

# CHRIST COMMUNITY CHURCH

## TRAFFIC IMPACT STUDY

### EXECUTIVE SUMMARY



**Prepared for:**

The Town of Chapel Hill  
Public Works Department - Engineering

**Prepared by:**

***HNTB North Carolina, PC***

*343 East Six Forks Road  
Suite 200  
Raleigh, NC 27609*

*NCBELS License #: C-1554*

June 2019



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## EXECUTIVE SUMMARY

### Project Overview

Christ Community Church of Chapel Hill is proposing the construction of a new church building on a parcel located along Erwin Road and Old Oxford Road in Chapel Hill. The project proposes to construct a 11,420 square foot building with 270 sanctuary seats and supporting facilities and 102 on-site parking spaces. **Figure ES-1** shows the general location of the site. The project is anticipated to be fully complete over the next four to six years. This report analyzes the transportation impacts for the build-out scenario for the year 2025 when church attendance at the Sunday AM service is expected to be approximately 220, the no-build scenario for 2025, as well as 2019 existing year traffic conditions.

The proposed site concept plan shows a full movement access connection with Old Oxford Road across from Kirkwood Drive and a right-turn in/right-turn out only (RIRO) access along Erwin Road across from McGregor Drive. This study also examines the impacts of allowing full access at the proposed RIRO driveway. Potential internal vehicular cross-access connections to the parcel to the south are also shown. No other transportation system changes are proposed on the site plan. **Figure ES-2** displays the preliminary concept plan of the Christ Community Church and nearby land uses and roadways.

This report analyzes and presents the transportation impacts that the Christ Community Church will have on the following existing and future intersections in the project study area:

- Old Oxford Road and Kirkwood Drive / Proposed Full Access Site Driveway
- Erwin Road and Old Oxford Road / Windhover Drive
- Erwin Road and McGregor Drive / Proposed Right-Turn In/Right-Turn Out Only Driveway
- Erwin Road and Dobbins Drive
- Erwin Road / Europa Drive and US 15-501 (Fordham Boulevard)

The impacts of the proposed site at the study area intersections were evaluated during a typical Sunday AM peak hour when church services would occur. The site is expected to only generate a nominal number of trips during the week.

### Existing Conditions

#### **Study Area**

The site is located in northern Chapel Hill along Erwin Road and Old Oxford Road just to the north of the US 15-501 (Fordham Boulevard) corridor. The study area contains four signalized intersections and several unsignalized intersections. It also includes the two future driveway connections from the site to Erwin Road and Old Oxford Road. US 15-501 is a major arterial facility providing connectivity between Chapel Hill, Durham and the I-40 corridor. Remaining study area network roadways are either minor arterial/collector facilities or local neighborhood access streets.

#### **Site Traffic Generation**

With the addition of new vehicular trips during the Sunday AM peak hour, there are potential site traffic impacts to the study area intersections. **Table ES-1** shows the site trip generation details, with generation rates and methodologies taken from a May 2018 trip generation study of the existing church site at the Extraordinary Ventures building located along Elliott Road in Chapel Hill. Information from the study was compared to data from the *Institute of Transportation Engineers (ITE) Trip Generation Manual, Version 10*. The existing church generation rates were based on number of attendees compared to observed vehicle trips entering and exiting the site and the highest peak hour data was selected for extrapolation for anticipated church attendance growth by 2025. The highest peak hour occurs at the conclusion of the church service. Church related traffic entering the site is spread out over a longer duration, as some



members arrive early for Sunday school activities and then others arrive for the primary service. This pattern is expected to continue for the proposed new church site.

**Table ES-1. Sunday AM Peak Hour Trip Generation Summary**

Land Use	Units	Sunday Daily			Sunday AM Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
Church	220 Attendees	103	103	206	4	98	102
<b>TOTALS</b>		<b>103</b>	<b>103</b>	<b>206</b>	<b>4</b>	<b>98</b>	<b>102</b>

**Background Traffic**

Background traffic growth for the 2025 analysis year is expected to come from two sources - ambient regional traffic growth and specific development-related traffic growth. Based on existing information, several currently proposed or Town-approved development projects in and near the project study area may be expected to contribute to specific background traffic growth by the 2025 analysis year. Two projects – the Wegmans Supermarket and the Marriott Residence Inn redevelopment were included as specific background traffic generators. To account for region-wide growth, an ambient area-wide traffic growth percentage of 1.0 percent per year was applied to existing traffic volumes, based on conservative growth projections based on historic daily traffic growth patterns in the project study area (NCDOT and Town of Chapel Hill daily traffic information).

**Impact Analysis**

**Peak Hour Intersection Level-of-Service (LOS)**

Study results indicate existing traffic operations at all study area intersections are acceptable during the Sunday AM peak hour. Even with the addition of peak hour site-generated trips to the projected 2025 background traffic volumes, none of the study area intersections are projected to experience deficient traffic operations in the Sunday AM peak hour in the 2025 analysis year. A summary of the traffic operations for each intersection, related to vehicular delays (intersection average as a whole if signalized, critical movement if stop-controlled) and the corresponding LOS is shown in **Table ES-2**.

**Table ES-2. Sunday AM Peak Hour LOS and Delay (Seconds/Vehicle) Summary**

Intersections	2019 Existing		2025 No-Build		2025 Build		2025 Build – Full Access on Erwin	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Old Oxford Road and Kirkwood Drive / Proposed Full Access Site Driveway <sup>#</sup>	A	9.0	A	9.0	A	9.5	A	9.3
Erwin Road and Old Oxford Road / Windhover Drive <sup>#</sup>	C	16.4	C	17.7	C	20.8	C	19.7
Erwin Road and McGregor Drive / Proposed Site RIRO Driveway <sup>#</sup>	C	11.2	C	11.6	C	15.7	C	16.2
Erwin Road and Dobbins Drive <sup>#</sup>	C	16.1	C	18.4	C	21.7	<b>Results are Same as 2025 Build Scenario</b>	
US 15-501 Northbound and Southbound U-Turn / Thru to 15-501 Service Road	A	7.9	A	9.0	A	11.2		
US 15-501 Northbound and Europa Drive	B	10.3	B	10.1	B	10.1		
US 15-501 Southbound and Northbound U-Turn	B	15.5	B	16.2	B	16.3		
US 15-501 Southbound and Erwin Road	C	26.2	C	28.3	D	41.0		

<sup>#</sup> - Worst-Case LOS/Delay for Unsignalized/Stop-Controlled Critical Movement



**Access Analysis**

Vehicular site access is to be accommodated by two proposed access driveways connecting to Old Oxford Road to the north (full access) and Erwin Road (RIRO only access) to the east of the site. Design details related to driveway throat lengths are shown on the concept plan and provide approximately 75 foot and 25 foot driveway throat lengths for the north and east access points, respectively. The driveway throat stem for the RIRO driveway along Erwin Road is shorter than recommended NCDOT standards (100 feet) and should be revised to include additional length, particularly if the driveway would serve as a full access point. Driveway separation distances along Erwin Road and Old Oxford Road are acceptable, based on recommendations of 100 foot minimum corner clearance as set forth in the 2003 *NCDOT Policy on Street and Driveway Access to North Carolina Highways* and the 100 foot minimum spacing between driveways and adjacent intersections along collector streets specified in the 2017 *Town of Chapel Hill Design Manual*.

Access for pedestrians and bicyclists is adequate in the project study area. Sidewalk is present on the eastern side of Erwin Road opposite the site between Windhover Drive and US 15-501. Crosswalk and pedestrian signals exist across US 15-501 superstreet intersection with Erwin Road/Europa Drive and unsignalized crosswalks are present at two quadrants of the Erwin Road/Dobbins Drive intersection. There is a short striped bicycle lane painted on the western side of Erwin Road south of the site to Dobbins Drive. Paved shoulders for bicycling exist along Dobbins Drive east of Erwin Road and along US 15-501 in the project study area. The site concept plan shows sidewalk provided along the north and east frontage of the site parcel.

**Signal Warrant Analysis**

Based on projected 2025 traffic volumes, operational LOS/delay results, and current/proposed access plans, no study area intersection would warrant the installation of a traffic signal, based on the methodology found in the *2009 Manual on Uniform Traffic Control Devices (MUTCD)*.

**Other Transportation-Related Analyses**

Other transportation-related analyses relevant to the 2001 Town of Chapel Hill Guidelines for the preparation of Traffic Impact Studies were completed as appropriate. The following topics listed in **Table ES-3** are germane to the scope of this study.

**Table ES-3. Other Transportation-Related Analyses**

<b>Analysis</b>	<b>Comment</b>
Long-Range Daily V/C Analysis	Due to the fact that the proposed site will add approximately 200 daily trips (on a Sunday) to the study area network, no long-range daily v/c analysis was conducted for this study.
Turn Lane Storage Requirements	Storage bay lengths at study area intersections were analyzed using Synchro and HCM 95 <sup>th</sup> percentile (max) queue length estimates for the 2025 Build Scenario. No unsignalized intersection is expected to have excessive peak hour queues or conditions that exceed existing turn lane storage. The US 15-501 superstreet intersection has estimated queues the may exceed the distance between US 15-501 and Dobbins Drive along southbound Erwin Road. These issues are not necessarily due to site-related traffic impacts and could be corrected by adjusting the green time for the Erwin Road approach to clear out the queue upstream of the intersection.
Appropriateness of Acceleration / Deceleration Lanes	The site concept plan shows no specifics related to acceleration/deceleration lanes along Erwin Road. Based on the existing 35 mph speed limit on Erwin Road, the fact that it functions as a higher volume collector facility, and capacity analysis results in this study, a separate northbound left-turn deceleration lane is recommended at the proposed site access driveway – if full access is allowed at this location. This would also allow the current roadway cross-section to match the upstream three-lane undivided cross-section. No other specific acceleration/deceleration lane issues were analyzed in the project study area.



<b>Analysis</b>	<b>Comment</b>
Pedestrian and Bicycle Analysis	Existing pedestrian and bicycle access and connectivity is adequate in the project study area. Sidewalk exists along on the east side of the Erwin Road corridor, and the proposed site plan will add sidewalk on the west side of the corridor. Pedestrian crossings and signals are present at the US 15-501 superstreet intersection and Dobbins Drive. Delineated bike lanes and wide paved shoulders are present in the study area in a few locations.
Public Transportation Analysis	Public transportation service to the study area is adequate with multiple bus stops and multiple local routes on Old Oxford Road and Dobbins Drive proximate to the site. However, no Sunday service is provided when the site would be producing the highest number of trips.

**Mitigation Measures/Recommendations**

**Planned Improvements**

There are no Town of Chapel Hill or North Carolina Department of Transportation improvement projects for study area roadway facilities within the analysis year time frame of 2019-2025.

**Background Committed Improvements**

There are no specific geometric or operational improvements to study area roadway intersections or facilities related to background private development projects that are expected to be completed between 2019 and 2025. The adjacent Marriott Residence Inn development is currently planning an expansion and provision of multi-family housing on that site parcel, with changes to existing access along Erwin Road. No specific recommendations from the current TIS for that project are assumed to be complete for this study’s 2025 analysis year. Projected site-related traffic from the redevelopment (known at Erwin Road Mixed-Use Redevelopment) were assumed to occur and were included in the analysis of background traffic volumes for this report. The recommended access improvements contained in **Section D** below should not interfere with any access plans being proposed for the Erwin Road Mixed-Use Redevelopment.

**Applicant Committed Improvements**

Based on the preliminary site concept plans and supporting development information provided, there are no specific external transportation-related improvements proposed adjacent to the Christ Community Church, other than the provision of the external local street access connections and sidewalk along Old Oxford Road and Erwin Road along the site frontage and the preliminary design to provide a limited access (RIRO) driveway along Erwin Road.

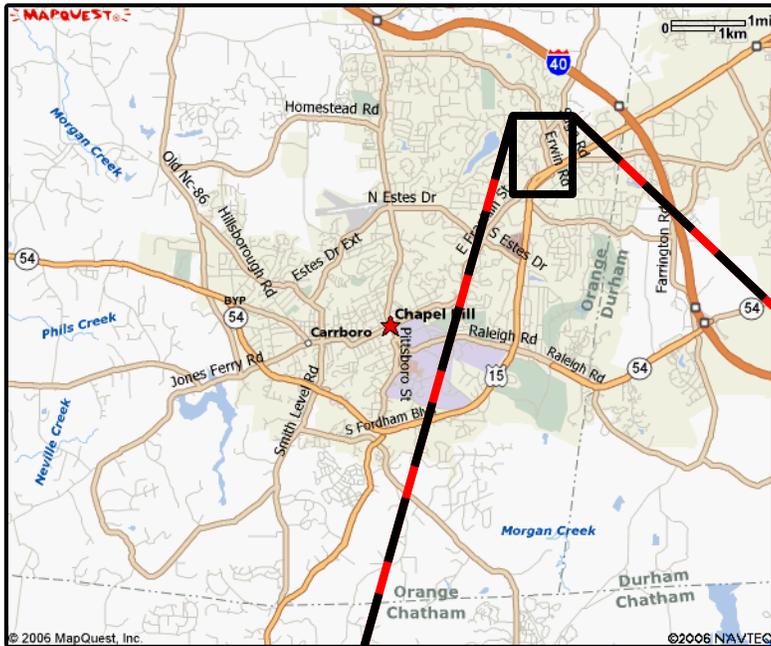
**Necessary Improvements**

Based on traffic capacity analyses for the 2025 design year, and analyses of existing study area turning bay storage lengths and site access, the following improvements are recommended as being necessary for adequate transportation network operations (see **Figure ES-3**).

- 1) A full access driveway connection with Erwin Road is operationally feasible, with the construction of northbound left-turn lane with 150 feet of vehicle storage at this connection with Erwin Road. The full access connection would reduce the traffic impact to local streets (Old Oxford Road) and should not interfere with proposed access connections or improvements that may stem from the adjacent Erwin Road Mixed-Use Redevelopment to the south.
- 2) Regardless of whether or not full access is allowed at the Erwin Road site driveway, the driveway design should include additional throat/stem length to provide 75 feet or more storage prior to the 1<sup>st</sup> parking lot stalls.



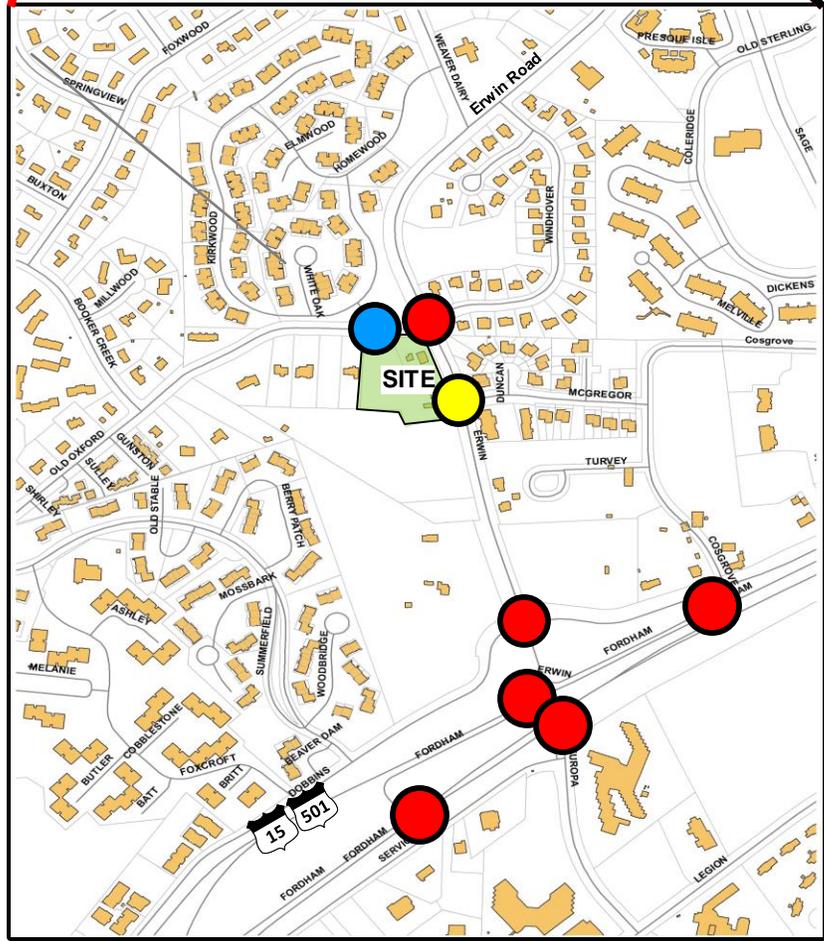
- 3) The site frontage along Erwin Road should include a widening of Erwin Road for a bicycle lane that would be consistent with the Town of Chapel Hill Mobility Plan.
- 4) Monitor the Erwin Road and US 15-501 superstreet intersection for potential retiming during the Sunday AM peak period to reduce potential queue spillback from Erwin Road past the Dobbins Drive intersection.
- 5) Potential internal cross-access connections with the adjacent Erwin Road Mixed-Use Redevelopment project should continue to be coordinated with both projects, though the focus should be limited to emergency access only and is not necessary from a traffic capacity perspective. No church-related trips or parking should be allowed on the Erwin Road Mixed-Use Redevelopment site or on local streets in the vicinity of the site. Additional on-site parking areas may need to be investigated if parking demand in the future exceeds the current designated supply of 102 spaces. Trip generation estimates of 98 peak hour vehicles in the 2025 analysis year exiting the site following church services indicate that parking demand may be close to capacity.



### LEGEND

- = Existing Study Area Intersection
- = Existing Study Area Intersection / Proposed Full Access Site Driveway
- = Existing Study Area Intersection / Proposed RIRO Site Driveway
- = Existing Building Footprint
- = Proposed Site Parcel

**NOT  
TO  
SCALE**

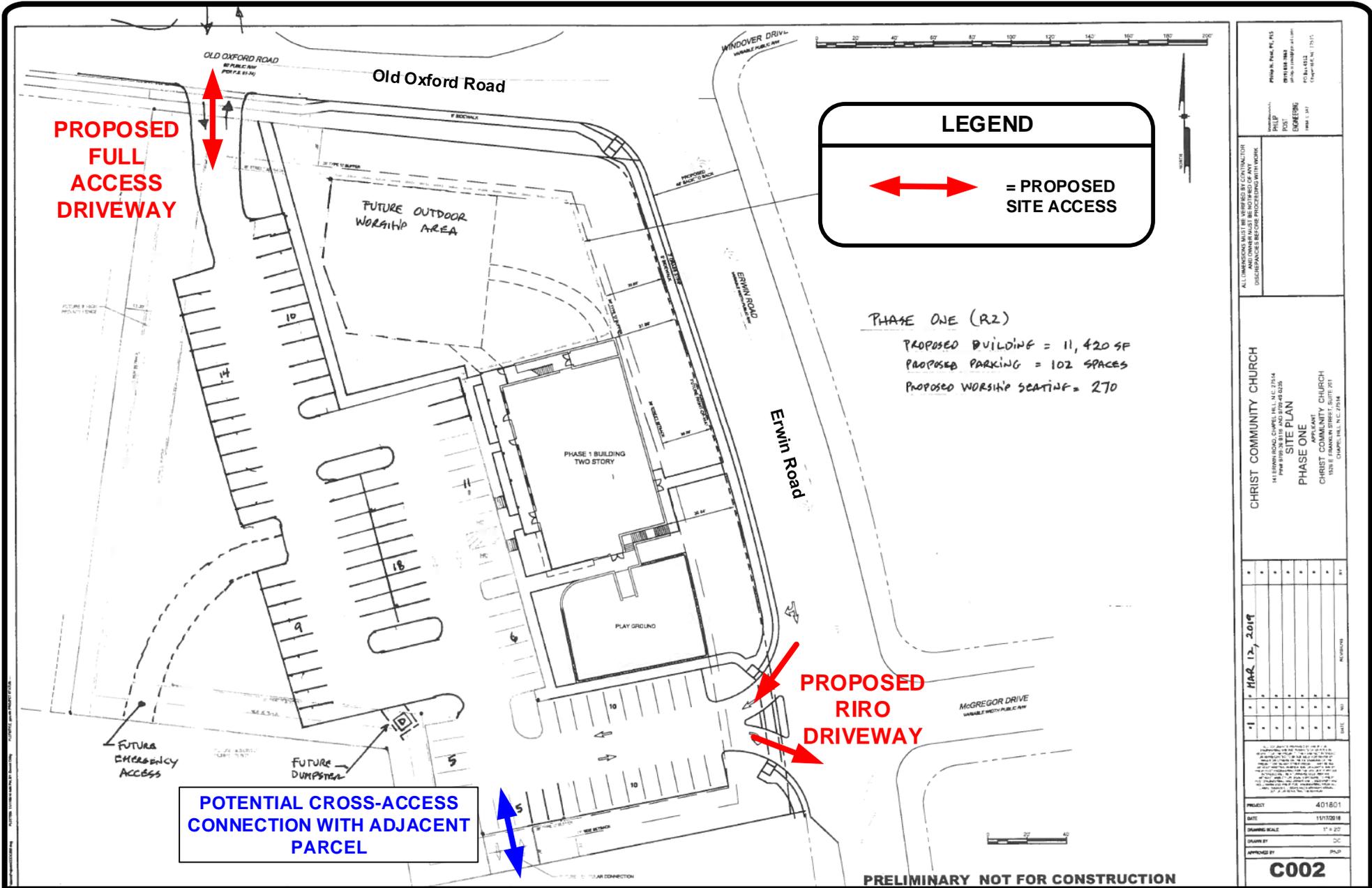


## Christ Community Church Traffic Impact Study

### PROJECT STUDY AREA MAP

DATE: June 2019

**FIGURE ES-1**

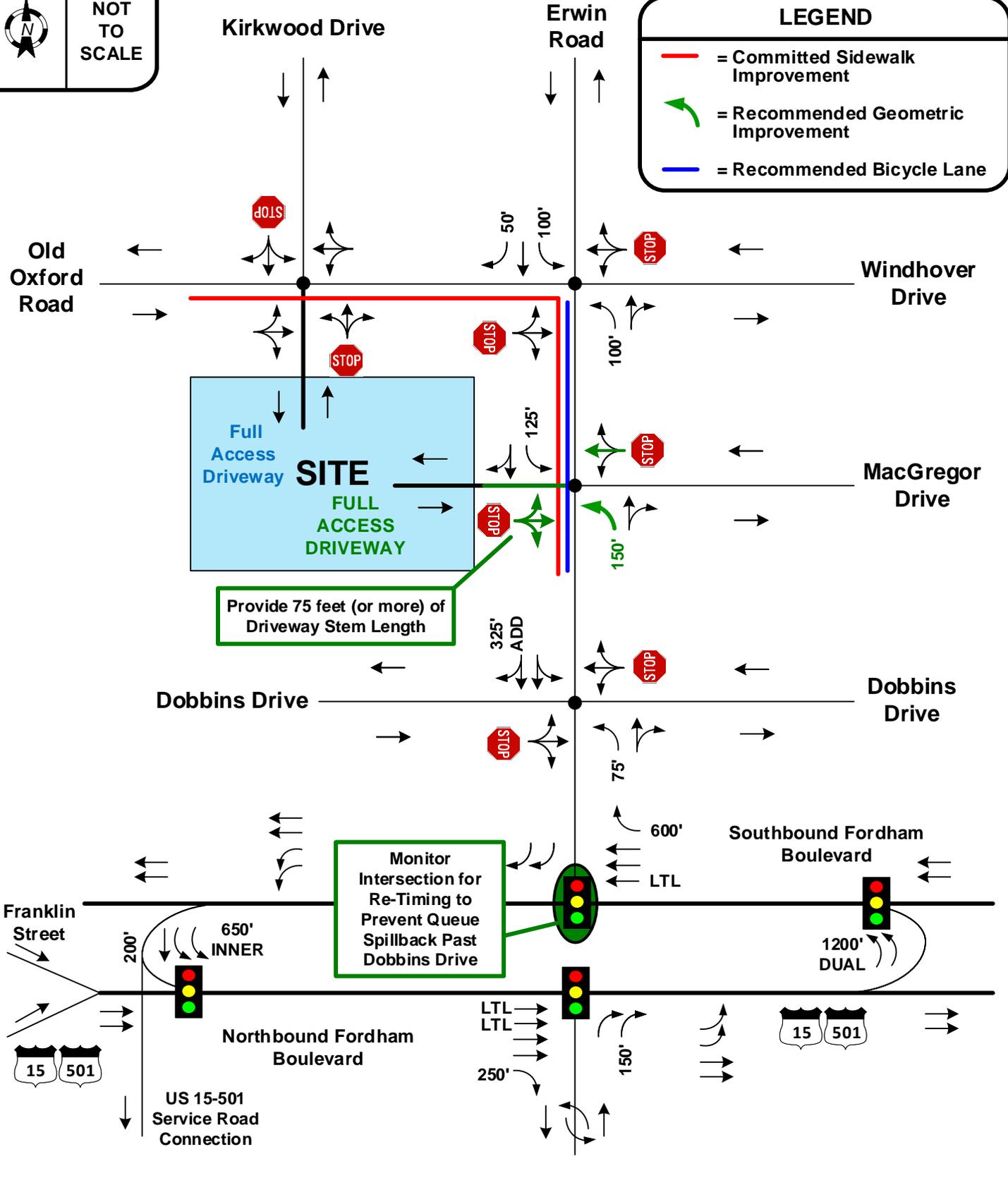




NOT TO SCALE

### LEGEND

- = Committed Sidewalk Improvement
- ↪ = Recommended Geometric Improvement
- = Recommended Bicycle Lane



## Christ Community Church Traffic Impact Study

DATE: June 2019

COMMITTED & RECOMMENDED IMPROVEMENTS

FIGURE ES-3