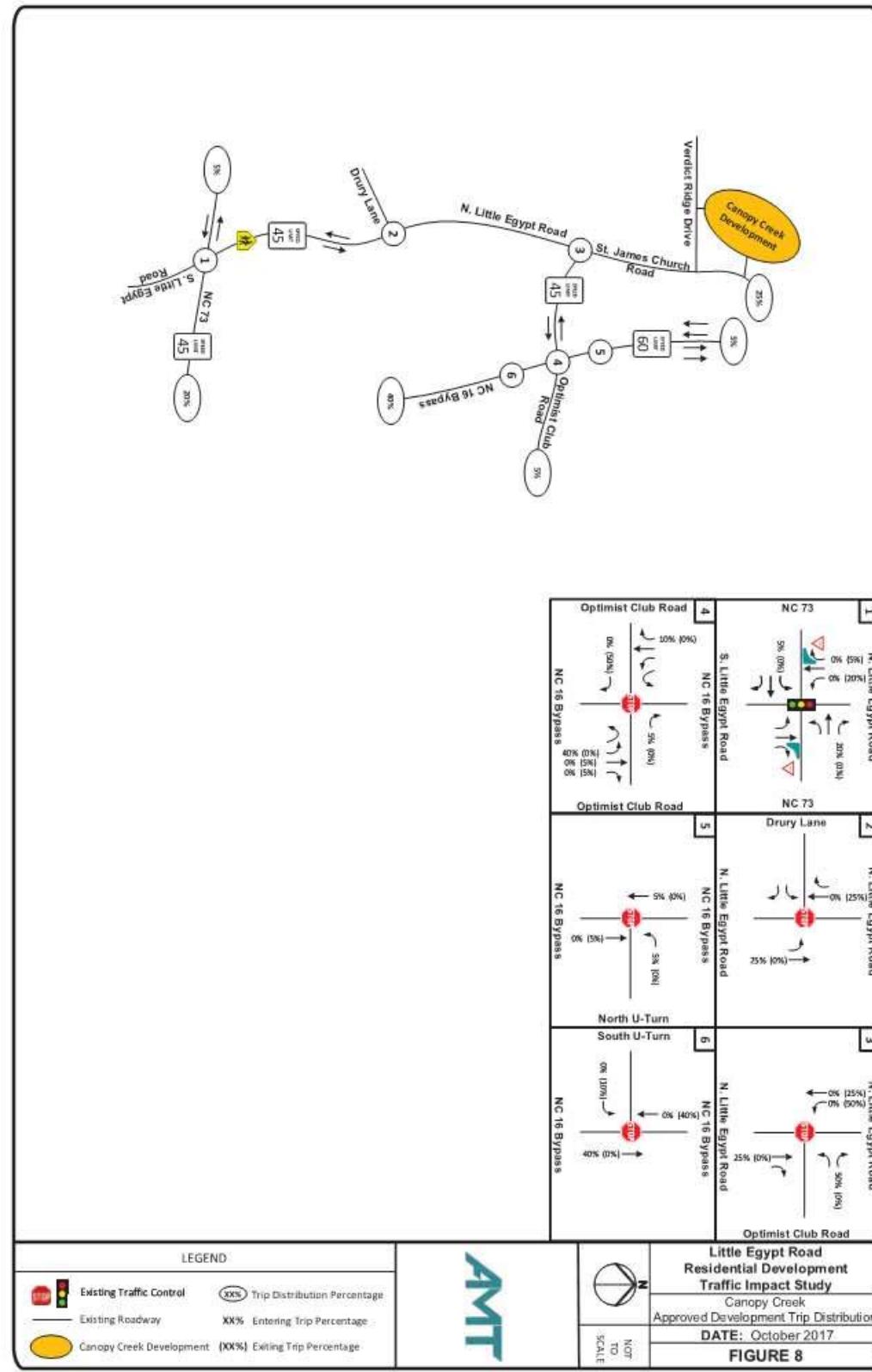
2022 Build-Out Traffic

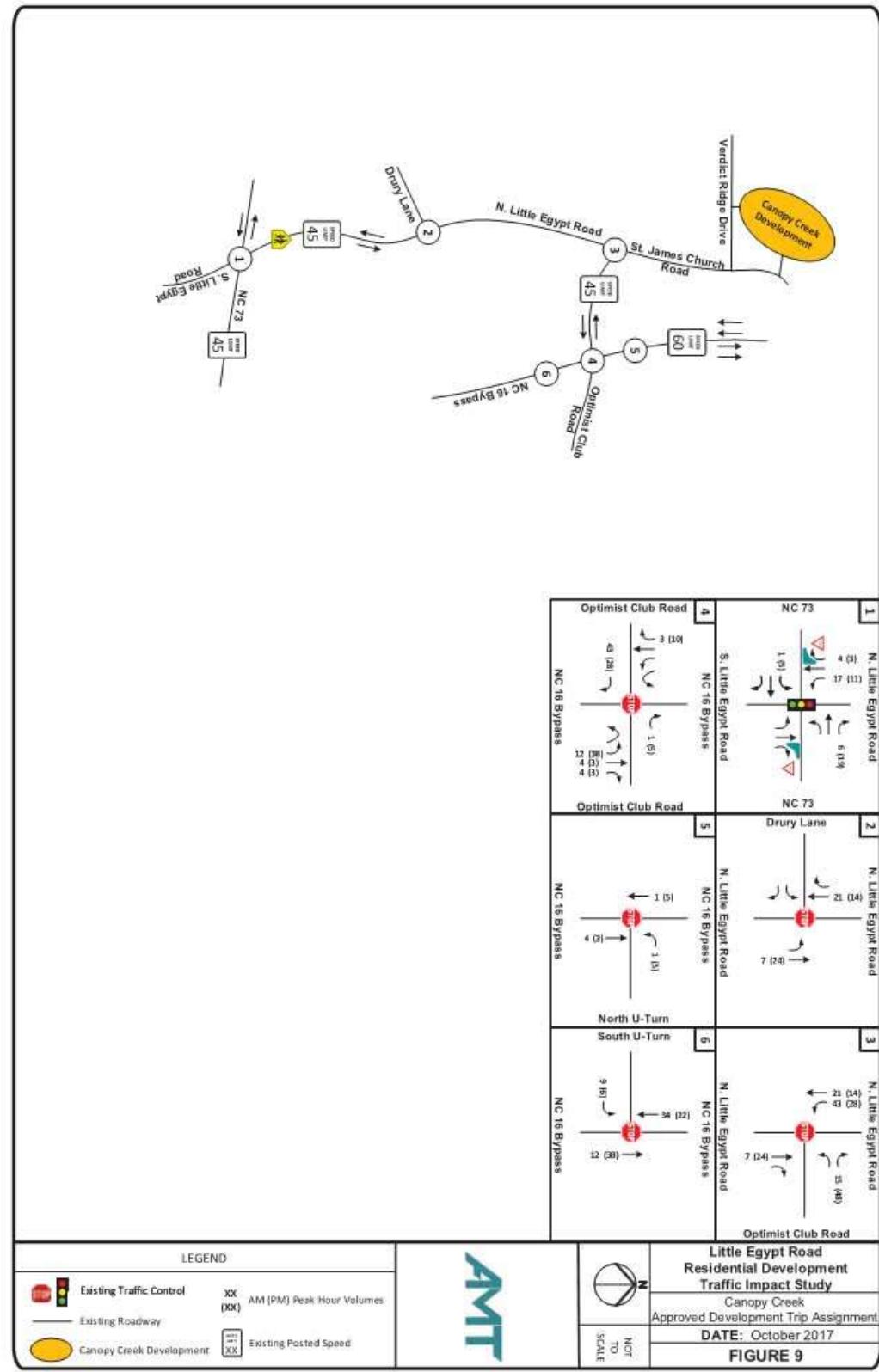
The 2022 build-out traffic volumes include the 2022 no-build traffic and the proposed development traffic. The AM and PM peak-hour 2022 build traffic volumes are shown in [Figure 14](#). The traffic volumes calculations are shown in [Appendix C](#).

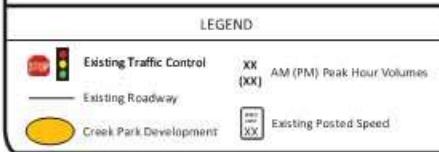
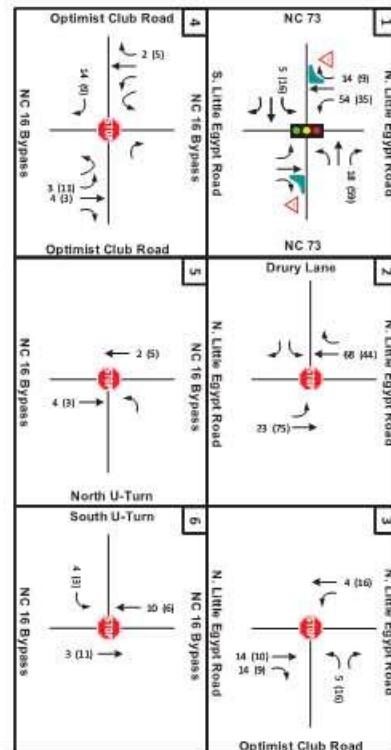
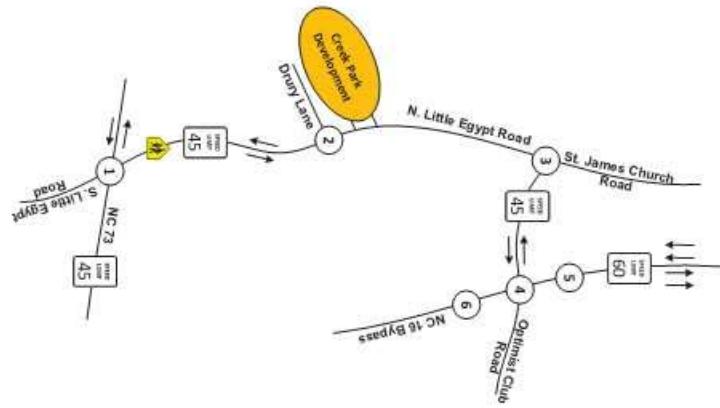




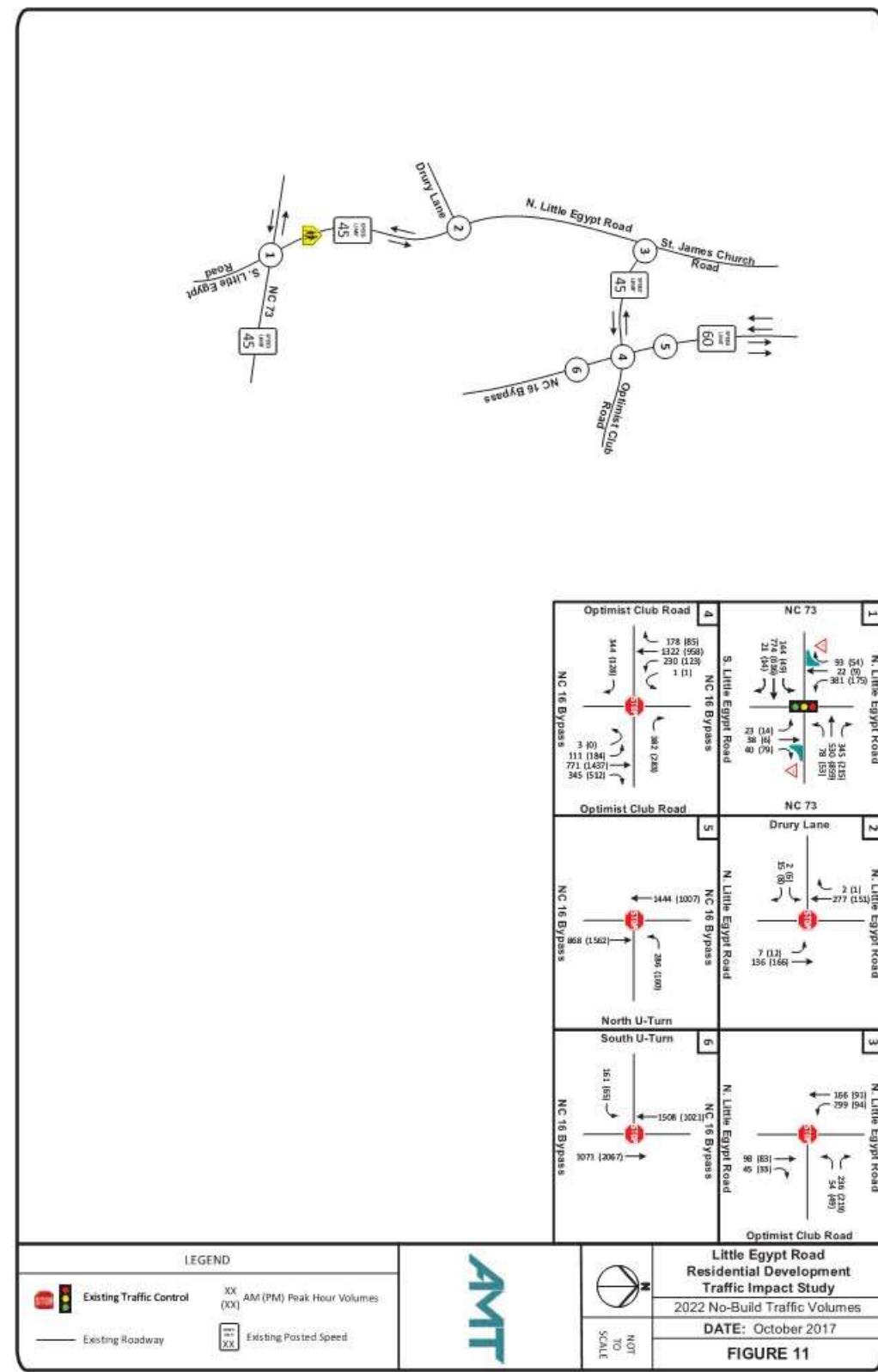


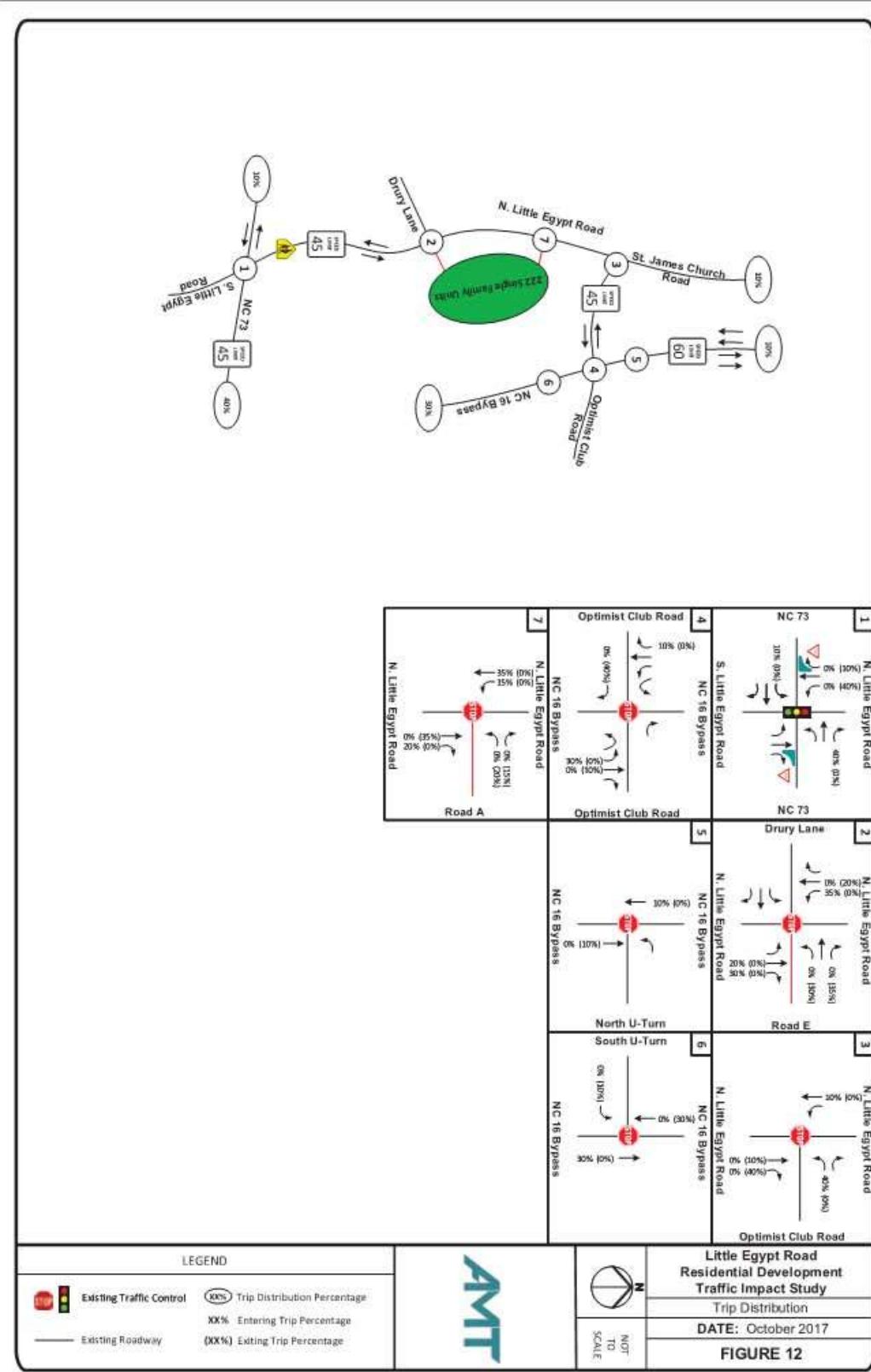


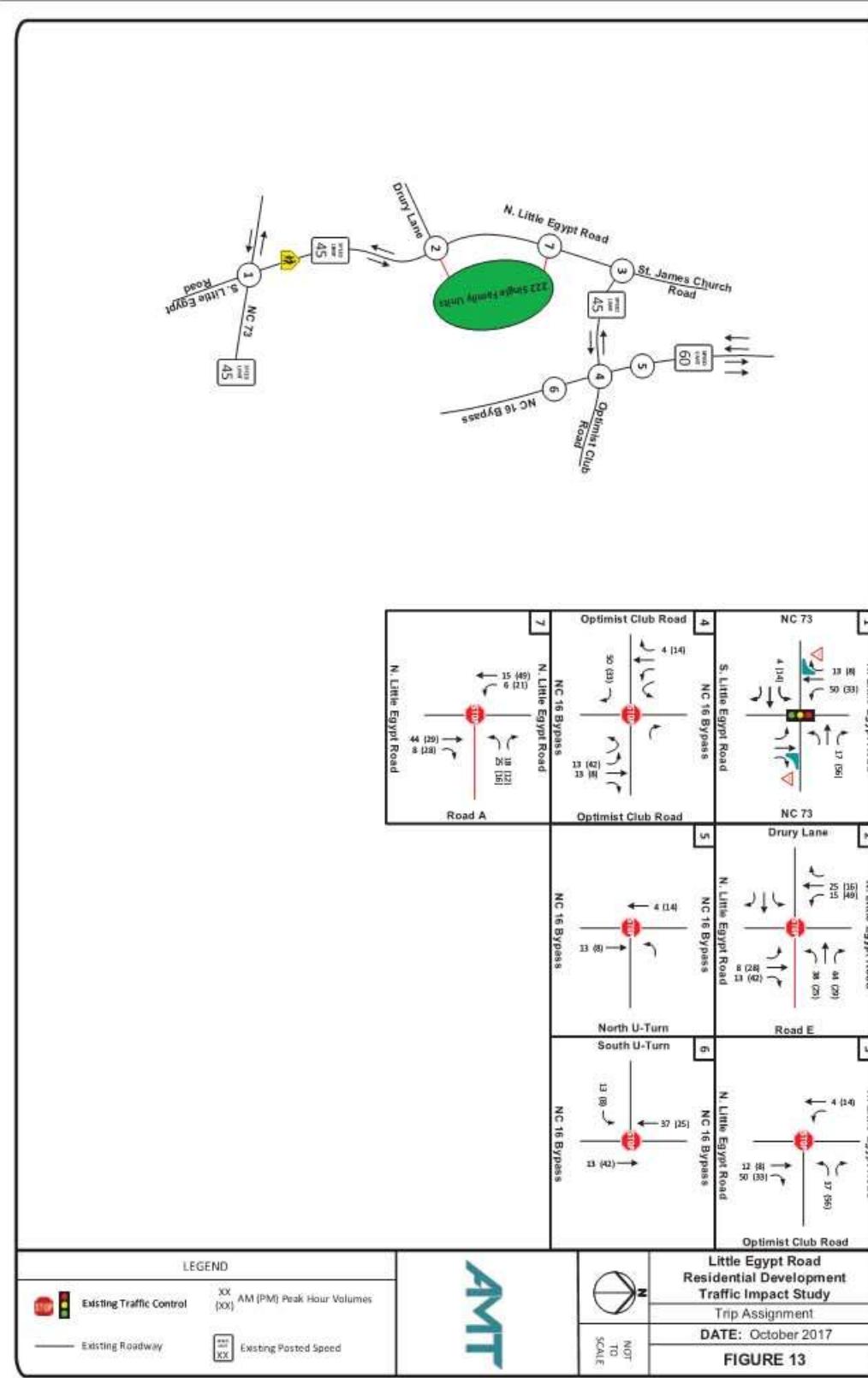


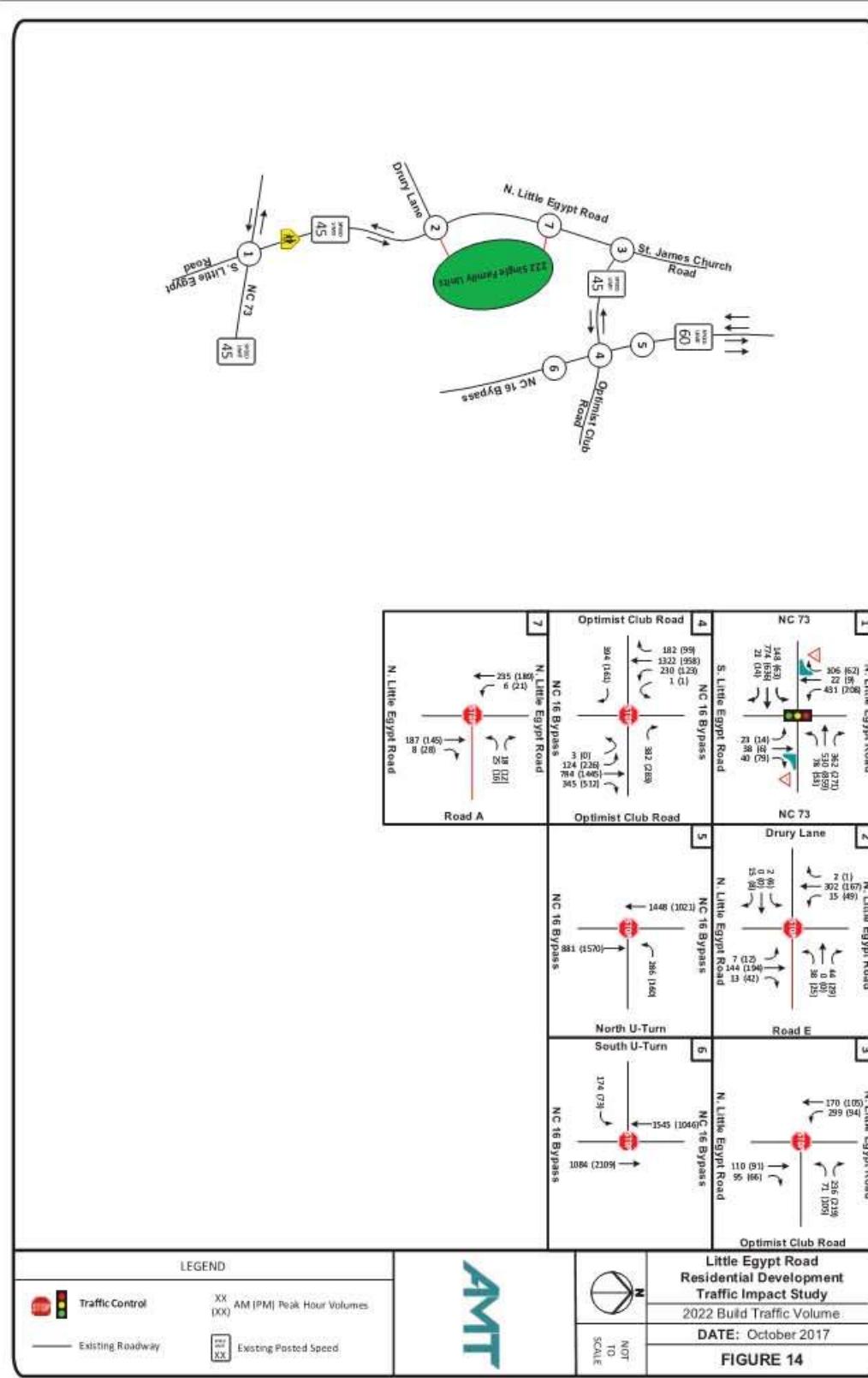


Little Egypt Road
Residential Development
Traffic Impact Study
Creek Park
Approved Development Trip Assignment
DATE: October 2017
FIGURE 10









CAPACITY ANALYSIS

2017 Existing Analysis

The Highway Capacity Manual defines capacity as the maximum suitable flow rate at which vehicles reasonably can be expected to traverse a point during a specified time period. Capacity uses the measure of efficiency, Level-of-Service (LOS), to describe the traffic performance at intersections. LOS is defined for the overall intersection delay for signalized intersections. An acceptable LOS for a signalized intersection is considered to be LOS D or better (i.e. A, B, C or D).

At unsignalized intersections, the LOS is defined by the control delay for the movement that must yield right-of-way. It may be typical for stop-controlled minor streets to experience long delays during peak periods, while the majority of the traffic flows through the intersection on the major street experiencing little or no delay.

The procedures outlined in the Highway Capacity Manual, 2010 Update were used as guidelines for the analysis of the study area intersections. This manual provides procedures for the analysis of both signalized and unsignalized intersections. LOS categories range from LOS "A" (best) to "F" (worst) as shown in Table 4.

Table 4: Level of Service Criteria

LEVEL OF SERVICE	SIGNALIZED INTERSECTION CONTROL DELAY (SEC/VEH)	UN SIGNALIZED INTERSECTION CONTROL DELAY (SEC/VEH)	INTERSECTION LEVEL-OF-SERVICE DESCRIPTION
A	≤ 10.0	≤ 10.0	Free flow, insignificant delays.
B	10.1 – 20.0	10.1 – 15.0	Stable operation, minimal delays
C	20.1 – 35.0	15.1 – 25.0	Stable operation, acceptable delays
D	35.1 – 55.0	25.1 – 35.0	Restricted flow, common delays.
E	55.1 -80.0	35.1 – 50.0	Maximum capacity, extended delays. Volumes at or near capacity. Long queues form upstream from intersection.
F	> 80	> 50.0	Forced flow, excessive delays. Represents jammed conditions. Intersection operates below capacity with low volumes. Queues may block upstream intersections.

The LOS analysis was completed through the use of Synchro, version 9.1. The software package categorizes the LOS based on HCM methodology and criteria. According to industry standards, any signalized intersection or any approach of an unsignalized intersection is considered acceptable if the average delay is at LOS D or better with the LOS A representing little or no delay. Any signalized intersection or approach with a LOS of E or F is considered substandard and may need solutions to improve the operational performance. Signal plans were obtained from NCDOT. These plans can be found in Appendix E.

SimTraffic presents the warnings that can be attributed to the signal design of the existing intersection and the geometry of the NC 16 at Optimist Club Road RCUT intersection. SimTraffic presents warnings that approaches of the aforementioned RCUT intersection are less than 25 degrees. This is due to the geometry of the existing intersection. Neither of these warnings impact the capacity analysis results presented herein or SimTraffic simulations.

Table 5 below lists the LOS results from the Synchro capacity analysis for the 2017 Existing Traffic Conditions.

Table 5: Level of Service Analysis – 2017 Existing Traffic Conditions

LOCATION	2017 EXISTING TRAFFIC CONDITIONS	
	AM PEAK LOS (delay/veh)	PM PEAK LOS (delay/veh)
INTERSECTION 1 – NC 73 at N. Little Egypt Road / S. Little Egypt Road (SIGNALIZED)		
Overall	D (43.8)	C (26.5)
Eastbound Approach	D (43.8)	C (22.0)
Westbound Approach	C (34.5)	C (24.9)
Northbound Approach	E (57.7)	E (57.1)
Southbound Approach	E (63.2)	D (36.0)
INTERSECTION 2 – N. Little Egypt Road at Drury Lane (UNSIGNALIZED)		
Eastbound Approach	A (9.5)	A (9.1)
Northbound Left-Turn	A (7.6)	A (7.4)
INTERSECTION 3 – N. Little Egypt Road / St. James Church Road at Optimist Club Road (UNSIGNALIZED)		
Westbound Approach	B (13.4)	A (9.9)
Southbound Left-Turn	A (7.9)	A (7.5)
INTERSECTION 4 – NC 16 Bypass at Optimist Club Road (UNSIGNALIZED)		
Eastbound Approach	D (33.5)	B (13.2)
Westbound Approach	C (20.1)	E (39.4)
Northbound Left-Turn	F (67.2)	D (34.3)
Southbound Left-Turn	E (38.4)	F (130.2)
INTERSECTION 5 – NC 16 Bypass at North U-Turn (UNSIGNALIZED)		
Westbound Left-Turn	E (44.6)	C (15.4)
INTERSECTION 6 – NC 16 Bypass at South U-Turn (UNSIGNALIZED)		
Eastbound Left-Turn	C (15.9)	C (25.2)

The results of this analysis indicate that the intersection of NC 73 at Little Egypt Road operates with an acceptable overall LOS; with the side street (i.e. NB and SB) approaches operating at unacceptable levels. The superstreet intersection of NC 16 bypass at Optimist Club Road has approaches operating at unacceptable LOS. The NCDOT planned project to signalize this intersection will address these unacceptable levels. All other intersections operate with acceptable levels of service.

An additional operational concern is queuing. Excessive queues can negatively impact operations at nearby intersections as well as cause safety concerns if the queues exceed the available storage of turn lanes. As such, the 95th percentile queues are reported for each traffic scenario. SimTraffic simulation results, which include maximum queues, can be found in the appendix. Table 6 lists the 95th percentile queues from the Synchro capacity analysis for the 2017 Existing Traffic Conditions. All instances where turn-lane storage lengths are exceeded are highlighted and bolded in the following table. Synchro and SimTraffic output pages can be found in Appendix F.

Table 6: Synchro 95th Percentile Queue Analysis – 2017 Existing Traffic Conditions

LOCATION	2017 EXISTING TRAFFIC CONDITIONS		
	EXISTING STORAGE LENGTH (ft.)	AM PEAK 95 th Percentile Queue (ft.)	PM PEAK 95 th Percentile Queue (ft.)
INTERSECTION 1 – NC 73 at N. Little Egypt Road / S. Little Egypt Road (SIGNALIZED)			
Eastbound Left	-	74	22
Eastbound Thru-Right	-	896	565
Westbound Left	150	63	35
Westbound Thru	-	489	932
Westbound Right	175	269	102
Northbound Thru-Left	-	80	38
Northbound Right	225	61	107
Southbound Left	-	266	122
Southbound Thru-Right	175	66	57
INTERSECTION 2 – N. Little Egypt Road at Drury Lane (UNSIGNALIZED)			
Eastbound Approach	-	2.5	0
Northbound Thru-Left	-	0	0
INTERSECTION 3 – N. Little Egypt Road / St. James Church Road at Optimist Club Road (UNSIGNALIZED)			
Westbound Approach	-	47.5	20
Southbound Thru-Left	-	15	2.5
INTERSECTION 4 – NC 16 Bypass at Optimist Club Road (UNSIGNALIZED)			
Eastbound Right	-	137.5	15
Westbound Right	-	107.5	152.5
Northbound Left	500	95	72.5
Southbound Left	550	127.5	160
INTERSECTION 5 – NC 16 Bypass at North U-Turn (UNSIGNALIZED)			
Westbound Left	600	170	32.5
INTERSECTION 6 – NC 16 Bypass at South U-Turn (UNSIGNALIZED)			
Eastbound Left	500	32.5	22.5

2022 No-Build Analysis

The site is proposed to be completed by year 2022. As agreed upon in the MOU, existing traffic volumes were increased by two percent (2%) per year in addition to the approved adjacent development trips to reflect 2022 no-build traffic volumes. This analysis also includes the roadway improvements committed to by NCDOT to signalize the NC 16 bypass at Optimist Club Road RCUT intersection. This is discussed in the Future Roadway Conditions section of this report. The intersection and individual approach LOS results from the 2022 No-Build Analysis are displayed in Table 7. Capacity analysis results can be found in Appendix F.

Table 7: Level of Service Analysis – 2022 No-Build Traffic Conditions

LOCATION	2022 NO-BUILD TRAFFIC CONDITIONS	
	AM PEAK LOS (delay/veh)	PM PEAK LOS (delay/veh)
INTERSECTION 1 – NC 73 at N. Little Egypt Road / S. Little Egypt Road (SIGNALIZED)		
Overall	E (75.8)	D (36.7)
Eastbound Approach	E (73.3)	C (27.5)
Westbound Approach	D (45.4)	D (40.8)
Northbound Approach	E (57.8)	E (57.2)
Southbound Approach	F (147.7)	D (35.6)
INTERSECTION 2 – N. Little Egypt Road at Drury Lane (UNSIGNALIZED)		
Eastbound Approach	B (10.3)	B (10.1)
Northbound Left-Turn	A (7.9)	A (7.6)
INTERSECTION 3 – N. Little Egypt Road / St. James Church Road at Optimist Club Road (UNSIGNALIZED)		
Westbound Approach	C (20.1)	B (11.7)
Southbound Left-Turn	A (8.3)	A (7.7)
INTERSECTION 4 – NC 16 Bypass at Optimist Club Road (FUTURE SIGNALIZED)		
Overall	B (16.2) / B (12.5)	A (8.9) / B (11.0)
Eastbound Approach	C (31.8)	C (23.2)
Westbound Approach	C (21.5)	C (31.1)
Northbound Approach	B (13.3)	B (17.3)
Southbound Approach	B (10.3)	B (19.0)
INTERSECTION 5 – NC 16 Bypass at North U-Turn (FUTURE SIGNALIZED)		
Overall	A (8.9)	B (10.7)
Westbound Approach	B (19.4)	B (18.9)
Southbound Approach	B (17.5)	A (7.0)
INTERSECTION 6 – NC 16 Bypass at South U-Turn (FUTURE SIGNALIZED)		
Overall	A (8.9)	B (10.7)
Eastbound Approach	C (20.2)	B (18.2)
Northbound Approach	A (7.3)	B (10.4)

The results of this analysis indicate that all study area intersections operate with acceptable levels of service except for NC 73 at Little Egypt Road. In the AM peak hour, the overall intersection and several approaches operate with unacceptable delays. In the PM peak hour, only the northbound approach is shown to operate with unacceptable delays.

An additional operational concern is queuing. Excessive queues can negatively impact operations at nearby intersections as well as cause safety concerns if the queues exceed the available storage of turn lanes. As such, the 95th percentile queues are reported for each traffic scenario. SimTraffic simulation results, which include maximum queues, can be found in the appendix. Table 8 lists the 95th percentile queues from the Synchro capacity analysis for the 2022 No-Build Traffic Conditions. All instances where turn-lane storage lengths are exceeded are highlighted and bolded in the following table. Synchro and SimTraffic output pages can be found in Appendix F.

Table 8: Synchro 95th Percentile Queue Analysis – 2022 No-Build Traffic Conditions

LOCATION	2022 NO-BUILD TRAFFIC CONDITIONS		
	EXISTING STORAGE LENGTH (ft.)	AM PEAK 95 th Percentile Queue (ft.)	PM PEAK 95 th Percentile Queue (ft.)
INTERSECTION 1 – NC 73 at N. Little Egypt Road / S. Little Egypt Road (SIGNALIZED)			
Eastbound Left	-	111	36
Eastbound Thru-Right	-	1059	720
Westbound Left	150	72	39
Westbound Thru	-	647	1108
Westbound Right	175	347	180
Northbound Thru-Left	-	85	41
Northbound Right	225	65	115
Southbound Left	-	469	173
Southbound Thru-Right	175	81	72
INTERSECTION 2 – N. Little Egypt Road at Drury Lane (UNSIGNALIZED)			
Eastbound Approach	-	2.5	5.2
Northbound Thru-Left	-	0	0
INTERSECTION 3 – N. Little Egypt Road / St. James Church Road at Optimist Club Road (UNSIGNALIZED)			
Westbound Approach	-	92.5	40
Southbound Thru-Left	-	22.5	5
INTERSECTION 4 – NC 16 Bypass at Optimist Club Road (FUTURE SIGNALIZED)			
Eastbound Right	-	198	86
Westbound Right	-	195	201
Northbound Left	500	55	70
Northbound Thru	-	74	104
Northbound Right	550	71	63
Southbound Left	550	63	91
Southbound Thru	-	228	91
Southbound Right	450	53	20
INTERSECTION 5 – NC 16 Bypass at North U-Turn (FUTURE SIGNALIZED)			
Westbound Left	600	108	55
Southbound Thru	-	417	159
INTERSECTION 6 – NC 16 Bypass at South U-Turn (FUTURE SIGNALIZED)			
Eastbound Left	500	74	36
Northbound Thru	-	174	576

2022 Build Analysis

The total future build traffic volumes include both the site traffic and traffic volumes from the No-Build Analysis. The Build Analysis evaluates the traffic conditions before any improvements are implemented. Table 9 shows the LOS results for the intersections within the study area. Capacity analysis results can be found in Appendix F.

Table 9: Level of Service Analysis – 2022 Build Traffic Conditions

LOCATION	2022 BUILD TRAFFIC CONDITIONS	
	AM PEAK LOS (delay/veh)	PM PEAK LOS (delay/veh)
INTERSECTION 1 – NC 73 at N. Little Egypt Road / S. Little Egypt Road (SIGNALIZED)		
Overall	F (90.6)	D (38.2)
Eastbound Approach	E (74.1)	C (28.0)
Westbound Approach	D (49.3)	D (42.9)
Northbound Approach	E (57.9)	E (57.2)
Southbound Approach	F (201.7)	D (37.1)
INTERSECTION 2 – N. Little Egypt Road at Drury Lane / Road E (UNSIGNALIZED)		
Eastbound Approach	B (10.7)	B (11.5)
Westbound Approach	B (12.3)	B (12.2)
Northbound Left-Turn	A (8.0)	A (7.6)
Southbound Left-Turn	A (7.6)	A (7.9)
INTERSECTION 3 – N. Little Egypt Road / St. James Church Road at Optimist Club Road (UNSIGNALIZED)		
Westbound Approach	E (36.2)	B (14.7)
Southbound Left-Turn	A (8.6)	A (7.8)
INTERSECTION 4 – NC 16 Bypass at Optimist Club Road (FUTURE SIGNALIZED)		
Overall	B (18.4) / B (12.3)	B (10.0) / B (11.0)
Eastbound Approach	D (40.3)	C (24.3)
Westbound Approach	C (21.5)	C (31.1)
Northbound Approach	A (9.6)	A (7.6)
Southbound Approach	B (13.1)	A (6.0)
INTERSECTION 5 – NC 16 Bypass at North U-Turn (FUTURE SIGNALIZED)		
Overall	B (17.8)	A (8.6)
Westbound Approach	B (19.0)	B (19.0)
Southbound Approach	B (17.6)	B (7.0)
INTERSECTION 6 – NC 16 Bypass at South U-Turn (FUTURE SIGNALIZED)		
Overall	B (10.0)	B (11.5)
Eastbound Approach	C (20.9)	C (21.4)
Northbound Approach	A (8.3)	B (11.1)
INTERSECTION 7 – N. Little Egypt Road at Road A (UNSIGNALIZED)		
Westbound Approach	B (11.2)	B (10.7)
Southbound Left-Turn	A (7.7)	A (7.7)

The results of this analysis indicate that all study area intersections operate with acceptable levels of service except for NC 73 at Little Egypt Road and the westbound approach of Optimist Club Road at Little Egypt Road.

The intersection of NC 73 at Little Egypt Road operates with unacceptable LOS in the AM peak hour; along with several approaches. In the PM peak hour, only the northbound approach is shown to operate with unacceptable delays.

The westbound approach of Optimist Club Road at Little Egypt Road operates with unacceptable delays in the AM peak hour.

An additional operational concern is queuing. Excessive queues can negatively impact operations at nearby intersections as well as cause safety concerns if the queues exceed the available storage of turn lanes. As such, the 95th percentile queues are reported for each traffic scenario. SimTraffic simulation results, which include maximum queues, can be found in the appendix. Table 10 lists the 95th percentile queues from the Synchro capacity analysis for the 2022 Build Traffic Conditions. All instances where turn-lane storage lengths are exceeded are highlighted and bolded in the following table. Synchro and SimTraffic output pages can be found in Appendix F.

Table 10: Synchro 95th Percentile Queue Analysis – 2022 Build Traffic Conditions

LOCATION	2022 BUILD TRAFFIC CONDITIONS		
	EXISTING STORAGE LENGTH (ft.)	AM PEAK 95 th Percentile Queue (ft.)	PM PEAK 95 th Percentile Queue (ft.)
INTERSECTION 1 – NC 73 at N. Little Egypt Road / S. Little Egypt Road (SIGNALIZED)			
Eastbound Left	-	118	53
Eastbound Thru-Right	-	1060	720
Westbound Left	150	72	39
Westbound Thru	-	657	1118
Westbound Right	175	372	233
Northbound Thru-Left	-	85	41
Northbound Right	225	65	115
Southbound Left	-	595	206
Southbound Thru-Right	175	88	79
INTERSECTION 2 – N. Little Egypt Road at Drury Lane / Road E (UNSIGNALIZED)			
Eastbound Approach	-	2.5	2.5
Westbound Approach	-	15	10
Northbound Left/Thru/Right	-	0	0
Southbound Left/Thru/Right	-	0	2.5
INTERSECTION 3 – N. Little Egypt Road / St. James Church Road at Optimist Club Road (UNSIGNALIZED)			
Westbound Approach	-	167.5	70
Southbound Thru-Left	-	25	5
INTERSECTION 4 – NC 16 Bypass at Optimist Club Road (FUTURE SIGNALIZED)			
Eastbound Right	-	295	116
Westbound Right	-	195	201
Northbound Left	500	61	90
Northbound Thru	-	77	110
Northbound Right	550	72	64
Southbound Left	550	63	91
Southbound Thru	-	228	90
Southbound Right	450	54	23
INTERSECTION 5 – NC 16 Bypass at North U-Turn (FUTURE SIGNALIZED)			
Westbound Left	600	107	55
Southbound Thru	-	419	162
INTERSECTION 6 – NC 16 Bypass at South U-Turn (FUTURE SIGNALIZED)			
Eastbound Left	500	78	48
Northbound Thru	-	177	596
INTERSECTION 7 – N. Little Egypt Road at Road A (UNSIGNALIZED)			
Westbound Approach	-	5	2.5
Southbound Thru-Left	-	0	2.5

2022 Build Improved Analysis

Table 11 shows the analysis results within the study area with the recommended improvements. The full-list of recommended improvements are listed in the Recommendations section. Capacity analysis results can be found in Appendix F.

Table 11: Level of Service Analysis – 2022 Build Improved Traffic Conditions

LOCATION	2022 BUILD IMPROVED TRAFFIC CONDITIONS	
	AM PEAK LOS (delay/veh)	PM PEAK LOS (delay/veh)
INTERSECTION 1 – NC 73 at N. Little Egypt Road / S. Little Egypt Road (SIGNALIZED)		
Overall	F (90.2)	D (38.2)
Eastbound Approach	E (71.3)	C (28.0)
Westbound Approach	D (47.7)	D (42.9)
Northbound Approach	E (57.2)	E (57.2)
Southbound Approach	F (207.3)	D (37.1)
INTERSECTION 2 – N. Little Egypt Road at Drury Lane / Road E (UNSIGNALIZED)		
Eastbound Approach	B (10.7)	B (11.3)
Westbound Approach	B (12.2)	B (11.9)
Northbound Left-Turn	A (8.0)	A (7.6)
Southbound Left-Turn	A (7.6)	A (7.8)
INTERSECTION 3 – N. Little Egypt Road / St. James Church Road at Optimist Club Road (UNSIGNALIZED)		
Westbound Approach	C (17.1)	B (11.6)
Southbound Left-Turn	A (8.6)	A (7.8)

The results of this analysis indicate that with the recommended improvements in place, unacceptable delays continue to be observed at the intersection of NC 73 at Little Egypt Road.

With the recommended improvements in place at the intersection of Little Egypt Road at Drury Lane and Road E, all approaches and movements operate with acceptable delays.

With the recommended improvements in place at the intersection of Little Egypt Road at Optimist Club Road / St. James Church Road, all approaches and movements operate with acceptable delays.

It should be noted that the Warrant for Left and Right-Turn Lanes nomograph for at-grade unsignalized intersections contained within NCDOT's Policy on Street and Driveway Access to North Carolina Highways was reviewed against the traffic volumes at the two site access points.

Table 12: Synchro 95th Percentile Queue Analysis – 2022 Build Improved Traffic Conditions

LOCATION	2022 BUILD IMPROVED TRAFFIC CONDITIONS		
	EXISTING STORAGE LENGTH (ft.)	AM PEAK 95 th Percentile Queue (ft.)	PM PEAK 95 th Percentile Queue (ft.)
INTERSECTION 1 – NC 73 at N. Little Egypt Road / S. Little Egypt Road (SIGNALIZED)			
Eastbound Left	-	114	53
Eastbound Thru-Right	-	1050	720
Westbound Left	150	72	39
Westbound Thru	-	644	1118
Westbound Right	175	367	233
Northbound Thru-Left	-	85	41
Northbound Right	225	66	115
Southbound Left	-	601	206
Southbound Thru	120 (proposed)	27	18
Southbound Right	120 (proposed)	106	71
INTERSECTION 2 – N. Little Egypt Road at Drury Lane / Road E (UNSIGNALIZED)			
Eastbound Approach	-	2.5	2.5
Westbound Approach	-	12.5	7.5
Northbound Thru-Left	-	0	0
Southbound Left	50 (proposed)	0	2.5
Southbound Thru-Right	-	0	0
INTERSECTION 3 – N. Little Egypt Road / St. James Church Road at Optimist Club Road (UNSIGNALIZED)			
Westbound Left	50 (proposed)	47.5	22.5
Westbound Right	-	32.5	27.5
Southbound Thru-Left	-	25	5

CONCLUSIONS

The proposed Little Egypt Road Development is located near the intersection of N. Little Egypt Road and Optimist Club in eastern Lincoln County, North Carolina. The development is proposed to consist of single family homes to be completed in 2022 with a total of 222 single family units. It is estimated that the proposed development will generate a total of 167 trips (42 in, 125 out) in the AM peak hour and 222 trips (140 in, 82 out) will be generated in the PM peak hour.

The site will have two access points on N. Little Egypt Road. It is envisioned that these access points will operate under stop-control. Other conclusions, organized by study intersection, are as follows:

NC 73 at N. Little Egypt Road / S. Little Egypt Road

The proposed development contributes to unacceptable delays present across all analysis scenarios. As a result, mitigation is proposed at this intersection.

Improvements at the intersection are limited in their constructability due to both NC 73 and Little Egypt Road consisting of two-lane undivided cross sections. NCDOT is planning to widen NC 73, however this widening's western limits are approximately one and a half miles to the east of this intersection.

Therefore, it is recommended to construct a southbound exclusive right-turn lane on Little Egypt Road. There is currently a short-channelized turn-lane on the approach. As such, this improvement seeks to provide additional storage for vehicles wishing to travel westbound on NC 73. This additional queuing does not result in a reduction in seconds of delay per vehicle on the approach. However, simulation results show reductions to vehicular queuing on the southbound approach of Little Egypt Road at NC 73. This is detailed in the below tables.

Table 13: SimTraffic Results – AM Peak Hour Max Observed Queues (ft.)

LOCATION	EXISTING STORAGE LENGTH (ft.)	2017 EXISTING	2022 NO-BUILD	2022 BUILD	2022 BUILD IMPROVED
INTERSECTION 1 – NC 73 at N. Little Egypt Road / S. Little Egypt Road (SIGNALIZED)					
Southbound Left	-	455	1207	1333	1392
Southbound Thru	120 (proposed)	275	275	275	220
Southbound Right	120 (proposed)				45

Table 14: SimTraffic Results – PM Peak Hour Max Observed Queues (ft.)

LOCATION	EXISTING STORAGE LENGTH (ft.)	2017 EXISTING	2022 NO-BUILD	2022 BUILD	2022 BUILD IMPROVED
INTERSECTION 1 – NC 73 at N. Little Egypt Road / S. Little Egypt Road (SIGNALIZED)					
Southbound Left	-	170	260	249	247
Southbound Thru	120 (proposed)	54	113	150	39
Southbound Right	120 (proposed)				69

N. Little Egypt Road at Drury Lane / Road E

Per the NCDOT's Policy on Street and Driveway Access to North Carolina Highways, because this proposed access point is off-of a state-maintained facility, the manual's nomograph requires both fifty-foot (50 ft.) left and right-turn lanes on N. Little Egypt Road.

The analysis presented herein found that Road E operates with acceptable levels of service with one egress lane serving both left, thru, and right-turning traffic.

N. Little Egypt Road / St. James Church Road at Optimist Club Road

The traffic analysis indicates that operations on the westbound approach of Optimist Club Road degrade from LOS C in the no-build to LOS E in the build scenario during the AM peak hour. As a result, mitigation is proposed at this intersection.

It should be noted that Lincoln County GIS indicate the right-of-way width to be sixty (60) feet. If this is not accurate and right-of-way is not able to be obtained; this improvement should be waived.

NC 16 Bypass at Optimist Club Road

The traffic analysis indicates that this intersection is projected to operate acceptably during both peak hours with the improvements planned by NCDOT. Therefore, improvements are not recommended at this intersection.

NC 16 Bypass at North U-Turn

The traffic analysis indicates that this intersection is projected to operate acceptably during both peak hours with the improvements planned by NCDOT. Therefore, improvements are not recommended at this intersection.

NC 16 Bypass at South U-Turn

The traffic analysis indicates that this intersection is projected to operate acceptably during both peak hours with the improvements planned by NCDOT. Therefore, improvements are not recommended at this intersection.

N. Little Egypt Road at Road A

The analysis presented herein found that low traffic volumes at this intersection are anticipated when the proposed development is constructed. As such, no additional turn-lanes are proposed at this planned intersection.

The specific recommendations at each study intersection are discussed in the Recommendations section.

RECOMMENDATIONS

Based on the findings of this study, a specific improvement has been identified and should be completed as part of the proposed development. The NCDOT "Policy on Street and Driveway Access to North Carolina Highways" manual was consulted to determine the appropriate storage for the recommended auxiliary lanes if warranted.

NC 73 at N. Little Egypt Road / S. Little Egypt Road

- Construct an exclusive right-turn lane on southbound Little Egypt Road. The exact storage should be determined through roadway design, but the storage should be maximized without interfering with the school driveway to the north. This is estimated to be approximately 120 feet of full width storage and appropriate taper.
- Restripe the southbound shared thru/right turn-lane to an exclusive thru lane.
- The above recommendations may require the modification of the traffic signal at the intersection.

N. Little Egypt Road at Drury Lane / Road E

- Construct Road E with one (1) ingress lane and one (1) egress lanes consisting of a shared left/thru/right-turn lane. The proposed intersection will operate under stop-control.
- Construct an exclusive right-turn lane with 50 feet of full-width storage and appropriate taper on northbound N. Little Egypt Road.
- Construct an exclusive left-turn lane with 50 feet of full-width storage and appropriate taper on southbound N. Little Egypt Road.

N. Little Egypt Road / St. James Church Road at Optimist Club Road

- Construct an exclusive left-turn lane with 50 feet of full-width storage and appropriate taper on westbound Optimist Club Road.

It should be noted that Lincoln County GIS indicate the right-of-way width to be sixty (60) feet. If this is not accurate and right-of-way is not able to be obtained; this improvement should be waived.

NC 16 Bypass at Optimist Club Road

There are no recommended improvements at this intersection.

NC 16 Bypass at North U-Turn

There are no recommended improvements at this intersection.

NC 16 Bypass at South U-Turn

There are no recommended improvements at this intersection.

N. Little Egypt Road at Road A

- Construct Road A with one (1) ingress lane and one (1) egress lanes consisting of a shared left/thru/right-turn lane. The proposed intersection will operate under stop-control.

The Recommended Improvements are shown in Figure 15.

