

Planet Fitness

Traffic Impact Analysis

Wake Forest, North Carolina

February 2019



Prepared for:

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EXECUTIVE SUMMARY

1 Introduction

The proposed development is located off Wrigley Drive north of its intersection with Wallridge Drive, east of US 1 (Capital Boulevard) in Wake Forest, NC, as shown on **Figure ES-1**. The development will consist of a 25,355 square-foot (SF) Planet Fitness development and 3,900 SF of commercial development. Access to the proposed site will be provided via two site driveways along Wrigley Drive. Preliminary site layout for the proposed development is located in **Figure ES-2**.

The study limits include the following seven (7) intersections:

1. US 1 (Capital Boulevard) / SR 1931 (Harris Road) / SR 1909 (Purnell Road) – Signalized;
2. SR 1931 (Harris Road) / Wallridge Drive – Unsignalized;
3. Wallridge Drive / Wrigley Drive – Unsignalized;
4. SR 1931/SR 5756 (Harris Road) / SR 1932 (Wall Road) / SR 1931 (W. Oak Avenue) – Unsignalized;
5. US 1A (N. Main Street) / SR 5756 (Harris Road) – Unsignalized;
6. Wrigley Drive / Site Driveway #1 – Unsignalized;
7. Wrigley Drive / Site Driveway #2 – Unsignalized.

2 Existing Information

The project study area is primarily serviced by the following corridors: US 1 (Capital Boulevard), Harris Road, Purnell Road, Wallridge Drive, Wall Road, W. Oak Avenue, and US 1A (N. Main Street). Timmons Group calculated peak hour volumes for the study area intersections using the AM (7:00 – 9:00) and PM (4:00 – 6:00) peak period turning movement counts undertaken in January 2019.

3 Existing and Background Conditions and Analyses

As shown in **Table ES-2** below, all unsignalized intersection movements are currently operating at an acceptable level of service during the 2019 AM and PM peak hours. Additionally, the four-way stopped controlled, roundabout, and signalized intersections are all operating at acceptable levels of service during both 2019 peak hours.

2020 Background traffic volumes were calculated using a 3% ambient growth factor and traffic volumes from the Bluffs at Joyner Park and Char-Grill Developments. As shown in **Table ES-2** below, all unsignalized intersection movements are projected to operate at an acceptable level of service during the 2020 Background AM and PM peak hours. Additionally, the four-way stopped controlled, roundabout, and signalized intersections are all projected to operate at acceptable levels of service during both 2020 Background peak hours.

4 Site Trip Generation and Distribution

The site-generated trips shown in **Table ES-1** are based on field data collection as well as trip generation information provided in the 10th Edition of the Institute of Transportation Engineer's (ITE's) *Trip Generation Manual*. Trip generation for the Planet Fitness Development was calculated using local data where trips for the commercial portion of the development were calculated using the proposed square footage (3,900 SF) as the independent variable, as well as the provided equation (per NCDOT guidelines).

Table ES-1: Trip Generation Summary

ITE Land Use Code	Daily			AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total	In	Out	Total
Planet Fitness (Hillsborough, NC) - Counted January 2019	--	--	*	47	23	70	99	76	175
% Reduction (January to June):	--	--	--	5%	5%	5%	32%	32%	32%
Subtotal:	--	--	--	45	22	67	68	52	120
820 – Shopping Center (3,900 SF)	331	331	662	85	58	153	24	26	50
Total:	331	331	662*	140	180	220	92	78	170

SOURCE: Institute of Transportation Engineers' *Trip Generation Manual* 10th Edition (2017)

* Daily totals were not collected for the Hillsborough, NC Planet Fitness

AM peak hour trips generated totaled 140 incoming and 180 outgoing where PM peak hour trips totaled 92 incoming and 78 outgoing.

The directional traffic patterns, or trip distribution, of the site-generated traffic was determined using the existing AM and PM peak hour traffic characteristics. Area trip distribution is based on traffic counts performed by Timmons Group as well as assumed travel patterns from area residential developments. Total trips into and out of the study area using US 1 (Capital Boulevard), Purnell Road, Wallridge Drive, W. Oak Avenue, and US 1A (N Main Street) form the basis for the percentage distribution. Distribution percentages and volumes into and out of the study area are provided in the document.

5 Build Conditions and Analysis

2020 Build traffic volumes were calculated by adding projected site trips to Background traffic volumes. As shown in **Table ES-2** below, all unsignalized intersection movements are projected to operate at an acceptable level of service during the 2020 Build AM and PM peak hours. Additionally, the four-way stopped controlled, roundabout, and signalized intersections are all projected to operate at acceptable levels of service during both 2020 Build peak hours.

Table ES-2 – Level of Service and Delay (sec/veh) Results – Study Area Intersections

Intersection	2019 Existing Traffic Volumes		2020 Background Traffic Volumes		2020 Build Traffic Volumes		2020 Build Traffic Volumes With Improvements	
	AM	PM	AM	PM	AM	PM	AM	PM
Wrigley Dr at Site Driveway #1	--	--	--	--	A (8.5)^	A (8.5)^	--	--
Wrigley Dr at Site Driveway #2	--	--	--	--	A (8.8)^	A (8.7)^	--	--
Wrigley Dr at Wallridge Dr	A (3.3)	A (3.0)	A (3.4)	A (3.0)	A (4.5)	A (3.4)	--	--
Harris Rd at Wallridge Dr	B (11.5)^	B (12.1)^	B (14.3)^	B (13.6)^	C (19.8)^	C (22.6)^	--	--
US 1 (Capital Blvd) at Purnell Rd / Harris Rd	D (35.1)	C (31.9)	D (40.0)	D (36.2)	D (43.8)	D (40.0)	--	--
W. Oak Ave / Wall Rd at Harris Rd	B (11.5)	A (9.4)	B (13.6)	A (9.9)	C (18.8)	B (10.9)	--	--
US 1A (N. Main St) at Harris Road	B (10.5)^	B (11.3)^	B (10.7)^	B (11.6)^	B (11.0)^	B (11.7)^	--	--

-- => Intersection not analyzed / Intersection does not exist

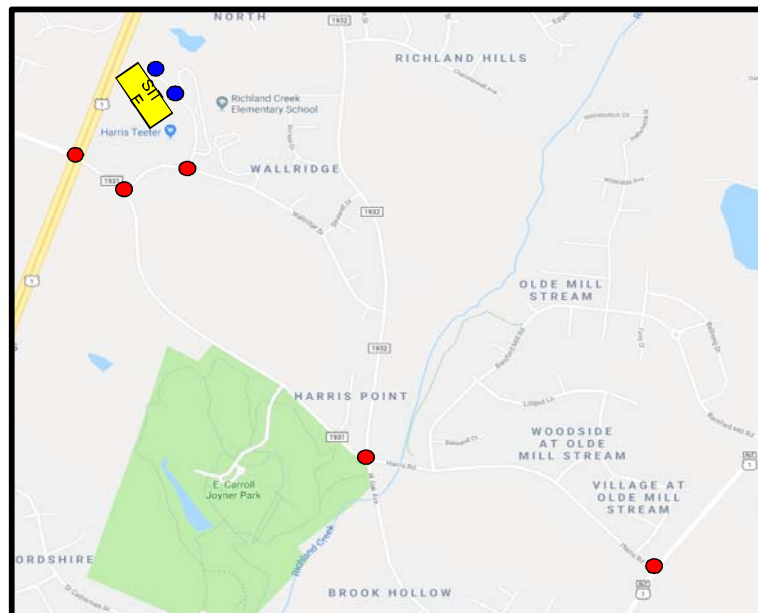
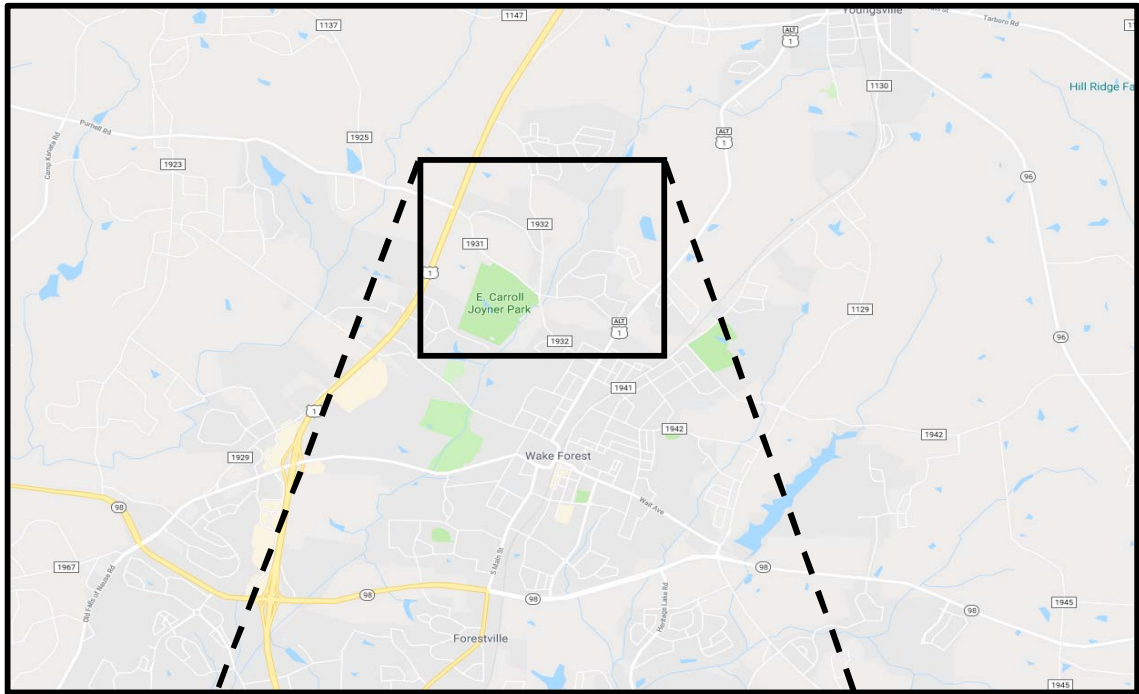
^ => Critical intersection movement for unsignalized intersections

6 Conclusions and Recommendations

No network improvements are recommended to the construction of the proposed Planet Fitness Development.



NOT TO SCALE



- Legend**
- = Study Area Intersection
 - = Driveway Intersection

TABLE OF CONTENTS

TABLE OF CONTENTS.....	I
LIST OF TABLES.....	II
LIST OF FIGURES	II
APPENDICES	III
1 INTRODUCTION.....	1-1
2 EXISTING INFORMATION.....	2-1
2.1 STUDY LIMITS.....	2-1
2.2 EXISTING ROADWAYS.....	2-1
2.3 EXISTING INTERSECTIONS.....	2-2
2.4 TRAFFIC VOLUMES	2-2
2.5 AREA SAFETY REVIEW.....	2-3
2.6 CAPACITY ANALYSIS	2-3
3 EXISTING AND BACKGROUND CONDITIONS AND ANALYSIS	3-1
3.1 2019 EXISTING ANALYSES.....	3-1
3.2 2023 BACKGROUND TRAFFIC VOLUMES.....	3-3
3.3 2020 BACKGROUND ANALYSIS	3-3
4 SITE TRIP GENERATION AND DISTRIBUTION	4-1
4.1 TRIP GENERATION.....	4-1
4.2 TRIP DISTRIBUTION	4-1
5 2020 BUILD CONDITION AND ANALYSIS.....	5-1
5.1 2020 BUILD TRAFFIC VOLUMES.....	5-1
5.2 2020 BUILD ANALYSIS.....	5-1
6 CONCLUSIONS AND RECOMMENDATIONS	6-1

LIST OF TABLES

TABLE 2-1: LEVEL OF SERVICE DEFINITIONS.....	2-4
TABLE 2-2: SIGNALIZED AND UNSIGNALIZED INTERSECTION LEVEL OF SERVICE CRITERIA.....	2-5
TABLE 3-1: INTERSECTION LEVEL OF SERVICE, DELAY AND 95 TH PERCENTILE QUEUE SUMMARY 2019 EXISTING TRAFFIC VOLUMES.....	3-2
TABLE 3-2: INTERSECTION LEVEL OF SERVICE, DELAY AND 95 TH PERCENTILE QUEUE SUMMARY 2020 BACKGROUND TRAFFIC VOLUMES	3-5
TABLE 4-1: TRIP GENERATION SUMMARY.....	4-1
TABLE 5-1: INTERSECTION LEVEL OF SERVICE, DELAY AND 95 TH PERCENTILE QUEUE SUMMARY 2020 BUILD TRAFFIC VOLUMES.....	5-3

LIST OF FIGURES

FIGURE 1-1: SITE LOCATION MAP
FIGURE 2-1: SURROUNDING ROADWAY NETWORK
FIGURE 2-2: PRELIMINARY SITE LAYOUT
FIGURE 2-3: EXISTING LANE CONFIGURATION
FIGURE 2-4: 2019 EXISTING TRAFFIC VOLUMES
FIGURE 3-1: 2020 BACKGROUND TRAFFIC VOLUMES
FIGURE 4-1: 2020 TRIP DISTRIBUTION PERCENTAGES
FIGURE 4-2: 2020 TRIP DISTRIBUTION VOLUMES
FIGURE 5-1: 2020 BUILD TRAFFIC VOLUMES

APPENDICES

Appendix A – Scoping Information

Appendix B – Traffic Counts

Appendix C – Accident Data (To Be Provided)

Appendix D – Traffic Signal Plans

Appendix E – Synchro / Sidra Analysis Outputs

Appendix F – Approved Area Developments

Appendix G – Hillsborough, NC Planet Fitness Data

1 INTRODUCTION

This report presents the findings of the traffic impact analysis for the proposed Planet Fitness commercial development. The development will be located off Wrigley Drive, in Wake Forest, NC (see **Figure 1-1**) and will consist of a 25,355 square-foot (SF) Planet Fitness development and 3,900 SF of commercial development. Scoping information for this traffic impact analysis is included in **Appendix A**.

Analyses were completed for the 2019 Existing traffic volumes, 2020 Background traffic volumes, and the 2020 Build traffic volumes (background + site trips). The purpose of this assessment is as follows:

1. Verify that the existing geometry provided within the study area is sufficient to accommodate the projected traffic volumes; and
2. Determine what, if any, improvements are necessary at the proposed site driveway connections to Wrigley Drive.

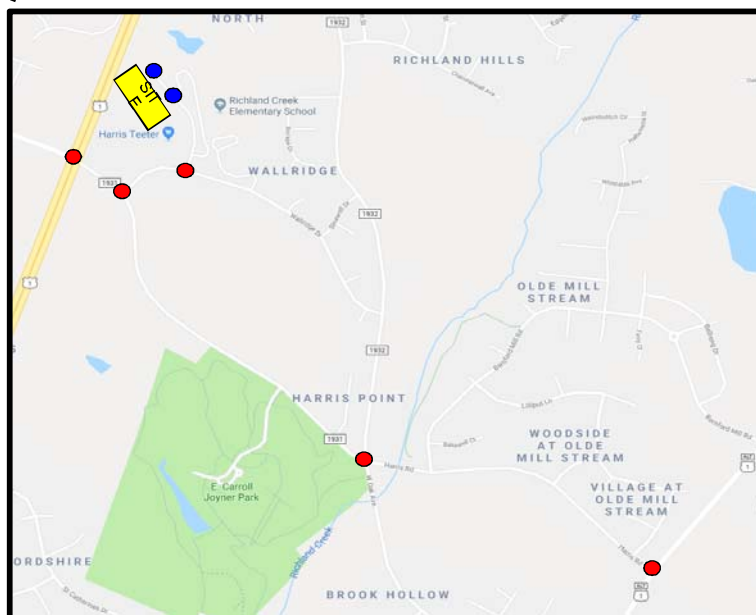
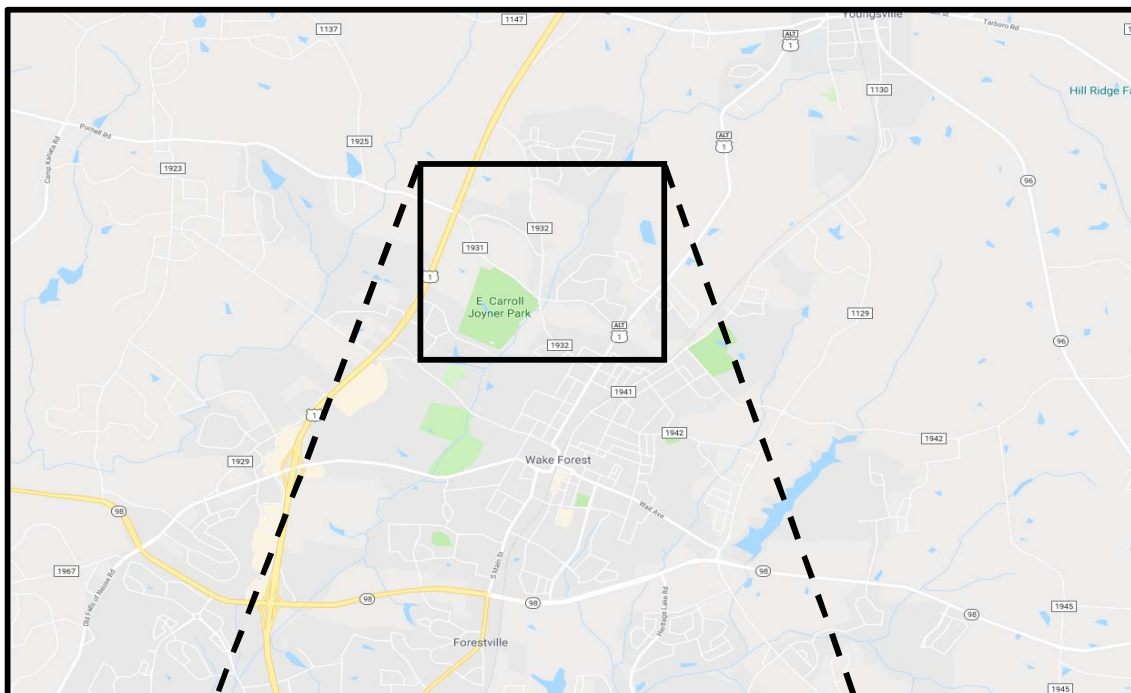
The following steps were taken to determine the potential traffic impacts associated with this project:

- Data Collection – AM (7:00 – 9:00) and PM (4:00 – 6:00) peak hour turning movement counts were collected in January 2019 at the following intersections:
 - US 1 (Capital Boulevard) / SR 1931 (Harris Road) / SR 1909 (Purnell Road) – Signalized;
 - SR 1931 (Harris Road) / Wallridge Drive – Unsignalized;
 - Wallridge Drive / Wrigley Drive – Unsignalized;
 - SR 1931/SR 5756 (Harris Road) / SR 1932 (Wall Road) / SR 1931 (W. Oak Avenue) – Unsignalized;
 - US 1A (N. Main Street) / SR 5756 (Harris Road) – Unsignalized.
- Trip Generation/Future Traffic – Traffic generated by the proposed development was estimated using the 10th Edition of the Institute of Transportation Engineers' *Trip Generation Manual*. Trip generation for the Planet Fitness Development was calculated using local data (described in the document below) where trips for the commercial portion of the development were calculated using the proposed square footage (3,900 SF) as the independent variable, as well as the provided equation (per NCDOT guidelines). Projected ambient traffic growth were calculated using a 3% ambient growth. There were two background developments that generated traffic for the future analysis scenarios: Bluff at Joyner Residential Development and Char-Grill Development.
- Trip Distribution and Projections – The distribution of site-generated trips was based on the distribution of existing area traffic. It was assumed, for purposes of analysis, that projected trips would follow the same patterns as existing traffic. The trip distribution percentages were reviewed and approved by the Town of Wake Forest prior to the onset of this study.
- Traffic Capacity Analysis – Level of service analyses were performed using SYNCHRO Version 9.2 for the following intersections:
 - US 1 (Capital Boulevard) / SR 1931 (Harris Road) / SR 1909 (Purnell Road) – Signalized;
 - SR 1931 (Harris Road) / Wallridge Drive – Unsignalized;
 - Wallridge Drive / Wrigley Drive – Unsignalized;
 - SR 1931/SR 5756 (Harris Road) / SR 1932 (Wall Road) / SR 1931 (W. Oak Avenue) – Unsignalized;
 - US 1A (N. Main Street) / SR 5756 (Harris Road) – Unsignalized;
 - Wrigley Drive / Site Driveway #1 – Unsignalized;
 - Wrigley Drive / Site Driveway #2 – Unsignalized.

- Queuing Analysis – The 95th percentile queue lengths from the capacity analyses were analyzed at the intersections listed above.
- Review of Proposed Improvements – Roadway improvements proposed to accommodate projected site-generated traffic were evaluated.



NOT TO SCALE



Legend

- = Study Area Intersection
- = Driveway Intersection

2 EXISTING INFORMATION

The proposed development is located off Wrigley Drive north of its intersection with Wallridge Drive, east of US 1 (Capital Boulevard) in Wake Forest, NC, as shown on **Figure 1-1**.

2.1 STUDY LIMITS

Access to the proposed site will be provided via two site driveways along Wrigley Drive.

The entrances are shown graphically on **Figure 2-1** and on the preliminary site layout for the development on **Figure 2-2** (all figures are located at the end of their respective chapter).

The study limits include the following seven (7) intersections:

- US 1 (Capital Boulevard) / SR 1931 (Harris Road) / SR 1909 (Purnell Road) – Signalized;
- SR 1931 (Harris Road) / Wallridge Drive – Unsignalized;
- Wallridge Drive / Wrigley Drive – Unsignalized;
- SR 1931/SR 5756 (Harris Road) / SR 1932 (Wall Road) / SR 1931 (W. Oak Avenue) – Unsignalized;
- US 1A (N. Main Street) / SR 5756 (Harris Road) – Unsignalized;
- Wrigley Drive / Site Driveway #1 – Unsignalized;
- Wrigley Drive / Site Driveway #2 – Unsignalized.

2.2 EXISTING ROADWAYS

US 1 (Capital Boulevard) is a four-lane facility that travels north to south through the study area. Near the project study area US 1 connects Raleigh and Henderson and has a posted 55-mph speed limit. Along its length, US 1 serves a mixture of land uses including shopping centers, light industrial, and residential developments. Per 2017 NCDOT Average Annual Daily Traffic (AADT) maps, US 1 carries 40,000 vehicles per day (VPD) north of the Harris Road / Purnell Road intersection and 36,000 VPD south of the intersection. No sidewalks or provisions for pedestrians exist along the facility in the project study area.

US 1A (N. Main Street) is a two-lane facility that travels north to south in study area. US 1A has a posted 45-mph speed limit north of Harris Road and 35-mph south of Harris Road. US 1A runs parallel to US 1 (connecting Wake Forest to Youngsville) and primarily serves residential land uses. Per 2017 NCDOT AADT maps, US 1A carries 4,000 VPD north of Harris Road. No sidewalks or provisions for pedestrians exist along the facility in the project study area.

SR 1931/SR 5756 (Harris Road) is a two-lane facility that travels east to west in study area. Harris Road has a posted 45-mph speed limit. Harris Road currently extends from US 1 to US 1A and primarily serves residential land uses. Per 2017 NCDOT AADT maps, Harris Road carries 4,500 VPD east of Wallridge Drive and 3,800 VPD east of Wall Road / W. Oak Avenue. No sidewalks or provisions for pedestrians exist along the facility in the project study area.

SR 1932 (Wall Road) is a two-lane facility that runs north to south in the project study area. The facility has a posted 45-mph speed limit and primarily serves residential developments. Wall Road connects US 1 with Harris Road. NCDOT AADT information is unavailable for this facility. No sidewalks or provisions for pedestrians exist along the facility in the project study area.

SR 1931 (W. Oak Avenue) is a two-lane facility that runs approximately northwest to southeast in the project study area. The facility has a posted 35-mph speed limit. W. Oak Avenue connects Harris Road and US 1A. In the project study area, the facility serves primarily residential land uses. NCDOT AADT

information is unavailable for this facility. No sidewalks or provisions for pedestrians exist along the facility in the project study area.

Wallridge Drive is a two-lane facility that runs east to west in the project study area. The facility has a posted 25-mph speed limit. In the project study area, the facility serves residential land uses and an elementary school. NCDOT AADT information is unavailable for this facility. Sidewalks exist along the facility from Harris Road to Sarratt Ridge Court. Additionally, crosswalks are present at each intersection between the two facilities.

Wrigley Drive is a two-lane facility that runs north to south and ends at cul-de-sac north of the proposed northernmost site driveway connection. The facility has a posted 25-mph speed limit. In the project study area, the facility serves commercial uses and an elementary school. NCDOT AADT information is unavailable for this facility. Sidewalks exist along the facility from Harris Road to the northern cul-de-sac. Additionally, crosswalks are present at each intersection.

2.3 EXISTING INTERSECTIONS

Using available aerial imagery and site visits, Timmons Group compiled the existing geometry for each of the study area intersections. The existing intersection geometry is shown on **Figure 2-3** and used throughout all analyses.

US 1 (Capital Boulevard) / Harris Road / Purnell Road is an eight-phase signalized intersection with a protected only westbound left-turn phase and protected / permitted left-turn phases for the north, south and eastbound intersection approaches. The north and southbound intersection approaches each include an exclusive left-turn, two through lanes, and an exclusive right-turn lane. The eastbound intersection approach includes exclusive left, through, and right-turn lanes. The westbound intersection approach includes dual left-turn lanes and a shared through / right-turn lane. There are currently no provisions for pedestrians at this intersection.

Harris Road / Wallridge Drive is an unsignalized T-intersection with the southbound approach encountering the stopped condition. The southbound intersection approach includes exclusive left and right-turn lanes. The eastbound approach includes an exclusive left-turn lane and a through lane. The westbound approach includes a through lane and an exclusive right-turn lane.

Wallridge Drive / Wrigley Drive is an unsignalized intersection that includes a roundabout. Each intersection approach includes a single shared lane. Crosswalks cross the northern, eastern, and western intersection legs.

Harris Road / Wall Road / W. Oak Avenue is an unsignalized intersection with each intersection approach encountering a stopped condition. All four intersection approaches include a single shared left-turn / through / right-turn lane.

US 1A (N. Main Street) / Harris Road is an unsignalized T-intersection with eastbound approach encountering the stopped condition. The northbound intersection approach includes an exclusive left-turn lane and a through lane. The southbound approach includes a through lane and an exclusive right-turn lane. The eastbound approach includes exclusive left and right-turn lanes.

2.4 TRAFFIC VOLUMES

Timmons Group calculated peak hour volumes for the study area intersections using the AM (7:00 – 9:00) and PM (4:00 – 6:00) peak period turning movement counts undertaken in January 2019. Traffic count data is summarized in **Figure 2-4**. The complete traffic count data can be found in **Appendix B**.

2.5 AREA SAFETY REVIEW

At the time this study was being completed crash data was not available for the study area intersections. Crash data will be provided later in an addendum.

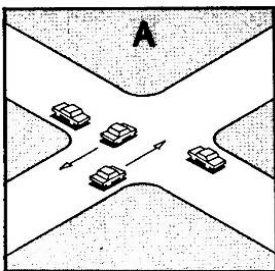
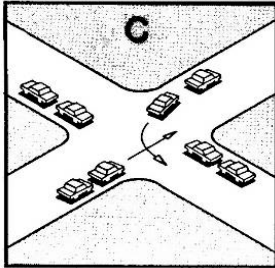
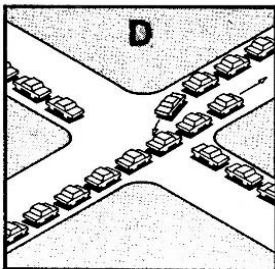
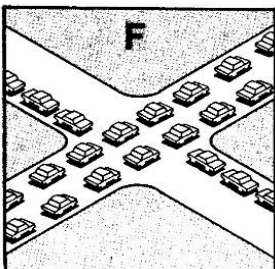
2.6 CAPACITY ANALYSIS

Using field observations, aerial photography, and traffic count data, traffic operations were analyzed during 2019 (existing) and 2020 (without and with the proposed development site trips).

Capacity analysis allows traffic engineers to determine the impacts of traffic on the surrounding roadway network. The Transportation Research Board's (TRB) *Highway Capacity Manual* (HCM) methodologies govern how the capacity analyses are conducted and how the results are interpreted. There are six letter grades of Levels of Service (LOS) from A to F, with LOS A representing the best operating conditions and LOS F the worst operating conditions. At signalized intersections, an overall intersection LOS E is generally considered unacceptable. At unsignalized intersections, a LOS E is generally considered acceptable only if the side street encounters delay. Nevertheless, side streets typically function at a LOS F during peak traffic periods, because the traffic volumes often do not warrant a traffic signal to assist side street traffic.

Table 2-1 shows in detail how each of these levels of service are interpreted.

Table 2-1: Level of Service Definitions

Level of Service	Roadway Segments or Controlled Access Highways	Intersections	
A	Free flow, low traffic density.	No vehicle waits longer than one signal indication.	
B	Delay is not unreasonable, stable traffic flow.	On a rare occasion motorists wait through more than one signal indication.	
C	Stable condition, movements somewhat restricted due to higher volumes, but not objectionable for motorists.	Intermittently drivers wait through more than one signal indication, and occasionally backups may develop behind left turning vehicles, traffic flow still stable and acceptable.	
D	Movements more restricted, queues and delays may occur during short peaks, but lower demands occur often enough to permit clearing, thus preventing excessive backups.	Delays at intersections may become extensive with some, especially left-turning vehicles waiting two or more signal indications, but enough cycles with lower demand occur to permit periodic clearance, thus preventing excessive backups.	
E	Actual capacity of the roadway involves delay to all motorists due to congestion.	Very long queues may create lengthy delays, especially for left-turning vehicles.	
F	Forced flow with demand volumes greater than capacity resulting in complete congestion. Volumes drop to zero in extreme cases.	Backups from locations downstream restrict or prevent movement of vehicles out of approach creating a storage area during part or all of an hour.	

SOURCE: "A Policy on Design of Design of Urban Highways and Arterial Streets" - AASHTO, 1973 based upon material published in "Highway Capacity Manual", National Academy of Sciences, 1965.

For signalized and unsignalized intersections, level of service is defined in terms of **delay**, a measure of driver discomfort, frustration, fuel consumption and lost travel time. **Table 2-2** summarizes the delay associated with each LOS category:

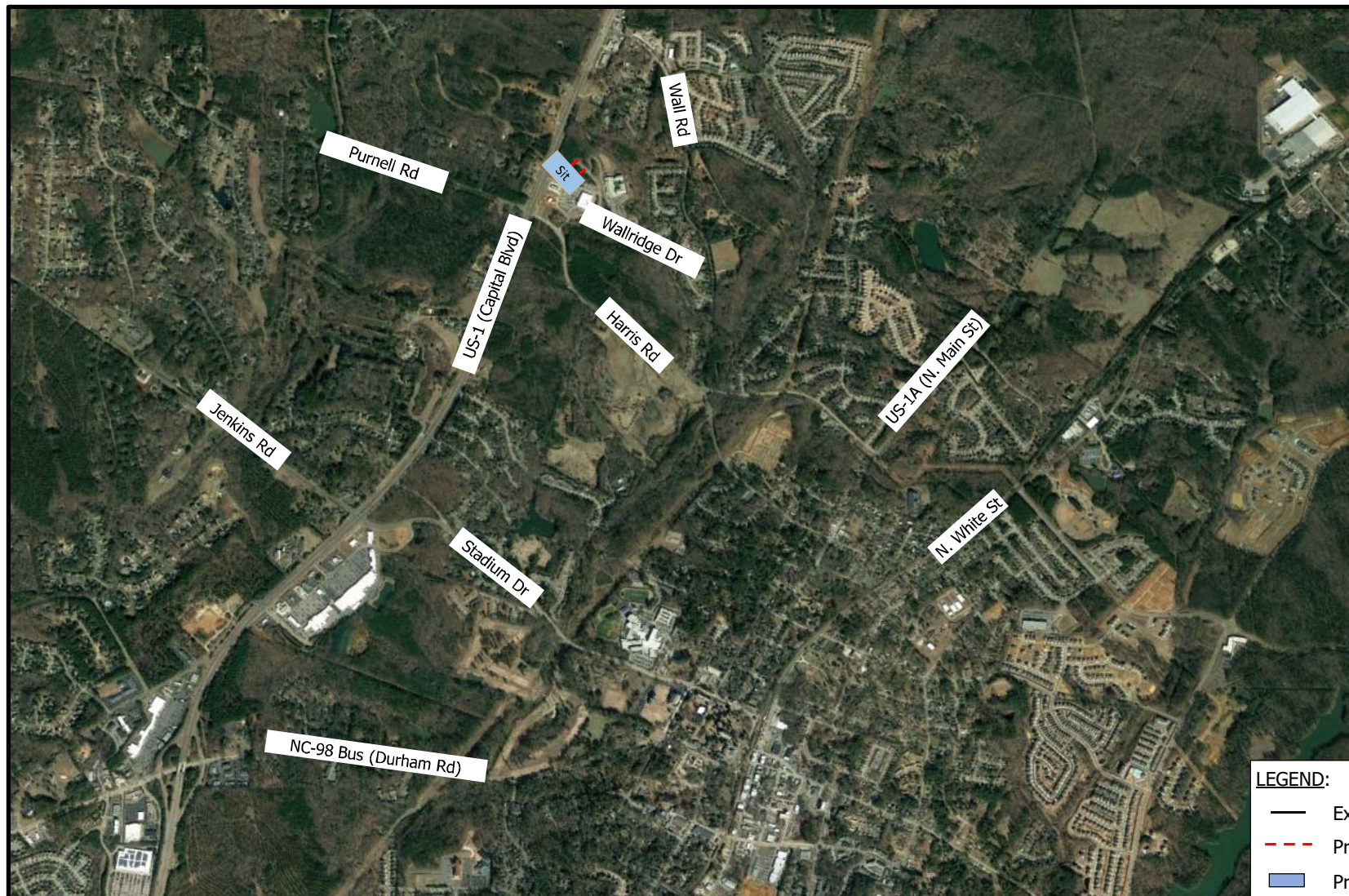
Table 2-2: Signalized and Unsignalized Intersection Level of Service Criteria

Signalized Intersections		Unsignalized Intersections	
Level of Service	Control Delay per Vehicle (sec/veh)	Level of Service	Average Control Delay (sec/veh)
A	≤ 10	A	0 to 10
B	> 10 to ≤ 20	B	> 10 to ≤ 15
C	> 20 to ≤ 35	C	> 15 to ≤ 25
D	> 35 to ≤ 55	D	> 25 to ≤ 35
E	> 55 to ≤ 80	E	> 35 to ≤ 50
F	> 80	F	> 50

*Source: Exhibit 16-2 and Exhibit 17-2 from
TRB's "Highway Capacity Manual 2000"*

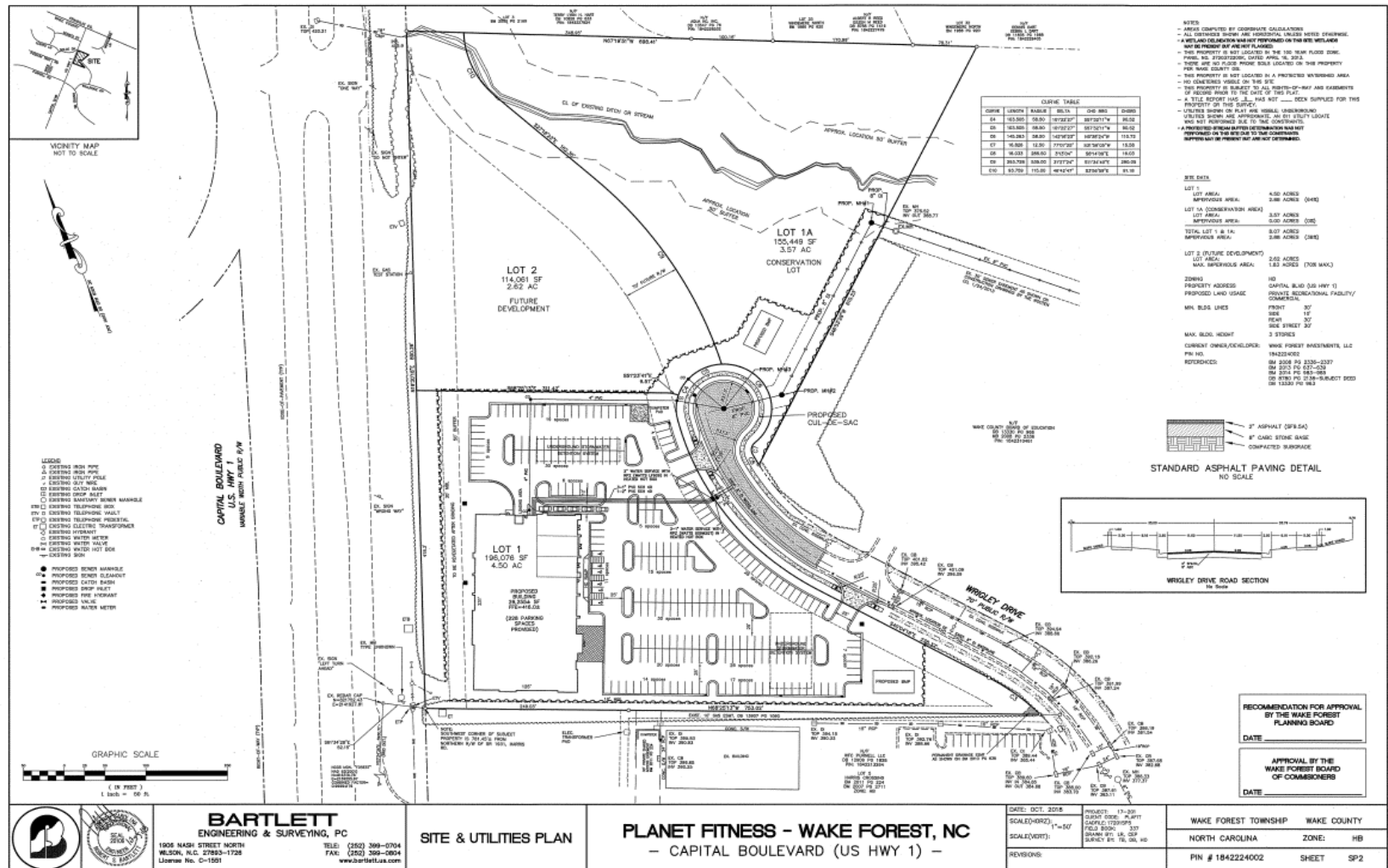
Capacity analyses were performed to assess operational conditions. Study area intersections were analyzed using SYNCHRO Version 9.2 based on Highway Capacity Manual (HCM) methodologies with the following assumptions:

- Existing grades;
- 12-foot lane widths;
- No parking activity, bus stops, or pedestrians;
- Existing AM peak hour factor (PHF) – due to the adjacent elementary school;
- PHF of 0.90 for PM peak hour;
- Heavy vehicle percentages 2%; and
- Timing values found in the provided traffic signal plans (see **Appendix D**).








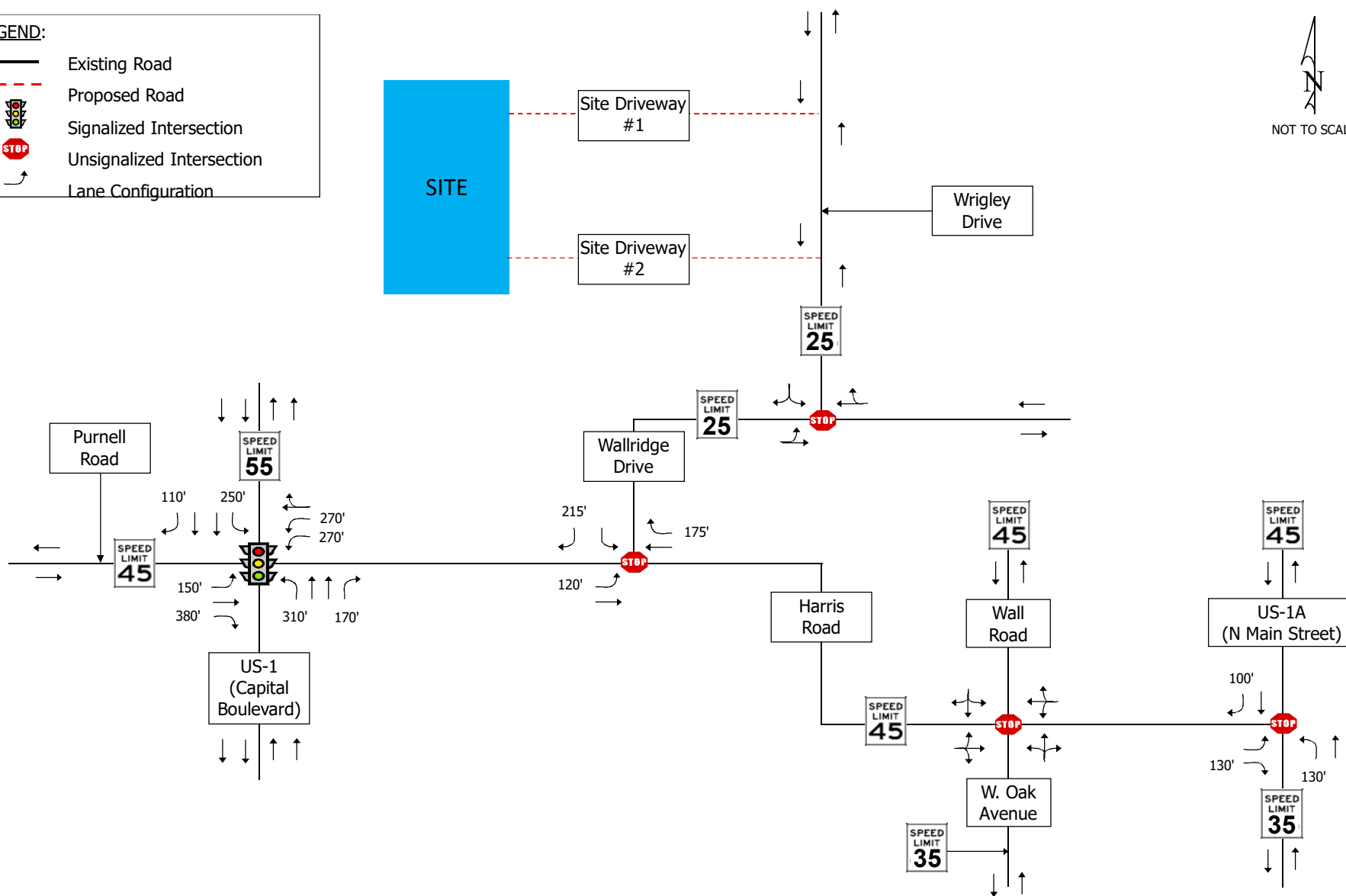
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- LEGEND:**
- Existing Road
 - - - Proposed Road
 - Proposed Site
 - Adjacent Site



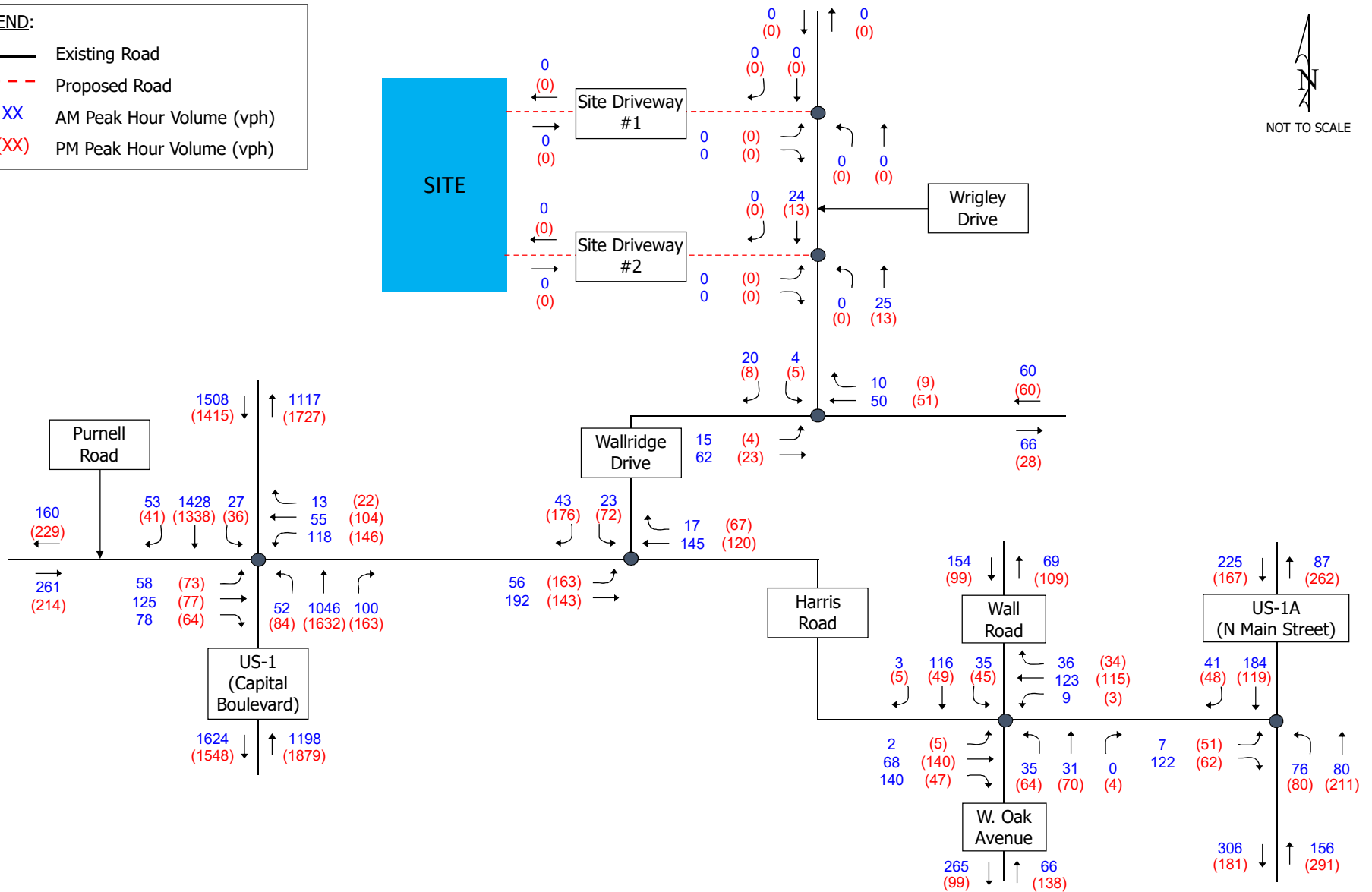
LEGEND:

-  Existing Road
-  Proposed Road
-  Signalized Intersection
-  Unsignalized Intersection
-  Lane Configuration



LEGEND:

- Existing Road
- - - Proposed Road
- XX AM Peak Hour Volume (vph)
- (XX) PM Peak Hour Volume (vph)



3 EXISTING AND BACKGROUND CONDITIONS AND ANALYSIS

3.1 2019 EXISTING ANALYSES

Table 3-1 summarizes the 2019 Existing intersection LOS, delay, and 95th percentile queue lengths based on the geometry shown on **Figure 2-3** and the 2019 Existing traffic volumes shown on **Figure 2-4**. The corresponding SYNCHRO output is included in **Appendix E**.

The existing roundabout intersection of Wallridge Drive / Wrigley Drive is currently operating at a LOS A during both analyzed peak hours. SYNCHRO analysis outputs are located in **Appendix E**.

All unsignalized intersection movements at Harris Road / Wallridge Drive are currently operating at a LOS B or better during both 2019 peak hours. Existing turn-lane storage is adequate to handle all 95th percentile queue lengths during both analyzed peak hours.

The signalized intersection of US 1 (Capital Boulevard) / Harris Road / Purnell Road is currently operating at a LOS D or better during both peak hours. Existing turn-lane storage is adequate to handle all 95th percentile queue lengths during both analyzed peak hours.

All unsignalized intersection movements at Harris Road / Wall Road / W. Oak Avenue are currently operating at a LOS B or better during both 2019 peak hours. Additionally, the overall intersection level of service is currently a LOS B or better during both peak hours. Existing turn-lane storage is adequate to handle all 95th percentile queue lengths during both analyzed peak hours.

All unsignalized intersection movements at US 1A (N. Main Street) / Harris Road are currently operating at a LOS B or better during both 2019 peak hours. Existing turn-lane storage is adequate to handle all 95th percentile queue lengths during both analyzed peak hours.

**Table 3-1: Intersection Level of Service, Delay and 95th Percentile Queue Summary
2019 Existing Traffic Volumes**

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR			PM PEAK HOUR		
			Delay ¹ (sec/veh)	LOS ¹	95th Percentile Queue Length (ft)	Delay ¹ (sec/veh)	LOS ¹	95th Percentile Queue Length (ft)
4: Harris Road & Wallridge Drive	EB Left	120	7.8	A	6	8.0	A	11
	EB Thru		0.0	0	0	0.0	0	0
	WB Thru		0.0	0	0	0.0	0	0
	WB Right	175	0.0	0	0	0.0	0	0
	SB Left		11.5	B	7	12.1	B	20
	SB Right	215	11.5	B	7	12.1	B	20
5: US 1 (Capital Boulevard) & Purnell Road/Harris Road	EB Left	150	47.5	D	86	51.9	D	114
	EB Thru		80.4	F	#211	71.0	E	141
	EB Right	380	36.7	D	91	36.2	D	84
	EB Approach		60.0	E	--	54.1	D	--
	WB Dual Lefts	270	74.3	E	94	74.4	E	119
	WB Thru/Right		64.5	E	121	83.3	F	#253
	WB Approach		70.7	E	--	78.5	E	--
	NB Left	310	71.9	E	100	80.5	F	151
	NB Thru		27.1	C	503	27.0	C	926
	NB Right	170	7.1	A	38	4.5	A	41
	NB Approach		27.4	C	--	27.4	C	--
	SB Left	250	55.1	E	57	72.6	E	77
	SB Thru		30.8	C	717	25.0	C	646
	SB Right	110	5.3	A	15	4.9	A	13
	SB Approach		30.3	C	--	25.6	C	--
	Overall		35.1	D	--	31.9	C	--
6: W. Oak Avenue/Wall Road & Harris Road	EB Left/Thru/Right		12.8	B	0	9.5	A	0
	WB Left/Thru/Right		10.0	A	0	9.2	A	0
	NB Left/Thru/Right		9.9	A	0	9.5	A	0
	SB Left/Thru/Right		10.8	B	0	9.1	A	0
	Overall		11.5	B	--	9.4	A	--
7: US 1A (N. Main Street) & Harris Road	EB Left		10.5	B	16	11.3	B	10
	EB Right	130	10.5	B	16	11.3	B	10
	NB Left	130	8.0	A	6	7.8	A	5
	NB Thru		0.0	0	0	0.0	0	0
	SB Thru		0.0	0	0	0.0	0	0
	SB Right	100	0.0	0	0	0.0	0	0

¹ Overall intersection LOS and delay reported for signalized intersections and roundabouts only.

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

- 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

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

3.2 2020 BACKGROUND TRAFFIC VOLUMES

Currently there are two (2) approved developments in the project study area that will be fully or partially build-out by 2020: (1) Bluffs at Joyner Park Development and (2) Char-Grill Development (see **Appendix F**). Listed below are the approved developments, site trip distribution assumptions, and proposed offsite improvements.

- Bluffs at Joyner Park Development
 - No TIA provided
 - Located off W. Oak Avenue south of the subject development
 - Assumed to be partially constructed prior to the Planet Fitness Development
 - 50 single-family detached houses – Land Use Code (LUC) 210
 - Trip generation and distribution to follow existing travel patterns
 - No assumed off-site improvements
- Char-Grill Development*
 - No TIA provided
 - Located off Wallridge Drive south of the subject development
 - Assumed to be fully constructed prior to the Planet Fitness Development
 - 3,333 square-foot restaurant development (with a drive-through) – LUC 934
 - Trip generation and distribution to follow existing travel patterns
 - No assumed off-site improvements

* No build-out information was provided for the subject development; therefore, assumptions were made for development square-footage, build-out year, and required LUC.

2020 ambient volumes (existing traffic volumes multiplied by a 3% growth factor) were initially calculated and are found in **Figure 3-1**. Projected and distributed trips from the approved developments (see **Appendix F**) were totaled and are in **Figure 3-2**. Approved Development trips were then added to the ambient traffic volumes to determine the 2020 Background traffic volumes (see **Figure 3-3**).

It should be noted that NCDOT STIP project U-5307 is planned for construction in the project study area. The project includes the conversion of US 1 (Capital Boulevard) to a limited access facility with an interchange at its intersection with Purnell Road and Harris Road. Construction for the northern portion of this project is scheduled for 2024. Because this project will be constructed after the subject development, no modifications were made to the existing lane configuration at any of the study area intersections.

3.3 2020 BACKGROUND ANALYSIS

Table 3-2 summarizes the 2020 Background intersection LOS, delay, and 95th percentile queue lengths based on the geometry shown in **Figure 2-3** and the 2020 Background traffic volumes shown in **Figure 3-3**. The corresponding SYNCHRO output is included in **Appendix E**.

The existing roundabout intersection of Wallridge Drive / Wrigley Drive is projected to operate at a LOS A during both analyzed 2020 Background peak hours. SYNCHRO analysis outputs are located in **Appendix E**.

All unsignalized intersection movements at Harris Road / Wallridge Drive are projected to operate at a LOS B or better during both 2020 Background peak hours. Existing turn-lane storage is adequate to handle all 95th percentile queue lengths during both analyzed peak hours.

The signalized intersection of US 1 (Capital Boulevard) / Harris Road / Purnell Road is projected to operate at a LOS D during both 2020 Background peak hours. Existing turn-lane storage is adequate to handle all 95th percentile queue lengths during both analyzed peak hours.

All unsignalized intersection movements at Harris Road / Wall Road / W. Oak Road are projected to operate at a LOS C or better during both 2020 Background peak hours. Additionally, the overall intersection level of service is currently a LOS B or better during both peak hours. Existing turn-lane storage is adequate to handle all 95th percentile queue lengths during both analyzed peak hours.

All unsignalized intersection movements at US 1A (N. Main Street) / Harris Road are projected to operate at a LOS B or better during both 2020 Background peak hours. Existing turn-lane storage is adequate to handle all 95th percentile queue lengths during both analyzed peak hours.

**Table 3-2: Intersection Level of Service, Delay and 95th Percentile Queue Summary
2020 Background Traffic Volumes**

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR			PM PEAK HOUR		
			Delay ¹ (sec/veh)	LOS ¹	95th Percentile Queue Length (ft)	Delay ¹ (sec/veh)	LOS ¹	95th Percentile Queue Length (ft)
4: Harris Road & Wallridge Drive	EB Left	120	8.2	A	13	8.2	A	15
	EB Thru		0.0	0	0	0.0	0	0
	WB Thru		0.0	0	0	0.0	0	0
	WB Right	175	0.0	0	0	0.0	0	0
	SB Left		14.3	B	22	13.6	B	30
	SB Right	215	14.3	B	22	13.6	B	30
5: US 1 (Capital Boulevard) & Purnell Road/Harris Road	EB Left	150	47.5	D	89	50.3	D	115
	EB Thru		82.9	F	#237	68.1	E	148
	EB Right	380	36.3	D	93	34.3	C	86
	EB Approach		61.7	E	--	52.2	D	--
	WB Dual Lefts	270	78.8	E	127	75.4	E	133
	WB Thru/Right		67.4	E	#183	80.9	F	#329
	WB Approach		74.4	E	--	78.0	E	--
	NB Left	310	72.7	E	104	78.3	E	155
	NB Thru		33.1	C	513	32.7	C	985
	NB Right	170	8.0	A	46	5.1	A	50
	NB Approach		32.2	C	--	32.0	C	--
	SB Left	250	57.2	E	110	78.4	E	113
	SB Thru		34.4	C	757	29.1	C	674
	SB Right	110	5.5	A	16	5.3	A	13
	SB Approach		34.3	C	--	30.4	C	--
	Overall		40.0	D	--	36.2	D	--
6: W. Oak Avenue/Wall Road & Harris Road	EB Left/Thru/Right		16.3	C	0	10.2	B	0
	WB Left/Thru/Right		10.9	B	0	9.6	A	0
	NB Left/Thru/Right		11.1	B	0	10.1	B	0
	SB Left/Thru/Right		11.7	B	0	9.5	A	0
	Overall		13.6	B	--	9.9	A	--
7: US 1A (N. Main Street) & Harris Road	EB Left		10.7	B	19	11.6	B	12
	EB Right	130	10.7	B	19	11.6	B	12
	NB Left	130	8.1	A	6	7.8	A	6
	NB Thru		0.0	0	0	0.0	0	0
	SB Thru		0.0	0	0	0.0	0	0
	SB Right	100	0.0	0	0	0.0	0	0

¹ Overall intersection LOS and delay reported for signalized intersections and roundabouts only.

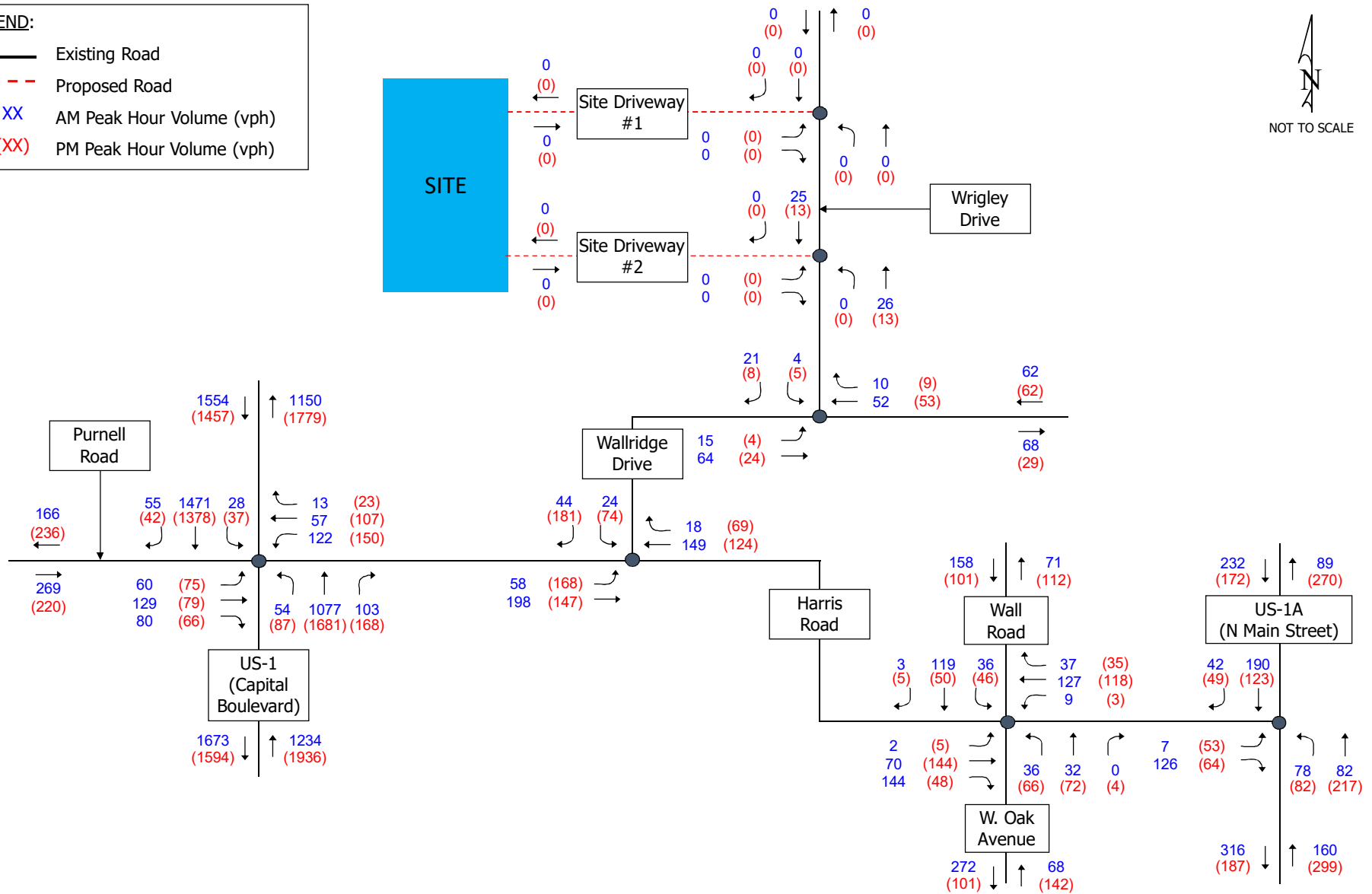
† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

- 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

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

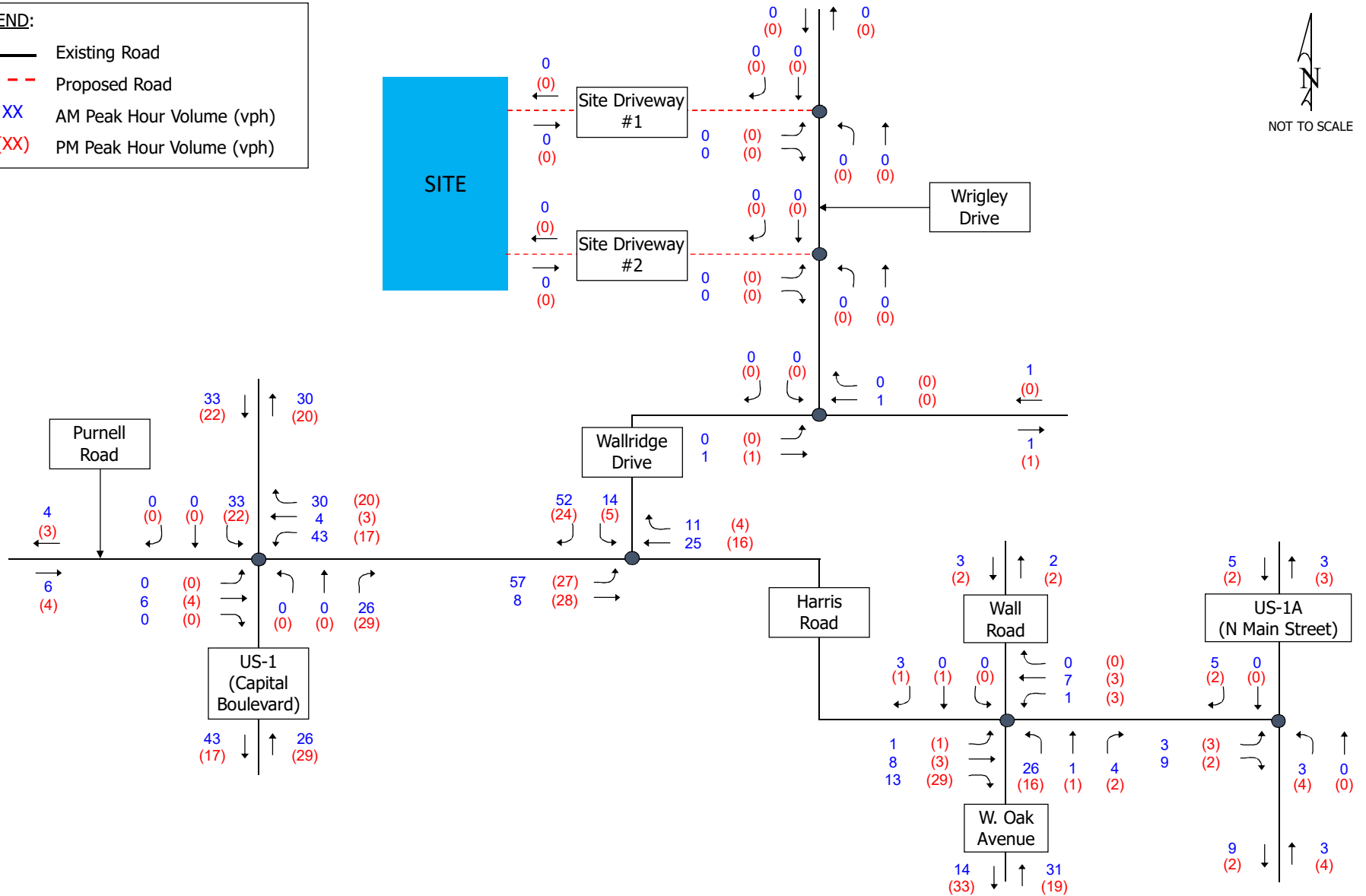
LEGEND:

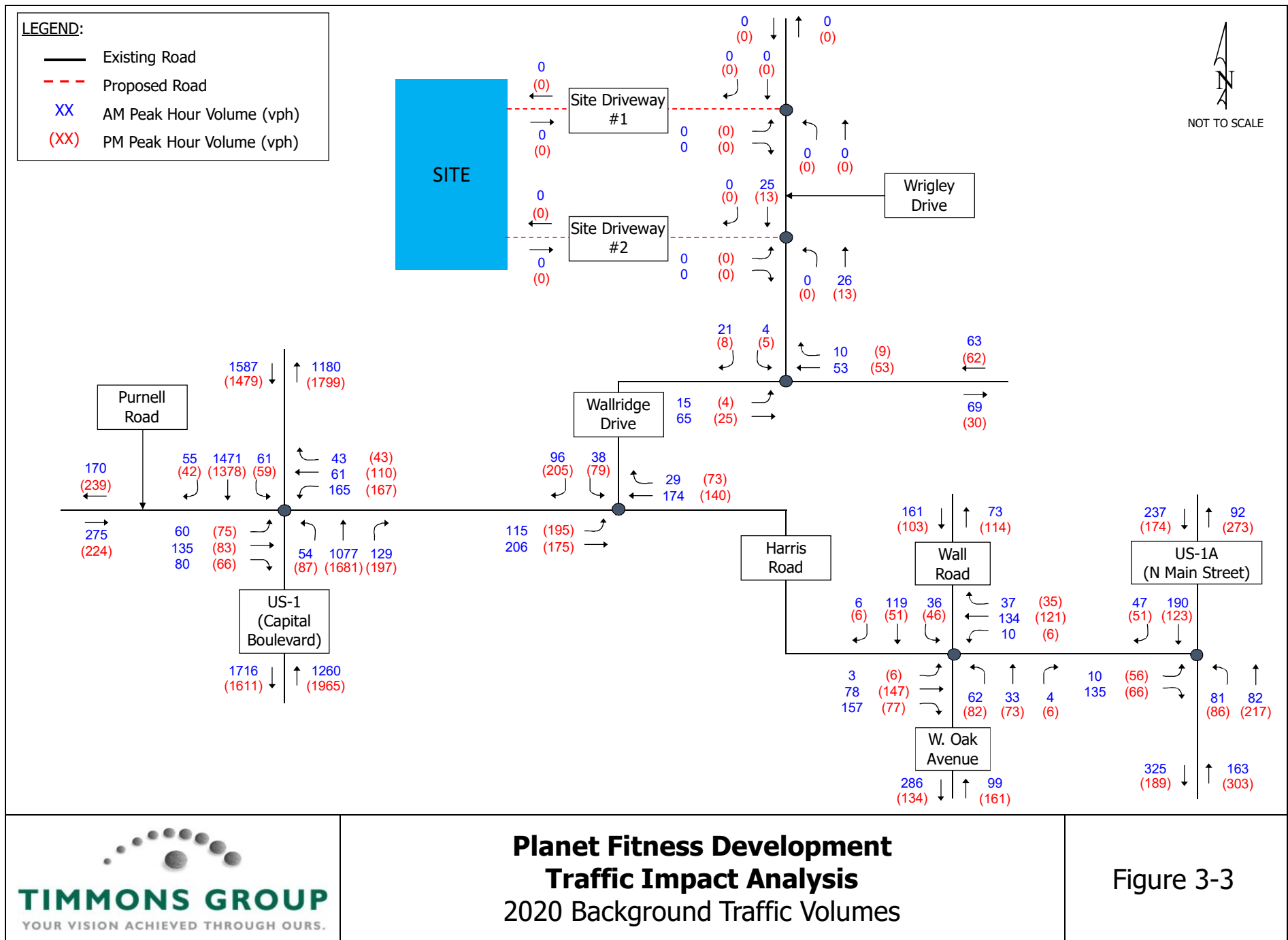
- Existing Road
- - - Proposed Road
- XX AM Peak Hour Volume (vph)
- (XX) PM Peak Hour Volume (vph)



LEGEND:

- Existing Road
- - - Proposed Road
- XX AM Peak Hour Volume (vph)
- (XX) PM Peak Hour Volume (vph)





4 SITE TRIP GENERATION AND DISTRIBUTION

Site trips for the Planet Fitness development were estimated based on the proposed land uses supplied by the developer and subsequently distributed onto the surrounding roadway network.

4.1 TRIP GENERATION

The site-generated trips shown in **Table 4-1** are based on field data collection as well as trip generation information provided in the 10th Edition of the Institute of Transportation Engineer's (ITE's) *Trip Generation Manual*. Trip generation for the Planet Fitness Development was calculated using local data where trips for the commercial portion of the development were calculated using the proposed square footage (3,900 SF) as the independent variable, as well as the provided equation (per NCDOT guidelines).

On January 10th, 2019, Timmons Group collected vehicular data at the existing Planet Fitness development located at 151 Mayo Street in Hillsborough, NC. Counts (incoming / outgoing) were conducted between 7:00 a.m. – 9:00 a.m. and 4:00 p.m. – 6:00 p.m. This data was then compared to “check-in” data provided by the existing facility. As January typically represents the heaviest month for Planet Fitness, data for Wednesday, June 18th, 2018 was also provided. June data was determined to be a better representation of actual facility operations. Timmons Group determined the percentage difference between the January check-in data and June check-in data and applied this percentage to the January 10th vehicular counts. As shown in **Table 4-1** below, June data was determined to be 5% less than January data during the AM peak hour and 32% less during the PM peak hour. Collected / provided Hillsborough, NC data is located in **Appendix G**.

Table 4-1: Trip Generation Summary

ITE Land Use Code	Daily			AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total	In	Out	Total
Planet Fitness (Hillsborough, NC) - Counted January 2019	--	--	*	47	23	70	99	76	175
% Reduction (January to June):	--	--	--	5%	5%	5%	32%	32%	32%
Subtotal:	--	--	--	45	22	67	68	52	120
820 – Shopping Center (3,900 SF)	331	331	662	85	58	153	24	26	50
Total:	331	331	662*	140	180	220	92	78	170

SOURCE: Institute of Transportation Engineers' *Trip Generation Manual* 10th Edition (2017)

* Daily totals were not collected for the Hillsborough, NC Planet Fitness

AM peak hour trips generated totaled 140 incoming and 180 outgoing where PM peak hour trips totaled 92 incoming and 78 outgoing.

NCDOT standards and procedures allow for a 34% pass-by reduction to the projected commercial traffic volumes. However, based on the location of the proposed commercial development it is unlikely that pass-bay trips will occur at this location. It should be noted that LUC 820 likely represents a gross over estimation of projected trips for the commercial portion of this development. Land uses complimentary to Planet Fitness will likely occur in this location that are projected to generate far less trips than those shown (small juice stores, health food stores, etc). The trip generation shown represents a “worst-case” scenario from a traffic volume perspective.

4.2 TRIP DISTRIBUTION

The directional traffic patterns, or trip distribution, of the site-generated traffic was determined using the existing AM and PM peak hour traffic characteristics. Area trip distribution is based on traffic counts performed by Timmons Group as well as assumed travel patterns from area residential developments.

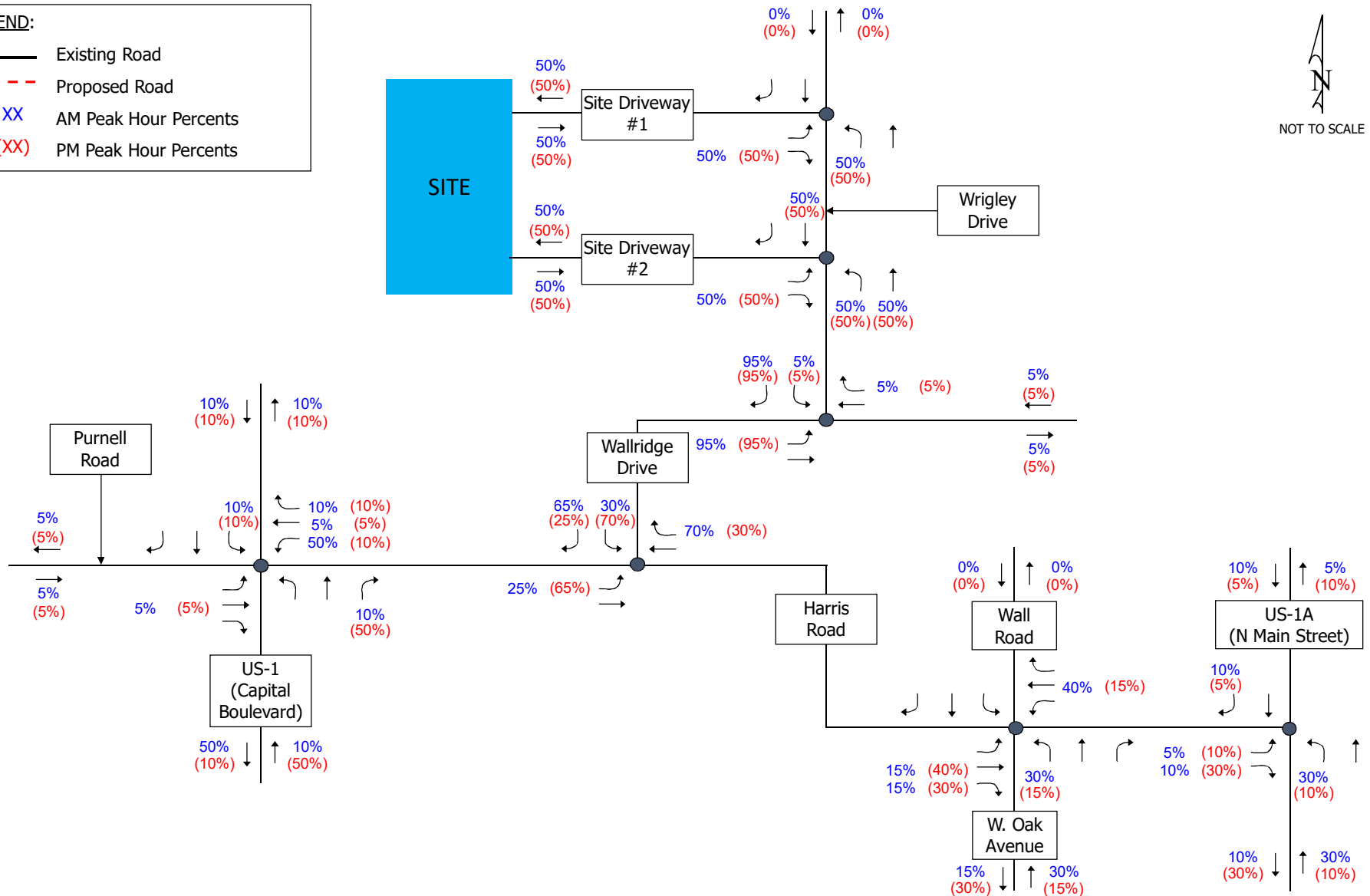
Total trips into and out of the study area using US 1 (Capital Boulevard), Purnell Road, Wallridge Drive, W. Oak Avenue, and US 1A (N Main Street) form the basis for the percentage distribution. Distribution percentages into and out of the study area were calculated using the following percent distributions:

- AM Peak Hour:
 - 10% – to/from US 1 (Capital Boulevard) – North
 - 10% – from US 1 (Capital Boulevard) – South
 - 50% – to US 1 (Capital Boulevard) – South
 - 5% – to/from Purnell Road – West
 - 30% – from W. Oak Avenue – South
 - 15% – to W. Oak Avenue – South
 - 10% – from US 1A (N. Main Street) – North
 - 5% – to US 1A (N. Main Street) – North
 - 30% – from US 1A (N. Main Street) – South
 - 10% – to US 1A (N. Main Street) – South
- PM Peak Hour:
 - 10% – to/from US 1 (Capital Boulevard) – North
 - 50% – from US 1 (Capital Boulevard) – South
 - 10% – to US 1 (Capital Boulevard) – South
 - 5% – to/from Purnell Road – West
 - 15% – from W. Oak Avenue – South
 - 30% – to W. Oak Avenue – South
 - 5% – from US 1A (N. Main Street) – North
 - 10% – to US 1A (N. Main Street) – North
 - 10% – from US 1A (N. Main Street) – South
 - 30% – to US 1A (N. Main Street) – South

The percentages were routed, via shortest path, to and from the proposed development. The distribution percentages were then applied to the generated trips to predict routes and project traffic volumes for the 2020 build-out scenario. **Figure 4-1** shows the 2020 distribution percentages and **Figure 4-2** shows the 2020 site trip distribution volumes. 2020 Build traffic volumes were determined by applying the total site trip distribution volumes to the Background traffic volumes (see **Figure 3-3**). Trip distribution percentages were reviewed and approved by the Town of Wake Forest prior to the submittal of this document.

LEGEND:

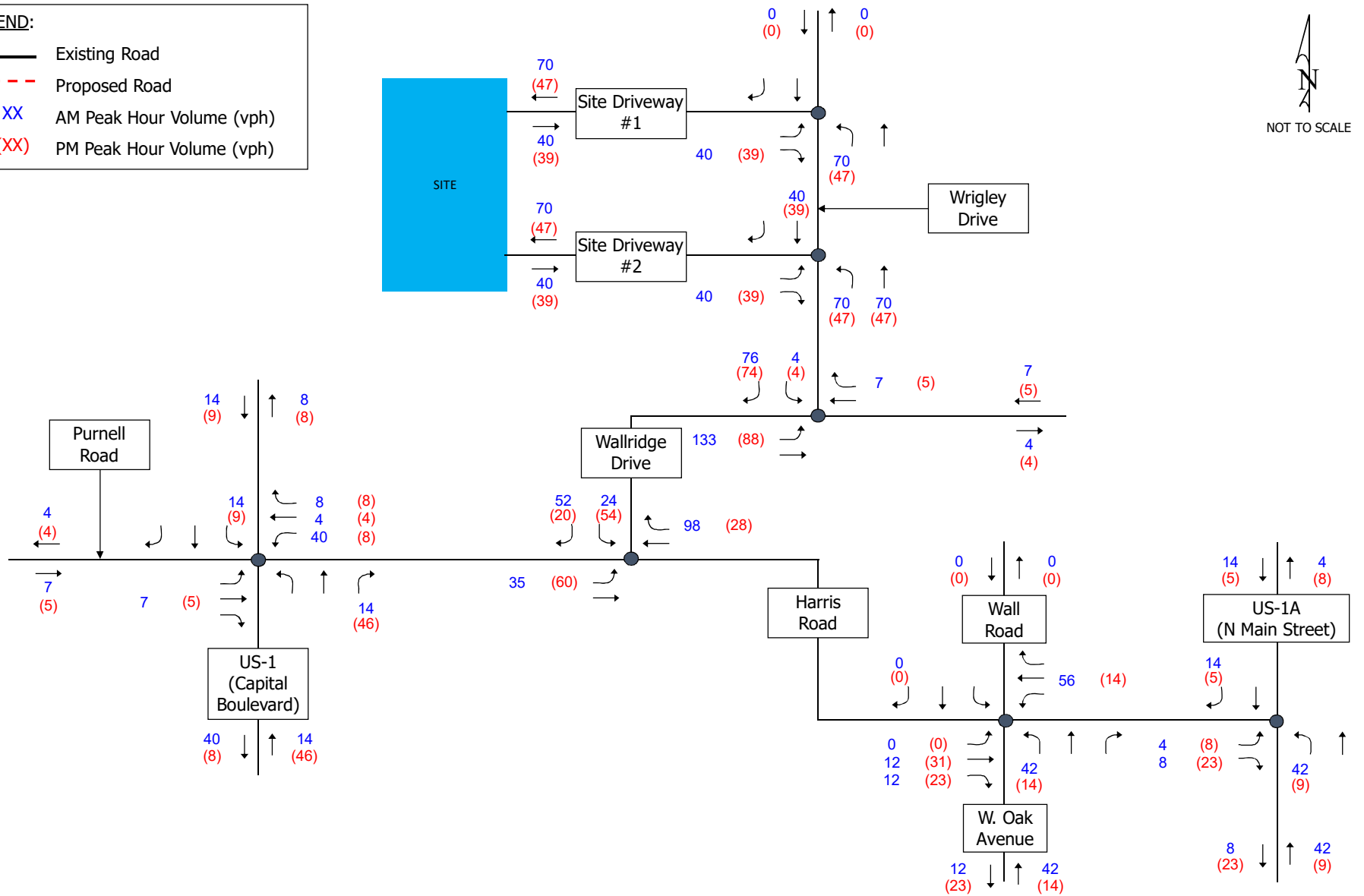
- Existing Road
- - - Proposed Road
- XX AM Peak Hour Percents
- (XX) PM Peak Hour Percents



NOT TO SCALE

LEGEND:

- Existing Road
- - - Proposed Road
- XX AM Peak Hour Volume (vph)
- (XX) PM Peak Hour Volume (vph)



5 2020 BUILD CONDITION AND ANALYSIS

To complete the 2020 Build analyses (including the proposed development), the estimated site trips were added to the 2020 Background traffic volumes. The projected total volumes, along with the existing intersection geometry (and approved development offsite improvements), were used to complete the capacity and turn lane warrant analyses.

5.1 2020 BUILD TRAFFIC VOLUMES

The Background traffic volumes from **Figure 3-3** were added to the projected site trips from the Planet Fitness Development to generate the 2020 Build traffic volumes (background + site) shown on **Figure 5-1**.

To summarize, the 2020 Build traffic volumes shown on **Figure 5-1** contain the following:

- Existing 2019 turning movement traffic count volumes collected by Timmons Group (January 2019) grown exponentially for 1 years at a 3% ambient growth rate;
- 2020 approved area development site trips;
- Site trips generated by the subject development.

5.2 2020 BUILD ANALYSIS

Table 5-1 summarizes the intersection LOS, delay, and 95th percentile queue lengths based on the 2020 Build traffic volumes (shown on **Figure 5-1**). The corresponding SYNCHRO output is included in **Appendix E**.

The existing roundabout intersection of Wallridge Drive / Wrigley Drive is projected to operate at a LOS A during both analyzed 2020 Build peak hours. SYNCHRO analysis outputs are located in **Appendix E**. Because the intersection is projected to operate at acceptable levels of service during both peak hours, no improvement recommendations are necessary to help mitigate intersection congestion due to the construction of the proposed development.

All unsignalized intersection movements at Harris Road / Wallridge Drive are projected to operate at a LOS C or better during both 2020 Build peak hours. Existing turn-lane storage is adequate to handle all 95th percentile queue lengths during both analyzed peak hours. Because all intersection movements are projected to operate at acceptable levels of service during both peak hours, no improvement recommendations are necessary to help mitigate intersection congestion due to the construction of the proposed development.

The signalized intersection of US 1 (Capital Boulevard) / Harris Road / Purnell Road is projected to operate at a LOS D during both 2020 Build peak hours. Existing turn-lane storage is adequate to handle all 95th percentile queue lengths during both analyzed peak hours. Because the intersection is projected to operate at acceptable levels of service during both peak hours, no improvement recommendations are necessary to help mitigate intersection congestion due to the construction of the proposed development.

All unsignalized intersection movements at Harris Road / Wall Road / W. Oak Road are projected to operate at a LOS D or better during both 2020 Build peak hours. Additionally, the overall intersection level of service is currently a LOS C or better during both peak hours. Existing turn-lane storage is adequate to handle all 95th percentile queue lengths during both analyzed peak hours. Because all intersection

movements are projected to operate at acceptable levels of service during both peak hours, no improvement recommendations are necessary to help mitigate intersection congestion due to the construction of the proposed development.

All unsignalized intersection movements at US 1A (N. Main Street) / Harris Road are projected to operate at a LOS B or better during both 2020 Build peak hours. Existing turn-lane storage is adequate to handle all 95th percentile queue lengths during both analyzed peak hours. Because all intersection movements are projected to operate at acceptable levels of service during both peak hours, no improvement recommendations are necessary to help mitigate intersection congestion due to the construction of the proposed development.

All unsignalized intersection movements at Wrigley Drive / Site Driveway #1 are projected to operate at a LOS B or better during the 2020 Build AM and PM peak hours. Per the NCDOT Policy on Street and Driveway Access to North Carolina Highways Manual:

“Generally left and right turn lanes and tapers shall be considered when:

- In accordance with G.S. 136-18(29), the average daily traffic meets or exceeds 4,000 vehicles per day on any secondary route (the average daily traffic should include both the existing traffic plus traffic generated by the proposed development)”*

With the AADT along Wrigley Drive not projected to exceed 4,000 VPD, no improvements are recommended at Site Driveway #1. Additionally, because all intersection movements are projected to operate at acceptable levels of service during both peak hours, no improvement recommendations are necessary to help mitigate intersection congestion due to the construction of the proposed development.

All unsignalized intersection movements at Wrigley Drive / Site Driveway #2 are projected to operate at a LOS B or better during the 2020 Build AM and PM peak hours. With the AADT along Wrigley Drive not projected to exceed 4,000 VPD, no improvements are recommended at Site Driveway #2. Additionally, because all intersection movements are projected to operate at acceptable levels of service during both peak hours, no improvement recommendations are necessary to help mitigate intersection congestion due to the construction of the proposed development.

**Table 5-1: Intersection Level of Service, Delay and 95th Percentile Queue Summary
2020 Build Traffic Volumes**

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR			PM PEAK HOUR		
			Delay ¹ (sec/veh)	LOS ¹	95th Percentile Queue Length (ft)	Delay ¹ (sec/veh)	LOS ¹	95th Percentile Queue Length (ft)
1: Wrigley Drive & Site Driveway #1	EB Left/Right		8.5	A	3	8.5	A	3
	NB Left/Thru		0.4	A	4	0.2	A	2
2: Wrigley Drive & Site Driveway #2	EB Left/Right		8.8	A	3	8.7	A	3
	NB Left/Thru		3.4	A	4	3.4	A	3
4: Harris Road & Wallridge Drive	EB Left	120	8.9	A	21	8.6	A	21
	EB Thru		0.0	0	0	0.0	0	0
	WB Thru		0.0	0	0	0.0	0	0
	WB Right	175	0.0	0	0	0.0	0	0
	SB Left		19.8	C	64	22.6	C	110
	SB Right	215	19.8	C	64	22.6	C	110
5: US 1 (Capital Boulevard) & Purnell Road/Harris Road	EB Left	150	47.0	D	89	49.7	D	115
	EB Thru		85.6	F	#254	67.5	E	157
	EB Right	380	36.0	D	93	33.0	C	86
	EB Approach		63.3	E	--	51.8	D	--
	WB Dual Lefts	270	82.5	F	154	75.5	E	138
	WB Thru/Right		67.0	E	#218	79.4	E	#362
	WB Approach		76.9	E	--	77.4	E	--
	NB Left	310	72.8	E	104	71.7	E	155
	NB Thru		39.3	D	513	39.3	D	985
	NB Right	170	8.7	A	50	6.0	A	62
	NB Approach		37.3	D	--	36.7	D	--
	SB Left	250	56.7	E	129	80.6	F	127
	SB Thru		36.5	D	757	32.7	C	674
	SB Right	110	5.6	A	16	5.5	A	13
	SB Approach		36.4	D	--	34.2	C	--
	Overall		43.8	D	--	40.0	D	--
6: W. Oak Avenue/Wall Road & Harris Road	EB Left/Thru/Right		25.1	D	0	11.6	B	0
	WB Left/Thru/Right		13.8	B	0	10.2	B	0
	NB Left/Thru/Right		13.7	B	0	10.9	B	0
	SB Left/Thru/Right		13.2	B	0	9.9	A	0
	Overall		18.8	C	--	10.9	B	--
7: US 1A (N. Main Street) & Harris Road	EB Left		11.0	B	20	11.7	B	15
	EB Right	130	11.0	B	20	11.7	B	15
	NB Left	130	8.2	A	10	7.8	A	6
	NB Thru		0.0	0	0	0.0	0	0
	SB Thru		0.0	0	0	0.0	0	0
	SB Right	100	0.0	0	0	0.0	0	0

¹ Overall intersection LOS and delay reported for signalized intersections and roundabouts only.

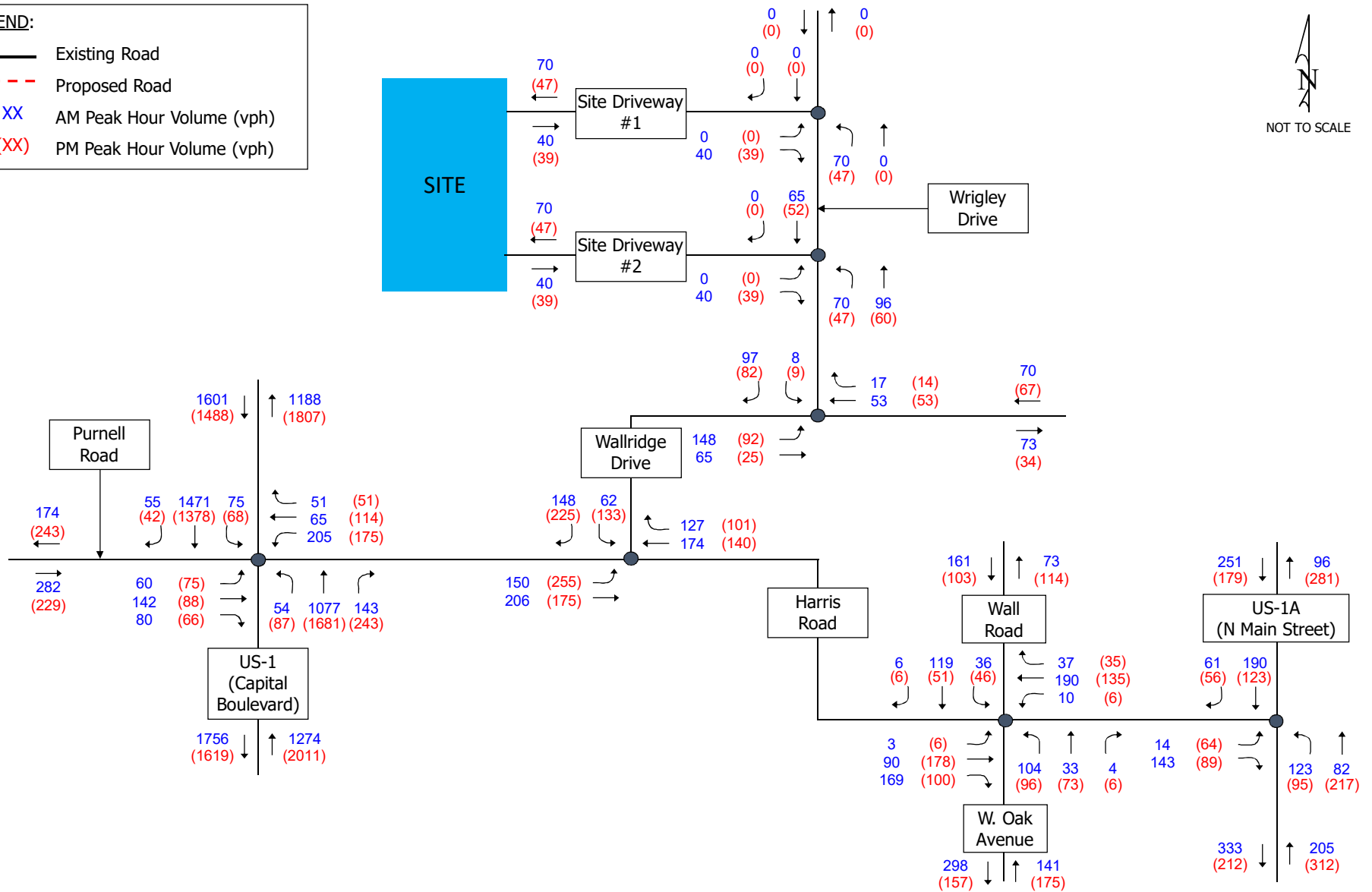
† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

- 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

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

LEGEND:

- Existing Road
- - - Proposed Road
- XX AM Peak Hour Volume (vph)
- (XX) PM Peak Hour Volume (vph)



6 CONCLUSIONS AND RECOMMENDATIONS

Capacity analyses were performed for 2019 Existing, 2020 Background (existing + ambient growth), and 2020 Build (background + site trips) traffic volumes

Based on the operational analyses the following is offered:

- The existing roundabout intersection of Wallridge Drive / Wrigley Drive is projected to operate at a LOS A during both analyzed 2020 Build peak hours. No improvements are recommended at this intersection due to the construction of the proposed development.
- All unsignalized intersection movements at Harris Road / Wallridge Drive are projected to operate at a LOS B or better during both 2020 Build peak hours. No improvements are recommended at this intersection due to the construction of the proposed development.
- The signalized intersection of US 1 (Capital Boulevard) / Harris Road / Purnell Road is projected to operate at a LOS D during both 2020 Build peak hours. No improvements are recommended at this intersection due to the construction of the proposed development.
- All unsignalized intersection movements at Harris Road / Wall Road / W. Oak Avenue are projected to operate at a LOS C or better during both 2020 Build peak hours. Additionally, the overall intersection level of service is currently a LOS B or better during both peak hours. No improvements are recommended at this intersection due to the construction of the proposed development.
- All unsignalized intersection movements at US 1A (N. Main Street) / Harris Road are projected to operate at a LOS B or better during both 2020 Build peak hours. No improvements are recommended at this intersection due to the construction of the proposed development.
- All unsignalized intersection movements at Wrigley Drive / Site Driveway #1 are projected to operate at a LOS B or better during the 2020 Build AM and PM peak hours. No improvements are recommended at this intersection due to the construction of the proposed development.
- All unsignalized intersection movements at Wrigley Drive / Site Driveway #2 are projected to operate at a LOS B or better during the 2020 Build AM and PM peak hours. No improvements are recommended at this intersection due to the construction of the proposed development.

Appendix A – Scoping Information

January 9, 2019

RE: Planet Fitness Meeting Minutes
Wake Forest, NC

On January 9, 2018 a meeting was held at the NCDOT District office between the Town of Wake Forest, NCDOT District Office, Bartlett Engineering & Surveying and Timmons Group to discuss scoping criteria for the Planet Fitness development in Wake Forest, NC.

In attendance were:

- Town of Wake Forest
- NCDOT District
- Bartlett Engineering & Surveying
- Timmons Group

Items discussed included:

- 1) The Planet Fitness Development is proposed for construction by Winter 2019
- 2) The development will include the anchor Planet Fitness as well as several small commercial outparcels (potentially: dry cleaner, small restaurant, etc.)
- 3) The NCDOT / Town agreed to the following study area intersections:
 - US-1 / Purnell Road / Harris Road
 - Harris Road / Wallridge Drive
 - Wrigley Drive / Wallridge Drive
 - Wrigley Drive / Site Driveway #1
 - Wrigley Drive / Site Driveway #2
 - Harris Road / Wall Road
 - Harris Road / US-1A (N Main Street)
- 4) Timmons Group will count / analyze membership data for the existing Planet Fitness (Leland Drive in Raleigh) to calculate / determine the trip generation for the proposed development
- 5) The Leland Drive Planet Fitness was chosen due to similarities in surrounding land uses / infrastructure (close proximity to residential developments, adjacent grocery store, proximity to major US highway that services commuter traffic, etc)
- 6) AM peak hour trips will likely approach the development from the east prior to heading to US-1
- 7) PM peak hour trips will likely approach the development from US-1 prior to heading east
- 8) A 3.0% ambient growth rate will be used for ambient traffic growth.
- 9) There are two NCDOT / Town infrastructure improvement projects in the study area that will occur following the proposed development's construction:
 - US-1 upgrade to an interstate (U-5307)
 - i. Phases 1-3 – 2021 Let
 - ii. Phase 4 (near Harris Road) – 2024 Let
 - Harris Road / Wall Road conversion to a roundabout (LAPP funded project)
- 10) CAMPO is currently studying the placement of Service Roads in the area.
- 11) The CAMPO Service Roads will fall within the proposed US-1 ROW

- 12) There are two approved area developments:
 - Bluffs @ Joyner Residential Development (a percentage of trips to be included)
 - Char Grill
- 13) The Town will provide build-out information to Timmons Group for both approved projects
- 14) The Town referenced a third area development (Devon Square), but said the project is not approved and currently does not have Town support.
- 15) Timmons Group to complete and provide a trip generation figure with the meeting minutes.

Should you have any questions, please do not hesitate to contact me.

Sincerely,

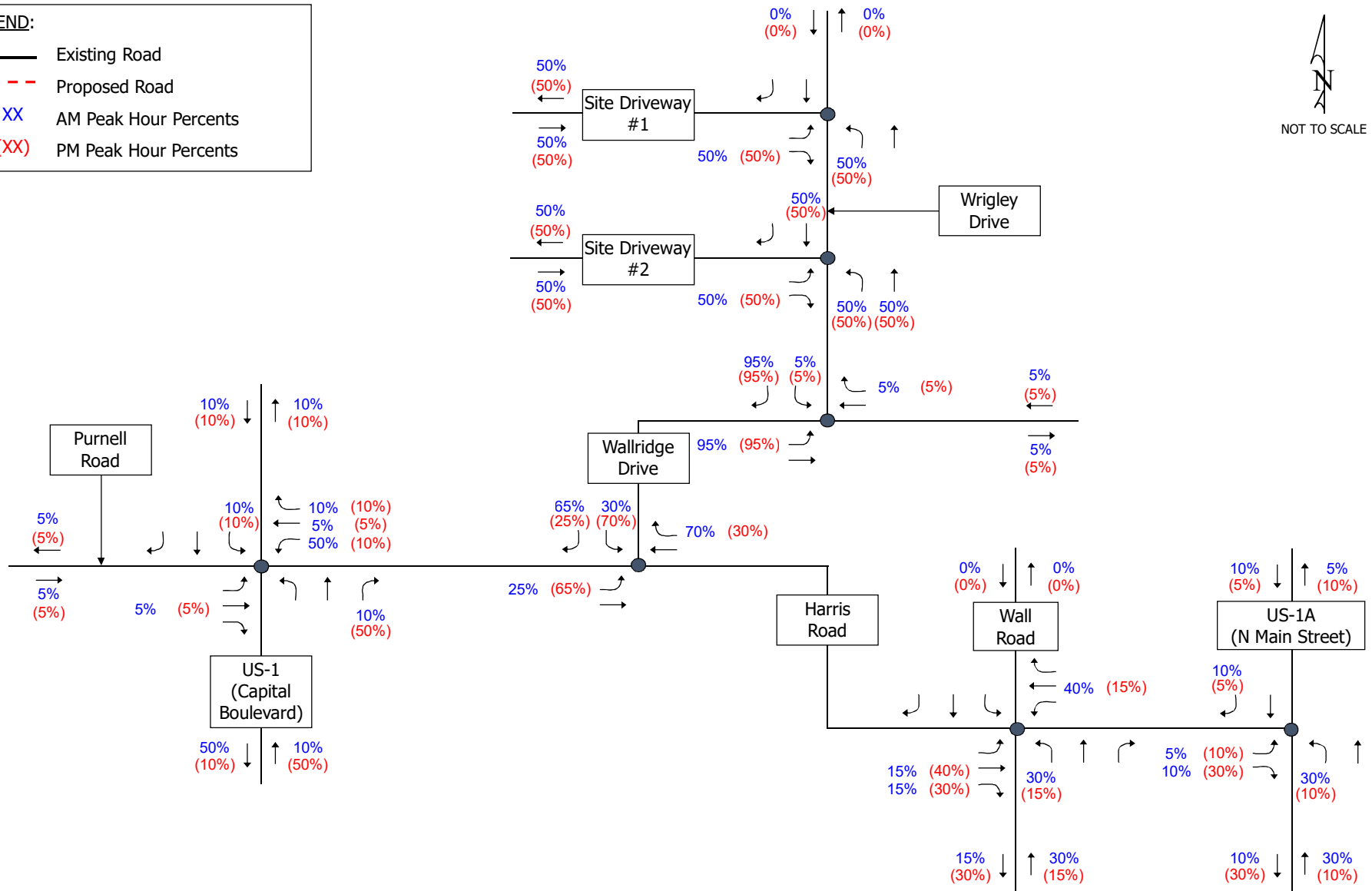
A handwritten signature in black ink, appearing to read 'J. P. Hochanadel', written in a cursive style.

Jeffrey P. Hochanadel, PE, PTOE
Senior Project Manager, Transportation

(Attachment)

LEGEND:

- Existing Road
- - - Proposed Road
- XX AM Peak Hour Percents
- (XX) PM Peak Hour Percents



Appendix B – Traffic Counts



File Name : Wake Forest(Harris and Main) AM Peak

Site Code :

Start Date : 1/10/2019

Page No : 1

Groups Printed- Cars + - Trucks

	Main Street Southbound			Main Street Northbound			Harris Road Eastbound			
Start Time	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	Int. Total
07:00 AM	12	57	69	18	14	32	34	1	35	136
07:15 AM	11	46	57	28	18	46	25	1	26	129
07:30 AM	11	35	46	15	22	37	26	3	29	112
07:45 AM	7	46	53	19	22	41	37	2	39	133
Total	41	184	225	80	76	156	122	7	129	510
08:00 AM	11	34	45	19	44	63	16	1	17	125
08:15 AM	11	36	47	14	13	27	15	3	18	92
08:30 AM	11	31	42	9	22	31	19	4	23	96
08:45 AM	17	32	49	13	25	38	21	6	27	114
Total	50	133	183	55	104	159	71	14	85	427
Grand Total	91	317	408	135	180	315	193	21	214	937
Apprch %	22.3	77.7		42.9	57.1		90.2	9.8		
Total %	9.7	33.8	43.5	14.4	19.2	33.6	20.6	2.2	22.8	
Cars +	91	317	408	134	180	314	192	21	213	935
% Cars +	100	100	100	99.3	100	99.7	99.5	100	99.5	99.8
Trucks	0	0	0	1	0	1	1	0	1	2
% Trucks	0	0	0	0.7	0	0.3	0.5	0	0.5	0.2



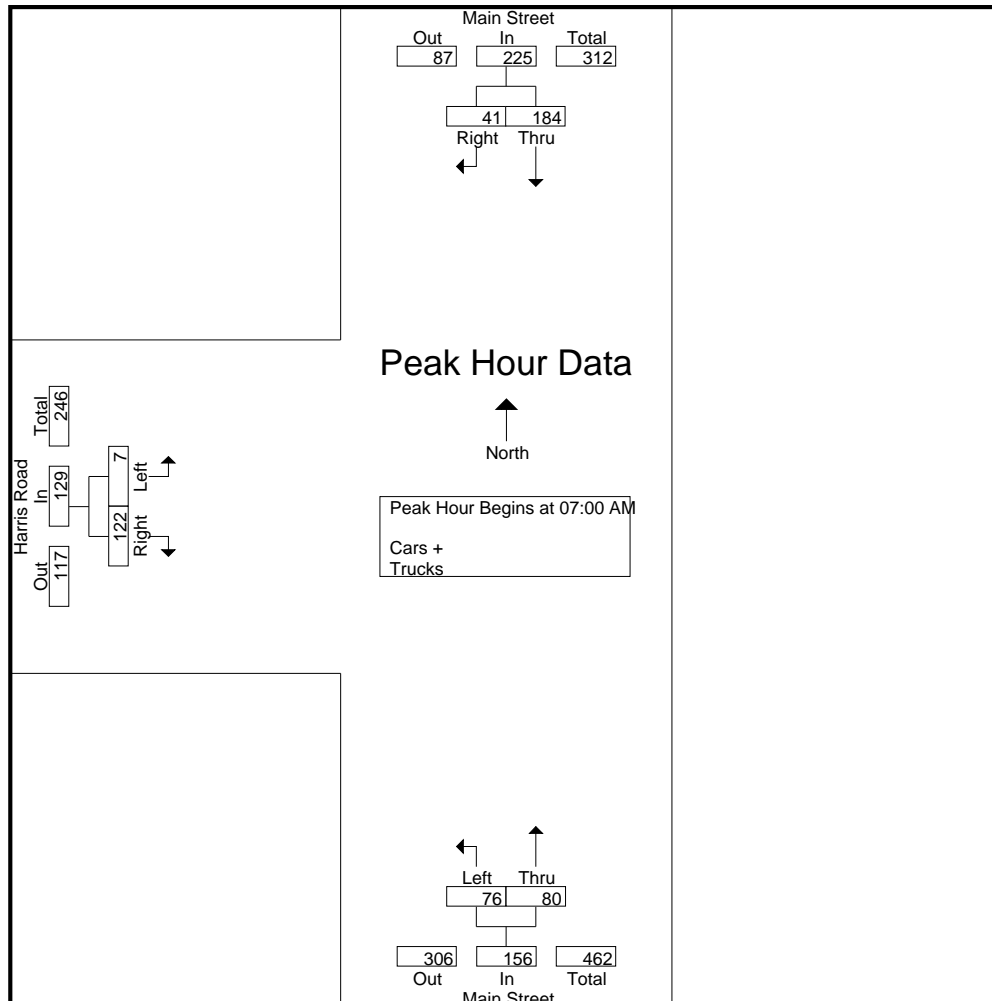
File Name : Wake Forest(Harris and Main) AM Peak

Site Code :

Start Date : 1/10/2019

Page No : 2

	Main Street Southbound			Main Street Northbound			Harris Road Eastbound			
Start Time	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	12	57	69	18	14	32	34	1	35	136
07:15 AM	11	46	57	28	18	46	25	1	26	129
07:30 AM	11	35	46	15	22	37	26	3	29	112
07:45 AM	7	46	53	19	22	41	37	2	39	133
Total Volume	41	184	225	80	76	156	122	7	129	510
% App. Total	18.2	81.8		51.3	48.7		94.6	5.4		
PHF	.854	.807	.815	.714	.864	.848	.824	.583	.827	.938





File Name : Wake Forest(Harris and Main) PM Peak

Site Code :

Start Date : 1/10/2019

Page No : 1

Groups Printed- Cars + - Trucks

	Main Street Southbound			Main Street Northbound			Harris Road Eastbound			
Start Time	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	Int. Total
04:00 PM	9	27	36	38	30	68	19	13	32	136
04:15 PM	7	30	37	46	30	76	17	15	32	145
04:30 PM	16	24	40	54	15	69	17	11	28	137
04:45 PM	15	26	41	42	21	63	15	18	33	137
Total	47	107	154	180	96	276	68	57	125	555
05:00 PM	9	31	40	61	28	89	12	10	22	151
05:15 PM	8	38	46	54	16	70	18	12	30	146
05:30 PM	8	26	34	42	28	70	19	8	27	131
05:45 PM	10	26	36	48	16	64	18	18	36	136
Total	35	121	156	205	88	293	67	48	115	564
Grand Total	82	228	310	385	184	569	135	105	240	1119
Apprch %	26.5	73.5		67.7	32.3		56.2	43.8		
Total %	7.3	20.4	27.7	34.4	16.4	50.8	12.1	9.4	21.4	
Cars +	81	227	308	384	184	568	135	105	240	1116
% Cars +	98.8	99.6	99.4	99.7	100	99.8	100	100	100	99.7
Trucks	1	1	2	1	0	1	0	0	0	3
% Trucks	1.2	0.4	0.6	0.3	0	0.2	0	0	0	0.3



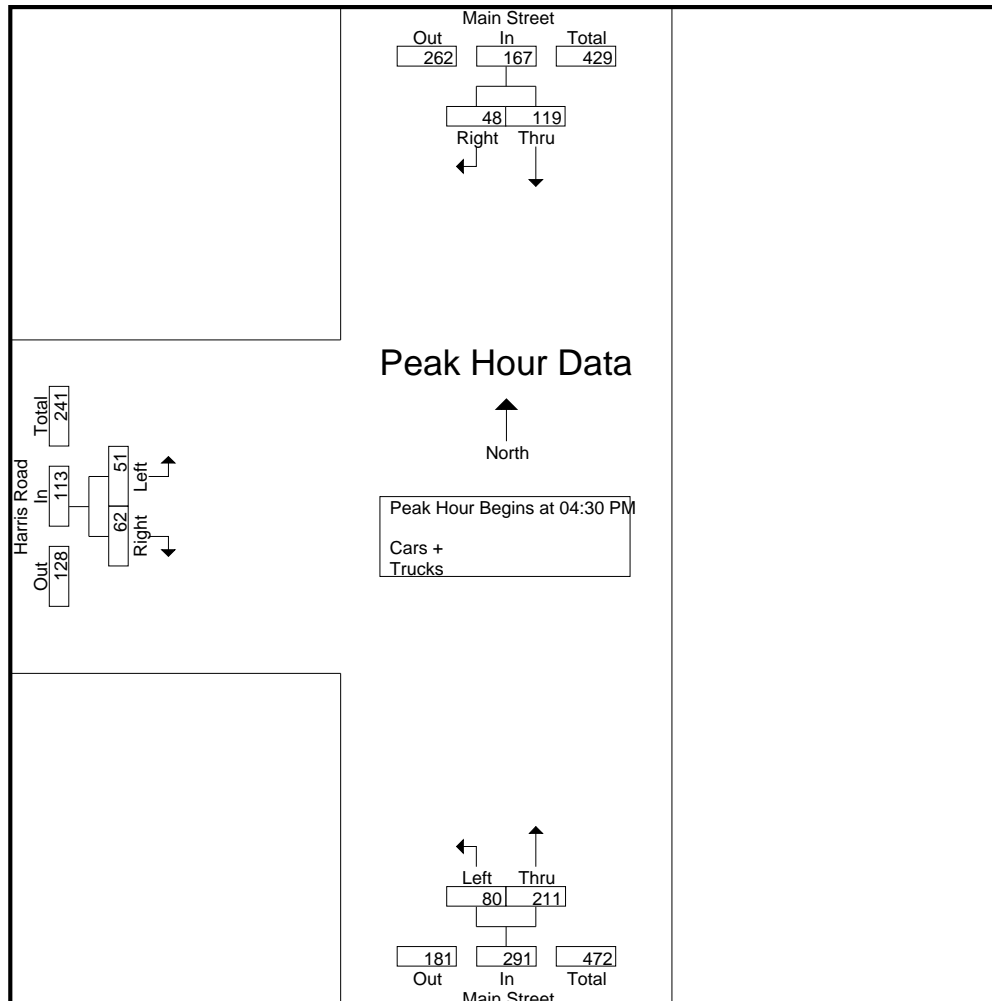
File Name : Wake Forest(Harris and Main) PM Peak

Site Code :

Start Date : 1/10/2019

Page No : 2

	Main Street Southbound			Main Street Northbound			Harris Road Eastbound			
Start Time	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	16	24	40	54	15	69	17	11	28	137
04:45 PM	15	26	41	42	21	63	15	18	33	137
05:00 PM	9	31	40	61	28	89	12	10	22	151
05:15 PM	8	38	46	54	16	70	18	12	30	146
Total Volume	48	119	167	211	80	291	62	51	113	571
% App. Total	28.7	71.3		72.5	27.5		54.9	45.1		
PHF	.750	.783	.908	.865	.714	.817	.861	.708	.856	.945





File Name : Wake Forest(Harris and US 1) AM Peak

Site Code :

Start Date : 1/10/2019

Page No : 1

Groups Printed- Cars + - Trucks

	US 1 Southbound					Harris Road Westbound					US 1 Northbound					Purnell Road Eastbound					
Start Time	Right	Thru	Left	UTrn	App. Total	Right	Thru	Left	UTrn	App. Total	Right	Thru	Left	UTrn	App. Total	Right	Thru	Left	UTrn	App. Total	Int. Total
07:00 AM	15	400	7	3	425	1	8	28	0	37	45	198	10	0	253	25	56	20	0	101	816
07:15 AM	17	334	6	2	359	5	21	37	0	63	17	227	18	0	262	20	24	16	0	60	744
07:30 AM	6	339	6	2	353	3	12	30	0	45	20	320	10	0	350	19	19	5	0	43	791
07:45 AM	15	355	8	0	378	4	14	23	0	41	18	301	14	0	333	14	26	17	0	57	809
Total	53	1428	27	7	1515	13	55	118	0	186	100	1046	52	0	1198	78	125	58	0	261	3160
08:00 AM	15	377	5	1	398	3	22	25	0	50	21	246	11	0	278	24	10	12	0	46	772
08:15 AM	12	382	11	3	408	1	16	32	0	49	24	198	11	0	233	14	13	7	0	34	724
08:30 AM	10	298	4	2	314	2	17	29	0	48	24	202	13	1	240	22	14	4	0	40	642
08:45 AM	11	281	6	0	298	2	9	59	0	70	44	189	12	0	245	21	9	6	0	36	649
Total	48	1338	26	6	1418	8	64	145	0	217	113	835	47	1	996	81	46	29	0	156	2787
Grand Total	101	2766	53	13	2933	21	119	263	0	403	213	1881	99	1	2194	159	171	87	0	417	5947
Apprch %	3.4	94.3	1.8	0.4		5.2	29.5	65.3	0		9.7	85.7	4.5	0		38.1	41	20.9	0		
Total %	1.7	46.5	0.9	0.2	49.3	0.4	2	4.4	0	6.8	3.6	31.6	1.7	0	36.9	2.7	2.9	1.5	0	7	
Cars +	101	2701	53	13	2868	21	119	262	0	402	212	1839	99	1	2151	159	171	87	0	417	5838
% Cars +	100	97.7	100	100	97.8	100	100	99.6	0	99.8	99.5	97.8	100	100	98	100	100	100	0	100	98.2
Trucks	0	65	0	0	65	0	0	1	0	1	1	42	0	0	43	0	0	0	0	0	109
% Trucks	0	2.3	0	0	2.2	0	0	0.4	0	0.2	0.5	2.2	0	0	2	0	0	0	0	0	1.8



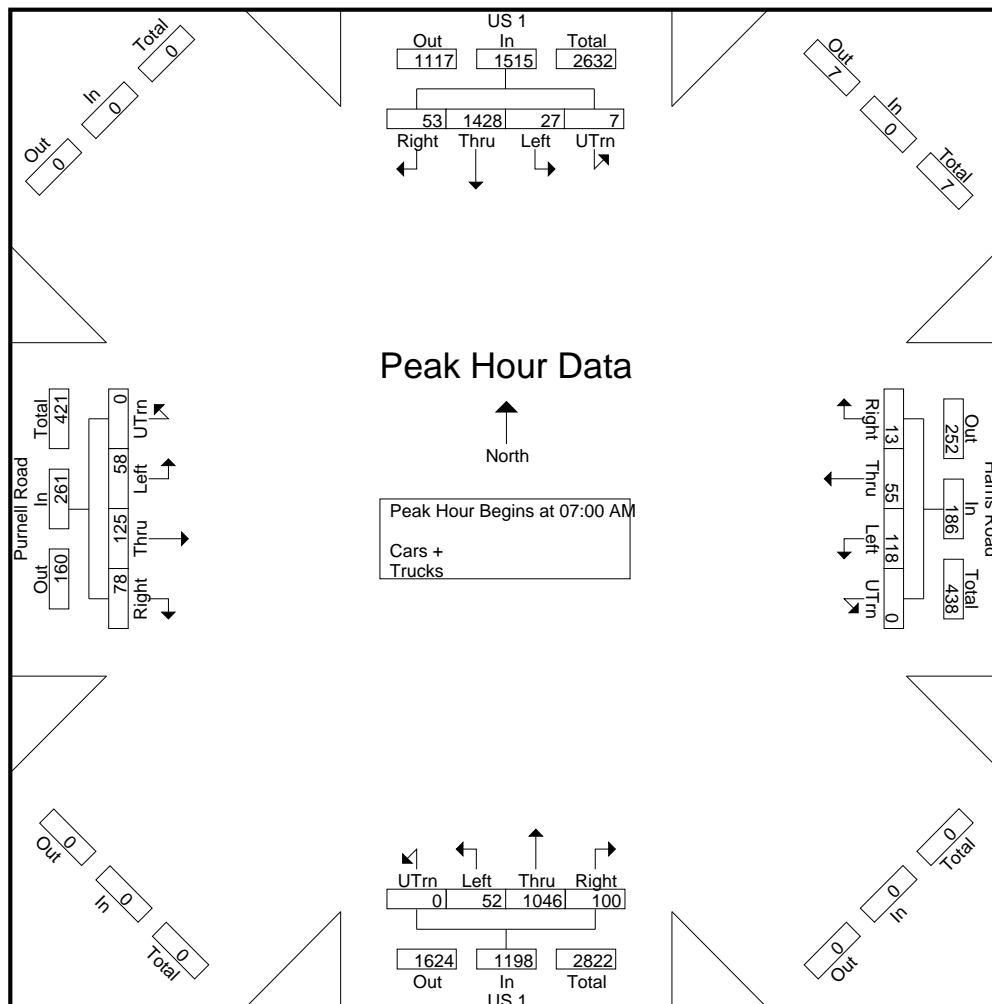
File Name : Wake Forest(Harris and US 1) AM Peak

Site Code :

Start Date : 1/10/2019

Page No : 2

	US 1 Southbound					Harris Road Westbound					US 1 Northbound					Purnell Road Eastbound					
Start Time	Right	Thru	Left	UTrn	App. Total	Right	Thru	Left	UTrn	App. Total	Right	Thru	Left	UTrn	App. Total	Right	Thru	Left	UTrn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	15	400	7	3	425	1	8	28	0	37	45	198	10	0	253	25	56	20	0	101	816
07:15 AM	17	334	6	2	359	5	21	37	0	63	17	227	18	0	262	20	24	16	0	60	744
07:30 AM	6	339	6	2	353	3	12	30	0	45	20	320	10	0	350	19	19	5	0	43	791
07:45 AM	15	355	8	0	378	4	14	23	0	41	18	301	14	0	333	14	26	17	0	57	809
Total Volume	53	1428	27	7	1515	13	55	118	0	186	100	1046	52	0	1198	78	125	58	0	261	3160
% App. Total	3.5	94.3	1.8	0.5		7	29.6	63.4	0		8.3	87.3	4.3	0		29.9	47.9	22.2	0		
PHF	.779	.893	.844	.583	.891	.650	.655	.797	.000	.738	.556	.817	.722	.000	.856	.780	.558	.725	.000	.646	.968





File Name : Wake Forest(Harris and US 1) PM Peak

Site Code :

Start Date : 1/10/2019

Page No : 1

Groups Printed- Cars + - Trucks

	US 1 Southbound					Harris Road Westbound					US 1 Northbound					Purnell Road Eastbound					
Start Time	Right	Thru	Left	UTrn	App. Total	Right	Thru	Left	UTrn	App. Total	Right	Thru	Left	UTrn	App. Total	Right	Thru	Left	UTrn	App. Total	Int. Total
04:00 PM	10	237	11	2	260	7	31	49	0	87	47	364	28	0	439	16	13	17	0	46	832
04:15 PM	7	287	8	5	307	4	26	34	0	64	42	377	22	0	441	15	20	13	0	48	860
04:30 PM	9	305	7	4	325	9	29	40	0	78	46	393	19	1	459	24	13	19	0	56	918
04:45 PM	9	321	7	6	343	8	29	36	0	73	40	365	21	1	427	12	18	21	0	51	894
Total	35	1150	33	17	1235	28	115	159	0	302	175	1499	90	2	1766	67	64	70	0	201	3504
05:00 PM	11	349	9	1	370	4	21	34	0	59	39	442	17	1	499	15	15	12	0	42	970
05:15 PM	10	298	14	4	326	6	32	37	0	75	52	378	23	0	453	20	24	21	0	65	919
05:30 PM	11	370	6	3	390	4	22	39	0	65	32	447	23	1	503	17	20	19	0	56	1014
05:45 PM	4	271	17	4	296	6	27	36	0	69	42	372	37	0	451	20	32	20	0	72	888
Total	36	1288	46	12	1382	20	102	146	0	268	165	1639	100	2	1906	72	91	72	0	235	3791
Grand Total	71	2438	79	29	2617	48	217	305	0	570	340	3138	190	4	3672	139	155	142	0	436	7295
Apprch %	2.7	93.2	3	1.1		8.4	38.1	53.5	0		9.3	85.5	5.2	0.1		31.9	35.6	32.6	0		
Total %	1	33.4	1.1	0.4	35.9	0.7	3	4.2	0	7.8	4.7	43	2.6	0.1	50.3	1.9	2.1	1.9	0	6	
Cars +	71	2392	79	29	2571	48	217	305	0	570	340	3107	190	4	3641	139	155	141	0	435	7217
% Cars +	100	98.1	100	100	98.2	100	100	100	0	100	100	99	100	100	99.2	100	100	99.3	0	99.8	98.9
Trucks	0	46	0	0	46	0	0	0	0	0	0	31	0	0	31	0	0	1	0	1	78
% Trucks	0	1.9	0	0	1.8	0	0	0	0	0	0	1	0	0	0.8	0	0	0.7	0	0.2	1.1



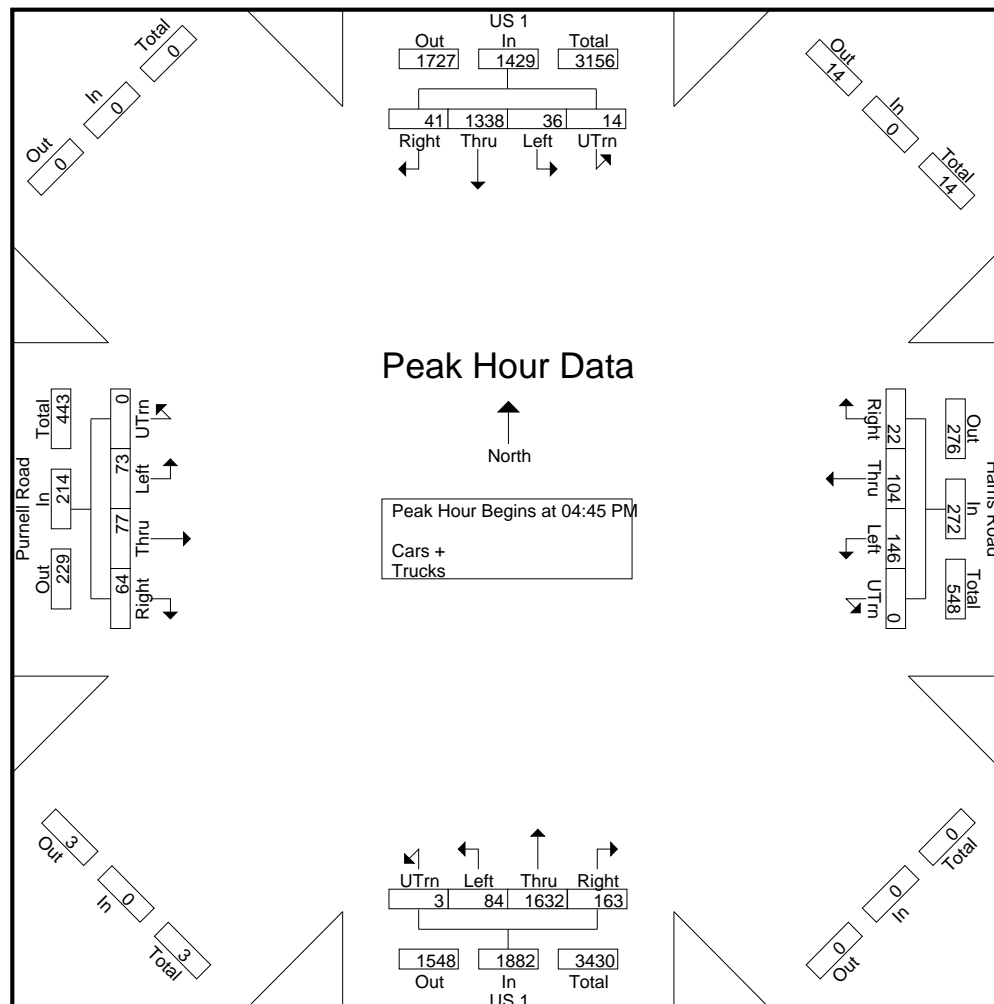
File Name : Wake Forest(Harris and US 1) PM Peak

Site Code :

Start Date : 1/10/2019

Page No : 2

	US 1 Southbound					Harris Road Westbound					US 1 Northbound					Purnell Road Eastbound					
Start Time	Right	Thru	Left	UTrn	App. Total	Right	Thru	Left	UTrn	App. Total	Right	Thru	Left	UTrn	App. Total	Right	Thru	Left	UTrn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	9	321	7	6	343	8	29	36	0	73	40	365	21	1	427	12	18	21	0	51	894
05:00 PM	11	349	9	1	370	4	21	34	0	59	39	442	17	1	499	15	15	12	0	42	970
05:15 PM	10	298	14	4	326	6	32	37	0	75	52	378	23	0	453	20	24	21	0	65	919
05:30 PM	11	370	6	3	390	4	22	39	0	65	32	447	23	1	503	17	20	19	0	56	1014
Total Volume	41	1338	36	14	1429	22	104	146	0	272	163	1632	84	3	1882	64	77	73	0	214	3797
% App. Total	2.9	93.6	2.5	1		8.1	38.2	53.7	0		8.7	86.7	4.5	0.2		29.9	36	34.1	0		
PHF	.932	.904	.643	.583	.916	.688	.813	.936	.000	.907	.784	.913	.913	.750	.935	.800	.802	.869	.000	.823	.936





File Name : Wake Forest(Harris and Wall) AM Peak

Site Code :

Start Date : 1/10/2019

Page No : 1

Groups Printed- Cars + - Trucks

	Wall Road Southbound				Harris Road Westbound				Oak Avenue Northbound				Harris Road Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
07:00 AM	1	32	12	45	6	26	9	41	0	6	8	14	100	16	0	116	216
07:15 AM	1	31	4	36	8	36	0	44	0	9	14	23	21	12	0	33	136
07:30 AM	1	29	9	39	12	33	0	45	0	8	8	16	14	19	1	34	134
07:45 AM	0	24	10	34	10	28	0	38	0	8	5	13	5	21	1	27	112
Total	3	116	35	154	36	123	9	168	0	31	35	66	140	68	2	210	598
08:00 AM	2	10	3	15	18	37	2	57	0	13	8	21	5	12	1	18	111
08:15 AM	1	13	3	17	7	25	0	32	2	10	2	14	10	9	1	20	83
08:30 AM	4	9	2	15	11	33	2	46	0	6	2	8	6	15	0	21	90
08:45 AM	2	31	24	57	37	37	0	74	0	18	9	27	19	25	0	44	202
Total	9	63	32	104	73	132	4	209	2	47	21	70	40	61	2	103	486
Grand Total	12	179	67	258	109	255	13	377	2	78	56	136	180	129	4	313	1084
Apprch %	4.7	69.4	26		28.9	67.6	3.4		1.5	57.4	41.2		57.5	41.2	1.3		
Total %	1.1	16.5	6.2	23.8	10.1	23.5	1.2	34.8	0.2	7.2	5.2	12.5	16.6	11.9	0.4	28.9	
Cars +	12	179	67	258	109	255	13	377	2	78	54	134	180	129	4	313	1082
% Cars +	100	100	100	100	100	100	100	100	100	100	96.4	98.5	100	100	100	100	99.8
Trucks	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	2
% Trucks	0	0	0	0	0	0	0	0	0	0	3.6	1.5	0	0	0	0	0.2



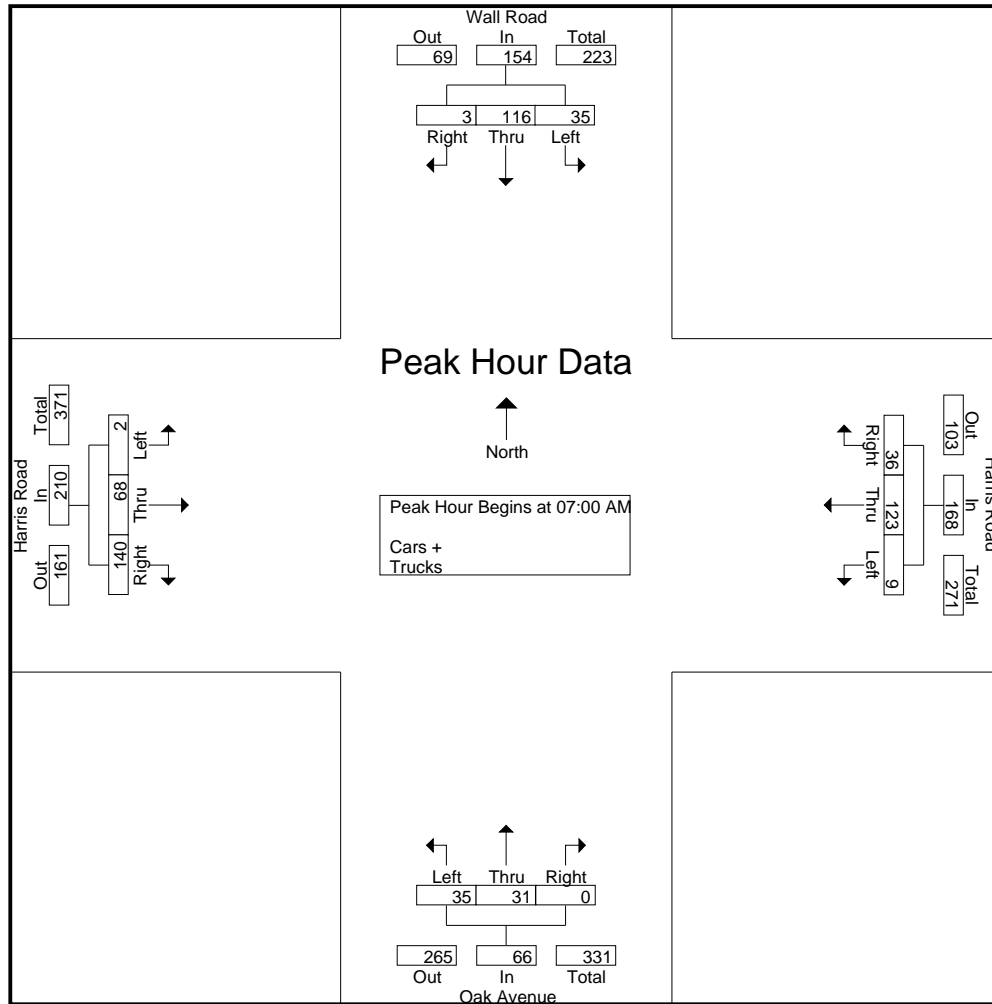
File Name : Wake Forest(Harris and Wall) AM Peak

Site Code :

Start Date : 1/10/2019

Page No : 2

	Wall Road Southbound				Harris Road Westbound				Oak Avenue Northbound				Harris Road Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	1	32	12	45	6	26	9	41	0	6	8	14	100	16	0	116	216
07:15 AM	1	31	4	36	8	36	0	44	0	9	14	23	21	12	0	33	136
07:30 AM	1	29	9	39	12	33	0	45	0	8	8	16	14	19	1	34	134
07:45 AM	0	24	10	34	10	28	0	38	0	8	5	13	5	21	1	27	112
Total Volume	3	116	35	154	36	123	9	168	0	31	35	66	140	68	2	210	598
% App. Total	1.9	75.3	22.7		21.4	73.2	5.4		0	47	53		66.7	32.4	1		
PHF	.750	.906	.729	.856	.750	.854	.250	.933	.000	.861	.625	.717	.350	.810	.500	.453	.692





Site Code :

Page No : 1

- Cars + - Trucks	
	Oak Ave

	Oak North
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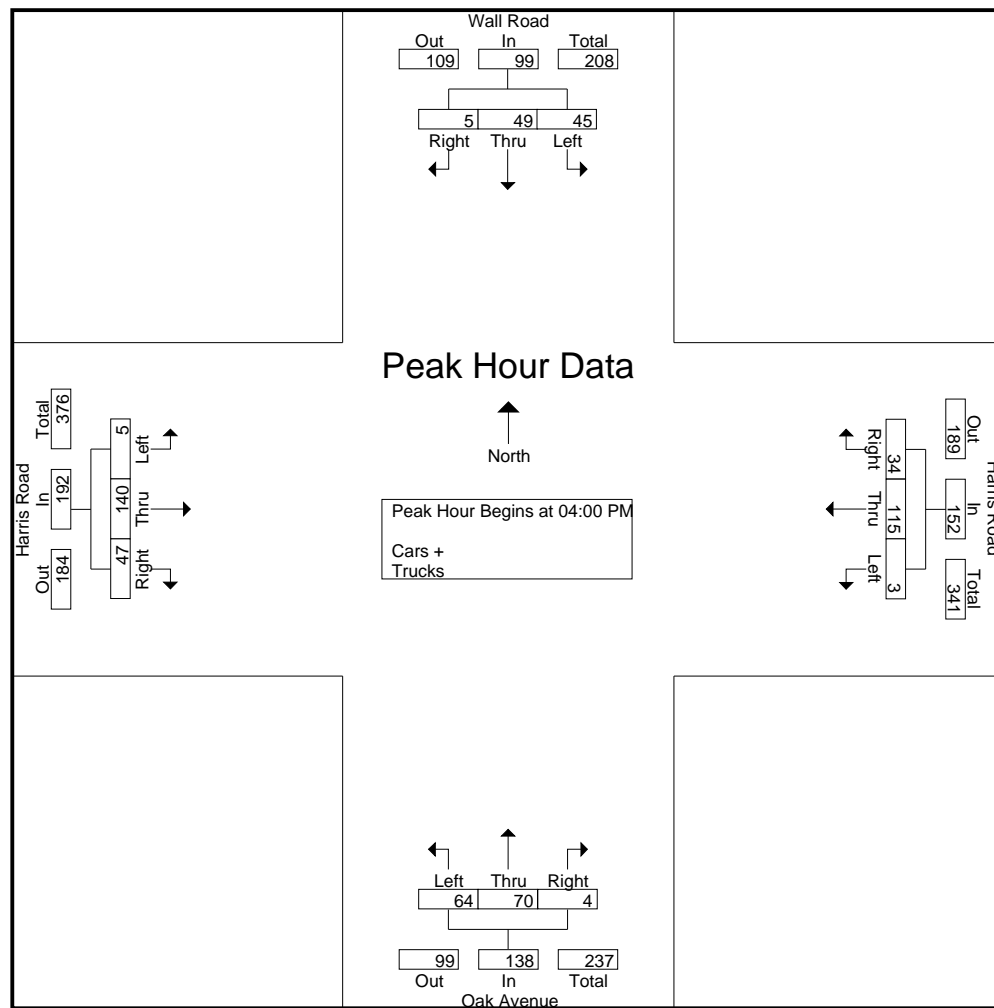
File Name : Wake Forest(Harris and Wall) PM Peak

Site Code :

Start Date : 1/10/2019

Page No : 2

	Wall Road Southbound				Harris Road Westbound				Oak Avenue Northbound				Harris Road Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	2	20	20	42	11	30	1	42	3	23	20	46	12	27	1	40	170
04:15 PM	0	9	10	19	10	26	1	37	1	13	12	26	17	33	1	51	133
04:30 PM	1	15	9	25	8	33	0	41	0	13	12	25	9	39	1	49	140
04:45 PM	2	5	6	13	5	26	1	32	0	21	20	41	9	41	2	52	138
Total Volume	5	49	45	99	34	115	3	152	4	70	64	138	47	140	5	192	581
% App. Total	5.1	49.5	45.5		22.4	75.7	2		2.9	50.7	46.4		24.5	72.9	2.6		
PHF	.625	.613	.563	.589	.773	.871	.750	.905	.333	.761	.800	.750	.691	.854	.625	.923	.854





File Name : Wake Forest(Harris and Wallridge) AM Peak

Site Code :

Start Date : 1/10/2019

Page No : 1

Groups Printed- Cars + - Trucks

	Wallridge Drive Southbound			Harris Road Westbound			Harris Road Eastbound			
Start Time	Right	Left	App. Total	Right	Thru	App. Total	Thru	Left	App. Total	Int. Total
07:00 AM	10	13	23	5	30	35	97	10	107	165
07:15 AM	12	2	14	2	48	50	36	11	47	111
07:30 AM	11	6	17	3	40	43	30	14	44	104
07:45 AM	10	2	12	7	27	34	29	21	50	96
Total	43	23	66	17	145	162	192	56	248	476
08:00 AM	15	2	17	12	36	48	16	19	35	100
08:15 AM	14	1	15	1	30	31	21	20	41	87
08:30 AM	13	2	15	6	37	43	19	27	46	104
08:45 AM	47	5	52	14	21	35	24	34	58	145
Total	89	10	99	33	124	157	80	100	180	436
Grand Total	132	33	165	50	269	319	272	156	428	912
Apprch %	80	20		15.7	84.3		63.6	36.4		
Total %	14.5	3.6	18.1	5.5	29.5	35	29.8	17.1	46.9	
Cars +	130	33	163	50	266	316	272	153	425	904
% Cars +	98.5	100	98.8	100	98.9	99.1	100	98.1	99.3	99.1
Trucks	2	0	2	0	3	3	0	3	3	8
% Trucks	1.5	0	1.2	0	1.1	0.9	0	1.9	0.7	0.9



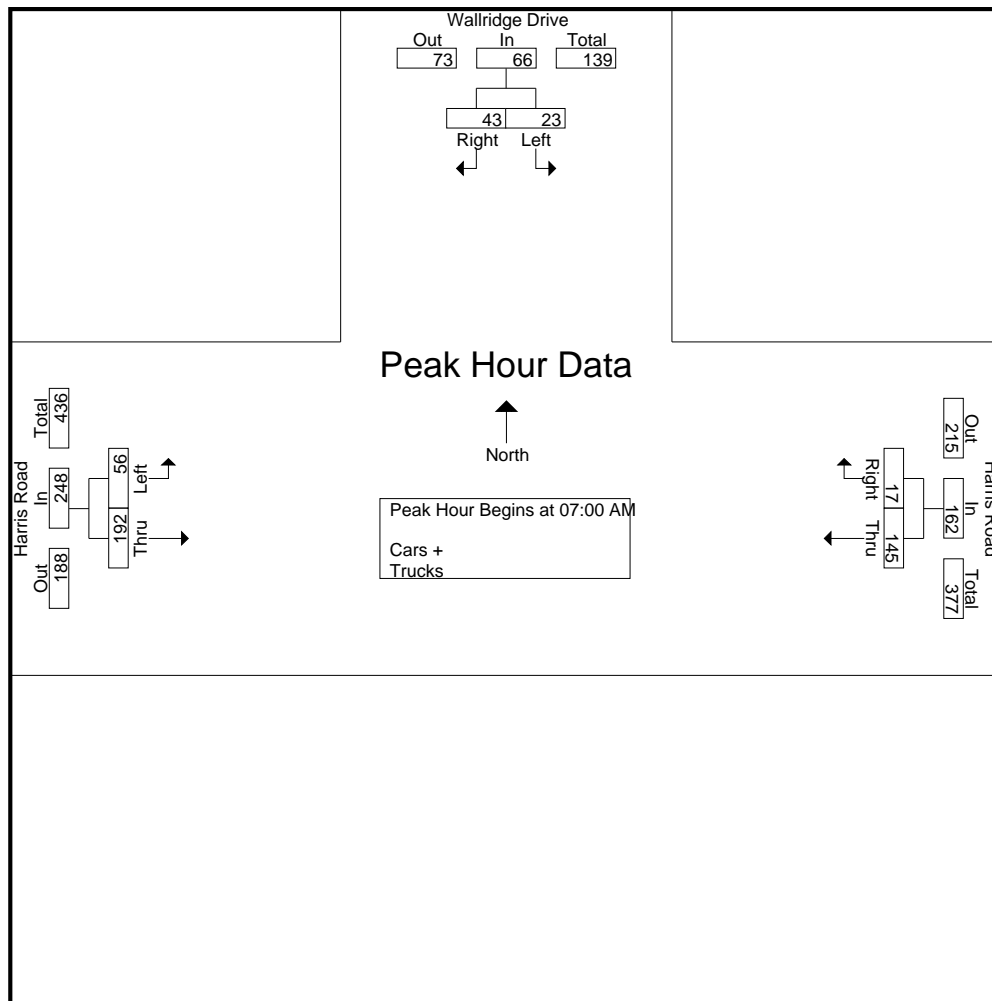
File Name : Wake Forest(Harris and Wallridge) AM Peak

Site Code :

Start Date : 1/10/2019

Page No : 2

	Wallridge Drive Southbound			Harris Road Westbound			Harris Road Eastbound			
Start Time	Right	Left	App. Total	Right	Thru	App. Total	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	10	13	23	5	30	35	97	10	107	165
07:15 AM	12	2	14	2	48	50	36	11	47	111
07:30 AM	11	6	17	3	40	43	30	14	44	104
07:45 AM	10	2	12	7	27	34	29	21	50	96
Total Volume	43	23	66	17	145	162	192	56	248	476
% App. Total	65.2	34.8		10.5	89.5		77.4	22.6		
PHF	.896	.442	.717	.607	.755	.810	.495	.667	.579	.721





File Name : Wake Forest(Harris and Wallridge) PM Peak

Site Code :

Start Date : 1/10/2019

Page No : 1

Groups Printed- Cars + - Trucks

	Wallridge Drive Southbound			Harris Road Westbound			Harris Road Eastbound			
Start Time	Right	Left	App. Total	Right	Thru	App. Total	Thru	Left	App. Total	Int. Total
04:00 AM	54	16	70	16	39	55	40	48	88	213
04:15 AM	30	24	54	16	29	45	38	32	70	169
04:30 AM	41	17	58	20	24	44	29	48	77	179
04:45 AM	51	15	66	15	28	43	36	35	71	180
Total	176	72	248	67	120	187	143	163	306	741
05:00 AM	30	24	54	22	33	55	26	48	74	183
05:15 AM	25	21	46	26	36	62	48	34	82	190
05:30 AM	41	13	54	21	26	47	37	40	77	178
05:45 AM	34	18	52	16	24	40	32	32	64	156
Total	130	76	206	85	119	204	143	154	297	707
Grand Total	306	148	454	152	239	391	286	317	603	1448
Apprch %	67.4	32.6		38.9	61.1		47.4	52.6		
Total %	21.1	10.2	31.4	10.5	16.5	27	19.8	21.9	41.6	
Cars +	306	148	454	152	239	391	285	317	602	1447
% Cars +	100	100	100	100	100	100	99.7	100	99.8	99.9
Trucks	0	0	0	0	0	0	1	0	1	1
% Trucks	0	0	0	0	0	0	0.3	0	0.2	0.1



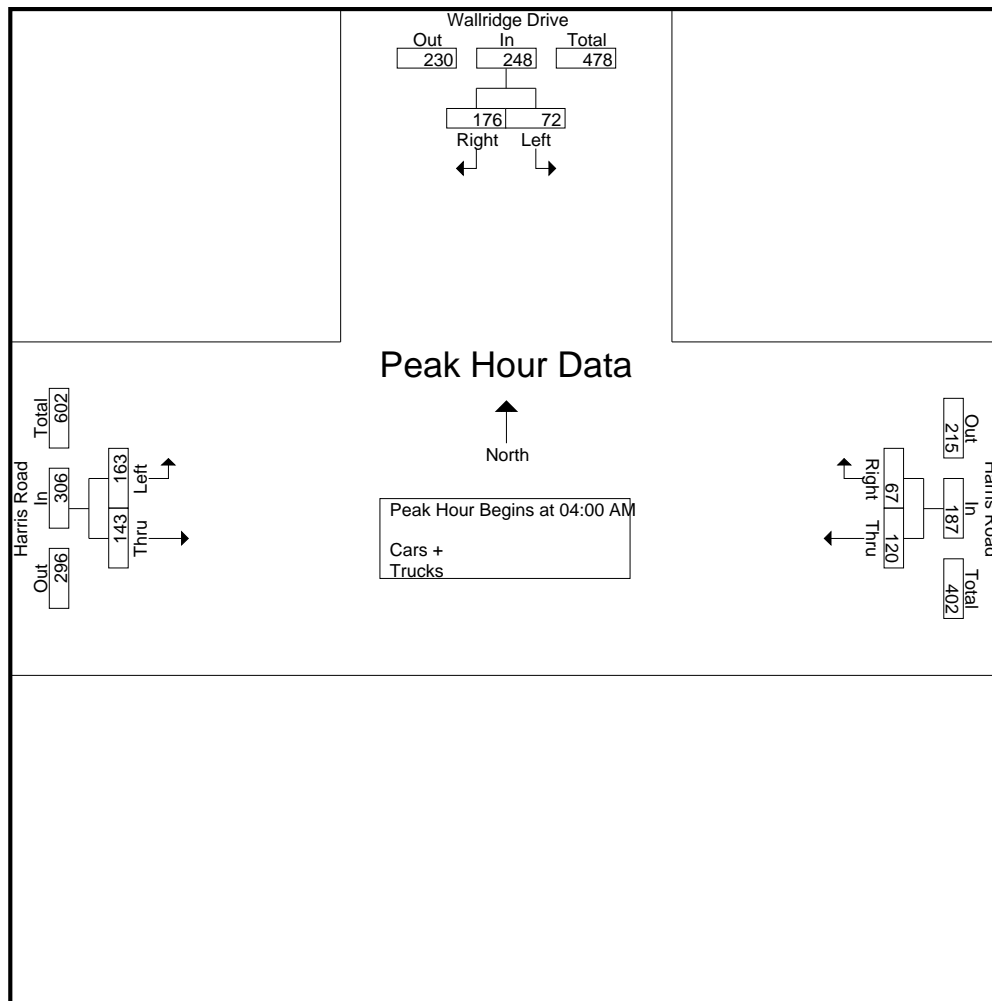
File Name : Wake Forest(Harris and Wallridge) PM Peak

Site Code :

Start Date : 1/10/2019

Page No : 2

	Wallridge Drive Southbound			Harris Road Westbound			Harris Road Eastbound			
Start Time	Right	Left	App. Total	Right	Thru	App. Total	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 AM to 05:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 AM										
04:00 AM	54	16	70	16	39	55	40	48	88	213
04:15 AM	30	24	54	16	29	45	38	32	70	169
04:30 AM	41	17	58	20	24	44	29	48	77	179
04:45 AM	51	15	66	15	28	43	36	35	71	180
Total Volume	176	72	248	67	120	187	143	163	306	741
% App. Total	71	29		35.8	64.2		46.7	53.3		
PHF	.815	.750	.886	.838	.769	.850	.894	.849	.869	.870





Site Code :

Page No : 1

Groups Printed- Cars + - Trucks

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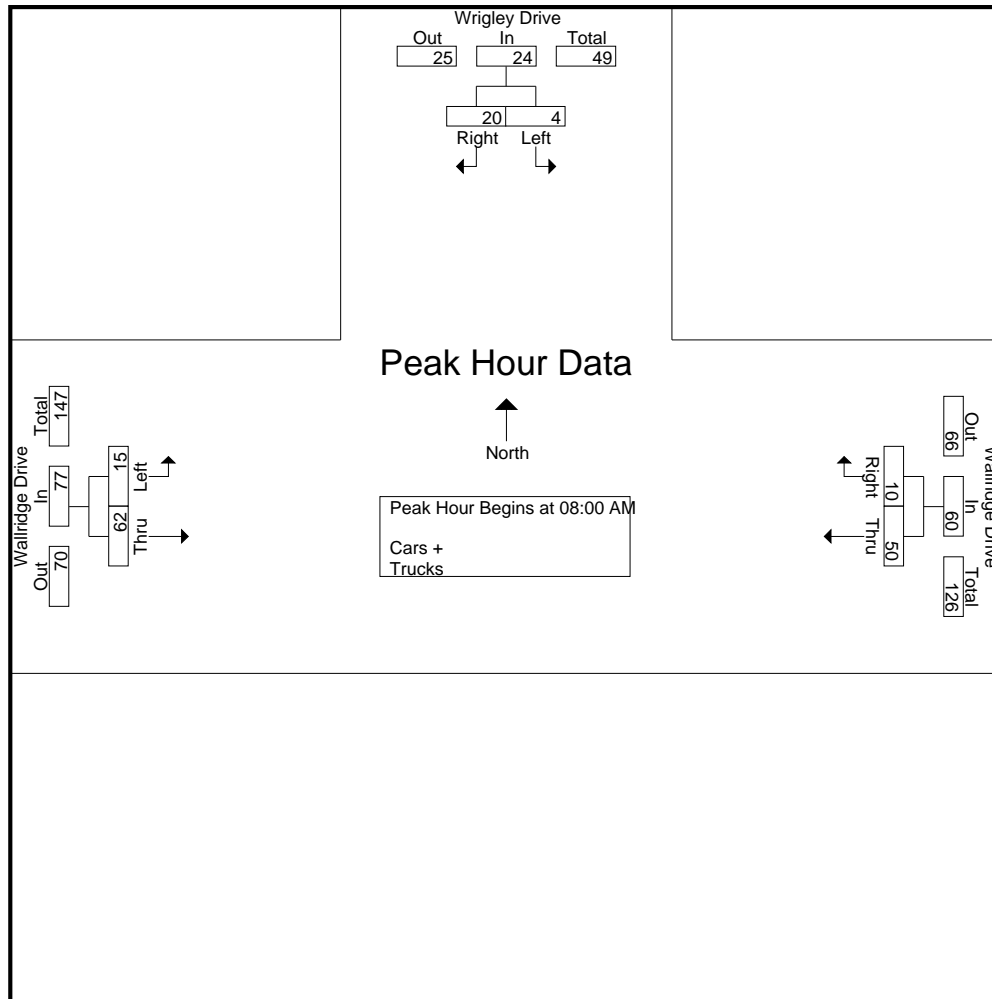
File Name : Wake Forest(Wrigley and Wallridge) AM Peak

Site Code :

Start Date : 1/10/2019

Page No : 2

	Wrigley Drive Southbound			Wallridge Drive Westbound			Wallridge Drive Eastbound			
Start Time	Right	Left	App. Total	Right	Thru	App. Total	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	3	2	5	3	1	4	11	3	14	23
08:15 AM	1	0	1	1	6	7	13	0	13	21
08:30 AM	3	0	3	0	4	4	17	5	22	29
08:45 AM	13	2	15	6	39	45	21	7	28	88
Total Volume	20	4	24	10	50	60	62	15	77	161
% App. Total	83.3	16.7		16.7	83.3		80.5	19.5		
PHF	.385	.500	.400	.417	.321	.333	.738	.536	.688	.457





Site Code :

Page No : 1

Groups Printed- Cars + - Trucks

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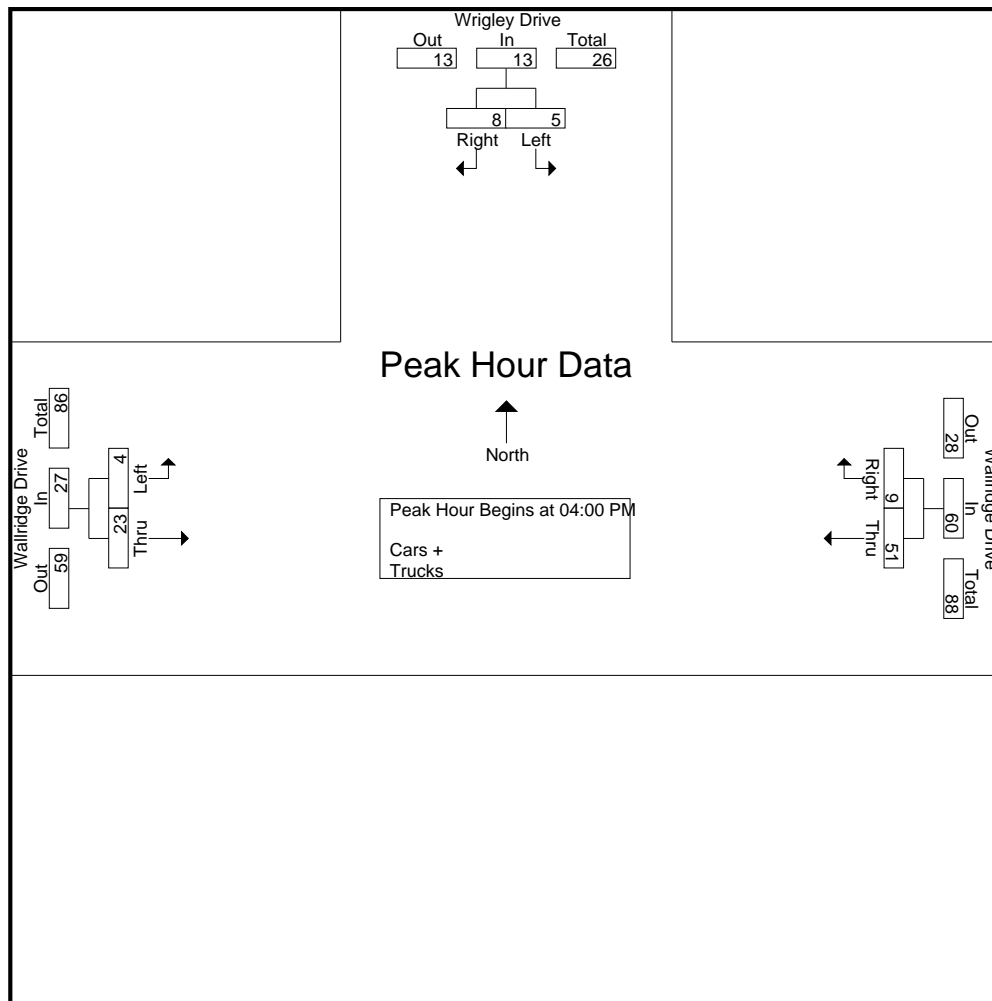
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Site Code :

Start Date : 1/10/2019

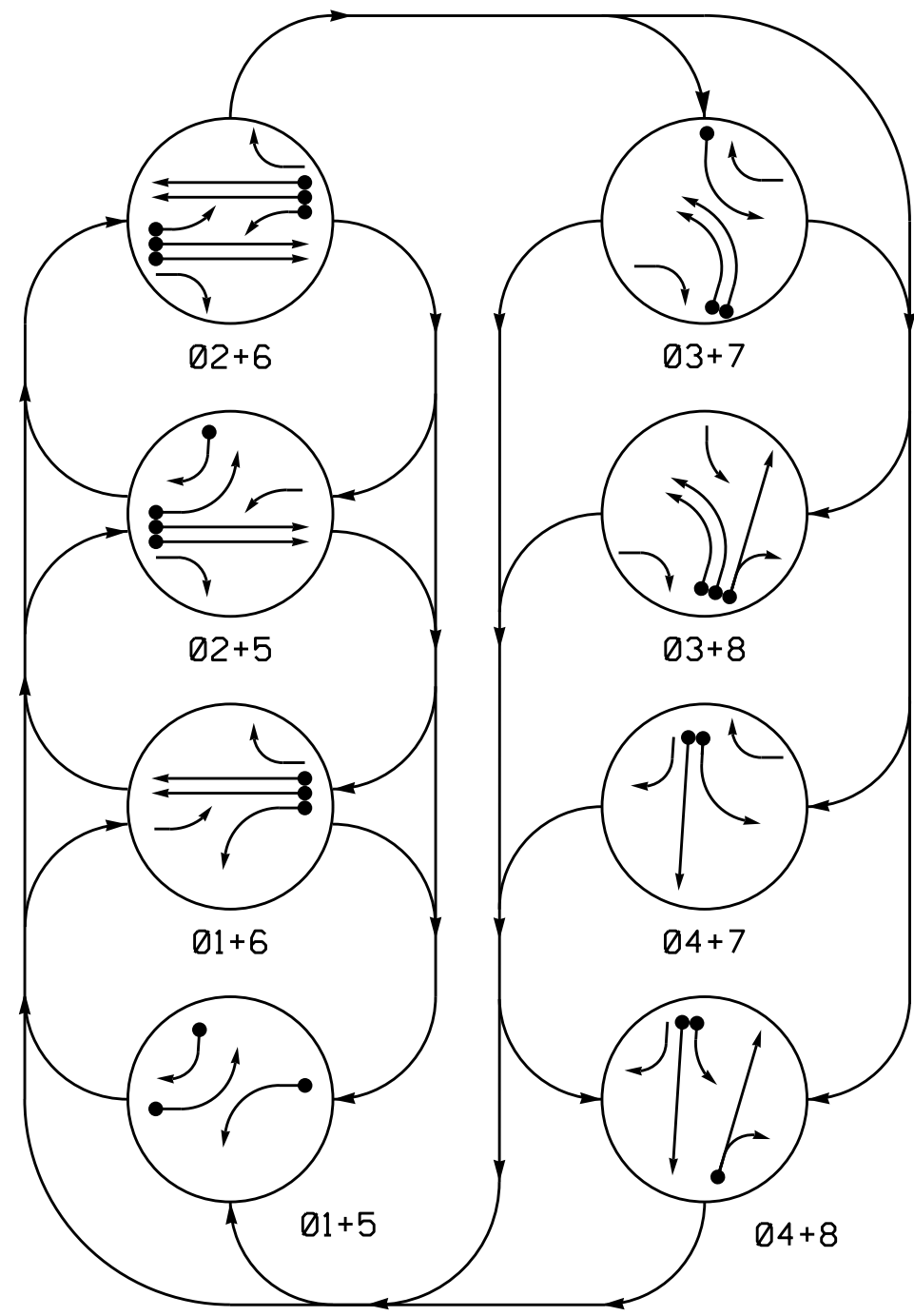
Page No : 2

	Wrigley Drive Southbound			Wallridge Drive Westbound			Wallridge Drive Eastbound			
Start Time	Right	Left	App. Total	Right	Thru	App. Total	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	4	2	6	3	23	26	8	0	8	40
04:15 PM	1	1	2	2	9	11	5	2	7	20
04:30 PM	2	2	4	2	13	15	3	1	4	23
04:45 PM	1	0	1	2	6	8	7	1	8	17
Total Volume	8	5	13	9	51	60	23	4	27	100
% App. Total	61.5	38.5		15	85		85.2	14.8		
PHF	.500	.625	.542	.750	.554	.577	.719	.500	.844	.625



Appendix D – Traffic Signal Plans

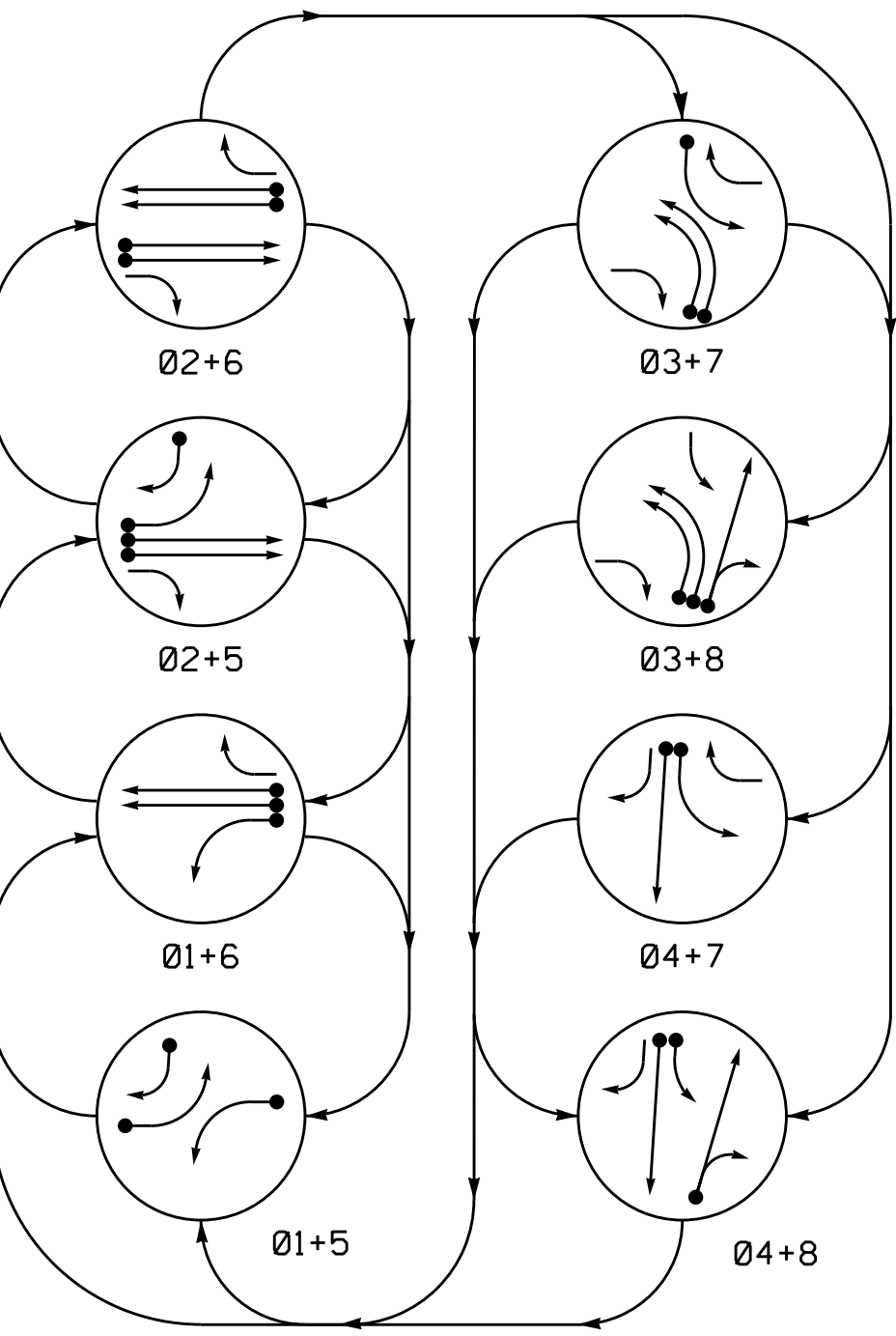
DEFAULT PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

ALTERNATE PHASING DIAGRAM



SIGNAL FACE	PHASE							
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8
11	←	←	←	←	←	←	←	←
21	R	R	G	G	R	R	R	R
22	R	R	G	G	R	R	R	R
31, 32	←	←	←	←	←	←	←	←
41	R	R	R	R	R	R	G	G
42	R	R	R	R	R	R	G	G
51	←	←	←	←	←	←	←	←
61	R	G	R	G	R	R	R	R
62	R	G	R	G	R	R	R	R
71	←	←	←	←	←	←	←	←
81, 82, 83	R	R	R	R	R	G	R	G

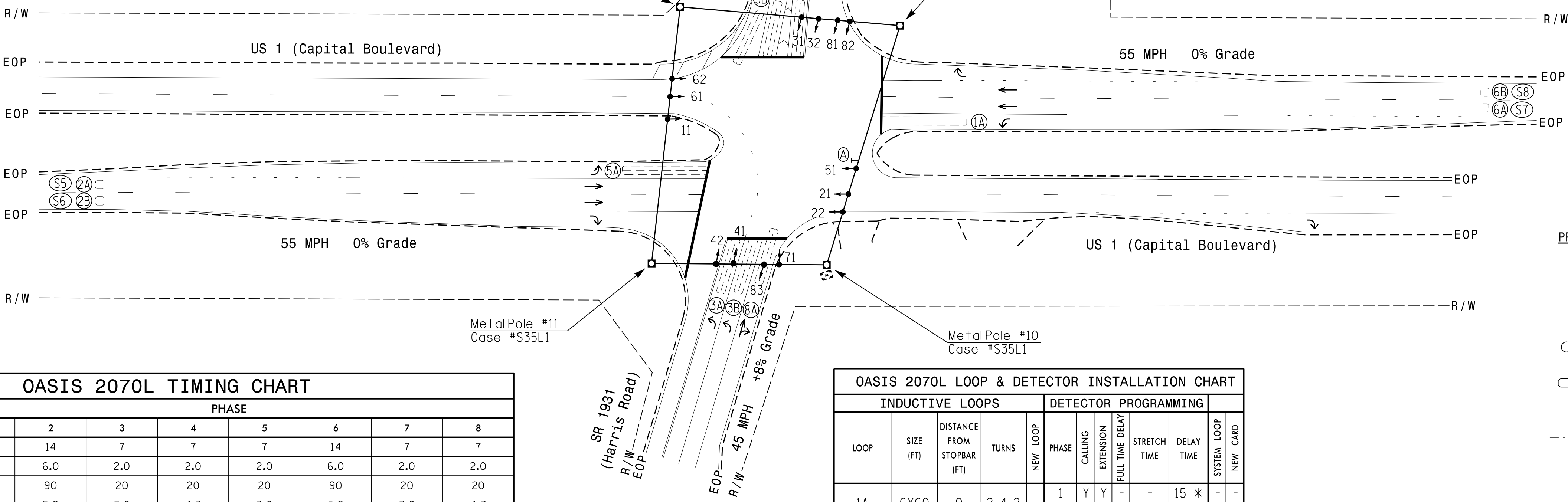
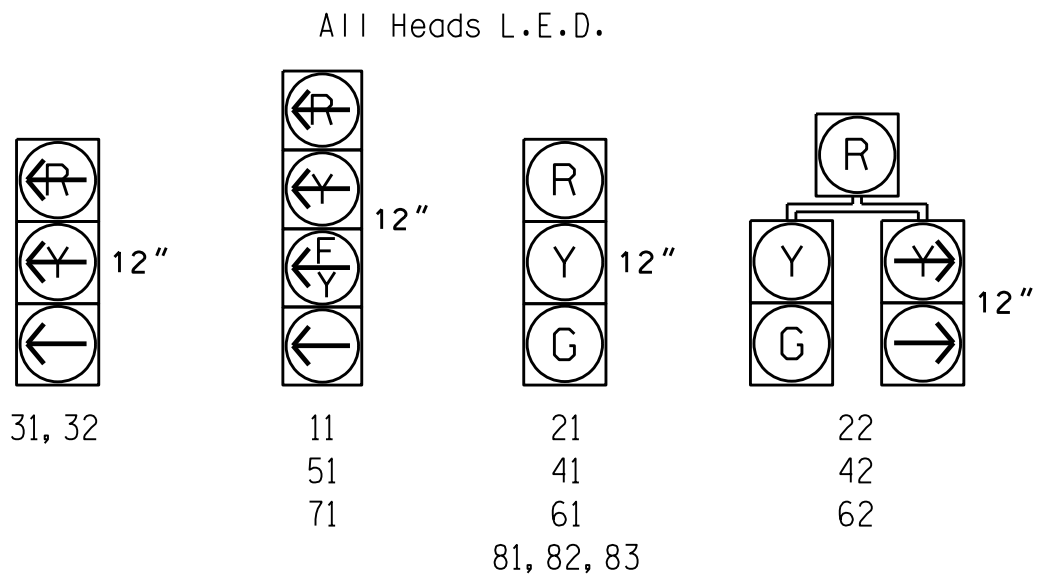
SIGNAL FACE	PHASE							
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8
11	←	←	←	←	←	←	←	←
21	R	R	G	G	R	R	R	R
22	R	R	G	G	R	R	R	R
31, 32	←	←	←	←	←	←	←	←
41	R	R	R	R	R	R	G	G
42	R	R	R	R	R	R	G	G
51	←	←	←	←	←	←	←	←
61	R	G	R	G	R	R	R	R
62	R	G	R	G	R	R	R	R
71	←	←	←	←	←	←	←	←
81, 82, 83	R	R	R	R	R	G	R	G

8 Phase Fully Actuated US 1 (Capital Boulevard) CLS

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be lagged.
- Phase 3 and/or phase 7 may be lagged.
- Set all detector units to presence mode.
- In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
- Pavement markings are existing.
- The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #: 1930.

SIGNAL FACE I.D.



FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green 1 *	7	14	7	7	7	14	7	7
Extension 1 *	1.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max Green 1 *	20	90	20	20	20	90	20	20
Yellow Clearance	3.0	5.2	3.0	4.7	3.0	5.2	3.0	4.7
Red Clearance	3.9	1.7	3.3	2.0	3.4	1.7	2.9	2.0
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	-	1.5	-	-
Max Variable Initial *	-	46	-	-	-	46	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	30	-	-	-	30	-	-
Minimum Gap	-	3.4	-	-	-	3.4	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

OASIS 2070L LOOP & DETECTOR INSTALLATION CHART											
INDUCTIVE LOOPS						DETECTOR PROGRAMMING					
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP CARD
1A	6X60	0	2-4-2	-	1	Y	Y	-	-	15 *	-
2A/S5	6X6	420	EXIST	-	2	Y	Y	-	-	-	-
2B/S6	6X6	420	EXIST	-	2	Y	Y	-	-	-	-
3A	6X40	0	2-4-2	-	3	Y	Y	-	-	3	-
3B	6X40	0	2-4-2	-	3	Y	Y	-	-	-	-
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	-	-
5A	6X60	0	2-4-2	-	5	Y	Y	-	-	15 *	-
5B	6X40	+5	2-4-2	-	5	Y	Y	-	-	10	-
6A/S7	6X6	420	EXIST	-	6	Y	Y	-	-	-	-
6B/S8	6X6	420	EXIST	-	6	Y	Y	-	-	-	-
7A	6X40	0	2-4-2	-	7	Y	Y	-	-	15	-
8A	6X40	+5	2-4-2	-	8	Y	Y	-	-	10	-

* Disable Delay During Alternate Phasing Operation.
Disable Phase Call For Loop(s) During Alternate Phasing Operation.

LEGEND

- PROPOSED: Traffic Signal Head, Modified Signal Head, Sign, Pedestrian Signal Head With Push Button & Sign, Signal Pole with Guy, Signal Pole with Sidewalk Guy, Inductive Loop Detector, Controller & Cabinet, Junction Box, 2-in Underground Conduit, Right of Way, Directional Arrow, Metal Strain Pole, "U-TURN YIELD TO RIGHT TURN" Sign (R10-16).
- EXISTING: N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A.

Signal Upgrade

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

TRANSPORTATION MOBILITY AND SAFETY DIVISION

DEPARTMENT OF TRANSPORTATION

SIGNAL DESIGN SECTION

US 1 (Capital Boulevard) at SR 1909 (Purnell Road) / SR 1931 (Harris Road)

Division 5 Wake County Wake Forest

PLAN DATE: February 2018 REVIEWED BY:

PREPARED BY: RJ Ziembra RKA PROJ. NO:

REVISIONS INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

PROFESSIONAL ENGINEER

SEAL 026486

ROBERT J. ZIEMBA

DATE 2/21/2018

SIG. INVENTORY NO. 05-1930

Appendix E – Synchro & SIDRA Outputs

Existing Traffic Volumes

Planet Fitness Development
4: Harris Road & Wallridge Drive

01/31/2019









Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	56	192	145	17	23	43
Future Volume (Veh/h)	56	192	145	17	23	43
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.58	0.58	0.81	0.81	0.72	0.72
Hourly flow rate (vph)	97	331	179	21	32	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						9
Median type		None	None			
Median storage veh						
Upstream signal (ft)		557				
pX, platoon unblocked					0.92	
vC, conflicting volume	200				704	179
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	200				631	179
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				92	93
cM capacity (veh/h)	1372				379	864
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	97	331	179	21	92	
Volume Left	97	0	0	0	32	
Volume Right	0	0	0	21	60	
cSH	1372	1700	1700	1700	1089	
Volume to Capacity	0.07	0.19	0.11	0.01	0.08	
Queue Length 95th (ft)	6	0	0	0	7	
Control Delay (s)	7.8	0.0	0.0	0.0	11.5	
Lane LOS	A				B	
Approach Delay (s)	1.8		0.0		11.5	
Approach LOS					B	
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			24.3%		ICU Level of Service	A
Analysis Period (min)			15			

Planet Fitness Development
7: US 1A (N. Main Street) & Harris Road

















01/31/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	122	76	80	184	41
Future Volume (Veh/h)	7	122	76	80	184	41
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.85	0.85	0.82	0.82
Hourly flow rate (vph)	8	147	89	94	224	50
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)	5					
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	496	224	274			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	496	224	274			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	82	93			
cM capacity (veh/h)	496	815	1289			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	155	89	94	224	50	
Volume Left	8	89	0	0	0	
Volume Right	147	0	0	0	50	
cSH	860	1289	1700	1700	1700	
Volume to Capacity	0.18	0.07	0.06	0.13	0.03	
Queue Length 95th (ft)	16	6	0	0	0	
Control Delay (s)	10.5	8.0	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	10.5	3.9	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			3.8			
Intersection Capacity Utilization			27.2%	ICU Level of Service		A
Analysis Period (min)			15			

Planet Fitness Development
6: W. Oak Avenue/Wall Road & Harris Road
























01/31/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	2	68	140	9	123	36	35	31	0	35	116	3
Future Volume (vph)	2	68	140	9	123	36	35	31	0	35	116	3
Peak Hour Factor	0.50	0.50	0.50	0.93	0.93	0.93	0.72	0.72	0.72	0.86	0.86	0.86
Hourly flow rate (vph)	4	136	280	10	132	39	49	43	0	41	135	3
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	420	181	92	179								
Volume Left (vph)	4	10	49	41								
Volume Right (vph)	280	39	0	3								
Hadj (s)	-0.36	-0.08	0.14	0.07								
Departure Headway (s)	4.6	5.2	5.9	5.6								
Degree Utilization, x	0.54	0.26	0.15	0.28								
Capacity (veh/h)	746	642	533	579								
Control Delay (s)	12.8	10.0	9.9	10.8								
Approach Delay (s)	12.8	10.0	9.9	10.8								
Approach LOS	B	A	A	B								
Intersection Summary												
Delay				11.5								
Level of Service				B								
Intersection Capacity Utilization				29.8%	ICU Level of Service	A						
Analysis Period (min)				15								

Planet Fitness Development

5: US 1 (Capital Boulevard) & Purnell Road/Harris Road

01/31/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	125	78	118	55	13	52	1046	100	27	1428	53
Future Volume (vph)	58	125	78	118	55	13	52	1046	100	27	1428	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-2%			8%			0%			0%	
Storage Length (ft)	150		380	270		0	310		170	250		110
Storage Lanes	1		1	2		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor												
Frt			0.850		0.971				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1881	1599	3296	1736	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.633			0.950			0.950			0.950		
Satd. Flow (perm)	1191	1881	1599	3296	1736	0	1770	3539	1583	1770	3539	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		621			557			800			785	
Travel Time (s)		9.4			8.4			9.9			9.7	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.65	0.65	0.65	0.74	0.74	0.74	0.86	0.86	0.86	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	89	192	120	159	74	18	60	1216	116	30	1604	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	192	120	159	92	0	60	1216	116	30	1604	60
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			47			44	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	1.05	1.05	1.05	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	D.P+P	NA	pm+ov	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8		5	2	3	1	6	7
Permitted Phases	8		4						2			6
Detector Phase	7	4	5	3	8		5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	14.0	7.0	7.0	14.0	7.0
Minimum Split (s)	12.9	20.0	13.4	13.3	20.0		13.4	22.5	13.3	13.9	22.5	12.9
Total Split (s)	20.0	20.0	20.0	20.0	20.0		20.0	90.0	20.0	20.0	90.0	20.0
Total Split (%)	13.3%	13.3%	13.3%	13.3%	13.3%		13.3%	60.0%	13.3%	13.3%	60.0%	13.3%

Planet Fitness Development

5: US 1 (Capital Boulevard) & Purnell Road/Harris Road

01/31/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	14.1	13.3	13.6	13.7	13.3		13.6	83.1	13.7	13.1	83.1	14.1
Yellow Time (s)	3.0	4.7	3.0	3.0	4.7		3.0	5.2	3.0	3.0	5.2	3.0
All-Red Time (s)	2.9	2.0	3.4	3.3	2.0		3.4	1.7	3.3	3.9	1.7	2.9
Lost Time Adjust (s)	-0.9	-1.7	-1.4	-1.3	-1.7		-1.4	-1.9	-1.3	-1.9	-1.9	-0.9
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	6.0	2.0	1.0	6.0	2.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2		0.2	3.4	0.2	0.2	3.4	0.2
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	15.0	0.0	0.0	15.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	30.0	0.0	0.0	30.0	0.0
Recall Mode	None	None	None	None	None		None	C-Min	None	None	C-Min	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effect Green (s)	33.0	20.4	33.3	12.6	21.6		12.9	83.0	97.6	19.6	84.1	95.5
Actuated g/C Ratio	0.22	0.14	0.22	0.08	0.14		0.09	0.55	0.65	0.13	0.56	0.64
v/c Ratio	0.29	0.75	0.34	0.58	0.37		0.39	0.62	0.11	0.13	0.81	0.06
Control Delay	47.5	80.4	36.7	74.3	64.5		71.9	27.1	7.1	55.1	30.8	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.5	80.4	36.7	74.3	64.5		71.9	27.1	7.1	55.1	30.8	5.3
LOS	D	F	D	E	E		E	C	A	E	C	A
Approach Delay		60.0			70.7			27.4			30.3	
Approach LOS		E			E			C			C	
Queue Length 50th (ft)	66	177	75	78	79		56	527	26	25	697	13
Queue Length 95th (ft)	86	#211	91	94	121		100	503	38	57	717	15
Internal Link Dist (ft)		541			477			720			705	
Turn Bay Length (ft)	150		380	270			310		170	250		110
Base Capacity (vph)	346	255	377	329	249		178	2160	1055	260	2024	1046
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.75	0.32	0.48	0.37		0.34	0.56	0.11	0.12	0.79	0.06

Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 54.5 (36%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 35.1

Intersection LOS: D

Intersection Capacity Utilization 68.1%









ICU Level of Service C

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 5: US 1 (Capital Boulevard) & Purnell Road/Harris Road

 Ø2 (R)	 Ø1	 Ø3	 Ø4
90 s	20 s	20 s	20 s
 Ø6 (R)	 Ø5	 Ø7	 Ø8
90 s	20 s	20 s	20 s

Planet Fitness Development
4: Harris Road & Wallridge Drive

01/31/2019









Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	163	143	120	67	72	176
Future Volume (Veh/h)	163	143	120	67	72	176
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	181	159	133	74	80	196
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						9
Median type		None	None			
Median storage veh						
Upstream signal (ft)		557				
pX, platoon unblocked						
vC, conflicting volume	207				654	133
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	207				654	133
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	87				79	79
cM capacity (veh/h)	1364				374	916
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	181	159	133	74	276	
Volume Left	181	0	0	0	80	
Volume Right	0	0	0	74	196	
cSH	1364	1700	1700	1700	1290	
Volume to Capacity	0.13	0.09	0.08	0.04	0.21	
Queue Length 95th (ft)	11	0	0	0	20	
Control Delay (s)	8.0	0.0	0.0	0.0	12.1	
Lane LOS	A				B	
Approach Delay (s)	4.3		0.0		12.1	
Approach LOS					B	
Intersection Summary						
Average Delay			5.8			
Intersection Capacity Utilization			26.4%		ICU Level of Service	A
Analysis Period (min)			15			

Planet Fitness Development
7: US 1A (N. Main Street) & Harris Road

















01/31/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	51	62	80	211	119	48
Future Volume (Veh/h)	51	62	80	211	119	48
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	57	69	89	234	132	53
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)	5					
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	544	132	185			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	544	132	185			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	88	92	94			
cM capacity (veh/h)	468	917	1390			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	126	89	234	132	53	
Volume Left	57	89	0	0	0	
Volume Right	69	0	0	0	53	
cSH	1035	1390	1700	1700	1700	
Volume to Capacity	0.12	0.06	0.14	0.08	0.03	
Queue Length 95th (ft)	10	5	0	0	0	
Control Delay (s)	11.3	7.8	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	11.3	2.1	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			3.3			
Intersection Capacity Utilization			21.1%	ICU Level of Service		A
Analysis Period (min)			15			

Planet Fitness Development
6: W. Oak Avenue/Wall Road & Harris Road
























01/31/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	140	47	3	115	34	64	70	4	45	49	5
Future Volume (vph)	5	140	47	3	115	34	64	70	4	45	49	5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	156	52	3	128	38	71	78	4	50	54	6
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	214	169	153	110								
Volume Left (vph)	6	3	71	50								
Volume Right (vph)	52	38	4	6								
Hadj (s)	-0.11	-0.10	0.11	0.09								
Departure Headway (s)	4.7	4.8	5.1	5.2								
Degree Utilization, x	0.28	0.22	0.22	0.16								
Capacity (veh/h)	713	701	650	635								
Control Delay (s)	9.5	9.2	9.5	9.1								
Approach Delay (s)	9.5	9.2	9.5	9.1								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			9.4									
Level of Service			A									
Intersection Capacity Utilization			29.1%		ICU Level of Service				A			
Analysis Period (min)			15									

Planet Fitness Development

5: US 1 (Capital Boulevard) & Purnell Road/Harris Road

01/31/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	77	64	146	104	22	84	1632	163	36	1338	41
Future Volume (vph)	73	77	64	146	104	22	84	1632	163	36	1338	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-2%			8%			0%			0%	
Storage Length (ft)	150		380	270		0	310		170	250		110
Storage Lanes	1		1	2		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor												
Frt			0.850		0.974				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1881	1599	3296	1742	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.411			0.950			0.950			0.950		
Satd. Flow (perm)	773	1881	1599	3296	1742	0	1770	3539	1583	1770	3539	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		621			557			800			785	
Travel Time (s)		9.4			8.4			9.9			9.7	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	81	86	71	162	116	24	93	1813	181	40	1487	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	81	86	71	162	140	0	93	1813	181	40	1487	46
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			47			44	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	1.05	1.05	1.05	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	D.P+P	NA	pm+ov	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8		5	2	3	1	6	7
Permitted Phases	8		4						2			6
Detector Phase	7	4	5	3	8		5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	14.0	7.0	7.0	14.0	7.0
Minimum Split (s)	12.9	20.0	13.4	13.3	20.0		13.4	22.5	13.3	13.9	22.5	12.9
Total Split (s)	20.0	20.0	20.0	20.0	20.0		20.0	90.0	20.0	20.0	90.0	20.0
Total Split (%)	13.3%	13.3%	13.3%	13.3%	13.3%		13.3%	60.0%	13.3%	13.3%	60.0%	13.3%

Planet Fitness Development

5: US 1 (Capital Boulevard) & Purnell Road/Harris Road

01/31/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	14.1	13.3	13.6	13.7	13.3		13.6	83.1	13.7	13.1	83.1	14.1
Yellow Time (s)	3.0	4.7	3.0	3.0	4.7		3.0	5.2	3.0	3.0	5.2	3.0
All-Red Time (s)	2.9	2.0	3.4	3.3	2.0		3.4	1.7	3.3	3.9	1.7	2.9
Lost Time Adjust (s)	-0.9	-1.7	-1.4	-1.3	-1.7		-1.4	-1.9	-1.3	-1.9	-1.9	-0.9
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	6.0	2.0	1.0	6.0	2.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2		0.2	3.4	0.2	0.2	3.4	0.2
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	15.0	0.0	0.0	15.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	30.0	0.0	0.0	30.0	0.0
Recall Mode	None	None	None	None	None		None	C-Min	None	None	C-Min	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effect Green (s)	27.9	15.2	28.6	12.7	17.0		13.4	94.4	108.1	10.5	88.7	99.6
Actuated g/C Ratio	0.19	0.10	0.19	0.08	0.11		0.09	0.63	0.72	0.07	0.59	0.66
v/c Ratio	0.37	0.45	0.23	0.58	0.71		0.59	0.81	0.16	0.32	0.71	0.04
Control Delay	51.9	71.0	36.2	74.4	83.3		80.5	27.0	4.5	72.6	25.0	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.9	71.0	36.2	74.4	83.3		80.5	27.0	4.5	72.6	25.0	4.9
LOS	D	E	D	E	F		F	C	A	E	C	A
Approach Delay		54.1			78.5			27.4			25.6	
Approach LOS		D			E			C			C	
Queue Length 50th (ft)	64	80	46	79	132		88	713	29	38	545	8
Queue Length 95th (ft)	114	141	84	119	#253		151	926	41	77	646	13
Internal Link Dist (ft)		541			477			720			705	
Turn Bay Length (ft)	150		380	270			310		170	250		110
Base Capacity (vph)	262	202	322	329	202		178	2227	1165	177	2110	1094
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.43	0.22	0.49	0.69		0.52	0.81	0.16	0.23	0.70	0.04

Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 54.5 (36%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 31.9

Intersection LOS: C

Intersection Capacity Utilization 80.3%









ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

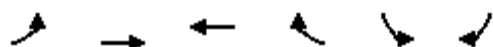
Splits and Phases: 5: US 1 (Capital Boulevard) & Purnell Road/Harris Road

 Ø2 (R) 90 s	 Ø1 20 s	 Ø3 20 s	 Ø4 20 s
 Ø6 (R) 90 s	 Ø5 20 s	 Ø7 20 s	 Ø8 20 s

Background Traffic Volumes

Planet Fitness Development
4: Harris Road & Wallridge Drive

01/31/2019









Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	115	206	174	29	38	96
Future Volume (Veh/h)	115	206	174	29	38	96
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.58	0.58	0.81	0.81	0.72	0.72
Hourly flow rate (vph)	198	355	215	36	53	133
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						9
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		557				
pX, platoon unblocked					0.92	
vC, conflicting volume	251				966	215
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	251				921	215
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	85				77	84
cM capacity (veh/h)	1314				235	825
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	198	355	215	36	186	
Volume Left	198	0	0	0	53	
Volume Right	0	0	0	36	133	
cSH	1314	1700	1700	1700	826	
Volume to Capacity	0.15	0.21	0.13	0.02	0.23	
Queue Length 95th (ft)	13	0	0	0	22	
Control Delay (s)	8.2	0.0	0.0	0.0	14.3	
Lane LOS	A				B	
Approach Delay (s)	2.9		0.0		14.3	
Approach LOS					B	
Intersection Summary						
Average Delay			4.3			
Intersection Capacity Utilization			28.9%		ICU Level of Service	A
Analysis Period (min)			15			

Planet Fitness Development
7: US 1A (N. Main Street) & Harris Road

















01/31/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	135	81	82	190	47
Future Volume (Veh/h)	10	135	81	82	190	47
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.85	0.85	0.82	0.82
Hourly flow rate (vph)	12	163	95	96	232	57
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)	5					
Median type				None	None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	518	232	289			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	518	232	289			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	80	93			
cM capacity (veh/h)	479	807	1273			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	175	95	96	232	57	
Volume Left	12	95	0	0	0	
Volume Right	163	0	0	0	57	
cSH	867	1273	1700	1700	1700	
Volume to Capacity	0.20	0.07	0.06	0.14	0.03	
Queue Length 95th (ft)	19	6	0	0	0	
Control Delay (s)	10.7	8.1	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	10.7	4.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization			27.8%	ICU Level of Service		A
Analysis Period (min)			15			

Planet Fitness Development
6: W. Oak Avenue/Wall Road & Harris Road
























01/31/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	3	78	157	10	134	37	62	33	4	36	119	6
Future Volume (vph)	3	78	157	10	134	37	62	33	4	36	119	6
Peak Hour Factor	0.50	0.50	0.50	0.93	0.93	0.93	0.72	0.72	0.72	0.86	0.86	0.86
Hourly flow rate (vph)	6	156	314	11	144	40	86	46	6	42	138	7
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	476	195	138	187								
Volume Left (vph)	6	11	86	42								
Volume Right (vph)	314	40	6	7								
Hadj (s)	-0.36	-0.08	0.13	0.06								
Departure Headway (s)	4.9	5.6	6.2	6.0								
Degree Utilization, x	0.64	0.30	0.24	0.31								
Capacity (veh/h)	706	590	507	535								
Control Delay (s)	16.3	10.9	11.1	11.7								
Approach Delay (s)	16.3	10.9	11.1	11.7								
Approach LOS	C	B	B	B								
Intersection Summary												
Delay			13.6									
Level of Service			B									
Intersection Capacity Utilization			35.0%	ICU Level of Service					A			
Analysis Period (min)			15									

Planet Fitness Development

5: US 1 (Capital Boulevard) & Purnell Road/Harris Road

01/31/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	135	80	165	61	43	54	1077	129	61	1471	55
Future Volume (vph)	60	135	80	165	61	43	54	1077	129	61	1471	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-2%			8%			0%			0%	
Storage Length (ft)	150		380	270		0	310		170	250		110
Storage Lanes	1		1	2		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor												
Frt			0.850		0.938				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1881	1599	3296	1677	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.505			0.950			0.950			0.950		
Satd. Flow (perm)	950	1881	1599	3296	1677	0	1770	3539	1583	1770	3539	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		621			557			800			785	
Travel Time (s)		9.4			8.4			9.9			9.7	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.65	0.65	0.65	0.74	0.74	0.74	0.86	0.86	0.86	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	92	208	123	223	82	58	63	1252	150	69	1653	62
Shared Lane Traffic (%)												
Lane Group Flow (vph)	92	208	123	223	140	0	63	1252	150	69	1653	62
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			47			44	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	1.05	1.05	1.05	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	D.P+P	NA	pm+ov	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8		5	2	3	1	6	7
Permitted Phases	8		4						2			6
Detector Phase	7	4	5	3	8		5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	14.0	7.0	7.0	14.0	7.0
Minimum Split (s)	12.9	20.0	13.4	13.3	20.0		13.4	22.5	13.3	13.9	22.5	12.9
Total Split (s)	20.0	20.0	20.0	20.0	20.0		20.0	90.0	20.0	20.0	90.0	20.0
Total Split (%)	13.3%	13.3%	13.3%	13.3%	13.3%		13.3%	60.0%	13.3%	13.3%	60.0%	13.3%

Planet Fitness Development

5: US 1 (Capital Boulevard) & Purnell Road/Harris Road

01/31/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	14.1	13.3	13.6	13.7	13.3		13.6	83.1	13.7	13.1	83.1	14.1
Yellow Time (s)	3.0	4.7	3.0	3.0	4.7		3.0	5.2	3.0	3.0	5.2	3.0
All-Red Time (s)	2.9	2.0	3.4	3.3	2.0		3.4	1.7	3.3	3.9	1.7	2.9
Lost Time Adjust (s)	-0.9	-1.7	-1.4	-1.3	-1.7		-1.4	-1.9	-1.3	-1.9	-1.9	-0.9
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	6.0	2.0	1.0	6.0	2.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2		0.2	3.4	0.2	0.2	3.4	0.2
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	15.0	0.0	0.0	15.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	30.0	0.0	0.0	30.0	0.0
Recall Mode	None	None	None	None	None		None	C-Min	None	None	C-Min	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effect Green (s)	35.3	21.0	33.9	14.3	23.9		12.9	74.7	90.0	22.7	81.8	93.3
Actuated g/C Ratio	0.24	0.14	0.23	0.10	0.16		0.09	0.50	0.60	0.15	0.55	0.62
v/c Ratio	0.32	0.79	0.34	0.71	0.53		0.41	0.71	0.16	0.26	0.86	0.06
Control Delay	47.5	82.9	36.3	78.8	67.4		72.7	33.1	8.0	57.2	34.4	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.5	82.9	36.3	78.8	67.4		72.7	33.1	8.0	57.2	34.4	5.5
LOS	D	F	D	E	E		E	C	A	E	C	A
Approach Delay		61.7			74.4			32.2			34.3	
Approach LOS		E			E			C			C	
Queue Length 50th (ft)	70	203	79	109	128		59	550	38	58	710	12
Queue Length 95th (ft)	89	#237	93	127	#183		104	513	46	110	757	16
Internal Link Dist (ft)		541			477			720			705	
Turn Bay Length (ft)	150		380	270			310		170	250		110
Base Capacity (vph)	326	263	383	333	266		177	2050	959	282	2005	1021
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.79	0.32	0.67	0.53		0.36	0.61	0.16	0.24	0.82	0.06

Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 54.5 (36%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 40.0

Intersection LOS: D

Intersection Capacity Utilization 76.1%









ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 5: US 1 (Capital Boulevard) & Purnell Road/Harris Road

 Ø2 (R)	 Ø1	 Ø3	 Ø4
90 s	20 s	20 s	20 s
 Ø6 (R)	 Ø5	 Ø7	 Ø8
90 s	20 s	20 s	20 s

Planet Fitness Development
4: Harris Road & Wallridge Drive

01/31/2019









Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	195	175	140	73	79	205
Future Volume (Veh/h)	195	175	140	73	79	205
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	217	194	156	81	88	228
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						9
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		557				
pX, platoon unblocked						
vC, conflicting volume	237				784	156
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	237				784	156
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	84				71	74
cM capacity (veh/h)	1330				303	890
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	217	194	156	81	316	
Volume Left	217	0	0	0	88	
Volume Right	0	0	0	81	228	
cSH	1330	1700	1700	1700	1088	
Volume to Capacity	0.16	0.11	0.09	0.05	0.29	
Queue Length 95th (ft)	15	0	0	0	30	
Control Delay (s)	8.2	0.0	0.0	0.0	13.6	
Lane LOS	A				B	
Approach Delay (s)	4.3		0.0		13.6	
Approach LOS					B	
Intersection Summary						
Average Delay			6.3			
Intersection Capacity Utilization			32.5%		ICU Level of Service	A
Analysis Period (min)			15			

Planet Fitness Development
7: US 1A (N. Main Street) & Harris Road

















01/31/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	56	66	86	217	123	51
Future Volume (Veh/h)	56	66	86	217	123	51
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	62	73	96	241	137	57
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)	5					
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	570	137	194			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	570	137	194			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	86	92	93			
cM capacity (veh/h)	449	911	1379			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	135	96	241	137	57	
Volume Left	62	96	0	0	0	
Volume Right	73	0	0	0	57	
cSH	978	1379	1700	1700	1700	
Volume to Capacity	0.14	0.07	0.14	0.08	0.03	
Queue Length 95th (ft)	12	6	0	0	0	
Control Delay (s)	11.6	7.8	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	11.6	2.2	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			24.6%	ICU Level of Service		A
Analysis Period (min)			15			

Planet Fitness Development
6: W. Oak Avenue/Wall Road & Harris Road
























01/31/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	6	147	77	6	121	35	82	73	6	46	51	6
Future Volume (vph)	6	147	77	6	121	35	82	73	6	46	51	6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	7	163	86	7	134	39	91	81	7	51	57	7
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	256	180	179	115								
Volume Left (vph)	7	7	91	51								
Volume Right (vph)	86	39	7	7								
Hadj (s)	-0.16	-0.09	0.11	0.09								
Departure Headway (s)	4.8	5.0	5.3	5.4								
Degree Utilization, x	0.34	0.25	0.26	0.17								
Capacity (veh/h)	701	669	617	604								
Control Delay (s)	10.2	9.6	10.1	9.5								
Approach Delay (s)	10.2	9.6	10.1	9.5								
Approach LOS	B	A	B	A								
Intersection Summary												
Delay				9.9								
Level of Service				A								
Intersection Capacity Utilization				33.3%	ICU Level of Service	A						
Analysis Period (min)				15								

Planet Fitness Development

5: US 1 (Capital Boulevard) & Purnell Road/Harris Road

01/31/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	83	66	167	110	43	87	1681	197	59	1378	42
Future Volume (vph)	75	83	66	167	110	43	87	1681	197	59	1378	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-2%			8%			0%			0%	
Storage Length (ft)	150		380	270		0	310		170	250		110
Storage Lanes	1		1	2		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor												
Frt			0.850		0.958				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1881	1599	3296	1713	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.364			0.950			0.950			0.950		
Satd. Flow (perm)	685	1881	1599	3296	1713	0	1770	3539	1583	1770	3539	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		621			557			800			785	
Travel Time (s)		9.4			8.4			9.9			9.7	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	83	92	73	186	122	48	97	1868	219	66	1531	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	83	92	73	186	170	0	97	1868	219	66	1531	47
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			47			44	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	1.05	1.05	1.05	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	D.P+P	NA	pm+ov	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8		5	2	3	1	6	7
Permitted Phases	8		4						2			6
Detector Phase	7	4	5	3	8		5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	14.0	7.0	7.0	14.0	7.0
Minimum Split (s)	12.9	20.0	13.4	13.3	20.0		13.4	22.5	13.3	13.9	22.5	12.9
Total Split (s)	20.0	20.0	20.0	20.0	20.0		20.0	90.0	20.0	20.0	90.0	20.0
Total Split (%)	13.3%	13.3%	13.3%	13.3%	13.3%		13.3%	60.0%	13.3%	13.3%	60.0%	13.3%

Planet Fitness Development

5: US 1 (Capital Boulevard) & Purnell Road/Harris Road

01/31/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	14.1	13.3	13.6	13.7	13.3		13.6	83.1	13.7	13.1	83.1	14.1
Yellow Time (s)	3.0	4.7	3.0	3.0	4.7		3.0	5.2	3.0	3.0	5.2	3.0
All-Red Time (s)	2.9	2.0	3.4	3.3	2.0		3.4	1.7	3.3	3.9	1.7	2.9
Lost Time Adjust (s)	-0.9	-1.7	-1.4	-1.3	-1.7		-1.4	-1.9	-1.3	-1.9	-1.9	-0.9
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	6.0	2.0	1.0	6.0	2.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2		0.2	3.4	0.2	0.2	3.4	0.2
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	15.0	0.0	0.0	15.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	30.0	0.0	0.0	30.0	0.0
Recall Mode	None	None	None	None	None		None	C-Min	None	None	C-Min	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effect Green (s)	31.3	17.8	32.2	13.5	20.2		14.4	90.1	104.6	11.4	84.3	95.4
Actuated g/C Ratio	0.21	0.12	0.21	0.09	0.13		0.10	0.60	0.70	0.08	0.56	0.64
v/c Ratio	0.37	0.41	0.21	0.63	0.74		0.57	0.88	0.20	0.49	0.77	0.05
Control Delay	50.3	68.1	34.3	75.4	80.9		78.3	32.7	5.1	78.4	29.1	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.3	68.1	34.3	75.4	80.9		78.3	32.7	5.1	78.4	29.1	5.3
LOS	D	E	C	E	F		E	C	A	E	C	A
Approach Delay		52.2			78.0			32.0			30.4	
Approach LOS		D			E			C			C	
Queue Length 50th (ft)	63	83	44	91	158		91	853	42	63	636	9
Queue Length 95th (ft)	115	148	86	133	#329		155	985	50	113	674	13
Internal Link Dist (ft)		541			477			720			705	
Turn Bay Length (ft)	150		380	270			310		170	250		110
Base Capacity (vph)	268	223	356	332	231		184	2125	1121	177	2042	1048
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.41	0.21	0.56	0.74		0.53	0.88	0.20	0.37	0.75	0.04

Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 54.5 (36%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 36.2

Intersection LOS: D

Intersection Capacity Utilization 83.2%









ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

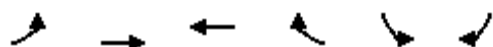
Splits and Phases: 5: US 1 (Capital Boulevard) & Purnell Road/Harris Road

 Ø2 (R)	 Ø1	 Ø3	 Ø4
90 s	20 s	20 s	20 s
 Ø6 (R)	 Ø5	 Ø7	 Ø8
90 s	20 s	20 s	20 s

Build Traffic Volumes

Planet Fitness Development
4: Harris Road & Wallridge Drive

01/31/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	150	206	174	127	62	148
Future Volume (Veh/h)	150	206	174	127	62	148
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.58	0.58	0.81	0.81	0.72	0.72
Hourly flow rate (vph)	259	355	215	157	86	206
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						9
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		557				
pX, platoon unblocked					0.93	
vC, conflicting volume	372				1088	215
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	372				1059	215
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	78				53	75
cM capacity (veh/h)	1186				181	825
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	259	355	215	157	292	
Volume Left	259	0	0	0	86	
Volume Right	0	0	0	157	206	
cSH	1186	1700	1700	1700	616	
Volume to Capacity	0.22	0.21	0.13	0.09	0.47	
Queue Length 95th (ft)	21	0	0	0	64	
Control Delay (s)	8.9	0.0	0.0	0.0	19.9	
Lane LOS	A				C	
Approach Delay (s)	3.7		0.0		19.9	
Approach LOS					C	
Intersection Summary						
Average Delay			6.3			
Intersection Capacity Utilization			30.9%		ICU Level of Service	A
Analysis Period (min)			15			

Planet Fitness Development
7: US 1A (N. Main Street) & Harris Road

















01/31/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↱	↱	↰
Traffic Volume (veh/h)	14	143	123	82	190	61
Future Volume (Veh/h)	14	143	123	82	190	61
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.85	0.85	0.82	0.82
Hourly flow rate (vph)	17	172	145	96	232	74
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)	5					
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	618	232	306			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	618	232	306			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	79	88			
cM capacity (veh/h)	400	807	1255			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	189	145	96	232	74	
Volume Left	17	145	0	0	0	
Volume Right	172	0	0	0	74	
cSH	887	1255	1700	1700	1700	
Volume to Capacity	0.21	0.12	0.06	0.14	0.04	
Queue Length 95th (ft)	20	10	0	0	0	
Control Delay (s)	11.0	8.2	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	11.0	5.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			4.4			
Intersection Capacity Utilization			30.1%	ICU Level of Service		A
Analysis Period (min)			15			

Planet Fitness Development
6: W. Oak Avenue/Wall Road & Harris Road
























01/31/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	3	90	169	10	190	37	104	33	4	36	119	6
Future Volume (vph)	3	90	169	10	190	37	104	33	4	36	119	6
Peak Hour Factor	0.50	0.50	0.50	0.93	0.93	0.93	0.72	0.72	0.72	0.86	0.86	0.86
Hourly flow rate (vph)	6	180	338	11	204	40	144	46	6	42	138	7
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	524	255	196	187								
Volume Left (vph)	6	11	144	42								
Volume Right (vph)	338	40	6	7								
Hadj (s)	-0.35	-0.05	0.16	0.06								
Departure Headway (s)	5.4	6.1	6.8	6.7								
Degree Utilization, x	0.78	0.43	0.37	0.35								
Capacity (veh/h)	648	530	472	477								
Control Delay (s)	25.1	13.8	13.7	13.2								
Approach Delay (s)	25.1	13.8	13.7	13.2								
Approach LOS	D	B	B	B								
Intersection Summary												
Delay				18.8								
Level of Service				C								
Intersection Capacity Utilization				44.9%	ICU Level of Service	A						
Analysis Period (min)				15								

Planet Fitness Development

5: US 1 (Capital Boulevard) & Purnell Road/Harris Road

01/31/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	142	80	205	65	51	54	1077	143	75	1471	55
Future Volume (vph)	60	142	80	205	65	51	54	1077	143	75	1471	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-2%			8%			0%			0%	
Storage Length (ft)	150		380	270		0	310		170	250		110
Storage Lanes	1		1	2		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor												
Frt			0.850		0.934				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1881	1599	3296	1670	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.475			0.950			0.950			0.950		
Satd. Flow (perm)	894	1881	1599	3296	1670	0	1770	3539	1583	1770	3539	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		621			557			800			785	
Travel Time (s)		9.4			8.4			9.9			9.7	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.65	0.65	0.65	0.74	0.74	0.74	0.86	0.86	0.86	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	92	218	123	277	88	69	63	1252	166	84	1653	62
Shared Lane Traffic (%)												
Lane Group Flow (vph)	92	218	123	277	157	0	63	1252	166	84	1653	62
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			47			44	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	1.05	1.05	1.05	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	D.P+P	NA	pm+ov	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8		5	2	3	1	6	7
Permitted Phases	8		4						2			6
Detector Phase	7	4	5	3	8		5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	14.0	7.0	7.0	14.0	7.0
Minimum Split (s)	12.9	20.0	13.4	13.3	20.0		13.4	22.5	13.3	13.9	22.5	12.9
Total Split (s)	20.0	20.0	20.0	20.0	20.0		20.0	90.0	20.0	20.0	90.0	20.0
Total Split (%)	13.3%	13.3%	13.3%	13.3%	13.3%		13.3%	60.0%	13.3%	13.3%	60.0%	13.3%

Planet Fitness Development

5: US 1 (Capital Boulevard) & Purnell Road/Harris Road

01/31/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	14.1	13.3	13.6	13.7	13.3		13.6	83.1	13.7	13.1	83.1	14.1
Yellow Time (s)	3.0	4.7	3.0	3.0	4.7		3.0	5.2	3.0	3.0	5.2	3.0
All-Red Time (s)	2.9	2.0	3.4	3.3	2.0		3.4	1.7	3.3	3.9	1.7	2.9
Lost Time Adjust (s)	-0.9	-1.7	-1.4	-1.3	-1.7		-1.4	-1.9	-1.3	-1.9	-1.9	-0.9
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	6.0	2.0	1.0	6.0	2.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2		0.2	3.4	0.2	0.2	3.4	0.2
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	15.0	0.0	0.0	15.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	30.0	0.0	0.0	30.0	0.0
Recall Mode	None	None	None	None	None		None	C-Min	None	None	C-Min	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effect Green (s)	37.1	21.2	34.1	15.8	25.6		12.9	67.1	82.9	25.9	80.1	91.5
Actuated g/C Ratio	0.25	0.14	0.23	0.11	0.17		0.09	0.45	0.55	0.17	0.53	0.61
v/c Ratio	0.32	0.82	0.34	0.80	0.55		0.42	0.79	0.19	0.28	0.88	0.06
Control Delay	47.0	85.6	36.0	82.5	67.0		72.8	39.3	8.7	56.7	36.5	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.0	85.6	36.0	82.5	67.0		72.8	39.3	8.7	56.7	36.5	5.6
LOS	D	F	D	F	E		E	D	A	E	D	A
Approach Delay		63.3			76.9			37.3			36.4	
Approach LOS		E			E			D			D	
Queue Length 50th (ft)	71	~251	81	136	147		59	543	43	70	689	12
Queue Length 95th (ft)	89	#254	93	154	#218		104	513	50	129	757	16
Internal Link Dist (ft)		541			477			720			705	
Turn Bay Length (ft)	150		380	270			310		170	250		110
Base Capacity (vph)	328	266	386	351	285		177	2005	876	305	2005	1003
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.82	0.32	0.79	0.55		0.36	0.62	0.19	0.28	0.82	0.06

Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 54.5 (36%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 43.8

Intersection LOS: D

Intersection Capacity Utilization 76.5%

ICU Level of Service D

Analysis Period (min) 15









~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

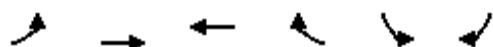
Queue shown is maximum after two cycles.

Splits and Phases: 5: US 1 (Capital Boulevard) & Purnell Road/Harris Road

 Ø2 (R)	 Ø1	 Ø3	 Ø4
90 s	20 s	20 s	20 s
 Ø6 (R)	 Ø5	 Ø7	 Ø8
90 s	20 s	20 s	20 s

Planet Fitness Development
4: Harris Road & Wallridge Drive

01/31/2019









Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	255	175	140	101	133	225
Future Volume (Veh/h)	255	175	140	101	133	225
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	283	194	156	112	148	250
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						9
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		557				
pX, platoon unblocked						
vC, conflicting volume	268				916	156
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	268				916	156
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	78				37	72
cM capacity (veh/h)	1296				236	890
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	283	194	156	112	398	
Volume Left	283	0	0	0	148	
Volume Right	0	0	0	112	250	
cSH	1296	1700	1700	1700	636	
Volume to Capacity	0.22	0.11	0.09	0.07	0.63	
Queue Length 95th (ft)	21	0	0	0	110	
Control Delay (s)	8.6	0.0	0.0	0.0	22.6	
Lane LOS	A				C	
Approach Delay (s)	5.1		0.0		22.6	
Approach LOS					C	
Intersection Summary						
Average Delay			10.0			
Intersection Capacity Utilization			38.9%		ICU Level of Service	A
Analysis Period (min)			15			

Planet Fitness Development
7: US 1A (N. Main Street) & Harris Road

















01/31/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	64	89	95	217	123	56
Future Volume (Veh/h)	64	89	95	217	123	56
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	71	99	106	241	137	62
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)	5					
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	590	137	199			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	590	137	199			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	84	89	92			
cM capacity (veh/h)	434	911	1373			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	170	106	241	137	62	
Volume Left	71	106	0	0	0	
Volume Right	99	0	0	0	62	
cSH	1039	1373	1700	1700	1700	
Volume to Capacity	0.16	0.08	0.14	0.08	0.04	
Queue Length 95th (ft)	15	6	0	0	0	
Control Delay (s)	11.7	7.8	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	11.7	2.4		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay	3.9					
Intersection Capacity Utilization	25.3%			ICU Level of Service		A
Analysis Period (min)	15					

Planet Fitness Development
6: W. Oak Avenue/Wall Road & Harris Road
























01/31/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	6	178	100	6	135	35	96	73	6	46	51	6
Future Volume (vph)	6	178	100	6	135	35	96	73	6	46	51	6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	7	198	111	7	150	39	107	81	7	51	57	7
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	316	196	195	115								
Volume Left (vph)	7	7	107	51								
Volume Right (vph)	111	39	7	7								
Hadj (s)	-0.17	-0.08	0.12	0.09								
Departure Headway (s)	4.9	5.2	5.5	5.7								
Degree Utilization, x	0.43	0.28	0.30	0.18								
Capacity (veh/h)	687	641	587	564								
Control Delay (s)	11.6	10.2	10.9	9.9								
Approach Delay (s)	11.6	10.2	10.9	9.9								
Approach LOS	B	B	B	A								
Intersection Summary												
Delay			10.9									
Level of Service			B									
Intersection Capacity Utilization			37.9%	ICU Level of Service					A			
Analysis Period (min)			15									

Planet Fitness Development

5: US 1 (Capital Boulevard) & Purnell Road/Harris Road

01/31/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	88	66	175	114	51	87	1681	243	68	1378	42
Future Volume (vph)	75	88	66	175	114	51	87	1681	243	68	1378	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-2%			8%			0%			0%	
Storage Length (ft)	150		380	270		0	310		170	250		110
Storage Lanes	1		1	2		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor												
Frt			0.850		0.954				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1881	1599	3296	1706	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.350			0.950			0.950			0.950		
Satd. Flow (perm)	658	1881	1599	3296	1706	0	1770	3539	1583	1770	3539	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			55			55	
Link Distance (ft)		621			557			800			785	
Travel Time (s)		9.4			8.4			9.9			9.7	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	83	98	73	194	127	57	97	1868	270	76	1531	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	83	98	73	194	184	0	97	1868	270	76	1531	47
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			47			44	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	1.05	1.05	1.05	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	D.P+P	NA	pm+ov	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8		5	2	3	1	6	7
Permitted Phases	8		4						2			6
Detector Phase	7	4	5	3	8		5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	14.0	7.0	7.0	14.0	7.0
Minimum Split (s)	12.9	20.0	13.4	13.3	20.0		13.4	22.5	13.3	13.9	22.5	12.9
Total Split (s)	20.0	20.0	20.0	20.0	20.0		20.0	90.0	20.0	20.0	90.0	20.0
Total Split (%)	13.3%	13.3%	13.3%	13.3%	13.3%		13.3%	60.0%	13.3%	13.3%	60.0%	13.3%

Planet Fitness Development

5: US 1 (Capital Boulevard) & Purnell Road/Harris Road

01/31/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	14.1	13.3	13.6	13.7	13.3		13.6	83.1	13.7	13.1	83.1	14.1
Yellow Time (s)	3.0	4.7	3.0	3.0	4.7		3.0	5.2	3.0	3.0	5.2	3.0
All-Red Time (s)	2.9	2.0	3.4	3.3	2.0		3.4	1.7	3.3	3.9	1.7	2.9
Lost Time Adjust (s)	-0.9	-1.7	-1.4	-1.3	-1.7		-1.4	-1.9	-1.3	-1.9	-1.9	-0.9
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	6.0	2.0	1.0	6.0	2.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2		0.2	3.4	0.2	0.2	3.4	0.2
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	15.0	0.0	0.0	15.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	30.0	0.0	0.0	30.0	0.0
Recall Mode	None	None	None	None	None		None	C-Min	None	None	C-Min	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	33.0	19.2	36.2	13.8	21.9		17.0	85.2	99.0	11.8	80.0	91.1
Actuated g/C Ratio	0.22	0.13	0.24	0.09	0.15		0.11	0.57	0.66	0.08	0.53	0.61
v/c Ratio	0.37	0.41	0.19	0.64	0.74		0.48	0.93	0.26	0.55	0.81	0.05
Control Delay	49.7	67.5	33.0	75.5	79.4		71.7	39.3	6.0	80.6	32.7	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.7	67.5	33.0	75.5	79.4		71.7	39.3	6.0	80.6	32.7	5.5
LOS	D	E	C	E	E		E	D	A	F	C	A
Approach Delay		51.8			77.4			36.7			34.2	
Approach LOS		D			E			D			C	
Queue Length 50th (ft)	64	90	44	95	174		90	853	51	73	636	9
Queue Length 95th (ft)	115	157	86	138	#362		155	985	62	127	674	13
Internal Link Dist (ft)		541			477			720			705	
Turn Bay Length (ft)	150		380	270			310		170	250		110
Base Capacity (vph)	272	240	385	334	248		201	2010	1059	177	2005	1002
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.41	0.19	0.58	0.74		0.48	0.93	0.25	0.43	0.76	0.05

Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 54.5 (36%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 40.0

Intersection LOS: D

Intersection Capacity Utilization 83.9%









ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 5: US 1 (Capital Boulevard) & Purnell Road/Harris Road

 Ø2 (R)	 Ø1	 Ø3	 Ø4
90 s	20 s	20 s	20 s
 Ø6 (R)	 Ø5	 Ø7	 Ø8
90 s	20 s	20 s	20 s

SIDRA Outputs

MOVEMENT SUMMARY

 **Site: 101 [2019 Existing AM peak hour - Planet Fitness]**

Wake Forest, NC
Wallridge Drive / Wrigley Drive
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: Wallridge Drive												
6	T1	100	2.0	0.091	3.4	LOS A	0.4	10.4	0.10	0.03	0.10	25.1
16	R2	20	2.0	0.091	3.4	LOS A	0.4	10.4	0.10	0.03	0.10	24.4
Approach		120	2.0	0.091	3.4	LOS A	0.4	10.4	0.10	0.03	0.10	25.0
North: Wrigley Drive												
7	L2	8	2.0	0.039	3.3	LOS A	0.2	4.2	0.23	0.10	0.23	25.3
14	R2	40	2.0	0.039	3.3	LOS A	0.2	4.2	0.23	0.10	0.23	24.1
Approach		48	2.0	0.039	3.3	LOS A	0.2	4.2	0.23	0.10	0.23	24.3
West: Wallridge Drive												
5	L2	22	2.0	0.081	3.2	LOS A	0.3	7.8	0.05	0.01	0.05	25.4
2	T1	90	2.0	0.081	3.2	LOS A	0.3	7.8	0.05	0.01	0.05	24.9
Approach		112	2.0	0.081	3.2	LOS A	0.3	7.8	0.05	0.01	0.05	25.0
All Vehicles		280	2.0	0.091	3.3	LOS A	0.4	10.4	0.10	0.03	0.10	24.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: TIMMONS GROUP | Processed: Thursday, January 31, 2019 3:56:43 PM

Project: L:\208\207\42963-Planet_Fitness_TIA\TRAFFIC\SIDRA\Existing\2019 Existing.sip8

MOVEMENT SUMMARY

 **Site: 101 [2019 Existing PM peak hour - Planet Fitness]**

Wake Forest, NC
Wallridge Drive / Wrigley Drive
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: Wallridge Drive												
6	T1	57	2.0	0.050	3.1	LOS A	0.2	5.4	0.04	0.00	0.04	25.2
16	R2	10	2.0	0.050	3.1	LOS A	0.2	5.4	0.04	0.00	0.04	24.5
Approach		67	2.0	0.050	3.1	LOS A	0.2	5.4	0.04	0.00	0.04	25.1
North: Wrigley Drive												
7	L2	6	2.0	0.011	2.9	LOS A	0.0	1.2	0.16	0.05	0.16	25.1
14	R2	9	2.0	0.011	2.9	LOS A	0.0	1.2	0.16	0.05	0.16	24.0
Approach		14	2.0	0.011	2.9	LOS A	0.0	1.2	0.16	0.05	0.16	24.4
West: Wallridge Drive												
5	L2	4	2.0	0.022	2.8	LOS A	0.1	2.0	0.03	0.00	0.03	25.7
2	T1	26	2.0	0.022	2.8	LOS A	0.1	2.0	0.03	0.00	0.03	25.1
Approach		30	2.0	0.022	2.8	LOS A	0.1	2.0	0.03	0.00	0.03	25.2
All Vehicles		111	2.0	0.050	3.0	LOS A	0.2	5.4	0.05	0.01	0.05	25.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: L:\208\207\42963-Planet_Fitness_TIA\TRAFFIC\SIDRA\Existing\2019 Existing.sip8

MOVEMENT SUMMARY

 **Site: 101 [2020 Background AM peak hour - Planet Fitness]**

Wake Forest, NC
Wallridge Drive / Wrigley Drive
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: Wallridge Drive												
6	T1	106	2.0	0.095	3.5	LOS A	0.4	10.9	0.10	0.03	0.10	25.1
16	R2	20	2.0	0.095	3.5	LOS A	0.4	10.9	0.10	0.03	0.10	24.4
Approach		126	2.0	0.095	3.5	LOS A	0.4	10.9	0.10	0.03	0.10	25.0
North: Wrigley Drive												
7	L2	8	2.0	0.041	3.3	LOS A	0.2	4.4	0.24	0.11	0.24	25.3
14	R2	42	2.0	0.041	3.3	LOS A	0.2	4.4	0.24	0.11	0.24	24.1
Approach		50	2.0	0.041	3.3	LOS A	0.2	4.4	0.24	0.11	0.24	24.3
West: Wallridge Drive												
5	L2	22	2.0	0.084	3.3	LOS A	0.3	8.2	0.05	0.01	0.05	25.5
2	T1	94	2.0	0.084	3.3	LOS A	0.3	8.2	0.05	0.01	0.05	24.9
Approach		116	2.0	0.084	3.3	LOS A	0.3	8.2	0.05	0.01	0.05	25.0
All Vehicles		292	2.0	0.095	3.4	LOS A	0.4	10.9	0.10	0.03	0.10	24.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: L:\208\207\42963-Planet_Fitness_TIA\TRAFFIC\SIDRA\Background\2020 Background.sip8

MOVEMENT SUMMARY

 **Site: 101 [2020 Background PM peak hour - Planet Fitness]**

Wake Forest, NC
Wallridge Drive / Wrigley Drive
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: Wallridge Drive												
6	T1	59	2.0	0.051	3.1	LOS A	0.2	5.6	0.04	0.00	0.04	25.2
16	R2	10	2.0	0.051	3.1	LOS A	0.2	5.6	0.04	0.00	0.04	24.5
Approach		69	2.0	0.051	3.1	LOS A	0.2	5.6	0.04	0.00	0.04	25.1
North: Wrigley Drive												
7	L2	6	2.0	0.011	2.9	LOS A	0.0	1.2	0.17	0.05	0.17	25.1
14	R2	9	2.0	0.011	2.9	LOS A	0.0	1.2	0.17	0.05	0.17	24.0
Approach		14	2.0	0.011	2.9	LOS A	0.0	1.2	0.17	0.05	0.17	24.4
West: Wallridge Drive												
5	L2	4	2.0	0.023	2.8	LOS A	0.1	2.1	0.03	0.00	0.03	25.7
2	T1	28	2.0	0.023	2.8	LOS A	0.1	2.1	0.03	0.00	0.03	25.1
Approach		32	2.0	0.023	2.8	LOS A	0.1	2.1	0.03	0.00	0.03	25.2
All Vehicles		116	2.0	0.051	3.0	LOS A	0.2	5.6	0.05	0.01	0.05	25.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

 **Site: 101 [2020 Build AM peak hour - Planet Fitness]**

Wake Forest, NC
Wallridge Drive / Wrigley Drive
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: Wallridge Drive												
6	T1	106	2.0	0.129	4.5	LOS A	0.6	14.6	0.37	0.24	0.37	24.8
16	R2	34	2.0	0.129	4.5	LOS A	0.6	14.6	0.37	0.24	0.37	24.1
Approach		140	2.0	0.129	4.5	LOS A	0.6	14.6	0.37	0.24	0.37	24.6
North: Wrigley Drive												
7	L2	16	2.0	0.173	4.5	LOS A	0.8	21.0	0.27	0.14	0.27	25.1
14	R2	194	2.0	0.173	4.5	LOS A	0.8	21.0	0.27	0.14	0.27	23.9
Approach		210	2.0	0.173	4.5	LOS A	0.8	21.0	0.27	0.14	0.27	24.0
West: Wallridge Drive												
5	L2	214	2.0	0.225	4.5	LOS A	1.0	25.7	0.08	0.02	0.08	24.4
2	T1	94	2.0	0.225	4.5	LOS A	1.0	25.7	0.08	0.02	0.08	24.0
Approach		309	2.0	0.225	4.5	LOS A	1.0	25.7	0.08	0.02	0.08	24.3
All Vehicles		659	2.0	0.225	4.5	LOS A	1.0	25.7	0.20	0.11	0.20	24.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: L:\208\207\42963-Planet_Fitness_TIA\TRAFFIC\SIDRA\Total\2020 Build.sip8

MOVEMENT SUMMARY

 **Site: 101 [2020 Build PM peak hour - Planet Fitness]**

Wake Forest, NC
Wallridge Drive / Wrigley Drive
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: Wallridge Drive												
6	T1	59	2.0	0.061	3.5	LOS A	0.3	6.7	0.24	0.11	0.24	25.1
16	R2	16	2.0	0.061	3.5	LOS A	0.3	6.7	0.24	0.11	0.24	24.4
Approach		74	2.0	0.061	3.5	LOS A	0.3	6.7	0.24	0.11	0.24	24.9
North: Wrigley Drive												
7	L2	10	2.0	0.079	3.5	LOS A	0.3	8.9	0.18	0.07	0.18	25.3
14	R2	91	2.0	0.079	3.5	LOS A	0.3	8.9	0.18	0.07	0.18	24.1
Approach		101	2.0	0.079	3.5	LOS A	0.3	8.9	0.18	0.07	0.18	24.2
West: Wallridge Drive												
5	L2	102	2.0	0.094	3.4	LOS A	0.4	9.3	0.05	0.01	0.05	24.6
2	T1	28	2.0	0.094	3.4	LOS A	0.4	9.3	0.05	0.01	0.05	24.1
Approach		130	2.0	0.094	3.4	LOS A	0.4	9.3	0.05	0.01	0.05	24.5
All Vehicles		306	2.0	0.094	3.4	LOS A	0.4	9.3	0.14	0.05	0.14	24.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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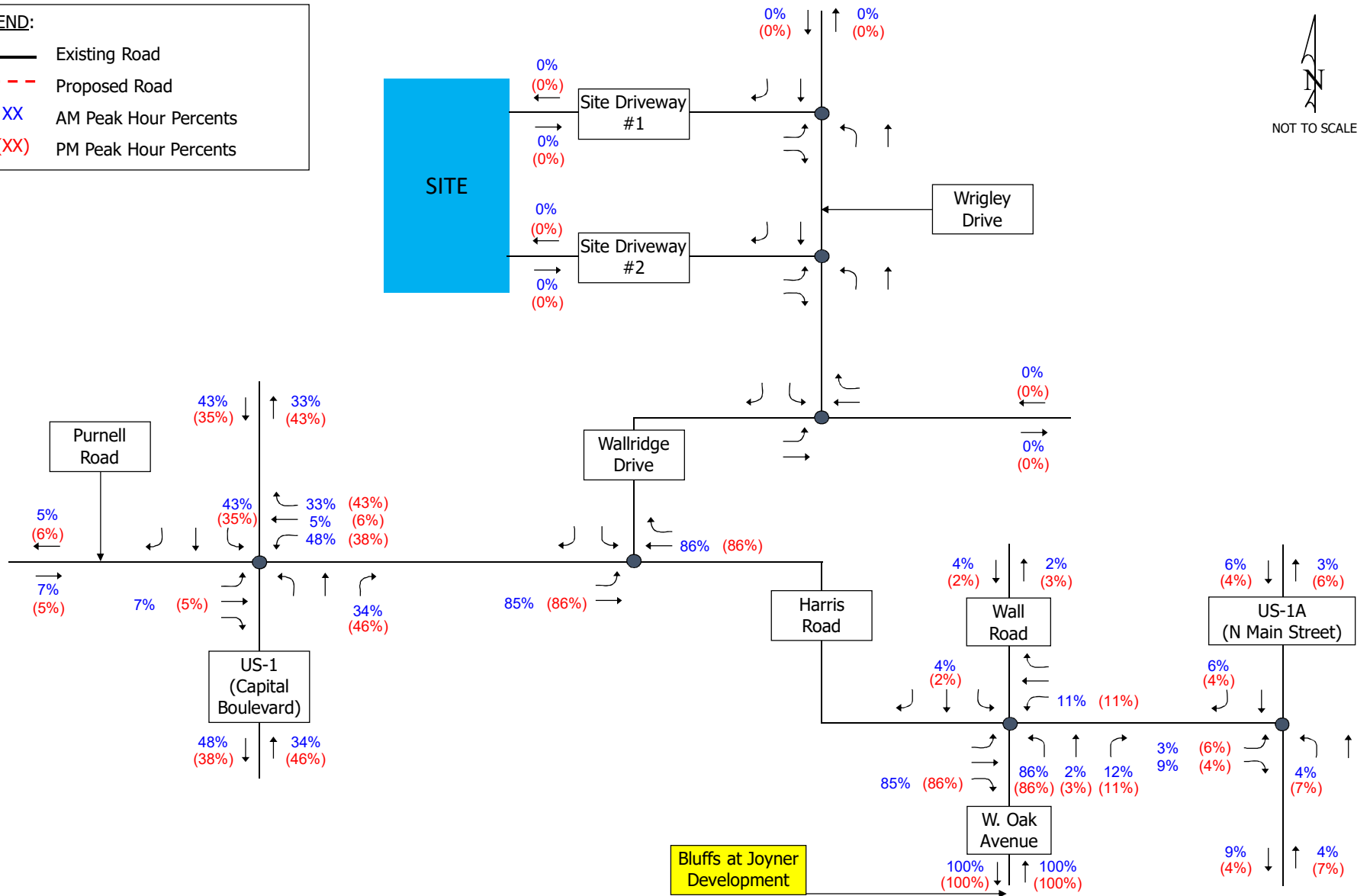
Organisation: TIMMONS GROUP | Processed: Thursday, January 31, 2019 2:59:10 PM

Project: L:\208\207\42963-Planet_Fitness_TIA\TRAFFIC\SIDRA\Total\2020 Build.sip8

Appendix F – Approved Area Developments

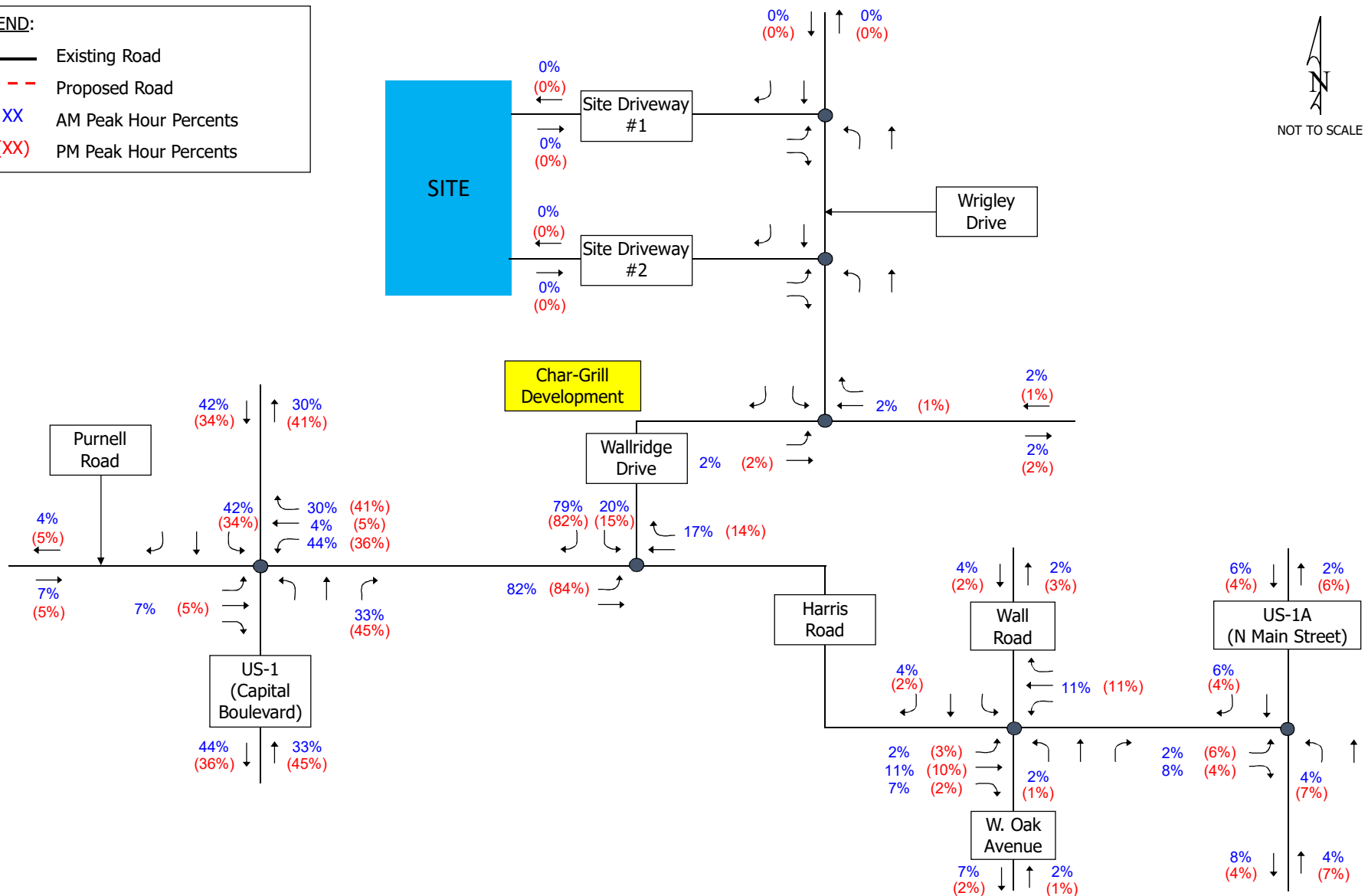
LEGEND:

- Existing Road
- - - Proposed Road
- XX AM Peak Hour Percents
- (XX) PM Peak Hour Percents



LEGEND:

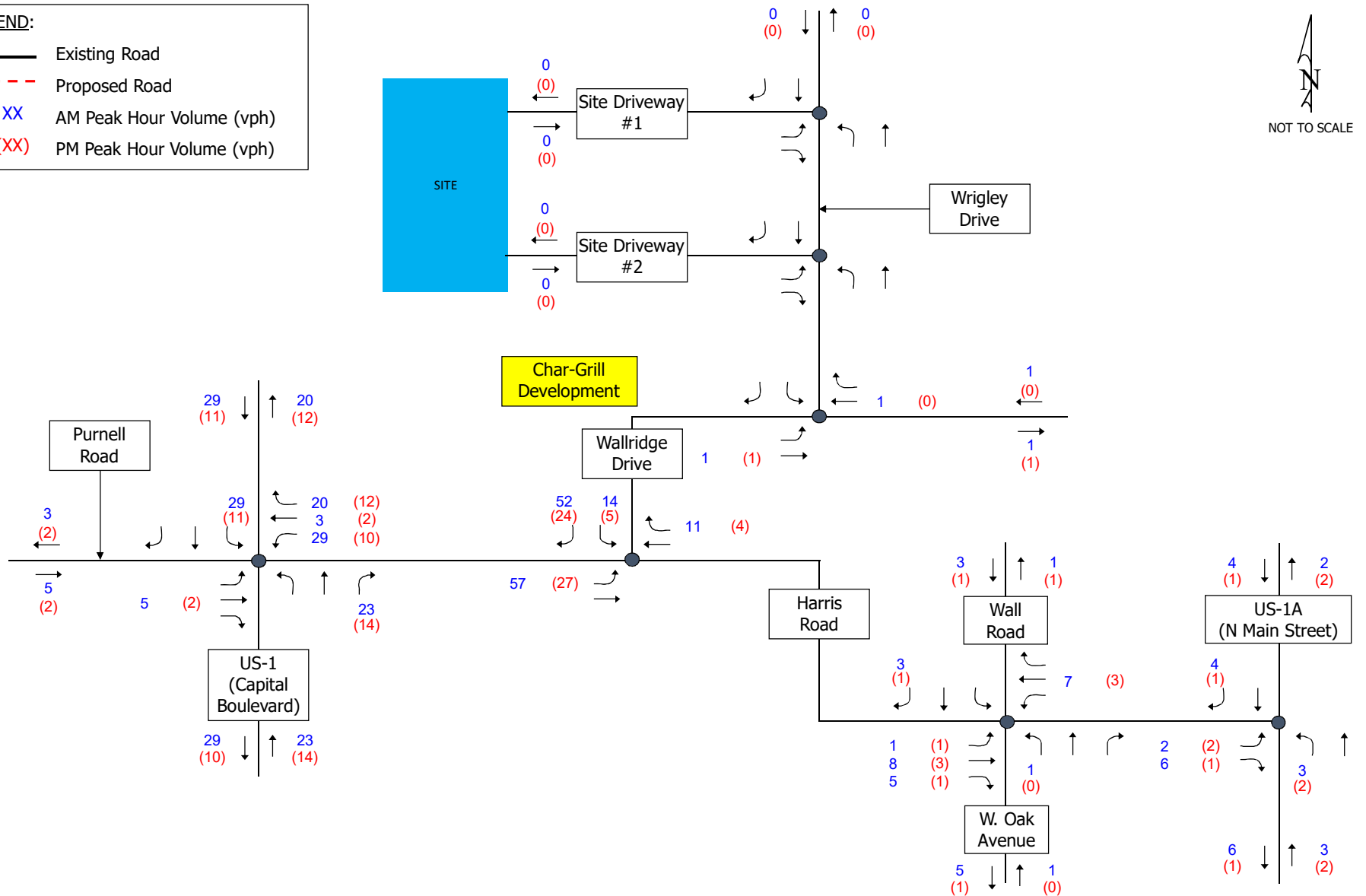
- Existing Road
- - - Proposed Road
- XX AM Peak Hour Percents
- (XX) PM Peak Hour Percents



NOT TO SCALE

LEGEND:

- Existing Road
- - - Proposed Road
- XX AM Peak Hour Volume (vph)
- (XX) PM Peak Hour Volume (vph)



Appendix G – Hillsborough, NC Planet Fitness Data

6/18/2018 Check Ins			
7am-9am		4pm-6pm	
7-7:15	18	4-4:15	22
7:16-7:30	5	4:16-4:30	16
7:31-7:45	12	4:31-4:45	11
7:46-8:00	6	4:46-5:00	14
8:01-8:15	6	5:01-5:15	9
8:16-8:30	8	5:16-5:30	20
8:31-8:45	5	5:31-5:45	15
8:46-90	1	5:46-6:00	15
Total	61	Total	122

1/10/2018 Check Ins			
7am-9am		4pm-6pm	
7-7:15	4	4-4:15	13
7:16-7:30	2	4:16-4:30	15
7:31-7:45	6	4:31-4:45	30
7:46-8:00	6	4:46-5:00	17
8:01-8:15	14	5:01-5:15	21
8:16-8:30	16	5:16-5:30	27
8:31-8:45	7	5:31-5:45	17
8:46-90	6	5:46-6:00	27
Total	61	Total	167

CMS

In

Out

* 7:00 IIII (4)

HT HT HT HT HT (14)

* 15 IIII (4)

HT HT HT HT HT (6)

* 30 HT HT (6)

HT HT (5)

* 45 HT HT HT HT (10)

HT HT (5)

* 8:00 HT HT HT HT HT (14)

HT HT HT HT HT (9)

* 15 HT HT HT HT HT (13)

HT HT HT HT HT (7)

* 30 HT HT HT HT HT (10)

HT HT (2)

* 45 HT HT HT HT HT (7)

HT HT HT HT HT (8)

68

56

In:

* 7:00 ~~III~~ IIII (4)
 * :15 IIII (5)
 * :30 IIII (6)
 * :45 IIII IIII (10)
 * 8:00 IIII IIII IIII (14)
 * :15 IIII IIII IIII (15)
 * :30 IIII IIII (10)
 * :45 IIII II (7)

71

Out:

III IIII ~~IIII~~ IIII (14)
 IIII (7)
 IIII (5)
 IIII (6)
 IIII IIII (9)
 IIII II (7)
 II (2)
 IIII IIII (8)

58

In

Out

Time

4:00	(13)	(6)
15	(20)	(13)
30	(39)	(18)
45	(20)	(16)
5:00	(25)	(18)
(25) 15	(29)	(29)
30	(26)	(22)
31 45		(23)

In

Out

Crs

4

4:00

||||| (13)

||| (6)

15

||||| (17)

||||| (13)

30

||||| ||| (33)

||||| ||| (16)

45

||||| (16)

||||| (14)

5:00

||||| || (22)

||||| (16)

15

||||| || (32)

||||| || (23)

30

||||| (19)

||||| (20)

45

||||| (26)

||||| (17)



TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS.

In		Out	
4	12	7	7
4:15	12	13	13
4:30	20	13	13
4:45	20	16	14
5:00	38	35	
5:15	21	17	14
↑		↑	
People		Cars	
5:00	25	18	18
5:15	35	29	24
5:30	19	21	20
5:45	31	26	18