



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: Joshua Grant, Planner II

Date: July 15, 2016

Re: PD #2016-4
Lawrence W. Mashburn & Assigns, applicant
Parcel ID# 86604, 34085, 58241, 32399, 32520, 32514, 34090, and 34096

The following information is for use by the Lincoln County Board of Commissioners and Planning Board at their joint meeting/public hearing on August 1, 2016.

REQUEST

The applicant is requesting the rezoning of 89.25 acres from R-SF (Residential Single-Family), R-T (Residential Transitional), and B-N CZ (Neighborhood Business Conditional Zoning) to PD-R (Planned Development-Residential) to permit a subdivision with up to 198 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 existing zoning districts.

A site plan and report, which outlines guidelines for the proposed development have been submitted as part of the rezoning application and would serve as the master plan and terms/conditions for the development if the rezoning request is approved. A traffic impact analysis has also been submitted.

SITE AREA AND DESCRIPTION

The property is located between N.C. 16 Business and Saint James Church Rd. about 2,700 feet south of their intersection in the Catawba Springs Township. It is adjoined by property zoned I-G (General Industrial), B-G (General Business) and B-N (Neighborhood Business), and R-T (Residential Transitional). Land uses in this area include residential, business commercial, religious and industrial. A very small portion of this property is located in a WS-IV Critical Area watershed district, however none of the homes are proposed to be located within that district. None of the property is located in a floodplain; although two creeks do traverse the property where 50' buffers are required to be established.

PLAN CONFORMANCE

The development site abuts a targeted focus area identified for a mixture of uses that make up the NC 16 Corridor Vision Plan's focus for a community center in downtown Denver. The uses for this area described by the corridor plan and uses in general that make up a community center are in many cases supported by residential on the fringe of the community.

The proposal also provides alternative transportation routes and connections to adjacent property in keeping with the Comprehensive Land Use Plan. In addition, as part of the walking trail improvements, the developer is going to reserve an easement for addition of a portion of the trail to the Carolina Thread Trail greenway corridor.

UDO COMPLIANCE

The UDO requires that a planned development include a minimum of 12.5% recreation and open space. The master plan for the proposed Sylvan Creek development calls for approximately 38% recreation and open space.

Subdivisions with more than 50 lots are required to have at least two access points. This proposal calls for one access point on NC 16 Business and a second on St. James Church Rd. The plan also complies with the UDO's subdivision standards for internal connectivity, block length and cul-de-sac length.

As a condition of a rezoning, Section 9.8.7 of the UDO requires an applicant to provide road improvements to maintain the service level of an intersection if it is impacted by a proposed development. The traffic impact analysis for the Sylvan Creek development shows it would impact the N.C. 16 and St. James Church Rd. as well as NC 16 Business and St. James Church Rd./Will Proctor Street intersections. Based on the analysis, the applicant has proposed or arranged with NCDOT, improvements to offset the impact.

STAFF'S RECOMMENDATION

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



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Zoning Amendment

Staff's Proposed Statement of Consistency and Reasonableness

Case No. **PD #2016-4**

Applicant **Lawrence W. Mashburn & Assigns**

Parcel ID# **86604, 34085, 58241, 32399, 32520, 32514, 34090, and 34096**

Location **Between N.C. 16 Business and Saint James Church Rd. 2,700 feet
south of intersection in the Catawba Springs Township.**

Proposed amendment

Rezoning of 89.25 acres from R-SF (Residential Single-Family), R-T (Residential Transitional), and B-N CZ (Neighborhood Business Conditional Zoning) to PD-R (Planned Development-Residential) to permit a subdivision with up to 198 single-family detached homes.

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

The proposal is consistent with the NC 16 Corridor Vision Plan's goal of creating a community center for "Downtown Denver". It is consistent with the corridor plan's goal of creating a new road network to provide alternate travel routes between N.C. 16 Business and St. James Church Rd. helping to alleviate traffic congestion at their intersection and allowing easier access to the NC 16 Bypass. The proposal also is consistent with guiding principle 6 of the Land Use Plan by integrating other land uses as a connection to Denver Baptist Church will be made on the northwestern side of the property.

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

The property abuts a targeted focus area identified for a mixture of uses that requires support from residential development along the periphery. The plans for this subdivision will meet all of the requirements of the Unified Development Ordinance. At least 38% of the property will be set aside as open space and stream corridors will be protected by buffer. Amenities will be provided as part of the master plan, including a walking trail, picnic areas, and a swimming pool. As part of this proposed amendment, off-site road improvements will be made by the developer to mitigate the impact of this subdivision.



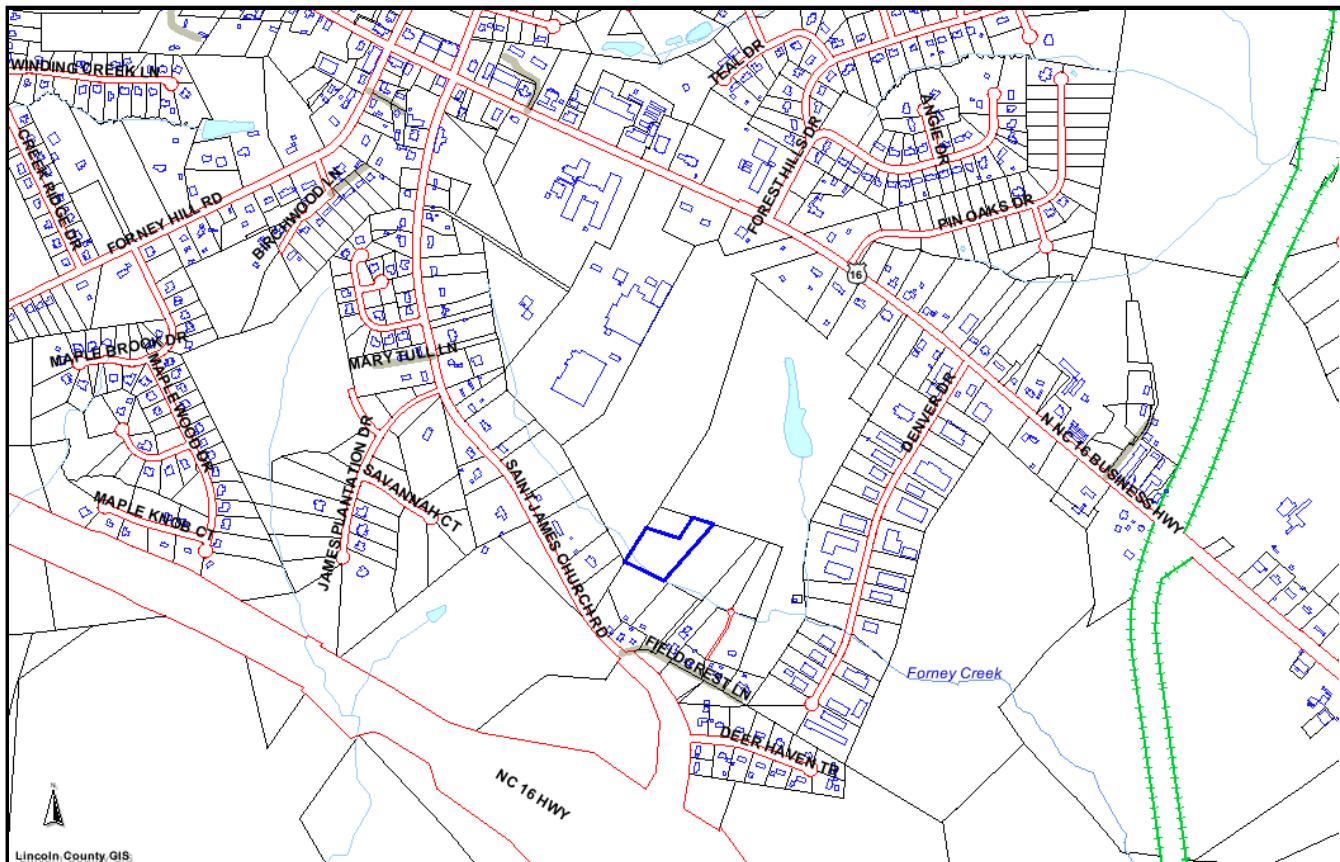
Lincoln County, NC

Office of the Tax Administrator, GIS Mapping Division

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Date: 7/15/2016 Scale: 1 Inch = 1320 Feet



Lincoln County, GIS:

PHOTOS



Photo Not Available

PARCEL INFORMATION FOR 3695-70-9976

Parcel ID	32399	Owner	SHERRILL ALLEN
Map	3695-04	Mailing Address	4909 STRATFORD DR DENVER NC 28037
Account	19541	Recorded	6/23/1981
Deed	579-515	Total Value	\$16,616
Land Value	\$16,616	----- All values are for tax year 2016. -----	
Description	SHERRILL LD RD 1380		
Address	SAINT JAMES CHURCH RD		
Township	CATAWBA SPRINGS		
Improvement		Tax/Fire District	No Improvements
Zoning District	Calculated Acres	Voting Precinct	Calculated Acres
R-SF	2.85	DENVER WEST (DW28)	3.04
R-T	0.19		
Watershed Class		Sewer District	
Not in a watershed	3.04	Not in the sewer district	3.04
2000 Census County		Tract	Block
37109		071100	1030
37109		071100	1038
Flood	Zone Description	Panel	
X	NO FLOOD HAZARD	3710369500	3.04



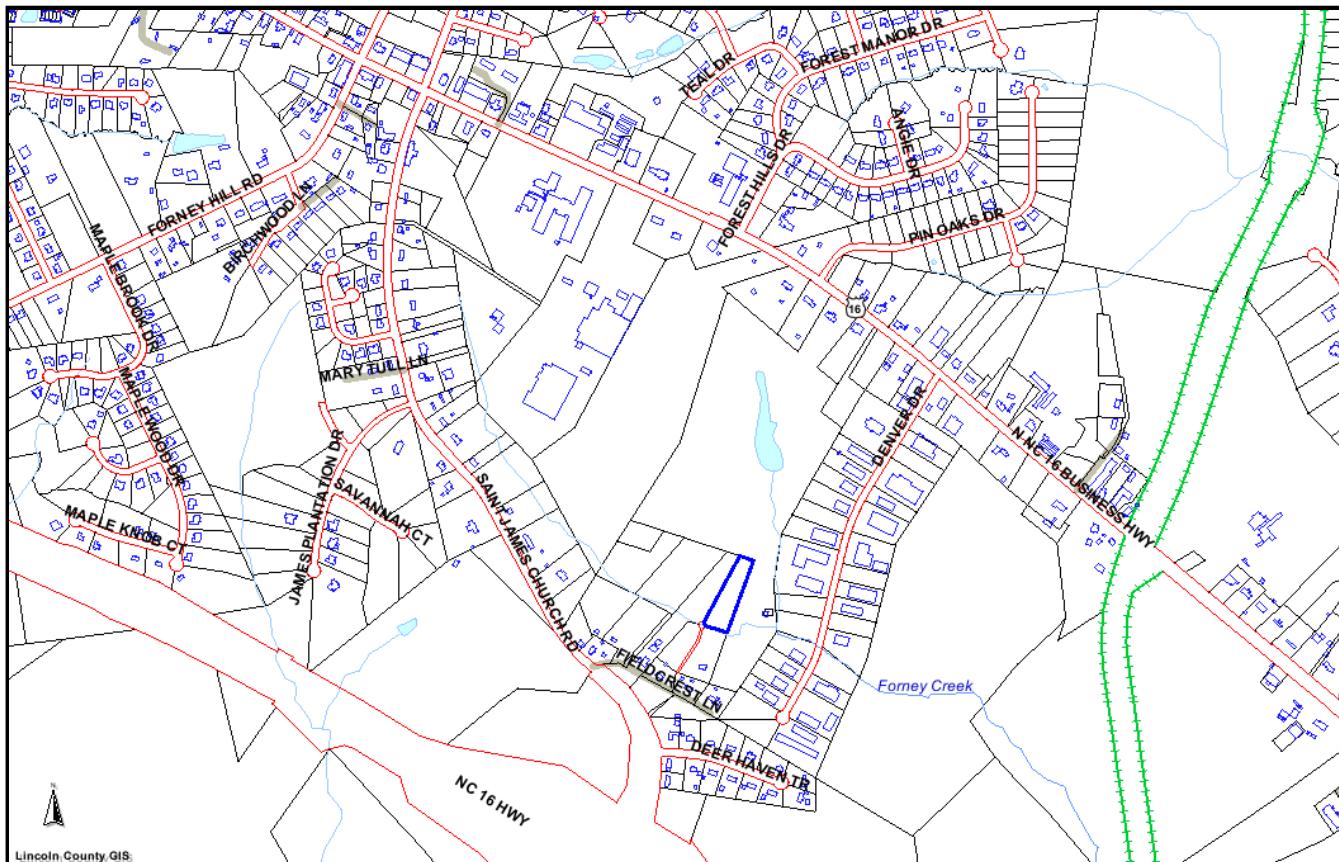
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PHOTOS		PARCEL INFORMATION FOR 3695-80-6831							
 Photo Not Available		Parcel ID	32514	Owner	SHERRILL TYRUS JR (HEIRS)				
		Map	3695-04	Mailing Address	2871 WESLEYAN CHURCH RD				
		Account	19681	Recorded	LINCOLNTON NC 28092-8242				
		Deed	541-896	Total Value	\$10,353	Sale Price	0		
		Land Value	\$10,353	----- All values are for tax year 2016. -----					
		Description	SHERRILL LD RD 1380			Deed Acres	1.85		
		Address	FIELDCREST LN			Tax Acres	1.89		
		Township	CATAWBA SPRINGS			Deer Haven			
		Improvement	No Improvements			Deer Haven			
		Zoning District	Calculated Acres	Voting Precinct			Calculated Acres		
		R-SF	1.89	DENVER WEST (DW28)			1.89		
		Watershed Class	1.89	Sewer District			1.89		
		Not in a watershed		Not in the sewer district					
		2000 Census County		Tract	071100	Block	1038		
		37109		Panel	3710369500		1.89		
		Flood	Zone Description						
		X	NO FLOOD HAZARD						



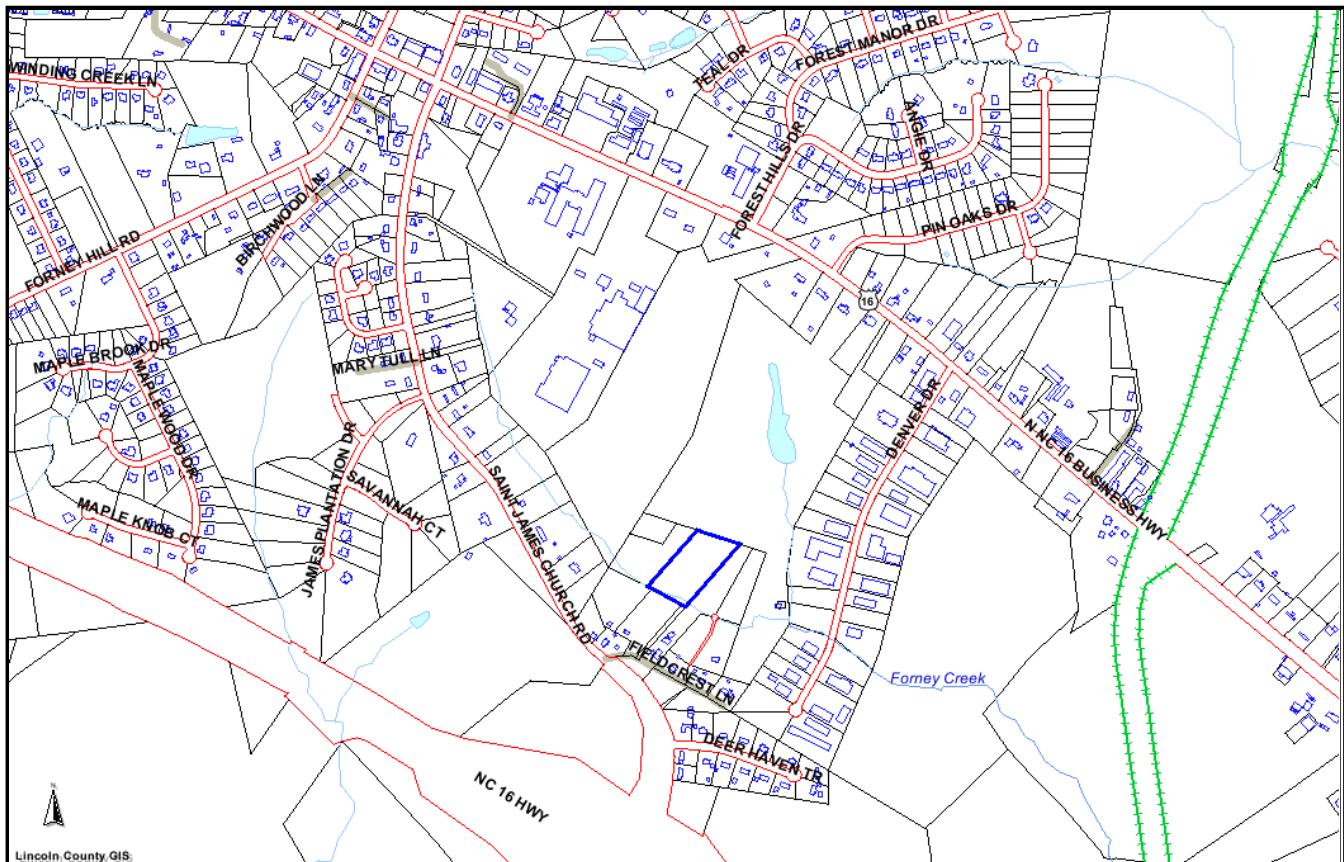
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Lincoln County, GIS:

PHOTOS



Photo Not Available

PARCEL INFORMATION FOR 3695-80-1889

Parcel ID	32520	Owner	SHERRILL WILLIAM G SHERRILL REGINA H PO BOX 373 DENVER NC 28037-0373
Map	3695-04	Mailing Address	
Account	19691	Recorded	
Deed	561-733	Total Value	\$21,598
Land Value	\$21,598	Sale Price Previous Parcel	0
Description	SHERRILL LD RD 1380		
Address	FIELD CREST LN		
Township	CATAWBA SPRINGS	Tax/Fire District	
Improvement		No Improvements	
Zoning District	Calculated Acres	Voting Precinct	Calculated Acres
R-SF	3.8	DENVER WEST (DW28)	3.95
R-T	0.15		
Watershed Class		Sewer District	
Not in a watershed	3.95	Not in the sewer district	3.95
2000 Census County		Tract	
37109		071100	
Flood	Zone Description	Block	
X	NO FLOOD HAZARD	1038	3.95
		Panel	
		3710369500	3.95



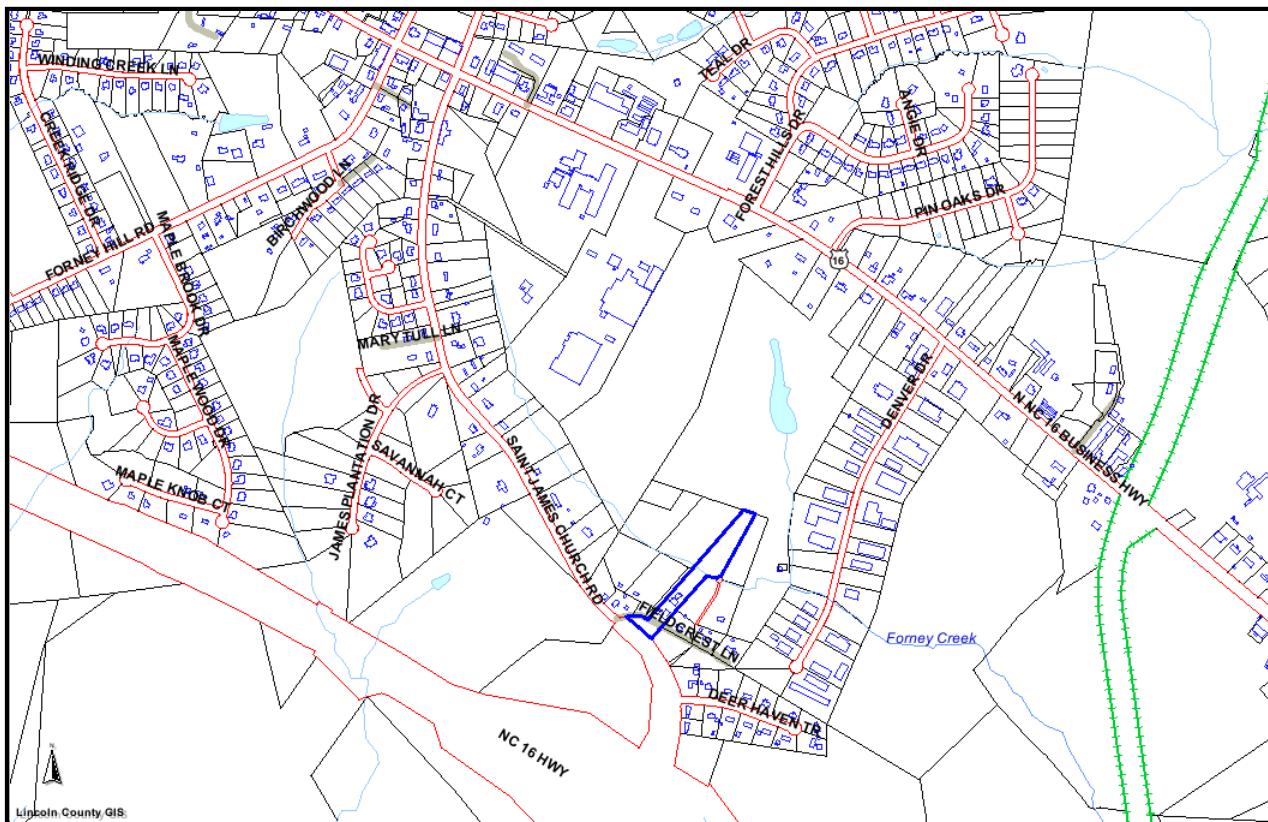
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PHOTOS



60189



60189

PARCEL INFORMATION FOR 3695-80-1585

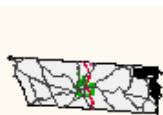
Parcel ID	60189	Owner	WARFORD WILLIAM H
Map	3695-04	Mailing	7013 FIELDCREST LN
Account	43388	Address	DENVER NC 28037
Deed	737-507	Recorded	1/1/1994
Land Value	\$44,647	Total Value	\$198,902
----- All values are for tax year 2016. -----			
Description	R HICKS LD SEE PAR#34085	Deed Acres	0
Address	7013 FIELDCREST LN	Tax Acres	3.21
Township	CATAWBA SPRINGS	Tax/Fire District	DENVER
Main Improvement		RANCH	
Main Sq Feet	2318	Stories	1
Unfinished Basement	1332	1 Year Built	1972
		Value	\$148,504
Parcel ID	34085	Owner	WARFORD WILLIAM H
Map	3695-04	Mailing	7013 FIELDCREST LN
Account	43388	Address	DENVER NC 28037
Deed	737-507	Recorded	
Land Value	\$4,964	Total Value	\$4,964
----- All values are for tax year 2016. -----			
Description	R. HICKS LD SEE PAR#60189	Deed Acres	0
Address	7013 FIELDCREST LN	Tax Acres	0.68
Township	CATAWBA SPRINGS	Tax/Fire District	DENVER / EL SEWER
Improvement		No Improvements	
Zoning District		Calculated Acres	Calculated Acres
R-SF		1.98	3.89
R-T		1.91	
Watershed Class	Not in a watershed	3.89	
2000 Census County		Voting Precinct	
37109		DENVER WEST (DW28)	
Flood	Zone Description	Tract	Block
X	NO FLOOD HAZARD	071100	1038
		Panel	
		3710369500	3.89



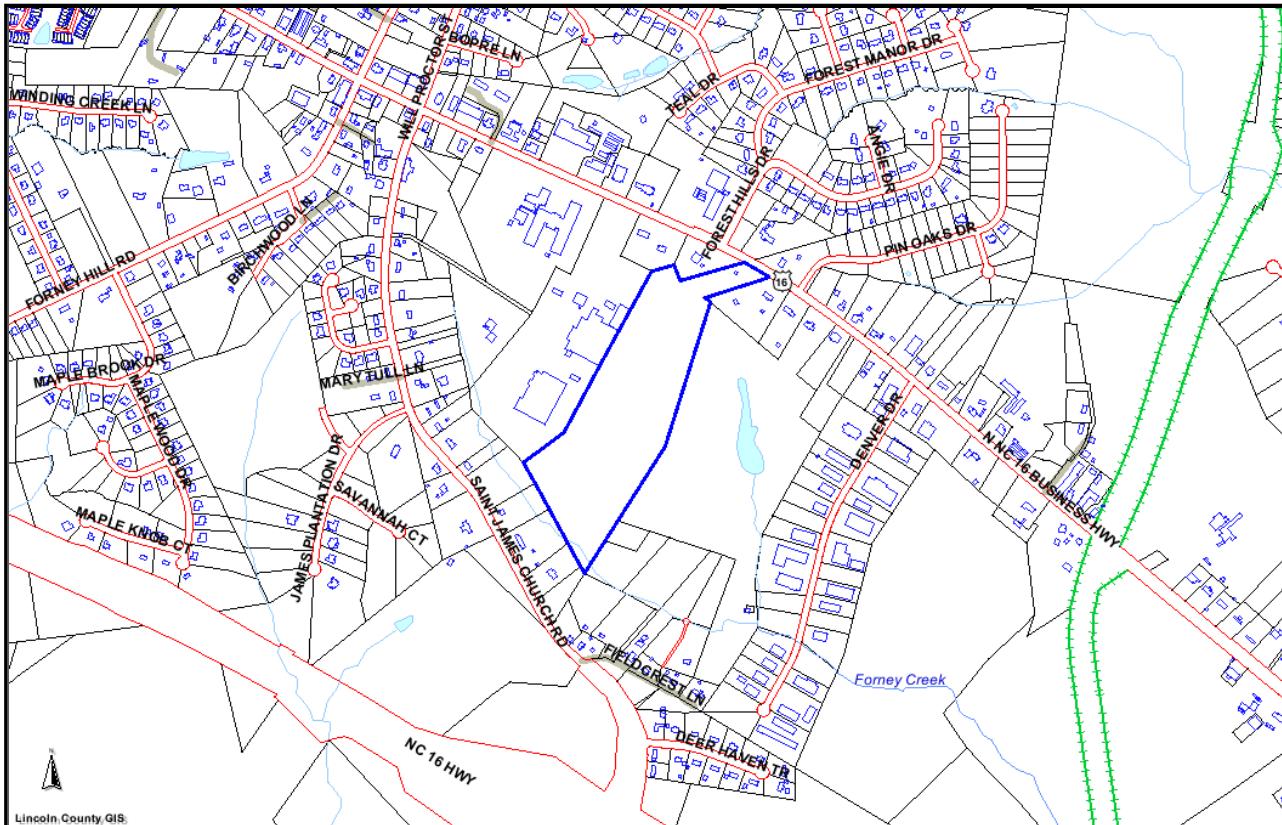
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Lincoln County GIS

PHOTOS



34090



34090

PARCEL INFORMATION FOR 3695-71-8948

Parcel ID	60051	Owner	DENVER BAPTIST CHURCH INC	
Map	3695-04	Mailing	3545 N NC 16 HWY	
Account	0174334	Address	DENVER NC 28037	
Deed	1994-107	Recorded	12/27/2007	
Land Value	\$919,138	Total Value	\$919,138	
----- All values are for tax year 2016. -----				
Subdivision	Lot DR O W SHELLEM	Plat	A-192	
Description	SHELLAM LD SEE PAR#34090	Deed Acres	33.74	
Address	N NC 16 BUSINESS HWY	Tax Acres	27.07	
Township	CATAWBA SPRINGS	Tax/Fire District	DENVER	
Improvement				
No Improvements				
Parcel ID	34090	Owner	DENVER BAPTIST CHURCH INC	
Map	3695-04	Mailing	3545 N NC 16 HWY	
Account	0174334	Address	DENVER NC 28037	
Deed	1994-107	Recorded	12/27/2007	
Land Value	\$168,172	Total Value	\$168,172	
----- All values are for tax year 2016. -----				
Subdivision	Lot DR O W SHELLEM	Plat	A-192	
Description	SHELLAM LD SEE PAR#60051	Deed Acres	33.74	
Address	N NC 16 BUSINESS HWY	Tax Acres	6.66	
Township	CATAWBA SPRINGS	Tax/Fire District	DENVER / EL SEWER	
Improvement				
No Improvements				
Zoning District		Calculated Acres		Calculated Acres
B-N CZ		33.74		33.74
Watershed Class				
Not in a watershed		33.74		
2000 Census County				
37109				
37109				
Flood	Zone Description			
X	NO FLOOD HAZARD			
		Panel		
		3710369500		33.74

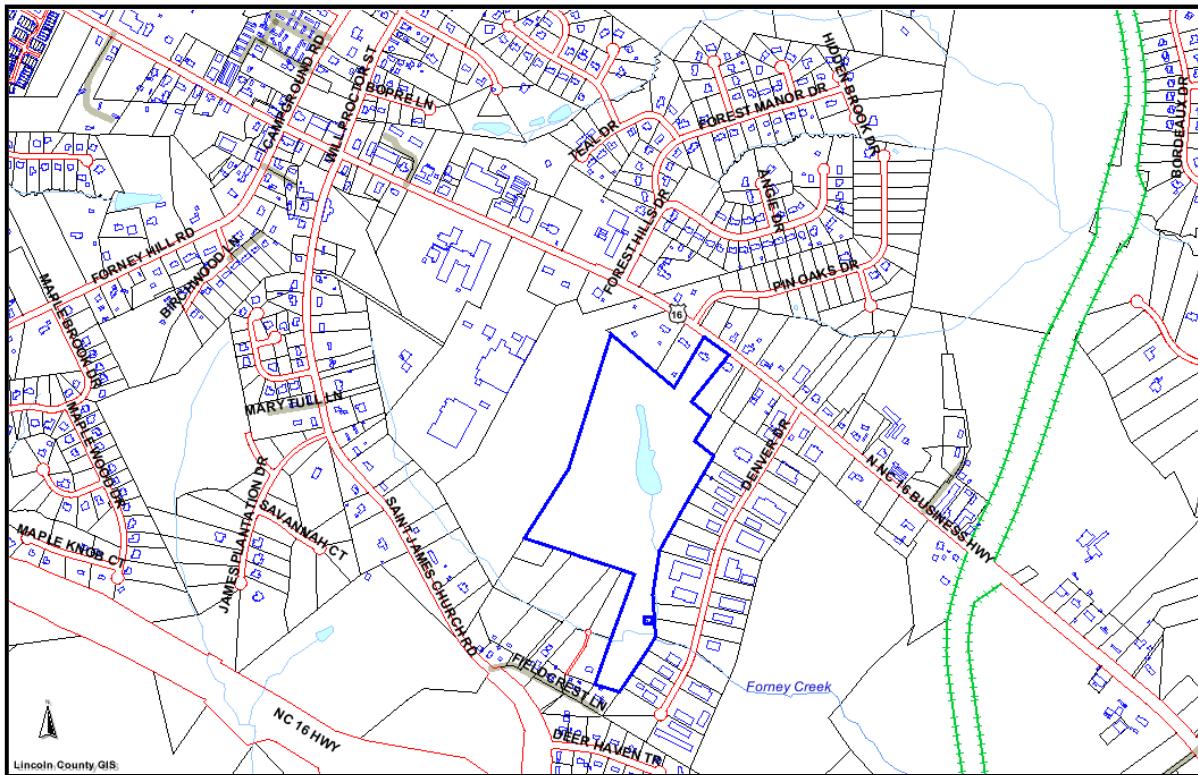


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Date: 7/15/2016 Scale: 1 Inch = 1320 Feet



Lincoln County GIS

PHOTOS



34996

PARCEL INFORMATION FOR 3695-82-7198

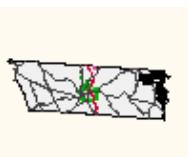
Parcel ID	60056	Owner	VAN WINGERDEN DIRKJE VAN WINGERDEN AART W VAN WINGERDEN THOMAS B
Map	3695-04	Mailing Address	16400 HUNTERSVILLE CONCORD RD
Account	0234513	Recorded	HUNTERSVILLE NC 28078
Deed	11E-355	Total Value	12/19/2009
Land Value	\$432,338	Sale Price	0
Description	----- All values are for tax year 2016. -----		
Address	HOWARD LAND SEE PAR #34096		
Township	N NC 16 BUSINESS HWY		
Improvement	Tax/Fire District		
Parcel ID	34096	Owner	No Improvements
Map	3695-04	Mailing Address	VAN WINGERDEN DIRKJE VAN WINGERDEN AART W VAN WINGERDEN THOMAS B
Account	0234513	Recorded	16400 HUNTERSVILLE CONCORD RD
Deed	11E-355	Total Value	HUNTERSVILLE NC 28078
Land Value	\$109,897	Sale Price	0
Description	----- All values are for tax year 2016. -----		
Address	HOWARD LD SEE PAR #60056		
Township	3387 N NC 16 BUSINESS HWY		
Main Improvement	Tax/Fire District		
Main Sq Feet	1618	Value	44.24
Finished Basement	712	Stories	8.33
Zoning	SPLIT LEVEL		
District	Calculated Acres	Voting Precinct	Calculated Acres
R-SF	41.59	DENVER (DN29)	0.02
R-T	2.94	DENVER WEST (DW28)	44.51
Watershed Class	Sewer District		
Not in a watershed	43.98	Not in the sewer district	36.19
WS-IVP	0.54	In the sewer District	8.34
2000 Census County	Panel		
37109	071100	Block	35.65
37109	071100	3710369500	8.88
Flood	Zone Description		
X	NO FLOOD HAZARD		44.53



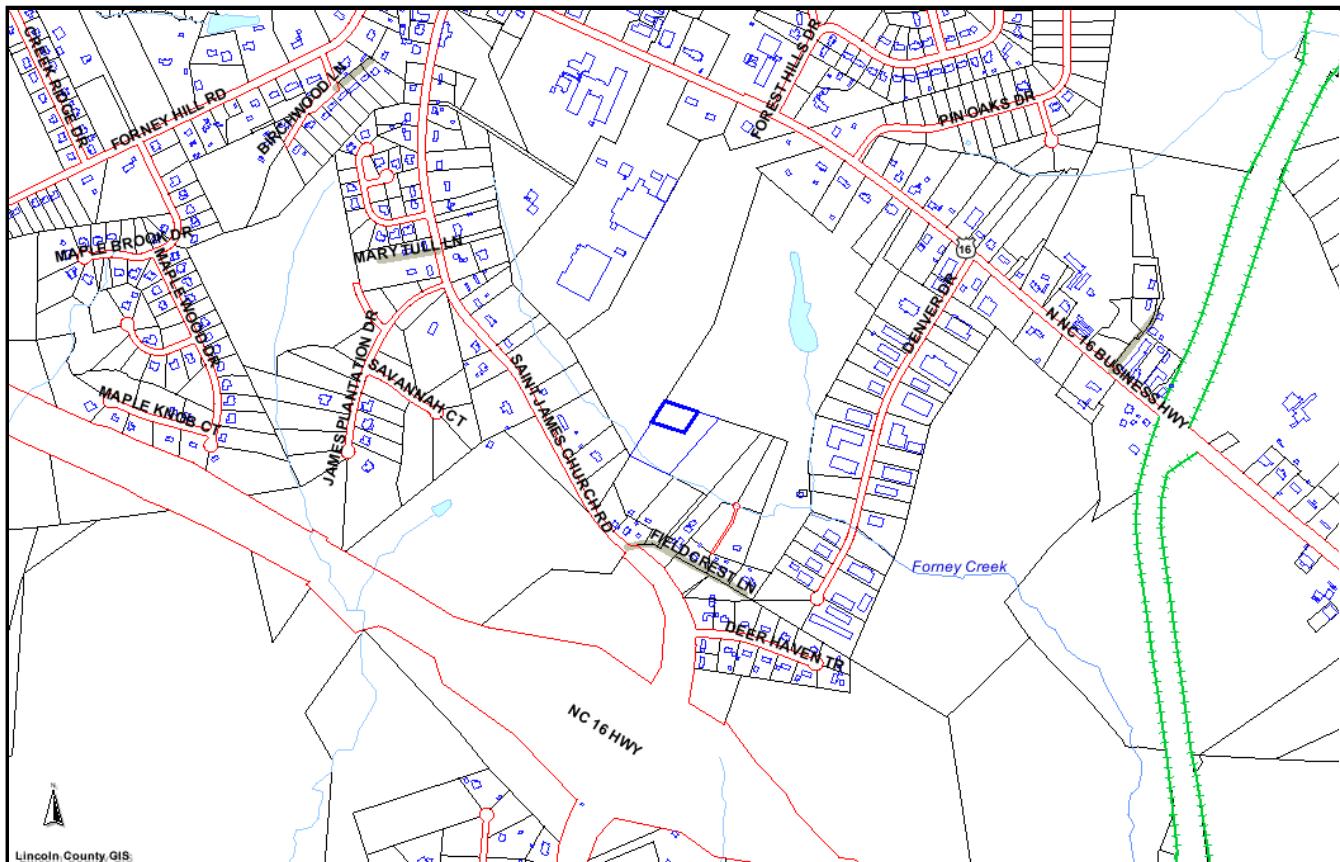
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Date: 7/15/2016 Scale: 1 Inch = 1320 Feet



Lincoln County, GIS:

PHOTOS



Photo Not Available

PARCEL INFORMATION FOR 3695-81-0206

Parcel ID	58241	Owner	SWAIM ANN SMITH	
Map	3695-04	Mailing	7107 EXECUTIVE CIR	
Account	0072901	Address	DENVER NC 28037	
Deed	816-236	Recorded	1/6/1993	
Land Value	\$5,480	Total Value	\$5,480	Sale Price \$1,000 Previous Parcel
----- All values are for tax year 2016. -----				
Description	SHERRILL LD RD 1380			
Address	SAINT JAMES CHURCH RD			
Township	CATAWBA SPRINGS			
Improvement		Tax/Fire District	DENVER	
Zoning	Calculated	Voting Precinct		Calculated Acres
District	Acres	DENVER WEST (DW28)		1
R-SF	1			
Watershed Class		Sewer District		
Not in a watershed		Not in the sewer district		1
2000 Census County		Tract		
37109		071100	1030	0.51
37109		071100	1038	0.49
Flood	Zone Description	Block		
X	NO FLOOD HAZARD	Panel		
		3710369500		1

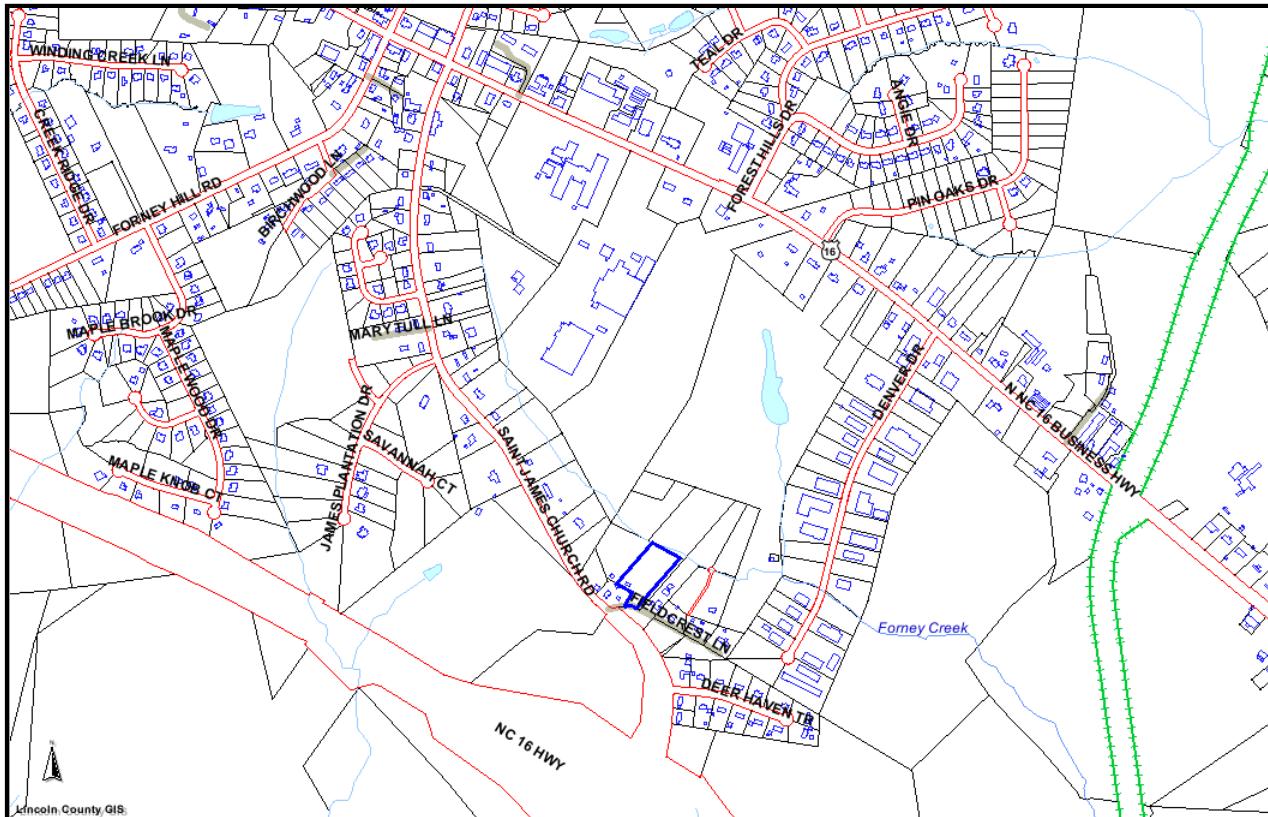


Lincoln County, NC

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Lincoln County, GIS

PHOTOS



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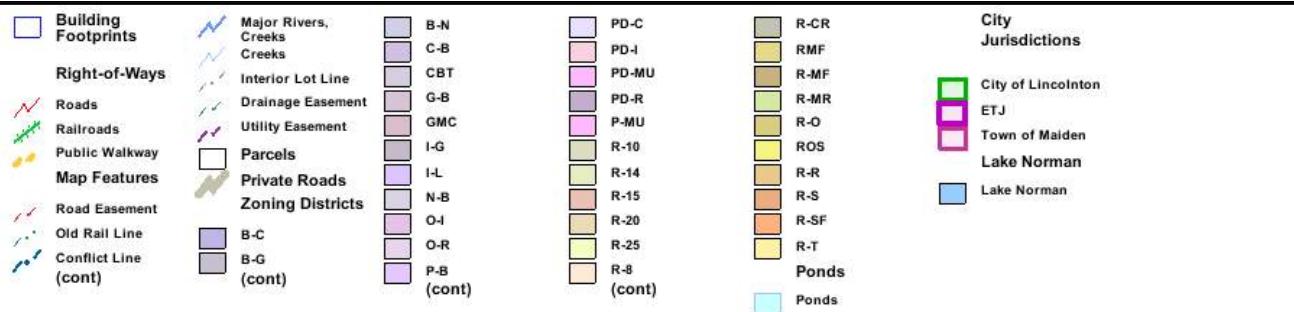
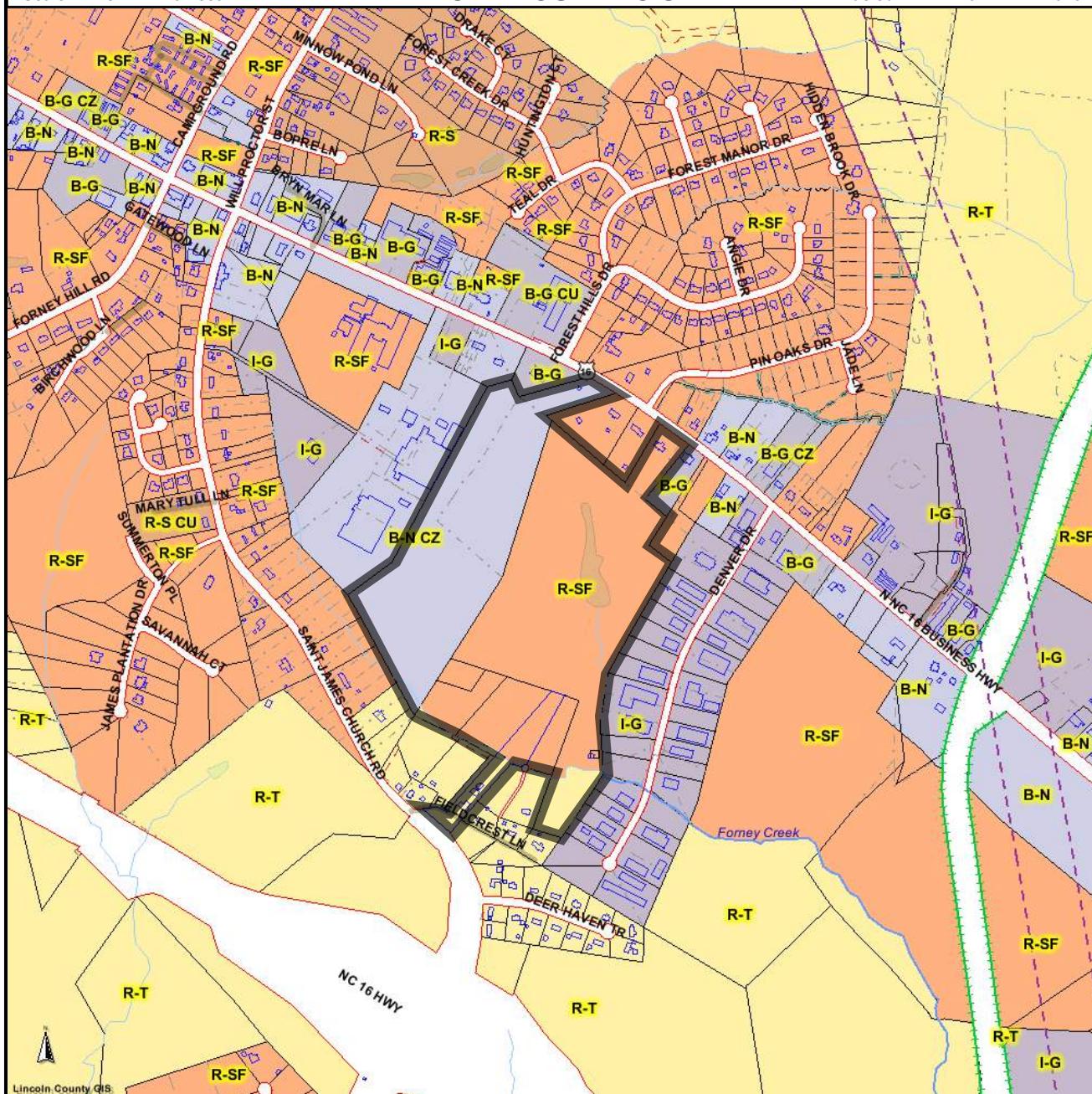
PARCEL INFORMATION FOR 3695-80-0760

Parcel ID	60049	Owner	LITTLE JANET S AKA FOLSOM JANET S
Map Account	3695-04 0123294	Mailing Address	PO BOX 92 DENVER NC 28037
Deed	1928-355	Recorded	5/15/2007
Land Value	\$11,486	Total Value	\$11,486
----- All values are for tax year 2016. -----			
Subdivision	Lot 2 KATHLEEN B SHERRILL	Plat	14-178
Description	#2 LT KATHLEEN B SHERRILL	Deed Acres	2.57
Address	SAINT JAMES CHURCH RD	Tax Acres	2.09
Township	CATAWBA SPRINGS	Tax/Fire District	DENVER
Improvement	No Improvements		
Parcel ID	86604	Owner	LITTLE JANET S AKA FOLSOM JANET S
Map Account	3695-04 0123294	Mailing Address	PO BOX 92 DENVER NC 28037
Deed	1928-355	Recorded	5/15/2007
Land Value	\$2,102	Total Value	\$2,102
----- All values are for tax year 2016. -----			
Subdivision	Lot 2 KATHLEEN B SHERRILL	Plat	14-178
Description	#2 LT KATHLEEN B SHERRILL	Deed Acres	2.57
Address	SAINT JAMES CHURCH RD	Tax Acres	0.38
Township	CATAWBA SPRINGS	Tax/Fire District	DENVER / EL SEWER
Improvement	No Improvements		
Zoning District	Calculated Acres	Voting Precinct	Calculated Acres
R-T	2.48	DENVER WEST (DW28)	2.48
Watershed Class		Sewer District	
Not in a watershed	2.48	Not in the sewer district	2.1
In the sewer District		In the sewer District	0.38
2000 Census County		Tract	
37109		071100	1038
Flood	Zone Description	Block	
X	NO FLOOD HAZARD	Panel	
		3710369500	2.48

Scale: 1 Inch = 1115 Feet

LINCOLN COUNTY GIS

Tue Jun 21 17:20:44 EDT 2016



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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 Lawrence W. Mashburn & Assigns

Applicant Address P.O. Box 37229, Charlotte, NC 28237

Applicant Phone Number (704) 619-3980

Property Owner Name See Attached

Property Owner Address See Attached

Property Owner Phone Number See Attached

PART II

Property Location Between St. James Church Rd and Business Hwy 16 in Denver, NC

Property ID (10 digits) See Attached Property size +/- 89.25 Acres

Parcel # (5 digits) See Attached Deed Book(s) See Attached Page(s) See Attached

PART III

Existing Zoning District See Attached Proposed Zoning District PD-R

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

The property is currently vacant except for an existing sanitary sewer pump station that is operated by Lincoln County Public Works and a single family home on parcel 34096 that will be removed as part of the project.

Briefly described the proposed planned development. The planned development will be a single family subdivision consisting of a mix of 62' and 72' wide lots with associated roadways, sidewalks, amenity area and open space. The development will also provide for a residential collector road connection between St. James Church Road and N.C. Business Hwy 16.

***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.

✓ J. W.

Applicant's Signature

6/16/2016

Date

Property Owners: Sylvan Creek Subdivision, Denver NC

<u>Pin #</u>	<u>Parcel #</u>	<u>Acreage</u>	<u>Name</u>	<u>Phone #</u>	<u>Zoning</u>	<u>Deed Book</u>	<u>Page</u>
3695-80-0760 (portion of)	86604	1.267	Janet L. Folsom PO Box 92 Denver NC 28037	704 763-7899	R-T	1928	355
3695-80-1585 (portion of)	34085	2.183	William H. Warford 7013 Fieldcrest Lane Denver NC 28037	704 740-7546	R-T	737	507
3695-81-0206	58241	0.995	Ann S. Burgan 7107 Executive Circle Denver NC 28037	704 433-7365	R-SF	816	236
3695-70-9976	32399	2.99	Allen Sherrill PO Box 1082 Troutman NC 28166	704 433-7365	R-T	579	515
3695-80-1889	32520	3.95	William G. Sherrill PO Box 373 Denver NC 28037	828 217-3997	R-SF & R-T	561	733
3695-80-6831	32514	1.89	Robin Cribb 2871 Wesleyan Church Rd. Lincolnton NC 28092	828 461-0137	R-SF	541	896
3695-71-8948	34090	33.74	Denver Baptist Church PO Box 383 Denver NC 28037	704 483-3030	B-N CZ	1994	107
3695-82-7198	34096	44.24	Art VanWingerden 16400 Huntersville Concord Rd. Huntersville NC 28078	704 658-9400	R-SF & R-T	11E	355



LINCOLN COUNTY PLANNING & INSPECTIONS DEPARTMENT

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Community Involvement Meeting Report

PD #2016-4

Lawrence W. Mashburn & assigns; applicant

A community involvement meeting was held at the East Lincoln Community Center at 8160 Optimist Club Rd., Denver, NC, on July 12, 2016 for a rezoning request of 89.25 acres from R-SF (Residential Single-Family), R-T (Residential-Transitional), and B-N CZ (Neighborhood Business – Conditional Zoning District) to PD-R (Planned Development-Residential) to permit a subdivision with up to 198 single-family detached homes. The property (Parcel ID# 86604, 34085, 58241, 32399, 32520, 32514, 34090, and 34096) is located between NC 16 Business and Saint James Church Rd. about 2,700 feet south of their intersection in the Catawba Springs Township.

Roughly 45 people attended the meeting, including Planning Board members Christine Poinsette (Chair of the Board) and John Dancoff. The developer Mr. Larry Mashburn gave an overview of the project, describing the proposed development, complete with an outline of traffic improvements, water and sewer system upgrades. Jamie Carpenter, PE and representative from the engineering firm Stewart, Inc., assisted Mashburn with the presentation of the technical aspects of the proposed development.

According to the presentation, the developer's vision is to develop a unique piece of property where people will be connected to nature. A natural surface walking trail is proposed to follow two streams, loop around the pond on the property, and provide access to additional open space on site. 38% of the total land area in the development will be maintained as common open space, incorporating areas that will remain undisturbed and areas for a small park and other amenities.

Mashburn stated that the development will be completed in phases with two different widths of lots, a 62' wide lot product and a 72' wide lot product. The expected price range for these homes is about \$270,000 for the 62' wide lots to \$350,000, for the 72' lots.

The developers expect to invest about \$100,000 in public wastewater improvements and in excess of \$1,000,000 in road improvements. As required by the Lincoln County Unified Development Ordinance, two entrances to the development will be provided, one on NC 16 Business and one on St. James Church Rd.

Mr. Mashburn opened the floor for questions or concerns from the residents who attended. Below is a list of the items and a brief synopsis of how the developer along with his engineer answered them.

Open Discussion:

1. Timeline
 - a. Engineering and Approval 6-7 months.
 - b. Breaking ground – February of 2017
2. Schools – Adding rooftops increases tax revenue and helps with associated costs
3. Road Improvements – We will be adding turn lanes at both entrances and increasing the collection area of road on 16 bypass as well as providing the collector road between St James Church Road and Business 16.
4. Impact Fees – the courts have not upheld the assessment of impact fees in this state.
5. Lot Pricing – the housing pricing will be starting from the \$270k on the 62ft lots and \$350k on the 72ft lots.
6. Nice use of green space – Our plans include nearly 40% of open space with natural features such as a pond and creeks. We are providing a tree park, adding natural walking trails and hoping to become part of the Carolina Thread trail.
7. How did you bring Pulte back? To be honest, I put them in my Jeep and road the property with them.
8. It was asked if we were intending to be like Trilogy – No our intention is to be a more family oriented community.
9. Traffic on St James Church Road is of concern at bypass – We are doing the improvements possible given the present configuration.
10. DOT Study – An extensive Traffic Impact Analysis study has been done.
11. Concern expressed in regards to travel to Mooresville. – The Mooresville customer is not considered to be a large part of our market.
12. Would the Industrial properties backing to the neighborhood see any changes to setbacks. – Response was that the existing setbacks would not be effected.
13. Revisit the water and sewer system upgrades – Lift station #11 is being upgraded to handle Rock Creek and Sylvan Creek subdivisions.
14. Fire Department member question width of roads – We are building to DOT specifications and mediums have special curbing to allow for emergency vehicles.
15. Who will be the utility provider – Those have not been determined as of yet.
16. Any consideration for the speed limit on St James Church Road? That will be determined by DOT.
17. What are the plans for Storm water and runoff? All storm water measures will be engineered during the technical phase.
18. What will be the zoning? We are asking for PDR which is Planned Development Residential.
19. With this becoming a collector road will there be any off road parking – No DOT regulations and deed restrictions will prohibit on road parking.

PD-R REPORT
SYLVAN CREEK SUBDIVISION
NC 16 BUSINESS HWY/
SAINT JAMES CHURCH ROAD
DENVER
LINCOLN COUNTY, NC

1. PROJECT INFORMATION

Sylvan Creek Subdivision is a proposed single family residential community proposing a mix of single family detached homes on an approximately 91.25 acre site on the west side of NC 16 Business Hwy and the east side of Saint James Church Road (see Preliminary Development Concept Plan). There will also be a street connection to provide access to the Denver Baptist Church property to the west of the project. The project will include Parcel ID numbers 58241, 32399, 32520, 32514, 34090, 34096, and a portion of parcels 86604 and 34085. The current plan features 198 single family lots with a density of up to 2.22 lots per acre with valley gutter streets.

Access to the site will be from NC 16 Business Hwy and Saint James Church Road. Land uses surrounding the site include single family residential homes, neighborhood businesses and industrial. The Preliminary Development Concept Plan with vicinity map is included for reference.

A key feature of the proposed community will be the ample open spaces, a trail system, existing streams and pond, and the community amenity area. Approximately 37.89% of the site will be left undeveloped as natural buffer area and/or passive and active open space.

The property is currently zoned R-T, R-SF and B-N CZ. Proposed zoning will be PD-R with a 2.00 acre portion of the property that fronts NC 16 Business Hwy remaining B-N CZ. This 2 acres was subtracted from the total project area prior to the calculation of the density and open space percentage.

The property is not located in a regulated watershed, so density is not limited.

2. GENERAL PROVISIONS

The Planned Development Concept 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 Planned Development Concept 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 entitled Planned Development Districts and Planned Development Review 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 Planned 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.

Each home shall contain no less than 2 different materials on front elevations exclusive of trim. These materials may consist of brick, stucco, stone, architectural concrete, cement fiber board, vinyl siding, wood, or shakes.

A. PERMITTED USES

- 1) The project shall be limited detached single family residential dwellings along with any incidental or accessory uses.
- 2) Uses on the Common Open Space (COS) may include pool, clubhouse, landscaping, fences, walls, berms, pedestrian trails, recreational uses, entry signage, monuments, and storm water BMPs (if required).

B. DENSITY

Gross residential density for the project will not exceed 2.22 lots per acre with curb and gutter streets. 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:	6 feet (12 feet for corner lots)
Rear Setback:	20 feet

Building height shall be limited to 40 feet. Lot platting will meet Lincoln County subdivision regulations.

D. GENERAL SITE DESIGN

The following items are 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) The project will contain the following amenity features. These proposed amenities will be installed no later than recordation of the 120th lot in Phase 4 of the project.
 - a. Picnic tables with outdoor grills in natural park area of large mature trees.
 - b. Swimming Pool and Cabana with Bathrooms. Outdoor equipped play area.
 - c. Landscape areas
 - d. Enhanced entry
 - e. Natural pedestrian trails along creek and pond. The developer will reserve an easement along Forney Creek on the south side of the property to allow for the future corridor of the Carolina Thread Trail.
 - f. 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 constructed of stone or brick material with integrated fencing or other similar mixture of materials at the petitioner's discretion, which complement the architectural characteristics of the neighborhood.
 - g. Landscaped medians will be provided throughout the collector road as shown on the master plan.

Canopy street trees shall be placed at a rate of at least one tree per 50' along both sides of the proposed streets. Driveway locations and street intersections may vary the placement of street trees.

- 3) Decorative lighting shall be used through the project. Street lighting shall be of an acorn style or similar fixture type.
- 4) Mail box kiosks will be located and reviewed by the Postmaster.
- 5) 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.
- 6) Garbage collection will be provided by a private service and included in homeowner association dues.
- 7) Open Space
 - a. The project will offer +/-37.89% of common open space. Common open space will be provided as generally depicted on the Planned Development Concept Plan. A portion of the open space will be active open space.
 - b. The project will offer a Class B perimeter buffers as required by 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 if required by stream crossing permits (401/404). Stream buffers shall be provided along all jurisdictional streams in accordance with NCDENR 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 (if required), trails, 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. The restrictive covenants will specifically restrict "on street" parking in the neighborhood to allow for better emergency access throughout the project.

H. VEHICULAR ACCESS AND ROAD IMPROVEMENTS

Vehicular access: Access will be provided via two main entrances, one on NC 16 Business Hwy and one on Saint James Church Road. These entrances will be provided with a landscaped island in the middle of the streets per the cross section shown on the Preliminary Development Concept Plan. The entrances, as well as internal streets, will provide for a collector road between St. James Church Road and NC Highway 16 Business. The right-of-way width for these collector streets will be 60' to accommodate the addition roadway width as well as a six foot planter strip and five foot sidewalk on both sides of the street. The collector road will have landscaped islands intermittently placed along the collector path to define the route. There will also be mountable round-a-bout islands at the intersections of the collector road and local residential streets. The local residential streets will have a 40' right-of-way with sidewalk and planter strip on one side of the street only.

A road connection will also be provided to the Denver Baptist Church property to the west of the project. A temporary construction entrance will be provided through the 2 acre parcel that will not be rezoned to provide access to NC business highway 16. This construction entrance will remain in place for the duration of the construction

Improvements to Existing Roads: A Traffic Impact Analysis (TIA) has been prepared for this

project and is has been reviewed by NCDOT. Improvements by developer required by NCDOT will be installed per their requirements. Improvement will be installed based on the timeline determined by NCDOT and the traffic engineer's phasing analysis. Below is a list of the improvements detailed in the TIA. Some of these improvements are recommended below to accommodate the site trips and mitigate existing and projected deficiencies in the future No Build Conditions. These improvements are necessitated by the collective impacts of the background traffic growth, off-site developments, and site trips. It may be appropriate for the developer to contribute towards, or implement elements of these improvements. In the event that individual off-site developments are delayed or canceled, the roadway improvements may be reevaluated as the traffic demands may differ from those analyzed in this study.

The proposed 198-lot Sylvan Creek Subdivision is estimated to generate 1,885 daily trips, including 149 AM peak hour trips and 198 PM peak hour trips.

The Existing Condition Analysis indicates that most of the study intersections and approaches are operating at LOS C or better during peak hours. The 2015 traffic counts suggest one or more signal warrants may already be met at the NC 16 WB U-turn intersection and the NC 16 WB/St. James Church Road intersection.

The 2021 No Build Analysis took into account the background traffic growth (1% per year) and three off- site developments. All the study intersections and approaches are expected to operate at LOS D or better during peak hours, except for the southbound Will Proctor Street approach which may degrade to LOS F at its NC 16 Business intersection during the PM peak hour.

The 2021 Build Condition Analysis examined the traffic performance with the site trips added to the study network. This analysis also included the background trip diversions, as the proposed subdivision's internal roadways may provide an alternative route between NC 16 and NC 16 Business. The traffic analyses shows that both site entrances will operate at LOS C during peak hours, but the existing intersections will have varying levels of delay increases. Based on the traffic analysis results, turn-lane warrant analysis, as well as engineering judgment, the following improvements are recommended.

NC 16 Business and North Entrance (by Developer)

- Westbound: Revise the two-way left-turn pavement markings on NC 16 Business to provide an exclusive westbound left-turn lane with 100 feet of storage and appropriate transitions.

St. James Church Road and South Entrance (by Developer)

- Westbound/Northbound: Construct a right-turn lane on St. James Church Road with 100 feet of storage and appropriate deceleration and taper lengths.

Additional improvements are suggested below to accommodate the site trips and mitigate the projected deficiencies in the future No Build Conditions. For practical purposes and given the current traffic demands and projected site traffic impacts, these improvements may be implemented by the NCDOT staff or included in the future Transportation Improvement Program.

NC 16 and St. James Church Road (by Developer)

- Westbound/Northbound: Extend the U-turn lane storage to the intersection with St. James Church Road allowing the right turn lane traffic entering NC Highway 16 to immediately enter the U-turn storage lane at the intersection. This will be accomplished by removing a portion of the existing concrete median and extending the U-turn lane with asphalt pavement.

NC 16 Business and St. James Church Road /Will Proctor Street (by NCDOT)

- Signal Timing Improvements for the PM peak period.

NC 16 and St. James Church Road (by NCDOT)

- Monitor traffic conditions and, if deemed appropriate and necessary, install traffic signal(s) at the WB U-turn intersection and/or the NC 16 WB/St. James Church Road intersection.

The proposed turn-lane improvements at the site entrance intersections will help to separate the turning vehicles from the though traffic streams, and therefore improve the traffic operations and safety performance. The proposed signal timing improvement at the intersection of NC 16 Business and St. James Church Road / Will Proctor Street will help to maintain the 2021 No Build traffic conditions.

While the site trips may increase delays at the NC 16 and St. James Church Road intersection, the resulting peak hour delays (46 seconds or less) appear to remain in a moderate level. It is typical for minor street approaches to experience higher delays at unsignalized intersections. The need for new traffic signals on NC 16 may be verified in the future based on field observations. Considering the current traffic demands and the projected site traffic impacts, the new signals, if justified, do not appear to be necessitated by the subject development.

Schedule of Improvements to Existing Roads: The internal residential collector street between St. James Church Rd and NC 16 Business will be constructed during the first two phases which have a total of 89 lots (or 45% buildout). The improvements at the two site entrances should be implemented initially.

The extension of the U-turn storage at on NC Highway 16 Bypass at the intersection with St. James Church Rd will be constructed prior to the third development phase (the 90th lot).

I. PERMITTING

The Petitioner understands that all permits from Lincoln County and appropriate agencies must be obtained prior to grading or construction activities.

J. CONSTRUCTION SCHEDULE AND PHASING

The development of the site will be completed in six (6) phases as shown on the PDR Plan.

K. MODEL HOMES/SALES OFFICES

Model homes may be constructed within residential areas. Mobile temporary sales offices

shall be allowed at the developer's discretion and shall be subject to any special permits required by Lincoln County.

L. WATER AND SEWER AVAILABILITY

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.

Lift Station # 11 is located within the property including existing sewer lines along Forney Creek and southern boundary line. Lincoln Co. Public Works revealed capacity issues and the necessity to upgrade the pumps at the lift station in order to handle the proposed additional waste. The developers of Rock Creek Subdivision have already begun repairs to Lift Station # 11 in order to determine existing capacity precisely which will provide a base for calculating upgrades required to serve their future residents. Petitioner has agreed to share in engineering and upgrade costs to accommodate the additional required capacity of Sylvan Creek Subdivision.

We anticipate that the additional flow from our 198 single family home project will require 2 new 50 horse power pumps and a new generator to support the larger pumps. We estimate a budget of \$100,000 for these improvements.

M. APPLICABLE ORDINANCES & PLANS

Development will be subject to the standards and requirements of the UDO in effect at the date of submission of the application for rezoning. The development is also subject to the NC 16 Corridor Vision Plan and the Lincoln County Land Use Plan and recommendations thereof.

N. 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.

O. 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.

P. PHASING SCHEDULE

Construction of infrastructure will begin in the first quarter of 2017. The first phase of 29 lots should be ready to plat and record within six months. The subsequent five phases of remaining 169 lots will be completed and recorded by 2020 given favorable market conditions.



Hawthorne Development Group
11220 Elm Lane, Suite 200, Charlotte, NC 28277

July 12, 2016

Silverhammer Inc,
Mr. Lawrence Mashburn
PO Box 37229
Charlotte, NC 28237

Dear Mr. Mashburn,

We have performed several exploratory tests on Lincoln County's pump station #11. Based on the information we have so far, I would expect the additional flow from your 200 single family homes to require 2 new 50 horse power pumps and a new generator to support the larger pumps. I would recommend a budget of \$100,000 for these improvements. We are continuing to study the station and new information may change your required improvements.

Sincerely,
Hawthorne Development Group



Steve Bailey

Traffic Impact Analysis

Sylvan Creek Subdivision

Lincoln County, NC

Prepared for:

Mr. Lawrence Mashburn
P.O. Box 37229
Charlotte, NC 28237

Prepared by:
Accelerate Engineering, PLLC
July 11, 2016



Accelerate Engineering, PLLC
License No. P-1442

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EXECUTIVE SUMMARY

Sylvan Creek Subdivision is a proposed residential development located on a 92-acre tract between NC 16 Business and St. James Church Road in Denver (Lincoln County), NC. The proposed development will have 198 detached single-family units, and is estimated to generate 1,885 daily trips, including 149 AM peak hour trips and 198 PM peak hour trips.

Two full-movement access points are proposed for the subject development. The North Entrance will be located on NC 16 Business, forming a new T-intersection approximately 250' east of Pin Oaks Drive. The South Entrance will be located on St. James Church Road, approximately 650' north of Deer Haven Trail. A connector is also proposed for the adjoining property to the west through which internal access to the Rock Springs Elementary School might be provided in the future.

After discussions with the County and NCDOT, the following eight intersections are included as part of the area of influence for the proposed development.

NC 16 Business and St. James Church Road/Will Proctor Street.....	<i>Signalized 4-legged intersection</i>
NC 16 and St. James Church Road (including U-Turns).....	<i>Unsignalized 4-legged intersection</i>
NC 16 Business and North Entrance.....	<i>Unsignalized T - intersection</i>
St. James Church Road and South Entrance.....	<i>Unsignalized T- intersection</i>

For the purposes of the Traffic Impact Analysis (TIA), the full build-out of the site will be completed, opened, and fully occupied in 2020. Thus, the design year in this study is 2021, or one year past build-out. This study evaluated the following four scenarios for the study intersections:

1. The “**2016 Existing Conditions Analysis**” evaluates the current intersection operational performance.
2. The “**2021 No Build Analysis**” examines the future traffic conditions where the proposed development is not constructed. This analysis takes into account background traffic growth (1% per year) and three nearby approved developments (Rock Creek Subdivision, The Village at Sherrills Ford Phases 1 & 2, and Newton Crossing).
3. The “**2021 Build Analysis**” evaluates the intersection operational performance after distributing site trips through the study area intersections and adjusting the background trips due to possible trip diversions.
4. The “**2021 Build with Improvements Analysis**” identifies and evaluates the mitigation measures, if there is any degradation in the operational performance when comparing scenarios 2 and 3 above.

Sylvan Creek Subdivision TIA

This traffic study evaluated the intersection traffic operational performance through the intersection capacity / Level of Service (LOS) analysis, traffic simulations and queue analysis for weekday AM and PM peak hours. LOS is a letter designated by the average vehicle delay time for an approach or an intersection with “A” representing little or no delay and “F” representing high levels of congestion. LOS D or better is typically considered acceptable. Delay and LOS results for unsignalized intersections are reported for each approach while signalized intersections add a composite delay (based on a weighted average of the approaches) and LOS for the overall intersection. The traffic analysis results are summarized below:

2016 Existing Conditions Analysis

The analysis results indicate that most of the study intersections and approaches are operating at LOS C or better during peak hours. The 2015 traffic counts suggest one or more signal warrants may already be met at the NC 16 WB U-turn intersection and the NC 16 WB/St. James Church Road intersection.

2021 No-Build Analysis

With the background traffic growth and the nearby proposed developments, all the study intersections and approaches are expected to operate at LOS D or better during peak hours, except for the southbound Will Proctor Street approach which may degrade to LOS F during the PM peak hour.

2021 Build Analysis

When comparing the 2021 No-Build Condition Analysis to the 2021 Build Condition Analysis, the NC 16 Business and St. James Church Road / Will Proctor Street intersection will maintain the overall intersection LOS during both AM and PM peak hours, but the northbound and southbound approaches are estimated to have higher delays and operate at LOS E and LOS F, respectively.

The NC 16 and St. James Church Road intersection will also have higher delays. During the AM peak hour, the NC 16 westbound U-turn movement is estimated to degrade to LOS E. During the PM peak hour and due to the heavy westbound through traffic (over 1,000 vph) on NC 16, both the southbound St. James Church approach and the eastbound NC 16 left-turn movement will degrade to LOS E.

Both proposed site entrances were analyzed with one ingress lane and one egress lane, and are expected to operate at LOS C (20 seconds or less) during peak hours.

2021 Build with Improvements Analysis

Comparing the Build Condition with the No Build Condition traffic analysis results, LOS degradations, significant delay increases (25% or greater), and turn-lane needs were identified several study location. Improvement options were evaluated to develop recommendations as discussed below.

Conclusions and Recommendations

Based on the capacity analysis and traffic simulation results, turn-lane warrant analysis, as well as engineering judgment, the following improvements are recommended.

NC 16 Business and North Entrance (by Developer - Phase 1)

- Westbound: Revise the two-way left-turn pavement markings on NC 16 Business to provide an exclusive westbound left-turn lane with 100 feet of storage and appropriate transitions.
- Northbound: Provide a 100 feet internal protected stem for the proposed entrance.

St. James Church Road and South Entrance (by Developer - Phase 2)

- Westbound (NW): Construct a right-turn lane on St. James Church Road with 100 feet of storage and appropriate deceleration and taper lengths.
- Southbound (SW): Provide a 100 feet internal protected stem for the proposed entrance.
- Ensure appropriate sight distance for turning vehicles at the proposed entrance.

NC 16 and St. James Church Road (by Developer - Phase 3, or 90th Lot)

- Westbound (NW) U-Turn: Extend the existing U-turn lane by approximately 250' to the main intersection of NC 16 and St. James Church Road, and provide an appropriate transition taper.

Additional improvements are suggested below to accommodate the site trips and mitigate the projected deficiencies in the future No Build Conditions. For practical purposes and given the current traffic demands and projected site traffic impacts, these improvements may be implemented by the NCDOT staff or included in the future Transportation Improvement Program.

NC 16 Business and St. James Church Road /Will Proctor Street (by NCDOT)

- Signal Timing Improvements for the PM peak period.

NC 16 and St. James Church Road (by NCDOT)

- Monitor traffic conditions and, if deemed appropriate and necessary, install traffic signal(s) at the WB U-turn intersection and/or the NC 16 WB/St. James Church Road intersection.

The proposed turn-lane improvements at the site entrance intersections will help to separate the turning vehicles from the though traffic streams, and therefore improve the traffic operations and safety performance. The proposed signal timing improvement at the intersection of NC 16 Business and St. James Church Road / Will Proctor Street will help to maintain the 2021 No Build traffic conditions.

Sylvan Creek Subdivision TIA

While the site trips may increase delays at the NC 16 and St. James Church Road intersection, the resulting peak hour delays (46 seconds or less) appear to remain in a moderate level. It is typical for minor street approaches to experience higher delays at unsignalized intersections. The proposed westbound U-turn extension on NC 16 should provide adequate storage capacity for the projected peak hour trips in 2021. The need for new traffic signals on NC 16 may be verified in the future based on field observations. Considering the current traffic demands and the projected site traffic impacts, the new signals, if justified, do not appear to be necessitated by the subject development.

INTRODUCTION

Sylvan Creek Subdivision is a proposed residential development located on a 92-acre tract between NC 16 Business and St. James Church Road in Denver, NC. The proposed development will include 198 detached single-family units. Figure 1 illustrates the location of the site and surrounding area.

The subject development, as shown in Figure 2 Site Plan, is proposed to have two access points. The North Entrance will be located on NC 16 Business, forming a new T-intersection approximately 250' east of Pin Oaks Drive. The South Entrance will be located on St. James Church Road, approximately 650' north of Deer Haven Trail.

After discussions with the Lincoln County and the North Carolina Department of Transportation (NCDOT) staff, the following intersections are included as part of the area of influence for the proposed development. A *Memorandum of Understanding* (MOU) summarizes the prior discussions on the traffic study assumptions, and is included in Appendix A.

NC 16 Business and St. James Church Road/Will Proctor Street.....	<i>Signalized 4-legged intersection</i>
NC 16 and St. James Church Road (including U-Turns).....	<i>Unsignalized 4-legged intersection</i>
NC 16 Business and North Entrance.....	<i>Unsignalized T - intersection</i>
St. James Church Road and South Entrance.....	<i>Unsignalized T- intersection</i>

The existing intersection lane configuration is shown in Figure 3. Below is a detailed description of the existing study area roadway network. The Average Annual Daily Traffic (AADT) information provided in this description was obtained from NCDOT.

NC 16 Business is an east-west roadway providing access to NC 150 to the north and NC 73 to the south. It has three lanes, including a center two-way left-turn lane, within the study area. The land uses along NC 16 Business are mainly commercial and institutional (Rock Springs Elementary School), with increasing residential uses on and off NC 16 Business near the eastern side of the study area. The 2014 AADT on NC 16 Business was 12,000 vehicles per day (vpd) east of Forest Hills Drive. The posted speed limit on NC 16 Business is 35 miles per hour (mph).

N

**Not to Scale



Study Area Intersections:

- 1 NC 16 Bus @ St James Church Rd / Will Proctor St
- 2 NC 16 @ St James Church Rd
- 3 NC 16 @ EB U-Turn
- 4 NC 16 @ WB U-Turn
- 5 NC 16 Bus @ North Entrance
- 6 St James Church Rd @ South Entrance

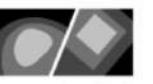
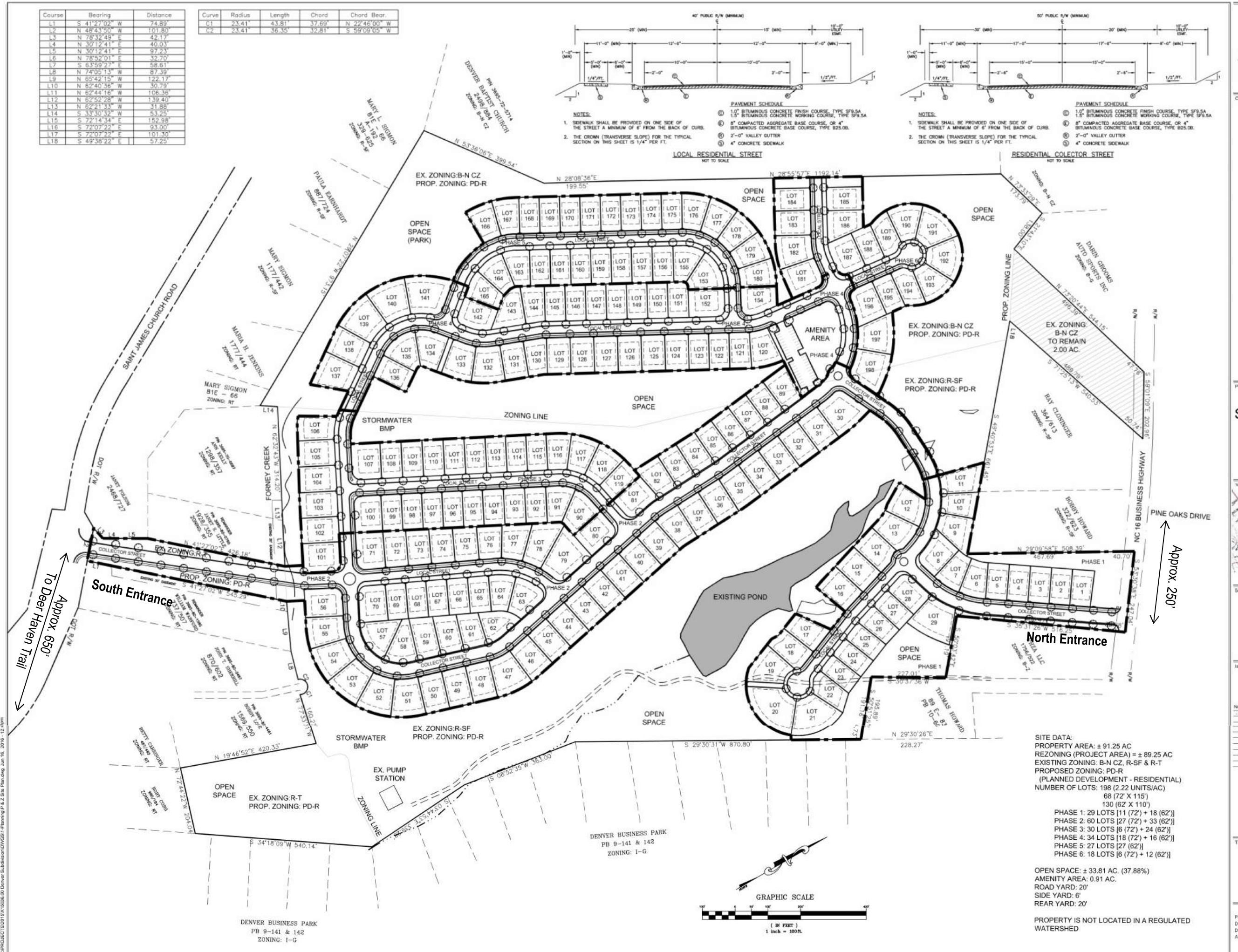
Legend	
	Signalized Intersection
	Unsignalized Intersection
	Future Site



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Denver, NC

Figure 1
Study Area



STEWART

200 E. COLLEGE ST. STE 700
CHARLOTTE, NC 28237
704.819.5980

Client: LAWRENCE W. MASHBURN & ASSOCIATES
P.O. BOX 37229
CHARLOTTE, NC 28237
704.819.5980

Engineering & CADD
714.347.7888

Project # X15036

Project:

SYLVAN CREEK SUBDIVISION

DENVER, NC



Issued for:

REZONING DOCUMENTS

No. Date Description

SITE DATA:
PROPERTY AREA: ± 91.25 AC
REZONING (PROJECT AREA) ± 89.25 AC
EXISTING ZONING: B-N CZ, R-SF & R-T
PROPOSED ZONING: PD-R
(PLANNED DEVELOPMENT - RESIDENTIAL)
NUMBER OF LOTS: 198 (2.22 UNITS/AC)
68 (72' X 115')
130 (62' X 110')
PHASE 1: 29 LOTS [11 (72') + 18 (62')]
PHASE 2: 60 LOTS [27 (72') + 33 (62')]
PHASE 3: 30 LOTS [6 (72') + 24 (62')]
PHASE 4: 34 LOTS [18 (72') + 16 (62')]
PHASE 5: 27 LOTS [27 (62')]
PHASE 6: 18 LOTS [6 (72') + 12 (62')]

OPEN SPACE: ± 33.81 AC (37.88%)
AMENITY AREA: 0.91 AC.
ROAD YARD: 20'
SIDE YARD: 6'
REAR YARD: 20'

PROPERTY IS NOT LOCATED IN A REGULATED
WATERSHED

PRELIMINARY
DEVELOPMENT
CONCEPT PLAN

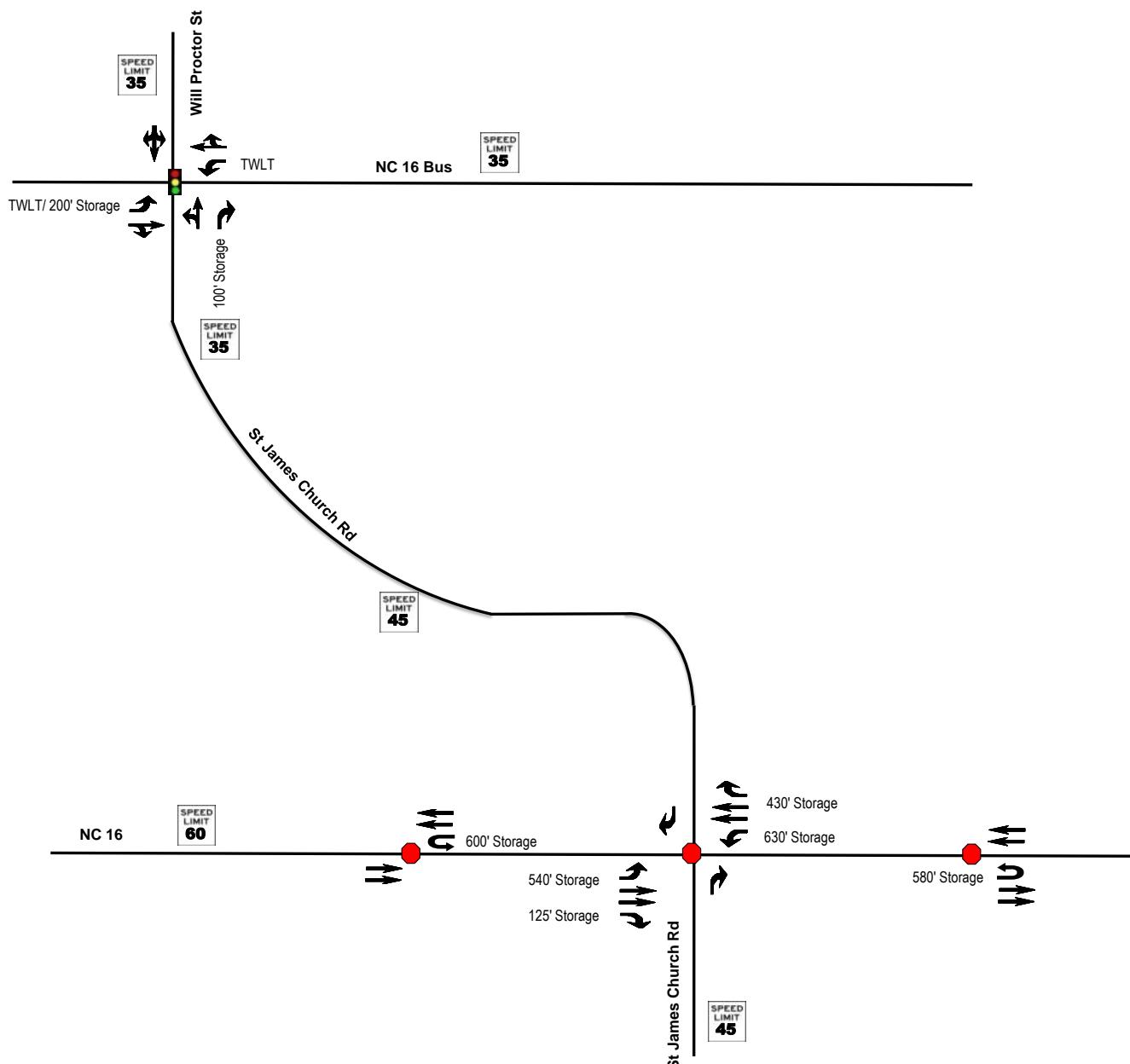
Project number: X15036.00
Date: 06-07-2016
Drawn by: JMC
Approved by: JMC

1 of 1

Figure 2

N

**Not to Scale



Legend	
—	Existing Roadway
■	Signalized Intersection
●	Unsignalized Intersection
↔	Existing Lane



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Figure 3
Existing Intersection Configuration

Sylvan Creek Subdivision TIA

Will Proctor Street is a north-south two-lane roadway, running parallel to Campground Road and providing an alternative access to NC 16 Business from Campground Road. The land uses along this roadway are mainly residential. There is no AADT available for this roadway. The speed limit along this road is 35 mph.

St. James Church Road is a two-lane roadway running mainly in the north-south direction. It connects NC 16 Business with NC 16, and at the southern end becomes Little Egypt Road which provides access to NC 73, E Lincoln High School and Catawba Springs Elementary School. The land uses along this roadway are mainly residential. The 2013 AADT (the latest data available) on St. James Church Road was 5,200 vpd south of NC 16 Business. The speed limit increases from 35 mph near its NC 16 Business intersection to 45 mph near NC 16 and points further south.

NC 16 is an east-west four-lane median divided arterial. It provides access to NC 150 and Catawba County to the north, and NC 73 and Charlotte to the south. NC 16 operates as a Synchronized Street, or a Superstreet as it was named previously in NC. At intersections along NC 16, no through or left-turn movements are allowed for the side-street approaches. Side-street travelers need to make first a right-turn and then a downstream U-turn to return to their routes. The land along NC 16 is mostly vacant within the study area. The 2014 AADT on NC 16 was 19,000 vpd south of St. James Church Road. The posted speed limit on NC is 60 mph.

METHODOLOGY

This traffic study evaluated the intersection traffic operational performance through the intersection capacity / Level of Service (LOS) analysis, traffic simulations, and queue analysis. The intersection LOS is a measurement of average delay incurred at an intersection for a particular movement or approach. LOS is defined by the Transportation Research Board's Highway Capacity Manual 2010 (HCM). The following tables list the HCM criteria for both signalized (HCM Exhibit 18-4) and unsignalized intersections (HCM Exhibit 19-1). In addition, an intersection or approach will automatically become LOS F if the Volume-to-Capacity (V/C) ratio exceeds 1.0.

Signalized Intersection HCM Exhibit 18-4		Unsignalized Intersection HCM Exhibit 19-1	
LOS	Control Delay (s/veh)	LOS	Control Delay (s/veh)
A	≤ 10	A	≤ 10
B	$> 10 - 20$	B	$> 10 - 15$
C	$> 20 - 35$	C	$> 15 - 25$
D	$> 35 - 55$	D	$> 25 - 35$
E	$> 55 - 80$	E	$> 35 - 50$
F	> 80	F	> 50

According to industry standards, any signalized intersection or any approach of an unsignalized intersection is considered acceptable if the LOS is D or better with the LOS A representing little or no delays. Intersections or approaches with a LOS of E or F are considered substandard and may need mitigations to improve the operational performance.

Existing volumes, traffic flow characteristics, and intersection geometrics collected during field visits, as well as projected travel demands and patterns were used to determine the level of service. The LOS analysis for signalized and unsignalized intersections was completed using Synchro, version 9, which categorizes the LOS based on HCM methodology and criteria. In addition, ten one-hour microscopic traffic simulations were conducted in SimTraffic, a simulation program, for each analysis scenario. The simulation runs not only account for the stochastic nature of traffic flow but also provide finer details in traffic operations.

For the purposes of the Traffic Impact Analysis (TIA), the site is assumed to be completed, opened, and fully occupied in 2020. Thus the design year in this study is 2021, or one year past build-out. This study evaluated the following four analysis scenarios:

1. The “**2016 Existing Conditions Analysis**” evaluates the current intersection operational performance.

2. The “**2021 No Build Analysis**” examines the future traffic conditions where the proposed development is not constructed. This analysis takes into account background traffic growth (1% per year), nearby approved developments and any committed transportation improvements.
3. The “**2021 Build Analysis**” evaluates the intersection operational performance after distributing site generated trips through the study area intersections, and,
4. The “**2021 Build with Improvements Analysis**” identifies and evaluates the mitigation measures, if there is any degradation in the operational performance when comparing scenarios 2 and 3 above.

The existing study intersections were analyzed in all scenarios while the proposed site entrances were evaluated in the future year “Build” and “Build with Improvements” scenarios only. Traffic counts conducted at the existing intersections were used to estimate the site trip distribution patterns. Intersection analyses were performed for both the weekday AM (peak hour between 7-9 AM) and PM (peak hour between 4-6 PM) peak hours in all scenarios.

In accordance with the NCDOT Capacity Analysis Guidelines, no “Right Turn on Red” (RTOR) was allowed in this study. The existing traffic signal phasing and clearance timings were used for the traffic analyses, as no major geometric changes are anticipated at the NC 16 Business and St. James Church Road / Will Proctor Street intersection. The signal lost times were adjusted to remain 5 seconds.

As the Rock Springs Elementary School is located on NC 16 Business within the study area, the concentrated arrivals and departures of school trips may affect the traffic conditions during the AM peak hour. The actual Peak Hour Factors (PHFs) in the original traffic counts were used for the Existing Conditions AM peak hour analysis, after discussions with the NCDOT staff. For future condition AM peak hour analyses, weighted PHFs were be calculated assuming a PHF of 0.9 for the site and off-site development trips. A PHF of 0.9 was used for the all the PM peak hour analyses.

2016 EXISTING CONDITION ANALYSIS

After discussions with the NCDOT staff, 2015 peak hour turning movement counts were used for the 2016 “Existing Condition” traffic analyses, due to the low development activities in the study area over the past year. The 2015 counts were collected at the NC 16 Business and St. James Church Road / Will Proctor Street intersection on Thursday 11/19/2015, and at the NC 16 and St. James Church Road intersection on Thursday 4/23/2015. In addition, 7:00-9:00 AM and 4:00-6:00 PM peak hour bidirectional traffic volumes on NC 16 Business were collected on Thursday 4/14/2016 near the proposed North Entrance (east of Pine Oaks Drive). The peak hour traffic counts are provided in Appendix B and depicted in Figure 4. Appendix C includes photos for the study intersections.

The traffic signal at the NC 16 Business and St. James Church Road / Will Proctor Street is part of the NC 16 Denver Closed Loop System (CLS). The traffic signal and timing plans were obtained from NCDOT and provided in Appendix D. The two-phase signal currently runs on a 90-second cycle length during both AM and PM peak hours.

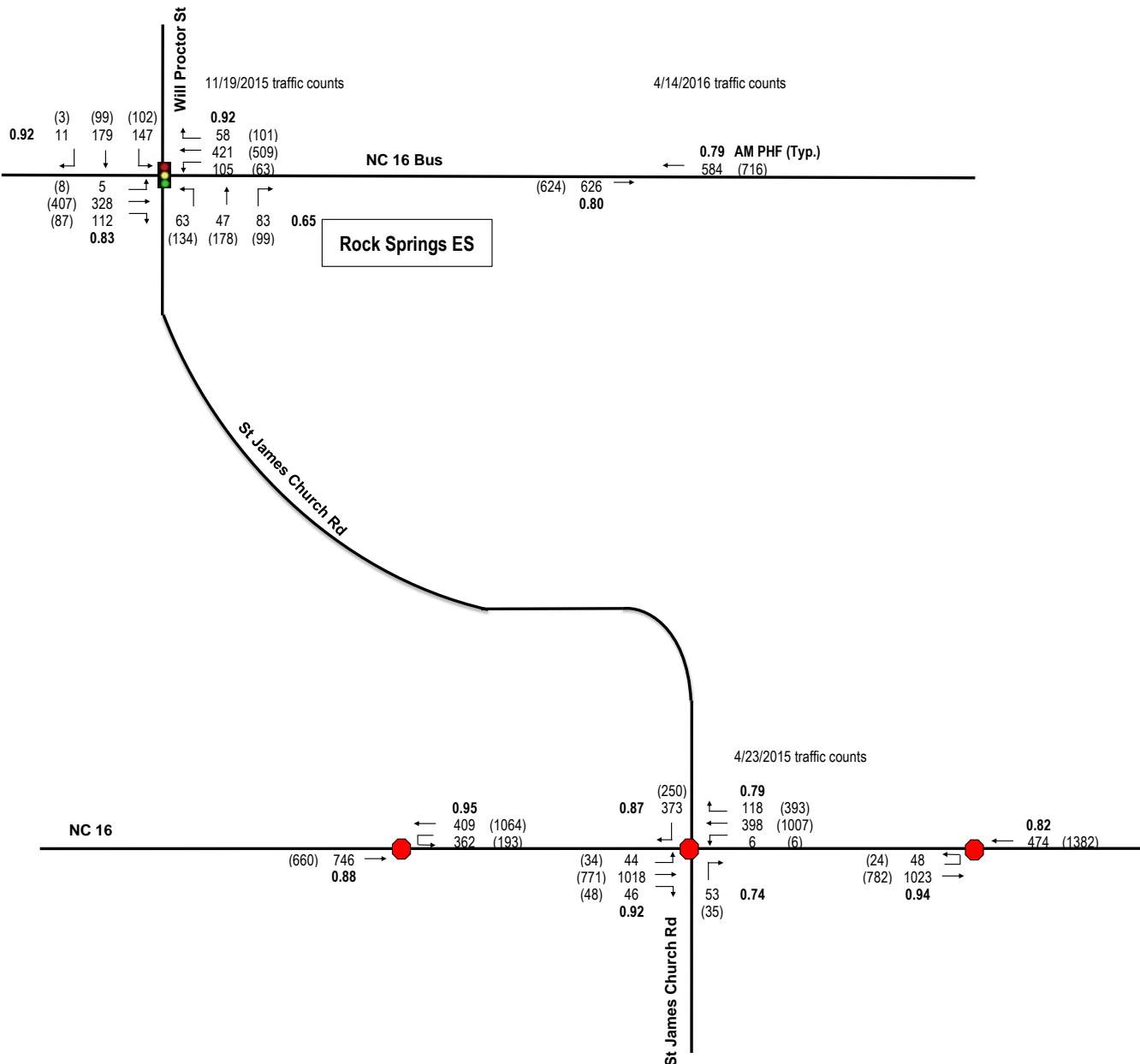
Existing volumes, traffic flow characteristics, signal configuration and timing parameters, and intersection geometrics collected during field visits were used to determine the intersection level of service. Table 1 lists the LOS results from the 2016 Existing Condition Analysis. Delay and LOS results are reported for each intersection approach. Intersection average delays (based on a weighted average of the approaches) and LOS are also reported for signalized intersections. Queue analysis results are summarized in Table 2. Detailed analysis and simulation output sheets are included in Appendix F.

Table 1: Level of Service Analysis – 2016 Existing Conditions

Intersection	Approach	Existing (2016)			
		AM		PM	
		Delay (sec)	LOS	Delay (sec)	LOS
NC 16 Bus @ St. James Church Rd / Will Proctor St	signalized	Intersection Average	22.3	C	23.9
		EB - NC 16 Bus	21.4	C	17.6
		WB - NC 16 Bus	20.8	C	21.1
		NB - St James Church Rd	20.6	C	31.3
		SB - Will Proctor St	27.4	C	33.7
NC 16 @ St James Church Rd	unsignalized	EB (Left-Turn) - NC 16	13.6	B	26.5
		WB (Left-Turn) - NC16	22.9	C	17.6
		NB - St James Church Rd	13.9	B	11.7
		SB - St James Church Rd	16.1	C	23.0
NC 16 U-Turns	unsignalized	EB (U-Turn) - NC 16	10.7	B	16.6
		WB (U-Turn) - NC 16	24.2	C	14.1



**Not to Scale



Legend	
—	Existing Roadway
	Signalized Intersection
	Unsignalized Intersection
XX	AM Peak Hour Traffic Volume
(XX)	PM Peak Hour Traffic Volume



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Figure 4 2016 Existing Peak Hour Traffic Volumes

Table 2: Queue Analysis – 2016 Existing Conditions

Intersection	Turn Lane	Storage Length {Future Storage} (ft)	Existing (2015)				
			AM		PM		
			95th% Queue (ft)	Max Queue (ft)	95th% Queue (ft)	Max Queue (ft)	
NC 16 Bus @ St. James Church Rd / Will Proctor St	signalized	EBL	TWL 200+/-	7	58	7	60
		WBL	TWL	78	131	32	238
		NBR	100	62	101	99	200
NC 16 @ St James Church Rd	unsignalized	EBL	540	9	42	17	58
		EBR	125	0	0	0	0
		WBL	630	3	17	2	20
		WBR	430	0	0	0	93
NC 16 U-Turns	unsignalized	EBU	580	6	39	6	40
		WBU	600	130	189	40	43

Queue length greater than storage length

The LOS analyses show that the NC 16 Business and St. James Church Road / Will Proctor Street intersection currently operates at LOS C in both AM and PM peak hours. During the PM peak hour, the delays on the northbound St. James Church Road approach (31.3 seconds, LOS C) are noticeably higher than those during the AM peak hour (20.6 seconds, LOS C), as the approach volumes more than double in the PM peak hour. The queue analysis also shows that the northbound right-turn lane may have storage deficiencies during the PM peak arrival period. As no RTOR was allowed in the traffic analysis, the right-turn queue length estimates may be overestimated.

At the NC 16 and St. James Church Road intersection, all the intersection approaches, including the U-turn movements, are operating at LOS C or better during the peak hours, except for the eastbound NC 16 left-turn movement which operate at LOS D (26.5 seconds) during the PM peak hour. NC 16 has a distinct direction travel pattern: approximately 70% traffic heads east in the morning and 60% heads west in the evening. The queue analysis shows that all the turn-lanes currently have adequate storage capacity.

Preliminary traffic signal warrant analyses were also conducted for the NC 16 and St. James Church Road intersection based on the 13-hour (6AM-7PM) traffic counts collected in April 2015. As a Synchronized Street (or a Superstreet) functions as two independent on-way pairs, the signal warrant analyses were conducted for each access point and U-turn median opening. At the NC 16 WB U-turn intersection, the traffic counts suggest that this location currently meets Warrant 2 Four-Hour Vehicular Volume (6-9AM and 5-6PM), Warrant 3 Peak Hour Volume (6-8AM), and is close to meeting the Warrant 1 Eight-Hour Vehicular Volume (seven hours). The NC 16 WB and St. James Church Road (SB) intersection appears to meet Warrant 3 Peak Hour Volume during the PM peak hour, assuming half of the southbound right-turn vehicles have minimum delays merging onto westbound NC 16. The minor street volumes at the NC 16 EB / St. James Church Road (NB) intersection and the NC 16 EB U-turn intersection are too low to meet any signal warrants. The signal warrant analysis results are summarized in Appendix G.

2021 NO-BUILD ANALYSIS

Since the proposed development is expected to be completed in 2020, the future analysis year is 2021, or one year past build-out to assume full capacity and “normalized” traffic patterns. After discussions with the County and NCDOT, an annual growth rate of 1% was applied to the existing traffic volumes to estimate the future (2021) background traffic volumes as shown in Figure 5. In addition, the following three nearby approved developments were included in the future condition analyses.

Rock Creek Subdivision

Rock Creek Subdivision is a 150-lot single-family residential development located on the west side of Campground Road north of NC 16 Business in Lincoln County, NC. No specific improvements are committed or planned for the study area intersections.

The Village at Sherrills Ford Phases 1 & 2

The Village at Sherrills Ford is a proposed mixed-use development located on approximately 200 acres near the intersection of NC 150 and Slanting Bridge Road in Catawba County, NC. The first two development phases will include 272 single-family units (on both sides of Slanting Bridge Road) and a 116,500 SF shopping center on the NE corner of the NC 150 / Slanting Bridge Road intersection. No specific improvements are committed or planned for the study area intersections.

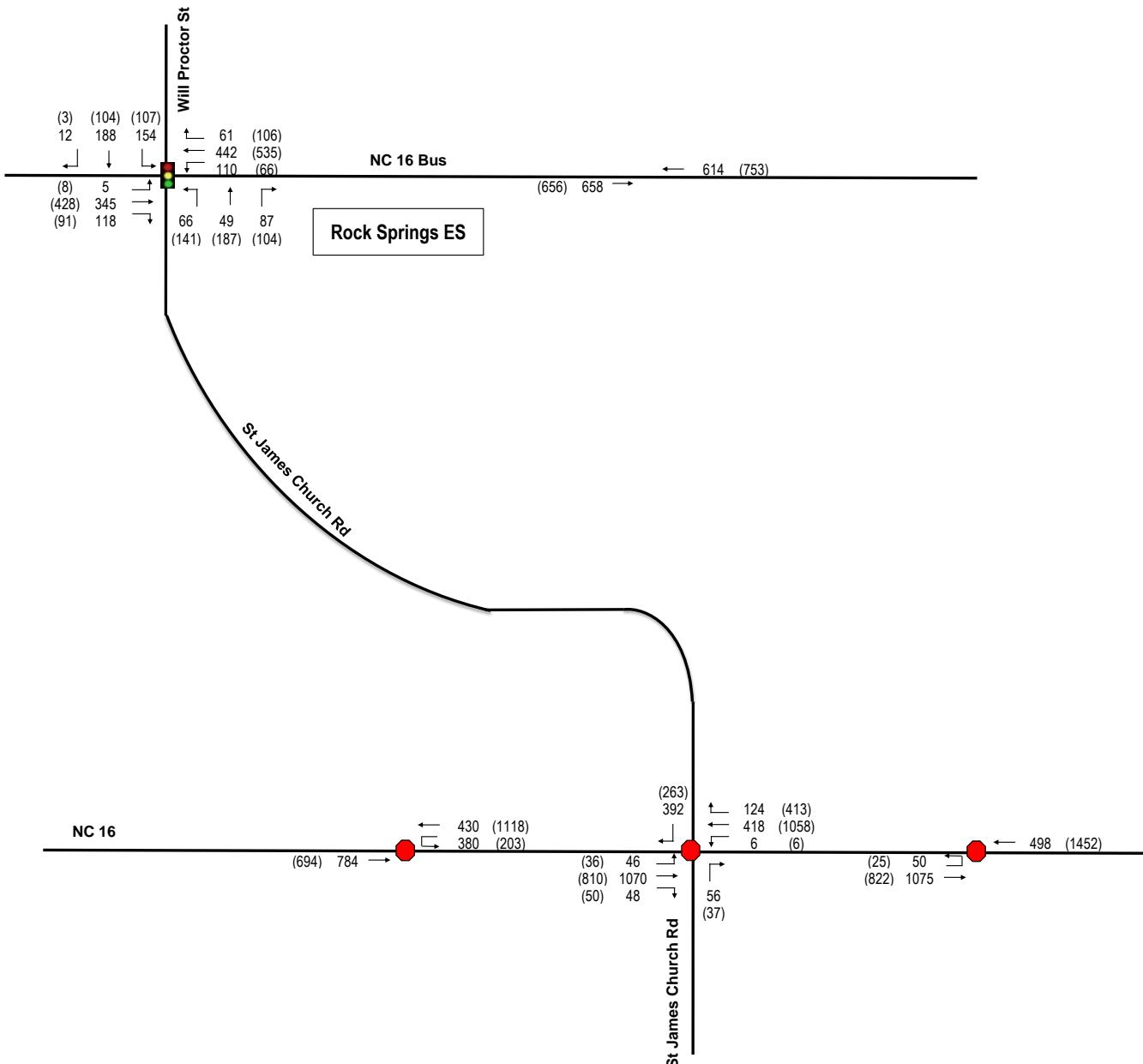
Newton Crossing

Newton Crossing is proposed 200-lot single-family residential development located on 70 acres on the east side of NC 16 Business just south of Sarah Drive and Webbs Road in Lincoln County, NC. While this development may also include a future elementary school (700 students), only the residential trips were included in the subject study after discussions with the NCDOT staff. No specific improvements are committed or planned for the study area intersections.

Trips from these off-site developments were distributed to the study area network based on the previous traffic studies (Appendix E) and existing traffic patterns. Figures 6 through 8 show the peak hour off-site development trips. The 2021 No-Build peak hour traffic volumes, as shown in Figure 9, include both background traffic growth and off-site development trips. As discussed in the “Methodology” section, the existing AM PHFs were adjusted assuming a PHF of 0.9 for the off-site development trips. The PM peak PHF remains 0.9 for all the study intersections.

Analysis Year = 2021
Years Out = 5
Growth Rate = 1.0%
Formula = $(1+1.0\%)^5$
Multiplier = 1.051

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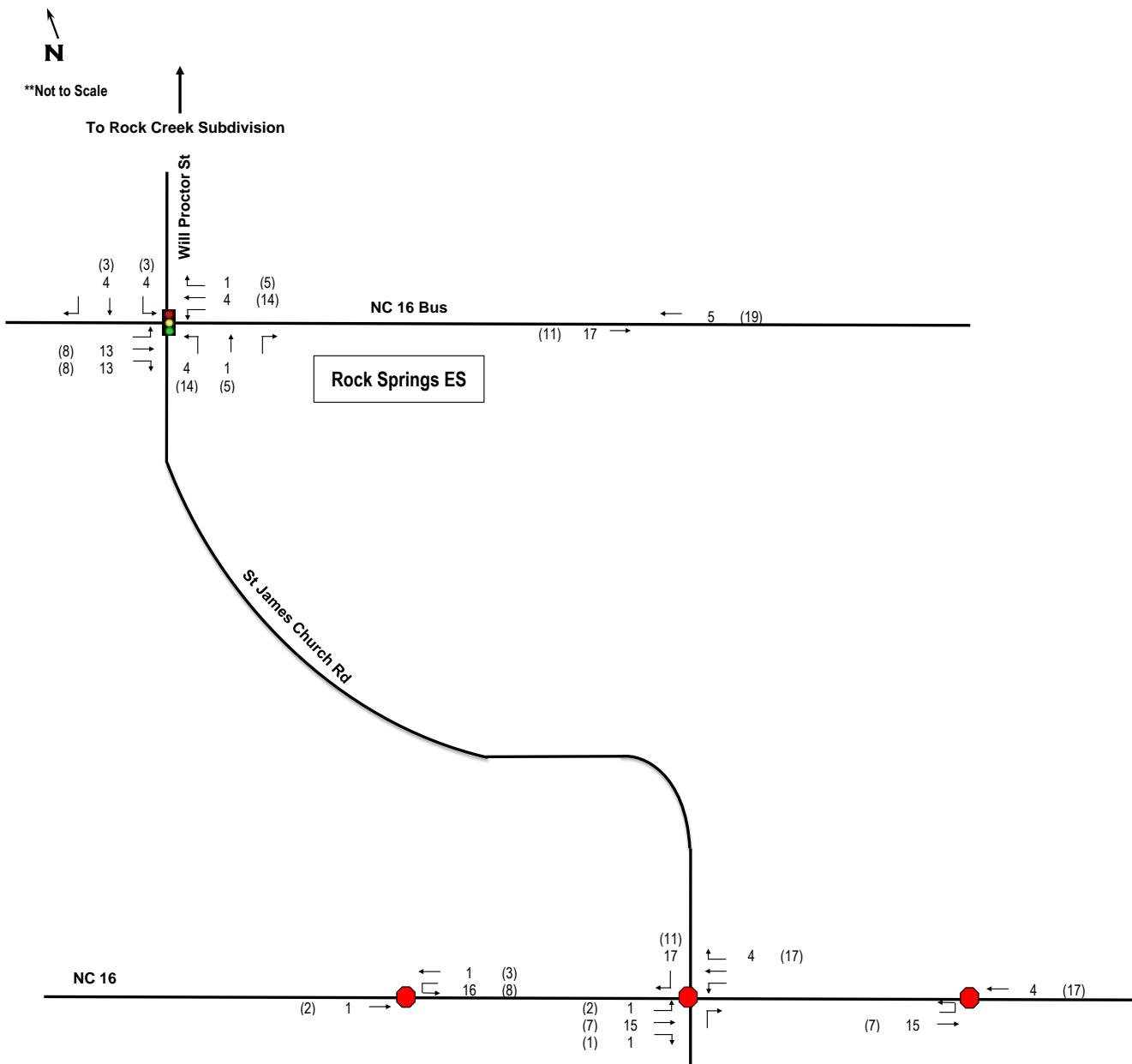
Legend	
—	Existing Roadway
	Signalized Intersection
	Unsignalized Intersection
XX	AM Peak Hour Traffic Volume
(XX)	PM Peak Hour Traffic Volume



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Figure 5 2021 Background Peak Hour Traffic Volumes

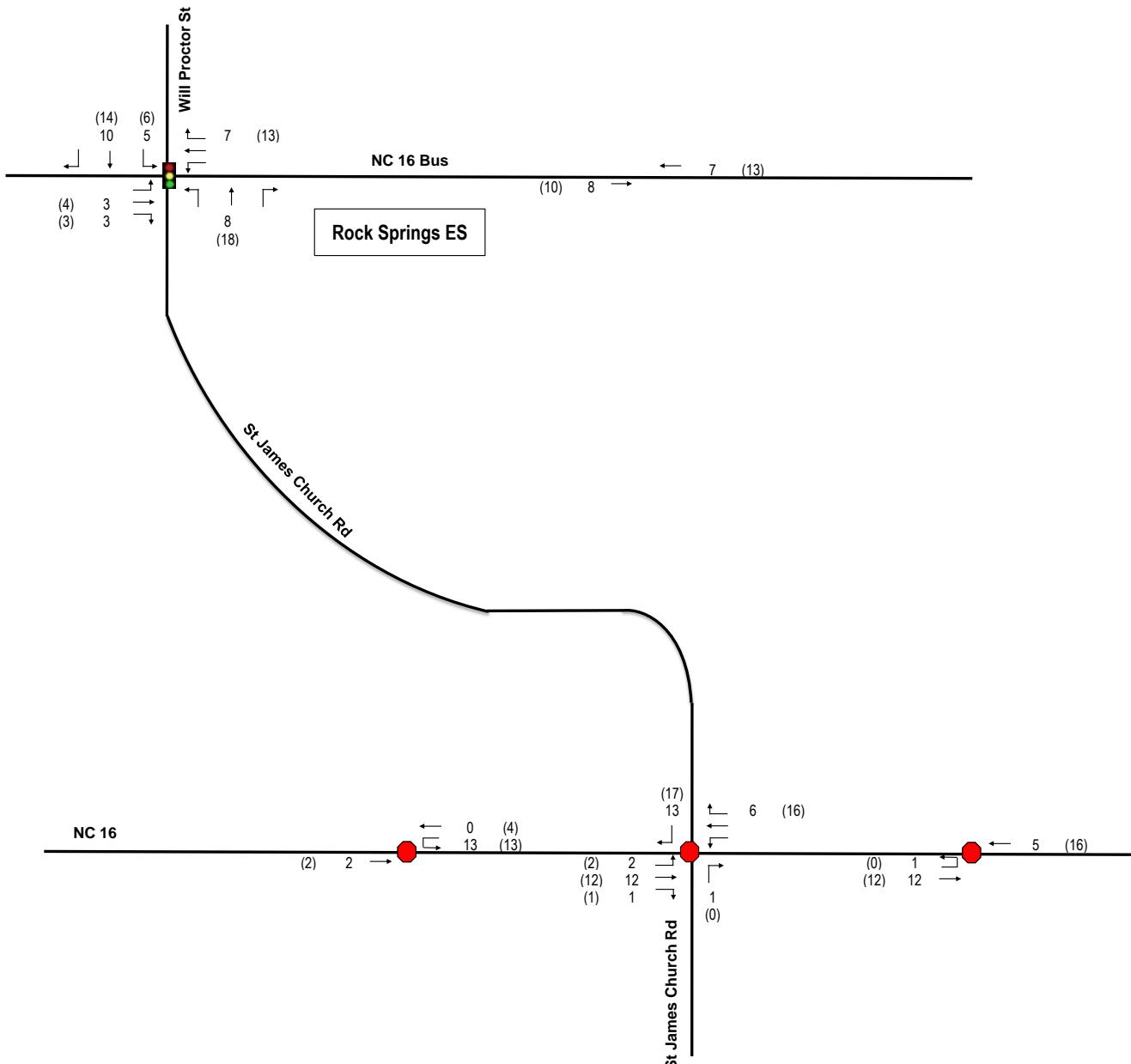


Legend	
—	Existing Roadway
	Signalized Intersection
	Unsignalized Intersection
XX	AM Peak Hour Traffic Volume
(XX)	PM Peak Hour Traffic Volume

N
↑
**Not to Scale

To The Village at Sherrills Ford

(Assume 60% of the Village at Sherrills Ford Phase 1& 2 off-site trips will impact the study area)



Legend	
—	Existing Roadway
■	Signalized Intersection
●	Unsignalized Intersection
XX	AM Peak Hour Traffic Volume
(XX)	PM Peak Hour Traffic Volume



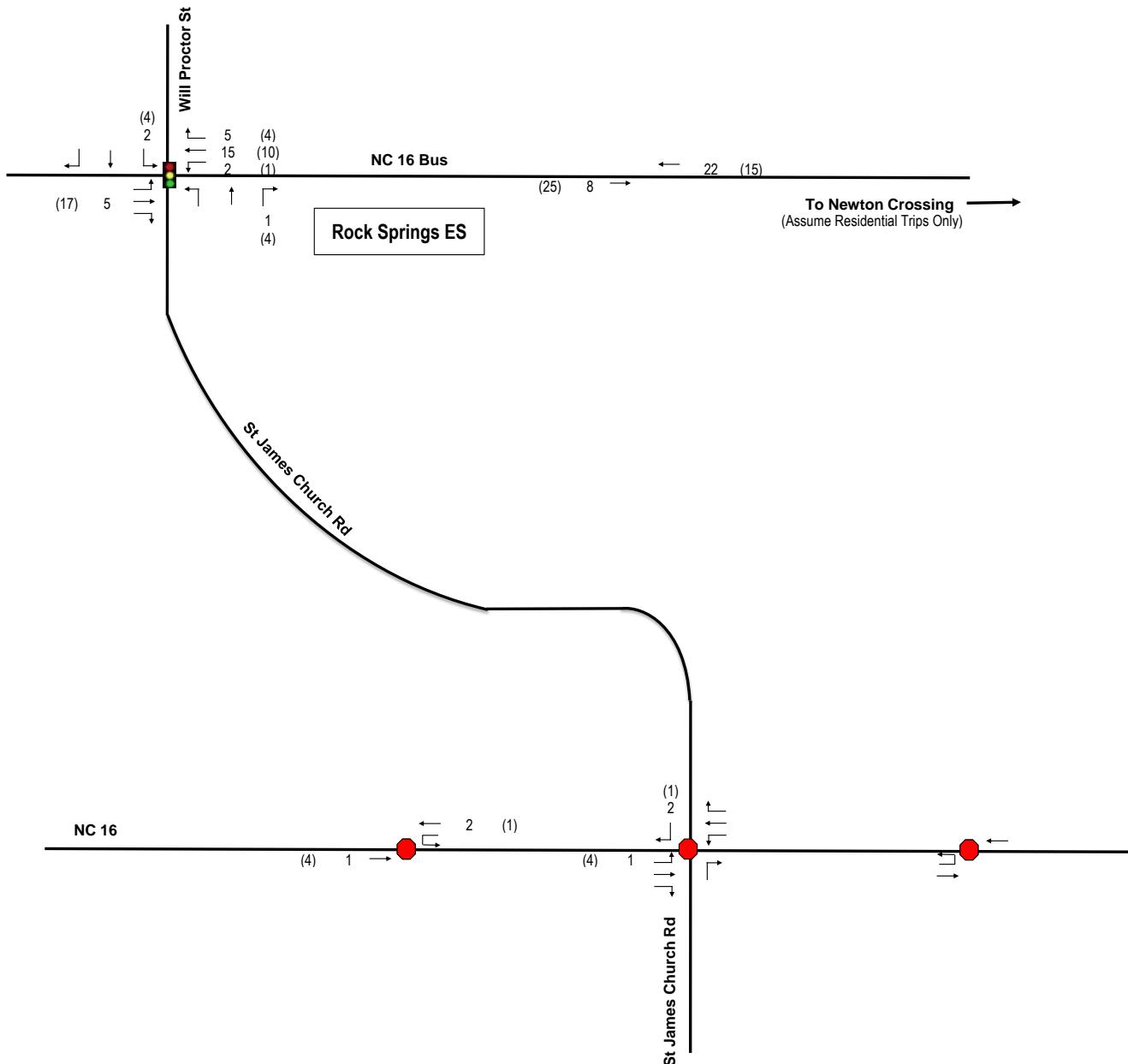
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Figure 7
The Village at Sherrills Ford
Phases 1&2 Peak Hour Trips

N

**Not to Scale



Legend	
—	Existing Roadway
■	Signalized Intersection
●	Unsignalized Intersection
XX	AM Peak Hour Traffic Volume
(XX)	PM Peak Hour Traffic Volume



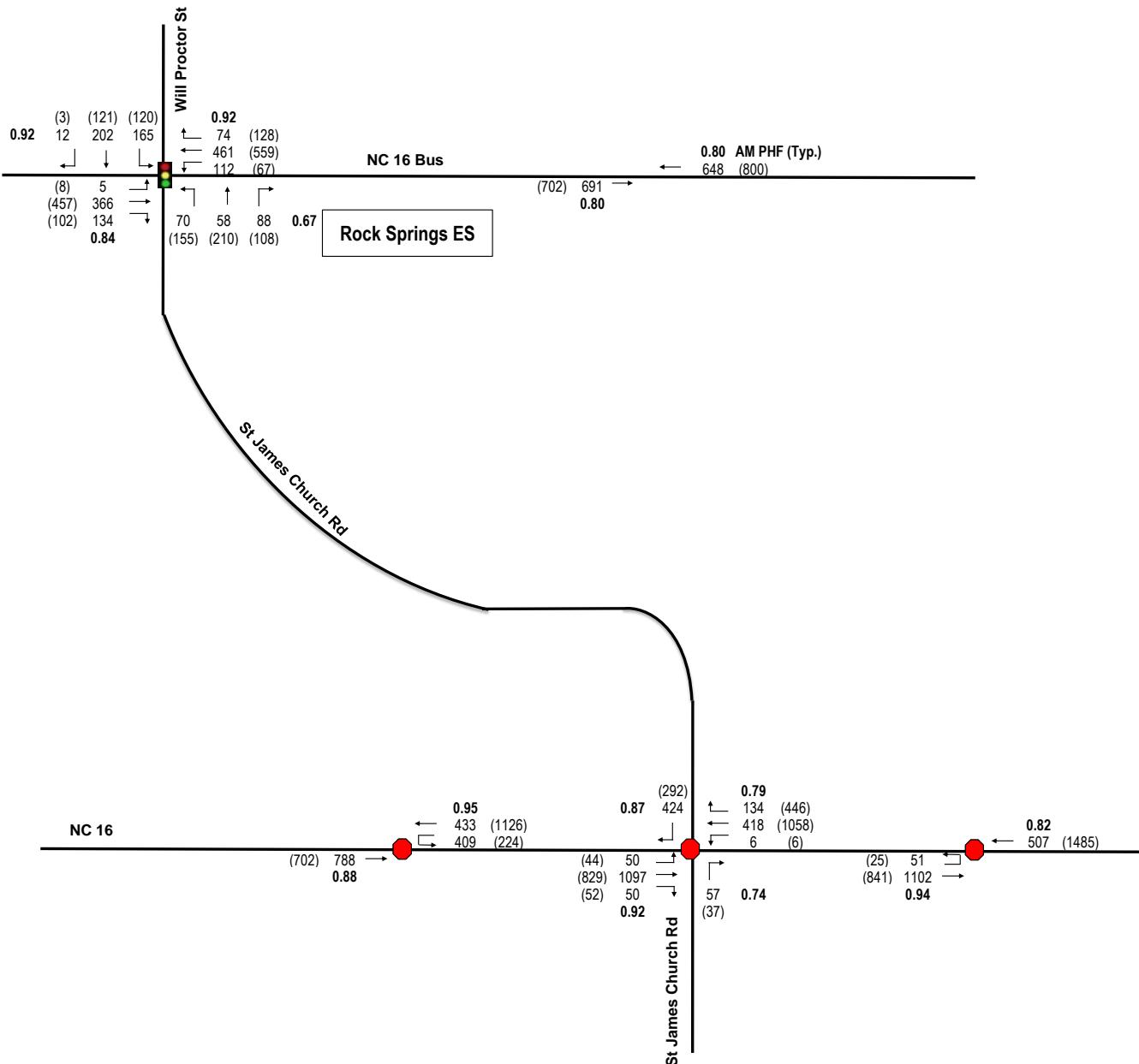
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Figure 8
Newton Crossing
Peak Hour Trips

N

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Figure 9
2021 No Build Peak Hour
Traffic Volumes

Sylvan Creek Subdivision TIA

The LOS and queue results of the 2021 No-Build analyses are displayed in Tables 3 and 4, respectively.

Table 3: Level of Service Analysis – 2021 No-Build

Intersection	Approach	No Build (2021)			
		AM		PM	
		Delay (sec)	LOS	Delay (sec)	LOS
NC 16 Bus @ St. James Church Rd / Will Proctor St	signalized	Intersection Average	25.8	C	39.5
		EB - NC 16 Bus	25.1	C	15.4
		WB - NC 16 Bus	25.3	C	19.0
		NB - St James Church Rd	21.7	C	49.7
		SB - Will Proctor St	31.2	C	139.7
NC 16 @ St James Church Rd	unsignalized	EB (Left-Turn) - NC 16	14.0	B	30.4
		WB (Left-Turn) - NC16	25.2	D	18.7
		NB - St James Church Rd	14.7	B	12.1
		SB - StJames Church Rd	19.0	C	30.6
NC 16 U-Turns	unsignalized	EB (U-Turn) - NC 16	11.0	B	17.7
		WB (U-Turn) - NC 16	33.1	D	15.6

Unacceptable Delay/LOS

Table 4: Queue Analysis – 2021 No-Build

Intersection	Turn Lane	Storage Length {Future Storage} (ft)	No Build (2021)			
			AM		PM	
			95th% Queue (ft)	Max Queue (ft)	95th% Queue (ft)	Max Queue (ft)
NC 16 Bus @ St. James Church Rd / Will Proctor St	signalized	EBL	TWL 200+/-	6	29	7
		WBL	TWL	88	222	34
		NBR	100	72	129	108
NC 16 @ St James Church Rd	unsignalized	EBL	540	10	51	25
		EBC	125	0	0	0
		WBL	630	3	18	2
		WBR	430	0	0	149
NC 16 U-Turns	unsignalized	EBU	580	7	41	7
		WBU	600	191	354	53

Queue length greater than storage length

With the background traffic growth and the nearby proposed developments, vehicle delays will increase at most of the study intersections, especially during the PM peak hour. At the NC 16 Business and St. James Church Road / Will Proctor Street intersection, while the intersection LOS is expected to remain C (25.8 seconds) during the AM peak hour, it is estimated to drop to LOS D (39.5 seconds) during the PM peak hour with the southbound Will Proctor Street approach operating at LOS F (139.7 seconds). Similar to the Existing Condition Analysis, the northbound right-turn lane may experience storage deficiencies during peak hours.

The NC 16 and St. James Church Road intersection is expected to remain under capacity. While the delays will increase, all the intersection approaches including the U-turn movements are expected to operate at LOS D or better during the peak hours with no storage deficiencies.

Sylvan Creek Subdivision TIA

SITE ACCESS

Two full-movement access points are proposed for the subject development. The North Entrance will be located on NC 16 Business, forming a new T-intersection approximately 250' east of Pin Oaks Drive. The South Entrance will be located on St. James Church Road, approximately 650' north of Deer Haven Trail. A connector is also proposed for the adjoining property to the west through which internal access to the Rock Springs Elementary School might be provided in the future.

SITE TRIP GENERATION AND DISTRIBUTION

The proposed subdivision will include 198 detached single-family units. Table 5 below shows the site trip estimates based on the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 9th Edition, and the NCDOT Congestion Management Section's Capacity Analysis Guidelines.

Table 5: Sylvan Creek Subdivision Trip Generation

ITE CODE	LAND USE	SIZE		Average Daily Trips (24 Hours)			AM Peak Hour (one hour between 7am and 9am)			PM Peak Hour (one hour between 4pm and 6pm)		
				Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
210	Single Family	198	DU	943	943	1,885	37	112	149	125	73	198

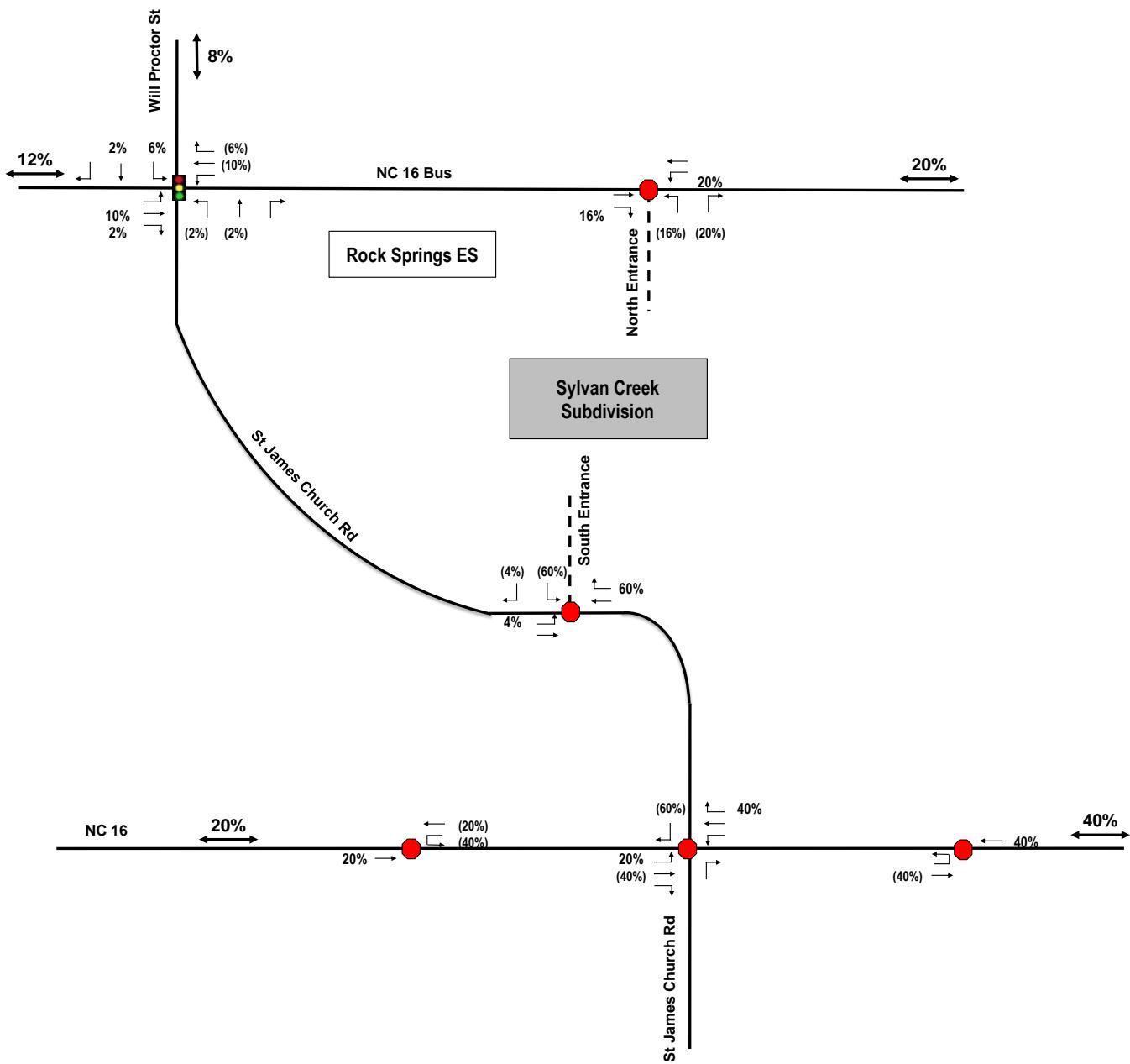
The proposed development is estimated to generate 1,885 daily trips, including 149 trips (37 entering and 112 exiting) during the AM peak hour and 198 new trips (125 entering and 73 exiting) during the PM peak hour.

Site trips were distributed based on the existing peak hour traffic counts and engineering judgement. It is estimated that 40% of the site traffic will head south/east on NC 16 towards Charlotte, 20% will head north/west on NC 16 towards Hickory/ Newton, 20% will head south on NC 16 Business, 8% will head north on Will Proctor Street towards Catawba County, and the remaining 12% will head north/west on NC 16 Business or Forney Hill Road. Ingress trips are assumed to follow the same patterns. It is also estimated that the South Entrance will accommodate 64% of the site traffic. Figure 10 illustrates the site trip distribution patterns. The site trip volumes, as shown in Figure 11, were computed by multiplying site trip distribution percentages by the peak hour site trip estimates.

The proposed subdivision's internal roadways may provide a more convenient route between NC 16 and NC 16 Business south of the North Entrance intersection. It is estimated that approximately 10% of the future background westbound left-turn and northbound right-turn traffic at the intersection of NC 16 Business and St James Church Road / Will Proctor Street will be diverted to go through the proposed subdivision. Figure 12 below shows the background trip adjustments/diversions.

N

**Not to Scale



Legend	
—	Existing Roadway
--	Proposed Roadway
	Signalized Intersection
	Unsignalized Intersection
XX%	Ingress Site Traffic %
(XX%)	Egress Site Traffic %



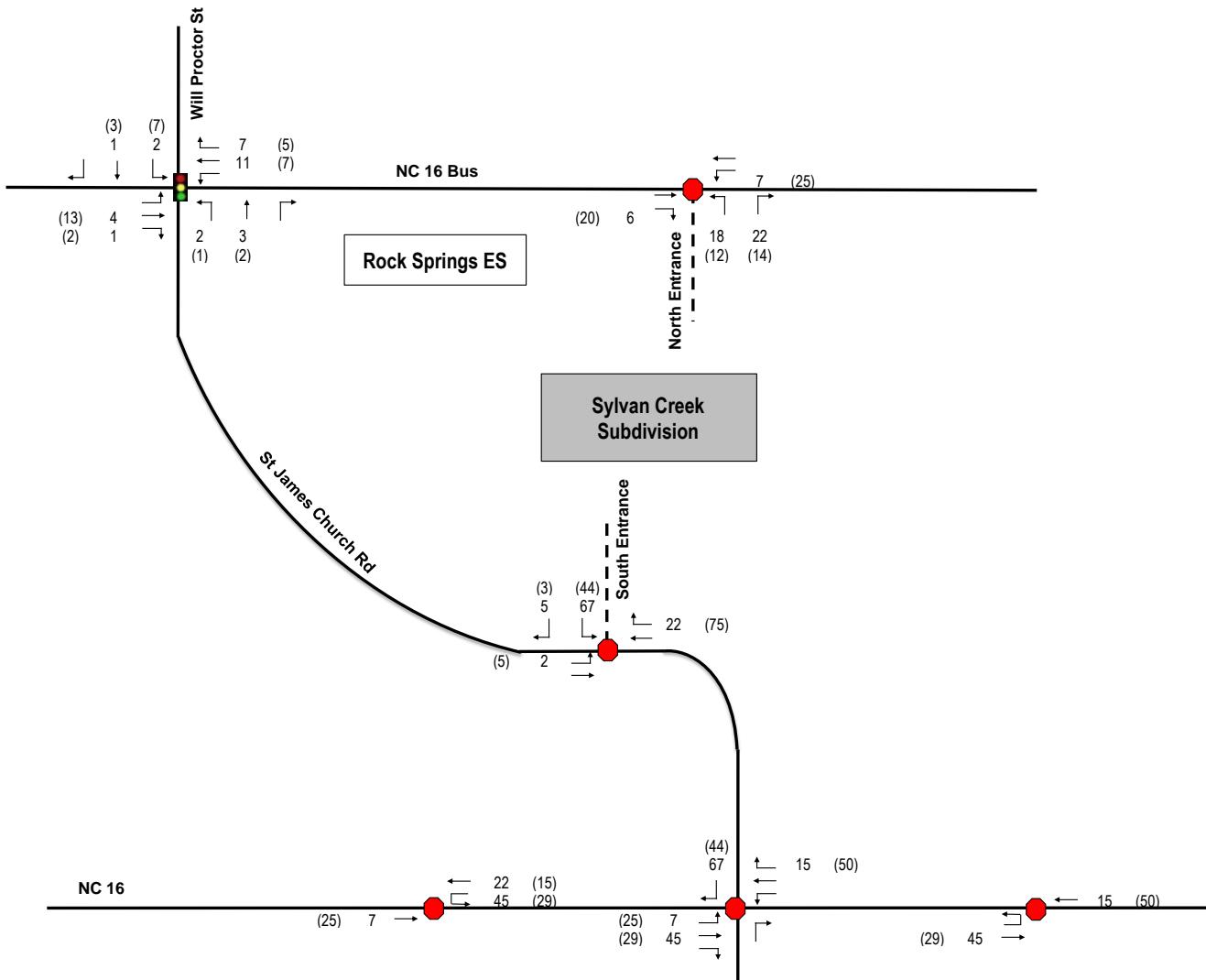
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Figure 10
Site Trip Distribution

N

**Not to Scale



Legend	
—	Existing Roadway
--	Proposed Roadway
■	Signalized Intersection
●	Unsignalized Intersection
XX	AM Peak Hour Traffic Volume
(XX)	PM Peak Hour Traffic Volume



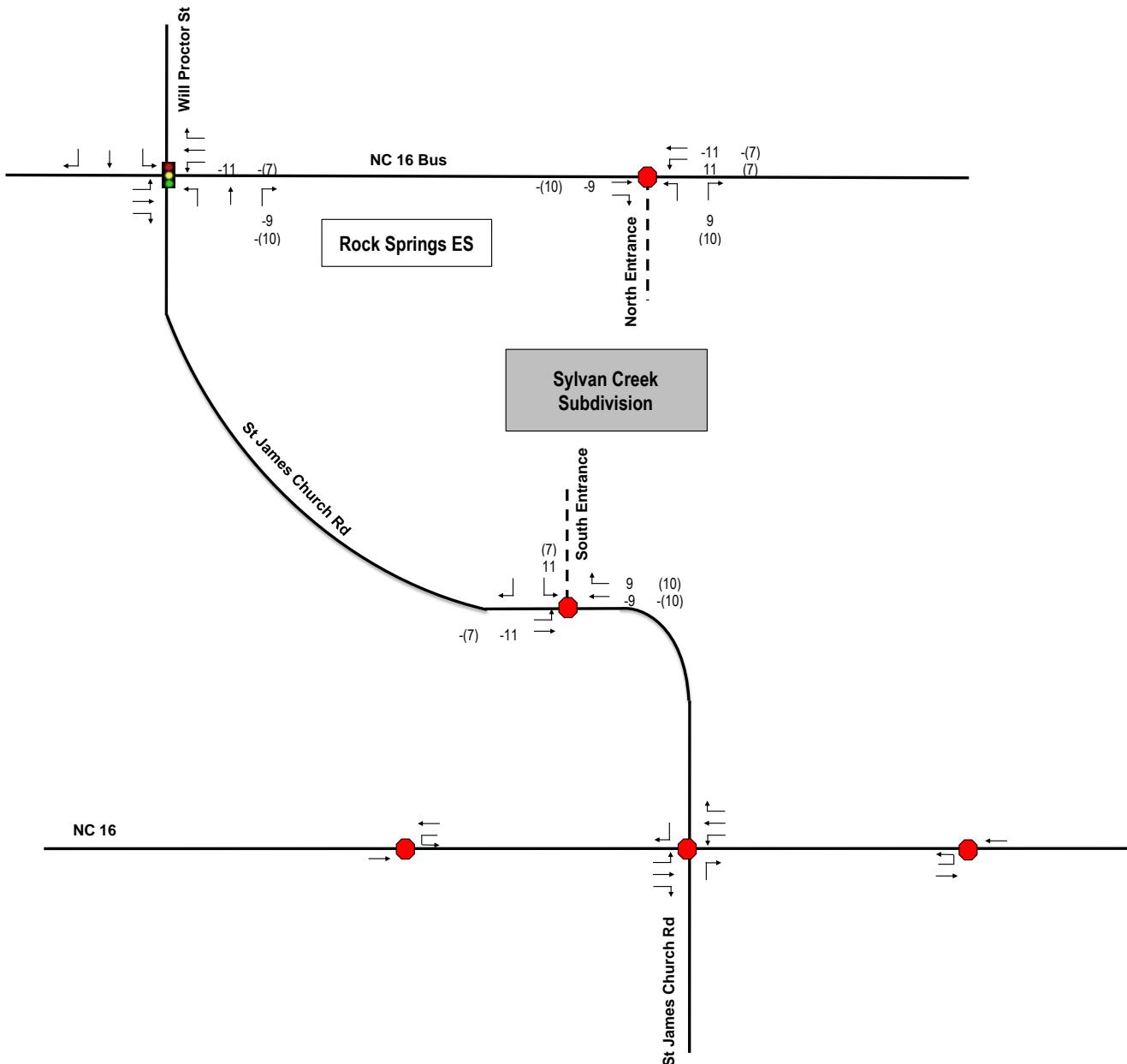
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Figure 11
Peak Hour Site Trips

N

**Not to Scale



Legend	
—	Existing Roadway
- -	Proposed Roadway
█	Signalized Intersection
●	Unsignalized Intersection
XX	AM Peak Hour Traffic Volume
(XX)	PM Peak Hour Traffic Volume



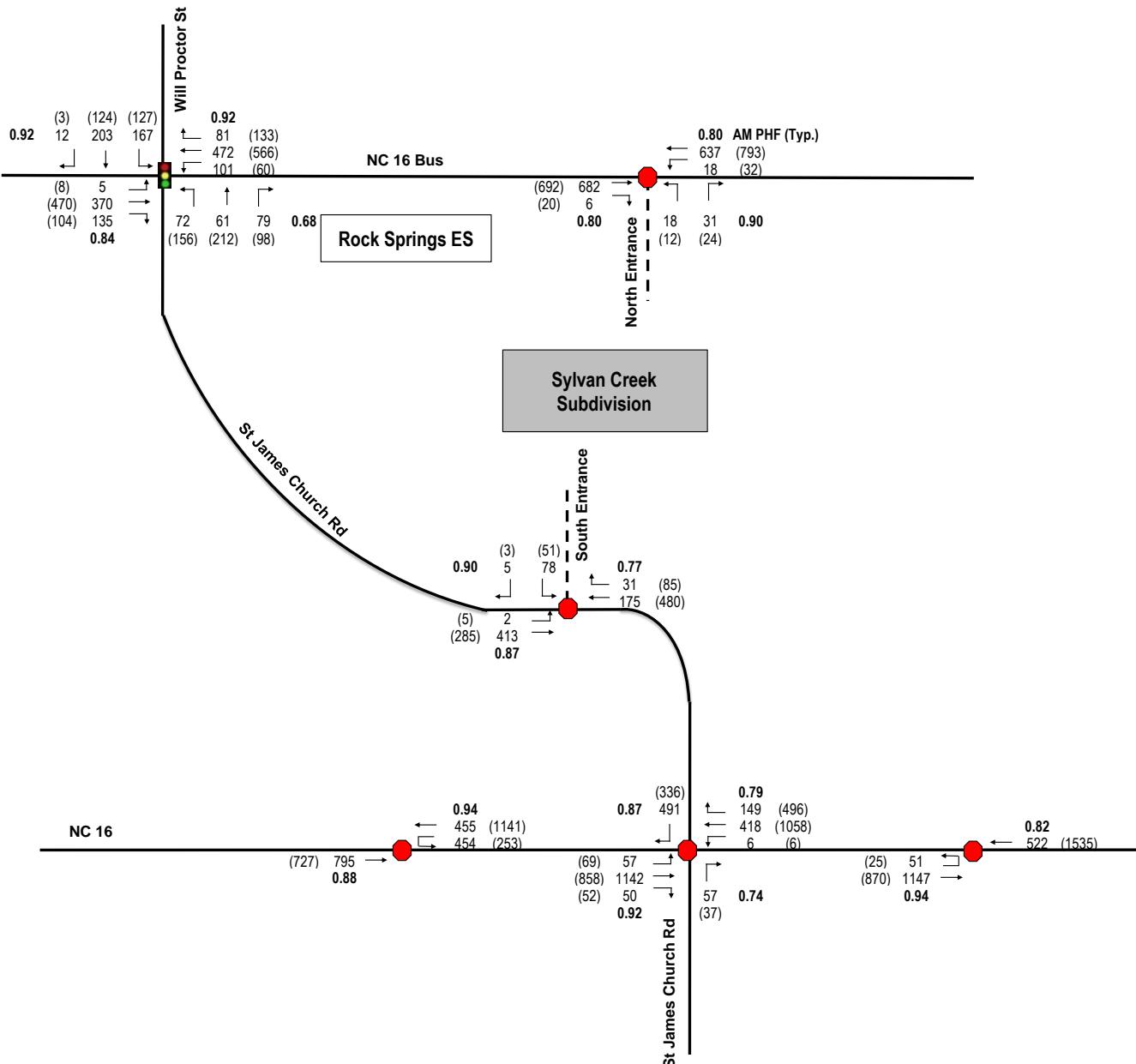
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Figure 12
Background Trip Adjustments

N

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Figure 13
2021 Build Peak Hour
Traffic Volumes

2021 BUILD ANALYSIS

The 2021 Build Analysis adds the site trips to the traffic volumes used in the 2021 No-Build Analysis, and includes the background trip adjustments/diversions. Figure 13 on the previous page shows the 2021 Build traffic volumes for the AM and PM peak hour conditions. The two proposed site entrances were both analyzed with one ingress lane and one egress lane. At the NC 16 Business / North Entrance intersection, a 100' westbound left-turn lane was modeled on NC 16 Business which currently has a TWLT lane. LOS and Queue Analysis results for the 2021 Build Analysis are shown in Tables 6 and 7, respectively.

Table 6: Level of Service Analysis - 2021 Build

Intersection	Approach	Build (2021)			
		AM		PM	
		Delay (sec)	LOS	Delay (sec)	LOS
NC 16 Bus @ St. James Church Rd / Will Proctor St	signalized	Intersection Average	26.0	C	47.5
		EB - NC 16 Bus	24.9	C	15.2
		WB - NC 16 Bus	24.9	C	18.8
		NB - St James Church Rd	22.2	C	55.1
		SB - Will Proctor St	32.3	C	193.4
NC 16 @ St James Church Rd	unsignalized	EB (Left-Turn) - NC 16	14.2	B	36.3
		WB (Left-Turn) - NC16	26.7	D	19.4
		NB - St James Church Rd	15.2	C	12.3
		SB - St James Church Rd	24.2	C	40.7
NC 16 U-Turns	unsignalized	EB (U-Turn) - NC 16	11.0	B	18.3
		WB (U-Turn) - NC 16	46.0	E	17.1
NC 16 Bus @ North Entrance	unsignalized	EB - NC 16 Bus	0.0	A	0.0
		WB - NC 16 Bus	0.3	A	0.4
		NB - North Entrance	17.9	C	16.5
St James Church Rd @ South Entrance	unsignalized	EB - St James Church Rd	0.0	A	0.2
		WB - St James Church Rd	0.0	A	0.0
		SB - South Entrance	16.6	C	19.4

Unacceptable Delay/LOS

Table 7: Queue Analysis - 2021 Build

Intersection	Turn Lane	Storage Length {Future Storage} (ft)	Build (2021)			
			AM		PM	
			95th% Queue (ft)	Max Queue (ft)	95th% Queue (ft)	Max Queue (ft)
NC 16 Bus @ St. James Church Rd / Will Proctor St	signalized	EBL	TWLT 200+/-	6	112	7
		WBL	TWLT	75	228	31
		NBR	100	70	113	99
NC 16 @ St James Church Rd	unsignalized	EBL	540	12	53	45
		EBR	125	0	0	0
		WBL	630	4	20	2
		WBR	430	0	0	189
NC 16 U-Turns	unsignalized	EBU	580	7	32	8
		WBU	600	263	509	67
NC 16 Bus @ North Entrance	unsignalized	WBL	{100}	2	35	3

Queue length greater than storage length

Sylvan Creek Subdivision TIA

The NC 16 Business and St. James Church Road / Will Proctor Street intersection is expected to remain operating at LOS C with little changes in delays during the AM peak hour, which suggests that the diversion of the background trips away from this intersection likely neutralizes the AM site trip impacts. While this intersection will continue to operate at LOS D (47.5 seconds) during the PM peak hour, average delays on the northbound and southbound approaches are estimated to increase to 55.1 seconds (LOS E) and 193.4 seconds (LOS F), respectively. The queue analyses show similar queue lengths on the existing turn-lanes when compared to the 2021 No-Build Condition Analysis results.

The NC 16 and St. James Church Road intersection is also expected to have higher delays. During the AM peak hour, the NC 16 westbound U-turn movement LOS will degrade from D (33.1 seconds) to E (46 seconds), while the eastbound U-turn movement and other intersection approaches will continue to operate at LOS D or better. During the PM peak hour and due to the heavy westbound through traffic (over 1,000 vph) on NC 16, both the southbound St. James Church approach (right-turn movement) and the eastbound NC 16 left-turn movement will degrade to LOS E with 40.7 seconds and 36.3 seconds of delays, respectively. The other intersection approaches and U-turn movements are estimate to operate at LOS C or better during the PM peak hour. It is typical for minor street approaches to experience higher delays at unsignalized intersections. The queue analyses show that the current turn-lanes at this intersection could still accommodate the storage needs during peak hours, but the westbound U-turn lane is getting close to its capacity during the AM peak hour.

Both the North Entrance and the South Entrance were analyzed with one ingress lane and one egress lane. The two site entrances are expected to operate at LOS C (20 seconds or less) during both AM and PM peak hours.

2021 BUILD WITH IMPROVEMENTS ANALYSIS

NCDOT requires improvements to the roadway network if:

1. The average delay at an intersection or individual approach increases by 25% or greater, or
2. The Level of Service degrades by at least one level, while comparing the future No-Build results to Build results.
3. Level of Service is “F”.

In addition, NCDOT’s *Policy on Street and Driveway Access to North Carolina Highway* specifies left-turn and right-turn lane warrants based on conflicting traffic volumes. The following improvements are recommended based on the capacity and queue analysis results, turn-lane warrant analysis, as well as engineering judgment:

NC 16 Business and North Entrance (by Developer)

- Westbound: Revise the two-way left-turn pavement markings on NC 16 Business to provide an exclusive westbound left-turn lane with 100 feet of storage and appropriate transitions.
- Northbound: Provide a 100 feet internal protected stem for the proposed entrance.

St. James Church Road and South Entrance (by Developer)

- Westbound (NW): Construct a right-turn lane on St. James Church Road with 100 feet of storage and appropriate deceleration and taper lengths.
- Southbound (SW): Provide a 100 feet internal protected stem for the proposed entrance.
- Ensure appropriate sight distance for turning vehicles at the proposed entrance.

NC 16 and St. James Church Road (by Developer)

- Westbound (NW) U-Turn: Extend the existing U-turn lane by approximately 250’ to the main intersection of NC 16 and St. James Church Road, and provide an appropriate transition taper.

The proposed westbound U-turn extension on NC 16 and the turn-lane improvements at the two site entrance intersections are expected to provide adequate storage capacity for the future 2021 traffic conditions.

The Sylvan Creek Subdivision is currently proposed to be developed in six phases over a three-year period. The internal residential collector street between St. James Church Road and NC 16 Business will be constructed during the first two phases which have a total of 89 single-family units (or 45% buildout). The improvements at the two site entrances therefore are recommended to be constructed in the initial development phase(s) prior to the opening of the internal collector street.

Sylvan Creek Subdivision TIA

Upon completion of the second phase, the site may add up to 20 westbound U-turn trips during the AM peak hour at the NC 16 / St. James Church Road intersection. This represents less than 6% of the existing westbound U-turn peak hour volumes (362 vph). As the AM peak westbound U-turn queues are estimated to approach the 600' storage capacity only in the 2021 full buildout conditions (including other off-site trips), it is recommended that the westbound U-turn extension should be completed prior to the third development phase (the 90th unit).

Additional improvements are suggested below to accommodate the site trips and mitigate the projected deficiencies in the future No Build Conditions. For practical purposes and given the current traffic demands and projected site traffic impacts, these improvements may be implemented by the NCDOT staff or included in the future Transportation Improvement Program.

NC 16 Business and St. James Church Road /Will Proctor Street (by NCDOT)

- Signal Timing Improvements for the PM peak period.

The analyses shows that a five-second increase in the split time for the side street approaches (to 30 seconds), while maintaining the current 90-second cycle length during the PM peak hour, could provide similar intersection performance when compared to the 2021 No Build Condition Analysis.

Protected/permissive westbound left-turn operations (with concurrent northbound right-turn movement) were also evaluated as a potential mitigation measure. The traffic analyses show that these signal phasing changes are less effective in reducing delays when compared to the signal timing improvement option with the current signal phasing scheme.

NC 16 and St. James Church Road (by NCDOT)

- Monitor traffic conditions and, if deemed appropriate and necessary, install traffic signal(s) at the WB U-turn intersection and/or the NC 16 WB/St. James Church Road intersection.

While the NC 16 and St. James Church Road intersection will have higher delays due to the new site trips, the results show that the minor street average delays are likely less than 50 seconds per vehicle during peak hours. Based on the projected moderate delays, the traffic signal installation, which is the only effective option to reduce minor street delays, may not be necessary.

It is noted that the 2015 traffic counts suggest one or more signal warrants may already be met at the WB U-turn intersection and the NC 16 WB/ St. James Church Road intersection. It is also noted that the southbound St. James Church Road right-turn performance at the NC 16 WB intersection may have a

Sylvan Creek Subdivision TIA

metering effect on the WB U-turn operations. Conservative gap acceptance behaviors may increase the vehicular delays on the southbound St. James Church Road approach which in turn may reduce the traffic demands (and likely delays) for the WB U-turn movements. Field observations and verifications of the congestion levels and queue conditions are therefore recommended to help determine if a signal should be installed. Based on the current traffic data and projected site trips, the signal control needs do not appear to be directly caused by the subject development.

Tables 8 and 9 summarize the LOS and queue analysis results for the future improvement conditions.

Table 8: Level of Service Analysis - 2021 Build with Improvements

Intersection	Approach	Build (2021) with Improvements			
		AM		PM	
		Delay (sec)	LOS	Delay (sec)	LOS
NC 16 Bus @ St. James Church Rd / Will Proctor St	signalized	Intersection Average	26.0	C	35.7
		EB - NC 16 Bus	24.9	C	18.1
		WB - NC 16 Bus	24.9	C	23.2
		NB - St James Church Rd	22.2	C	42.2
		SB - Will Proctor St	32.3	C	101.9
NC 16 @ St James Church Rd	unsignalized	EB (Left-Turn) - NC 16	14.2	B	36.3
		WB (Left-Turn) - NC16	26.7	D	19.4
		NB - St James Church Rd	15.2	C	12.3
		SB - St James Church Rd	24.2	C	40.7
NC 16 U-Turns	unsignalized	EB (U-Turn) - NC 16	11.0	B	18.3
		WB (U-Turn) - NC 16	46.0	E	17.1
NC 16 Bus @ North Entrance	unsignalized	EB - NC 16 Bus	0.0	A	0.0
		WB - NC 16 Bus	0.3	A	0.4
		NB - North Entrance	17.9	C	16.5
St James Church Rd @ South Entrance	unsignalized	EB - St James Church Rd	0.0	A	0.2
		WB - St James Church Rd	0.0	A	0.0
		SB - South Entrance	16.2	C	18.3

Unacceptable Delay/LOS

Table 9: Queue Analysis - 2021 Build with Improvements

Intersection	Turn Lane	Storage Length {Future Storage} (ft)	Build (2021) with Improvements			
			AM		PM	
			95th% Queue (ft)	Max Queue (ft)	95th% Queue (ft)	Max Queue (ft)
NC 16 Bus @ St. James Church Rd / Will Proctor St	signalized	EBL	TWLT 200+/-	6	53	8
		WBL	TWLT	75	227	38
		NBR	100	70	124	92
NC 16 @ St James Church Rd	unsignalized	EBL	540	12	50	45
		EBR	125	0	0	0
		WBL	630	4	21	2
		WBR	430	0	0	151
NC 16 U-Turns	unsignalized	EBU	580	7	32	8
		WBU	600 {850}	263	634	67
NC 16 Bus @ North Entrance	unsignalized	WBL	{100}	2	31	3
St James Church Rd @ South Entrance	unsignalized	WBR	{100}	0	0	0

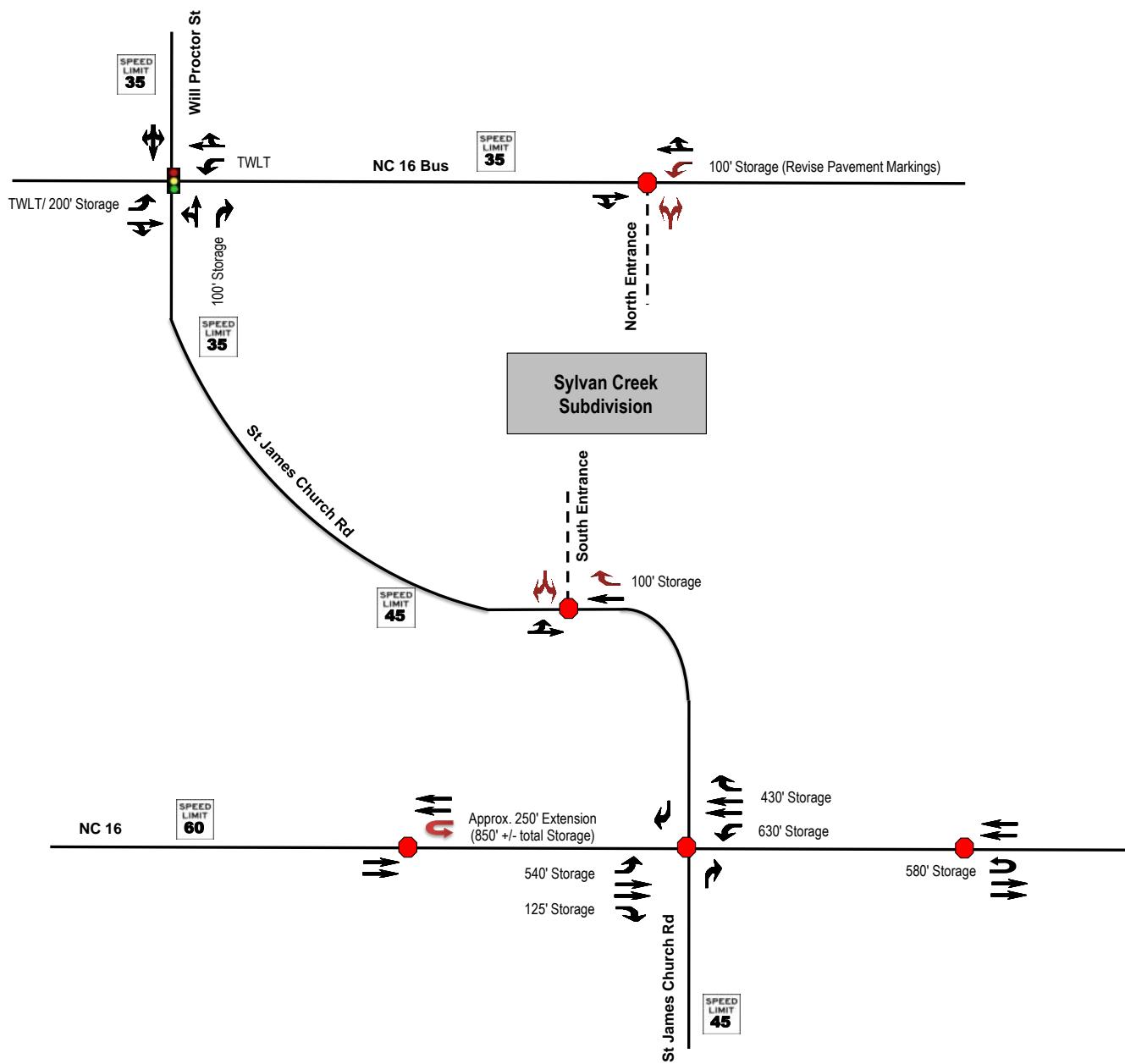
Queue length greater than storage length

Sylvan Creek Subdivision TIA

The proposed turn-lane improvements at the site entrance intersections will help to separate the turning vehicles from the though traffic streams, and therefore improve the traffic operations and safety performance. With the proposed signal timing improvement, peak hour delays at the intersection of NC 16 Business and St. James Church Road / Will Proctor Street are expected to be similar to those in the 2021 No Build Conditions.

While the site trips may increase delays at the NC 16 and St. James Church Road intersection, the resulting peak hour delays (46 seconds or less) appear to remain in a moderate level. It is typical for minor street approaches to experience higher delays at unsignalized intersections. The proposed westbound U-turn extension on NC 16 should provide adequate storage capacity for the projected peak hour trips in 2021. New traffic signals on NC 16, if justified, do not appear to be necessitated by the subject development. Figure 14 illustrates the proposed intersection configurations.

****Not to Scale**



Legend	
—	Existing Roadway
--	Proposed Roadway
	Signalized Intersection
	Unsignalized Intersection
	Existing Lane
	Future Lane

CONCLUSIONS AND RECOMMENDATIONS

The proposed 198-lot Sylvan Creek Subdivision is estimated to generate 1,885 daily trips, including 149 AM peak hour trips and 198 PM peak hour trips.

The Existing Condition Analysis indicates that most of the study intersections and approaches are operating at LOS C or better during peak hours. The 2015 traffic counts suggest one or more signal warrants may already be met at the NC 16 WB U-turn intersection and the NC 16 WB/St. James Church Road intersection.

The 2021 No Build Analysis took into account the background traffic growth (1% per year) and three off-site developments. All the study intersections and approaches are expected to operate at LOS D or better during peak hours, except for the southbound Will Proctor Street approach which may degrade to LOS F at its NC 16 Business intersection during the PM peak hour.

The 2021 Build Condition Analysis examined the traffic performance with the site trips added to the study network. This analysis also included the background trip diversions, as the proposed subdivision's internal roadways may provide an alternative route between NC 16 and NC 16 Business. The traffic analyses shows that both site entrances will operate at LOS C during peak hours, but the existing intersections will have varying levels of delay increases. Based on the traffic analysis results, turn-lane warrant analysis, as well as engineering judgment, the following improvements are recommended.

Prior to the opening of the internal residential collector street between St. James Church Road and NC 16 Business, the following improvements at the site entrances should be completed by the developer in the initial development phase(s).

NC 16 Business and North Entrance (by Developer - Phase 1)

- Westbound: Revise the two-way left-turn pavement markings on NC 16 Business to provide an exclusive westbound left-turn lane with 100 feet of storage and appropriate transitions.
- Northbound: Provide a 100 feet internal protected stem for the proposed entrance.

St. James Church Road and South Entrance (by Developer - Phase 2)

- Westbound (NW): Construct a right-turn lane on St. James Church Road with 100 feet of storage and appropriate deceleration and taper lengths.
- Southbound (SW): Provide a 100 feet internal protected stem for the proposed entrance.
- Ensure appropriate sight distance for turning vehicles at the proposed entrance.

Sylvan Creek Subdivision TIA

The following improvement should be completed by the developer prior to the third development phase or the 90th single-family unit.

NC 16 and St. James Church Road (by Developer - Phase 3 or 90th Lot)

- Westbound (NW) U-Turn: Extend the existing U-turn lane by approximately 250' to the main intersection of NC 16 and St. James Church Road, and provide an appropriate transition taper.

Additional improvements are suggested below to accommodate the site trips and mitigate the projected deficiencies in the future No Build Conditions. For practical purposes and given the current traffic demands and projected site traffic impacts, these improvements may be implemented by the NCDOT staff or included in the future Transportation Improvement Program.

NC 16 Business and St. James Church Road /Will Proctor Street (by NCDOT)

- Signal Timing Improvements for the PM peak period.

NC 16 and St. James Church Road (by NCDOT)

- Monitor traffic conditions and, if deemed appropriate and necessary, install traffic signal(s) at the WB U-turn intersection and/or the NC 16 WB/St. James Church Road intersection.

The proposed turn-lane improvements at the site entrance intersections will help to separate the turning vehicles from the though traffic streams, and therefore improve the traffic operations and safety performance. The proposed signal timing improvement at the intersection of NC 16 Business and St. James Church Road / Will Proctor Street will help to maintain the 2021 No Build traffic conditions.

While the site trips may increase delays at the NC 16 and St. James Church Road intersection, the resulting peak hour delays (46 seconds or less) appear to remain in a moderate level. It is typical for minor street approaches to experience higher delays at unsignalized intersections. The proposed westbound U-turn extension on NC 16 should provide adequate storage capacity for the projected peak hour trips in 2021. The need for new traffic signals on NC 16 may be verified in the future based on field observations. Considering the current traffic demands and the projected site traffic impacts, the new signals, if justified, do not appear to be necessitated by the subject development.

Tables 10 and 11 on the following pages summarize the capacity analysis and queue analysis results for this study, respectively.

Sylvan Creek Subdivision TIA

Table 10: LOS & Queue Analysis Summary

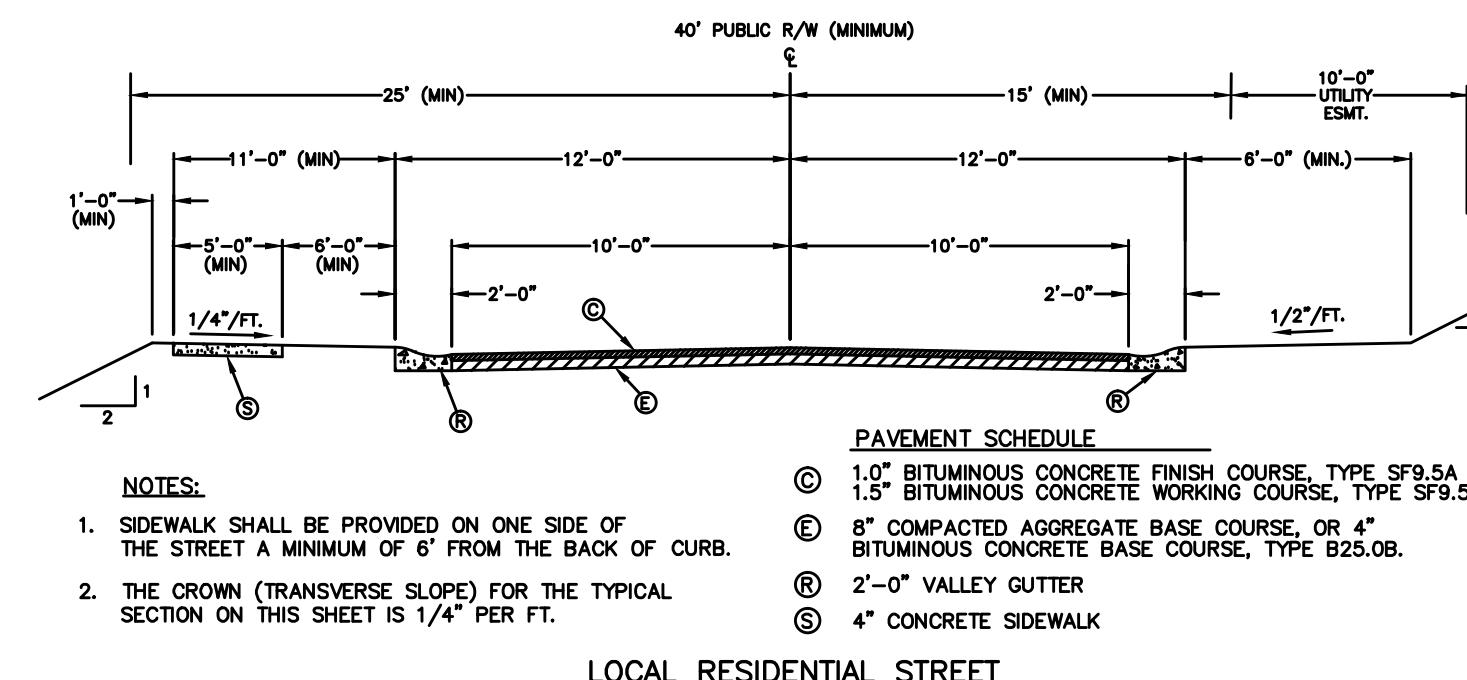
Intersection	Approach	Existing (2016)				No Build (2021)				Build (2021)				Build (2021) with Improvements			
		AM		PM		AM		PM		AM		PM		AM		PM	
Delay (sec)	LOS (sec)	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
NC 16 Bus @ St. James Church Rd / Will Proctor St signalized	Intersection Average	22.3	C	23.9	C	25.8	C	39.5	D	26.0	C	47.5	D	26.0	C	35.7	D
	EB-NC 16 Bus	21.4	C	17.6	B	25.1	C	15.4	B	24.9	C	15.2	B	24.9	C	18.1	B
	WB-NC 16 Bus	20.8	C	21.1	C	25.3	C	19.0	B	24.9	C	18.8	B	24.9	C	23.2	C
	NB-St.James Church Rd	20.6	C	31.3	C	21.7	C	49.7	D	22.2	C	55.1	E	22.2	C	42.2	F
	SB-Will Proctor St	27.4	C	33.7	C	31.2	C	139.7	F	32.3	C	193.4	F	32.3	C	101.9	F
	EB (Left-Turn) - NC 16	13.6	B	26.5	D	14.0	B	30.4	D	14.2	B	36.3	E	14.2	B	36.3	E
	WB (Left-Turn) - NC 16	22.9	C	17.6	C	25.2	D	18.7	C	26.7	D	19.4	E	26.7	D	19.4	C
NC 16 @ St. James Church Rd unsignalized	NB-St.James Church Rd	13.9	B	11.7	B	14.7	B	12.1	B	15.2	C	12.3	B	15.2	C	12.3	C
	SB-St.James Church Rd	16.1	C	23.0	C	19.0	C	30.6	D	24.2	C	40.7	E	24.2	C	40.7	E
	EB(U-Turn) - NC 16	10.7	B	16.6	C	11.0	B	17.7	C	11.0	B	18.3	C	11.0	B	18.3	C
NC 16 U-Turns unsignalized	WB(U-Turn) - NC 16	24.2	C	14.1	B	33.1	D	15.6	C	46.0	E	17.1	C	46.0	E	17.1	C
	EB-NC 16 Bus	-	-	-	-	-	-	-	-	0.0	A	0.0	A	0.0	A	0.0	A
	NB-NC 16 Bus	-	-	-	-	-	-	-	-	0.3	A	0.4	A	0.3	A	0.4	A
NC 16 Bus @ North Entrance unsignalized	NB-North Entrance	-	-	-	-	-	-	-	-	17.9	C	16.5	C	17.9	C	16.5	C
	EB-St.James Church Rd	-	-	-	-	-	-	-	-	0.0	A	0.2	A	0.0	A	0.2	A
	WB-St.James Church Rd	-	-	-	-	-	-	-	-	0.0	A	0.0	A	0.0	A	0.0	A
St James Church Rd @ South Entrance unsignalized	SB-South Entrance	-	-	-	-	-	-	-	-	16.6	C	19.4	C	16.2	C	18.3	C
	Unacceptable Delay/LOS																

Intersection	Turn Lane	Storage Length (Future Storage) (ft)	Existing (2015)				No Build (2021)				Build (2021)				Build (2021) with Improvements			
			AM		PM		AM		PM		AM		PM		AM		PM	
95th% Queue (ft)	Max Queue (ft)	95th% Queue (ft)	Max Queue (ft)	95th% Queue (ft)	Max Queue (ft)	95th% Queue (ft)	Max Queue (ft)	95th% Queue (ft)	Max Queue (ft)	95th% Queue (ft)	Max Queue (ft)	95th% Queue (ft)	Max Queue (ft)	95th% Queue (ft)	Max Queue (ft)	95th% Queue (ft)	Max Queue (ft)	
NC 16 Bus @ St. James Church Rd / Will Proctor St signalized	EBL	7	56	7	60	6	29	7	42	6	112	7	43	6	53	8	93	
	TWL/T	78	131	32	238	88	222	34	256	75	228	31	235	75	227	38	282	
	NBR	62	101	99	200	72	129	108	200	70	113	99	200	70	124	92	200	
	EBR	9	42	17	58	10	51	25	67	12	53	45	80	12	50	45	84	
	EBR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	WBL	3	17	2	20	3	18	2	18	4	20	2	18	4	21	2	18	
	WBR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
NC 16 @ St. James Church Rd unsignalized	EBU	430	0	93	0	93	0	0	149	0	0	0	189	0	0	0	0	151
	WBU	580	6	39	6	40	7	41	7	40	7	32	8	41	7	32	8	44
	WBU	600 (850)	130	189	40	43	191	354	53	62	263	509	67	72	263	634	67	70
NC 16 Bus @ North Entrance unsignalized	WBL	(100)	-	-	-	-	-	-	-	2	35	3	39	2	31	3	48	
	St James Church Rd @ South Entrance unsignalized	WBR	{100}	-	-	-	-	-	-	-	-	-	-	0	0	0	0	

Queue length greater than storage length

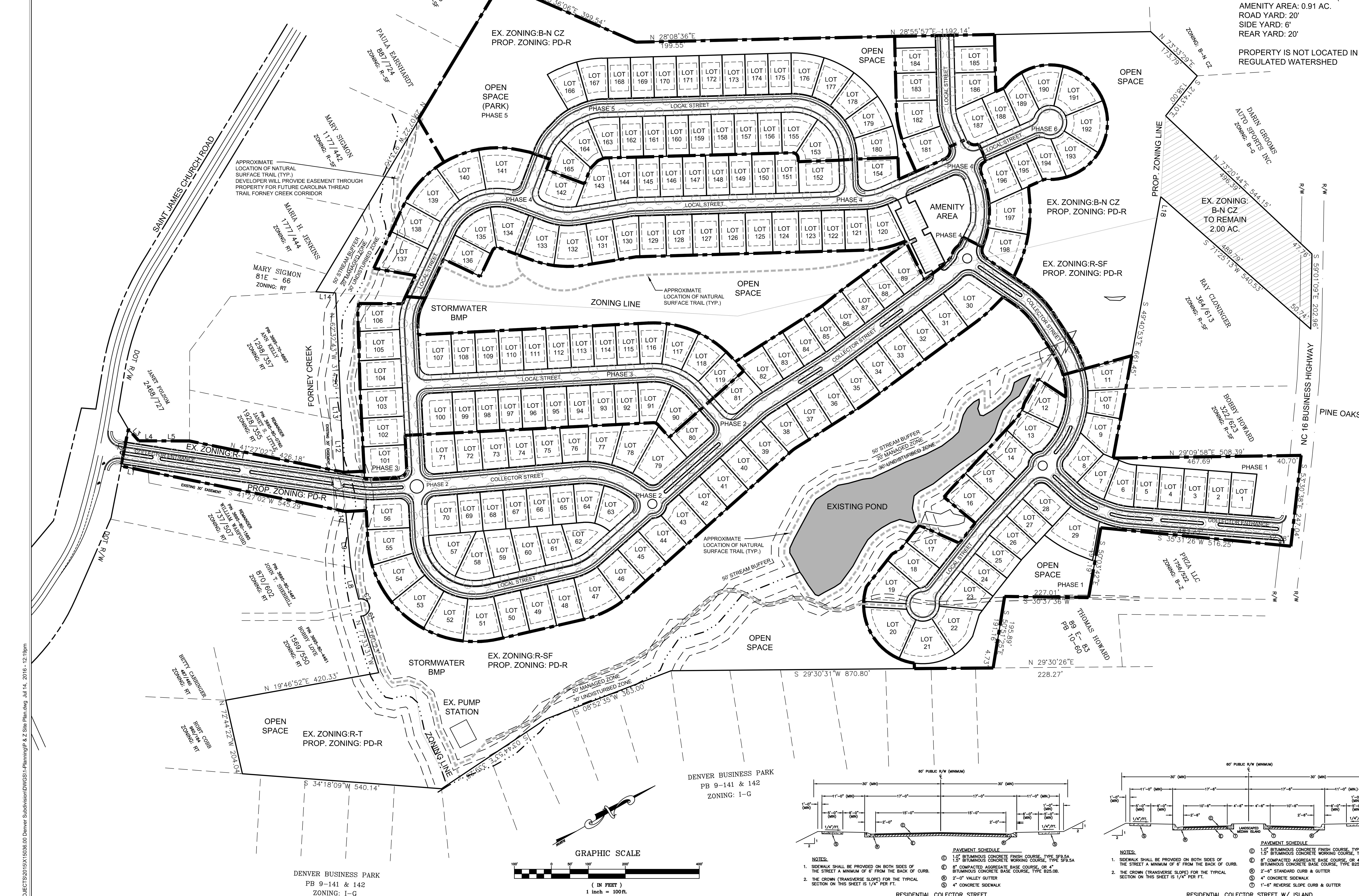
Course	Bearing	Distance
L1	S 41°27'02" W	74.89'
L2	N 48°43'50" W	101.80'
L3	N 78°32'49" E	42.17'
L4	N 30°12'41" E	40.03'
L5	N 30°12'41" E	97.23'
L6	N 78°52'01" E	32.70'
L7	S 63°59'27" E	58.61'
L8	N 74°05'13" W	87.39'
L9	N 65°42'15" W	122.17'
L10	N 62°40'36" W	30.79'
L11	N 62°44'16" W	106.36'
L12	N 62°52'28" W	139.40'
L13	N 62°21'33" W	31.88'
L14	S 33°30'32" W	53.25'
L15	S 72°14'34" E	152.98'
L16	S 72°07'22" E	93.00'
L17	S 72°07'22" E	101.30'
L18	S 49°38'22" E	57.25'

Curve	Radius	Length	Chord	Chord Bear.
C1	23.41'	43.81'	37.69'	N 22°46'00" W
C2	23.41'	36.35'	32.81'	S 59°09'05" W



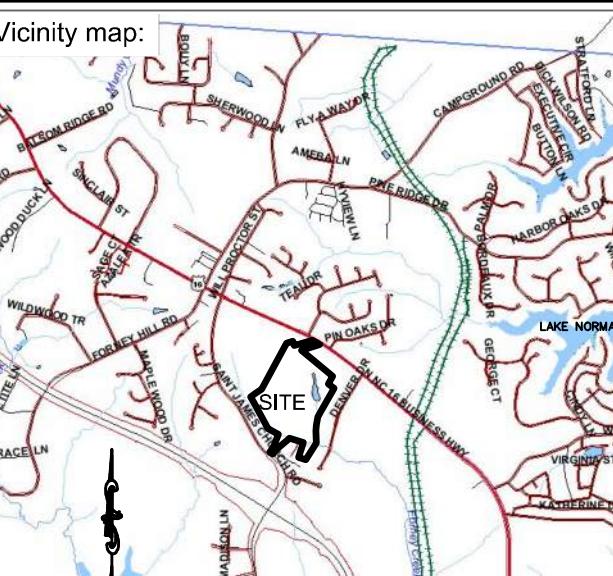
SITE DATA:
PROPERTY AREA: ± 91.25 AC
REZONING (PROJECT AREA) = ± 89.25 AC
EXISTING ZONING: B-N CZ, R-SF & R-T
PROPOSED ZONING: PD-R
(PLANNED DEVELOPMENT - RESIDENTIAL)
NUMBER OF LOTS: 198 (2.22 UNITS/AC)
68 (72' X 115')
130 (62' X 110')
PHASE 1: 29 LOTS [11 (72') + 18 (62')]
PHASE 2: 60 LOTS [27 (72') + 33 (62')]
PHASE 3: 30 LOTS [6 (72') + 24 (62')]
PHASE 4: 34 LOTS [18 (72') + 16 (62')]
PHASE 5: 27 LOTS [27 (62')]
PHASE 6: 18 LOTS [6 (72') + 12 (62')]

Client: LAWRENCE W. MASHBURN & ASSIGNS
P.O. BOX 37229
CHARLOTTE, NC 28237
704.619.3980



SYLVAN CREEK SUBDIVISION

DENVER, NC



NOT TO SCALE

REZONING DOCUMENTS

Title: **PRELIMINARY
DEVELOPMENT**

Project number: X15036.00
Date: 07-13-2016
Drawn by: JMC
Approved by: JMC **1**