CHRIST COMMUNITY CHURCH

TRAFFIC IMPACT STUDY

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

HNTB

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I. EXISTING CONDITIONS

A. 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 1** (found in ***Appendix A***) 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 2** displays the preliminary concept plan of the Christ Community Church and nearby land uses and roadways.

B. Site Location and Study Area

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)

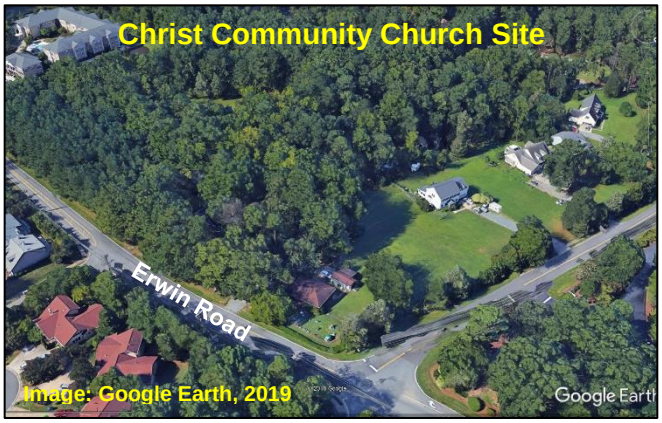
The impacts of the proposed site at the study area intersections will be evaluated during a typical Sunday AM peak hour, as the site is expected to have little activity during the week and feature one main worship service on Sunday morning. The following study is based on background traffic for the existing year, 2019, the year 2025, as well as the estimated site-generated traffic produced by the proposed development, based on field data collected at the existing church site and projections of congregation growth.

There are several Town-approved developments or current development projects in and just outside the immediate project study area that were considered to be fully built-out by 2025 that are expected to potentially generate additional background traffic to the project study area. Potential background traffic from these sites was added to an overall regional ambient future traffic growth percentage of 1.0 percent per year to estimate future total background Sunday AM traffic volumes. Ambient growth was based on conservative projections of historical average annual daily traffic (AADT) growth rate data provided by the Town of Chapel Hill and the North Carolina Department of Transportation (NCDOT).

C. Site Description

The Christ Community Church site currently contains several single family homesites, with remaining portions of the site parcel being undeveloped open and wooded land. The site borders multi-family and single-family residential neighborhoods to the west, north and east. To the south, it is bordered by a Residence Inn by Marriott hotel and the Dobbins Drive and US 15-501 roadway corridors.

All vehicular access is proposed to enter and exit the site via two site driveways – one full access driveway along Old Oxford Road and a RIRO restricted access driveway proposed along Erwin Road. The driveways will serve an on-site parking lot and all parking is assumed to be provided on-site. The proposed site plan, shown in **Figure 2**, shows the location of the local access street, internal driveway network and adjacent transportation facilities.



D. Existing and Proposed Uses in Vicinity of Site

The land uses and development in the study area along Erwin Road are a mixture of single-family and multi-family residential uses, with some commercial development along the Dobbins Drive and nearby US 15-501 (Fordham Boulevard) corridors. The Existing Land Use Plan shown in the 2020 *Town of Chapel Hill Comprehensive Plan* and adopted November 25, 2012, indicates that the existing site is designated as "Low Density Residential (1-4 units/acre)". The Future Land Use Plan, that is also a part of the Town Comprehensive Plan, indicates that the site would continue to be designated as "Low Density Residential (1-4 units/acre)". The site is currently zoned "Residential-2, 4 units/acre".

E. Existing and Committed Surface Transportation Network

Roadways

The Christ Community Church project study area features one major arterial roadway serving areas throughout the Town of Chapel Hill and points beyond, as well as some smaller collector and local access streets. **Table 1** summarizes pertinent information on the study area roadway facilities. Average Annual Daily Traffic (AADT) data was taken from 2017 AADT mapping produced by the NCDOT Traffic Survey Unit. **Figure 3** shows the existing lane configuration, traffic control, and speed limits for these study area roadways. Detailed descriptions of several of the major study area roadways are as follows:

- **US 15-501** is a major east-west arterial in the project study area that provides regional connectivity between Chapel Hill and Durham. In the study area, US 15-501 is a median divided facility and features a 45 mph speed limit in the study area.
- **Erwin Road** is minor arterial/collector street that provides access to residential neighborhoods and development in north Chapel Hill. It is primarily a two-lane facility with auxiliary turn lanes at most major intersections with a posted speed limit of 35 mph in the study area. On-street parking is not permitted.
- **Dobbins Drive** is a local frontage road facility paralleling the US 15-501 corridor in the project study area. It has a posted speed limit of 25 mph and serves commercial and residential development.
- **Old Oxford Road** is a local collector street that provides access to residential subdivisions in the project study area. It is a two-lane facility with a posted speed limit of 25 mph. On-street parking is not permitted and no sidewalk is present.
- **Windhover Drive, Kirkwood Drive, and McGregor Drive** are local streets that provide direct access to residential neighborhoods**.** These roadways are two-lane facilities with a posted speed limit of 25 mph in the study area. On-street parking is permitted in some areas on these streets and sidewalk is present on one side of the street in some areas.

Table 1. Existing Study Area Roadways

Road Name	Functional Classification*	Study Area Cross-Section	2017 AADT	Speed Limit	Sidewalk	On-Street Parking
US 15-501 (Fordham Boulevard)	Other Freeway	4 lane divided	43,000 – 49,000	45	N	N
Erwin Road	Major Collector	2 lane undivided with auxiliary turn lanes	7,200	35	S	N
Dobbins Drive	Local	2 lane undivided	N/A	25-35	S	N
Old Oxford Road	Local	2 lane undivided	N/A	25	S	N
Windhover Drive	Local	2 lane undivided	N/A	25	Y	S
McGregor Drive	Local	2 lane undivided	N/A	25	Y	S
Kirkwood Drive	Local	2 lane undivided	N/A	25	N	S
Europa Drive	Local	2 lane undivided with auxiliary turn lanes	2,500**	25	Y	N

S – Some Sidewalk/On-Street Parking Present
* - *NCDOT Urban Functional Classification Map (2019). https://ncdot.maps.arcgis.com/home/webmap/viewer.html*
** - From Recent 2016 48 Hour Volume/Classification Count

Intersections

Table 2 summarizes all eight existing study area intersections, traffic control features, and pedestrian amenities at each. Laneage details and intersection turn bay lengths are also detailed on **Figure 3**.

Table 2. Existing Study Area Intersection Details

Intersection	Traffic Control	Signal Phases	Signal Operation	Cross walk	Ped Signals
Old Oxford Road and Kirkwood Drive	TWSC	N/A	N/A	No	No
Erwin Road and Old Oxford Road / Windhover Drive	TWSC	N/A	N/A	No	No
Erwin Road and McGregor Drive	TWSC	N/A	N/A	No	No
Erwin Road and Dobbins Drive	TWSC	N/A	N/A	Yes (2)	No
US 15-501 (Fordham Boulevard) Southbound and Southbound U-Turn	Signal	2	Coordinated	No	No
US 15-501 (Fordham Boulevard) Southbound and Erwin Road	Signal	3	Coordinated	Yes	Yes (1)
US 15-501 (Fordham Boulevard) Northbound and Northbound U-Turn	Signal	2	Coordinated	No	No
US 15-501 (Fordham Boulevard) Northbound and Europa Drive	Signal	3	Coordinated	Yes	Yes (1)

Signal – Signalized, TWSC – Two-Way Stop Controlled Crosswalk/Ped Signals (# of Approaches Featuring Signals)

The US 15-501 intersection with Erwin Road and Europa Drive is a modified superstreet-type design, with no direct access for crossing traffic between Erwin Road and Europa Drive. Four traffic signals control all through, right-turn and u-turn movements and operate in directional pairs along US 15-501.

Bicycle Routes and Sidewalks

Limited specific bicycle facilities (bike lanes) are present in the immediate study area, with a short segment located along Erwin Road southbound just south of the proposed site. Paved shoulders, usable for bicyclists, are present along Dobbins Drive and US 15-501. Pedestrian sidewalk exists along on at least one side of the street for most of the local collector and residential access streets. Crosswalks and pedestrian signals are present across the US 15-501 superstreet intersections at the Erwin Road and Europa Drive approaches. Unsignalized crosswalks are also present across Erwin Road at Dobbins Drive. **Figure 4** displays a schematic of existing pedestrian/bicycle facilities in the project study area.

Transit Routes

Current Chapel Hill Transit (CHT) local Routes D, and CL serve the project study area along several study area roadways with weekday bus service. Several bus stops, with a range of amenities (shelters, benches), are present in the study area. **Table 3** details the two current CHT routes serving the study area, weekday bus headways and destinations outside the project study area. Weekend Saturday Service is provided on the D Route with 65 minute headways. No Sunday service is provided by CHT in the project study area. Go Triangle provides regional bus service to the immediate study area via the 400 and 405 Routes that run along US 15-501 (Fordham Boulevard) between Chapel Hill and Durham. Service for these routes occurs at 30 minute headways during peak weekday periods. The 400 Route also provides Sunday service on 60 minute headways.

Table 3. Current Study Area Weekday Transit Service

Route	Headways (minutes)			Study Area Stops	Destinations
	AM Peak	PM Peak	Off Peak		
CHT Local Service*					
D**	10-20	30-50	10-20	• Europa Drive • Dobbins Drive	• Downtown Chapel Hill • Eastowne • Culbreth Road
CL	50-60	70	N/A	• Old Oxford Road • Europa Drive • Dobbins Drive	• Eastgate • Downtown Chapel Hill / UNC • Colony Lake
Triangle Transit*					
400	30	30	30	• US 15-501 (Fordham Boulevard)	• Durham • Patterson Place / New Hope Commons • Downtown Chapel Hill / UNC
405	25-30	25-30	N/A		

* - Sources: Chapel Hill Transit 2018 Fall Ride Guide, GoTriangle System Map (Spring 2019)
** - D Route Also Offers Saturday Service on 65 Minute Headways

Recommended/Committed Surface Transportation Improvement Projects

There is one NCDOT State Transportation Improvement Program (STIP) project that is currently programmed in the project study area. NCDOT STIP U-5304F is described as a "capacity improvement" to the US 15-501 corridor between Ephesus Church Road and I-40 in the approved NCDOT 2018-2027 STIP. Right-of-way acquisition is currently scheduled for 2024 and construction beginning in 2026. Since no formal design is currently available for this project, its impacts were not analyzed in the 2025 future build-out year.

There are no Town of Chapel Hill transportation improvement projects, or private development-related projects to improve roadway facilities in the study area that are expected to be complete by 2025. A concurrent traffic impact study of a potential redevelopment of the Residence Inn by Marriott parcel

adjacent to the Christ Community Church site is ongoing as of May 2019, currently known as the "Erwin Road Mixed-Use Redevelopment". No recommended or committed transportation improvements from that study's Applicant or from the ongoing TIS are included in this report. Projected background traffic volumes from the Erwin Road Mixed-Use TIS were conservatively included in this report (see **Section II. B** for details).

F. Existing Traffic Conditions

Figure 6 shows recent Sunday AM peak hour traffic volumes for the study area intersections. The counts used to determine these volumes were collected in April 2019 for all existing study area intersections during the Sunday AM peak period 10:30 AM – 12:30 PM which coincides with the general Sunday worship service time for the existing Christ Community Church. The turning movement count output for all study area intersections is found in ***Appendix B***.

Traffic count information shows that traffic flows on US 15-501 (Fordham Boulevard) were fairly heavy during the Sunday AM peak count period relatively to comparable weekday peak traffic counts in this vicinity. Traffic on Erwin Road was moderate during the Sunday AM period, with southbound flows heaviest during this time. Traffic flows were light on the remaining study area roadways that function as collector or local access streets.

Table 4. Traffic Count Information

Traffic Count Location	Period Counted	Peak Hour	Count Date
Old Oxford Road and Kirkwood Drive	Sunday AM Peak	11:30 AM – 12:30 PM	4/14/19
Erwin Road and Old Oxford Road / Windhover Drive	Sunday AM Peak	10:30 – 11:30 AM	4/14/19
Erwin Road and McGregor Drive	Sunday AM Peak	10:30 – 11:30 AM	4/14/19
Erwin Road and Dobbins Drive	Sunday AM Peak	10:30 – 11:30 AM	4/14/19
Erwin Road / Europa Drive and US 15-501 (Fordham Boulevard)	Sunday AM Peak	10:30 – 11:30 AM	4/14/19

II. 2025 BUILD-OUT YEAR+1 CONDITIONS

A. Future Ambient Area-Wide Traffic Growth Estimation

Based on information on average daily traffic collected by the Town of Chapel Hill and the NCDOT, a yearly ambient traffic growth rate of 1.0 percent per year was used for the short-term 2025 design year capacity analyses. This rate is based on previous and anticipated growth trends for this area from Town and NCDOT average annual daily traffic (AADT) information from the period 1990-2017. In some cases, AADT's on study area roadways have actually declined over the last 10 years. However, to conservatively account for any background development projects and potential traffic increases in the future, a positive growth rate was selected.

B. Approved Background Development Traffic Estimation

Per information from Town of Chapel Hill staff and information from the Town's Planning Department Development Activity Map (current as of April 2019), several Town-approved developments that are either currently approved, under construction, or are expected to be built out and fully operational by the 2025 design analysis year, may potentially impact Sunday AM peak hour operations within the specific

project study area. Two developments were considered for inclusion as specific background traffic generators for this study:

- **Wegmans Supermarket** – is currently under construction and located on US 15-501 just to the north and east of the project study area. To estimate Sunday AM peak trips from the Wegmans site, the *Wegmans Supermarket Traffic Impact Study* (HNTB, 2016) was reviewed and noon peak hour site traffic assignment estimates from that study were utilized with the assumption that approximately 50% of the noon peak trips on a typical weekday would be generated in a Sunday AM peak hour with similar percentage distributions as were assumed in the Wegmans TIS. No analysis of Sunday AM peak hour trips was specifically done for that study.

- **Residence Inn by Marriott Redevelopment (known as Erwin Road Mixed-Use Redevelopment)** – the parcel to the south of the proposed Christ Community Church is going through the planning and Special-use Permit process with the Town of Chapel Hill. A TIS developed by HNTB is on-going and in the process of being completed in May 2019 for this site – focusing on AM, Noon, and PM peak weekday impacts of the expansion of the existing hotel (66 additional rooms) and site redevelopment for 220 multi-family apartments to the north of the existing hotel. Additional access changes along Erwin Road are also being evaluated. To account for potential Sunday AM peak hour impacts from this redevelopment, current site traffic assignment estimates for noon weekday peak trips were applied to the Sunday AM peak hour being evaluated. Weekday AM peak hour trips were not utilized as the weekday AM peak hour does not coincide with the Sunday AM peak hour (which is closer to noon).

Figure 7 shows the estimated 2025 analysis year Sunday AM peak hour total specific background generator traffic volume projections from the two development sites. ***Appendix C*** provides spreadsheet results for traffic volume development for all scenarios analyzed in this report.

C. Proposed Project Traffic

i. Trip Generation

A trip generation study was conducted by HNTB in May 2018 to assess current Sunday AM peak period trip-making characteristics of the existing Christ Community Church. The existing congregation meets at the Extraordinary Ventures building along Elliott Road in Chapel Hill. Both entering and exiting traffic volumes were compiled for a typical Sunday morning service and compared to the number of attendees to develop trip generation rates per attendee. This information was then extrapolated for estimated church congregation growth between 2018 and a near-term projection for 2025. ***Appendix D*** contains the technical memorandum results from the study. Based on the study results, **Table 5** shows the anticipated number of vehicular trips generated by the Christ Community Church during a Sunday AM peak hour, based on the trip generation study results as described above. A peak hour truck percentage of two percent was estimated for all site-generated traffic.

Table 5. Sunday Vehicle 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
TOTALS		**103**	**103**	**206**	**4**	**98**	**102**

It is important to note that the specific highest peak hour of trip generation occurs at the end of the Sunday service when most vehicles are exiting the site. Trips entering the site prior to the service are distributed over a period longer than a single hour and are further divided by those who attend Sunday School activities which occur prior to the worship service and those who attend the service only.

Projected trips for the proposed church estimated by the trip generation study were compared to data from the *ITE Trip Generation Manual* (Institute of Transportation Engineers, 10th Edition, 2017) and shown in **Table 6**. The most conservative ITE trip generation methodologies were used to develop the highest estimates of trip-making. The ITE data includes a substantial number of churches with multiple services and peak hour times that would include trips exiting one service and entering for the next service. In addition, these churches likely have more robust Sunday church-related activities than what is currently provided by (and what is envisioned for) the Christ Community Church. Most of the ITE trip generation estimates contain small sample sizes and need to be applied with caution and the use of local data. These differences produce trip generation estimates that do not have good correlation or applicability for the proposed Christ Community Church.

Table 6. Comparisons with ITE Trip Generation Estimates

Land Use	ITE LUC	Units	Sunday Daily			Sunday Peak Hour - Generator		
			Enter	Exit	Total	Enter	Exit	Total
Church	560	11,420 SF	158	158	316	75	82	157
		270 seats	164	164	328	71	75	146
		220 attendees	N/A	N/A	N/A	58	59	117

ii.) Adjustments to Trip Generation Rates

Typically, raw ITE trip generation estimates for daily and peak hour trips have the potential to be adjusted for the following factors to reduce raw trip generation estimates to actual estimated vehicular trips produced by the Christ Community Church. The following discussion highlights this process.

a.) Internal Capture
The land uses proposed for Christ Community Church do not exhibit the potential for internally-captured trips for on-site uses. No modifications or reductions were made to trip generation results to account for internal capture.

b.) Modal Split
The study area is well served by multiple CHT fixed bus routes with frequent existing service and also has facilities for pedestrians and bicyclists with adequate connectivity to trip attractions in areas of northern Chapel Hill. Since there is no CHT Sunday fixed-route service in the area, no reductions for Sunday AM peak trips to church services would be expected. In addition, to be conservative, no trip reductions for pedestrians or bicycles was made for this analysis. Count observations for pedestrians and bicyclists indicate that these modes only account for a small portion of existing trips in the project study area.

c.) Pass-by Trips
The proposed Christ Community Church does not feature a land use type that would typically generate pass-by trips. No pass-by trip reductions were considered for this study.

d.) Trip Generation Budget
Current information from the Applicant related to the Christ Community Church project indicates that the project will be built out in one phase for this study. No adjustments or recommendations for a trip generation budget are made for this study if the development is ultimately built to the densities (total building size, worship seating and estimated number of church service attendees) listed by the Applicant.

iii.) Trip Distribution

Trip distribution for site-related traffic was based on existing daily and peak hour traffic patterns on major study area thoroughfares, and engineering judgment, to determine the directional peak hour characteristics of traffic to and from the site from the major study area thoroughfares. No local trips to/from lower volume collector and residential streets were estimated, though the possibility exists a small portion of trip-making may occur to/from these local streets. Trips were also distributed based on proximity to the two proposed site access connections and the proposed limitation of access at the Erwin Road driveway.

An evaluation of impacts of allowing full access at the driveway along Erwin Road was also completed for this study. A full access driveway at this location would likely cause some considerable changes to local trip distribution around the site. **Figures 9A and 9B** present the projected trip distribution traffic percentages for the proposed site in 2025 for the two site access scenarios.

iv.) Trip Assignment

Figures 10A and 10B show the corresponding Sunday AM peak hour site traffic volumes distributed on the 2025 study area network. Total volumes into and out of the site correspond to total external vehicular trips generated, based on the trip generation methodology developed previously.

D. Future Traffic Forecasts with the Proposed Development

Figures 11A and 11B display the 2025 Build-out+1 year projected study area traffic volumes with site traffic added for the two Erwin Road driveway access scenarios described previously. These traffic volumes represent the aggregate traffic growth over existing traffic volumes for ambient traffic growth and specific background traffic generators coupled with the estimated site traffic assignments for the Christ Community Church site.

III. IMPACT ANALYSES

A. Peak Hour Intersection Level of Service Analysis

i.) Methodology

Evaluation of traffic operations on suburban arterials and local street network is most effective through the determination of level of service (LOS) criteria. The concept of level of service correlates qualitative aspects of traffic flow to quantitative terms. This enables transportation professionals to take the qualitative issues, such as congestion and substandard geometrics, and translate them into measurable quantities, such as operating speeds and vehicular delays. The 2016 *Highway Capacity Manual (HCM Version 6)* characterizes level of service by letter designations A through F. Level of service A represents ideal low-volume traffic operations, and level of service F represents over-saturated high-volume traffic operations. Level of service is measured differently for various roadway facilities, but in general, level of service letter designations are described by the following in **Table 7**.

The *Synchro Professional Version 10* operations analysis software was used to analyze peak hour conditions at signalized intersections. The Synchro software package was also used to analyze peak hour conditions at unsignalized intersections, through the use of the HCM unsignalized two-way stop control evaluation module. The minimum acceptable peak hour intersection level of service established for this project is LOS D for signalized intersections or LOS E for critical movements at unsignalized intersections, or no increase in delay for signalized intersections operating below LOS D or unsignalized intersection critical movements operating below LOS E without the inclusion of site traffic. The following four conditions were evaluated:

Condition 1 - 2019 Existing Traffic
Condition 2 - 2025 Traffic without Site Traffic
Condition 3 - 2025 Traffic with Site Traffic Volumes Added
Condition 4 - 2025 Traffic with Site Traffic Volumes Added and Full Access on Erwin Road

Table 7. Level of Service (LOS) Characteristics

Level of Service Description	Per Vehicle Delay at Signal	Per Vehicle Delay at Stop Sign
LOS A ➢ Free flow ➢ Freedom to select desired speed and to maneuver is extremely high ➢ General level of comfort and convenience for motorists is excellent	**< 10.0 sec**	**< 10.0 sec**
LOS B ➢ Stable flow ➢ Other vehicles in the traffic stream become noticeable ➢ Reduction in freedom to maneuver from LOS A	**10.0 – 20.0 sec**	**10.0 – 15.0 sec**
LOS C ➢ Stable flow ➢ Maneuverability and operating speed are significantly affected by other vehicles ➢ General level of comfort and convenience declines noticeably	**20.0 – 35.0 sec**	**15.0 – 25.0 sec**
LOS D ➢ High density but stable flow ➢ Speed/freedom to maneuver are very restricted ➢ General level of comfort / convenience is poor ➢ Small increases in traffic will generally cause operational problems	**35.0 – 55.0 sec**	**25.0 – 35.0 sec**
LOS E ➢ Unstable flow ➢ Speed reduced to lower but relatively uniform value ➢ Volumes at or near capacity level ➢ Comfort and convenience are extremely poor ➢ Small flow increases or minor traffic stream disturbances will cause breakdowns	**55.0 – 80.0 sec**	**35.0 – 50.0 sec**
LOS F ➢ Forced or breakdown flow ➢ Volumes exceed roadway capacity ➢ Formation of unstable queues ➢ Stoppages for long periods of time because of traffic congestion	**> 80.0 sec**	**> 50.0 sec**

The results of this analysis are based on the procedures presented in the *HCM Version 6* and performed with the corresponding capacity analysis software described previously. The methodology of evaluating each condition for signalized intersections is presented below:

- **Condition 1** – Use current Town of Chapel Hill data for the cycle length, splits and offsets of individual signalized intersections and report LOS and delay values from Synchro.

- **Conditions 2, 3 and 4** – Reoptimize the cycle lengths and splits of individual intersections in Synchro, if existing timing data does not provide adequate overall intersection LOS. Adjust cycle lengths, splits, and offsets, if necessary, if the signal is currently operating in a coordinated system. The optimized signal timing information will be held constant for all Conditions, to provide a means to compare effects of the proposed site traffic.

- **Mitigation Conditions (if Needed)** – Optimize coordinated traffic signals for effects of recommended mitigation strategies that change existing/committed changes to lane geometrics. Evaluate the potential for different signal phasing schemes (left-turn lag phases, for example). Retain existing split minimums and any pedestrian timing values. Recommendations, if warranted, will be made to obtain at least LOS D for the intersection as a whole.

The net effect of this process is that direct comparisons, by movement, of delay and LOS between each of the four conditions are impossible because splits and cycle lengths can and do change between conditions. The pertinent statistic of this analysis is the *overall intersection level of service and delay*. Improvements to deficient intersections in Condition 3 were made by first attempting to adjust signal operations via changes in cycle lengths, splits and/or with acceptable adjustments to signal phasing. If that did not produce satisfactory results for all intersections, geometric improvements to improve intersection capacity were considered for the deficient intersections. ***Appendix D*** contains the Synchro output for all four conditions (where applicable).

The existing study area unsignalized intersections along Erwin Road and Old Oxford Road were analyzed in Synchro using the HCM unsignalized intersection module. Their results were evaluated on a per-movement basis, since HCM methodologies do not produce an overall intersection level of service for unsignalized intersections. Thus, intersections with deficient (LOS F) movements in Condition 2 would need to be evaluated for improvements in Condition 3. This methodology differs from signalized intersections, where one or more movements at an intersection may be deficient in Condition 2, but as long as the overall intersection level of service does not fall below LOS D, no intersection improvements are deemed necessary. ***Appendix E*** contains the Synchro two-way stop controlled unsignalized intersection output for all unsignalized intersections under study.

ii.) 2019 Existing Conditions Results

Table 8 presents the results for the existing year traffic conditions as compiled from field data. The table lists LOS and delay values for those movements that are in existence at this time. It also only lists data for individual movements encountering delay at the stop-controlled intersection (which does not have an overall intersection delay value produced by HCM methodologies).

Currently, all study area signalized intersections operate at acceptable overall levels of service for the analyzed 2019 Sunday AM peak hour. At the US 15-501 superstreet intersection, minor movements (u-turns and right-turns from the side streets) operate at LOS E or F, due to coordinated signal timing operations along the US 15-501 mainline. All unsignalized intersections have critical movement LOS and delays (typically a stop-controlled minor street approach movement) that are an acceptable LOS A-E.

Table 8. Capacity Analysis Results for Study Area Intersections
Condition 1 – 2019 Existing Peak Hour Traffic

Intersections / Movements	LOS	Average Vehicular Delay (sec/veh)	95th% Queue Length (Ft)	Existing Storage (Ft)
	Sunday AM	Sunday AM	Sunday AM	
Old Oxford Road and Kirkwood Drive	N/A	N/A		
EB LT	A	7.3	0	
SB LT-RT	A	9.0	0	
Erwin Road and Old Oxford Road / Windhover Drive	N/A	N/A		
EB LT-THRU-RT	C	16.4	25	
WB LT-THRU-RT	B	12.3	0	
NB LT	A	8.4	25	100
SB LT	A	0.0	0	100
Erwin Road and McGregor Drive	N/A	N/A		
WB LT-RT	B	11.2	25	
SB LT	A	0.0	0	125
Erwin Road and Dobbins Drive	N/A	N/A		
EB LT-THRU-RT	C	16.1	25	
WB LT-THRU-RT	B	14.2	25	
NB LT	A	8.5	25	75
SB LT	A	7.5	0	
US 15-501 Northbound and US 15-501 Southbound U-Turn/Through	A	7.9		
SB U-TURN	***E***	***77.2***	100	650
SB THRU	***E***	***77.2***	0	200
EB THRU	A	3.1		
US 15-501 Northbound and Europa Drive	B	10.3		
EB THRU	A	1.9		
EB RT	A	0.1	0	250
NB RT	***F***	***99.2***	150	
US 15-501 Southbound and US 15-501 Northbound U-Turn	B	15.5		
WB THRU	A	4.2		
NB U-TURN	***F***	***87.4***	200	1200
US 15-501 Southbound and Erwin Road	C	26.2		
WB THRU	A	7.9		
WB RT	A	0.1	0	600
SB RT	***F***	***93.1***	300	325

N/A - Not Applicable, i.e. movement is non-existent or overall intersection values are not reported for unsignalized intersections
BOLD/ITALICS – Movement or overall intersection is over Town TIS Guidelines threshold capacity
PURPLE – Maximum Queue May Exceed Storage Bay Distance

iii.) 2025 No-Build Scenario (Condition 2) Results

Table 9 presents the results for the 2025 analysis year estimated traffic conditions without the impacts of site-related traffic. This analysis includes the application of the 1.0 percent per year ambient growth factor to existing 2019 traffic volumes and the effects of added background traffic from the planned Erwin Road Mixed-Use Redevelopment adjacent to the Christ Community Church site, as well as Wegmans Supermarket currently under construction to the north/east along US 15-501.

During Condition 2 - 2025 Without Site Traffic, all study area intersections are expected to operate at acceptable levels of service for the Sunday AM peak hour. For the Condition 2 analysis, existing 2019 signal timings and system operations were conservatively held constant with 2019 existing year data for comparison purposes. All individual movement delays marginally increase, but do not cause overall signalized operations to drop to deficient levels. All unsignalized intersection critical stop-controlled movements continue to operate acceptably.

iv.) 2025 Build Scenario (Condition 3) Results

Table 10 presents results for 2025 analysis year estimated traffic conditions, including impacts of site-related traffic increases and initial proposed driveway access. In general, the addition of site-related traffic will marginally increase delays at signalized intersections, but not cause any to become deficient (overall LOS E or F). Delays will marginally increase for individual intersection movements for both signalized and unsignalized intersections. No unsignalized intersection critical movement delay is expected to drop to LOS F. Site access intersection operations are expected to be acceptable (LOS E or better for critical movements).

LOS and 95th percentile queue data found in **Table 10** indicates that the southbound Erwin Road approach at the US 15-501 superstreet intersection may experience delay increases and queues that block the upstream nearby intersection at Dobbins Drive. To mitigate this situation, it is recommended that signal timings be monitored and adjusted as necessary to increase green time for the southbound approach if needed to prevent upstream intersection blockage.

Table 9. Capacity Analysis Results for Study Area Intersections
Condition 2 – 2025 Peak Hour Traffic Without Site

Intersections / Movements	LOS	Average Vehicular Delay (sec/veh)	95th% Queue Length (Ft)	Existing Storage (Ft)
	Sunday AM	Sunday AM	Sunday AM	
Old Oxford Road and Kirkwood Drive	N/A	N/A		
EB LT	A	7.3	0	
SB LT-RT	A	9.0	0	
Erwin Road and Old Oxford Road / Windhover Drive	N/A	N/A		
EB LT-THRU-RT	C	17.7	25	
WB LT-THRU-RT	B	12.9	25	
NB LT	A	8.5	25	100
SB LT	A	0.0	0	100
Erwin Road and McGregor Drive	N/A	N/A		
WB LT-RT	B	11.6	25	
SB LT	A	0.0	0	125
Erwin Road and Dobbins Drive	N/A	N/A		
EB LT-THRU-RT	C	18.4	25	
WB LT-THRU-RT	C	16.0	25	
NB LT	A	8.7	25	75
SB LT	A	7.6	0	
US 15-501 Northbound and US 15-501 Southbound U-Turn/Through	A	9.0		
SB U-TURN	***E***	***75.9***	125	650
SB THRU	***E***	***75.9***	0	200
EB THRU	A	3.8		
US 15-501 Northbound and Europa Drive	B	10.1		
EB THRU	A	2.2		
EB RT	A	0.1	0	250
NB RT	***F***	***99.0***	175	
US 15-501 Southbound and US 15-501 Northbound U-Turn	B	16.2		
WB THRU	A	5.1		
NB U-TURN	***F***	***86.2***	200	1200
US 15-501 Southbound and Erwin Road	C	28.3		
WB THRU	A	9.3		
WB RT	A	0.2	0	600
SB RT	***F***	***96.0***	350	325

N/A - Not Applicable, i.e. movement is non-existent or overall intersection values are not reported for unsignalized intersections
BOLD/ITALICS – Movement or overall intersection is over Town TIS Guidelines threshold capacity
PURPLE – Maximum Queue May Exceed Storage Bay Distance

Table 10. Capacity Analysis Results for Study Area Intersections
Condition 3 – 2025 Peak Hour Traffic With Site

Intersections / Movements	LOS	Ave Vehicular Delay (sec/veh)	95th% Queue Length (Ft)	Existing Storage (Ft)
	Sunday AM	Sunday AM	Sunday AM	
Old Oxford Road and Kirkwood Drive / Full Access Site Driveway	N/A	N/A		
EB LT	A	7.3	0	
WB LT	A	7.4	0	
SB LT-**THRU**-RT	A	9.5	0	
NB LT-THRU-RT	A	8.9	25	
Erwin Road and Old Oxford Road / Windhover Drive	N/A	N/A		
EB LT-THRU-RT	C	20.8	50	
WB LT-THRU-RT	B	13.4	25	
NB LT	A	8.5	25	100
SB LT	A	0.0	0	100
Erwin Road and McGregor Drive / RIRO Site Driveway	N/A	N/A		
EB RT	B	14.8	50	
WB LT-RT	C	15.7	25	
SB LT	A	0.0	0	125
Erwin Road and Dobbins Drive	N/A	N/A		
EB LT-THRU-RT	C	21.7	25	
WB LT-THRU-RT	C	17.8	25	
NB LT	A	9.2	25	75
SB LT	A	7.6	0	
US 15-501 Northbound and US 15-501 Southbound U-Turn/Through	B	11.2		
SB U-TURN	***E***	***74.8***	150	650
SB THRU	***E***	***74.8***	0	200
EB THRU	A	4.7		
US 15-501 Northbound and Europa Drive	B	10.1		
EB THRU	A	2.4		
EB RT	A	0.1	0	250
NB RT	***F***	***99.0***	175	
US 15-501 Southbound and US 15-501 Northbound U-Turn	B	16.3		
WB THRU	A	5.1		
NB U-TURN	***F***	***85.5***	200	1200
US 15-501 Southbound and Erwin Road	D	41.0		
WB THRU	B	10.0		
WB RT	A	0.2	0	600
SB RT	***F***	***130.8***	**425**	325

N/A - Not Applicable, i.e. movement is non-existent or overall intersection values are not reported for unsignalized intersections
BOLD/ITALICS – Movement or overall intersection is over Town TIS Guidelines threshold capacity
BLUE – Proposed Build Scenario Changes **PURPLE** – Maximum Queue May Exceed Storage Bay Distance

v.) 2025 Build Scenario - Full Access on Erwin Road (Condition 4) Results

The proposed RIRO site driveway intersection along Erwin Road was analyzed with a change in access to allow all inbound and outbound movements. This option causes changes in projected trip distribution and site traffic assignment in the vicinity of the study area intersections along Old Oxford Road and Erwin Road. It was assumed that a northbound left-turn lane with 150 feet of storage would be needed to separate inbound traffic flow to the site at this location. The site driveway was assumed to contain a single shared left-turn/through/right-turn lane and still be aligned directly with McGregor Drive to the east. Results in **Table 11** indicate that this change in configuration and access would still allow acceptable Sunday AM peak hour traffic cooperation for all unsignalized intersections affected by the access change.

Table 11. Capacity Analysis Results for Study Area Intersections
Condition 4 – 2025 Peak Hour Traffic With Site and Full Access Driveway at Erwin Road

Intersections / Movements	LOS	Ave Vehicular Delay (sec/veh)	95th% Queue Length (Ft)	Existing Storage (Ft)
	Sunday AM	Sunday AM	Sunday AM	
Old Oxford Road and Kirkwood Drive / Full Access Site Driveway	N/A	N/A		
EB LT	A	7.3	0	
WB LT	A	7.4	0	
SB LT-THRU-RT	A	9.3	0	
NB LT-THRU-RT	A	8.8	25	
Erwin Road and Old Oxford Road / Windhover Drive	N/A	N/A		
EB LT-THRU-RT	C	19.7	50	
WB LT-THRU-RT	B	13.1	25	
NB LT	A	8.5	25	100
SB LT	A	0.0	0	100
Erwin Road and McGregor Drive / Full Access Site Driveway	N/A	N/A		
EB LT-THRU-RT	C	15.9	50	
WB LT-**THRU**-RT	C	16.2	25	
NB LT	A	8.6	0	**150**
SB LT	A	0.0	0	125

N/A - Not Applicable, i.e. movement is non-existent or overall intersection values are not reported for unsignalized intersections
BLUE – Proposed Build Scenario Changes for Full Access at Erwin Road

B. 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. These access points directly serve on-site surface parking lots that occupy a large portion of the site parcel. 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 distances along Erwin Road from its intersection with the proposed RIRO driveway connection are approximately 350 feet (to Old Oxford Road/Windhover Drive) and 775 feet (to the Residence Inn Driveway) and 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.* Distances for the northern full access driveway connection to Old Oxford Road to nearest intersections are 225 feet to Erwin Road to the east and 1,000 feet to Booker Creek Road to the west – also acceptable per NCDOT design standards. The proposed spacing between the proposed driveway connections and adjacent local driveways is more than the recommended 50 foot spacing along collector streets found in Table 3.2 in the Town 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.

C. 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)*.

D. Sight Distance Analysis

In general, sight distance issues entering/exiting the proposed Christ Community Church driveways should be minimal. For the RIRO access point on Erwin Road, visibility along this section of Erwin Road is adequate, as no significant horizontal or vertical curvature is present at this location. For the access point on Old Oxford Road, there is some horizontal and vertical curvature along Old Oxford Road in this area, but considering the 25 mph speed limit on Old Oxford Road, and the fact that the location is not in a crest vertical curve, there should not be significant sight distance issues at this location either.

The intersection of Erwin Road and Old Oxford Road/Windhover Drive has some sight distance limitations for traffic at the Old Oxford Road and Windhover Drive approaches as there is an upgrade on Old Oxford Road at the intersection and a horizontal curve immediately upstream on Erwin Road. Limiting the amount of site-related traffic using Old Oxford Road would help mitigate any sight distance and safety issues at this location.

E. Crash Analysis

Data from the NCDOT Traffic Safety Unit was extracted from the TEAAS crash database software for the five year period 4/1/2014 to 3/31/2019 for the project study area. This information included crash segment data along Erwin Road from Windhover Drive north/east of Weaver Dairy Road to the US 15-501 intersection. Raw corridor segment crash data is located in ***Appendix G*** and results are shown in **Tables 12 and 13**.

<u>Erwin Road Corridor</u>
Table 12 presents a comparison between the Erwin Road corridor study area crash rates and the latest North Carolina statewide rates for the period 2015-2017 (compiled by NCDOT Traffic Safety Unit).

Overall, the crash rate along Erwin Road in the project study area between Windhover Drive and US 15-501 was similar or slightly higher than statewide averages for comparable facilities for the crash characteristic categories shown. Rear-end crashes and angle (T-bone) crashes were the most common crash type – with eight and six, respectively, crashes of the 26 crashes reported along the 0.57 mile segment. Spatial and directional distribution of crashes along the corridor indicate that most crashes occurred in the vicinity of Erwin Road southbound near the US 15-501 intersection through Dobbins Drive, with only a few crashes in the vicinity of the proposed site upstream along Erwin Road. Only three of the 26 total crashes occurred on a Sunday (when church services occur).

Table 12. Study Area Crash Rate Comparison – Erwin Road Corridor

Statistic	Crashes Per 100 Million Vehicle Miles	
	Erwin Road Windhover Drive to US 15-501	NC Statewide Averages* Two-Lane Undivided Secondary Road
Total Crash Rate	285.87	255.33
Fatal Crash Rate	0.00	1.09
Non-Fatal (Injury) Crash Rate	109.95	76.91
Night Crash Rate	54.98	66.47
Wet Crash Rate	32.99	41.11

* - Data for Urban Secondary Roadways

Study Area Intersections

In addition to the crash comparison for the Erwin Road corridor segment, individual intersection crash data in the vicinity of the proposed site for the same five year period was compiled from the segment data and results are shown in **Table 13**. The crash data, as previously stated, shows that the majority of crashes occur along Erwin Road in the vicinity of the US 15-501 corridor and just upstream.

Table 13. Study Area Intersection Crash Summary

Intersection	Number of Total Crashes
Erwin Road & Old Oxford Road / Windhover Drive	1
Erwin Road & MacGregor Drive	0
Erwin Road & Existing Residence Inn Driveway	0
Erwin Road & Dobbins Drive	10
Erwin Road & US 15-501 (Fordham Boulevard) Southbound	13

F. 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 topics listed in **Table 14** are germane to the scope of this study.

Table 14. Other Transportation-Related Analyses

Analysis	Comment
Long-Range Planning Level Daily Volume-Capacity 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 95th 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.
Pedestrian and Bicycle Analysis	Existing pedestrian and bicycle access and connectivity is adequate in the project study area. Sidewalk exists along the Erwin Road corridor on the east side of the road, 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 bicycle lanes and wide paved shoulders are present in the project 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 bus 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.

G. Special Analysis/Issues Related to Project

Based on discussions with Town of Chapel Hill staff, there are no special issues or analyses beyond the ones already discussed for this proposed project.

IV. MITIGATION MEASURES/RECOMMENDATIONS

A. 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.

B. 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.

C. 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.

D. 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 12**).

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.

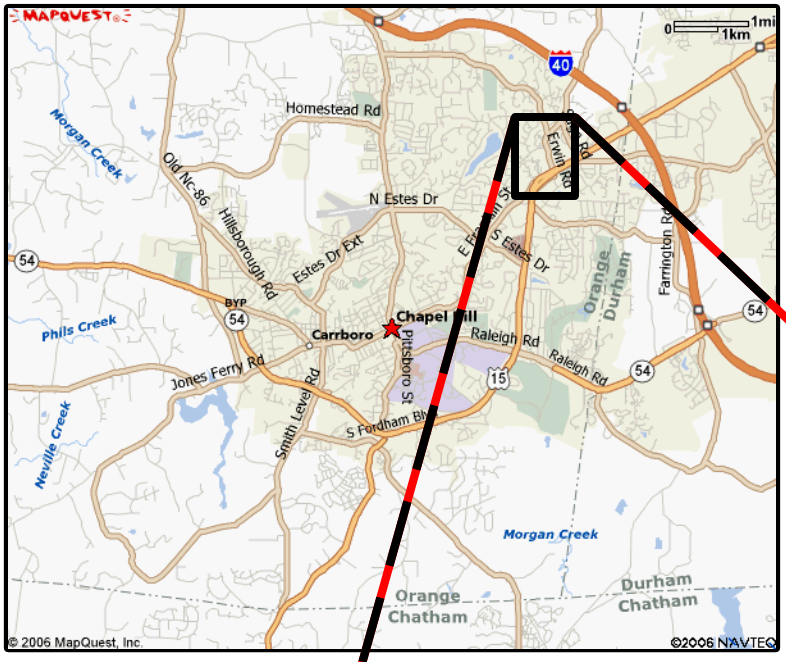
2) Regardless of whether or not full access is allowed at the Erwin Road site driveway, the driveway design should include additional throat/stem length to provide 75 feet or more storage prior to the 1st parking lot stalls.

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.

Appendix A – Figures

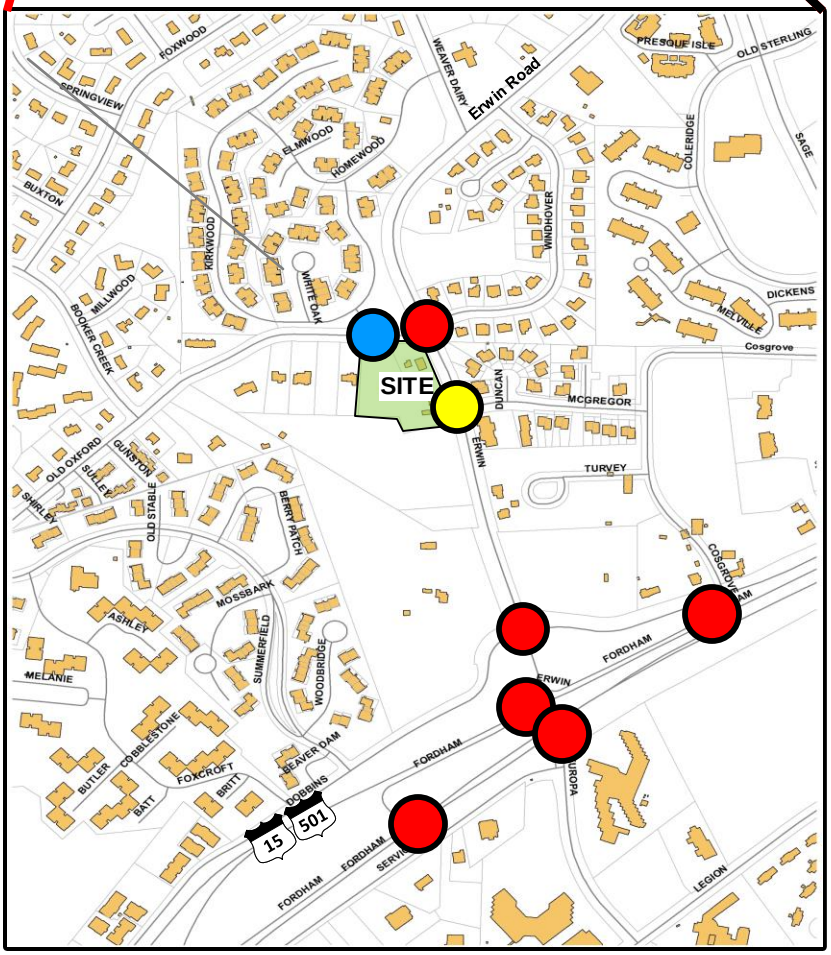


LEGEND

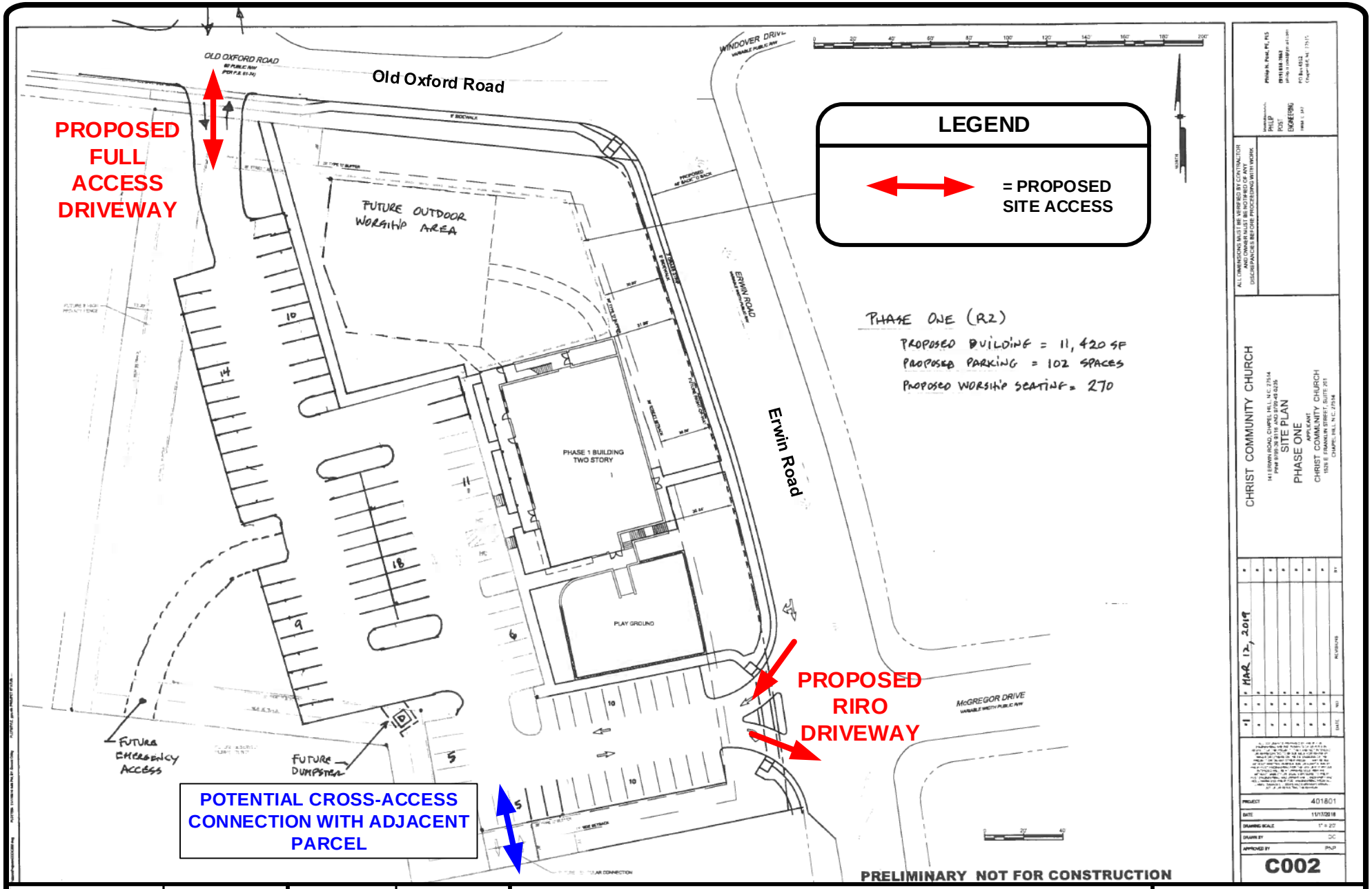
- = Existing Study Area Intersection
- = Existing Study Area Intersection / Proposed Full Access Site Driveway
- = Existing Study Area Intersection / Proposed RIRO Site Driveway
- = Existing Building Footprint
- = Proposed Site Parcel

N

NOT TO SCALE



HNTB / TOWN OF CHAPEL HILL	**Christ Community Church** **Traffic Impact Study**	**DATE:** June 2019
	PROJECT STUDY AREA MAP	**FIGURE 1**



HNTB

TOWN OF CHAPEL HILL

N

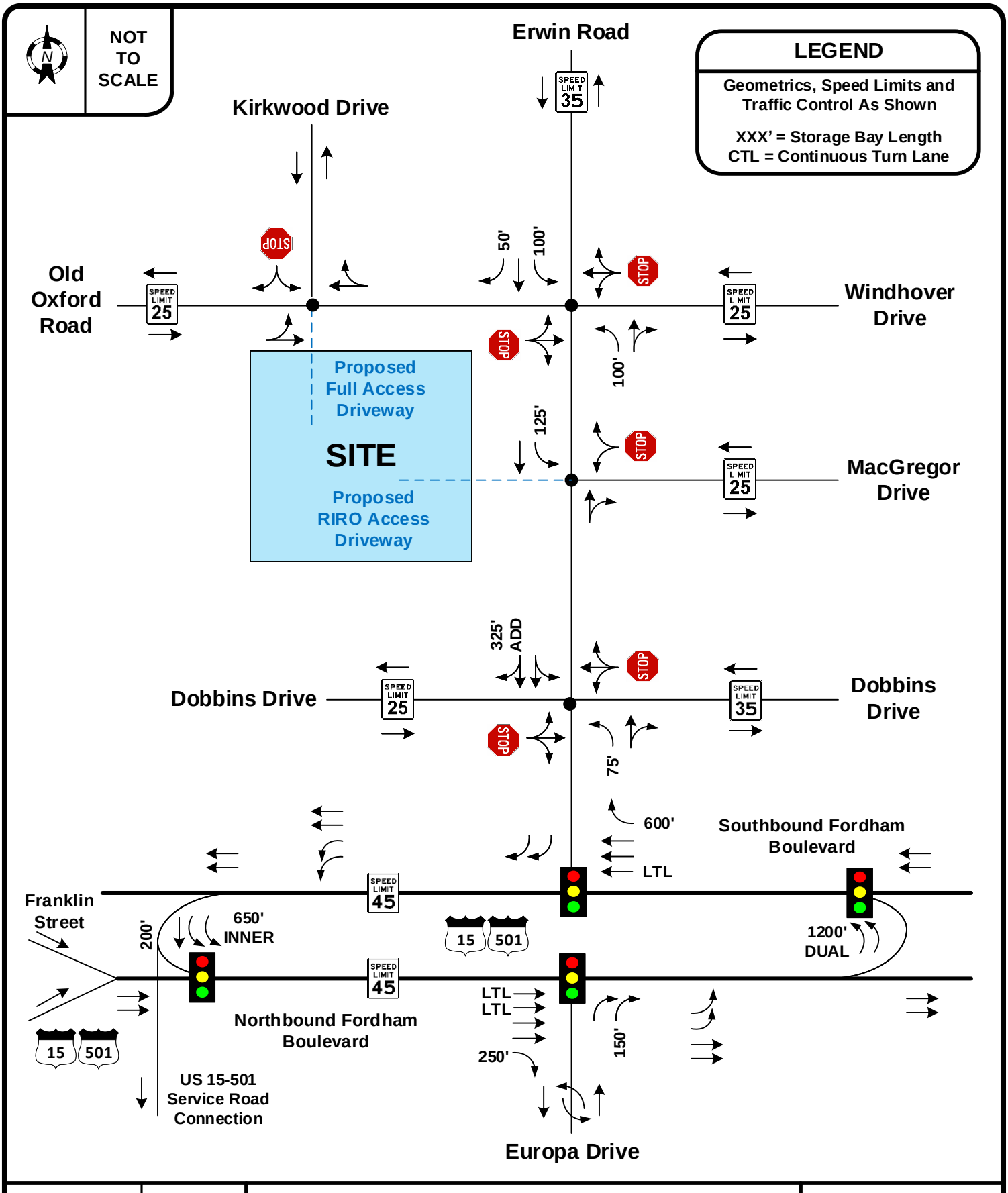
NOT TO SCALE

Christ Community Church
Traffic Impact Study

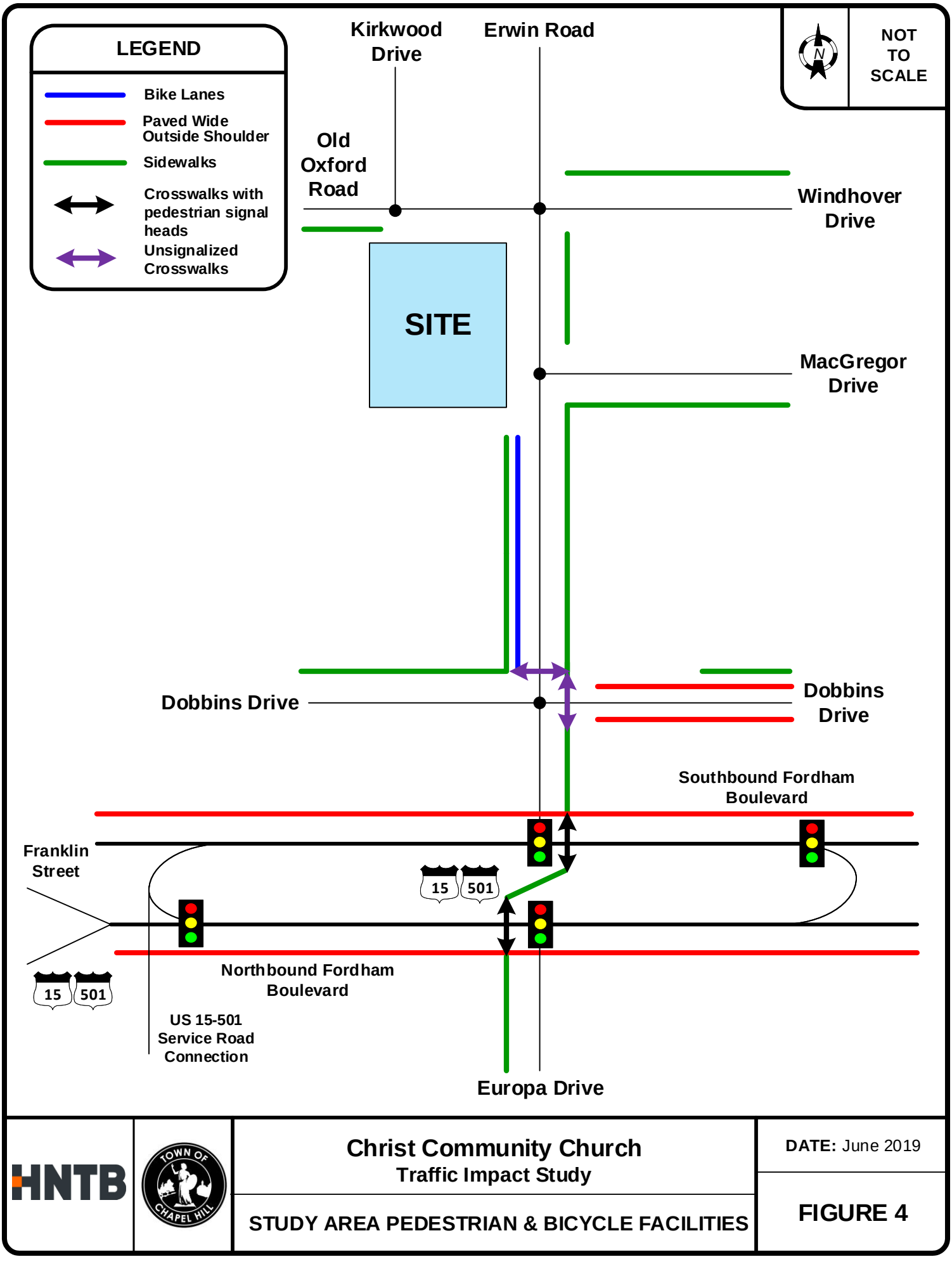
SITE CONCEPT PLAN

DATE: June 2019

FIGURE 2



HNTB / TOWN OF CHAPEL HILL	**Christ Community Church** **Traffic Impact Study**	**DATE:** June 2019
	EXISTING LANEAGE AND GEOMETRICS	**FIGURE 3**



HNTB

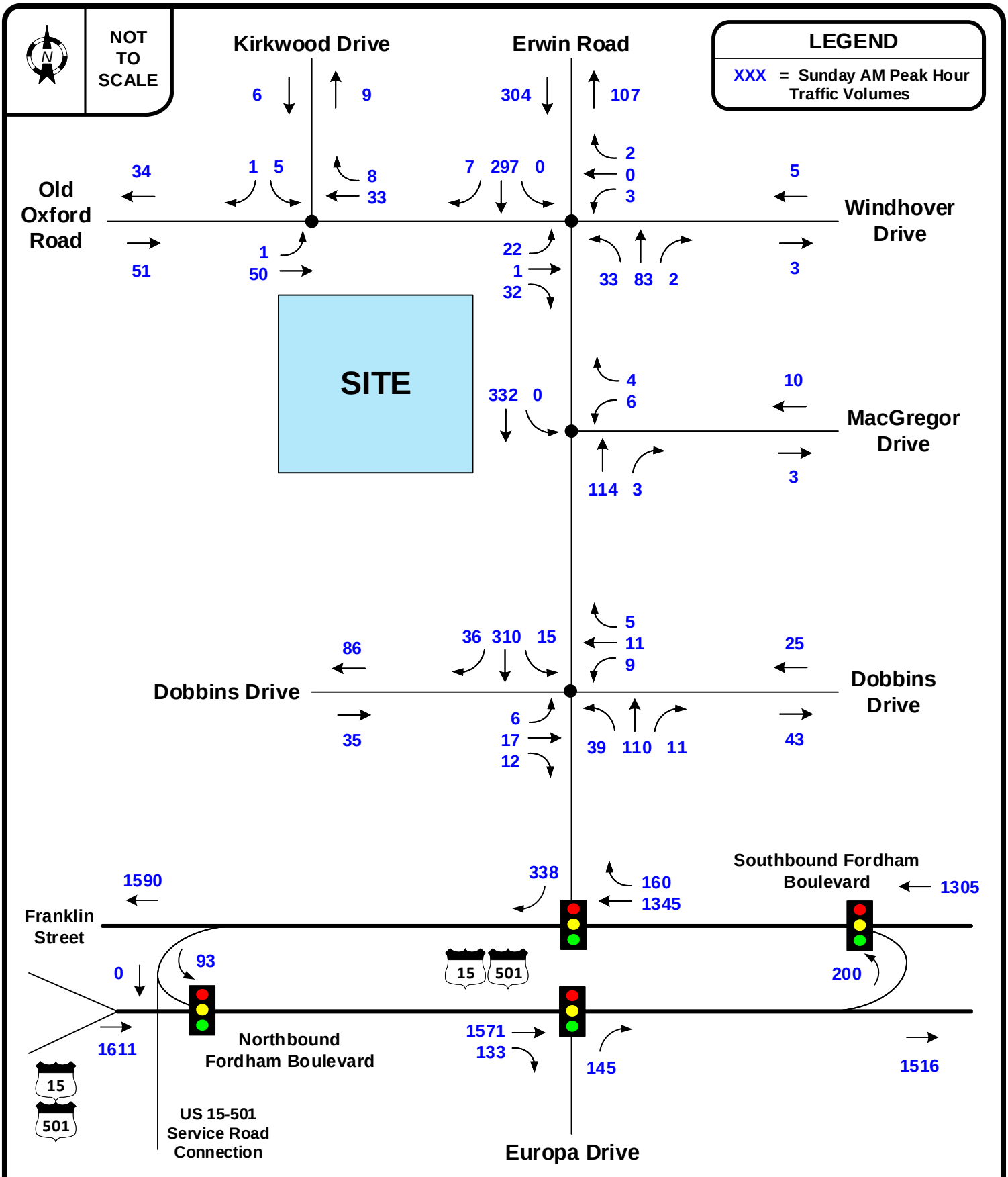
TOWN OF CHAPEL HILL

Christ Community Church
Traffic Impact Study

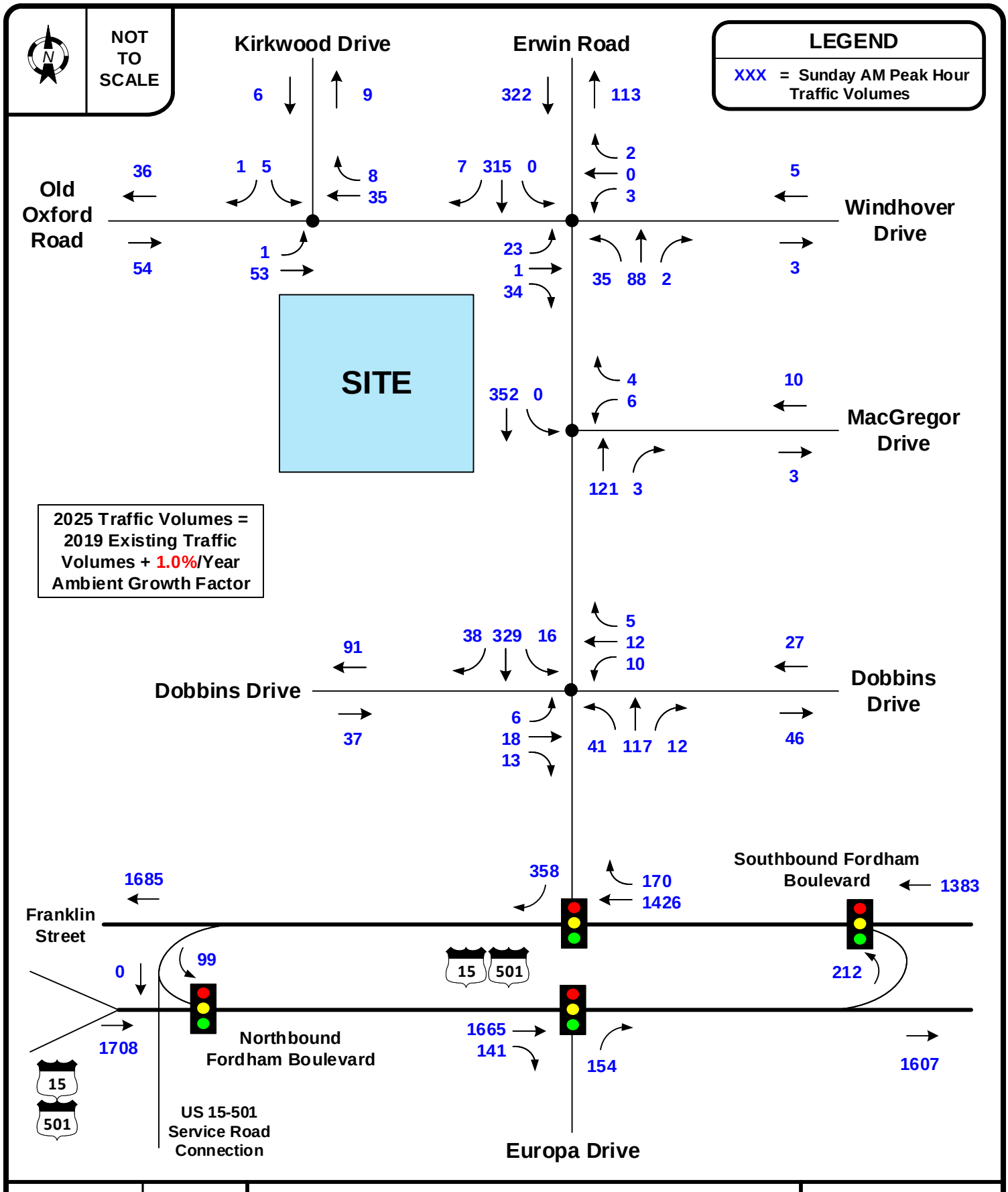
STUDY AREA PEDESTRIAN & BICYCLE FACILITIES

DATE: June 2019

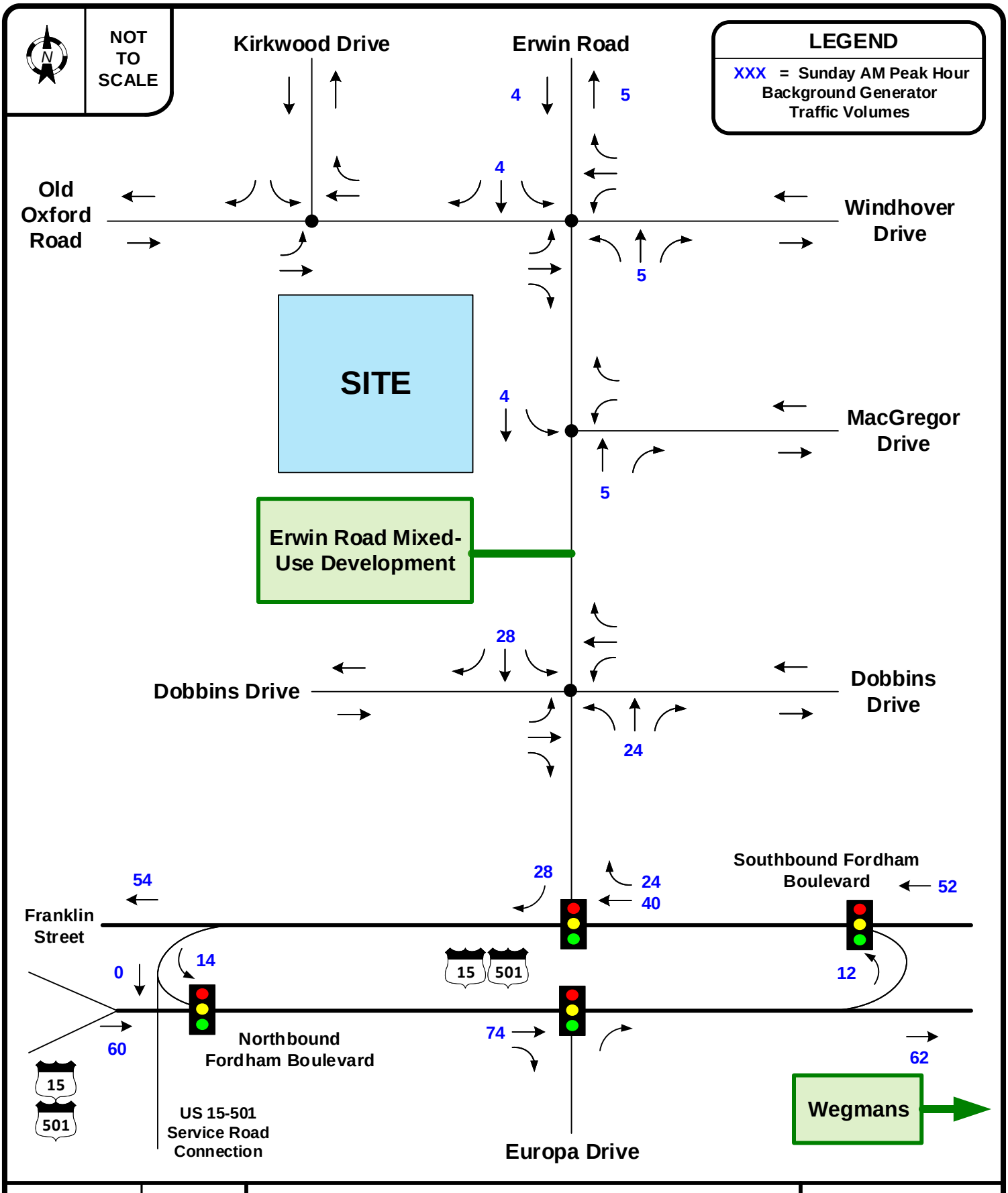
FIGURE 4



HNTB	Christ Community Church Traffic Impact Study	DATE: June 2019
	2019 EXISTING PEAK HOUR TRAFFIC VOLUMES	FIGURE 5



HNTB	Christ Community Church Traffic Impact Study	DATE: June 2019
	2025 AMBIENT GROWTH PEAK HOUR TRAFFIC VOLUMES	FIGURE 6



HNTB

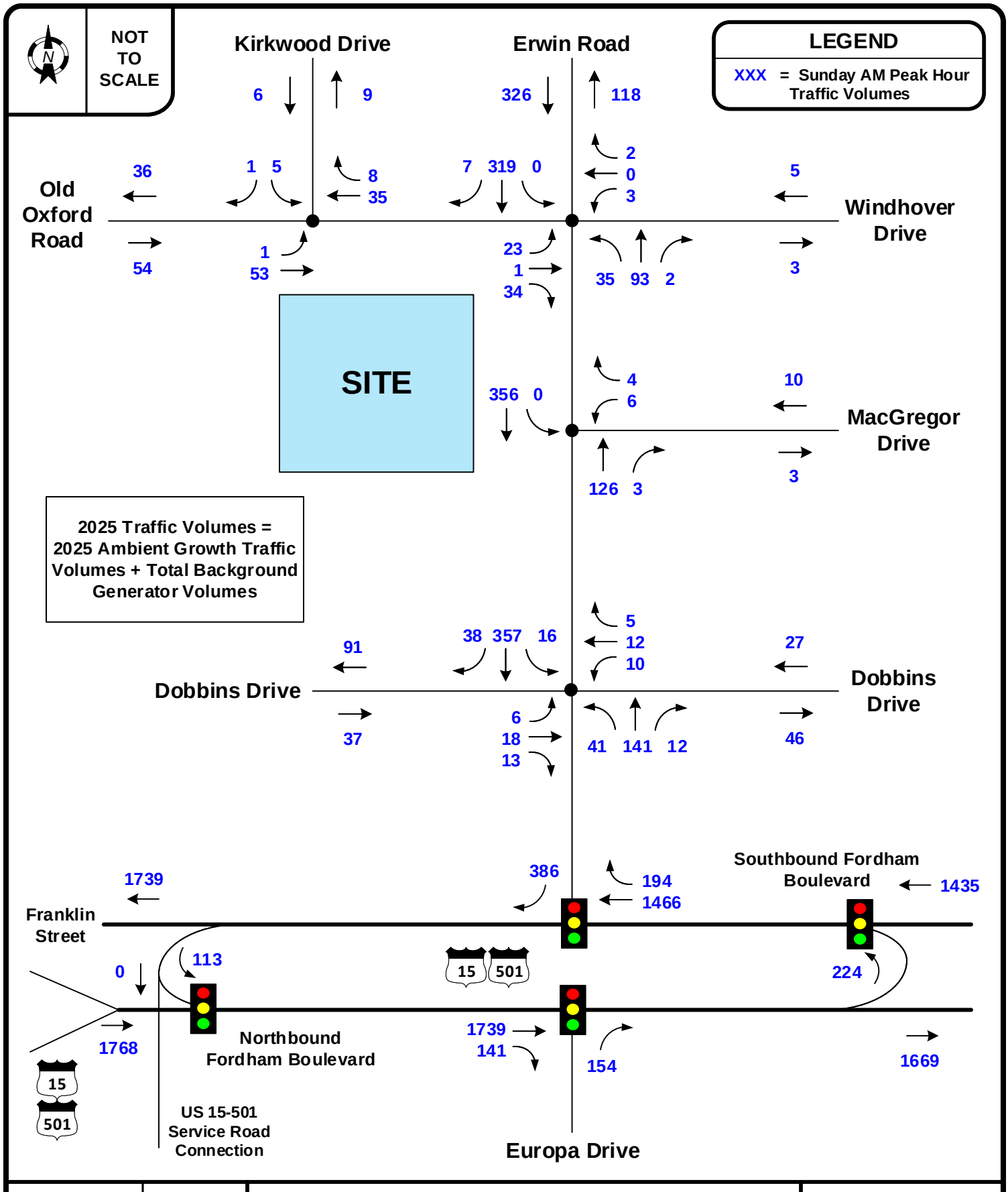
TOWN OF CHAPEL HILL

Christ Community Church
Traffic Impact Study

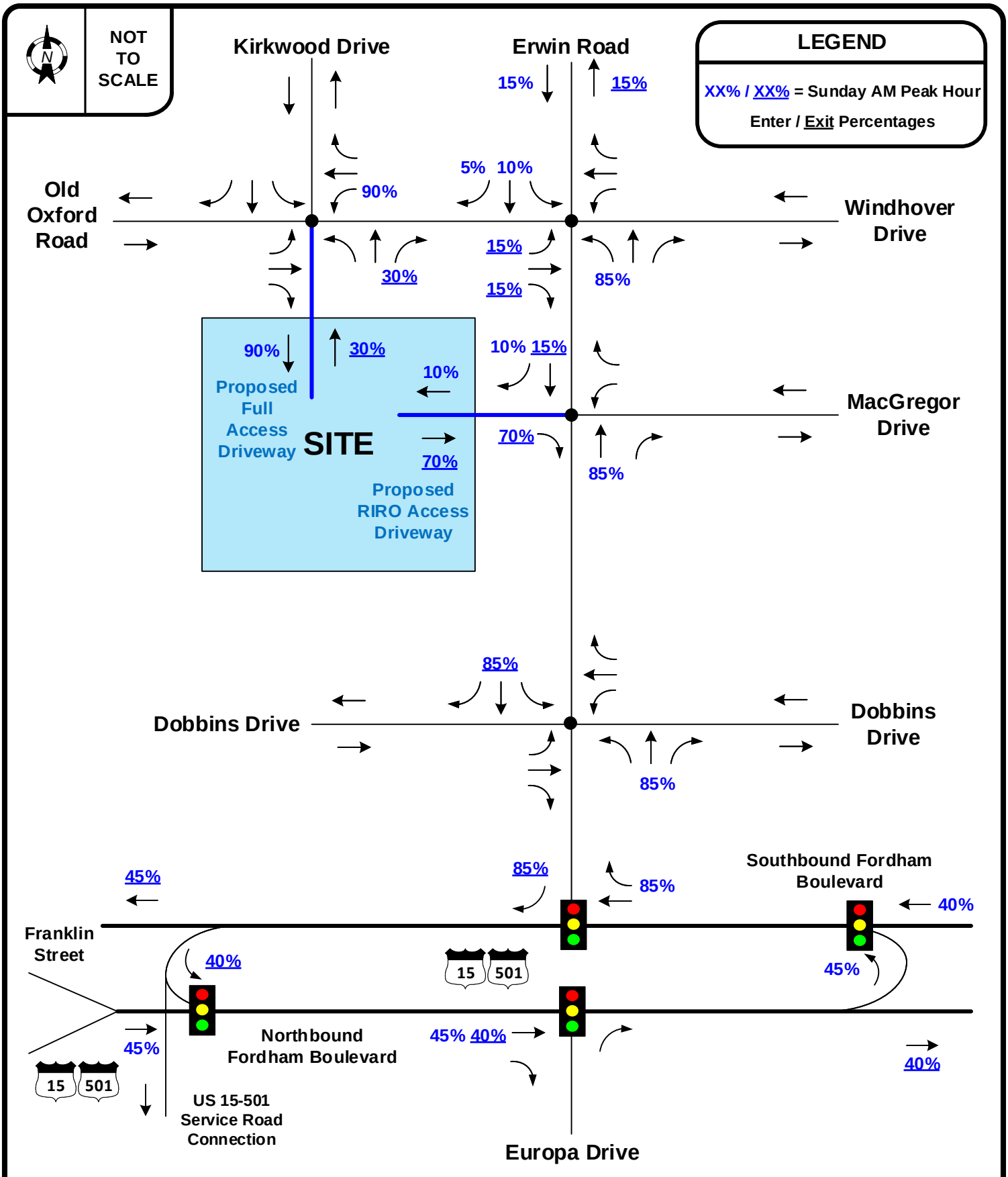
TOTAL BACKGROUND GENERATOR PEAK HOUR TRAFFIC VOLUMES

DATE: June 2019

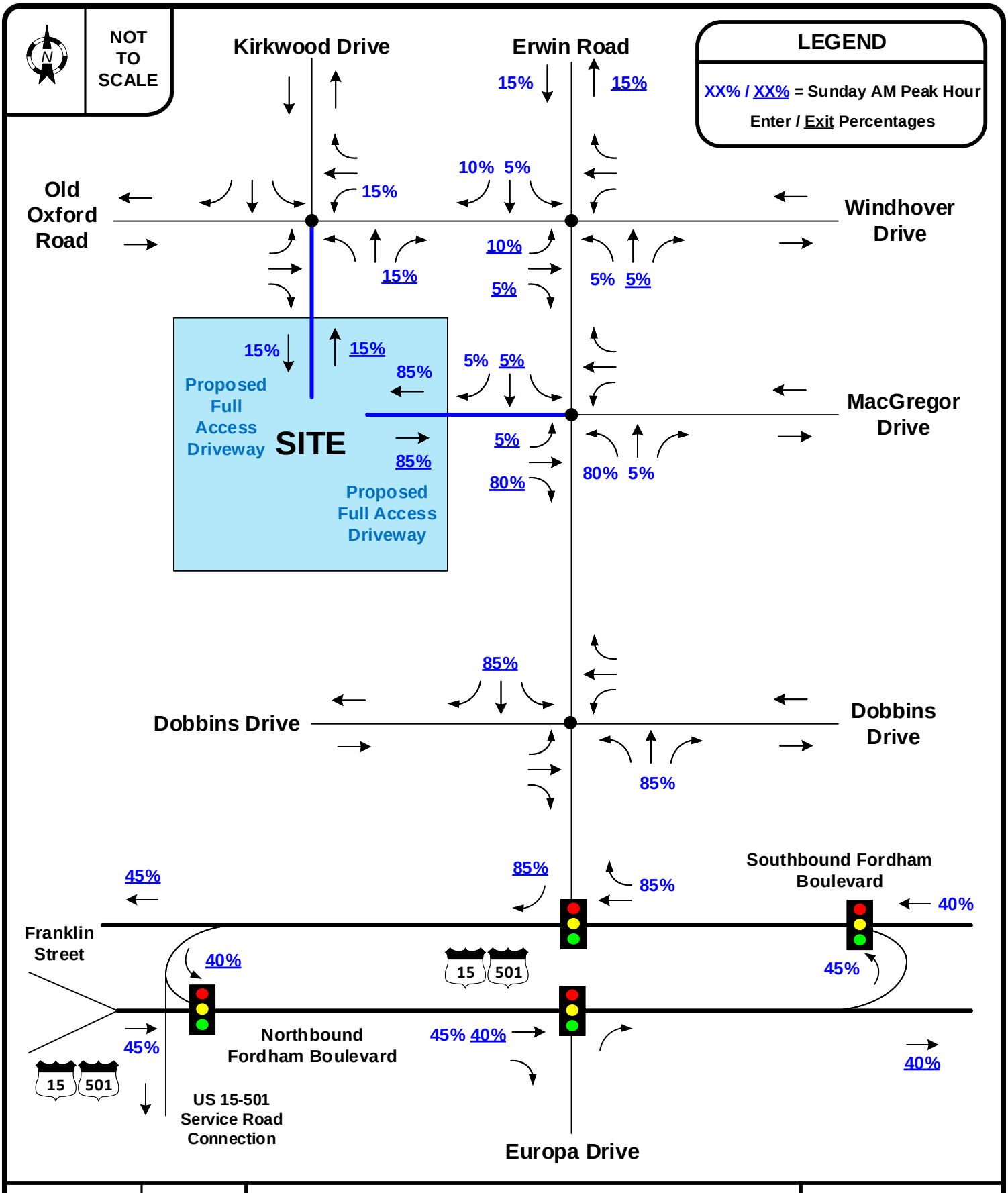
FIGURE 7



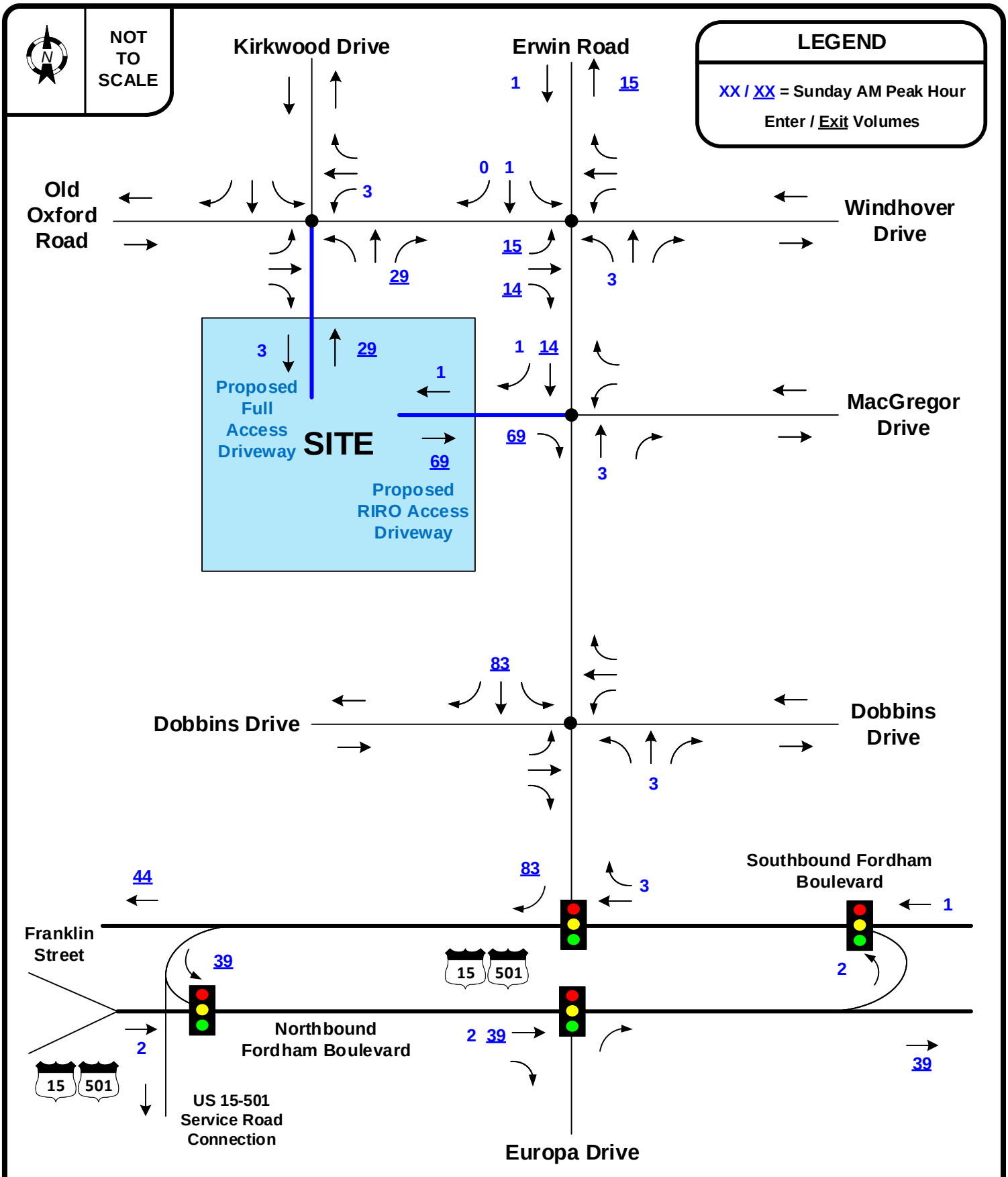
HNTB	TOWN OF CHAPEL HILL	**Christ Community Church** **Traffic Impact Study**	**DATE:** June 2019
		2025 PEAK HOUR TRAFFIC VOLUMES WITHOUT SITE	**FIGURE 8**



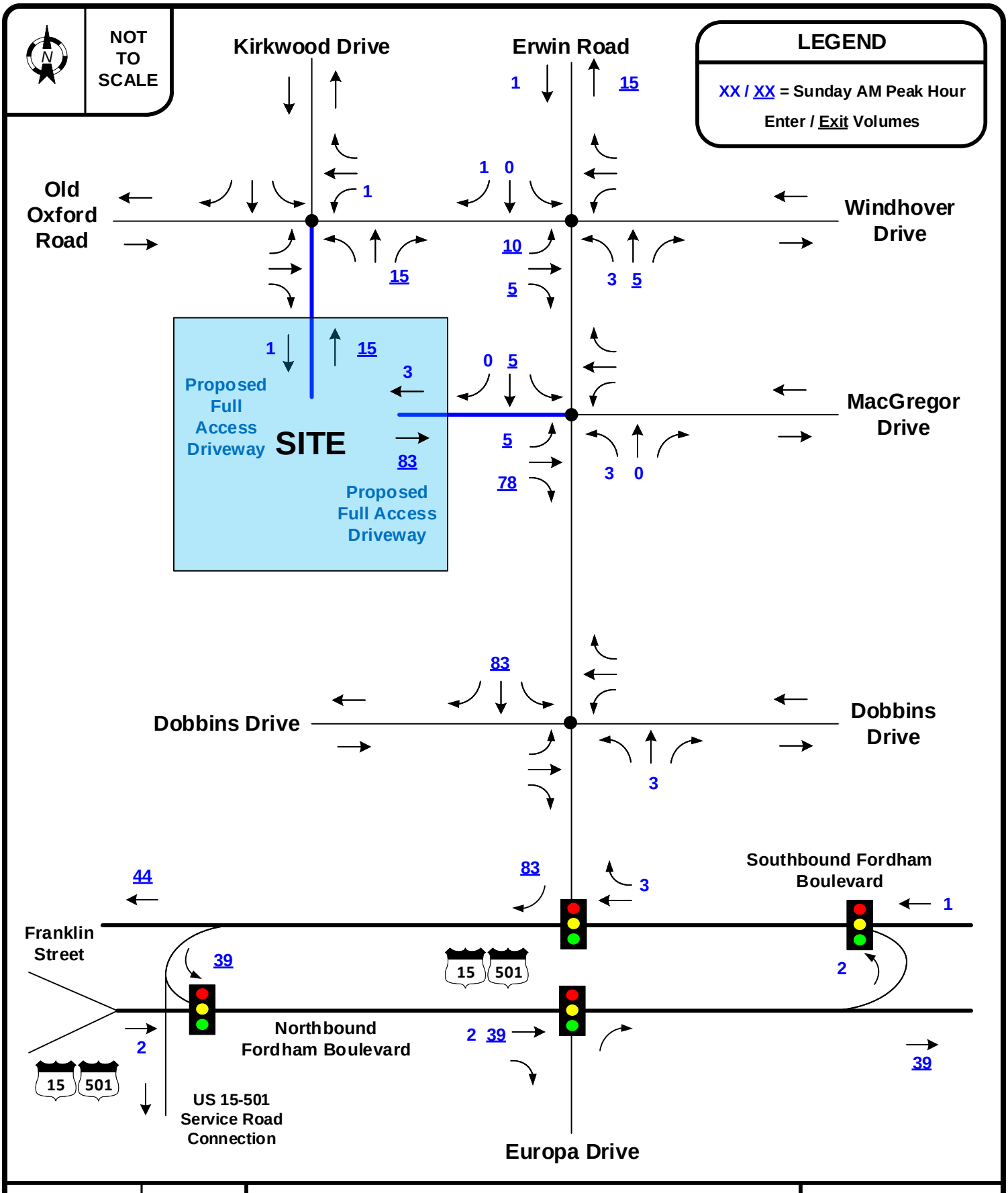
HNTB	Christ Community Church Traffic Impact Study	DATE: June 2019
	SITE TRIP DISTRIBUTION PERCENTAGES	FIGURE 9A



HNTB	**Christ Community Church** **Traffic Impact Study**	**DATE:** June 2019
	SITE TRIP DISTRIBUTION PERCENTAGES **FULL ACCESS ON ERWIN ROAD**	**FIGURE 9B**



HNTB	**Christ Community Church** **Traffic Impact Study**	**DATE:** June 2019
	SUNDAY AM PEAK HOUR SITE TRAFFIC ASSIGNMENT	**FIGURE 10A**

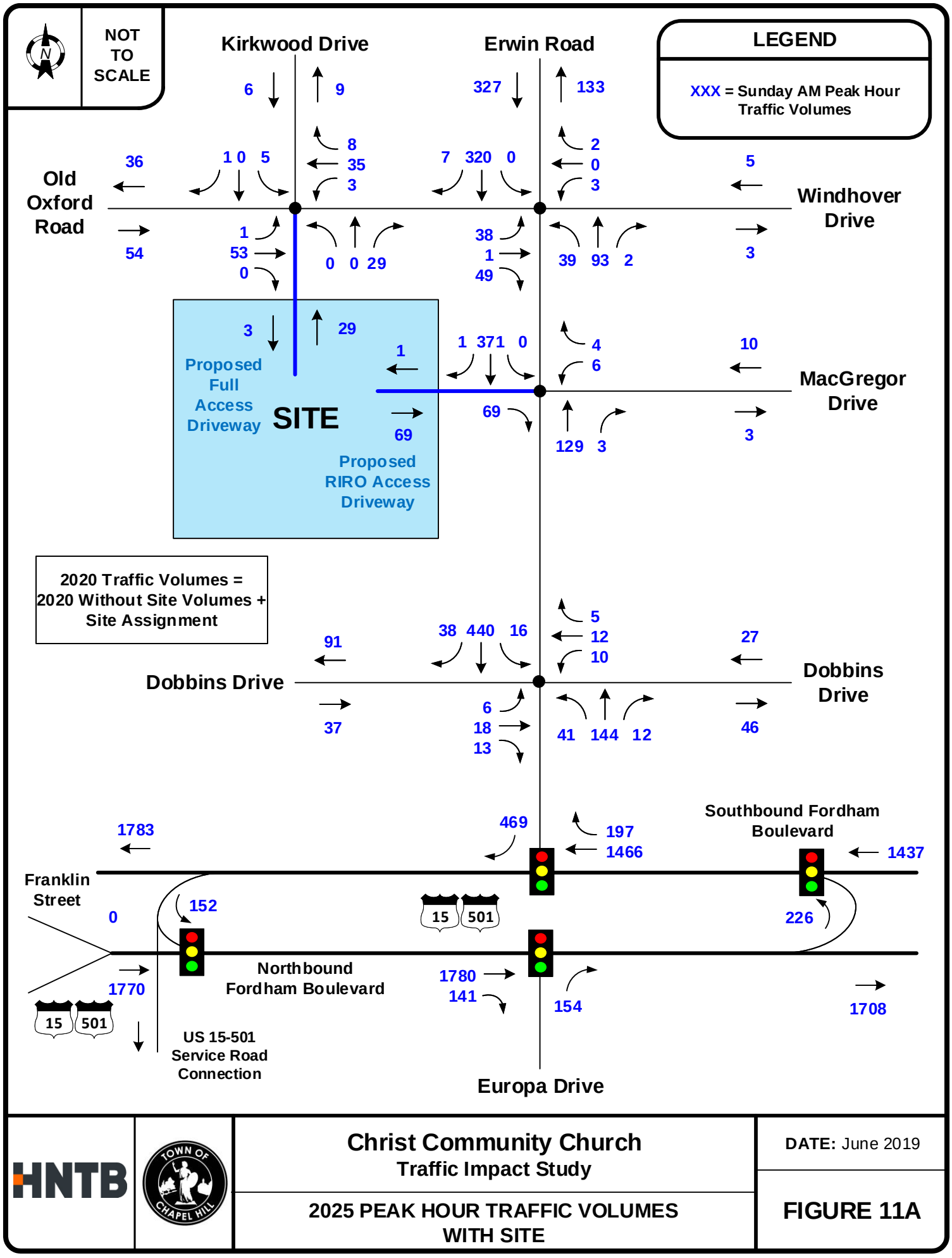


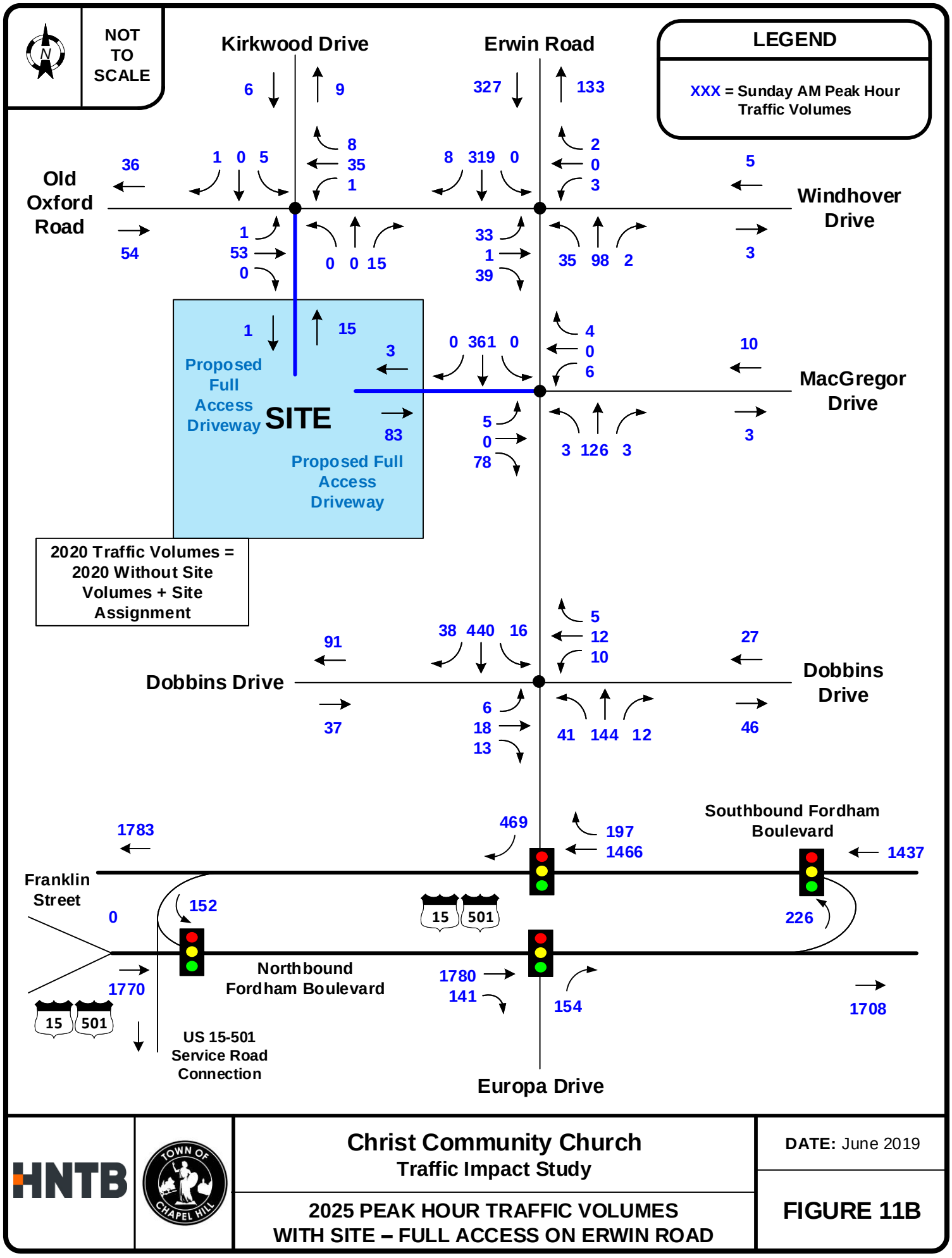
Christ Community Church
Traffic Impact Study

DATE: June 2019

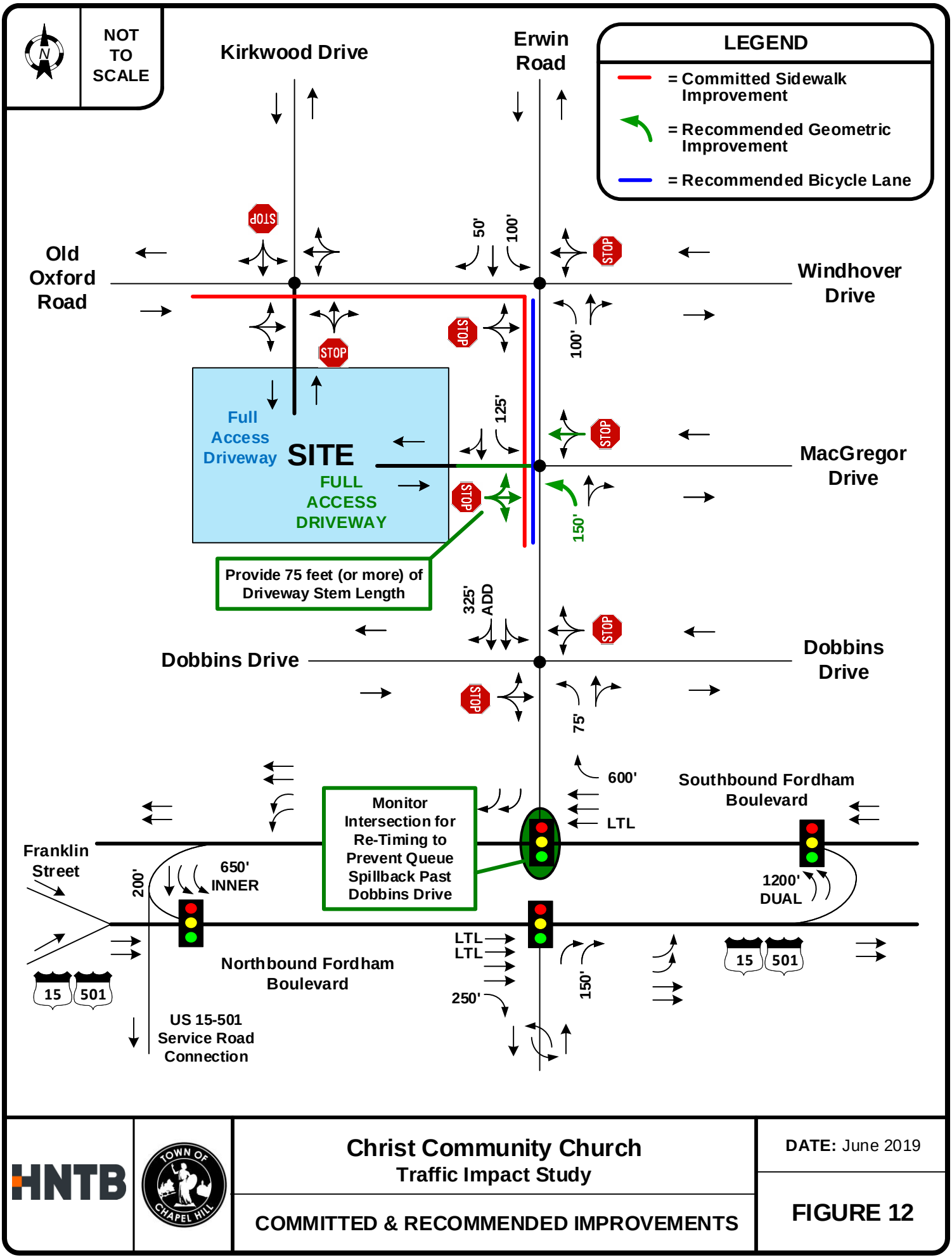
SUNDAY AM PEAK HOUR SITE TRAFFIC ASSIGNMENT – FULL ACCESS ON ERWIN ROAD

FIGURE 10B


NOT TO SCALE
LEGEND
XXX = Sunday AM Peak Hour Traffic Volumes
Kirkwood Drive
Erwin Road
Old Oxford Road
Windhover Drive
MacGregor Drive
Dobbins Drive
Dobbins Drive
Proposed Full Access Driveway
SITE
Proposed RIRO Access Driveway
2020 Traffic Volumes = 2020 Without Site Volumes + Site Assignment
Southbound Fordham Boulevard
Franklin Street
Northbound Fordham Boulevard
US 15-501 Service Road Connection
Europa Drive
6 9
327 133
8 35 3
7 320 0
2 0 3
36
1 0 5
5
54
1 53 0
0 0 29
38 1 49
39 93 2
3
3 29
1
1 371 0
4 6
10
69
69
129 3
3
91
38 440 16
5 12 10
27
37
6 18 13
41 144 12
46
1783
469
197 1466
1437
0
152
15 501
226
1770
15 501
1780 141
154
1708
HNTB
TOWN OF CHAPEL HILL
Christ Community Church
Traffic Impact Study
DATE: June 2019
2025 PEAK HOUR TRAFFIC VOLUMES WITH SITE
FIGURE 11A



HNTB	TOWN OF CHAPEL HILL	**Christ Community Church** **Traffic Impact Study**	**DATE:** June 2019
		2025 PEAK HOUR TRAFFIC VOLUMES WITH SITE – FULL ACCESS ON ERWIN ROAD	**FIGURE 11B**



HNTB

TOWN OF CHAPEL HILL

Christ Community Church
Traffic Impact Study

COMMITTED & RECOMMENDED IMPROVEMENTS

DATE: June 2019

FIGURE 12

Appendix B – Traffic Count Data

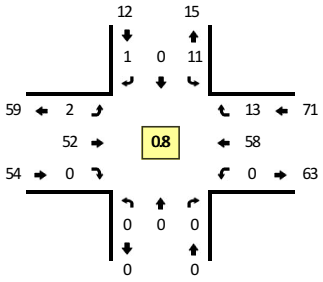
Type of peak hour being reported: Intersection Peak

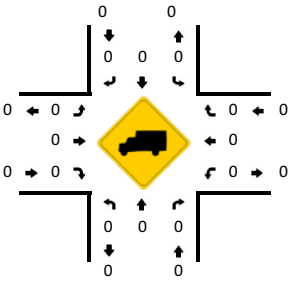
Method for determining peak hour: Total Entering Volume

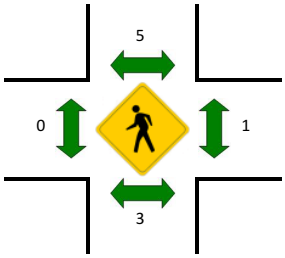
LOCATION: Kirkwood Dr -- Old Oxford Rd E
CITY/STATE: Orange, NC

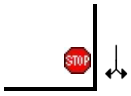
QC JOB #: 14946408
DATE: Sun, Apr 14 2019

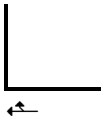
Peak-Hour: 11:30 AM -- 12:30 PM
Peak 15-Min: 12:00 PM -- 12:15 PM

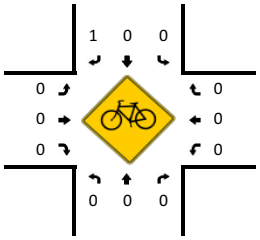


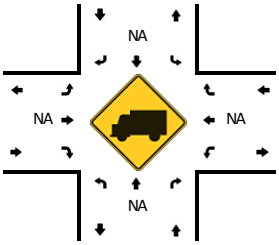


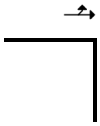


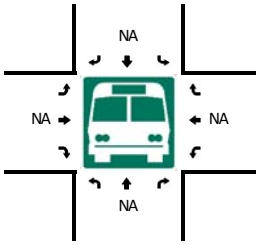












15-Min Count Period Beginning At	Kirkwood Dr (Northbound)				Kirkwood Dr (Southbound)				Old Oxford Rd E (Eastbound)				Old Oxford Rd E (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
10:30 AM	0	0	0	0	1	0	1	0	1	16	0	1	0	8	2	0	30	
10:45 AM	0	0	0	0	1	0	0	0	0	6	0	0	0	9	2	0	18	
11:00 AM	0	0	0	0	1	0	0	0	0	9	0	0	0	8	2	0	20	
11:15 AM	0	0	0	0	2	0	0	0	0	19	0	0	0	8	2	0	31	99
11:30 AM	0	0	0	0	0	0	0	0	1	12	0	0	0	18	2	0	33	102
11:45 AM	0	0	0	0	1	0	0	0	0	11	0	0	0	10	2	0	24	108
12:00 PM	0	0	0	0	5	0	1	0	1	16	0	0	0	15	5	0	43	131
12:15 PM	0	0	0	0	5	0	0	0	0	13	0	0	0	15	4	0	37	137

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	20	0	4	0	4	64	0	0	0	60	20	0	172
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	1		0	0	0		0	0	0		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 4/18/2019 12:51 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

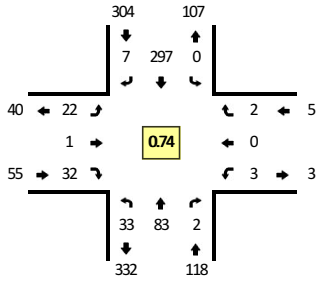
Type of peak hour being reported: Intersection Peak

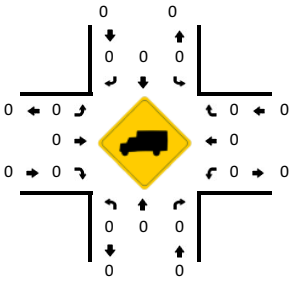
Method for determining peak hour: Total Entering Volume

LOCATION: Erwin Rd -- Old Oxford Rd E/Windhover Dr
CITY/STATE: Orange, NC

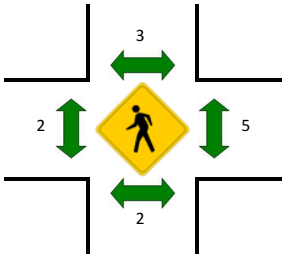
QC JOB #: 14946401
DATE: Sun, Apr 14 2019

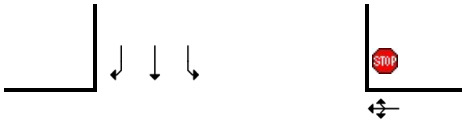
Peak-Hour: 10:30 AM -- 11:30 AM
Peak 15-Min: 11:15 AM -- 11:30 AM

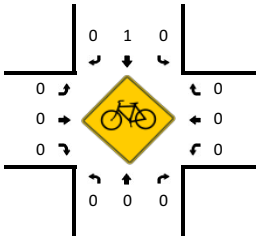


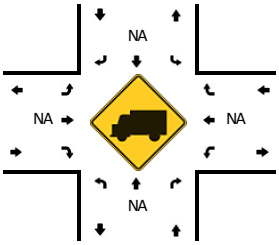


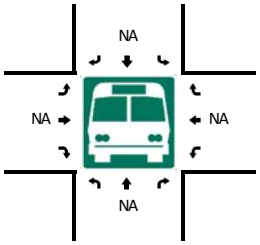
Quality Counts
DATA THAT DRIVES COMMUNITIES











15-Min Count Period Beginning At	Erwin Rd (Northbound)				Erwin Rd (Southbound)				Old Oxford Rd E/Windhover Dr (Eastbound)				Old Oxford Rd E/Windhover Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
10:30 AM	8	21	0	0	0	115	1	0	5	1	11	0	0	0	1	0	163	
10:45 AM	10	23	2	0	0	79	2	0	2	0	5	0	1	0	1	0	125	
11:00 AM	8	21	0	0	0	69	1	0	3	0	7	0	1	0	0	0	110	
11:15 AM	7	18	0	0	0	34	3	0	12	0	9	0	1	0	0	0	84	482
11:30 AM	13	9	0	0	0	51	7	0	2	0	10	0	0	0	1	0	93	412
11:45 AM	11	19	1	0	1	53	1	0	3	0	9	0	0	0	1	0	99	386
12:00 PM	13	15	0	0	0	54	6	0	4	0	16	0	2	1	1	0	112	388
12:15 PM	15	14	0	0	0	114	5	0	4	1	14	0	1	0	1	0	169	473

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	28	72	0	0	0	136	12	0	48	0	36	0	4	0	0	0	336
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				4			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad Stopped Buses																	

Comments:

Report generated on 4/18/2019 12:50 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

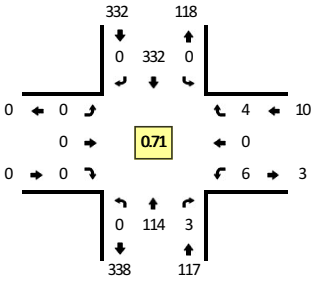
Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

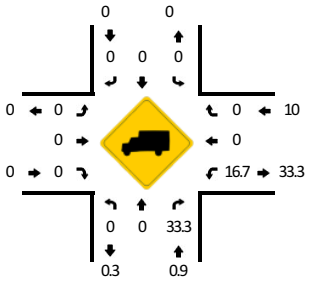
LOCATION: Erwin Rd -- McGregor Dr
CITY/STATE: Orange, NC

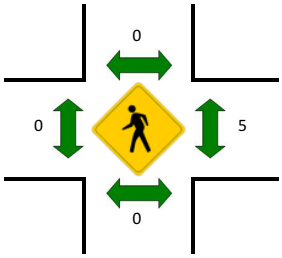
QC JOB #: 14946402
DATE: Sun, Apr 14 2019

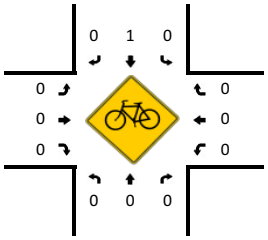
Peak-Hour: 10:30 AM -- 11:30 AM
Peak 15-Min: 11:15 AM -- 11:30 AM

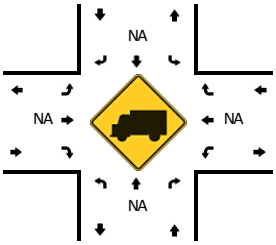


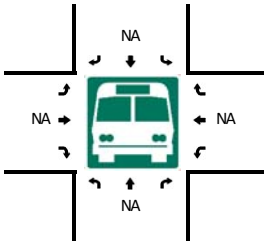
Quality Counts
DATA THAT DRIVES COMMUNITIES











15-Min Count Period Beginning At	Erwin Rd (Northbound)				Erwin Rd (Southbound)				McGregor Dr (Eastbound)				McGregor Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
10:30 AM	0	32	1	0	0	127	0	0	0	0	0	0	1	0	0	0	161	
10:45 AM	0	32	0	0	0	84	0	0	0	0	0	0	3	0	2	0	121	
11:00 AM	0	26	0	0	0	77	0	0	0	0	0	0	1	0	1	0	105	
11:15 AM	0	24	2	0	0	44	0	0	0	0	0	0	1	0	1	0	72	459
11:30 AM	0	22	1	0	1	61	0	0	0	0	0	0	1	0	0	0	86	384
11:45 AM	0	31	2	1	0	61	0	0	0	0	0	0	0	0	0	0	95	358
12:00 PM	0	28	2	0	3	68	0	0	0	0	0	0	2	0	0	0	103	356
12:15 PM	0	28	5	0	0	129	0	0	0	0	0	0	3	0	1	0	166	450

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	96	8	0	0	176	0	0	0	0	0	0	4	0	4	0	288
Heavy Trucks	0	0	4		0	0	0		0	0	0		4	0	0		8
Pedestrians		0				0				0				4			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad Stopped Buses																	

Comments:

Report generated on 4/18/2019 12:51 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

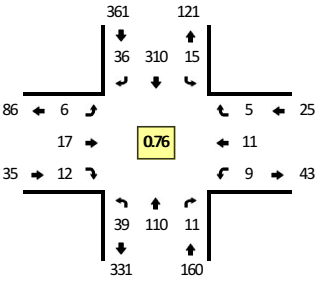
Type of peak hour being reported: Intersection Peak

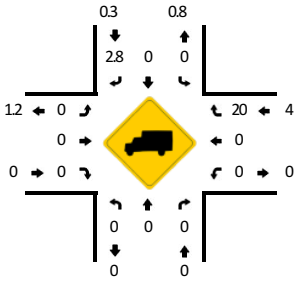
Method for determining peak hour: Total Entering Volume

LOCATION: Erwin Rd -- Dobbins Dr
CITY/STATE: Orange, NC

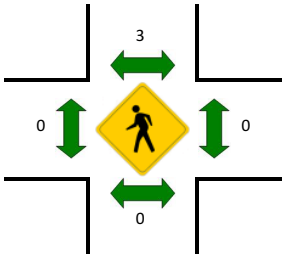
QC JOB #: 14946403
DATE: Sun, Apr 14 2019

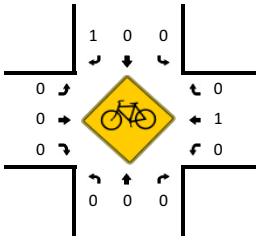
Peak-Hour: 10:30 AM -- 11:30 AM
Peak 15-Min: 11:15 AM -- 11:30 AM

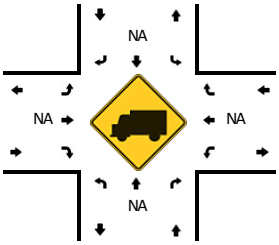


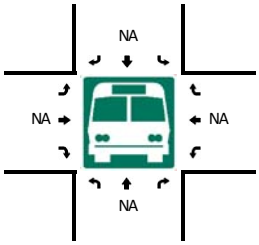


Quality Counts
DATA THAT DRIVES COMMUNITIES









15-Min Count Period Beginning At	Erwin Rd (Northbound)				Erwin Rd (Southbound)				Dobbins Dr (Eastbound)				Dobbins Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
10:30 AM	10	29	3	0	6	111	12	0	3	4	5	0	2	3	2	0	190	
10:45 AM	9	29	4	0	4	82	11	0	0	5	2	0	6	4	1	0	157	
11:00 AM	8	24	1	0	1	76	9	0	3	6	3	0	1	2	0	0	134	
11:15 AM	12	28	3	0	4	41	4	0	0	2	2	0	0	2	2	0	100	581
11:30 AM	13	22	0	0	3	53	5	0	0	1	7	0	4	5	0	0	113	504
11:45 AM	14	33	5	0	4	60	8	0	2	4	3	0	4	6	0	0	143	490
12:00 PM	9	29	4	0	1	61	10	0	1	2	3	0	1	3	2	0	126	482
12:15 PM	11	31	1	1	3	106	25	0	2	1	4	0	4	3	1	0	193	575

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	48	112	12	0	16	164	16	0	0	8	8	0	0	8	8	0	400
Heavy Trucks	0	0	0		0	0	4		0	0	0		0	0	4		8
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad Stopped Buses																	

Comments:

Report generated on 4/18/2019 12:51 PM

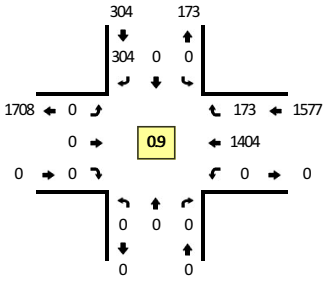
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

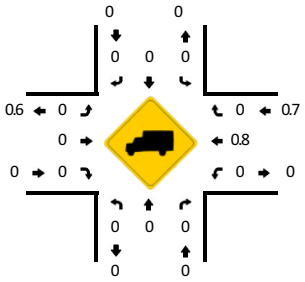
LOCATION: Erwin Rd -- US 15-501 WB
CITY/STATE: Orange, NC

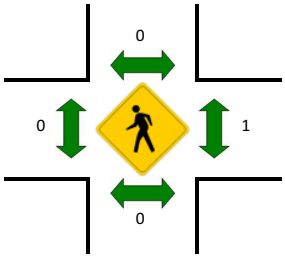
QC JOB #: 14946404
DATE: Sun, Apr 14 2019

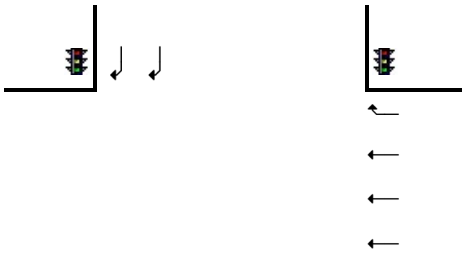
Peak-Hour: 11:30 AM -- 12:30 PM
Peak 15-Min: 12:15 PM -- 12:30 PM

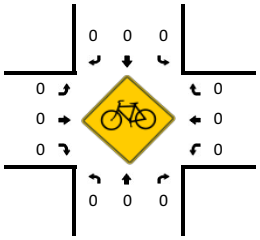


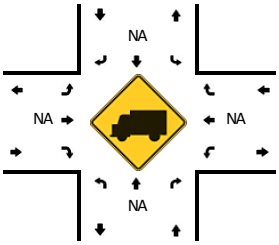
Quality Counts
DATA THAT DRIVES COMMUNITIES

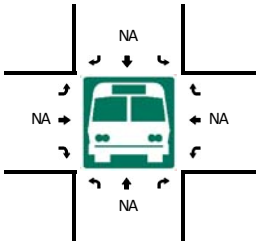












15-Min Count Period Beginning At	Erwin Rd (Northbound)				Erwin Rd (Southbound)				US 15-501 WB (Eastbound)				US 15-501 WB (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
10:30 AM	0	0	0	0	0	0	120	0	0	0	0	0	0	316	42	0	478	
10:45 AM	0	0	0	0	0	0	93	0	0	0	0	0	0	383	42	0	518	
11:00 AM	0	0	0	0	0	0	78	0	0	0	0	0	0	324	33	0	435	
11:15 AM	0	0	0	0	0	0	47	0	0	0	0	0	0	322	43	0	412	1843
11:30 AM	0	0	0	0	0	0	65	0	0	0	0	0	0	348	36	0	449	1814
11:45 AM	0	0	0	0	0	0	67	0	0	0	0	0	0	363	52	0	482	1778
12:00 PM	0	0	0	0	0	0	60	0	0	0	0	0	0	326	41	0	427	1770
12:15 PM	0	0	0	0	0	0	112	0	0	0	0	0	0	367	44	0	523	1881

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	448	0	0	0	0	0	0	1468	176	0	2092
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	4	0		4
Pedestrians		0				0				0				4			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 4/18/2019 12:51 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

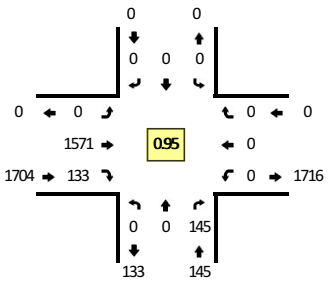
Type of peak hour being reported: Intersection Peak

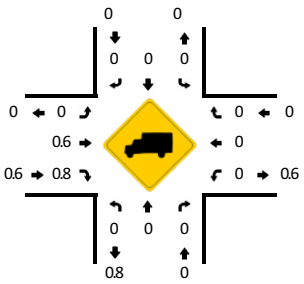
Method for determining peak hour: Total Entering Volume

LOCATION: Europa Dr -- US 15-501 EB
CITY/STATE: Orange, NC

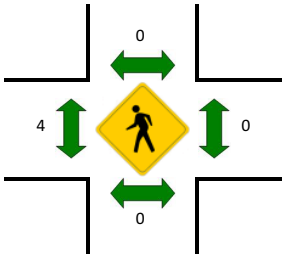
QC JOB #: 14946405
DATE: Sun, Apr 14 2019

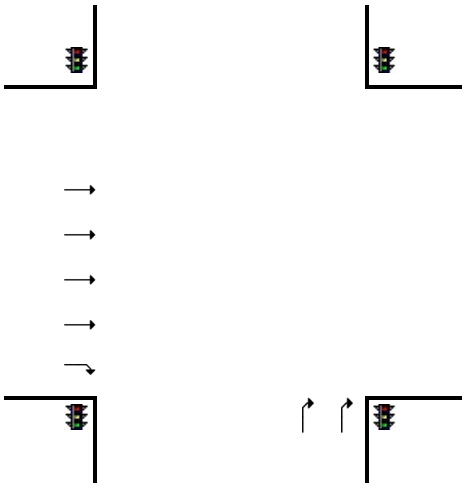
Peak-Hour: 10:30 AM -- 11:30 AM
Peak 15-Min: 10:45 AM -- 11:00 AM

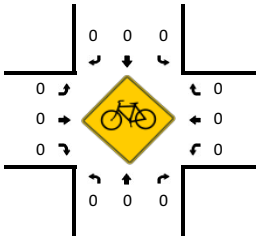


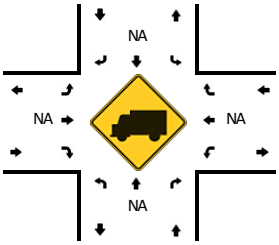


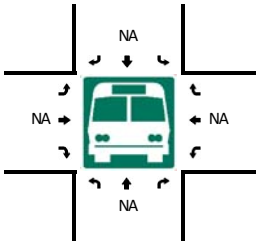
Quality Counts
DATA THAT DRIVES COMMUNITIES











15-Min Count Period Beginning At	Europa Dr (Northbound)				Europa Dr (Southbound)				US 15-501 EB (Eastbound)				US 15-501 EB (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
10:30 AM	0	0	34	0	0	0	0	0	0	396	36	0	0	0	0	0	466	
10:45 AM	0	0	42	0	0	0	0	0	0	406	39	0	0	0	0	0	487	
11:00 AM	0	0	36	0	0	0	0	0	0	390	23	0	0	0	0	0	449	
11:15 AM	0	0	33	0	0	0	0	0	0	379	35	0	0	0	0	0	447	1849
11:30 AM	0	0	27	0	0	0	0	0	0	350	20	0	0	0	0	0	397	1780
11:45 AM	0	0	37	0	0	0	0	0	0	354	36	0	0	0	0	0	427	1720
12:00 PM	0	0	44	0	0	0	0	0	0	419	24	0	0	0	0	0	487	1758
12:15 PM	0	0	41	0	0	0	0	0	0	416	40	0	0	0	0	0	497	1808

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	168	0	0	0	0	0	0	1624	156	0	0	0	0	0	1948
Heavy Trucks	0	0	0		0	0	0		0	8	0		0	0	0		8
Pedestrians		0				0				4				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad Stopped Buses																	

Comments:

Report generated on 4/18/2019 12:51 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

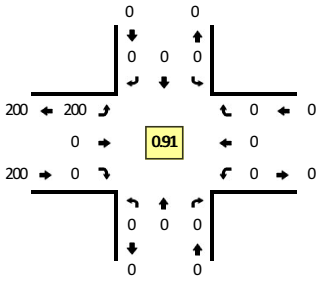
Type of peak hour being reported: Intersection Peak

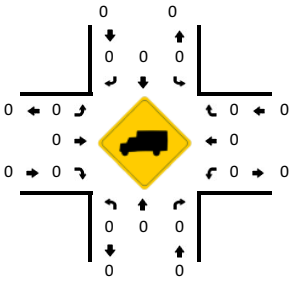
Method for determining peak hour: Total Entering Volume

LOCATION: EB U-Turn Junction -- US 15-501
CITY/STATE: Orange, NC

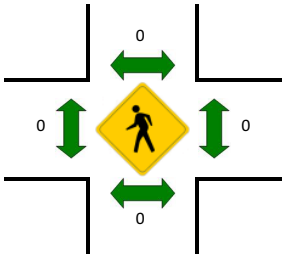
QC JOB #: 14946406
DATE: Sun, Apr 14 2019

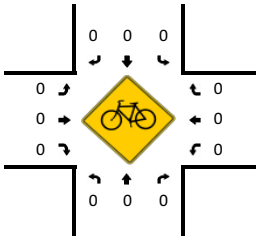
Peak-Hour: 10:30 AM -- 11:30 AM
Peak 15-Min: 10:45 AM -- 11:00 AM

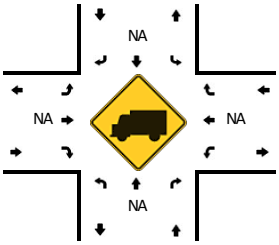


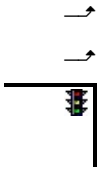


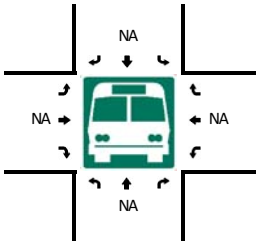
Quality Counts
DATA THAT DRIVES COMMUNITIES











15-Min Count Period Beginning At	EB U-Turn Junction (Northbound)				EB U-Turn Junction (Southbound)				US 15-501 (Eastbound)				US 15-501 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	52	0	0	0	0	52	
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	55	0	0	0	0	55	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	43	0	0	0	0	43	
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	50	0	0	0	0	50	200
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	40	0	0	0	0	40	188
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	44	0	0	0	0	44	177
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	46	0	0	0	0	46	180
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	42	0	0	0	0	42	172

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	0	0	0	0	0	220	0	0	0	0	220
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 4/18/2019 12:51 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

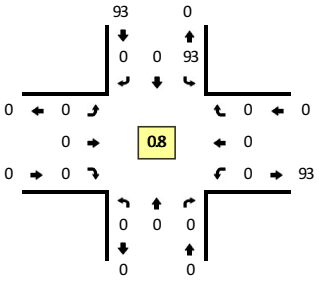
Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

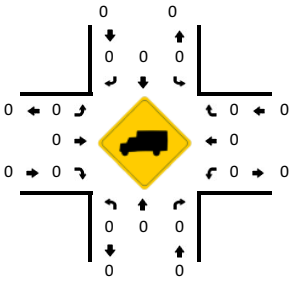
LOCATION: WB U-Turn Junction/Service Rd -- US 15-501
CITY/STATE: Orange, NC

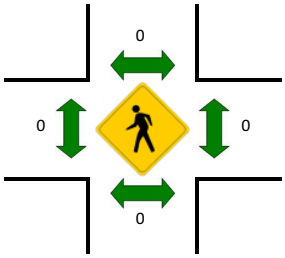
QC JOB #: 14946407
DATE: Sun, Apr 14 2019

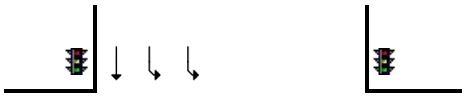
Peak-Hour: 10:30 AM -- 11:30 AM
Peak 15-Min: 11:15 AM -- 11:30 AM

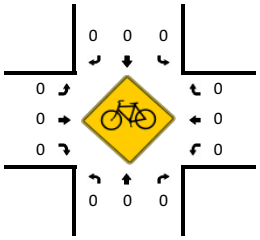


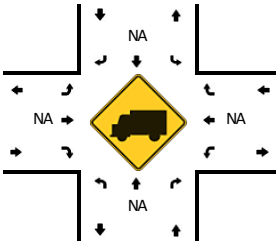
Quality Counts
DATA THAT DRIVES COMMUNITIES

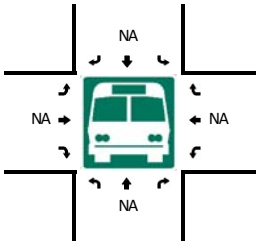












15-Min Count Period Beginning At	WB U-Turn Junction/Service Rd (Northbound)				WB U-Turn Junction/Service Rd (Southbound)				US 15-501 (Eastbound)				US 15-501 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
10:30 AM	0	0	0	0	29	0	0	0	0	0	0	0	0	0	0	0	29	
10:45 AM	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	25	
11:00 AM	0	0	0	0	19	0	0	0	0	0	0	0	0	0	0	0	19	
11:15 AM	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	20	93
11:30 AM	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	16	80
11:45 AM	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	25	80
12:00 PM	0	0	0	0	19	0	0	0	0	0	0	0	0	0	0	0	19	80
12:15 PM	0	0	0	0	23	0	0	0	0	0	0	0	0	0	0	0	23	83

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	80	0	0	0	0	0	0	0	0	0	0	0	80
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad Stopped Buses																	

Comments:

Report generated on 4/18/2019 12:51 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Appendix C - Traffic Volume Development Spreadsheets

Christ Community Church Trip Generation

Land Use	ITE LUC	Units	Daily - Sunday			Sunday Peak Hour - Generator		
			Enter	Exit	Total	Enter	Exit	Total
Church (Trip Gen Study)	N/A	220 Attendees	103	103	206	4	98	102
		TOTALS	**103**	**103**	**206**	**4**	**98**	**102**

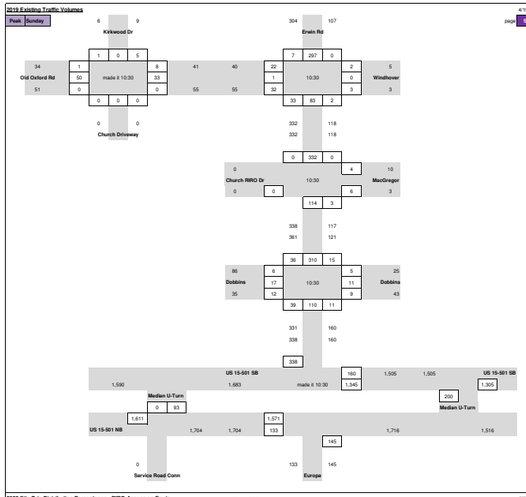
Comparisons with ITE Data (using most conservative method - rate or equation based)

Land Use	ITE LUC	Units	Daily - Sunday			Sunday Peak Hour - Generator		
			Enter	Exit	Total	Enter	Exit	Total
Church	560	11,420 SF	158	158	316	75	82	157
Church	560	270 seats	164	164	328	71	75	146
Church	560	220 attendees	N/A	N/A	N/A	58	59	117

ITE Data Reflects Multiple Services and Trips Entering/Leaving Between Services
NCDOT Recommends 1000 SF/Peak Hour of Generator/Local Data

2019 Existing Traffic Volumes

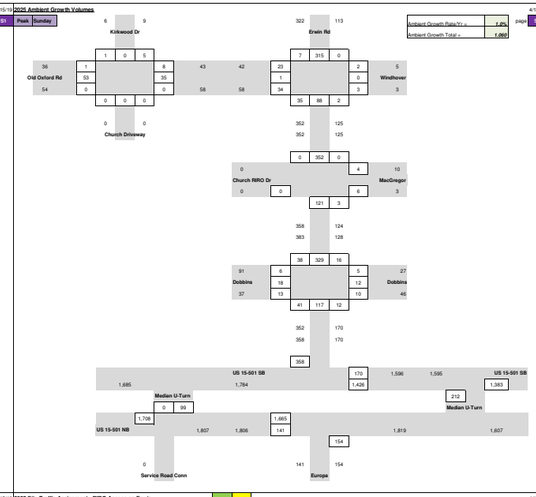
Peak | Sunday



2025 Ambient Growth Volumes

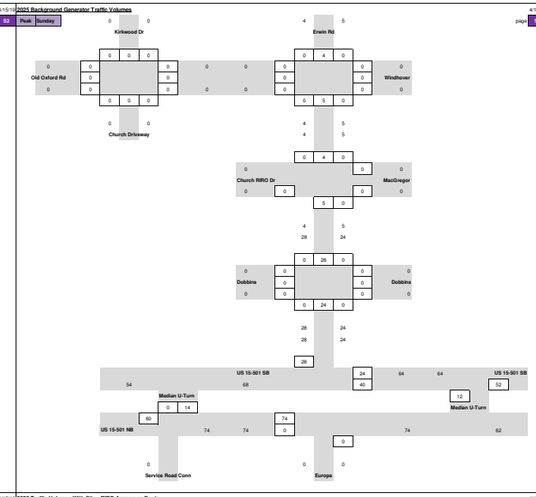
Peak | Sunday

Ambient Growth Rate/Yr =	1.4%
Ambient Growth Total =	1.060



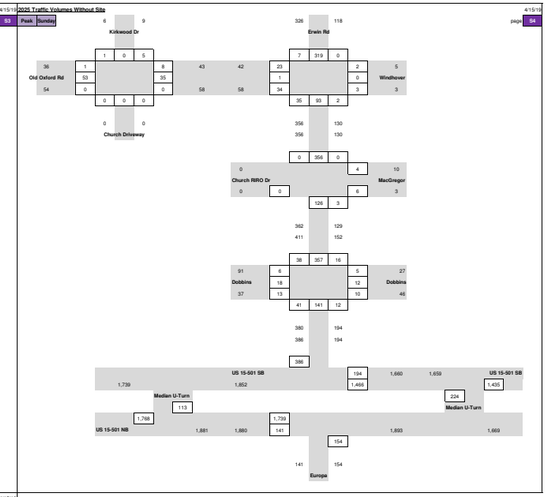
2025 Background Generator Traffic Volumes

Peak | Sunday



2025 Traffic Volumes Without Site

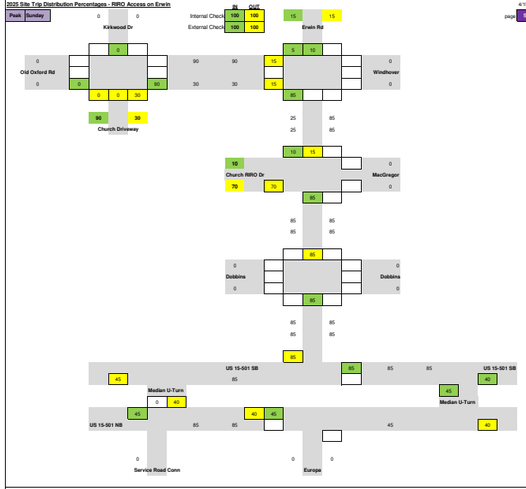
Peak | Sunday



2025 Site Trip Distribution Percentages - RIRO Access on Erwin

Peak | Sunday

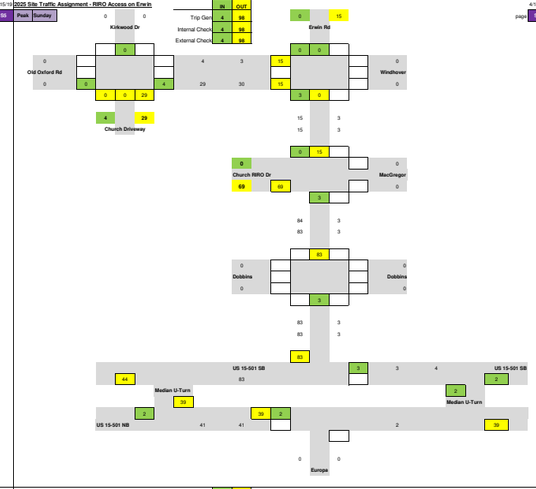
	IN	OUT
Internal Check	100	100
External Check	100	100



2025 Site Traffic Assignment - RIRO Access on Erwin

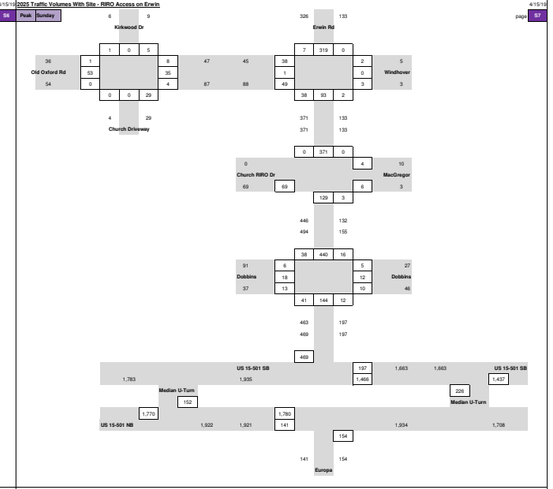
Peak | Sunday

	IN	OUT
Trip Gen	4	95
Internal Check	4	95
External Check	4	95



2025 Traffic Volumes With Site - RIRO Access on Erwin

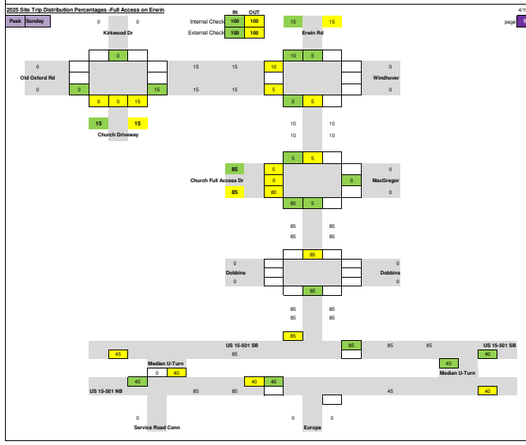
Peak | Sunday



2025 Site Trip Distribution Percentages -Full Access on Erwin

Peak | Sunday

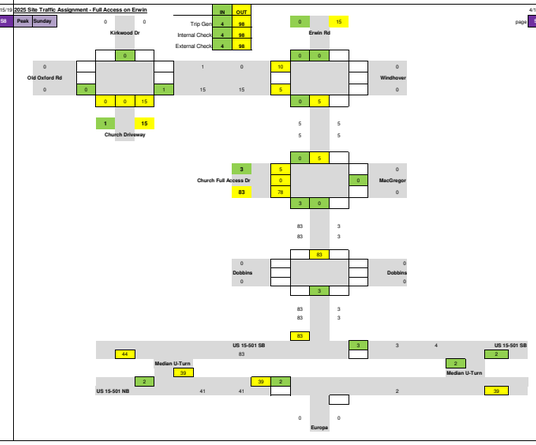
	IN	OUT
Internal Check	100	100
External Check	100	100



2025 Site Traffic Assignment - Full Access on Erwin

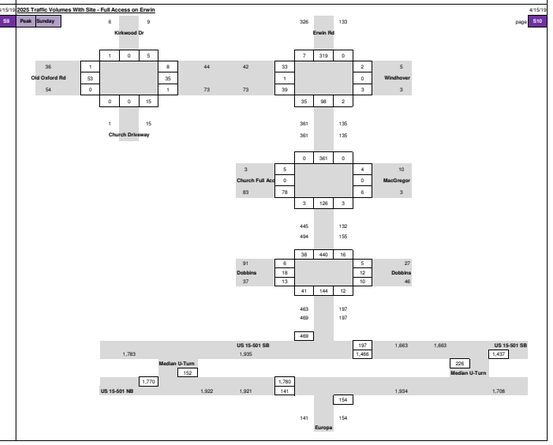
Peak | Sunday

	IN	OUT
Trip Gen	4	95
Internal Check	4	95
External Check	4	95



2025 Traffic Volumes With Site - Full Access on Erwin

Peak | Sunday

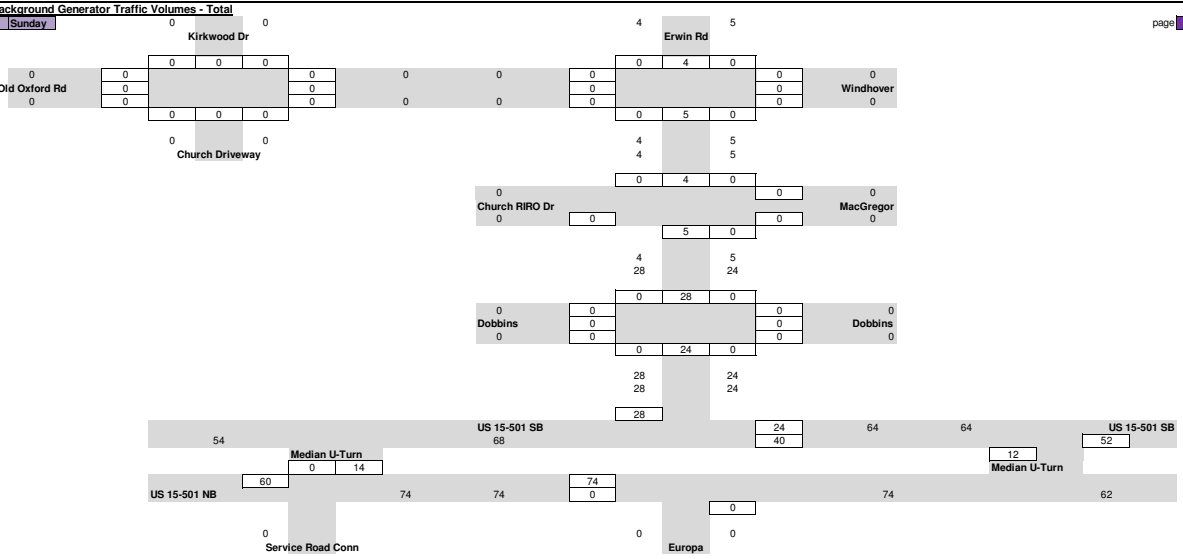


2025 Background Generator Traffic Volumes - Total

Peak | Sunday

4/15/19

page Bk1

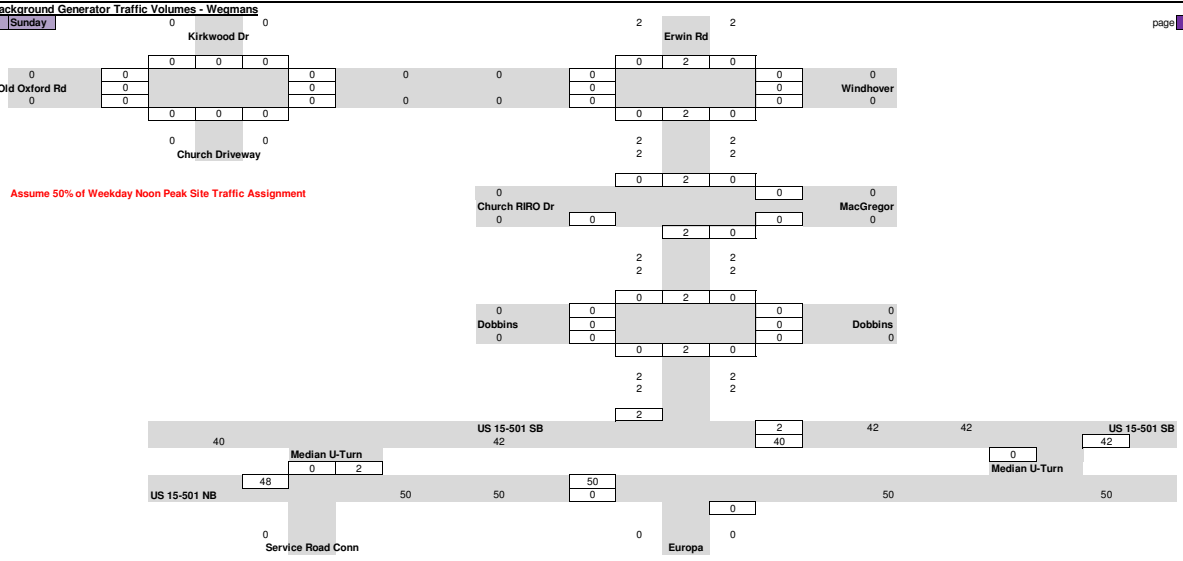


2025 Background Generator Traffic Volumes - Wegmans

Peak | Sunday

4/15/19

page Bk2

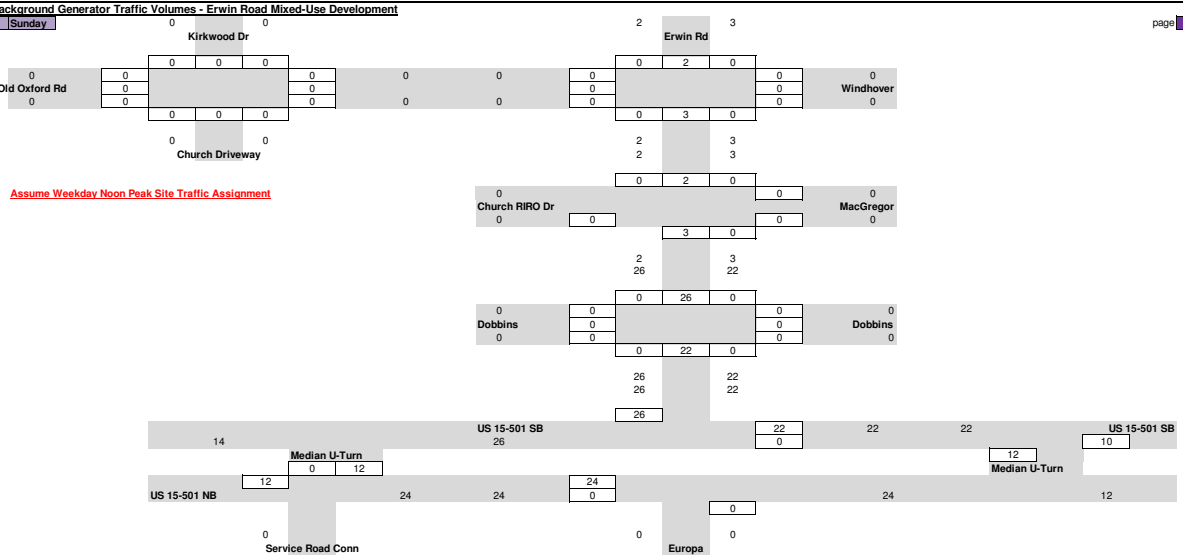


2025 Background Generator Traffic Volumes - Erwin Road Mixed-Use Development

Peak | Sunday

4/15/19

page Bk3



Appendix D – Christ Community Church Trip Generation Study

TECHNICAL MEMORANDUM - FINAL

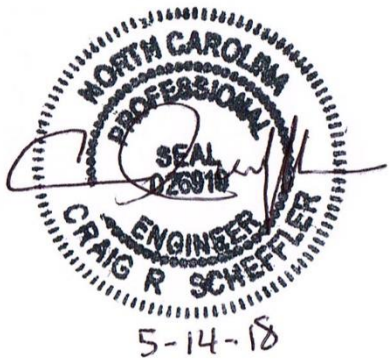
To
Philip Post, P.E., PLS
Philip Post Engineering, Inc.

From
Craig Scheffler, P.E., PTOE
HNTB North Carolina, P.C.

Cc
HNTB Project File: 73133

Subject
Christ Community Church of Chapel Hill –
Trip Generation Estimation

Date
05/15/18



Per direction from Philip Post Engineering, Inc. related to a proposed new facility for the Christ Community Church (CCC) of Chapel Hill, the following information represents an evaluation of existing and estimated future vehicular trip generation for the church based on number of attendees at the primary Sunday church worship service.

Existing CCC Trip Generation

To determine existing vehicular trip generation for CCC at its current worship service location at the Extraordinary Ventures building located on Elliott Road in Chapel Hill, HNTB staff conducted field trip generation counts on Sunday May 6, 2018. The results of field observations of the pre-service and post-service peak hours and overall tally of vehicles entering/exiting over the period of 9:45 AM – 12:30 PM is listed in **Table 1**.

Table 1 – Existing CCC Field Trip Observation Summary

Time Period	Trips Entering	Trips Exiting	Total Trips
Sunday School	30**	0	30
Pre-Worship Service Peak Hour	29	8	37
Post-Worship Service Peak hour	3	64	67
Total Raw Sunday "Daily" Trips	62	72	134

** - Based on Parking Lot Count

Two HNTB staff observed parking operations at the Extraordinary Ventures surface parking lot and for adjacent parking lots that were utilized by church attendees. Parking lot counts were also conducted during CCC Sunday School (9:15-10:45 AM time period) and during and post-worship service (10:45 AM and 12:30 PM).

Existing CCC Trip Generation Rates

Information from the Applicant related to average monthly worship attendance for 2017 and 2018 was provided to HNTB, along with an attendance count for the May 6th, 2018 worship service. **Table 2** highlights those results. It was also reported that approximately 40 members and staff total were present for Sunday School on May 6th.

Table 2 – CCC Average Monthly Attendance

Year	Month	Sunday Service Averages	Year	Month	Sunday Service Averages
2017	January	168	2017	October	166
	February	189		November	160
	March	181		December	178
	April	176	2018	January	169
	May	166		February	168
	June	156		March	160
	July	161		April	176
	August	168		*May 6th Actual*	*143*
	September	166	**Recent 12 Month Average**		**166.2**

Based on the field collected data in **Table 1**, and utilizing the most recent 12 month average attendance found in **Table 2**, the following trip rates, peak hour of generator, and overall "daily" trip generation estimates were calculated in **Table 3**. The post-service data was used for the "peak hour of generator", as it had the highest number of vehicular trips.

Table 3 – Existing CCC Trip Generation Estimation

Trip Rates - Peak Hour of Generator

Trip Rate for 5/6 Service	**0.47**	trips/attendee
ITE Comparable Trip Rate	**0.53**	trips/attendee

Trip Rates - Daily

Trip Rate for 5/6 Service	**0.94**	trips/attendee

Peak Hour / Daily Trips for Average Sunday - Existing CCC Church Service

Trip Generation Time Period	Enter	Exit	Total
Peak Hour of Generator	3	74	77
Total Sunday "Daily"	78	78	156

Table 3 presents the vehicular trip rates per attendee for the peak hour of generator and overall "daily" trip categories, as well as a comparison to Institute of Transportation Engineers (ITE) *Trip Generation Manual* (10th Edition, 2017) data for the peak hour of generator using number of attendees as a trip generating variable. Limited data exists for ITE Land Use Code 565 – Church related to number of attendees as a generating variable, so the results should be interpreted with caution, although they do correlate well with the field observed data.

Future CCC Trip Generation Estimates

Based on information provided by the Applicant presented in **Table 2**, the existing CCC average primary service attendance is approximately 166 as of May 2018. With the proposed new church facility to be located on Erwin Road, and considering growth opportunities provided by the new facility and expected membership growth in the future, a future Phase 1 projected church attendance of 220 at the primary service is expected in the next few years. Ultimate plans for church expansion and congregation growth, as envisioned by the Applicant over a 15 year period result in an estimate of 390 people attending a primary Sunday worship service in the future. These attendance expansion estimates produce attendance growth factors of 1.32 and 2.35, respectively.

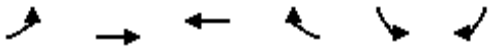
Table 4 shows the future CCC trip generation summary, taking into account the future attendance growth factors above applied to the existing trip generation rates derived from field data in **Table 3**.

Table 4 – Future CCC Trip Generation Estimate Summary

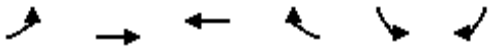
Future Scenario	Trip Generation Time Period	Enter	Exit	Total
Phase 1 Near Term	Peak Hour of Generator	4	98	102
	Total Sunday "Daily"	103	103	206
Phase 2 Ultimate 15 Year	Peak Hour of Generator	7	174	181
	Total Sunday "Daily"	183	183	366

No additional considerations or estimates were made for additional services or church-related functions on a typical Sunday. Additional service times would likely affect the "peak hour generator" data in terms of trip entering/exiting, as the generator peak hour would likely be the time period between the highest attended church services if multiple services were to exist. Total Sunday Daily trip generation estimates may or may not be affected, depending on additional church-related programs that would result in multiple trips being made by church membership.

Appendix E – Synchro Signalized Capacity Analysis Output



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø8
Lane Configurations							
Traffic Volume (vph)	0	0	1345	160	0	338	
Future Volume (vph)	0	0	1345	160	0	338	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Grade (%)		0%	0%		4%		
Storage Length (ft)	0			600	0	0	
Storage Lanes	0			1	0	2	
Taper Length (ft)	25				25		
Lane Util. Factor	1.00	1.00	*0.81	1.00	1.00	0.88	
Frt				0.850		0.850	
Flt Protected							
Satd. Flow (prot)	0	0	4526	1583	0	2731	
Flt Permitted							
Satd. Flow (perm)	0	0	4526	1583	0	2731	
Right Turn on Red				No		No	
Satd. Flow (RTOR)							
Link Speed (mph)		30	45		35		
Link Distance (ft)		743	764		314		
Travel Time (s)		16.9	11.6		6.1		
Peak Hour Factor	0.92	0.92	0.89	0.89	0.92	0.70	
Adj. Flow (vph)	0	0	1511	180	0	483	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	0	1511	180	0	483	
Turn Type			NA	custom		Perm	
Protected Phases			6				8
Permitted Phases				4 6		4	
Detector Phase			6	4 6		4	
Switch Phase							
Minimum Initial (s)			12.0			7.0	7.0
Minimum Split (s)			19.0			13.0	27.4
Total Split (s)			135.0			45.0	45.0
Total Split (%)			75.0%			25.0%	25%
Yellow Time (s)			4.5			3.0	3.0
All-Red Time (s)			1.7			2.4	2.4
Lost Time Adjust (s)			-1.2			-0.4	
Total Lost Time (s)			5.0			5.0	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode			C-Max			None	None
Act Effct Green (s)			135.0	180.0		35.0	
Actuated g/C Ratio			0.75	1.00		0.19	
v/c Ratio			0.45	0.11		0.91	
Control Delay			7.8	0.1		93.1	
Queue Delay			0.1	0.0		0.0	
Total Delay			7.9	0.1		93.1	
LOS			A	A		F	
Approach Delay			7.1		93.1		
Approach LOS			A		F		
Queue Length 50th (ft)			245	0		319	

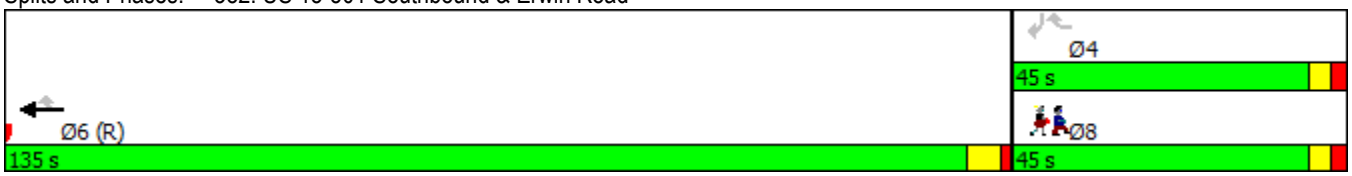


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø8
Queue Length 95th (ft)			260	0		286	
Internal Link Dist (ft)		663	684		234		
Turn Bay Length (ft)				600			
Base Capacity (vph)			3395	1577		606	
Starvation Cap Reductn			541	0		0	
Spillback Cap Reductn			0	0		0	
Storage Cap Reductn			0	0		0	
Reduced v/c Ratio			0.53	0.11		0.80	

Intersection Summary			
Area Type:	Other		
Cycle Length: 180			
Actuated Cycle Length: 180			
Offset: 151 (84%), Referenced to phase 6:WBT, Start of Green			
Natural Cycle: 55			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 26.2		Intersection LOS: C	
Intersection Capacity Utilization 46.1%		ICU Level of Service A	
Analysis Period (min) 15			

* User Entered Value

Splits and Phases: 382: US 15-501 Southbound & Erwin Road



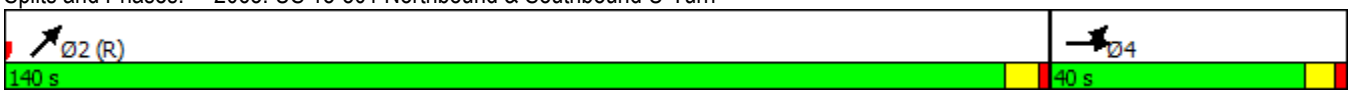
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	93	0	0	0	0	0	0	1611	0	0	0	0
Future Volume (vph)	93	0	0	0	0	0	0	1611	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			1%			0%	
Storage Length (ft)	0		125	0		0	0		0	0		0
Storage Lanes	2		1	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Frt												
Flt Protected	0.950											
Satd. Flow (prot)	3433	1863	0	0	0	0	0	3522	0	0	0	0
Flt Permitted	0.950											
Satd. Flow (perm)	3433	1863	0	0	0	0	0	3522	0	0	0	0
Right Turn on Red	No		No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		20			30			45			30	
Link Distance (ft)		210			123			846			732	
Travel Time (s)		7.2			2.8			12.8			16.6	
Peak Hour Factor	0.80	0.80	0.92	0.92	0.92	0.92	0.92	0.96	0.92	0.92	0.92	0.92
Adj. Flow (vph)	116	0	0	0	0	0	0	1678	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	116	0	0	0	0	0	0	1678	0	0	0	0
Turn Type	Split							NA				
Protected Phases	4	4						2				
Permitted Phases												
Detector Phase	4	4						2				
Switch Phase												
Minimum Initial (s)	7.0	7.0						12.0				
Minimum Split (s)	13.0	13.0						19.0				
Total Split (s)	40.0	40.0						140.0				
Total Split (%)	22.2%	22.2%						77.8%				
Yellow Time (s)	4.0	4.0						4.7				
All-Red Time (s)	2.0	2.0						1.5				
Lost Time Adjust (s)	-1.0	-1.0						-1.2				
Total Lost Time (s)	5.0	5.0						5.0				
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None						C-Max				
Act Effct Green (s)	10.7							159.3				
Actuated g/C Ratio	0.06							0.88				
v/c Ratio	0.57							0.54				
Control Delay	77.2							3.1				
Queue Delay	0.0							0.0				
Total Delay	77.2							3.1				
LOS	E							A				
Approach Delay		77.2						3.1				
Approach LOS		E						A				
Queue Length 50th (ft)	72							170				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Queue Length 95th (ft)	m91							234				
Internal Link Dist (ft)		130			43			766			652	
Turn Bay Length (ft)												
Base Capacity (vph)	667							3117				
Starvation Cap Reductn	0							0				
Spillback Cap Reductn	0							0				
Storage Cap Reductn	0							0				
Reduced v/c Ratio	0.17							0.54				

Intersection Summary			
Area Type:	Other		
Cycle Length: 180			
Actuated Cycle Length: 180			
Offset: 70 (39%), Referenced to phase 2:NET, Start of Green			
Natural Cycle: 45			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.57			
Intersection Signal Delay: 7.9		Intersection LOS: A	
Intersection Capacity Utilization 96.0%		ICU Level of Service F	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2065: US 15-501 Northbound & Southbound U-Turn



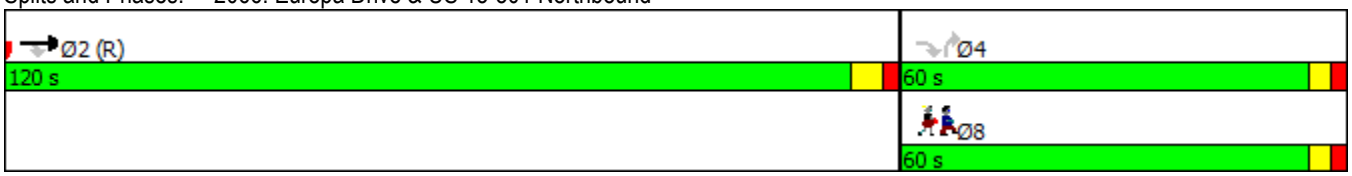
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Lane Configurations							
Traffic Volume (vph)	1571	133	0	0	0	145	
Future Volume (vph)	1571	133	0	0	0	145	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Grade (%)	1%			0%	-2%		
Storage Length (ft)		250	0		0	150	
Storage Lanes		1	0		0	1	
Taper Length (ft)			25		25		
Lane Util. Factor	*0.77	1.00	1.00	1.00	1.00	0.88	
Frt		0.850				0.850	
Flt Protected							
Satd. Flow (prot)	5709	1575	0	0	0	2815	
Flt Permitted							
Satd. Flow (perm)	5709	1575	0	0	0	2815	
Right Turn on Red		No				No	
Satd. Flow (RTOR)							
Link Speed (mph)	45			30	25		
Link Distance (ft)	732			555	706		
Travel Time (s)	11.1			12.6	19.3		
Peak Hour Factor	0.96	0.96	0.92	0.92	0.92	0.86	
Adj. Flow (vph)	1636	139	0	0	0	169	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	1636	139	0	0	0	169	
Turn Type	NA	custom				Perm	
Protected Phases	2						8
Permitted Phases		2 4				4	
Detector Phase	2	2 4				4	
Switch Phase							
Minimum Initial (s)	12.0					7.0	7.0
Minimum Split (s)	19.0					13.0	28.3
Total Split (s)	120.0					60.0	60.0
Total Split (%)	66.7%					33.3%	33%
Yellow Time (s)	4.5					3.0	3.0
All-Red Time (s)	2.3					2.3	2.3
Lost Time Adjust (s)	-1.8					-0.3	
Total Lost Time (s)	5.0					5.0	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	C-Max					None	None
Act Effct Green (s)	155.3	180.0				14.7	
Actuated g/C Ratio	0.86	1.00				0.08	
v/c Ratio	0.33	0.09				0.74	
Control Delay	1.9	0.1				99.2	
Queue Delay	0.0	0.0				0.0	
Total Delay	1.9	0.1				99.2	
LOS	A	A				F	
Approach Delay	1.8				99.2		
Approach LOS	A				F		
Queue Length 50th (ft)	60	0				113	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Queue Length 95th (ft)	64	0				151	
Internal Link Dist (ft)	652			475	626		
Turn Bay Length (ft)		250				150	
Base Capacity (vph)	4926	1575				860	
Starvation Cap Reductn	0	0				0	
Spillback Cap Reductn	0	0				0	
Storage Cap Reductn	0	0				0	
Reduced v/c Ratio	0.33	0.09				0.20	

Intersection Summary			
Area Type:	Other		
Cycle Length: 180			
Actuated Cycle Length: 180			
Offset: 96 (53%), Referenced to phase 2:EBT, Start of Green			
Natural Cycle: 50			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 10.3		Intersection LOS: B	
Intersection Capacity Utilization 36.9%		ICU Level of Service A	
Analysis Period (min) 15			

* User Entered Value

Splits and Phases: 2066: Europa Drive & US 15-501 Northbound

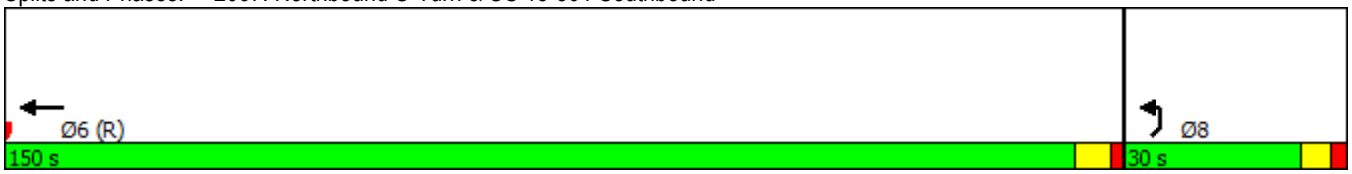


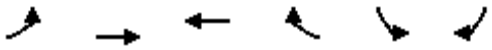
Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	0	0	0	1305	200	0
Future Volume (vph)	0	0	0	1305	200	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	0%			-2%	1%	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.97	1.00
Frt						
Flt Protected					0.950	
Satd. Flow (prot)	0	0	0	3575	3416	0
Flt Permitted					0.950	
Satd. Flow (perm)	0	0	0	3575	3416	0
Right Turn on Red		No			No	No
Satd. Flow (RTOR)						
Link Speed (mph)	30			45	20	
Link Distance (ft)	764			838	211	
Travel Time (s)	17.4			12.7	7.2	
Peak Hour Factor	0.92	0.92	0.92	0.89	0.87	0.92
Adj. Flow (vph)	0	0	0	1466	230	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	1466	230	0
Turn Type				NA	Prot	
Protected Phases				6	8	
Permitted Phases						
Detector Phase				6	8	
Switch Phase						
Minimum Initial (s)				12.0	7.0	
Minimum Split (s)				19.0	14.0	
Total Split (s)				150.0	30.0	
Total Split (%)				83.3%	16.7%	
Yellow Time (s)				4.7	4.0	
All-Red Time (s)				2.0	2.5	
Lost Time Adjust (s)				-1.7	-1.5	
Total Lost Time (s)				5.0	5.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode				C-Max	None	
Act Effct Green (s)				153.0	17.0	
Actuated g/C Ratio				0.85	0.09	
v/c Ratio				0.48	0.71	
Control Delay				4.2	87.4	
Queue Delay				0.0	0.0	
Total Delay				4.2	87.4	
LOS				A	F	
Approach Delay				4.2	87.4	
Approach LOS				A	F	
Queue Length 50th (ft)				191	140	
Queue Length 95th (ft)				257	181	
Internal Link Dist (ft)	684			758	131	
Turn Bay Length (ft)						

Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Base Capacity (vph)				3038	474	
Starvation Cap Reductn				0	0	
Spillback Cap Reductn				0	0	
Storage Cap Reductn				0	0	
Reduced v/c Ratio				0.48	0.49	

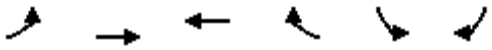
Intersection Summary			
Area Type:	Other		
Cycle Length: 180			
Actuated Cycle Length: 180			
Offset: 162 (90%), Referenced to phase 6:WBT, Start of Green			
Natural Cycle: 40			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 15.5		Intersection LOS: B	
Intersection Capacity Utilization 85.5%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 2067: Northbound U-Turn & US 15-501 Southbound





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø8
Lane Configurations							
Traffic Volume (vph)	0	0	1466	194	0	386	
Future Volume (vph)	0	0	1466	194	0	386	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Grade (%)		0%	0%		4%		
Storage Length (ft)	0			600	0	0	
Storage Lanes	0			1	0	2	
Taper Length (ft)	25				25		
Lane Util. Factor	1.00	1.00	*0.81	1.00	1.00	0.88	
Frt				0.850		0.850	
Flt Protected							
Satd. Flow (prot)	0	0	4526	1583	0	2731	
Flt Permitted							
Satd. Flow (perm)	0	0	4526	1583	0	2731	
Right Turn on Red				No		No	
Satd. Flow (RTOR)							
Link Speed (mph)		30	45		35		
Link Distance (ft)		743	764		314		
Travel Time (s)		16.9	11.6		6.1		
Peak Hour Factor	0.92	0.92	0.89	0.89	0.92	0.70	
Adj. Flow (vph)	0	0	1647	218	0	551	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	0	1647	218	0	551	
Turn Type			NA	custom		Perm	
Protected Phases			6				8
Permitted Phases				4 6		4	
Detector Phase			6	4 6		4	
Switch Phase							
Minimum Initial (s)			12.0			7.0	7.0
Minimum Split (s)			19.0			13.0	27.4
Total Split (s)			135.0			45.0	45.0
Total Split (%)			75.0%			25.0%	25%
Yellow Time (s)			4.5			3.0	3.0
All-Red Time (s)			1.7			2.4	2.4
Lost Time Adjust (s)			-1.2			-0.4	
Total Lost Time (s)			5.0			5.0	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode			C-Max			None	None
Act Effct Green (s)			131.7	180.0		38.3	
Actuated g/C Ratio			0.73	1.00		0.21	
v/c Ratio			0.50	0.14		0.95	
Control Delay			9.2	0.2		96.0	
Queue Delay			0.1	0.0		0.0	
Total Delay			9.3	0.2		96.0	
LOS			A	A		F	
Approach Delay			8.2		96.0		
Approach LOS			A		F		
Queue Length 50th (ft)			269	0		364	

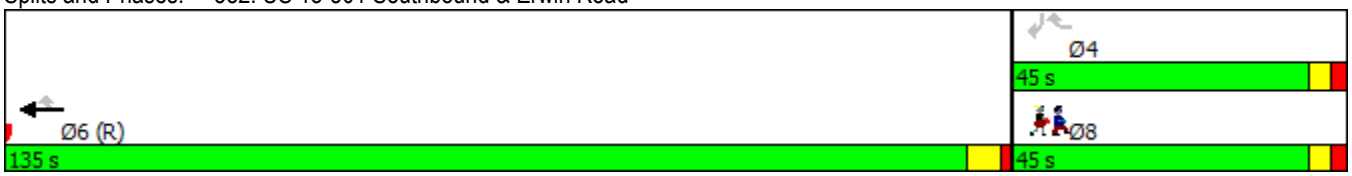


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø8
Queue Length 95th (ft)			283	0		328	
Internal Link Dist (ft)		663	684		234		
Turn Bay Length (ft)				600			
Base Capacity (vph)			3312	1579		606	
Starvation Cap Reductn			501	0		0	
Spillback Cap Reductn			0	0		0	
Storage Cap Reductn			0	0		0	
Reduced v/c Ratio			0.59	0.14		0.91	

Intersection Summary			
Area Type:	Other		
Cycle Length: 180			
Actuated Cycle Length: 180			
Offset: 151 (84%), Referenced to phase 6:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.95			
Intersection Signal Delay: 28.3		Intersection LOS: C	
Intersection Capacity Utilization 50.2%		ICU Level of Service A	
Analysis Period (min) 15			

* User Entered Value

Splits and Phases: 382: US 15-501 Southbound & Erwin Road



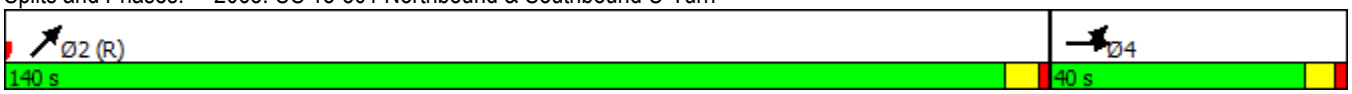
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	113	0	0	0	0	0	0	1768	0	0	0	0
Future Volume (vph)	113	0	0	0	0	0	0	1768	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			1%			0%	
Storage Length (ft)	0		125	0		0	0		0	0		0
Storage Lanes	2		1	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Frt												
Flt Protected	0.950											
Satd. Flow (prot)	3433	1863	0	0	0	0	0	3522	0	0	0	0
Flt Permitted	0.950											
Satd. Flow (perm)	3433	1863	0	0	0	0	0	3522	0	0	0	0
Right Turn on Red	No		No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		20			30			45			30	
Link Distance (ft)		210			123			846			732	
Travel Time (s)		7.2			2.8			12.8			16.6	
Peak Hour Factor	0.80	0.80	0.92	0.92	0.92	0.92	0.92	0.96	0.92	0.92	0.92	0.92
Adj. Flow (vph)	141	0	0	0	0	0	0	1842	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	141	0	0	0	0	0	0	1842	0	0	0	0
Turn Type	Split							NA				
Protected Phases	4	4						2				
Permitted Phases												
Detector Phase	4	4						2				
Switch Phase												
Minimum Initial (s)	7.0	7.0						12.0				
Minimum Split (s)	13.0	13.0						19.0				
Total Split (s)	40.0	40.0						140.0				
Total Split (%)	22.2%	22.2%						77.8%				
Yellow Time (s)	4.0	4.0						4.7				
All-Red Time (s)	2.0	2.0						1.5				
Lost Time Adjust (s)	-1.0	-1.0						-1.2				
Total Lost Time (s)	5.0	5.0						5.0				
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None						C-Max				
Act Effct Green (s)	11.8							158.2				
Actuated g/C Ratio	0.07							0.88				
v/c Ratio	0.63							0.60				
Control Delay	75.9							3.8				
Queue Delay	0.0							0.0				
Total Delay	75.9							3.8				
LOS	E							A				
Approach Delay		75.9						3.8				
Approach LOS		E						A				
Queue Length 50th (ft)	87							223				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Queue Length 95th (ft)	m102							307				
Internal Link Dist (ft)		130			43			766			652	
Turn Bay Length (ft)												
Base Capacity (vph)	667							3094				
Starvation Cap Reductn	0							0				
Spillback Cap Reductn	0							0				
Storage Cap Reductn	0							0				
Reduced v/c Ratio	0.21							0.60				

Intersection Summary			
Area Type:	Other		
Cycle Length: 180			
Actuated Cycle Length: 180			
Offset: 70 (39%), Referenced to phase 2:NET, Start of Green			
Natural Cycle: 50			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.63			
Intersection Signal Delay: 9.0		Intersection LOS: A	
Intersection Capacity Utilization 104.4%		ICU Level of Service G	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2065: US 15-501 Northbound & Southbound U-Turn



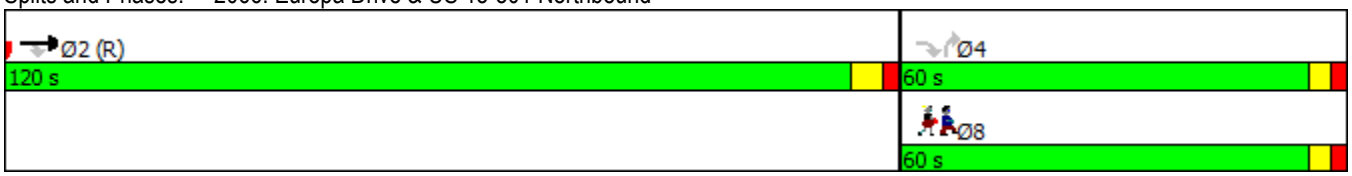
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Lane Configurations							
Traffic Volume (vph)	1739	141	0	0	0	154	
Future Volume (vph)	1739	141	0	0	0	154	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Grade (%)	1%			0%	-2%		
Storage Length (ft)		250	0		0	150	
Storage Lanes		1	0		0	1	
Taper Length (ft)			25		25		
Lane Util. Factor	*0.77	1.00	1.00	1.00	1.00	0.88	
Frt		0.850				0.850	
Flt Protected							
Satd. Flow (prot)	5709	1575	0	0	0	2815	
Flt Permitted							
Satd. Flow (perm)	5709	1575	0	0	0	2815	
Right Turn on Red		No				No	
Satd. Flow (RTOR)							
Link Speed (mph)	45			30	25		
Link Distance (ft)	732			555	706		
Travel Time (s)	11.1			12.6	19.3		
Peak Hour Factor	0.96	0.96	0.92	0.92	0.92	0.86	
Adj. Flow (vph)	1811	147	0	0	0	179	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	1811	147	0	0	0	179	
Turn Type	NA	custom				Perm	
Protected Phases	2						8
Permitted Phases		2 4				4	
Detector Phase	2	2 4				4	
Switch Phase							
Minimum Initial (s)	12.0					7.0	7.0
Minimum Split (s)	19.0					13.0	28.3
Total Split (s)	120.0					60.0	60.0
Total Split (%)	66.7%					33.3%	33%
Yellow Time (s)	4.5					3.0	3.0
All-Red Time (s)	2.3					2.3	2.3
Lost Time Adjust (s)	-1.8					-0.3	
Total Lost Time (s)	5.0					5.0	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	C-Max					None	None
Act Effct Green (s)	154.7	180.0				15.3	
Actuated g/C Ratio	0.86	1.00				0.08	
v/c Ratio	0.37	0.09				0.75	
Control Delay	2.1	0.1				99.0	
Queue Delay	0.1	0.0				0.0	
Total Delay	2.2	0.1				99.0	
LOS	A	A				F	
Approach Delay	2.0				99.0		
Approach LOS	A				F		
Queue Length 50th (ft)	71	0				119	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Queue Length 95th (ft)	75	0				157	
Internal Link Dist (ft)	652			475	626		
Turn Bay Length (ft)		250				150	
Base Capacity (vph)	4906	1575				860	
Starvation Cap Reductn	1209	0				0	
Spillback Cap Reductn	0	0				0	
Storage Cap Reductn	0	0				0	
Reduced v/c Ratio	0.49	0.09				0.21	

Intersection Summary			
Area Type:	Other		
Cycle Length: 180			
Actuated Cycle Length: 180			
Offset: 96 (53%), Referenced to phase 2:EBT, Start of Green			
Natural Cycle: 55			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.75			
Intersection Signal Delay: 10.1		Intersection LOS: B	
Intersection Capacity Utilization 39.4%		ICU Level of Service A	
Analysis Period (min) 15			

* User Entered Value

Splits and Phases: 2066: Europa Drive & US 15-501 Northbound

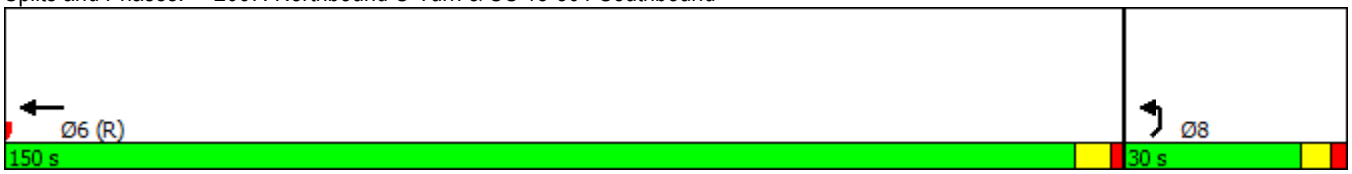


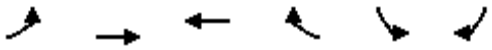
Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	0	0	0	1435	224	0
Future Volume (vph)	0	0	0	1435	224	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	0%			-2%	1%	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.97	1.00
Frt						
Flt Protected					0.950	
Satd. Flow (prot)	0	0	0	3575	3416	0
Flt Permitted					0.950	
Satd. Flow (perm)	0	0	0	3575	3416	0
Right Turn on Red		No			No	No
Satd. Flow (RTOR)						
Link Speed (mph)	30			45	20	
Link Distance (ft)	764			838	211	
Travel Time (s)	17.4			12.7	7.2	
Peak Hour Factor	0.92	0.92	0.92	0.89	0.87	0.92
Adj. Flow (vph)	0	0	0	1612	257	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	1612	257	0
Turn Type				NA	Prot	
Protected Phases				6	8	
Permitted Phases						
Detector Phase				6	8	
Switch Phase						
Minimum Initial (s)				12.0	7.0	
Minimum Split (s)				19.0	14.0	
Total Split (s)				150.0	30.0	
Total Split (%)				83.3%	16.7%	
Yellow Time (s)				4.7	4.0	
All-Red Time (s)				2.0	2.5	
Lost Time Adjust (s)				-1.7	-1.5	
Total Lost Time (s)				5.0	5.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode				C-Max	None	
Act Effct Green (s)				151.5	18.5	
Actuated g/C Ratio				0.84	0.10	
v/c Ratio				0.54	0.73	
Control Delay				5.1	86.2	
Queue Delay				0.0	0.0	
Total Delay				5.1	86.2	
LOS				A	F	
Approach Delay				5.1	86.2	
Approach LOS				A	F	
Queue Length 50th (ft)				242	156	
Queue Length 95th (ft)				322	196	
Internal Link Dist (ft)	684			758	131	
Turn Bay Length (ft)						

Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Base Capacity (vph)				3009	474	
Starvation Cap Reductn				0	0	
Spillback Cap Reductn				0	0	
Storage Cap Reductn				0	0	
Reduced v/c Ratio				0.54	0.54	

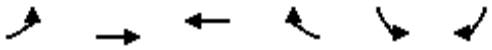
Intersection Summary			
Area Type:	Other		
Cycle Length: 180			
Actuated Cycle Length: 180			
Offset: 162 (90%), Referenced to phase 6:WBT, Start of Green			
Natural Cycle: 45			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 16.2		Intersection LOS: B	
Intersection Capacity Utilization 93.3%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 2067: Northbound U-Turn & US 15-501 Southbound





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø8
Lane Configurations							
Traffic Volume (vph)	0	0	1466	197	0	469	
Future Volume (vph)	0	0	1466	197	0	469	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Grade (%)		0%	0%		4%		
Storage Length (ft)	0			600	0	0	
Storage Lanes	0			1	0	2	
Taper Length (ft)	25				25		
Lane Util. Factor	1.00	1.00	*0.81	1.00	1.00	0.88	
Frt				0.850		0.850	
Flt Protected							
Satd. Flow (prot)	0	0	4526	1583	0	2731	
Flt Permitted							
Satd. Flow (perm)	0	0	4526	1583	0	2731	
Right Turn on Red				No		No	
Satd. Flow (RTOR)							
Link Speed (mph)		30	45		35		
Link Distance (ft)		743	764		314		
Travel Time (s)		16.9	11.6		6.1		
Peak Hour Factor	0.92	0.92	0.89	0.89	0.92	0.70	
Adj. Flow (vph)	0	0	1647	221	0	670	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	0	1647	221	0	670	
Turn Type			NA	custom		Perm	
Protected Phases			6				8
Permitted Phases				4 6		4	
Detector Phase			6	4 6		4	
Switch Phase							
Minimum Initial (s)			12.0			7.0	7.0
Minimum Split (s)			19.0			13.0	27.4
Total Split (s)			135.0			45.0	45.0
Total Split (%)			75.0%			25.0%	25%
Yellow Time (s)			4.5			3.0	3.0
All-Red Time (s)			1.7			2.4	2.4
Lost Time Adjust (s)			-1.2			-0.4	
Total Lost Time (s)			5.0			5.0	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode			C-Max			None	None
Act Effct Green (s)			130.0	180.0		40.0	
Actuated g/C Ratio			0.72	1.00		0.22	
v/c Ratio			0.50	0.14		1.11	
Control Delay			9.9	0.2		130.8	
Queue Delay			0.1	0.0		0.0	
Total Delay			10.0	0.2		130.8	
LOS			B	A		F	
Approach Delay			8.9		130.8		
Approach LOS			A		F		
Queue Length 50th (ft)			270	0		~509	



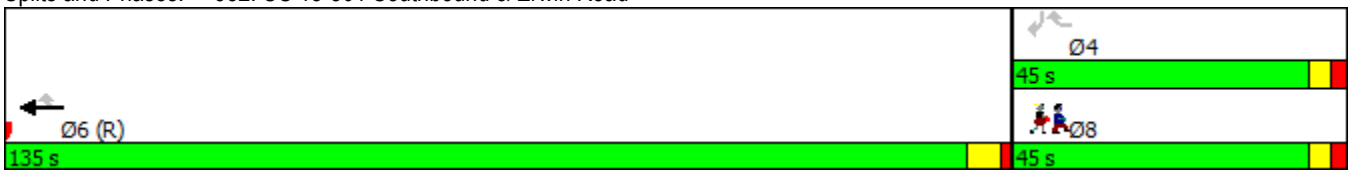
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø8
Queue Length 95th (ft)			283	0		407	
Internal Link Dist (ft)		663	684		234		
Turn Bay Length (ft)				600			
Base Capacity (vph)			3268	1583		606	
Starvation Cap Reductn			505	0		0	
Spillback Cap Reductn			0	0		0	
Storage Cap Reductn			0	0		0	
Reduced v/c Ratio			0.60	0.14		1.11	

Intersection Summary			
Area Type:	Other		
Cycle Length: 180			
Actuated Cycle Length: 180			
Offset: 151 (84%), Referenced to phase 6:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.11			
Intersection Signal Delay: 41.0		Intersection LOS: D	
Intersection Capacity Utilization 53.1%		ICU Level of Service A	
Analysis Period (min) 15			

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

Splits and Phases: 382: US 15-501 Southbound & Erwin Road



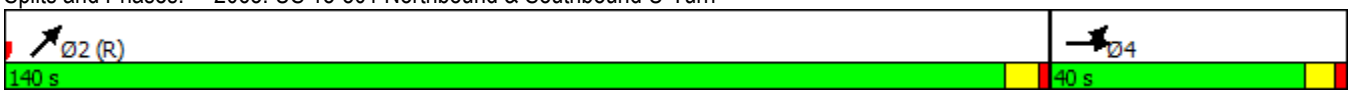
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	152	0	0	0	0	0	0	1770	0	0	0	0
Future Volume (vph)	152	0	0	0	0	0	0	1770	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			1%			0%	
Storage Length (ft)	0		125	0		0	0		0	0		0
Storage Lanes	2		1	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Frt												
Flt Protected	0.950											
Satd. Flow (prot)	3433	1863	0	0	0	0	0	3522	0	0	0	0
Flt Permitted	0.950											
Satd. Flow (perm)	3433	1863	0	0	0	0	0	3522	0	0	0	0
Right Turn on Red	No		No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		20			30			45			30	
Link Distance (ft)		210			123			846			732	
Travel Time (s)		7.2			2.8			12.8			16.6	
Peak Hour Factor	0.80	0.80	0.92	0.92	0.92	0.92	0.92	0.96	0.92	0.92	0.92	0.92
Adj. Flow (vph)	190	0	0	0	0	0	0	1844	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	190	0	0	0	0	0	0	1844	0	0	0	0
Turn Type	Split							NA				
Protected Phases	4	4						2				
Permitted Phases												
Detector Phase	4	4						2				
Switch Phase												
Minimum Initial (s)	7.0	7.0						12.0				
Minimum Split (s)	13.0	13.0						19.0				
Total Split (s)	40.0	40.0						140.0				
Total Split (%)	22.2%	22.2%						77.8%				
Yellow Time (s)	4.0	4.0						4.7				
All-Red Time (s)	2.0	2.0						1.5				
Lost Time Adjust (s)	-1.0	-1.0						-1.2				
Total Lost Time (s)	5.0	5.0						5.0				
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None						C-Max				
Act Effct Green (s)	14.4							155.6				
Actuated g/C Ratio	0.08							0.86				
v/c Ratio	0.69							0.61				
Control Delay	74.8							4.7				
Queue Delay	0.0							0.0				
Total Delay	74.8							4.7				
LOS	E							A				
Approach Delay		74.8						4.7				
Approach LOS		E						A				
Queue Length 50th (ft)	118							261				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Queue Length 95th (ft)	m127							358				
Internal Link Dist (ft)		130			43			766			652	
Turn Bay Length (ft)												
Base Capacity (vph)	667							3044				
Starvation Cap Reductn	0							0				
Spillback Cap Reductn	0							0				
Storage Cap Reductn	0							0				
Reduced v/c Ratio	0.28							0.61				

Intersection Summary			
Area Type:	Other		
Cycle Length: 180			
Actuated Cycle Length: 180			
Offset: 70 (39%), Referenced to phase 2:NET, Start of Green			
Natural Cycle: 50			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 11.2		Intersection LOS: B	
Intersection Capacity Utilization 105.7%		ICU Level of Service G	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2065: US 15-501 Northbound & Southbound U-Turn



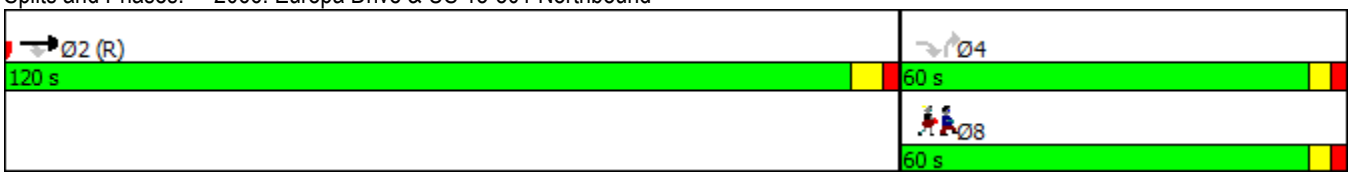
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Lane Configurations							
Traffic Volume (vph)	1780	141	0	0	0	154	
Future Volume (vph)	1780	141	0	0	0	154	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Grade (%)	1%			0%	-2%		
Storage Length (ft)		250	0		0	150	
Storage Lanes		1	0		0	1	
Taper Length (ft)			25		25		
Lane Util. Factor	*0.77	1.00	1.00	1.00	1.00	0.88	
Frt		0.850				0.850	
Flt Protected							
Satd. Flow (prot)	5709	1575	0	0	0	2815	
Flt Permitted							
Satd. Flow (perm)	5709	1575	0	0	0	2815	
Right Turn on Red		No				No	
Satd. Flow (RTOR)							
Link Speed (mph)	45			30	25		
Link Distance (ft)	732			555	706		
Travel Time (s)	11.1			12.6	19.3		
Peak Hour Factor	0.96	0.96	0.92	0.92	0.92	0.86	
Adj. Flow (vph)	1854	147	0	0	0	179	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	1854	147	0	0	0	179	
Turn Type	NA	custom				Perm	
Protected Phases	2						8
Permitted Phases		2 4				4	
Detector Phase	2	2 4				4	
Switch Phase							
Minimum Initial (s)	12.0					7.0	7.0
Minimum Split (s)	19.0					13.0	28.3
Total Split (s)	120.0					60.0	60.0
Total Split (%)	66.7%					33.3%	33%
Yellow Time (s)	4.5					3.0	3.0
All-Red Time (s)	2.3					2.3	2.3
Lost Time Adjust (s)	-1.8					-0.3	
Total Lost Time (s)	5.0					5.0	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	C-Max					None	None
Act Effct Green (s)	154.7	180.0				15.3	
Actuated g/C Ratio	0.86	1.00				0.08	
v/c Ratio	0.38	0.09				0.75	
Control Delay	2.3	0.1				99.0	
Queue Delay	0.1	0.0				0.0	
Total Delay	2.4	0.1				99.0	
LOS	A	A				F	
Approach Delay	2.2				99.0		
Approach LOS	A				F		
Queue Length 50th (ft)	89	0				119	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø8
Queue Length 95th (ft)	94	0				157	
Internal Link Dist (ft)	652			475	626		
Turn Bay Length (ft)		250				150	
Base Capacity (vph)	4906	1575				860	
Starvation Cap Reductn	1213	0				0	
Spillback Cap Reductn	0	0				0	
Storage Cap Reductn	0	0				0	
Reduced v/c Ratio	0.50	0.09				0.21	

Intersection Summary			
Area Type:	Other		
Cycle Length: 180			
Actuated Cycle Length: 180			
Offset: 96 (53%), Referenced to phase 2:EBT, Start of Green			
Natural Cycle: 55			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.75			
Intersection Signal Delay: 10.1		Intersection LOS: B	
Intersection Capacity Utilization 40.0%		ICU Level of Service A	
Analysis Period (min) 15			

* User Entered Value

Splits and Phases: 2066: Europa Drive & US 15-501 Northbound

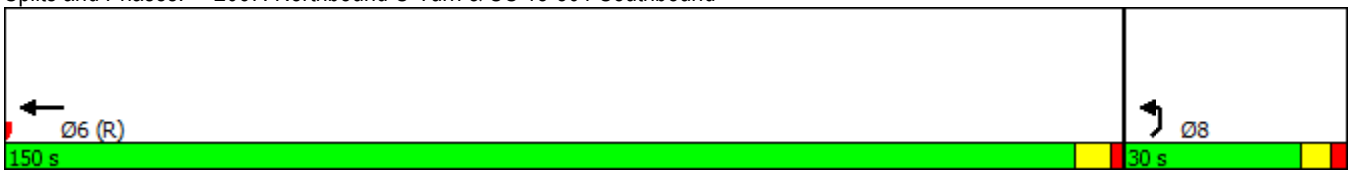


Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	0	0	0	1437	226	0
Future Volume (vph)	0	0	0	1437	226	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	0%			-2%	1%	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.97	1.00
Frt						
Flt Protected					0.950	
Satd. Flow (prot)	0	0	0	3575	3416	0
Flt Permitted					0.950	
Satd. Flow (perm)	0	0	0	3575	3416	0
Right Turn on Red		No			No	No
Satd. Flow (RTOR)						
Link Speed (mph)	30			45	20	
Link Distance (ft)	764			838	211	
Travel Time (s)	17.4			12.7	7.2	
Peak Hour Factor	0.92	0.92	0.92	0.89	0.87	0.92
Adj. Flow (vph)	0	0	0	1615	260	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	1615	260	0
Turn Type				NA	Prot	
Protected Phases				6	8	
Permitted Phases						
Detector Phase				6	8	
Switch Phase						
Minimum Initial (s)				12.0	7.0	
Minimum Split (s)				19.0	14.0	
Total Split (s)				150.0	30.0	
Total Split (%)				83.3%	16.7%	
Yellow Time (s)				4.7	4.0	
All-Red Time (s)				2.0	2.5	
Lost Time Adjust (s)				-1.7	-1.5	
Total Lost Time (s)				5.0	5.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode				C-Max	None	
Act Effct Green (s)				151.4	18.6	
Actuated g/C Ratio				0.84	0.10	
v/c Ratio				0.54	0.74	
Control Delay				5.1	85.5	
Queue Delay				0.0	0.0	
Total Delay				5.1	85.5	
LOS				A	F	
Approach Delay				5.1	85.5	
Approach LOS				A	F	
Queue Length 50th (ft)				243	158	
Queue Length 95th (ft)				325	200	
Internal Link Dist (ft)	684			758	131	
Turn Bay Length (ft)						

Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Base Capacity (vph)				3006	474	
Starvation Cap Reductn				0	0	
Spillback Cap Reductn				0	0	
Storage Cap Reductn				0	0	
Reduced v/c Ratio				0.54	0.55	

Intersection Summary			
Area Type:	Other		
Cycle Length: 180			
Actuated Cycle Length: 180			
Offset: 162 (90%), Referenced to phase 6:WBT, Start of Green			
Natural Cycle: 45			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 16.3		Intersection LOS: B	
Intersection Capacity Utilization 94.4%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 2067: Northbound U-Turn & US 15-501 Southbound



Appendix F – Synchro Unsignalized HCM Analysis Output

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	50	33	8	5	1
Future Vol, veh/h	1	50	33	8	5	1
Conflicting Peds, #/hr	5	0	0	5	1	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	5	-5	-	-5	-
Peak Hour Factor	67	67	93	93	75	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	75	35	9	7	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	49	0	-	0	123	45
Stage 1	-	-	-	-	45	-
Stage 2	-	-	-	-	78	-
Critical Hdwy	4.12	-	-	-	5.42	5.72
Critical Hdwy Stg 1	-	-	-	-	4.42	-
Critical Hdwy Stg 2	-	-	-	-	4.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1558	-	-	-	902	1031
Stage 1	-	-	-	-	990	-
Stage 2	-	-	-	-	966	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1551	-	-	-	892	1026
Mov Cap-2 Maneuver	-	-	-	-	892	-
Stage 1	-	-	-	-	984	-
Stage 2	-	-	-	-	961	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1551	-	-	-	912
HCM Lane V/C Ratio	0.001	-	-	-	0.009
HCM Control Delay (s)	7.3	0	-	-	9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	1	32	3	0	2	33	83	2	0	297	7
Future Vol, veh/h	22	1	32	3	0	2	33	83	2	0	297	7
Conflicting Peds, #/hr	3	0	2	2	0	3	2	0	5	5	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	7	-	-	-4	-	-	3	-	-	-3	-
Peak Hour Factor	65	65	65	63	63	63	84	84	84	66	66	66
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	34	2	49	5	0	3	39	99	2	0	450	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	641	642	460	666	646	108	463	0	0	106	0	0
Stage 1	458	458	-	183	183	-	-	-	-	-	-	-
Stage 2	183	184	-	483	463	-	-	-	-	-	-	-
Critical Hdwy	8.52	7.92	6.92	6.32	5.72	5.82	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	7.52	6.92	-	5.32	4.72	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.52	6.92	-	5.32	4.72	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	302	306	550	432	451	957	1098	-	-	1485	-	-
Stage 1	488	474	-	853	779	-	-	-	-	-	-	-
Stage 2	763	696	-	629	625	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	291	293	548	378	432	950	1096	-	-	1478	-	-
Mov Cap-2 Maneuver	291	293	-	378	432	-	-	-	-	-	-	-
Stage 1	470	473	-	819	747	-	-	-	-	-	-	-
Stage 2	731	667	-	570	624	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.4	12.3	2.4	0
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1096	-	-	400	498	1478	-	-
HCM Lane V/C Ratio	0.036	-	-	0.212	0.016	-	-	-
HCM Control Delay (s)	8.4	-	-	16.4	12.3	0	-	-
HCM Lane LOS	A	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.8	0	0	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	4	114	3	0	332
Future Vol, veh/h	6	4	114	3	0	332
Conflicting Peds, #/hr	0	0	0	5	5	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	125	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-3	-	3	-	-	-3
Peak Hour Factor	50	50	89	89	65	65
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	8	128	3	0	511

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	646	135	0	0	136	0
Stage 1	135	-	-	-	-	-
Stage 2	511	-	-	-	-	-
Critical Hdwy	5.82	5.92	-	-	4.12	-
Critical Hdwy Stg 1	4.82	-	-	-	-	-
Critical Hdwy Stg 2	4.82	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	486	924	-	-	1448	-
Stage 1	912	-	-	-	-	-
Stage 2	656	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	484	920	-	-	1441	-
Mov Cap-2 Maneuver	484	-	-	-	-	-
Stage 1	907	-	-	-	-	-
Stage 2	656	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	597	1441	-
HCM Lane V/C Ratio	-	-	0.034	-	-
HCM Control Delay (s)	-	-	11.2	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	17	12	9	11	5	39	110	11	15	310	36
Future Vol, veh/h	6	17	12	9	11	5	39	110	11	15	310	36
Conflicting Peds, #/hr	3	0	0	0	0	3	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	75	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	2	-	-	-2	-	-	2	-	-	-4	-
Peak Hour Factor	73	73	73	57	57	57	93	93	93	70	70	70
Heavy Vehicles, %	2	2	2	4	4	4	2	2	2	2	2	2
Mvmt Flow	8	23	16	16	19	9	42	118	12	21	443	51

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	736	725	247	483	744	127	494	0	0	130	0	0
Stage 1	511	511	-	208	208	-	-	-	-	-	-	-
Stage 2	225	214	-	275	536	-	-	-	-	-	-	-
Critical Hdwy	7.73	6.93	7.13	6.96	6.16	6.06	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.93	5.93	-	5.76	5.16	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.53	5.93	-	6.16	5.16	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	3.538	4.038	3.338	2.219	-	-	2.219	-	-
Pot Cap-1 Maneuver	295	324	744	502	368	923	1068	-	-	1454	-	-
Stage 1	486	507	-	807	742	-	-	-	-	-	-	-
Stage 2	758	708	-	725	550	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	267	305	744	442	347	920	1068	-	-	1454	-	-
Mov Cap-2 Maneuver	267	305	-	442	347	-	-	-	-	-	-	-
Stage 1	467	497	-	776	713	-	-	-	-	-	-	-
Stage 2	700	680	-	662	539	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.1	14.2	2.1	0.4
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1068	-	-	371	435	1454	-	-
HCM Lane V/C Ratio	0.039	-	-	0.129	0.101	0.015	-	-
HCM Control Delay (s)	8.5	-	-	16.1	14.2	7.5	0.1	-
HCM Lane LOS	A	-	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.3	0	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	53	35	8	5	1
Future Vol, veh/h	1	53	35	8	5	1
Conflicting Peds, #/hr	5	0	0	5	1	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	5	-5	-	-5	-
Peak Hour Factor	67	67	93	93	75	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	79	38	9	7	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	52	0	-	0	130	48
Stage 1	-	-	-	-	48	-
Stage 2	-	-	-	-	82	-
Critical Hdwy	4.12	-	-	-	5.42	5.72
Critical Hdwy Stg 1	-	-	-	-	4.42	-
Critical Hdwy Stg 2	-	-	-	-	4.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1554	-	-	-	896	1028
Stage 1	-	-	-	-	988	-
Stage 2	-	-	-	-	963	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1547	-	-	-	886	1023
Mov Cap-2 Maneuver	-	-	-	-	886	-
Stage 1	-	-	-	-	982	-
Stage 2	-	-	-	-	958	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1547	-	-	-	906
HCM Lane V/C Ratio	0.001	-	-	-	0.009
HCM Control Delay (s)	7.3	0	-	-	9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	23	1	34	3	0	2	35	93	2	0	319	7
Future Vol, veh/h	23	1	34	3	0	2	35	93	2	0	319	7
Conflicting Peds, #/hr	3	0	2	2	0	3	2	0	5	5	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	7	-	-	-4	-	-	3	-	-	-3	-
Peak Hour Factor	65	65	65	63	63	63	84	84	84	66	66	66
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	35	2	52	5	0	3	42	111	2	0	483	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	692	693	493	719	697	120	496	0	0	118	0	0
Stage 1	491	491	-	201	201	-	-	-	-	-	-	-
Stage 2	201	202	-	518	496	-	-	-	-	-	-	-
Critical Hdwy	8.52	7.92	6.92	6.32	5.72	5.82	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	7.52	6.92	-	5.32	4.72	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.52	6.92	-	5.32	4.72	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	274	280	523	403	426	944	1068	-	-	1470	-	-
Stage 1	462	453	-	837	769	-	-	-	-	-	-	-
Stage 2	741	679	-	607	609	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	264	267	521	348	406	937	1066	-	-	1463	-	-
Mov Cap-2 Maneuver	264	267	-	348	406	-	-	-	-	-	-	-
Stage 1	443	452	-	800	735	-	-	-	-	-	-	-
Stage 2	707	649	-	543	608	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.7	12.9	2.3	0
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1066	-	-	371	465	1463	-	-
HCM Lane V/C Ratio	0.039	-	-	0.241	0.017	-	-	-
HCM Control Delay (s)	8.5	-	-	17.7	12.9	0	-	-
HCM Lane LOS	A	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.9	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	4	126	3	0	356
Future Vol, veh/h	6	4	126	3	0	356
Conflicting Peds, #/hr	0	0	0	5	5	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	125	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-3	-	3	-	-	-3
Peak Hour Factor	50	50	89	89	65	65
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	8	142	3	0	548

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	697	149	0	0	150	0
Stage 1	149	-	-	-	-	-
Stage 2	548	-	-	-	-	-
Critical Hdwy	5.82	5.92	-	-	4.12	-
Critical Hdwy Stg 1	4.82	-	-	-	-	-
Critical Hdwy Stg 2	4.82	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	457	909	-	-	1431	-
Stage 1	901	-	-	-	-	-
Stage 2	635	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	455	905	-	-	1424	-
Mov Cap-2 Maneuver	455	-	-	-	-	-
Stage 1	896	-	-	-	-	-
Stage 2	635	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.6	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	568	1424	-
HCM Lane V/C Ratio	-	-	0.035	-	-
HCM Control Delay (s)	-	-	11.6	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	18	13	10	12	5	41	141	12	16	357	38
Future Vol, veh/h	6	18	13	10	12	5	41	141	12	16	357	38
Conflicting Peds, #/hr	3	0	0	0	0	3	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	75	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	2	-	-	-2	-	-	2	-	-	-4	-
Peak Hour Factor	73	73	73	57	57	57	93	93	93	70	70	70
Heavy Vehicles, %	2	2	2	4	4	4	2	2	2	2	2	2
Mvmt Flow	8	25	18	18	21	9	44	152	13	23	510	54

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	848	836	282	561	857	162	564	0	0	165	0	0
Stage 1	583	583	-	247	247	-	-	-	-	-	-	-
Stage 2	265	253	-	314	610	-	-	-	-	-	-	-
Critical Hdwy	7.73	6.93	7.13	6.96	6.16	6.06	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.93	5.93	-	5.76	5.16	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.53	5.93	-	6.16	5.16	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	3.538	4.038	3.338	2.219	-	-	2.219	-	-
Pot Cap-1 Maneuver	244	276	705	447	320	884	1006	-	-	1412	-	-
Stage 1	437	466	-	772	716	-	-	-	-	-	-	-
Stage 2	718	678	-	691	514	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	216	258	705	384	299	881	1006	-	-	1412	-	-
Mov Cap-2 Maneuver	216	258	-	384	299	-	-	-	-	-	-	-
Stage 1	418	455	-	738	684	-	-	-	-	-	-	-
Stage 2	657	648	-	622	502	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.4	16	1.8	0.4
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1006	-	-	319	376	1412	-	-
HCM Lane V/C Ratio	0.044	-	-	0.159	0.126	0.016	-	-
HCM Control Delay (s)	8.7	-	-	18.4	16	7.6	0.1	-
HCM Lane LOS	A	-	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.6	0.4	0	-	-

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	53	0	4	35	8	0	0	29	5	0	1
Future Vol, veh/h	1	53	0	4	35	8	0	0	29	5	0	1
Conflicting Peds, #/hr	5	0	0	0	0	5	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	5	-	-	-5	-	-	4	-	-	-5	-
Peak Hour Factor	67	67	50	50	93	93	50	50	50	75	50	75
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	79	0	8	38	9	0	0	58	7	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	52	0	0	79	0	0	140	149	80	175	145	48
Stage 1	-	-	-	-	-	-	81	81	-	64	64	-
Stage 2	-	-	-	-	-	-	59	68	-	111	81	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.92	7.32	6.62	6.12	5.52	5.72
Critical Hdwy Stg 1	-	-	-	-	-	-	6.92	6.32	-	5.12	4.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.92	6.32	-	5.12	4.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1554	-	-	1519	-	-	805	718	972	827	777	1028
Stage 1	-	-	-	-	-	-	911	813	-	964	857	-
Stage 2	-	-	-	-	-	-	940	826	-	922	846	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1547	-	-	1519	-	-	800	710	971	770	768	1023
Mov Cap-2 Maneuver	-	-	-	-	-	-	800	710	-	770	768	-
Stage 1	-	-	-	-	-	-	910	812	-	958	848	-
Stage 2	-	-	-	-	-	-	934	818	-	865	845	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.1	8.9	9.5
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	971	1547	-	-	1519	-	-	803
HCM Lane V/C Ratio	0.06	0.001	-	-	0.005	-	-	0.01
HCM Control Delay (s)	8.9	7.3	0	-	7.4	0	-	9.5
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	1	49	3	0	2	38	93	2	0	319	8
Future Vol, veh/h	38	1	49	3	0	2	38	93	2	0	319	8
Conflicting Peds, #/hr	3	0	2	2	0	3	2	0	5	5	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	7	-	-	-4	-	-	3	-	-	-3	-
Peak Hour Factor	65	65	65	63	63	63	84	84	84	66	66	66
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	58	2	75	5	0	3	45	111	2	0	483	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	698	699	493	737	704	120	497	0	0	118	0	0
Stage 1	491	491	-	207	207	-	-	-	-	-	-	-
Stage 2	207	208	-	530	497	-	-	-	-	-	-	-
Critical Hdwy	8.52	7.92	6.92	6.32	5.72	5.82	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	7.52	6.92	-	5.32	4.72	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.52	6.92	-	5.32	4.72	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	271	277	523	394	423	944	1067	-	-	1470	-	-
Stage 1	462	453	-	832	765	-	-	-	-	-	-	-
Stage 2	734	673	-	599	608	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	260	263	521	323	402	937	1065	-	-	1463	-	-
Mov Cap-2 Maneuver	260	263	-	323	402	-	-	-	-	-	-	-
Stage 1	442	452	-	793	729	-	-	-	-	-	-	-
Stage 2	699	641	-	510	607	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20.8	13.4	2.4	0
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1065	-	-	361	438	1463	-	-
HCM Lane V/C Ratio	0.042	-	-	0.375	0.018	-	-	-
HCM Control Delay (s)	8.5	-	-	20.8	13.4	0	-	-
HCM Lane LOS	A	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	1.7	0.1	0	-	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	69	6	0	4	0	129	3	0	371	0
Future Vol, veh/h	0	0	69	6	0	4	0	129	3	0	371	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	5	5	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	125	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	2	-	-	-3	-	-	3	-	-	-3	-
Peak Hour Factor	92	92	50	50	92	50	92	89	89	65	65	50
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	138	12	0	8	0	145	3	0	571	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	571	792	723	152	-	0	0	153	0	0
Stage 1	-	-	-	152	152	-	-	-	-	-	-	-
Stage 2	-	-	-	640	571	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.42	6.52	5.92	5.92	-	-	-	4.12	-	-
Critical Hdwy Stg 1	-	-	-	5.52	4.92	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	5.52	4.92	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	0	504	350	398	906	0	-	-	1428	-	-
Stage 1	0	0	-	872	791	-	0	-	-	-	-	-
Stage 2	0	0	-	516	555	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	504	253	396	902	-	-	-	1421	-	-
Mov Cap-2 Maneuver	-	-	-	253	396	-	-	-	-	-	-	-
Stage 1	-	-	-	872	787	-	-	-	-	-	-	-
Stage 2	-	-	-	375	555	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.8	15.7	0	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	504	355	1421	-	-
HCM Lane V/C Ratio	-	-	0.274	0.056	-	-	-
HCM Control Delay (s)	-	-	14.8	15.7	0	-	-
HCM Lane LOS	-	-	B	C	A	-	-
HCM 95th %tile Q(veh)	-	-	1.1	0.2	0	-	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	18	13	10	12	5	41	144	12	16	440	38
Future Vol, veh/h	6	18	13	10	12	5	41	144	12	16	440	38
Conflicting Peds, #/hr	3	0	0	0	0	3	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	75	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	2	-	-	-2	-	-	2	-	-	-4	-
Peak Hour Factor	73	73	73	57	57	57	93	93	93	70	70	70
Heavy Vehicles, %	2	2	2	4	4	4	2	2	2	2	2	2
Mvmt Flow	8	25	18	18	21	9	44	155	13	23	629	54

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	970	958	342	623	979	165	683	0	0	168	0	0
Stage 1	702	702	-	250	250	-	-	-	-	-	-	-
Stage 2	268	256	-	373	729	-	-	-	-	-	-	-
Critical Hdwy	7.73	6.93	7.13	6.96	6.16	6.06	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.93	5.93	-	5.76	5.16	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.53	5.93	-	6.16	5.16	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	3.538	4.038	3.338	2.219	-	-	2.219	-	-
Pot Cap-1 Maneuver	197	231	642	408	275	881	908	-	-	1408	-	-
Stage 1	366	407	-	769	714	-	-	-	-	-	-	-
Stage 2	715	676	-	642	459	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	172	214	642	341	255	878	908	-	-	1408	-	-
Mov Cap-2 Maneuver	172	214	-	341	255	-	-	-	-	-	-	-
Stage 1	348	396	-	732	680	-	-	-	-	-	-	-
Stage 2	651	644	-	570	447	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	21.7	17.8	1.9	0.3
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	908	-	-	266	329	1408	-	-
HCM Lane V/C Ratio	0.049	-	-	0.191	0.144	0.016	-	-
HCM Control Delay (s)	9.2	-	-	21.7	17.8	7.6	0.1	-
HCM Lane LOS	A	-	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.7	0.5	0	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	53	0	1	35	8	0	0	15	5	0	1
Future Vol, veh/h	1	53	0	1	35	8	0	0	15	5	0	1
Conflicting Peds, #/hr	5	0	0	0	0	5	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	5	-	-	-5	-	-	4	-	-	-5	-
Peak Hour Factor	67	67	50	50	93	93	50	50	50	75	50	75
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	79	0	2	38	9	0	0	30	7	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	52	0	0	79	0	0	128	137	80	149	133	48
Stage 1	-	-	-	-	-	-	81	81	-	52	52	-
Stage 2	-	-	-	-	-	-	47	56	-	97	81	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.92	7.32	6.62	6.12	5.52	5.72
Critical Hdwy Stg 1	-	-	-	-	-	-	6.92	6.32	-	5.12	4.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.92	6.32	-	5.12	4.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1554	-	-	1519	-	-	821	731	972	854	786	1028
Stage 1	-	-	-	-	-	-	911	813	-	975	864	-
Stage 2	-	-	-	-	-	-	957	838	-	934	846	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1547	-	-	1519	-	-	819	726	971	822	780	1023
Mov Cap-2 Maneuver	-	-	-	-	-	-	819	726	-	822	780	-
Stage 1	-	-	-	-	-	-	910	812	-	969	859	-
Stage 2	-	-	-	-	-	-	955	833	-	903	845	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.3	8.8	9.3
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	971	1547	-	-	1519	-	-	850
HCM Lane V/C Ratio	0.031	0.001	-	-	0.001	-	-	0.009
HCM Control Delay (s)	8.8	7.3	0	-	7.4	0	-	9.3
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	33	1	39	3	0	2	35	98	2	0	319	8
Future Vol, veh/h	33	1	39	3	0	2	35	98	2	0	319	8
Conflicting Peds, #/hr	3	0	2	2	0	3	2	0	5	5	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	7	-	-	-4	-	-	3	-	-	-3	-
Peak Hour Factor	65	65	65	63	63	63	84	84	84	66	66	66
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	51	2	60	5	0	3	42	117	2	0	483	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	698	699	493	729	704	126	497	0	0	124	0	0
Stage 1	491	491	-	207	207	-	-	-	-	-	-	-
Stage 2	207	208	-	522	497	-	-	-	-	-	-	-
Critical Hdwy	8.52	7.92	6.92	6.32	5.72	5.82	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	7.52	6.92	-	5.32	4.72	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.52	6.92	-	5.32	4.72	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	271	277	523	398	423	937	1067	-	-	1463	-	-
Stage 1	462	453	-	832	765	-	-	-	-	-	-	-
Stage 2	734	673	-	604	608	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	261	264	521	338	404	930	1065	-	-	1456	-	-
Mov Cap-2 Maneuver	261	264	-	338	404	-	-	-	-	-	-	-
Stage 1	443	452	-	795	731	-	-	-	-	-	-	-
Stage 2	701	643	-	532	607	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.7	13.1	2.2	0
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1065	-	-	356	453	1456	-	-
HCM Lane V/C Ratio	0.039	-	-	0.315	0.018	-	-	-
HCM Control Delay (s)	8.5	-	-	19.7	13.1	0	-	-
HCM Lane LOS	A	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	1.3	0.1	0	-	-

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	78	6	0	4	3	126	3	0	361	0
Future Vol, veh/h	5	0	78	6	0	4	3	126	3	0	361	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	5	5	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	125	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	2	-	-	-3	-	-	3	-	-	-3	-
Peak Hour Factor	50	50	50	50	92	50	50	89	89	65	65	50
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	0	156	12	0	8	6	142	3	0	555	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	715	717	555	794	716	149	555	0	0	150	0	0
Stage 1	555	555	-	161	161	-	-	-	-	-	-	-
Stage 2	160	162	-	633	555	-	-	-	-	-	-	-
Critical Hdwy	7.52	6.92	6.42	6.52	5.92	5.92	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.52	5.92	-	5.52	4.92	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.52	5.92	-	5.52	4.92	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	319	328	515	349	401	909	1015	-	-	1431	-	-
Stage 1	485	483	-	864	786	-	-	-	-	-	-	-
Stage 2	827	750	-	520	563	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	315	324	515	241	397	905	1015	-	-	1424	-	-
Mov Cap-2 Maneuver	315	324	-	241	397	-	-	-	-	-	-	-
Stage 1	482	483	-	854	777	-	-	-	-	-	-	-
Stage 2	815	742	-	362	563	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.9	16.2	0.3	0
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1015	-	-	496	341	1424	-	-
HCM Lane V/C Ratio	0.006	-	-	0.335	0.059	-	-	-
HCM Control Delay (s)	8.6	-	-	15.9	16.2	0	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	1.5	0.2	0	-	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	18	13	10	12	5	41	144	12	16	440	38
Future Vol, veh/h	6	18	13	10	12	5	41	144	12	16	440	38
Conflicting Peds, #/hr	3	0	0	0	0	3	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	75	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	2	-	-	-2	-	-	2	-	-	-4	-
Peak Hour Factor	73	73	73	57	57	57	93	93	93	70	70	70
Heavy Vehicles, %	2	2	2	4	4	4	2	2	2	2	2	2
Mvmt Flow	8	25	18	18	21	9	44	155	13	23	629	54

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	970	958	342	623	979	165	683	0	0	168	0	0
Stage 1	702	702	-	250	250	-	-	-	-	-	-	-
Stage 2	268	256	-	373	729	-	-	-	-	-	-	-
Critical Hdwy	7.73	6.93	7.13	6.96	6.16	6.06	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.93	5.93	-	5.76	5.16	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.53	5.93	-	6.16	5.16	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	3.538	4.038	3.338	2.219	-	-	2.219	-	-
Pot Cap-1 Maneuver	197	231	642	408	275	881	908	-	-	1408	-	-
Stage 1	366	407	-	769	714	-	-	-	-	-	-	-
Stage 2	715	676	-	642	459	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	172	214	642	341	255	878	908	-	-	1408	-	-
Mov Cap-2 Maneuver	172	214	-	341	255	-	-	-	-	-	-	-
Stage 1	348	396	-	732	680	-	-	-	-	-	-	-
Stage 2	651	644	-	570	447	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	21.7	17.8	1.9	0.3
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	908	-	-	266	329	1408	-	-
HCM Lane V/C Ratio	0.049	-	-	0.191	0.144	0.016	-	-
HCM Control Delay (s)	9.2	-	-	21.7	17.8	7.6	0.1	-
HCM Lane LOS	A	-	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.7	0.5	0	-	-

Appendix G – Crash Data

North Carolina Department of Transportation
Traffic Engineering Accident Analysis System
Strip Analysis Report

Study Criteria Summary

County: ORANGE **City:** All and Rural
Date: 04/01/2014 **to** 03/31/2019 **Study:** ERWINTIA
Location: SR 1734 (Erwin Rd) from 150 ft. N of Windhover Dr/Old Oxford Rd to US15/501 (Fordham Blvd)

Report Details

Acc No	Crash ID	Milepost	Date	Accident Type	Total Damage	Injuries F	A	B	C	Condition R	L	W	Road Ch	Ci	Trfc Ctl Dv	Op
1	**104423320**	2.826	07/02/2015 08:22	REAR END, SLOW OR STOP	$ 3300	0	0	0	2	1	1	2	3	0	3	1
Unit 1 : 1	**Alchl/Drgs:** 0	**Speed:** 10 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:** 12	**Obj Strk:**											
Unit 2 : 1	**Alchl/Drgs:** 0	**Speed:** 0 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:** 1	**Obj Strk:**											
Unit 3 : 1	**Alchl/Drgs:** 0	**Speed:** 0 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:** 1	**Obj Strk:**											
2	**104496286**	2.952	09/18/2015 09:06	FIXED OBJECT	$ 2000	0	0	0	0	1	1	1	5	0	13	1
Unit 1 : 1	**Alchl/Drgs:** 0	**Speed:** 0 MPH	**Dir:** SE	**Veh Mnvr/Ped Actn:** 16	**Obj Strk:** 59											
3	**104992333**	3.005	01/01/2017 13:52	RAN OFF ROAD - RIGHT	$ 2000	0	0	0	0	2	1	3	1	0		
Unit 1 : 2	**Alchl/Drgs:** 0	**Speed:** 40 MPH	**Dir:** SE	**Veh Mnvr/Ped Actn:** 4	**Obj Strk:** 33											
4	**104268466**	3.297	12/29/2014 13:56	REAR END, SLOW OR STOP	$ 3000	0	0	0	0	2	1	2	3	0		
Unit 1 : 1	**Alchl/Drgs:** 0	**Speed:** 35 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:** 1	**Obj Strk:**											
Unit 2 : 1	**Alchl/Drgs:** 0	**Speed:** 35 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:** 11	**Obj Strk:**											
5	**104422017**	3.301	06/29/2015 08:57	ANGLE	$ 11500	0	0	0	0	1	1	1	1	0	0	3
Unit 1 : 1	**Alchl/Drgs:** 0	**Speed:** 35 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:** 4	**Obj Strk:**											
Unit 2 : 5	**Alchl/Drgs:** 0	**Speed:** 0 MPH	**Dir:** W	**Veh Mnvr/Ped Actn:** 4	**Obj Strk:**											
6	**104935715**	3.301	11/03/2016 09:56	LEFT TURN, DIFFERENT ROADWAYS	$ 11000	0	0	0	0	1	1	1	1	0	1	1
Unit 1 : 1	**Alchl/Drgs:** 0	**Speed:** 35 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:** 4	**Obj Strk:**											
Unit 2 : 4	**Alchl/Drgs:** 0	**Speed:** 10 MPH	**Dir:** SW	**Veh Mnvr/Ped Actn:** 8	**Obj Strk:**											
7	**104967374**	3.301	12/09/2016 08:05	ANGLE	$ 5500	0	0	0	1	1	1	1	4	0	1	1
Unit 1 : 1	**Alchl/Drgs:** 0	**Speed:** 20 MPH	**Dir:** W	**Veh Mnvr/Ped Actn:** 4	**Obj Strk:**											
Unit 2 : 1	**Alchl/Drgs:** 0	**Speed:** 30 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:** 4	**Obj Strk:**											
8	**104984804**	3.301	12/22/2016 18:40	SIDESWIPE, SAME DIRECTION	$ 5000	0	0	0	0	1	4	1	3	0	13	1
Unit 1 : 1	**Alchl/Drgs:** 0	**Speed:** 20 MPH	**Dir:** N	**Veh Mnvr/Ped Actn:** 5	**Obj Strk:**											
Unit 2 : 1	**Alchl/Drgs:** 0	**Speed:** 20 MPH	**Dir:** N	**Veh Mnvr/Ped Actn:** 4	**Obj Strk:**											

Acc No	Crash ID	Milepost	Date	Accident Type	Total Damage	Injuries F	A	B	C	Condition R	L	W	Road Ch	Ci	Trfc Ctl Dv	Op
9	**105150935**	3.301	06/29/2017 11:45	LEFT TURN, DIFFERENT ROADWAYS	$ 2000	0	0	1	0	1	1	1	3	0	1	1
Unit	**1 :** 21	**Alchl/Drgs:**	0	**Speed:** 30 MPH	**Dir:** E	**Veh Mnvr/Ped Actn:**				4			**Obj Strk:**			
Unit	**2 :** 1	**Alchl/Drgs:**	0	**Speed:** 10 MPH	**Dir:** SE	**Veh Mnvr/Ped Actn:**				8			**Obj Strk:**			
10	**105730361**	3.301	12/15/2018 10:10	ANGLE	$ 13000	0	0	0	2	2	1	2	3	0	1	1
Unit	**1 :** 2	**Alchl/Drgs:**	0	**Speed:** 35 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:**				4			**Obj Strk:**			
Unit	**2 :** 1	**Alchl/Drgs:**	0	**Speed:** 15 MPH	**Dir:** W	**Veh Mnvr/Ped Actn:**				4			**Obj Strk:**			
11	**105762546**	3.301	01/27/2019 18:39	ANGLE	$ 13000	0	0	0	0	1	4	2	3	0	1	1
Unit	**1 :** 4	**Alchl/Drgs:**	0	**Speed:** 15 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:**				12			**Obj Strk:**			
Unit	**2 :** 4	**Alchl/Drgs:**	0	**Speed:** 30 MPH	**Dir:** E	**Veh Mnvr/Ped Actn:**				4			**Obj Strk:**			
12	**105057541**	3.316	03/30/2017 16:20	SIDESWIPE, SAME DIRECTION	$ 1700	0	0	0	0	1	1	1	3	0		2
Unit	**1 :** 1	**Alchl/Drgs:**	0	**Speed:** 5 MPH	**Dir:** W	**Veh Mnvr/Ped Actn:**				5			**Obj Strk:**			
Unit	**2 :** 1	**Alchl/Drgs:**	0	**Speed:** 20 MPH	**Dir:** W	**Veh Mnvr/Ped Actn:**				4			**Obj Strk:**			
13	**104946835**	3.320	12/04/2015 21:13	SIDESWIPE, SAME DIRECTION	$ 800	0	0	0	0	1	4	1	1	0	0	
Unit	**1 :** 4	**Alchl/Drgs:**	0	**Speed:** 5 MPH	**Dir:** N	**Veh Mnvr/Ped Actn:**				5			**Obj Strk:**			
Unit	**2 :** 1	**Alchl/Drgs:**	0	**Speed:** 25 MPH	**Dir:** N	**Veh Mnvr/Ped Actn:**				4			**Obj Strk:**			
14	**105472724**	3.351	05/06/2018 12:36	REAR END, SLOW OR STOP	$ 1500	0	0	0	1	1	1	1	3	0	3	1
Unit	**1 :** 4	**Alchl/Drgs:**	0	**Speed:** 0 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:**				1			**Obj Strk:**			
Unit	**2 :** 4	**Alchl/Drgs:**	0	**Speed:** 5 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:**				4			**Obj Strk:**			
15	**104712571**	3.357	04/13/2016 10:31	REAR END, SLOW OR STOP	$ 2000	0	0	0	0	1	1	1	3	0	3	1
Unit	**1 :** 1	**Alchl/Drgs:**	0	**Speed:** 30 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:**				1			**Obj Strk:**			
Unit	**2 :** 4	**Alchl/Drgs:**	0	**Speed:** 30 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:**				4			**Obj Strk:**			
16	**104723789**	3.360	04/22/2016 12:01	REAR END, SLOW OR STOP	$ 1400	0	0	0	0	1	1	1	7	0	3	1
Unit	**1 :** 5	**Alchl/Drgs:**	0	**Speed:** 30 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:**				1			**Obj Strk:**			
Unit	**2 :** 4	**Alchl/Drgs:**	0	**Speed:** 30 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:**				4			**Obj Strk:**			
17	**104231280**	3.361	11/14/2014 09:47	REAR END, SLOW OR STOP	$ 2500	0	0	0	1	1	1	1	2	0	3	1
Unit	**1 :** 5	**Alchl/Drgs:**	0	**Speed:** 0 MPH	**Dir:** E	**Veh Mnvr/Ped Actn:**				1			**Obj Strk:**			
Unit	**2 :** 2	**Alchl/Drgs:**	0	**Speed:** 10 MPH	**Dir:** E	**Veh Mnvr/Ped Actn:**				4			**Obj Strk:**			

Acc No	Crash ID	Milepost	Date	Accident Type	Total Damage	Injuries F	A	B	C	Condition R	L	W	Road Ch	Ci	Trfc Ctl Dv	Op
18	**104380787**	3.361	05/13/2015 16:49	RIGHT TURN, DIFFERENT ROADWAYS	$ 4000	0	0	0	0	1	1	1	1	0	3	1
Unit 1 : 5	**Alchl/Drgs:** 0	**Speed:** 15 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:** 7	**Obj Strk:**											
Unit 2 : 10	**Alchl/Drgs:** 0	**Speed:** 45 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:** 4	**Obj Strk:**											
19	**104812595**	3.361	07/14/2016 18:48	RIGHT TURN, DIFFERENT ROADWAYS	$ 9000	0	0	0	1	1	1	1	1	0	3	1
Unit 1 : 1	**Alchl/Drgs:** 0	**Speed:** 45 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:** 4	**Obj Strk:**											
Unit 2 : 4	**Alchl/Drgs:** 0	**Speed:** 5 MPH	**Dir:** E	**Veh Mnvr/Ped Actn:** 7	**Obj Strk:**											
20	**104915241**	3.361	11/05/2016 20:39	RAN OFF ROAD - LEFT	$ 2400	0	0	0	0	1	4	1	1	0	3	1
Unit 1 : 1	**Alchl/Drgs:** 0	**Speed:** 2 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:** 7	**Obj Strk:**											
Unit 2 : 1	**Alchl/Drgs:** 0	**Speed:** 5 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:** 7	**Obj Strk:**											
21	**105223119**	3.361	09/08/2017 07:17	RIGHT TURN, SAME ROADWAY	$ 2100	0	0	0	0	1	1	1	1	0	3	1
Unit 1 : 4	**Alchl/Drgs:** 0	**Speed:** 15 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:** 7	**Obj Strk:**											
Unit 2 : 4	**Alchl/Drgs:** 0	**Speed:** 15 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:** 7	**Obj Strk:**											
22	**105328700**	3.361	12/11/2017 11:27	REAR END, SLOW OR STOP	$ 1200	0	0	0	0	1	1	1		0	3	1
Unit 1 : 2	**Alchl/Drgs:** 0	**Speed:** 35 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:** 1	**Obj Strk:**											
Unit 2 : 1	**Alchl/Drgs:** 0	**Speed:** 35 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:** 4	**Obj Strk:**											
23	**105472753**	3.361	05/04/2018 21:11	ANGLE	$ 5500	0	0	0	2	1	4	1	1	0	3	1
Unit 1 : 1	**Alchl/Drgs:** 0	**Speed:** 45 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:** 4	**Obj Strk:**											
Unit 2 : 3	**Alchl/Drgs:** 0	**Speed:** 10 MPH	**Dir:** E	**Veh Mnvr/Ped Actn:** 7	**Obj Strk:**											
24	**105524218**	3.361	06/14/2018 17:49	ANGLE	$ 9000	0	0	0	1	1	1	1	1	0	3	1
Unit 1 : 1	**Alchl/Drgs:** 0	**Speed:** 10 MPH	**Dir:** SW	**Veh Mnvr/Ped Actn:** 7	**Obj Strk:**											
Unit 2 : 1	**Alchl/Drgs:** 0	**Speed:** 30 MPH	**Dir:** W	**Veh Mnvr/Ped Actn:** 4	**Obj Strk:**											
Unit 3 : 2	**Alchl/Drgs:** 0	**Speed:** 30 MPH	**Dir:** W	**Veh Mnvr/Ped Actn:** 4	**Obj Strk:**											
25	**105628692**	3.361	09/27/2018 09:00	RIGHT TURN, DIFFERENT ROADWAYS	$ 7575	0	0	0	0	1	1	2	1	0	3	1
Unit 1 : 4	**Alchl/Drgs:** 0	**Speed:** 35 MPH	**Dir:** S	**Veh Mnvr/Ped Actn:** 4	**Obj Strk:**											
Unit 2 : 4	**Alchl/Drgs:** 0	**Speed:** 35 MPH	**Dir:** SW	**Veh Mnvr/Ped Actn:** 4	**Obj Strk:**											
26	**105698288**	3.361	11/15/2018 13:21	REAR END, SLOW OR STOP	$ 4500	0	0	0	1	1	1	3	3	0	3	1
Unit 1 : 1	**Alchl/Drgs:** 0	**Speed:** 0 MPH	**Dir:** E	**Veh Mnvr/Ped Actn:** 1	**Obj Strk:**											
Unit 2 : 1	**Alchl/Drgs:** 0	**Speed:** 0 MPH	**Dir:** SW	**Veh Mnvr/Ped Actn:** 7	**Obj Strk:**											
Unit 3 : 1	**Alchl/Drgs:** 0	**Speed:** 0 MPH	**Dir:** E	**Veh Mnvr/Ped Actn:** 4	**Obj Strk:**											

North Carolina Department of Transportation
Traffic Engineering Accident Analysis System
Strip Analysis Report

Acc No	Crash ID	Milepost	Date	Accident Type	Total Damage	Injuries				Condition			Road		Trfc Ctl	
						F	A	B	C	R	L	W	Ch	Ci	Dv	Op

Legend for Report Details:

Acc No - Accident Number
Injuries: F - Fatal, A - Class A, B - Class B, C - Class C
Condition: R - Road Surface, L - Ambient Light, W - Weather
Rd Ch - Road Character
Rd Ci - Roadway Contributing Circumstances
Trfc Ctl - Traffic Control: Dv - Device, Op - Operating
Alchl/Drgs - Alcohol Drugs Suspected
Veh Mnvr/Ped Actn - Vehicle Maneuver/Pedestrian Action
Obj Strk - Object Struck

Summary Statistics

High Level Crash Summary

Crash Type	Number of Crashes	Percent of Total
Total Crashes	26	100.00
Fatal Crashes	0	0.00
Non-Fatal Injury Crashes	10	38.46
Total Injury Crashes	10	38.46
Property Damage Only Crashes	16	61.54
Night Crashes	5	19.23
Wet Crashes	3	11.54
Alcohol/Drugs Involvement Crashes	0	0.00

Crash Severity Summary

Crash Type	Number of Crashes	Percent of Total
Total Crashes	26	100.00
Fatal Crashes	0	0.00
Class A Crashes	0	0.00
Class B Crashes	1	3.85
Class C Crashes	9	34.62
Property Damage Only Crashes	16	61.54

Vehicle Exposure Statistics

Annual ADT = 8800

Total Length = 0.566 (Miles) **0.911 (Kilometers)**

Total Vehicle Exposure = 9.09 (MVMT) **14.64 (MVKMT)**

Crash Rate	Crashes Per 100 Million Vehicle Miles	Crashes Per 100 Million Vehicle Kilometers
Total Crash Rate	285.87	177.63
Fatal Crash Rate	0.00	0.00
Non Fatal Crash Rate	109.95	68.32
Night Crash Rate	54.98	34.16
Wet Crash Rate	32.99	20.50
EPDO Rate	1099.51	683.21

Miscellaneous Statistics

Severity Index =	3.85
EPDO Crash Index =	100.00
Estimated Property Damage Total = $	126475.00

Accident Type Summary

Accident Type	Number of Crashes	Percent of Total
ANGLE	6	23.08
FIXED OBJECT	1	3.85
LEFT TURN, DIFFERENT ROADWAYS	2	7.69
RAN OFF ROAD - LEFT	1	3.85
RAN OFF ROAD - RIGHT	1	3.85
REAR END, SLOW OR STOP	8	30.77
RIGHT TURN, DIFFERENT ROADWAYS	3	11.54
RIGHT TURN, SAME ROADWAY	1	3.85
SIDESWIPE, SAME DIRECTION	3	11.54

Injury Summary

Injury Type	Number of Injuries	Percent of Total
Fatal Injuries	0	0.00
Class A Injuries	0	0.00
Class B Injuries	1	7.69
Class C Injuries	12	92.31
Total Non-Fatal Injuries	13	100.00
Total Injuries	13	100.00

Monthly Summary

Month	Number of Crashes	Percent of Total
Jan	2	7.69
Feb	0	0.00
Mar	1	3.85
Apr	2	7.69
May	3	11.54
Jun	3	11.54
Jul	2	7.69
Aug	0	0.00
Sep	3	11.54
Oct	0	0.00
Nov	4	15.38
Dec	6	23.08

Daily Summary

Day	Number of Crashes	Percent of Total
Mon	3	11.54
Tue	0	0.00
Wed	2	7.69
Thu	9	34.62
Fri	7	26.92
Sat	2	7.69
Sun	3	11.54

Hourly Summary

Hour	Number of Crashes	Percent of Total
0000-0059	0	0.00
0100-0159	0	0.00
0200-0259	0	0.00
0300-0359	0	0.00
0400-0459	0	0.00
0500-0559	0	0.00
0600-0659	0	0.00
0700-0759	1	3.85
0800-0859	3	11.54
0900-0959	4	15.38
1000-1059	2	7.69
1100-1159	2	7.69
1200-1259	2	7.69
1300-1359	3	11.54
1400-1459	0	0.00
1500-1559	0	0.00
1600-1659	2	7.69
1700-1759	1	3.85
1800-1859	3	11.54
1900-1959	0	0.00
2000-2059	1	3.85
2100-2159	2	7.69
2200-2259	0	0.00
2300-2359	0	0.00

Light and Road Conditions Summary

Condition	Dry	Wet	Other	Total
Day	18	3	0	21
Dark	5	0	0	5
Other	0	0	0	0
Total	23	3	0	26

Object Struck Summary

Object Type	Times Struck	Percent of Total
EMBANKMENT	1	50.00
TREE	1	50.00

Vehicle Type Summary

Vehicle Type	Number Involved	Percent of Total
LIGHT TRUCK (MINI-VAN, PANEL)	1	1.89
MOPED	1	1.89
PASSENGER CAR	28	52.83
PICKUP	5	9.43
SINGLE UNIT TRUCK (2-AXLE, 6-TIRE)	1	1.89
SPORT UTILITY	13	24.53
VAN	4	7.55

Yearly Totals Summary

Accident Totals

Year	Total Accidents	Fatal Accidents	Injury Accidents	Property Damage Only Accidents
2014	2	0	1	1
2015	5	0	1	4
2016	7	0	2	5
2017	5	0	1	4
2018	6	0	5	1
2019	1	0	0	1
Total	26	0	10	16

Injury Totals

Year	Fatal Injuries	Class A, B, or C Injuries
2014	0	1
2015	0	2
2016	0	2
2017	0	1
2018	0	7
2019	0	0
Total	0	13

Miscellaneous Totals

Year	Property Damage	EPDO Index
2014	$ 5500	9.40
2015	$ 21600	12.40
2016	$ 36300	21.80
2017	$ 9000	12.40
2018	$ 41075	43.00
2019	$ 13000	1.00
Total	$ 126475	100.00

Type of Accident Totals

Year	Left Turn	Right Turn	Rear End	Run Off Road & Fixed Object	Angle	Side Swipe	Other
2014	0	0	2	0	0	0	0
2015	0	1	1	1	1	1	0

Year	Left Turn	Right Turn	Rear End	Run Off Road & Fixed Object	Angle	Side Swipe	Other
2016	1	1	2	1	1	1	0
2017	1	1	1	1	0	1	0
2018	0	1	2	0	3	0	0
2019	0	0	0	0	1	0	0
Total	2	4	8	3	6	3	0

Strip Diagram

Features	Milepost	Crash IDs
BEGIN STUDY 150 FT. N OF WINDHOVER	2.80	
	2.81	
WINDHOVER	2.82	
	2.83	104423320
	2.84	
SR 1733 | WEAVER DAIRY	2.85	
	2.86	
	2.87	
	2.88	
	2.89	
	2.90	
	2.91	
	2.92	
	2.93	
	2.94	
	2.95	104496286
	2.96	
	2.97	
	2.98	
	2.99	
	3.00	
	3.01	104992333
SR 1735 | MCFARLING | OLD OXFORD |	3.02	
WINDHOVER		
	3.03	
	3.04	
	3.05	
	3.06	
	3.07	
	3.08	
	3.09	
MCGREGOR	3.10	
	3.11	
	3.12	
	3.13	
	3.14	
	3.15	
	3.16	
	3.17	
	3.18	
	3.19	
	3.20	
	3.21	

Features	Milepost	Crash IDs
	3.22	
	3.23	
	3.24	
	3.25	
	3.26	
	3.27	
	3.28	
	3.29	
SR 1740 | DOBBIN | WILSON	3.30	104268466 | 104422017 | 104935715 | 104967374 | 104984804 | 105150935 | 105730361 | 105762546
	3.31	
US 15 | US 501 | EUROPA | FORDHAM | DURHAM CHAPEL HILL	3.32	105057541 | 104946835
	3.33	
	3.34	
	3.35	105472724
US 501 | US 15 | FORDHAM | US 15 SB COUPLET	3.36	104712571 | 104723789 | 104231280 | 104380787 | 104812595 | 104915241 | 105223119 | 105328700 | 105472753 | 105524218 | 105628692 | 105698288

Study Criteria

Study Name	Log No.	PH No.	TIP No.	K/A Cf.	B/C Cf.	ADT	ADT Route
ERWINTIA				76.8	8.4	8800	40001734

Request Date	Courier Service	Phone No.	Ext.	Fax No.

County			Municipality					
Name	Code	Div.	Name	Code	Y-Line Ft.	Begin Date	End Date	Years
ORANGE	68	7	All and Rural		0	04/01/2014	03/31/2019	5.00

Location Text

SR 1734 (Erwin Rd) from 150 ft. N of Windhover Dr/Old Oxford Rd to US15/501 (Fordham Blvd)

Requestor

Included Accidents	Old MP	New MP	Type
104231280	3.316	3.361	R
104496286	2.752	2.952	I
104712571	3.312	3.357	R
104723789	3.314	3.36	R
104946835	3.282	3.32	R
105328700	3.316	3.361	R
105472724	3.306	3.351	R
105698288	3.316	3.361	R
105628692		3.361	I
105524218		3.361	I
105472753		3.361	I
104915241		3.361	I
105223119		3.361	I
104380787		3.361	I
104812595		3.361	I

Excluded Accidents

105697866
105605079
105593568
105487469
105445507
105090063
105075918
105050198
104984818

Excluded Accidents
104639137
104547034
104416427
104357869
104262187
104122971

Fiche Roads

Name	Code
SR 1734	40001734
SR 1307	40001307
SR 1306	40001306
IRWIN	50015045
EUROPA	50009953

Strip Road

Name	Code	Begin MP	End MP	Miles	Kilometers
SR 1734	40001734	2.795	3.361	0.566	0.911