

Poole Road Assemblage
Traffic Impact Analysis
Knightdale, North Carolina

TRAFFIC IMPACT ANALYSIS

FOR

POOLE ROAD ASSEMBLAGE

LOCATED

IN

KNIGHTDALE, NC

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10/14/2022

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RKA Project No. 22069

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TABLE OF CONTENTS

- 1. INTRODUCTION 1**
 - 1.1. Site Location and Study Area.....2
 - 1.2. Proposed Land Use and Site Access2
 - 1.3. Adjacent Land Uses2
 - 1.4. Existing Roadways3
- 2. 2022 EXISTING PEAK HOUR CONDITIONS..... 7**
 - 2.1. 2022 Existing Peak Hour Traffic Volumes7
 - 2.2. Analysis of 2022 Existing Peak Hour Traffic Conditions.....7
- 3. 2027 NO-BUILD PEAK HOUR CONDITIONS 9**
 - 3.1. Ambient Traffic Growth9
 - 3.2. Adjacent Development Traffic9
 - 3.3. Future Roadway Improvements 10
 - 3.4. 2027 No-Build Peak Hour Traffic Volumes 11
 - 3.5. Analysis of 2027 No-Build Peak Hour Traffic Conditions..... 11
- 4. SITE TRIP GENERATION AND DISTRIBUTION..... 15**
 - 4.1. Trip Generation..... 15
 - 4.2. Site Trip Distribution and Assignment 15
- 5. 2027 BUILD TRAFFIC CONDITIONS 21**
 - 5.1. 2027 Build Peak Hour Traffic Volumes 21
 - 5.2. Analysis of 2027 Build Peak Hour Traffic Conditions 21
- 6. 2036 FUTURE TRAFFIC CONDITIONS 24**
 - 6.1. 2036 Future Peak Hour Traffic Volumes 24
 - 6.2. Analysis of 2036 Future Peak Hour Traffic 24
- 7. TRAFFIC ANALYSIS PROCEDURE..... 27**
 - 7.1. Adjustments to Analysis Guidelines 27
- 8. CAPACITY ANALYSIS 28**
 - 8.1. Poole Road [EB-WB] and Smithfield Road [NB-SB] 28
 - 8.2. Smithfield Road [NB-SB] and Sandy Run [EB-WB] 30

8.3. Smithfield Road [NB-SB] and I-87 (US 64/264) Eastbound Ramps [EB]..... 31

8.4. Smithfield Road [NB-SB] and I-87 (US 64/264) Westbound Ramps [WB]..... 33

8.5. Smithfield Road [NB-SB] and Major Slade Road [EB-WB] 35

8.6. Poole Road [EB-WB] and Major Slade Road [NB]..... 36

8.7. Poole Road [EB-WB] and Site Drive 1 [SB]..... 37

8.8. Poole Road [EB-WB] and Site Drive 2 [SB]..... 39

9. CONCLUSIONS 41

10. RECOMMENDATIONS..... 43

LIST OF FIGURES

Figure 1 – Site Location Map..... 4

Figure 2 – Preliminary Site Plan..... 5

Figure 3 – Existing Lane Configurations 6

Figure 4 – 2022 Existing Peak Hour Traffic..... 8

Figure 5 – 2027 Projected Peak Hour Traffic12

Figure 6 – Adjacent Development Trips13

Figure 7 – 2027 No-Build Peak Hour Traffic.....14

Figure 8a – Site Trip Distribution – Scenario 117

Figure 8b – Site Trip Distribution – Scenario 218

Figure 9a –Site Trip Assignment – Scenario 119

Figure 9b –Site Trip Assignment – Scenario 220

Figure 10a – 2027 Build Peak Hour Traffic – Scenario 1.....22

Figure 10a – 2027 Build Peak Hour Traffic – Scenario 2.....23

Figure 11b – 2036 Future Peak Hour Traffic – Scenario 125

Figure 11b – 2036 Future Peak Hour Traffic – Scenario 226

Figure 12a – Recommended Lane Configurations – Scenario 146

Figure 12b – Recommended Lane Configurations – Scenario 247

LIST OF TABLES

Table 1: Existing Roadway Inventory 3

Table 2: Adjacent Development Information.....10

Table 3: Trip Generation Summary15

Table 4: Highway Capacity Manual – Levels-of-Service and Delay27

Table 5: Analysis Summary of Poole Road and Smithfield Road28

Table 6: Analysis Summary of Smithfield Road and Sandy Run.....30

Table 7: Analysis Summary of Smithfield Road and I-87 (US 64/264) Eastbound Ramps31

Table 8: Analysis Summary of Smithfield Road and I-87 (US 64 / 264) Westbound Ramps33

Table 9: Analysis Summary of Smithfield Road and Major Slade Road35

Table 10: Analysis Summary of Poole Road and Major Slade Road36

Table 11: Analysis Summary of Poole Road and Site Drive 137

Table 12: Analysis Summary of Poole Road and Site Drive 239

TECHNICAL APPENDIX

- Appendix A: Scoping Documentation
- Appendix B: Traffic Counts
- Appendix C: Signal Plans
- Appendix D: Adjacent Development Information
- Appendix E: Future Roadway Improvements
- Appendix F: Capacity Calculations - Poole Road and Smithfield Road
- Appendix G: Capacity Calculations - Smithfield Road and Sandy Run
- Appendix H: Capacity Calculations - Smithfield Road and I-87 (US 64/264) Eastbound Ramps
- Appendix I: Capacity Calculations - Smithfield Road and I-87 (US 64/264) Westbound Ramps
- Appendix J: Capacity Calculations - Smithfield Road and Major Slade Road
- Appendix K: Capacity Calculations - Poole Road and Major Slade Road
- Appendix L: Capacity Calculations - Poole Road and Site Drive 1
- Appendix M: Capacity Calculations - Poole Road and Site Drive 2
- Appendix N: SimTraffic Queuing Reports

TRAFFIC IMPACT ANALYSIS
POOLE ROAD ASSEMBLAGE
KNIGHTDALE, NORTH CAROLINA

1. INTRODUCTION

The contents of this report present the findings of the Traffic Impact Analysis (TIA) conducted for the proposed Poole Road Assemblage development to be located in the northeast quadrant of the intersection of Poole Road at Smithfield Road in Knightdale, North Carolina. The purpose of this study is to determine the potential impacts to the surrounding transportation system created by traffic generated by the proposed development, as well as recommend improvements to mitigate the impacts.

The proposed development, anticipated to be completed by 2026, is assumed to consist of a maximum of 246 single-family homes. It should be noted that the site plan includes a mixture of single-family homes and townhomes; however, all units were studied as single-family homes for a conservative analysis.

Per the Town of Knightdale (Town) guidelines, a future analysis year of one year beyond build-out (2027) and ten years beyond build-out (2036) was considered. Additionally, this study analyzes two (2) build scenarios: Scenario 1 analyzes both Site Drive 1 and Site Drive 2 as full movement intersections and Scenario 2 analyzes Site Drive 1 as a full movement intersection and Site Drive 2 as a right-in/right-out intersection. The study analyzes traffic conditions during the weekday AM and PM peak hours for the following scenarios:

- 2022 Existing Traffic Conditions
- 2027 No-Build Traffic Conditions
- 2027 Build Traffic Conditions – Scenario 1
- 2027 Build Traffic Conditions – Scenario 2
- 2036 Future Traffic Conditions – Scenario 1 – Per Town UDO (with STIP I-6007 Improvements)
- 2036 Future Traffic Conditions – Scenario 2 – Per Town UDO (with STIP I-6007 Improvements)

1.1. Site Location and Study Area

The development is proposed to be located to be located in the northeast quadrant of the intersection of Poole Road at Smithfield Road in Knightdale, North Carolina. Refer to Figure 1 for the site location map.

The study area for the TIA was determined through coordination with the North Carolina Department of Transportation (NCDOT) and the Town of Knightdale (Town) and consists of the following existing intersections:

- Poole Road and Smithfield Road
- Smithfield Road and Sandy Run
- Smithfield Road and I-87 (US 64 / US 264) Eastbound Ramps
- Smithfield Road and I-87 (US 64 / US 264) Westbound Ramps
- Smithfield Road and Major Slade Road
- Poole Road and Major Slade Road

Refer to Appendix A for the approved scoping documentation.

1.2. Proposed Land Use and Site Access

The site is expected to be located in the northeast quadrant of the intersection of Poole Road at Smithfield Road. The proposed development, anticipated to be completed by 2026, is assumed to consist of a maximum of 246 single-family homes.

This study analyzes two (2) build scenarios: Scenario 1 analyzes both Site Drive 1 and Site Drive 2 as full movement intersections along Poole Road and Scenario 2 analyzes Site Drive 1 as a full movement intersection and Site Drive 2 as a right-in/right-out intersection, both along Poole Road. Refer to Figure 2 for a copy of the preliminary site plan.

1.3. Adjacent Land Uses

The proposed development is located in an area consisting primarily of undeveloped land and residential development.

1.4. Existing Roadways

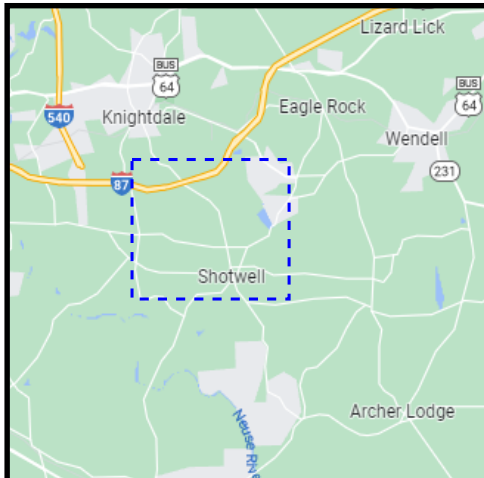
Existing lane configurations (number of traffic lanes on each intersection approach), lane widths, storage capacities, and other intersection and roadway information within the study area are shown in Figure 3. Table 1 provides a summary of this information, as well.

Table 1: Existing Roadway Inventory

Road Name	Route Number	Typical Cross Section	Speed Limit	2019 AADT (vpd)
Poole Road	SR 1007	2-lane undivided	55 mph	3,000
Smithfield Road	SR 2233	2-lane undivided	45 mph	14,000*
Sandy Run	SR 2685	2-lane undivided	25 mph	2,800**
I-87 (US 64 / US 264)		6-lane divided	70 mph	71,000
Major Slade Road	SR 2506	2-lane undivided	55 mph (assumed)	4,620**

*ADT from 2017

**ADT based on the traffic counts from 2022 and assuming the weekday PM peak hour volume is 10% of the average daily traffic.

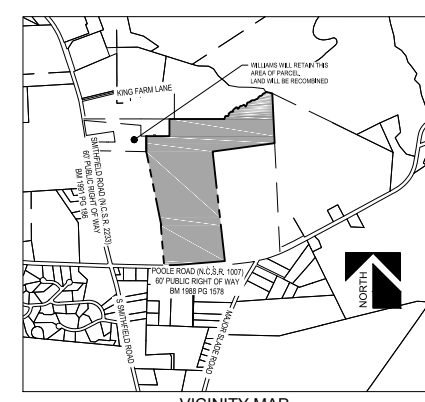


LEGEND	
	Proposed Site Location
	Study Intersection
	Study Area

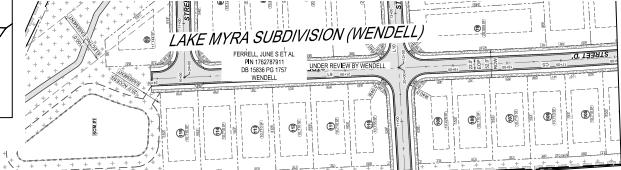


Poole Road Assemblage
Knightdale, NC

Site Location Map	
Scale: Not to Scale	Figure 1



VICINITY MAP
SCALE: 1" = 100'



LAKE MYRA SUBDIVISION (WENDELL)

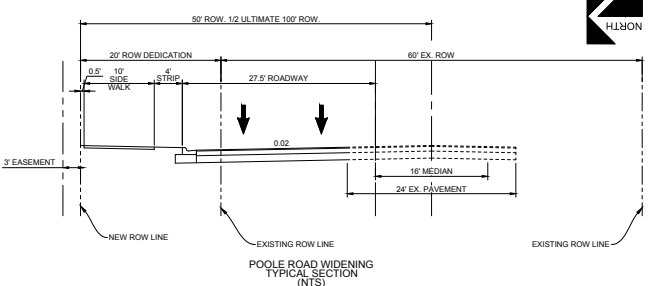
LEGEND

- ON STREET PARKING-STRIPED
- TYPICAL MEDIANS
- STREAM BUFFER
- PERIMETER BUFFER
- TREE SAVE
- POND
- ACTIVE OPEN SPACE (AOS)
- PASSIVE OPEN SPACE (POS)
- PUBLIC GREENWAY
- 35' SINGLE FAMILY
- 60' SINGLE FAMILY
- TOWNHOUSE
- DISC GOLF COURSE
- OPEN SPACE LABEL

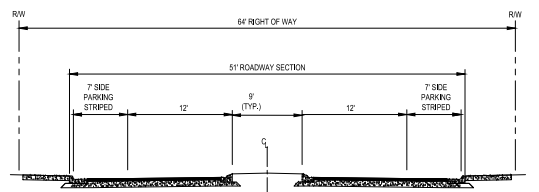
OPEN SPACE

#	ACTIVE (SF)	PASSIVE (SF)	DESCRIPTION
OS-1	9,119		ENHANCED LANDSCAPING, SIDEWALK, BENCHES
OS-2	10,120		GATEWAY LANDSCAPING, PUBLIC ART
OS-3	47,698		CLUBHOUSE (MIN. 1,500 SF), RESORT STYLE POOL, PLAYGROUND, BIKE RACKS, PAVILION
OS-4	4,950		ENHANCED LANDSCAPING, ENHANCED MEANDERING SIDEWALK, BENCHES, PUBLIC ART
OS-5	10,297		ENHANCED LANDSCAPING, ENHANCED MEANDERING SIDEWALK, BENCHES, PUBLIC ART
OS-6	11,487		ENHANCED LANDSCAPING, ENHANCED MEANDERING SIDEWALK, BENCHES, PUBLIC ART, SWING PARK, PAVILION
OS-7	33,514		ENHANCED LANDSCAPING, ENHANCED MEANDERING SIDEWALK NETWORK, BENCHES
OS-8	26,246		ENHANCED LANDSCAPING, ENHANCED MEANDERING SIDEWALK, BENCHES, PUBLIC ART, SWING PARK, PAVILION
OS-9	7,564		ENHANCED LANDSCAPING, ENHANCED SIDEWALK NETWORK, BENCHES, SWING PARK
OS-10	9,471		ENHANCED LANDSCAPING
OS-11	5,450		ENHANCED ROADSIDE LANDSCAPING
OS-12	174,351		9-HOLE DISC GOLF COURSE, MONARCH BUTTERFLY WAY STATION, NATIVE PLANTINGS AND EDUCATIONAL SIGNAGE, BIKE RACKS
OS-13	19,344		DISC GOLF COURSE
OS-14	23,390		ENHANCED ROADSIDE LANDSCAPING
OS-15	11,004		SWING PARK, PAVILION
OS-16	15,896		PLAYGROUND, BIKE RACKS, PAVILION
TOTAL	241,393		ACTIVE (SF)
TOTAL	5.54		ACTIVE (AC)
TOTAL		178,508	PASSIVE (SF)
TOTAL		4.10	PASSIVE (AC)

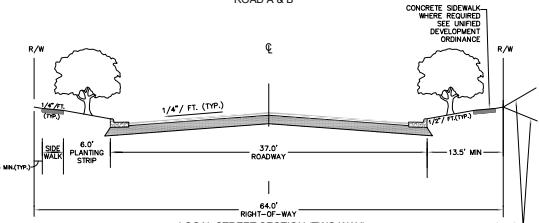
- NOTES:**
- IN ORDER TO PROVIDE FLEXIBILITY DURING FINAL DESIGN, PUBLIC ART, PAVILION, PLAYGROUND AND SWING PARK ARE LISTED IN MULTIPLE LOCATIONS.
 - THE OVERALL PROJECT WILL PROVIDE A MINIMUM OF ONE(1) EACH OF THESE THREE ELEMENTS. ALL OTHER ITEMS WILL BE PROVIDED AS LISTED IN THE TABLE ABOVE IF SHOWN IN MULTIPLE LOCATIONS.
 - ENHANCED SIDEWALKS - IN ORDER TO PROVIDE A UNIQUE PEDESTRIAN STREET SCAPES, PUBLIC SIDEWALKS WITHIN THE RIGHT-OF-WAY WILL BE REPLACED BY ENHANCED MEANDERING SIDEWALKS WITHIN OPEN SPACE AREA. THESE SIDEWALKS WILL BE MAINTAINED BY THE HOME'S OWNERS ASSOCIATION AND WILL BE LOCATED WITHIN A PUBLIC SIDEWALK EASEMENT.



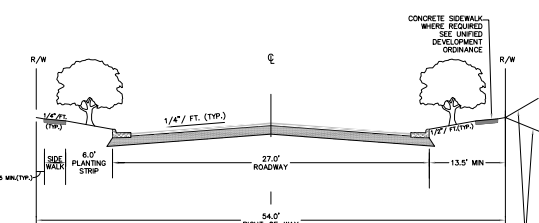
POOLER ROAD WIDENING TYPICAL SECTION (NTS)



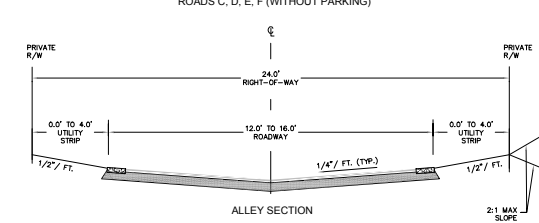
MAIN STREET SECTION SIDE PARKING W/MEDIAN (TWO WAY) ROAD A & B



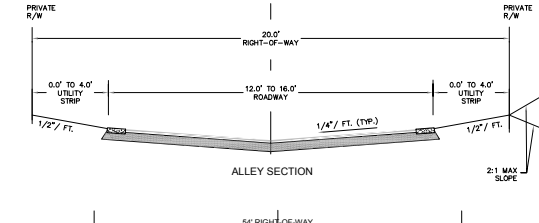
LOCAL STREET SECTION (TWO WAY) ROAD H



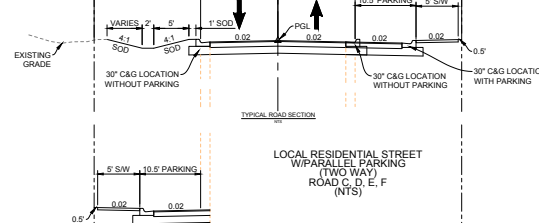
LOCAL STREET SECTION (TWO WAY) ROADS G, I, J, K, L, M



LOCAL STREET SECTION (TWO WAY) ROADS C, D, E, F (WITHOUT PARKING)



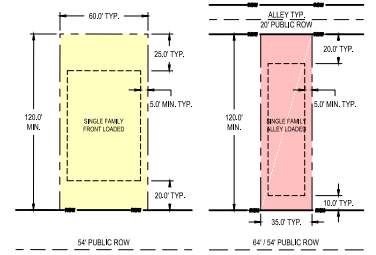
ALLEY SECTION



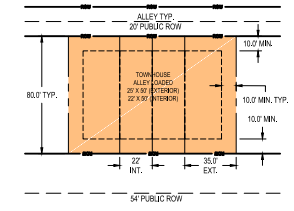
ALLEY SECTION



LOCAL RESIDENTIAL STREET (TWO WAY) ROAD C, D, E, F (NTS)



TYPICAL LOT LAYOUTS
SCALE: 1" = 40'



TYPICAL LOT LAYOUTS
SCALE: 1" = 40'

SITE DATA TABLE

OWNER: Kevin D Williams and Debbie A. Williams
Smithfield-Pooler Holdings LLC

DEVELOPER: D.R. Horton

PIN#	AREA (AC)	AREA (SF)
1762595569	6.06	263,992
1762592868	58.19	2,534,845
1762577131	4.33	186,710
1762483243	0.76	33,519
GROSS AREA	79.35	3,191,026
NET AREA	0.46	19,919
NET AREA	72.80	3,171,107

EXISTING ZONING
EXISTING USE/VACANT/AG

PROPOSED ZONING/PLD-GRE8
PROPOSED USE/SF RESIDENTIAL

FRONT LOAD 60' SINGLE FAMILY	85
ALLEY LOAD 35' SINGLE FAMILY	124
ALLEY LOAD TOWNHOMES	37
TOTAL	246
DENSITY DUA/C	3.4
MAXIMUM DENSITY DUA/C	

CONNECTIVITY INDEX: 1.7

TREE SAVE AREA
REQUIRED (AS20N AC): 7.28
PROVIDED (AC): 7.30

NATURAL RESOURCES INVENTORY

STREAM BUFFER	4.7 AC
WETLANDS	0.05 AC
FOREST COVER	37 AC

OPEN SPACE

UNITS	FACTOR	BEDS	
TOTAL BEDS OUTSIDE 1/2 MILE	246	3.5	861
(SF) TOTAL SF TOTAL AC			
OPEN SPACE CALC	520	447,720	10.28
REDUCTION	25%	335,790	7.71
REQUIRED ACTIVE OPEN SPACE	187,895	3.85	
REQUIRED PASSIVE OPEN SPACE	167,895	3.85	

PROVIDED OPEN SPACE

ACTIVE OPEN SPACE	240,892	SF	5.53	AC
PASSIVE OPEN SPACE	174,561	SF	4.01	AC
TOTAL	415,453	SF	9.54	AC

ADDITIONAL OPEN SPACE

	SF	0.00	AC
--	----	------	----

ENVIRONMENTAL OPEN SPACE

	SF	4.86	AC	
TOTAL OPEN SPACE	1,042,558	SF	23.93	AC
% TOTAL OPEN SPACE			32.9%	

SETBACKS

FRONT LOAD SINGLE FAMILY	30
SIDE (FT)	5
CORNER SIDE (FT)	5
REAR (FT)	25
MIN FRONT LOT WIDTH (FT)	60
MIN AREA (SF)	3500
ALLEY LOAD 35' SINGLE FAMILY	10
SIDE (FT)	5
CORNER SIDE (FT)	5
REAR (FT)	20
MIN FRONT LOT WIDTH (FT)	35
MIN AREA (SF)	1750

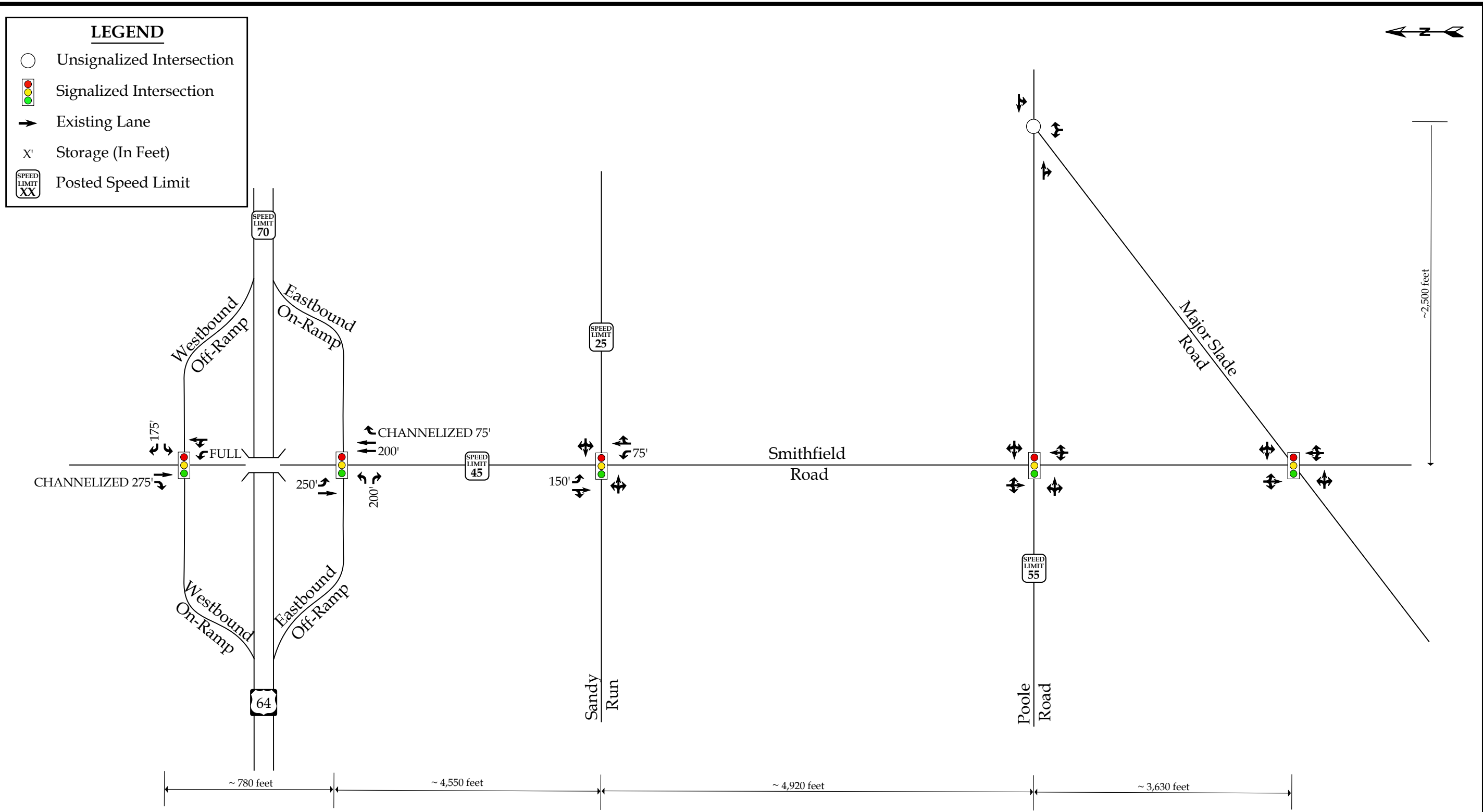
WATER ALLOCATION

	PTS
MAJOR SUBDIVISION	15
ARCHITECTURAL	15
PUBLIC ART	4
FOUNTAIN IN BMP/SCM	4
ON-STREET PARKING	4
ENHANCED ROADSIDE LANDSCAPE	2
DISC/PATIO GREATER THAN 3000 SF	3
TOT LOT W/ WIP/MA PLAYGROUND EQUIPMENT	4
9-HOLE DISC GOLF COURSE	4
TOTAL	55

- NOTES:**
- STREETS TREES TO BE PROVIDED EVERY 40 FT
 - A PORTION OF THE SITE IS LOCATED WITHIN THE POPLAR CREEK WATERSHED WITHIN THE NEUSE RIVER BASIN. A PORTION OF THE SITE IS LOCATED WITHIN LAKE MYRA BASIN, NSW, WITHIN THE NEUSE RIVER BASIN.
 - SITE IS NOT WITHIN FEMA FLOOD PLAIN PER MAPS 3720176200J (5/02/2006) AND 3720176300J (5/02/2006).
- NOTE: DEVELOPER IS PROPRIETOR OF 50% AND CORNER SETBACKS AND 25' REAR SETBACKS WITH PLD

KNIGHTDALE ASSEMBLY

THIS DOCUMENT, TOGETHER WITH THE CONCEPTS AND DESIGNS PRESENTED HEREIN, AS AN INSTRUMENT OF SERVICE, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DOCUMENT WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY BGE INC. SHALL BE WITHOUT LIABILITY TO BGE INC.



Poole Road Assemblage
Knightdale, NC

2022 Existing
Lane Configurations

Scale: Not to Scale Figure 3

2. 2022 EXISTING PEAK HOUR CONDITIONS

2.1. 2022 Existing Peak Hour Traffic Volumes

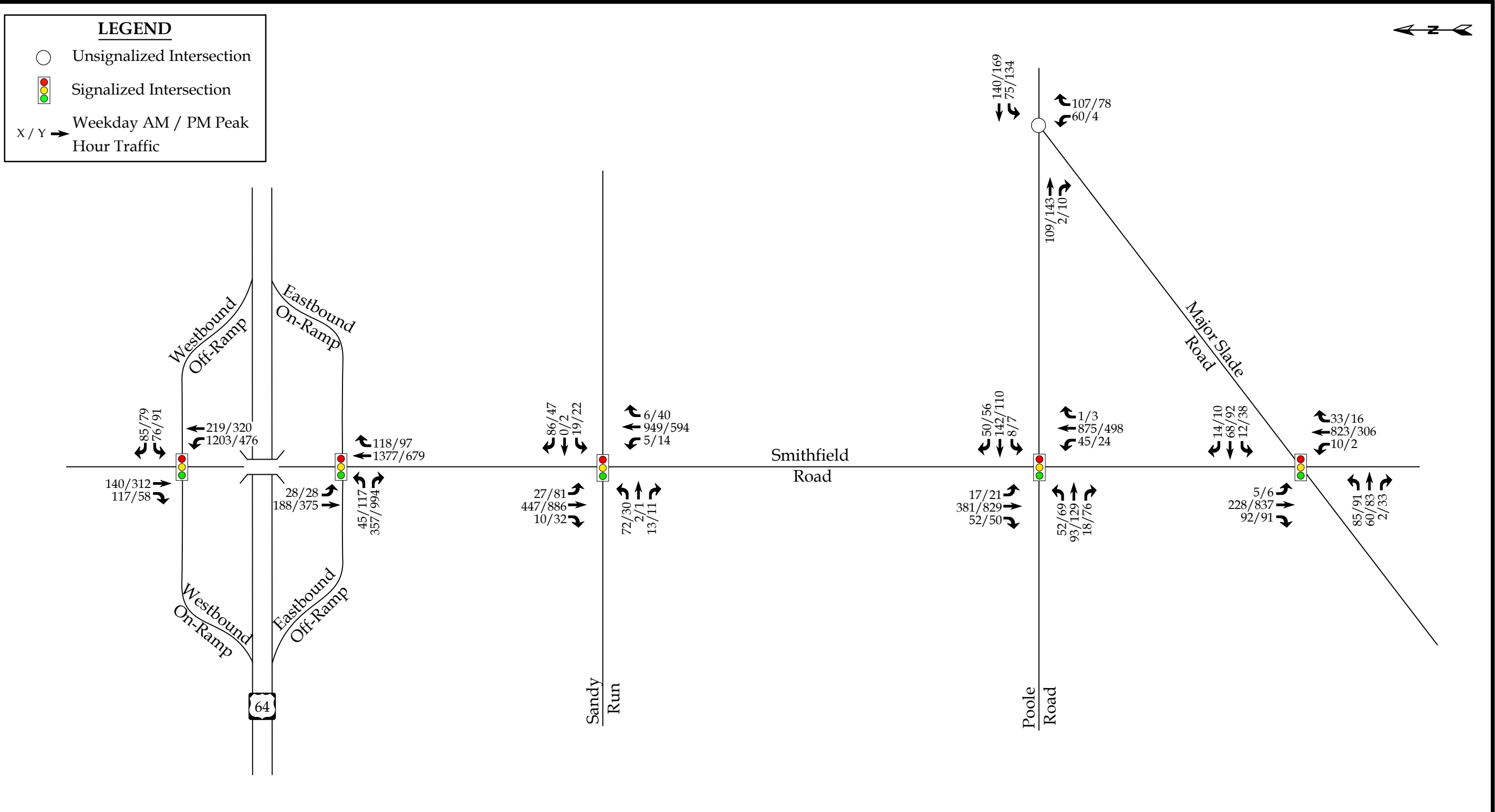
Existing peak hour traffic volumes were determined based on traffic counts conducted at the study intersections listed below, in January and March of 2022 during a typical weekday AM (7:00 AM – 9:00 AM) and PM (4:00 PM – 6:00 PM) peak periods while schools were in session for in-person learning:

- Poole Road and Smithfield Road
- Smithfield Road and Sandy Run
- Smithfield Road and I-87 (US 64 / US 264) Eastbound Ramps
- Smithfield Road and I-87 (US 64 / US 264) Westbound Ramps
- Smithfield Road and Major Slade Road
- Poole Road and Major Slade Road

Weekday AM and PM traffic volumes were balanced between study intersections, where appropriate. Refer to Figure 4 for 2022 existing weekday AM and PM peak hour traffic volumes. A copy of the count data is located in Appendix B of this report.

2.2. Analysis of 2022 Existing Peak Hour Traffic Conditions

The 2022 existing weekday AM and PM peak hour traffic volumes were analyzed to determine the current levels of service at the study intersections under existing roadway conditions. Signal information was obtained from NCDOT and is included in Appendix C. The results of the analysis are presented in Section 8 of this report.



Note: Based on NCDOT Congestion Management guidelines, a volume of 4 vehicles per hour (vph) was analyzed for any movement with less than 4 vph.



Poole Road Assemblage
Knightdale, NC

2022 Existing
Peak Hour Traffic

Scale: Not to Scale Figure 4

3. 2027 NO-BUILD PEAK HOUR CONDITIONS

In order to account for growth of traffic and subsequent traffic conditions at a future year, no-build traffic projections are needed. No-build traffic is the component of traffic due to the growth of the community and surrounding area that is anticipated to occur regardless of whether or not the proposed development is constructed. No-build traffic is comprised of existing traffic growth within the study area and additional traffic created as a result of adjacent approved developments.

3.1. Ambient Traffic Growth

Through coordination with the Town and NCDOT, it was determined that an annual growth rate of 3% would be used to generate 2027 projected weekday AM and PM peak hour traffic volumes. Refer to Figure 5 for 2027 projected peak hour traffic.

3.2. Adjacent Development Traffic

Through coordination with the Town and NCDOT, the following adjacent developments were identified to be included as an approved adjacent development in this study:

- Lake Myra
- Baker Roofing
- Poole Road Marin
- Poole at Smithfield

Table 2, on the following page, provides a summary of the adjacent developments.

Table 2: Adjacent Development Information

Development Name	Location	Build-Out Year	Land Use / Intensity	TIA Performed
Lake Myra	North of Poole Road, west of Lake Myra Road	2025	177 townhomes 225 single-family homes	May 2021 by RKA
Baker Roofing	Northwest quadrant of the US 64-264 at Smithfield Road interchange	2026	220,000 Warehouse 145,000 Specialty Trade 16 f.p. gas station 22,000 general retail 20,000 general office 4,000 s.f. FF w/ DT 200-room hotel	March 2022 by KHA
Poole Road Martin	Along Poole Road	2025	185 single-family homes	<i>N/A Trips generated and applied to roadway network</i>
Poole at Smithfield – Phase 1	North of Poole Road, along both sides of Smithfield Road	2025	187 townhomes 47 single family homes	<i>N/A Trips generated and applied to roadway network</i>

It should be noted that the adjacent developments were approved, during scoping, by the Town and NCDOT. Adjacent development trips are shown in Figure 6. Adjacent development information can be found in Appendix D.

3.3. Future Roadway Improvements

Based on coordination with the NCDOT and the Town, it was determined that the roadway improvements associated with the State Transportation Improvement Program (STIP) projects I-6007 and HL-0031 are to be considered in this study. STIP I-6007 is expected to convert the US 264 interchange at Smithfield Road to a diverging diamond interchange, while STIP HL-0031 is expected to improve the intersection of Poole Road and Smithfield Road by adding exclusive left-turn lanes at the intersection. Future roadway improvements associated

with this STIP project will be analyzed under 2036 future traffic conditions, as the project is not currently funded for construction. Additionally, future roadway improvements associated with the adjacent developments will be analyzed under future conditions.

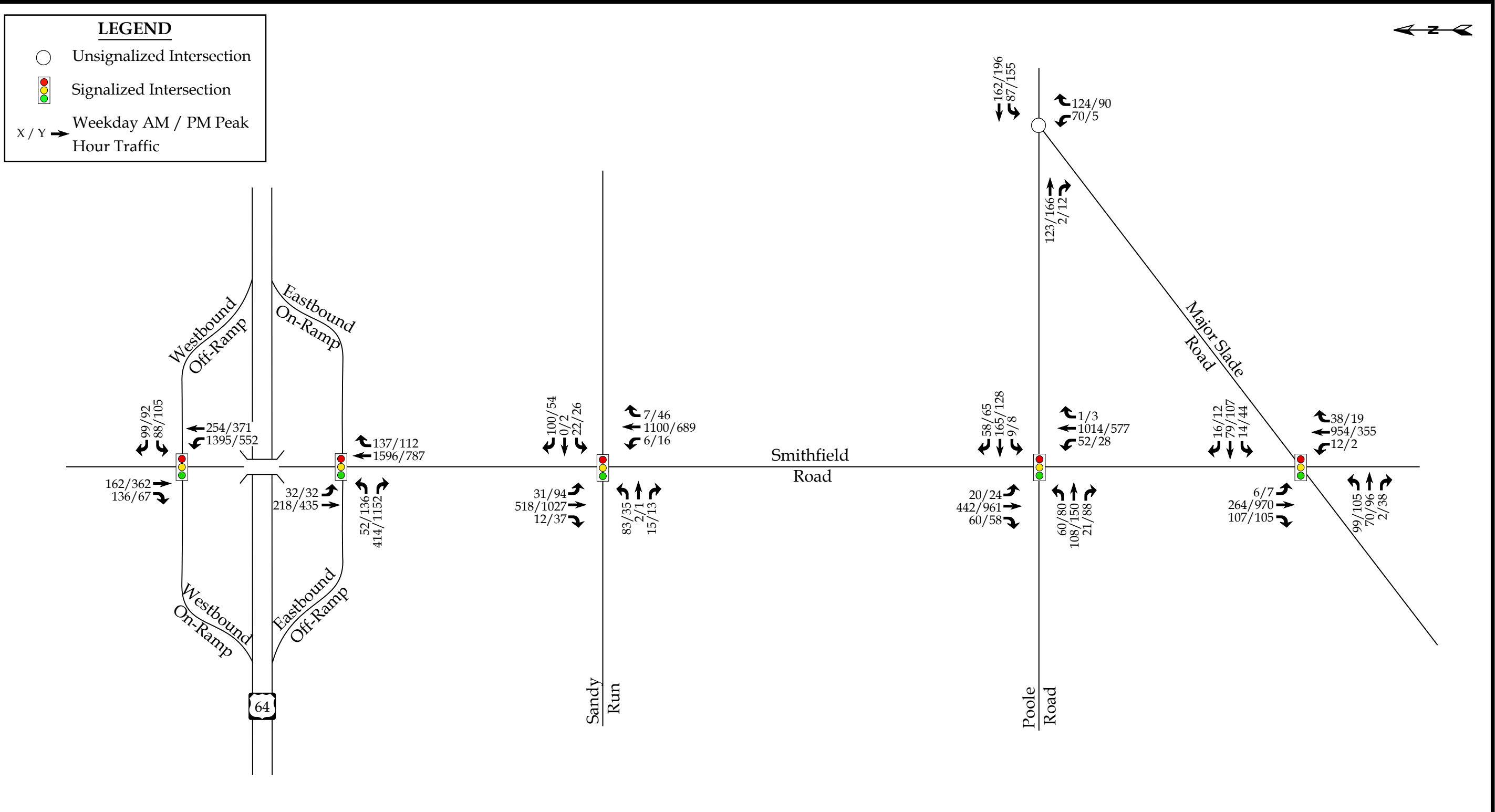
The STIP I-6007 plans can be found in Appendix E.

3.4. 2027 No-Build Peak Hour Traffic Volumes

The 2027 no-build traffic volumes were determined by projecting the 2022 existing peak hour traffic to the year 2027, and adding the adjacent development trips. Refer to Figure 7 for an illustration of the 2027 no-build peak hour traffic volumes at the study intersections.

3.5. Analysis of 2027 No-Build Peak Hour Traffic Conditions

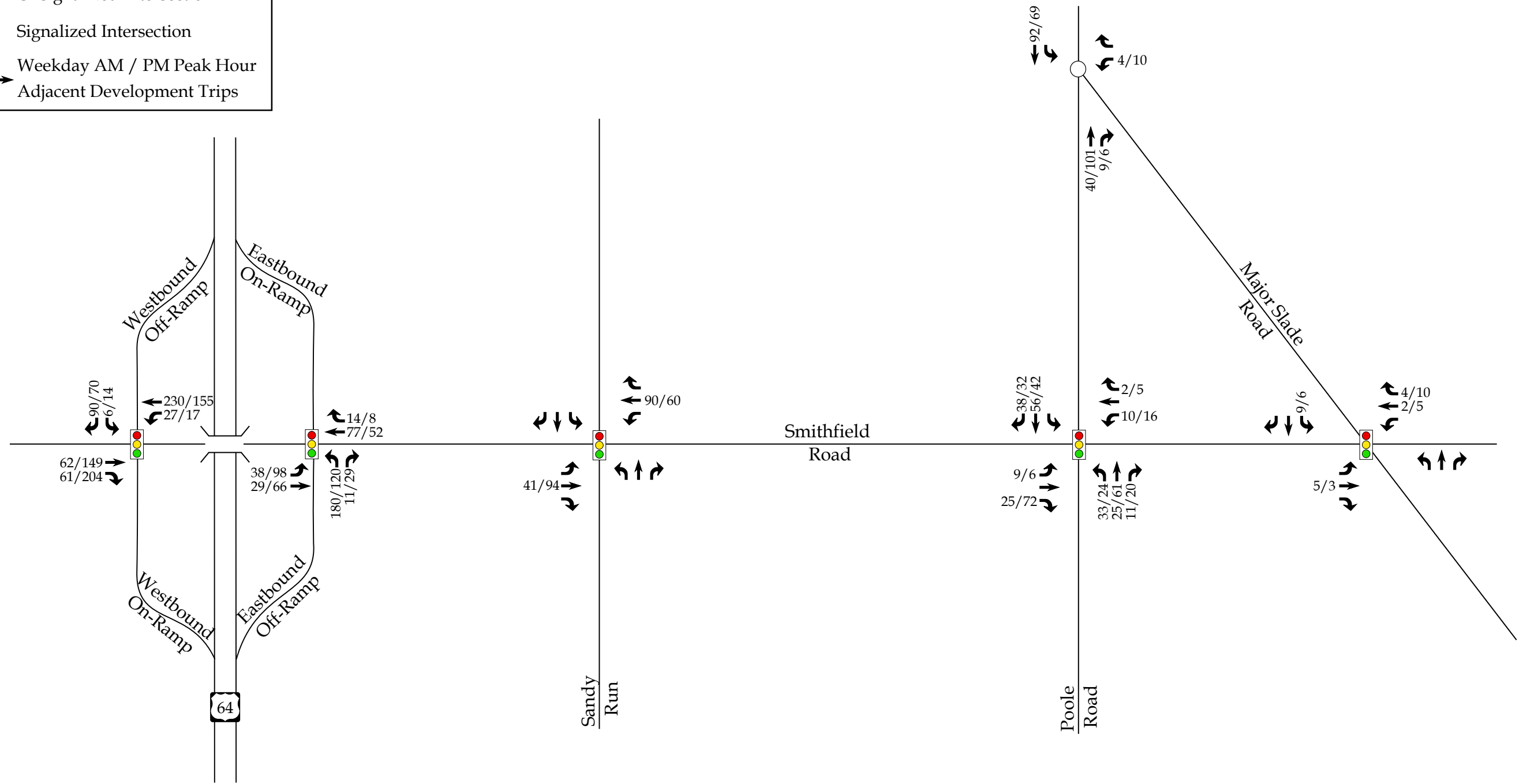
The 2027 no-build AM and PM peak hour traffic volumes at the study intersections were analyzed with future geometric roadway conditions and traffic control. The analysis results are presented in Section 8 of this report.



	Poole Road Assemblage Knightdale, NC	2027 Projected Peak Hour Traffic	
		Scale: Not to Scale	Figure 5

LEGEND

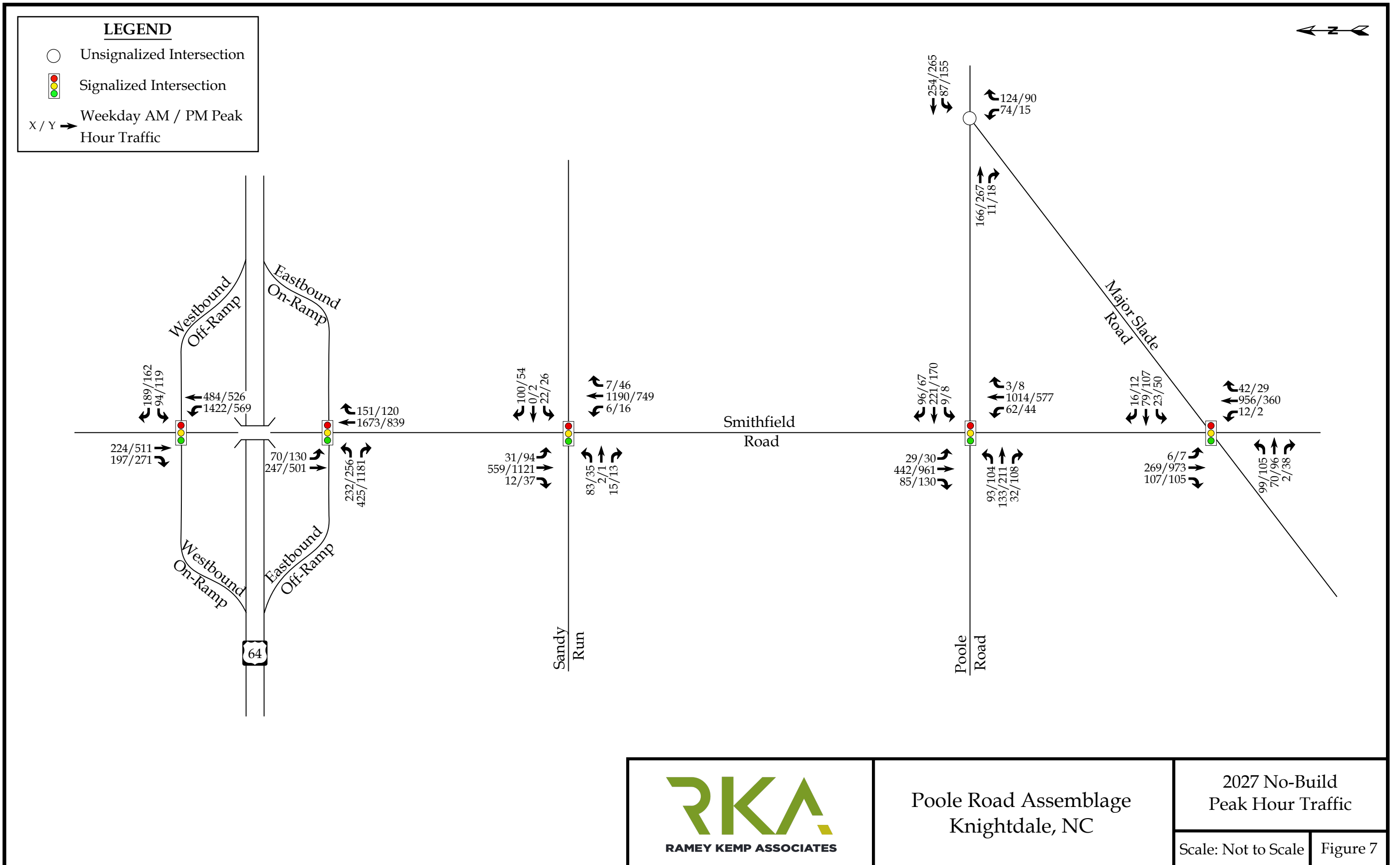
- Unsignalized Intersection
- 🚦 Signalized Intersection
- X / Y → Weekday AM / PM Peak Hour Adjacent Development Trips



Poole Road Assemblage
Knightdale, NC

Peak Hour Adjacent
Development Trips

Scale: Not to Scale Figure 6



Poole Road Assemblage
Knightdale, NC

2027 No-Build
Peak Hour Traffic

Scale: Not to Scale

Figure 7

4. SITE TRIP GENERATION AND DISTRIBUTION

4.1. Trip Generation

The proposed development is assumed to consist of a maximum of 246 single family homes. It should be noted that the site plan includes a mixture of single family homes and townhomes; however, all units were studied as single family homes for a conservative analysis. Average weekday daily, AM peak hour, and PM peak hour trips for the proposed development were estimated using methodology contained within the ITE *Trip Generation Manual*, 11th Edition. Table 3 provides a summary of the trip generation potential for the site.

Table 3: Trip Generation Summary

Land Use (ITE Code)	Intensity	Daily Traffic (vpd)	Weekday AM Peak Hour Trips (vph)		Weekday PM Peak Hour Trips (vph)	
			Enter	Exit	Enter	Exit
Single-Family Homes (210)	246 Units	2,310	44	125	146	86

It is estimated that the proposed development will generate approximately 2,310 total site trips on the roadway network during a typical 24-hour weekday period. Of the daily traffic volume, it is anticipated that 169 trips (44 entering and 125 exiting) will occur during the weekday AM peak hour and 232 (146 entering and 86 exiting) will occur during the weekday PM peak hour.

4.2. Site Trip Distribution and Assignment

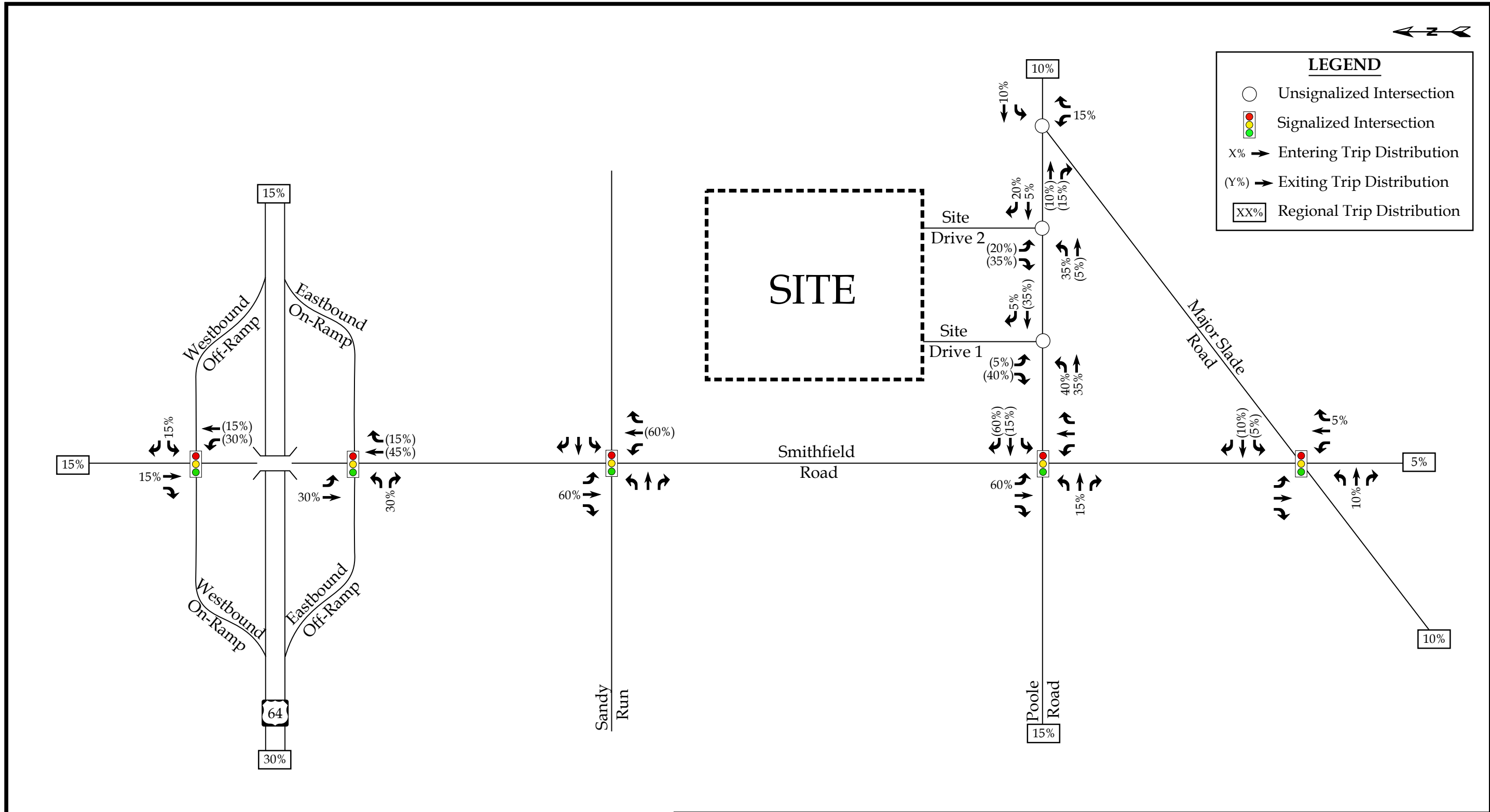
Trip distribution percentages used in assigning site traffic for this development were estimated based on a combination of existing traffic patterns, population centers adjacent to the study area, and engineering judgment.

It is estimated that the site trips will be regionally distributed as follows:

- 15% to/from the east via I-87 (US 64 / US 264)
- 30% to/from the west via I-87 (US 64 / US 264)
- 15% to/from the north via Smithfield Road
- 5% to/from the south via Smithfield Road
- 15% to/from the west via Poole Road

- 10% to/from the east via Poole Road

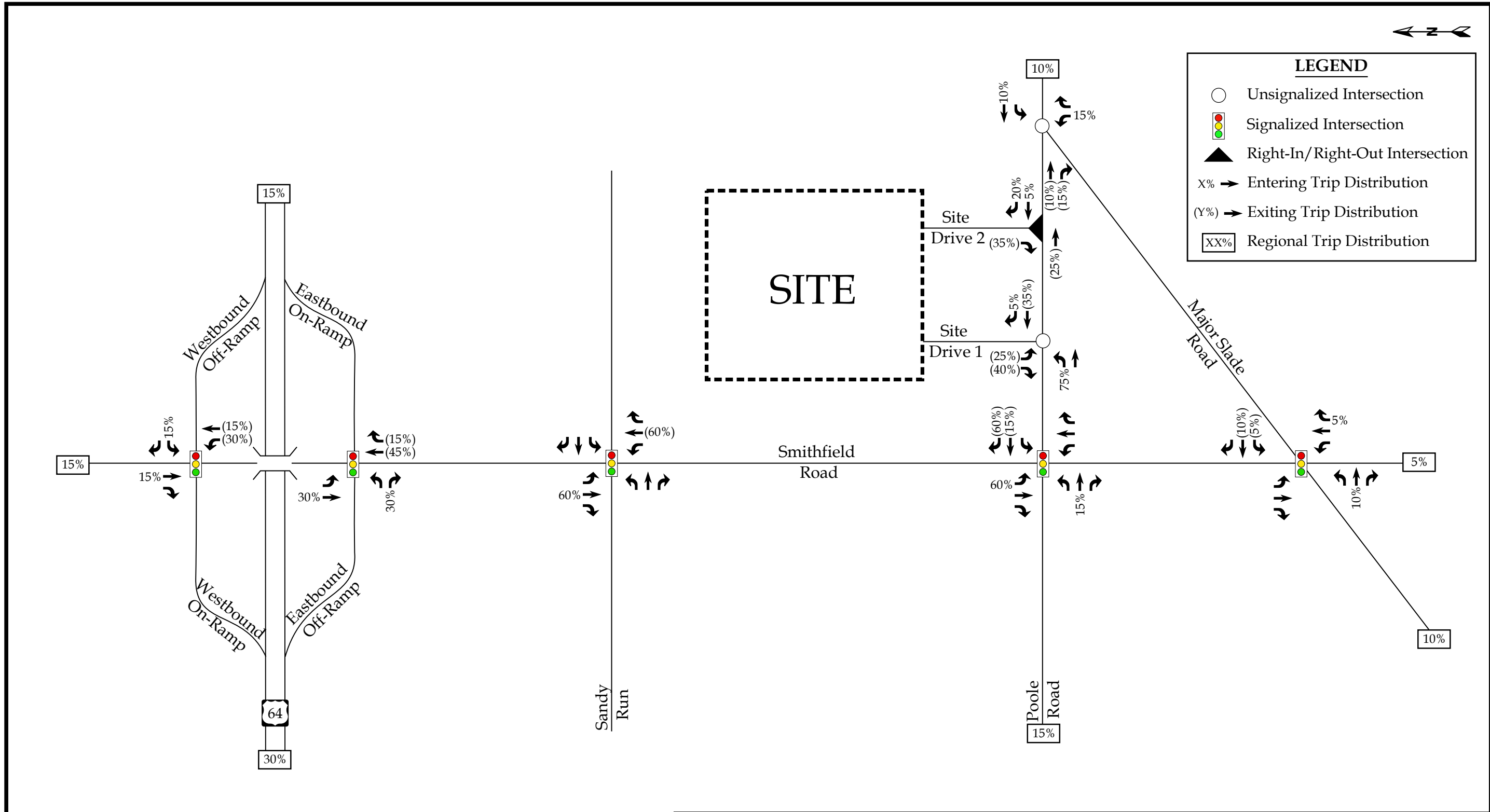
The site trip distribution for Scenarios 1 and 2 are shown in Figures 8a and 8b, respectively. Refer to Figure 9a and 9b for the site trip assignment for Scenarios 1 and 2.



Poole Road Assemblage
Knightdale, NC

Site Trip Distribution
- Scenario 1

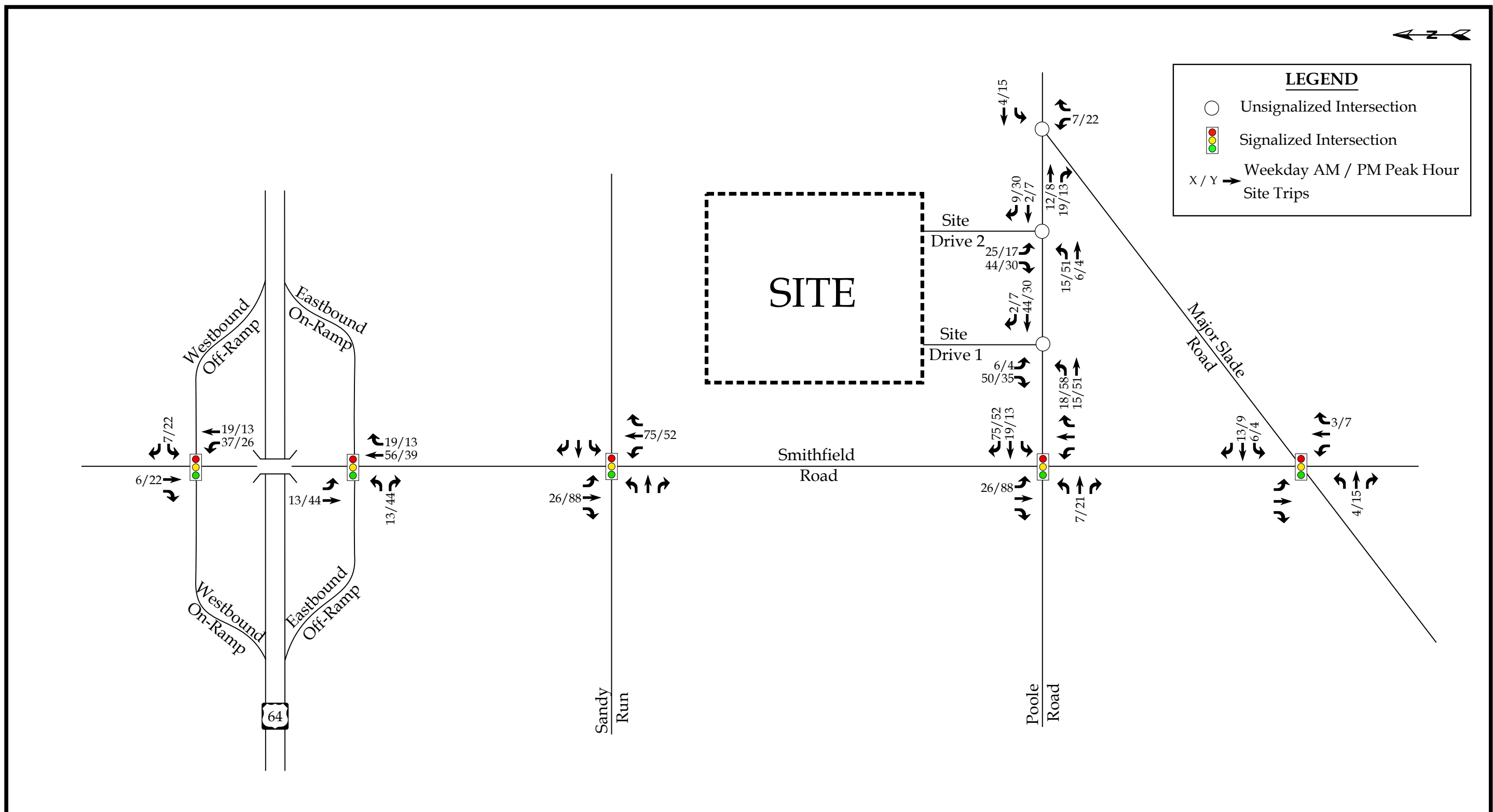
Scale: Not to Scale Figure 8a



Poole Road Assemblage
Knightdale, NC

Site Trip Distribution
- Scenario 2

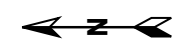
Scale: Not to Scale Figure 8b



Poole Road Assemblage
Knightdale, NC

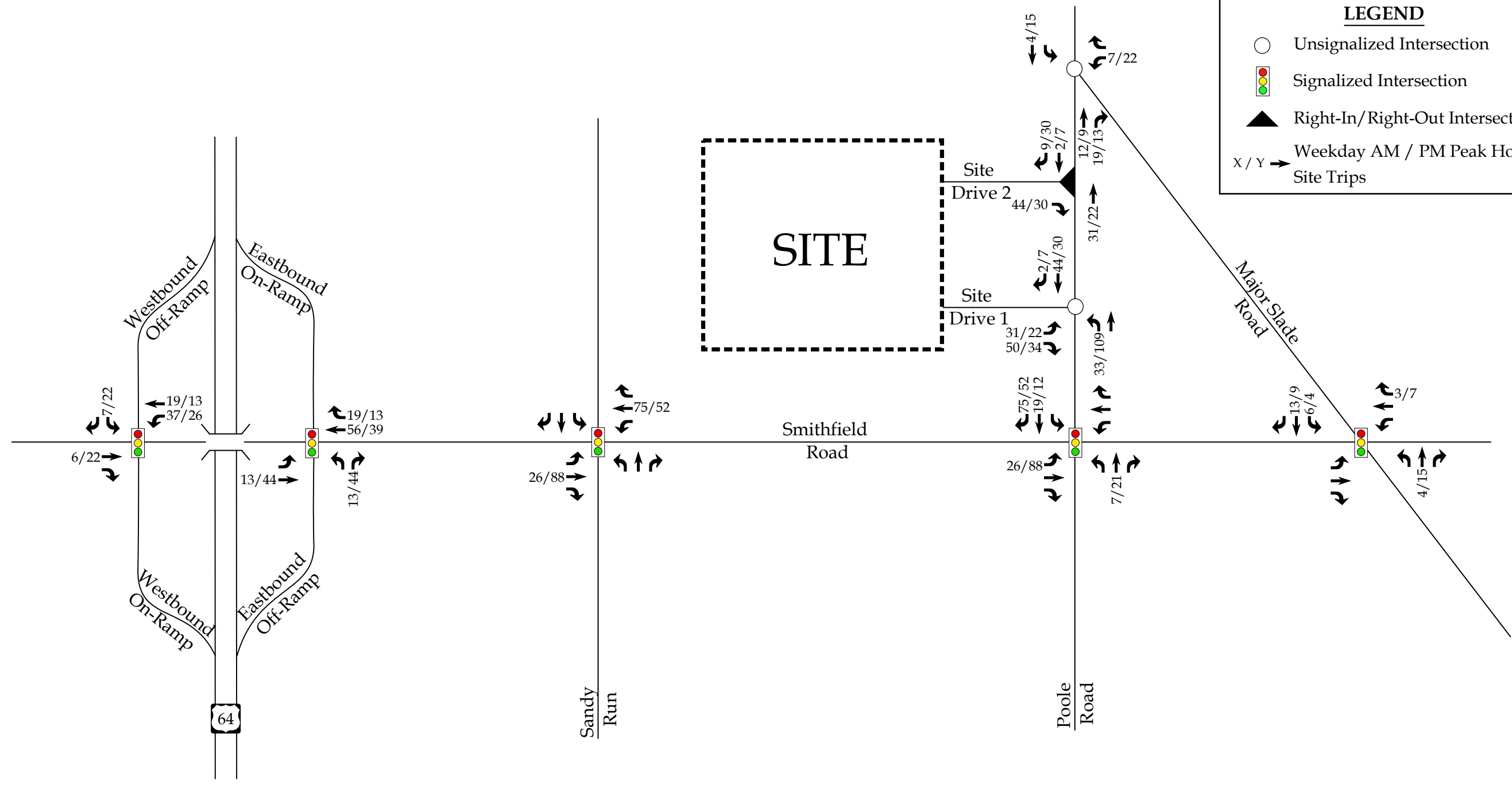
Site Trip Assignment
- Scenario 1

Scale: Not to Scale Figure 9a



LEGEND

- Unsignalized Intersection
- ⬆️⬆️⬆️ Signalized Intersection
- ▲ Right-In/Right-Out Intersection
- X / Y → Weekday AM / PM Peak Hour Site Trips



	<p>Poole Road Assemblage Knightdale, NC</p>	<p>Site Trip Assignment - Scenario 2</p>	
		<p>Scale: Not to Scale</p>	<p>Figure 9b</p>

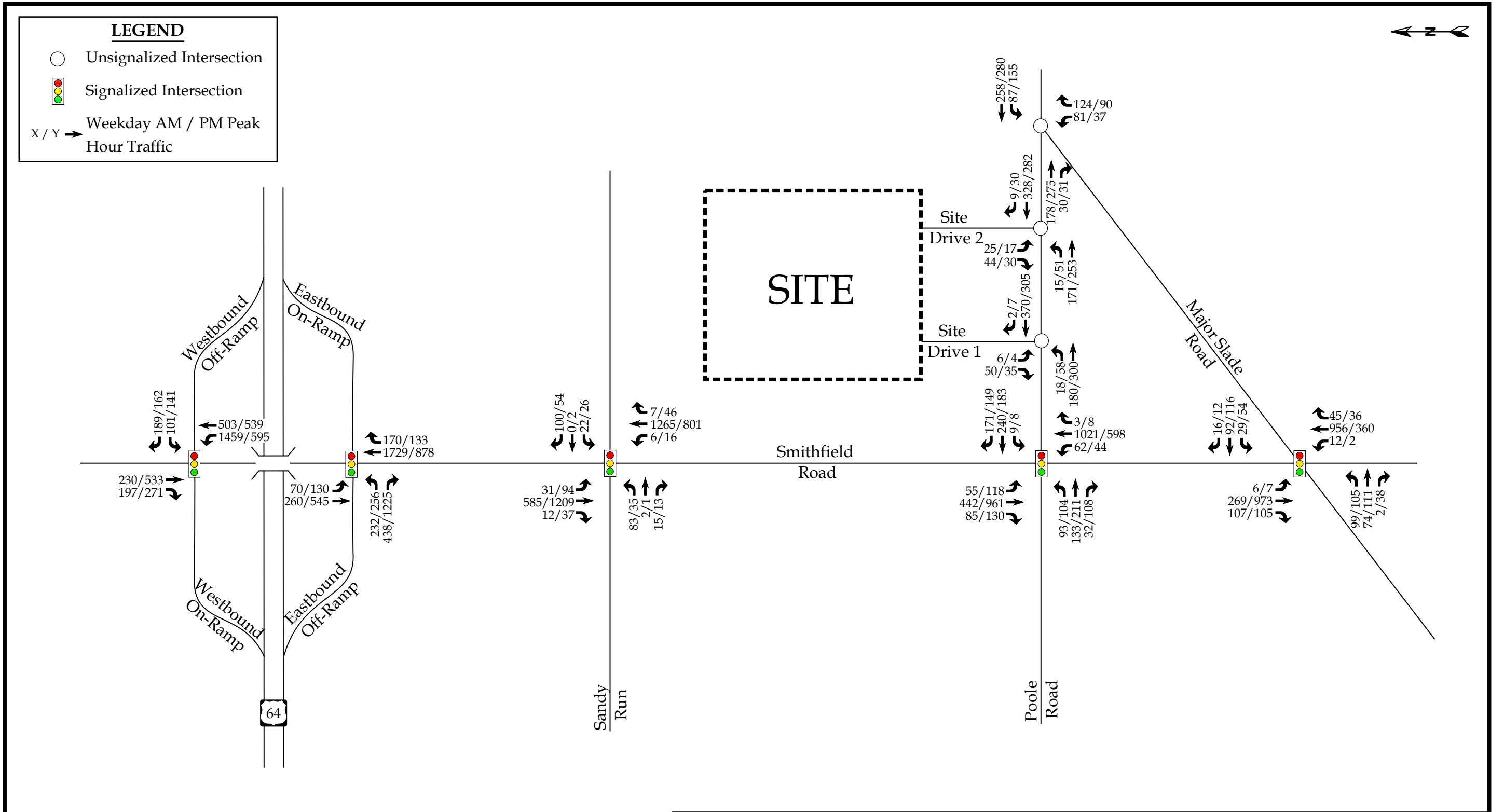
5. 2027 BUILD TRAFFIC CONDITIONS

5.1. 2027 Build Peak Hour Traffic Volumes

To estimate traffic conditions with the site fully built-out, the total site trips were added to the 2027 no-build traffic volumes to determine the 2027 build traffic volumes. Refer to Figures 10a and 10b for an illustration of the 2027 build peak hour traffic volumes with the proposed site fully developed for the respective scenarios.

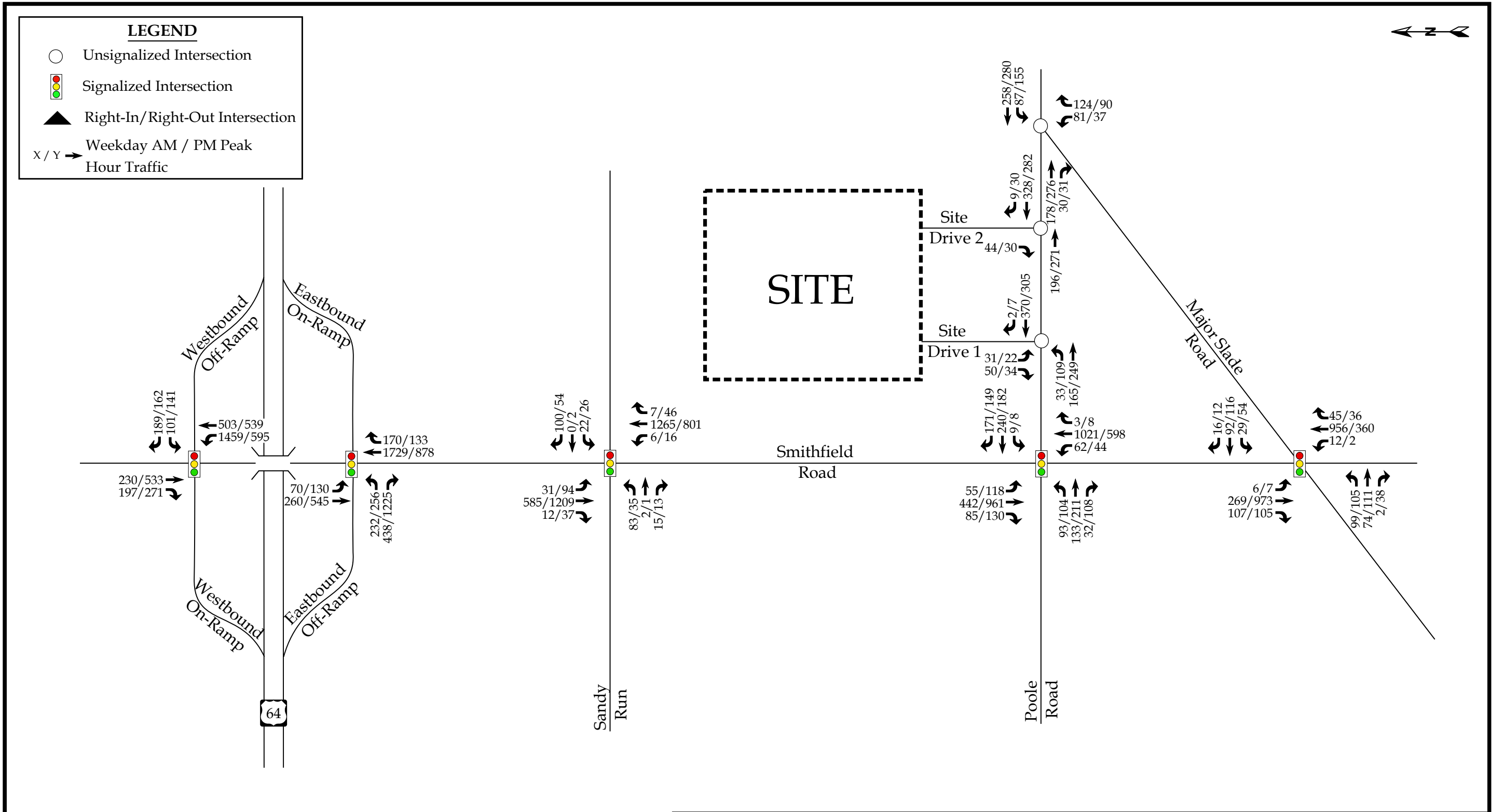
5.2. Analysis of 2027 Build Peak Hour Traffic Conditions

Study intersections were analyzed with the 2027 build traffic volumes using the same methodology previously discussed for existing and no-build traffic conditions. Intersections were analyzed with improvements necessary to accommodate future traffic volumes. The results of the capacity analysis for each intersection are presented in Section 8 of this report.



Note: Based on NCDOT Congestion Management guidelines, a volume of 4 vehicles per hour (vph) was analyzed for any movement with less than 4 vph.

	Poole Road Assemblage Knightdale, NC	2027 Build Peak Hour Traffic - Scenario 1	
		Scale: Not to Scale	Figure 10a



Note: Based on NCDOT Congestion Management guidelines, a volume of 4 vehicles per hour (vph) was analyzed for any movement with less than 4 vph.



Poole Road Assemblage
Knightdale, NC

2027 Build
Peak Hour Traffic -
Scenario 2

Scale: Not to Scale | Figure 10b

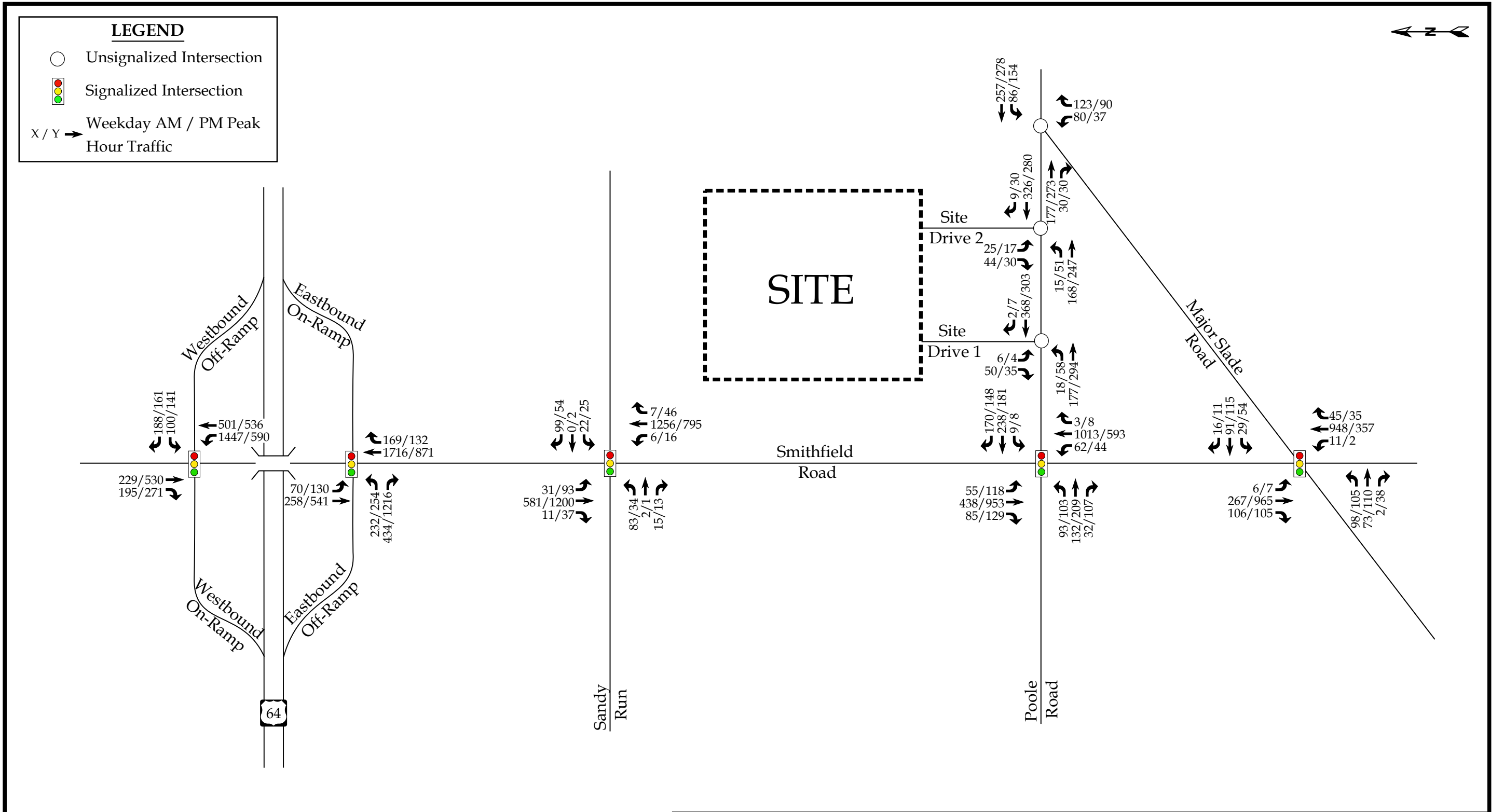
6. 2036 FUTURE TRAFFIC CONDITIONS

6.1. 2036 Future Peak Hour Traffic Volumes

Per the Town of Knightdale TIA guidelines, an analysis of the proposed development ten (10) years after build-out is required. In order to estimate traffic conditions ten years beyond build-out of the proposed development, 2022 existing volumes were grown to the future year 2036 using the NCDOT and Town approved 1% annual growth rate. Proposed development site trips [Figure 9a & Figure 9b] and adjacent development trips [Figure 6] were added to the projected traffic volumes to determine 2036 future traffic volumes. Refer to Figure 11a and Figure 11b for an illustration of the 2036 future traffic volumes under scenario 1 and scenario 2, respectively.

6.2. Analysis of 2036 Future Peak Hour Traffic

Study intersections were analyzed with the 2036 future traffic volumes using the same methodology previously discussed for existing, no-build, and build traffic conditions. The results of the capacity analysis for each intersection are presented in Section 8 of this report.



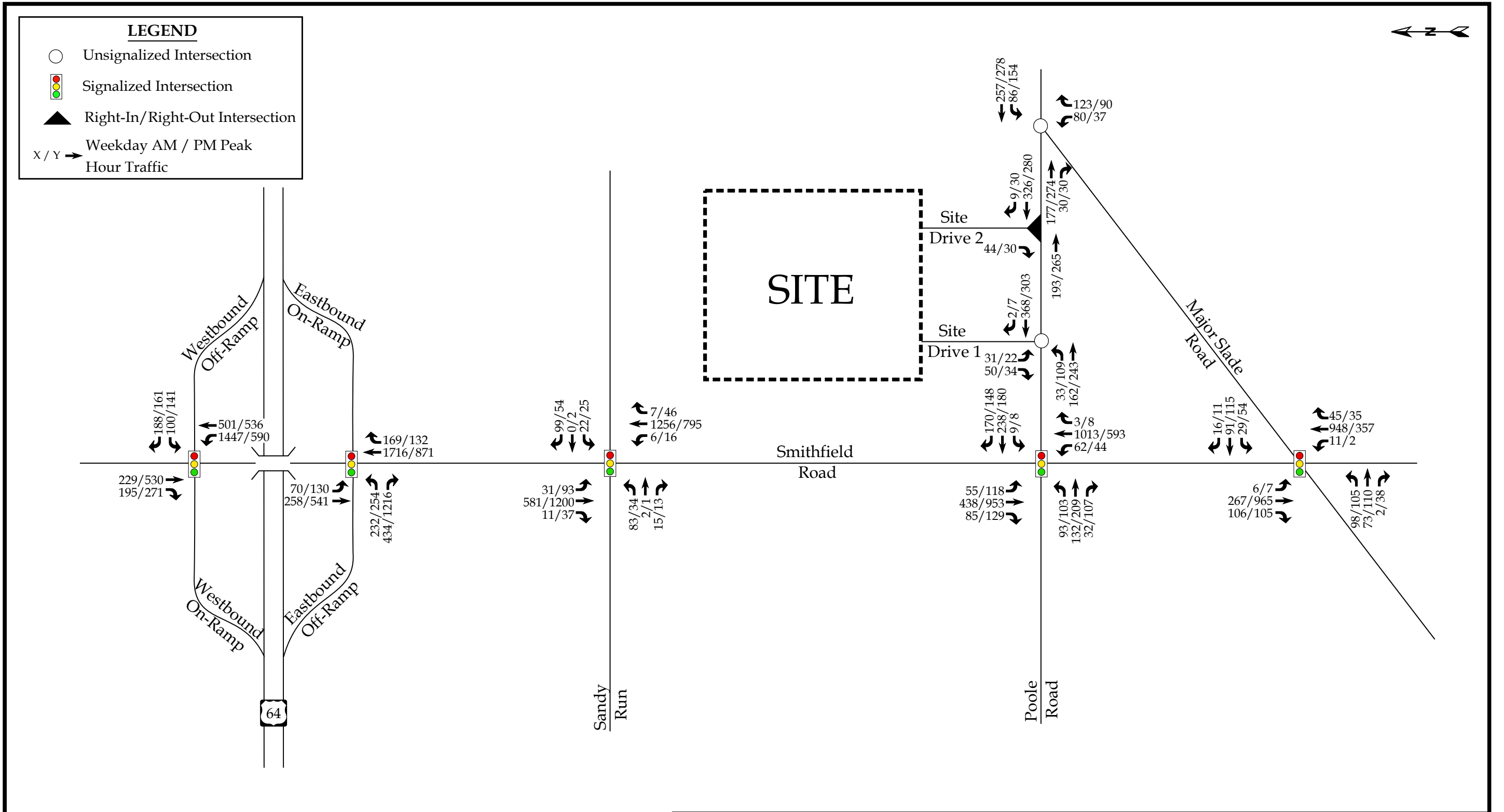
Note: Based on NCDOT Congestion Management guidelines, a volume of 4 vehicles per hour (vph) was analyzed for any movement with less than 4 vph.



Poole Road Assemblage
Knightdale, NC

2036 Future
Peak Hour Traffic -
Scenario 1

Scale: Not to Scale | Figure 11a



Note: Based on NCDOT Congestion Management guidelines, a volume of 4 vehicles per hour (vph) was analyzed for any movement with less than 4 vph.



Poole Road Assemblage
Knightdale, NC

2036 Future
Peak Hour Traffic -
Scenario 2

Scale: Not to Scale | Figure 11b

7. TRAFFIC ANALYSIS PROCEDURE

Study intersections were analyzed using the methodology outlined in the *Highway Capacity Manual* (HCM), 6th Edition published by the Transportation Research Board. Capacity and level of service are the design criteria for this traffic study. A computer software package, Synchro (Version 10.3), was used to complete the analyses for the study area intersections. Please note that the unsignalized capacity analysis does not provide an overall level of service for an intersection; only delay for an approach with a conflicting movement.

The HCM defines capacity as “the maximum hourly rate at which persons or vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time period under prevailing roadway, traffic, and control conditions.” Level of service (LOS) is a term used to represent different driving conditions, and is defined as a “qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers.” Level of service varies from Level “A” representing free flow, to Level “F” where breakdown conditions are evident. Refer to Table 4 for HCM levels of service and related average control delay per vehicle for both signalized and unsignalized intersections. Control delay as defined by the HCM includes “initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay”. An average control delay of 50 seconds at a signalized intersection results in LOS “D” operation at the intersection.

Table 4: Highway Capacity Manual – Levels-of-Service and Delay

UNSIGNALIZED INTERSECTION		SIGNALIZED INTERSECTION	
LEVEL OF SERVICE	AVERAGE CONTROL DELAY PER VEHICLE (SECONDS)	LEVEL OF SERVICE	AVERAGE CONTROL DELAY PER VEHICLE (SECONDS)
A	0-10	A	0-10
B	10-15	B	10-20
C	15-25	C	20-35
D	25-35	D	35-55
E	35-50	E	55-80
F	>50	F	>80

7.1. Adjustments to Analysis Guidelines

Capacity analysis at all study intersections was completed according to the NCDOT Congestion Management Guidelines.

8. CAPACITY ANALYSIS

8.1. Poole Road [EB-WB] and Smithfield Road [NB-SB]

The existing signalized intersection of Poole Road and Smithfield Road was analyzed under 2022 existing, 2027 no-build, 2027 build (scenarios 1 & 2), and 2036 future (scenarios 1 & 2) traffic conditions with lane configurations and traffic control shown in Table 5. It should be noted that under future conditions, STIP HL-0031 is expected to improve the intersection by addition exclusive left-turn lanes on all approaches. Refer to Table 5 for a summary of the analysis results. Refer to Appendix F for the Synchro capacity analysis reports. SimTraffic queuing reports can be found in Appendix N.

Table 5: Analysis Summary of Poole Road and Smithfield Road

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (seconds)	Approach	Overall (seconds)
2022 Existing	EB	1 LT-TH-RT	D	C (24)	E	C (29)
	WB	1 LT-TH-RT	D		D	
	NB	1 LT-TH-RT	C		B	
	SB	1 LT-TH-RT	A		C	
2027 No-Build	EB	<u>1 LT</u> , 1 TH-RT	D	F (82)	E	F (100)
	WB	<u>1 LT</u> , 1 TH-RT	F		F	
	NB	<u>1 LT</u> , 1 TH-RT	F		C	
	SB	<u>1 LT</u> , 1 TH-RT	C		F	
2027 Build Scenarios 1 & 2	EB	<u>1 LT</u> , 1 TH-RT	D	F (122)	E	F (112)
	WB	<u>1 LT</u> , 1 TH-RT	F		F	
	NB	<u>1 LT</u> , 1 TH-RT	F		D	
	SB	<u>1 LT</u> , 1 TH-RT	C		F	
2027 Build Scenarios 1 & 2 - with Improvements	EB	<u>1 LT</u> , 1 TH-RT	E	D (48)	E	D (45)
	WB	<u>1 LT</u> , 1 TH, 1 RT	E		D	
	NB	<u>1 LT</u> , 1 TH-RT	D		C	
	SB	<u>1 LT</u> , 1 TH-RT	B		D	
2036 Future Scenarios 1 & 2	EB	<u>1 LT</u> , 1 TH-RT	D	D (47)	E	D (45)
	WB	<u>1 LT</u> , 1 TH, 1 RT	E		D	
	NB	<u>1 LT</u> , 1 TH-RT	D		C	
	SB	<u>1 LT</u> , 1 TH-RT	B		D	

Improvements to lane configurations by STIP HL-0031 shown underlined.
 Improvements by Developer shown in **bold**.

Capacity analysis of 2022 existing traffic conditions indicates that the intersection of Poole Road and Smithfield Road is expected to operate at an overall LOS C during the weekday AM and PM peak hours. Under 2027 no-build and 2027 build traffic conditions, the intersection is expected to operate at LOS F during the weekday AM and PM peak hours.

To mitigate poor levels of service experienced at the intersection during the weekday AM and PM peak hours under 2027 build conditions, the intersection was analyzed with an exclusive right-turn lane on the westbound approach. It should be noted that the exclusive westbound right-turn lane was modeled as a channelized lane under yield control. With this exclusive turn lane and signal timing adjustments to accommodate the new lane configuration, the intersection is expected to operate at an overall LOS D during the weekday AM and PM peak hours. Capacity analysis of 2036 future conditions with these improvements indicates that the intersection is expected to operate at an overall LOS D during the weekday AM and PM peak hours.

A channelized westbound right-turn lane under yield control is recommended at this intersection by the proposed development.

8.2. Smithfield Road [NB-SB] and Sandy Run [EB-WB]

The existing signalized intersection of Smithfield Road and Sandy Run was analyzed under 2022 existing, 2027 no-build, 2027 build (scenarios 1 & 2), and 2036 future (scenarios 1 & 2) traffic conditions with existing lane configurations and traffic control. Refer to Table 6 for a summary of the analysis results. Refer to Appendix G for the Synchro capacity analysis reports. SimTraffic queuing reports can be found in Appendix N.

Table 6: Analysis Summary of Smithfield Road and Sandy Run

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (seconds)	Approach	Overall (seconds)
2027 Existing	EB	1 LT-TH-RT	E	C (21)	D	B (12)
	WB	1 LT-TH-RT	D		D	
	NB	1 LT, 1 TH-RT	C		B	
	SB	1 LT, 1 TH-RT	A		A	
2027 No-Build	EB	1 LT-TH-RT	F	D (36)	D	C (21)
	WB	1 LT-TH-RT	E		E	
	NB	1 LT, 1 TH-RT	D		C	
	SB	1 LT, 1 TH-RT	A		B	
2027 Build <i>Scenarios 1 & 2</i>	EB	1 LT-TH-RT	F	D (46)	E	C (29)
	WB	1 LT-TH-RT	E		E	
	NB	1 LT, 1 TH-RT	E		D	
	SB	1 LT, 1 TH-RT	A		C	
2036 Future <i>Scenarios 1 & 2</i>	EB	1 LT-TH-RT	F	D (45)	E	C (28)
	WB	1 LT-TH-RT	E		E	
	NB	1 LT, 1 TH-RT	E		D	
	SB	1 LT, 1 TH-RT	A		C	

Capacity analysis of 2022 existing, 2027 no-build, 2027 build, and 2036 future traffic conditions indicates that the intersection of Smithfield Road and Sandy Run is expected to operate at an overall LOS D or better during the weekday AM and PM peak hours.

Due to acceptable intersection operations, no improvements are recommended at this intersection by the proposed development.

8.3. Smithfield Road [NB-SB] and I-87 (US 64/264) Eastbound Ramps [EB]

The existing signalized intersection of Smithfield Road and I-87 (US 64/264) Eastbound Ramps were analyzed under 2022 existing, 2027 no-build, and 2027 build (scenarios 1 & 2), traffic conditions with the lane configurations and traffic control shown in Table 7. Under 2036 future (scenarios 1 & 2), the intersection was analyzed as half of a diverging diamond interchange, per future roadway improvements associated with STIP I-6007. Refer to Table 7 for a summary of the analysis results. Refer to Appendix H for the Synchro capacity analysis reports. SimTraffic queuing reports can be found in Appendix N.

Table 7: Analysis Summary of Smithfield Road and I-87 (US 64/264) Eastbound Ramps

ANALYSIS SCENARIO	NODE	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
				Approach	Overall (seconds)	Approach	Overall (seconds)
2022 Existing	3	EB NB SB	1 LT, 1 RT 2 TH, 1 RT 1 LT, 1 TH	D A B	B (14)	F A D	D (51)
2027 No-Build	3	EB NB SB	1 LT, 1 RT 2 TH, 1 RT 1 LT, 1 TH	C B D	C (24)	F A D	F (122)
2027 Build <i>Scenarios 1 & 2</i>	3	EB NB SB	1 LT, 1 RT 2 TH, 1 RT 1 LT, 1 TH	C B D	C (25)	F A D	F (140)
2036 Future <i>Scenarios 1 & 2</i>	33	EB SB	<u>2 RT</u> <u>1 TH</u>	C A	B (19)	D B	C (30)
	35	WB SB	<u>2 TH</u> <u>1 LT</u>	B D	B (19)	B B	B (19)
	38	EB NB	<u>1 LT</u> <u>2 TH</u>	D A	A (6)	C A	A (6)

Improvements to lane configurations by STIP I-6007 shown underlined.

Capacity analysis of 2022 existing traffic conditions indicates that the intersection of Smithfield Road and I-87 (US 64/264) Eastbound Ramps is expected to operate at an overall LOS D or better during the weekday AM and PM peak hours. Under 2027 no-build and 2027

build conditions, the intersection is expected to operate at an overall LOS C during the weekday AM peak hour and LOS F during the weekday PM peak hour. This intersection was analyzed as half of a diverging diamond interchange under 2036 future conditions per future roadway improvements associated with STIP I-6007. Capacity analysis of 2036 future conditions indicates that the intersection is expected to operate at an overall LOS C or better during the weekday AM and PM peak hours.

The proposed development is only expected to account for approximately 3% of the overall traffic at the intersection during the weekday AM peak hour and approximately 4% of the overall traffic at the intersection during the weekday PM peak hour. Additionally, this signal is currently operating in free run conditions, which means that there is not time of day signal timings that adjust the signal timings throughout the day to account for traffic pattern changes. Coordinated timings during the weekday peak hours would be beneficial by dedicating the appropriate green time to the heavier movements. Due to these reasons and the expectation that improvements to I-540 will further improve traffic patterns along Smithfield Road, no further improvements are recommended by the proposed development.

8.4. Smithfield Road [NB-SB] and I-87 (US 64/264) Westbound Ramps [WB]

The existing signalized intersections of Smithfield Road and I-87 (US 64 / 264) WB Ramps were analyzed under 2022 existing, 2027 no-build, 2027 build (scenarios 1 & 2), and 2036 future (scenarios 1 & 2) traffic conditions with the lane configurations and traffic control shown in Table 8. Refer to Table 8 for a summary of the analysis results. Refer to Appendix I for the Synchro capacity analysis reports. SimTraffic queuing reports can be found in Appendix N.

Table 8: Analysis Summary of Smithfield Road and I-87 (US 64 / 264) Westbound Ramps

ANALYSIS SCENARIO	NODE	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
				Approach	Overall (seconds)	Approach	Overall (seconds)
2022 Existing	4	WB NB SB	1 LT, 1 RT 1 LT, 1 LT-TH 1 TH, 1 RT	D B B	B (16)	D A B	B (13)
2027 No-Build	4	WB NB SB	1 LT, 1 RT <u>2 LT</u> , 1 TH 1 TH, 1 RT	E C C	C (30)	D C B	C (26)
2027 Build Scenarios 1 & 2	4	WB NB SB	1 LT, 1 RT <u>2 LT</u> , 1 TH 1 TH, 1 RT	E C C	C (31)	D C B	C (28)
2036 Future Scenarios 1 & 2	43	WB NB	<u>1 RT</u> <u>1 TH</u>	C A	B (11)	C A	A (7)
	45	EB SB	<u>1 TH</u> <u>1 TH</u>	B B	B (16)	C B	C (21)
	48	WB SB	<u>1 LT</u> <u>1 TH</u>	C A	B (10)	C A	A (5)

Improvements to lane configurations by STIP I-6007 shown underlined.

Capacity analysis of 2022 existing, 2027 no-build, 2027 build traffic conditions indicates that the intersection of Smithfield Road and I-87 (US 64/264) Westbound Ramps is expected to operate at an overall LOS C or better during the weekday AM and PM peak hours. This intersection was analyzed as half of a diverging diamond interchange under 2036 future conditions per future roadway improvements associated with STIP I-6007. Capacity analysis

of 2036 future conditions indicates that the intersection is expected to operate at an overall LOS C or better during the weekday AM and PM peak hours.

Due to acceptable intersection operations, no further improvements are recommended by the proposed development.

8.5. Smithfield Road [NB-SB] and Major Slade Road [EB-WB]

The existing signalized intersection of Smithfield Road and Major Slade Road was analyzed under 2022 existing, 2027 no-build, 2027 build (scenarios 1 & 2), and 2036 future (scenarios 1 & 2) traffic conditions with existing lane configurations and traffic control. Refer to Table 9 for a summary of the analysis results. Refer to Appendix J for the Synchro capacity analysis reports. SimTraffic queuing reports can be found in Appendix N.

Table 9: Analysis Summary of Smithfield Road and Major Slade Road

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (seconds)	Approach	Overall (seconds)
2022 Existing	EB	1 LT-TH-RT	D	B (18)	E	C (26)
	WB	1 LT-TH-RT	D			
	NB	1 LT-TH-RT	B			
	SB	1 LT-TH-RT	A			
2027 No-Build	EB	1 LT-TH-RT	E	C (25)	E	D (42)
	WB	1 LT-TH-RT	D			
	NB	1 LT-TH-RT	C			
	SB	1 LT-TH-RT	A			
2027 Build Scenarios 1 & 2	EB	1 LT-TH-RT	E	C (26)	E	D (45)
	WB	1 LT-TH-RT	D			
	NB	1 LT-TH-RT	C			
	SB	1 LT-TH-RT	A			
2036 Build Scenarios 1 & 2	EB	1 LT-TH-RT	E	C (26)	E	D (43)
	WB	1 LT-TH-RT	D			
	NB	1 LT-TH-RT	C			
	SB	1 LT-TH-RT	A			

Capacity analysis of 2022 existing, 2027 no-build, 2027 build, and 2036 future traffic conditions indicates that the intersection of Smithfield Road and Major Slade Road is expected to operate at an overall LOS D or better during the weekday AM and PM peak hours.

Due to acceptable intersection operations, no improvements are recommended at this intersection by the proposed development.

8.6. Poole Road [EB-WB] and Major Slade Road [NB]

The existing unsignalized intersection of Poole Road and Major Slade Road was analyzed 2022 existing, 2027 no-build, 2027 build (scenarios 1 & 2), and 2036 future (scenarios 1 & 2) traffic conditions with the lane configurations and traffic control shown in Table 10. Refer to Table 10 for a summary of the analysis results. Refer to Appendix K for the Synchro capacity analysis reports. SimTraffic queuing reports can be found in Appendix N.

Table 10: Analysis Summary of Poole Road and Major Slade Road

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (seconds)	Approach	Overall (seconds)
2022 Existing	EB WB NB	1 TH-RT 1 LT-TH 1 LT-RT	-- A ¹ B ²	N/A	-- A ¹ A ²	N/A
2027 No-Build	EB WB NB	1 TH-RT 1 LT-TH 1 LT-RT	-- A ¹ B ²	N/A	-- A ¹ B ²	N/A
2027 Build <i>Scenarios 1 & 2</i>	EB WB NB	1 TH-RT 1 LT-TH 1 LT-RT	-- A ¹ C ²	N/A	-- A ¹ C ²	N/A
2036 Build <i>Scenarios 1 & 2</i>	EB WB NB	1 TH-RT 1 LT-TH 1 LT-RT	-- A ¹ C ²	N/A	-- A ¹ C ²	N/A

1. Level of service for major-street left-turn movement.
2. Level of service for minor-street approach.

Capacity analysis of 2022 existing, 2027 no-build, 2027 build, and 2036 future traffic conditions indicates that the major-street left-turn movement and the minor-street approach at the intersection of Poole Road and Major Slade Road is expected to operate at LOS C or better during the weekday AM and PM peak hours.

Due to acceptable intersection operations, no improvements are recommended at this intersection by the proposed development.

8.7. Poole Road [EB-WB] and Site Drive 1 [SB]

The proposed unsignalized intersection of Poole Road and Site Drive 1 was analyzed under 2027 build – scenario 1, 2027 build – scenario 2, 2036 future – scenario 1, and 2036 future – scenario 2 traffic conditions with lane configurations and traffic control shown in Table 11. Refer to Table 11 for a summary of the analysis results. Refer to Appendix L for the Synchro capacity analysis reports. SimTraffic queuing reports can be found in Appendix N.

Table 11: Analysis Summary of Poole Road and Site Drive 1

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (seconds)	Approach	Overall (seconds)
2027 Build Scenario 1	EB WB SB	1 LT, 1 TH 1 TH-RT 1 LT-RT	A ¹ -- B ²	N/A	A ¹ -- B ²	N/A
2027 Build Scenario 2	EB WB SB	1 LT, 1 TH 1 TH-RT 1 LT-RT	A ¹ -- B ²	N/A	A ¹ -- B ²	N/A
2036 Future Scenario 1	EB WB SB	1 LT, 1 TH 1 TH-RT 1 LT-RT	A ¹ -- B ²	N/A	A ¹ -- B ²	N/A
2036 Future Scenario 2	EB WB SB	1 LT, 1 TH 1 TH-RT 1 LT-RT	A ¹ -- B ²	N/A	A ¹ -- B ²	N/A

Improvements to lane configurations are shown in bold.

1. Level of service for major-street left-turn movement.
2. Level of service for minor-street approach.

Capacity analysis of 2027 build (scenario 1 & 2) and 2036 future (scenario 1 & 2) traffic conditions indicates that the major-street left-turn movement and the minor-street approach at the intersection of Poole Road and Site Drive 1 are expected to operate at LOS B or better during the weekday AM and PM peak hours.

Turn lanes were considered based on the NCDOT *Policy on Street and Driveway Access to North Carolina Highways* (Driveway Manual). Based on the Driveway Manual, an exclusive eastbound left-turn lane with a minimum of 75’ of storage is warranted and recommended

under access scenario 1 and a minimum of 100' of storage is warranted and recommended under access scenario 2, both with appropriate deceleration length and taper.

8.8. Poole Road [EB-WB] and Site Drive 2 [SB]

The proposed unsignalized intersection of Poole Road and Site Drive 2 was analyzed under 2027 build – scenario 1, 2027 build – scenario 2, 2036 future – scenario 1, and 2036 future – scenario 2 with lane configurations and traffic control shown in Table 12. Refer to Table 12 for a summary of the analysis results. Refer to Appendix M for the Synchro capacity analysis reports. SimTraffic queuing reports can be found in Appendix N.

Table 12: Analysis Summary of Poole Road and Site Drive 2

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (seconds)	Approach	Overall (seconds)
2027 Build Scenario 1 <i>Full Movement</i>	EB	1 LT, 1 TH	A ¹	N/A	A ¹	N/A
	WB	1 TH, 1 RT	--		--	
	SB	1 LT-RT	B ²		B ²	
2027 Build Scenario 2 <i>Right-in/Right-out</i>	EB	1 TH	--	N/A	--	N/A
	WB	1 TH, 1 RT	--		--	
	SB	1 RT	B ²		B ²	
2036 Future Scenario 1 <i>Full Movement</i>	EB	1 LT, 1 TH	A ¹	N/A	A ¹	N/A
	WB	1 TH, 1 RT	--		--	
	SB	1 LT-RT	B ²		B ²	
2036 Future Scenario 2 <i>Right-in/Right-out</i>	EB	1 TH	--	N/A	--	N/A
	WB	1 TH, 1 RT	--		--	
	SB	1 RT	B ²		B ²	

Improvements to lane configurations are shown in bold.

1. Level of service for major-street left-turn movement.
2. Level of service for minor-street approach.

Capacity analysis of 2027 build (scenario 1 & 2) and 2036 future (scenario 1 & 2) traffic conditions indicates that the major-street left-turn movement and the minor-street approach at the intersection of Poole Road and Site Drive 2 are expected to operate at LOS B or better during the weekday AM and PM peak hours.

Turn lanes were considered based on the NCDOT *Policy on Street and Driveway Access to North Carolina Highways* (Driveway Manual). Based on the Driveway Manual, an exclusive eastbound left-turn lane with a minimum of 75' of storage and a westbound right-turn lane

with a minimum of 50' of storage, both with appropriate deceleration and taper length, are warranted and recommended under access scenario 1. Under access scenario 2, only an exclusive eastbound left-turn lane with a minimum of 75' of storage and appropriate deceleration and taper length is warranted and recommended as the intersection was analyzed as a right-in/right-out.

9. CONCLUSIONS

This Traffic Impact Analysis was conducted to determine the potential traffic impacts of the proposed residential development, the northeast quadrant of the intersection of Poole Road at Smithfield Road in Knightdale, North Carolina. The proposed development, anticipated to be completed by 2026, is assumed to consist of a maximum of 246 single-family homes. This study analyzes two (2) build scenarios: Scenario 1 analyzes both Site Drive 1 and Site Drive 2 as full movement intersections and Scenario 2 analyzes Site Drive 1 as a full movement intersection and Site Drive 2 as a right-in/right-out intersection.

The study analyzes traffic conditions during the weekday AM and PM peak hours for the following scenarios:

- 2022 Existing Traffic Conditions
- 2027 No-Build Traffic Conditions
- 2027 Build Traffic Conditions – Scenario 1
- 2027 Build Traffic Conditions – Scenario 2
- 2036 Future Traffic Conditions – Scenario 1 – Per Town UDO (with STIP I-6007 Improvements)
- 2036 Future Traffic Conditions – Scenario 2 – Per Town UDO (with STIP I-6007 Improvements)

Trip Generation

It should be noted that the site plan includes a mixture of single family homes and townhomes; however, all units were studied as single family homes for a conservative analysis. It is estimated that the proposed development will generate approximately 2,310 total site trips on the roadway network during a typical 24-hour weekday period. Of the daily traffic volume, it is anticipated that 169 trips (44 entering and 125 exiting) will occur during the weekday AM peak hour and 232 (146 entering and 86 exiting) will occur during the weekday PM peak hour.

Adjustments to Analysis Guidelines

Capacity analysis at all study intersections was completed according to NCDOT Congestion Management Guidelines. Refer to section 7.1 of this report for a detailed description of any adjustments to these guidelines made throughout the analysis.

Intersection Capacity Analysis Summary

Refer to section 8 of this report for a detailed description of the study area intersections (including the proposed site driveways) that are expected to operate at acceptable levels-of-service under existing and future year conditions and the study intersections that are expected to need improvements.

10. RECOMMENDATIONS

Based on the findings of this study, specific geometric improvements have been identified and are recommended to accommodate future traffic conditions. See a more detailed description of the recommended improvements below. Refer to Figures 12 & 13 for illustrations of the recommended lane configuration for the proposed development under scenarios 1 & 2.

Improvements by Baker Roofing HQ

Smithfield Road and I-87 (US 64 / 264) Westbound Ramps

- Extend the exclusive southbound right-turn lane to have full storage.
- Restripe the northbound left-through lane to provide an additional left-turn lane.
- Construct a northbound through lane with a minimum of 250 feet of storage and appropriate deceleration and taper length.

Improvements by NCDOT STIP I-6007

STIP I-6007 is expected to convert the I-87 (US 64 / 264) interchange at Smithfield Road to a diverging diamond interchange.

Improvements by NCDOT STIP HL-0031

STIP HL-0031 is expected to improve the intersection of Poole Road and Smithfield Road by adding exclusive turn lanes on every approach.

Recommended Improvements by Developer – Scenario 1

Poole Road and Smithfield Road

- Construct a channelized westbound right-turn lane that operates under yield control with a minimum of 100 feet of storage and appropriate deceleration and taper length.
- Coordinate with NCDOT to develop a signal modification plan for the intersection.

Poole Road and Site Drive 1

- Construct southbound approach with one (1) ingress lane and one (1) egress lane striped as a shared left-right lane.
- Provide an exclusive eastbound left-turn lane with a minimum 75 feet of storage and appropriate taper.
- Provide stop-control for the southbound approach.

Poole Road and Site Drive 2

- Construct southbound approach with one (1) ingress lane and one (1) egress lane striped as a shared left-right lane.
- Provide an exclusive eastbound left-turn lane with a minimum of 75 feet of storage and appropriate deceleration and taper.
- Provide an exclusive westbound right-turn lane with a minimum of 50 feet of storage and appropriate deceleration and taper.
- Provide stop-control for southbound approach.

Recommended Improvements by Developer – Scenario 2Poole Road and Smithfield Road

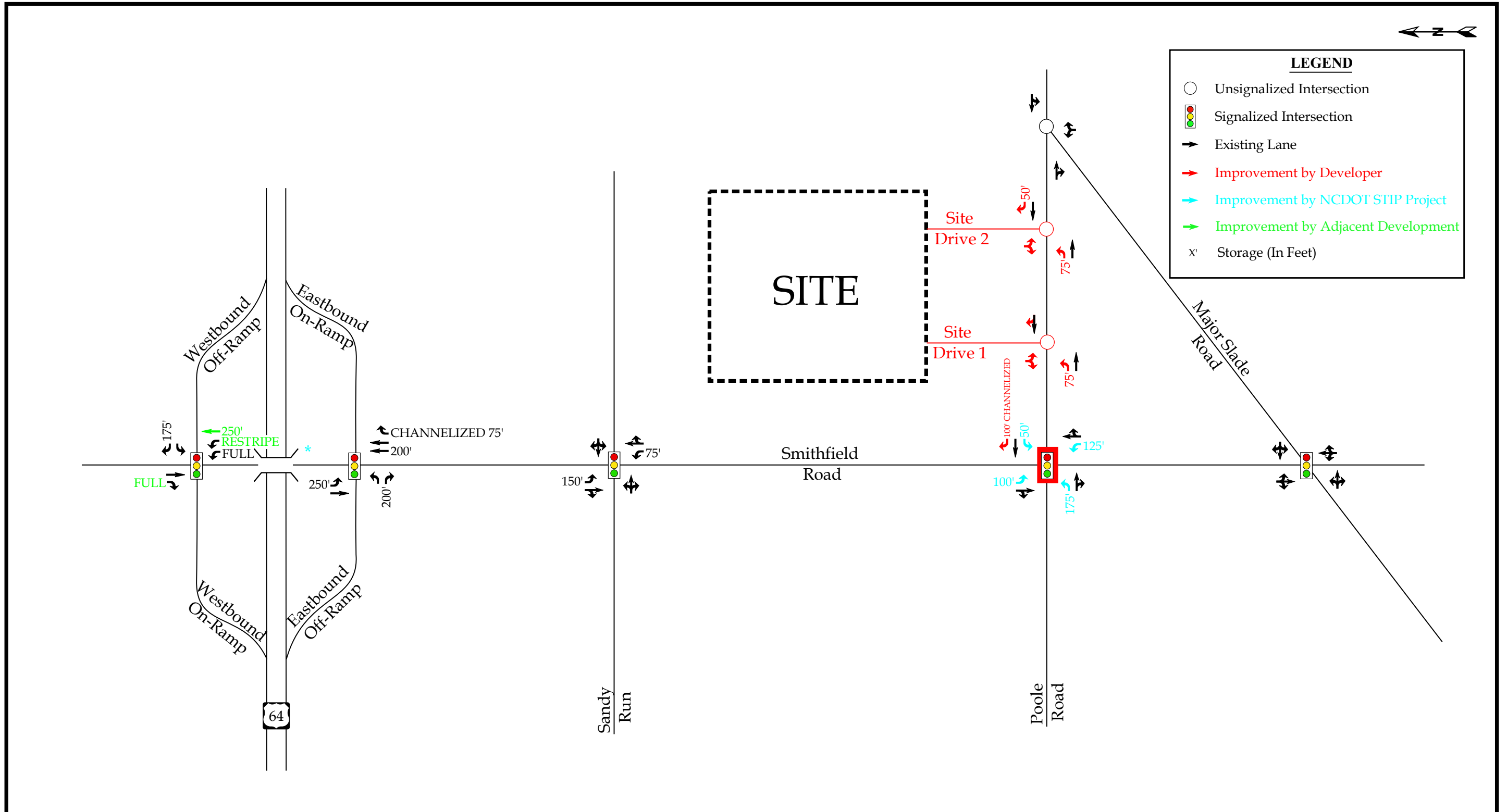
- Construct a channelized westbound right-turn lane that operates under yield control with a minimum of 100 feet of storage and appropriate deceleration and taper length.
- Coordinate with NCDOT to develop a signal modification plan for the intersection.

Poole Road and Site Drive 1

- Construct southbound approach with one (1) ingress lane and one (1) egress lane striped as a shared left-right lane.
- Provide an exclusive eastbound left-turn lane with a minimum 100 feet of storage and appropriate taper.
- Provide stop-control for southbound approach.

Poole Road and Site Drive 2

- Construct southbound approach as right-in/right-out intersection with one (1) ingress lane and one (1) egress lane.
- Provide westbound right-turn lane with a minimum of 50 feet of storage and appropriate deceleration and taper.
- Provide stop-control for southbound approach.



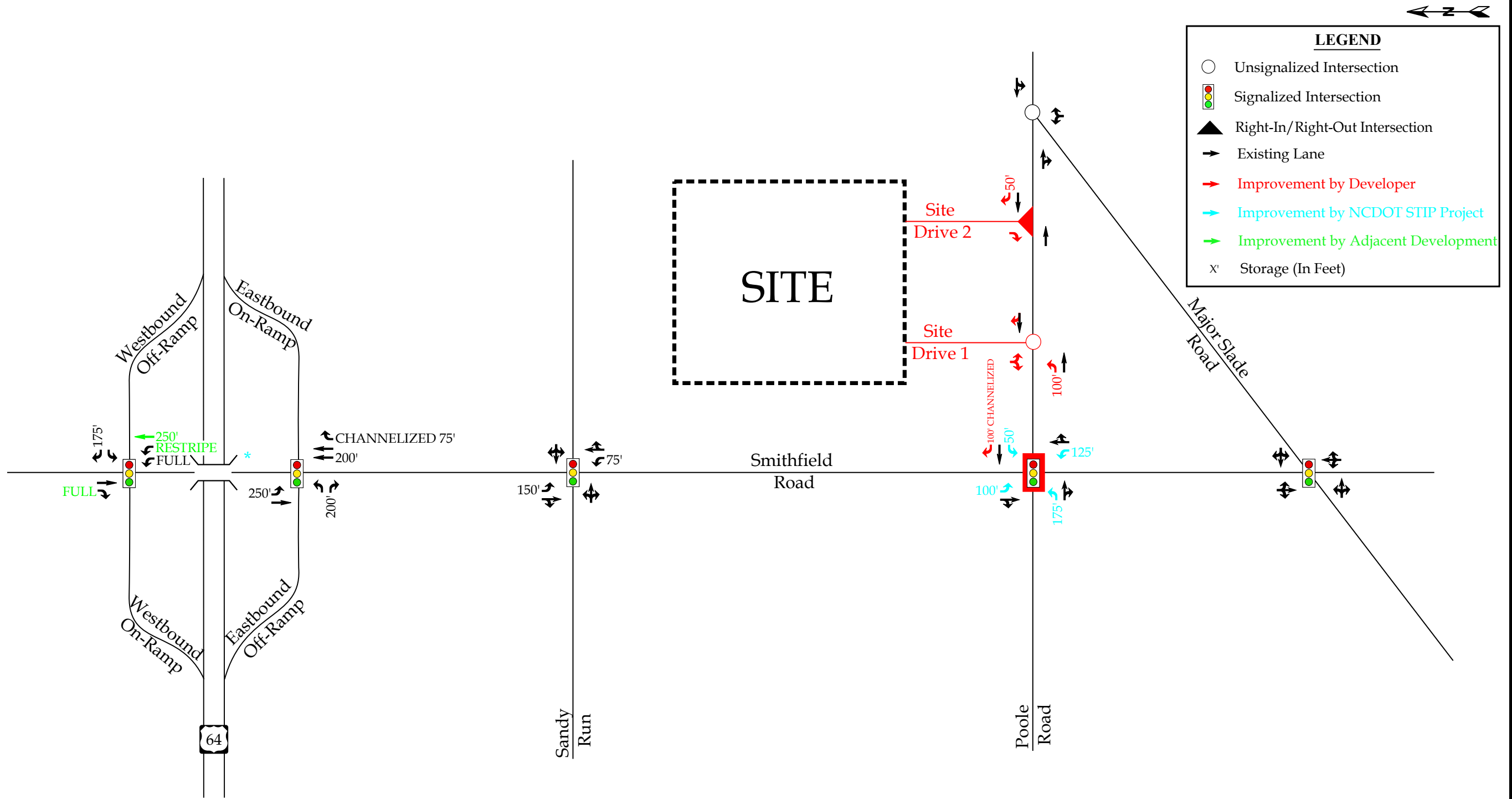
*Note: NCDOT STIP project I-6007 is expected to convert the I-87 (US 64/264) at Smithfield Road interchange to a diverging diamond interchange.



Poole Road Assemblage
Knightdale, NC

Recommended Lane
Configurations -
Scenario 1

Scale: Not to Scale | Figure 12a



*Note: NCDOT STIP project I-6007 is expected to convert the I-87 (US 64/264) at Smithfield Road interchange to a diverging diamond interchange.



Poole Road Assemblage
Knightdale, NC

Recommended Lane
Configurations -
Scenario 2

Scale: Not to Scale | Figure 12b

