

October 30, 2024

Cate Farrell
Planning Office
Town of Zebulon
1003 N. Arendell Avenue
Zebulon, NC 27597
P: (919) 823-1811

Reference: Zebulon Residential Development
Zebulon, NC

Subject: **DRAFT** - Development Entry Point Evaluation

Dear Ms. Ferrell:

The following letter provides additional information regarding the proposed access points for the Zebulon Residential development and has been completed in conjunction with the Traffic Impact Analysis (TIA). Per the Town's Unified Development Ordinance (UDO), the minimum number of vehicular access points should be 2 + 1 per every additional 100 lots for developments with 201+ lots (unless conditions per UDO Section 6.10.I are met). The conditions laid out in the UDO Section 6.10.I are as follows:

- A transportation impact analysis allows a deviation;
- No other street access points can be located due to existing lot configuration, absence of connecting streets, environmental, or topographic constraints;
- NCDOT will not authorize the required number of entrances; or
- Alternative access can be provided in a manner acceptable to the Town that is supported by a transportation impact analysis.

For the attached TIA, only the two access points were modeled in the analysis per the latest configuration of the site plan. The site plan currently shows site access is proposed via the following:

- One (1) full-movement driveway along Pearces Road
- Cross Access with Golden Plum Lane via Hunters Greene Drive
- Street stub to the north (future potential interconnectivity)
- Street stub to the west (future potential interconnectivity)

The proposed full-movement access along Pearces Road, discussed in **Section 7.10 of the TIA**, is expected to operate at LOS C or better during both peak hours. The intersection of Pearces Road and Golden Plum Lane, discussed in **Section 7.2 of the TIA**, is expected to operate at LOS C or better during both peak hours. Per the Town's UDO, Section 6.13.7, evidence of LOS D operations would indicate the need for additional access points. Additionally, it was assumed that all proposed site traffic along Golden Plum Lane would enter/exit the site at Hunters Greene Drive; however, the proposed driveways currently under construction by the adjacent development (Pearces Landing) along Golden Plum Lane will provide alternative routes to Hunters Greene Drive for proposed site traffic.

The proposed site plan shows that the parcel for the development has 400 feet of road frontage along Pearces Road, which would only allow for the construction of one (1) access point. Based on the analysis of build (2031) traffic conditions, the proposed development driveways are expected to operate at acceptable levels of service with minimal queueing.

Therefore, while the proposed development does not meet the 'Required Points of Access' per Table 6.10.7.I in the UDO, the results of this TIA conclude that there will not be capacity analysis or queuing issues at the access points that are provided that would indicate the need for additional site access.

Please let me know if there are any questions or concerns, and do not hesitate to contact me.

Sincerely,
Bolton & Menk, Inc.

Josh Reinke, PE
Senior Traffic Engineer

DRAFT

Zebulon Residential

DRAFT – Traffic Impact Analysis

Zebulon, NC

DRAFT



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& MENK**

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Prepared for:
TBM Partners

DRAFT – Traffic Impact Analysis

for

Zebulon Residential

Zebulon, NC

October 2024

10/30/2024

Prepared By: AGW

Reviewed By: JTR/AMI

DRAFT – TRAFFIC IMPACT ANALYSIS
ZEBULON RESIDENTIAL
ZEBULON, NORTH CAROLINA
DRAFT – EXECUTIVE SUMMARY

1. Development Overview

A Traffic Impact Analysis (TIA) was conducted for the proposed residential development in accordance with the North Carolina Department of Transportation (NCDOT) Congestion Management Guidelines and the Town of Zebulon (Town) Unified Development Ordinance (UDO), with the exception of the Town's build +1 analysis scenario. The proposed development is to be located along Pearces Road, east of Zebulon Road (NC 96) in Zebulon, North Carolina.

The proposed development, anticipated to be completed in 2031, is assumed to consist of a maximum of 340 single-family detached units, 200 single-family attached units, and a 160-student daycare center. It should be noted that the preliminary site plan shows a lower number of total residential units (517 units) than the proposed maximum total residential units (540 units). Analysis in the report will consider the maximum number of total residential units (540 units). The site plan currently shows site access is proposed via the following:

- One (1) full-movement driveway along Pearces Road
- Cross Access with Golden Plum Lane via Hunters Greene Drive
- Street stub to the north (future potential interconnectivity)
- Street stub to the west (future potential interconnectivity)

Per the Town's UDO, the minimum number of vehicular access points should be 2 + 1 per every additional 100 lots for developments with 201+ lots (unless conditions per UDO Section 6.10.1 are met). However, the study only analyzes the two proposed access points. This provides a worst-case scenario as additional driveways would alleviate traffic at the driveways modeled.

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

- Existing Traffic Conditions (2024)
- No-Build Traffic Conditions (2031)
- Build Traffic Conditions (2031)

The Town approved the build out year (2031) for the future analysis scenario as part of the Memorandum of Understanding (MOU). It should be noted that a Memorandum of Understanding (MOU) was originally submitted on June 12th, 2024; however, an MOU update (hereinafter referenced as MOU) was submitted on August 21st, 2024, and approved by the North Carolina Department of Transportation (NCDOT) and the Town of Zebulon (Town) to address changes to the land use and proposed daycare site trip distribution percentages for the proposed development. It should be noted that the TIA includes the most updated site plan provided by the project team with changes to the proposed residential development densities and an additional street stub to the west, which were approved in the MOU.

2. Existing Traffic Conditions

The study area for the TIA was determined through coordination with the NCDOT and the Town and consists of the following existing intersections:

- Pearces Road and Ferrell Road
- Pearces Road and Golden Plum Lane
- Pearces Road and Pippin Road
- Pearces Road and Proctor Street
- Pearces Road and N Arendell Avenue
- Zebulon Road and Pippin Road
- Zebulon Road and Glory Road
- Zebulon Road and Ferrell Road
- Golden Plum Lane and Hunters Greene Drive

Existing peak hour traffic volumes were determined based on traffic counts conducted at the study intersections listed above, in May of 2024 by Burns Service Inc. (BSI) during typical weekday AM (7:00 AM – 9:00 AM) and PM (4:00 PM – 6:00 PM) peak periods while schools were in session. All allowable movements were analyzed with a minimum traffic volume of four (4) vehicles per hour (vph) per NCDOT Congestion Management Guidelines.

3. Site Trip Generation

Average weekday daily, AM peak hour, and PM peak hour trips for the proposed development were estimated using methodology contained within the Institute of Transportation Engineers’

(ITE) *Trip Generation Manual*, 11.1 Edition. **Table E-1** provides a summary of the trip generation potential for the site.

Table E-1: Site Trip Generation

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 Detached (210)	340 units	3,112	57	170	198	116
Single-Family Attached (215)	200 units	1,474	25	73	68	48
Day Care Center (565)	160 students	618	60	54	52	59
Total Trips		5,204	142	297	318	223
<i>Pass-By Trips: Daycare (0% AM & 44% PM)*</i>			--	--	-24	-24
Total Primary Trips			142	297	294	199

*Pass-By Rate based on NCDOT Trip Generation Rate Equation Recommendations (TripGen V11) ITE Code 565.

4. Future Traffic Conditions

Through coordination with the Town and NCDOT, it was determined that an annual growth rate of 3% would be used to generate 2031 projected weekday AM and PM peak hour traffic volumes. The following adjacent developments were identified to be included as an approved adjacent development in this study:

- Clifton Grove (also referred to as Pearces Road Residential)
- Weavers Point
- Pearces Landing

Based on coordination with the Town and NCDOT, it was determined that planned roadway improvements associated with the Town’s N Arendell Avenue/Hwy 96 Improvements project would be considered under future conditions.

5. Capacity Analysis Summary

The analysis considered weekday AM and PM peak hour traffic for existing (2024), no-build (2031), and build (2031) conditions. Study area intersections (including the proposed site

driveways) are expected to operate at acceptable levels-of-service under existing and build year conditions with the improvements discussed in **Section 7** of the TIA.

6. Development Entry Points Summary

Per the Town's UDO, the minimum number of vehicular access points should be 2 + 1 per every additional 100 lots for development with 201+ lots (unless conditions per UDO Section 6.10.I are met). The site plan currently shows site access is proposed via the following:

- One (1) full-movement driveway along Pearces Road
- Cross Access with Golden Plum Lane via Hunters Greene Drive
- Street stub to the north (future potential interconnectivity)
- Street stub to the west (future potential interconnectivity)

Based on the analysis of build (2031) traffic conditions, the results of this TIA conclude that there will not be capacity analysis or queuing issues at the access points that are provided that would indicate the need for additional site access. Refer to **Section 7.11.** of the TIA report for more information under build year conditions.

7. Recommendations

Based on the findings of this study, specific geometric and traffic control improvements have been identified and are recommended to accommodate future traffic conditions at the study intersections. The improvements are summarized below, and recommended lane configurations are illustrated in **Figure E-1** for the proposed development.

Background Improvements by the Town's N Arendell Avenue/Hwy 96 Improvements project:

Pearces Road [WB] and N Arendell Avenue [NB/SB]

- Extend the existing southbound left-turn lane along N Arendell Avenue to approximately 275 feet of storage and appropriate deceleration and taper length.
- Restripe the existing westbound right-turn lane along Pearces Road to a shared left/right turn lane.
- Restripe the existing northbound right-turn lane along N Arendell Avenue to a shared through/right turn lane.
- Construct an additional northbound receiving lane along N Arendell Avenue that drops to one lane approximately 830 feet north of Pearces Road.

- Construct an additional southbound through lane along N Arendell Avenue that will drop to one lane approximately 830 feet north of Pearces Road.
- Construct an additional southbound receiving lane along N Arendell Avenue that extends to the existing dual southbound through lanes south of Hendricks Drive.
- Provide a pedestrian crosswalk on the northern leg of the intersection crossing N Arendell Avenue.
- Provide a pedestrian crosswalk on the eastern leg of the intersection crossing Pearces Road.
- Modify signal timings to accommodate new lane configurations.

Recommended Improvements by Developer:

Pearces Road [NB/SB] and Pippin Road [EB/WB]

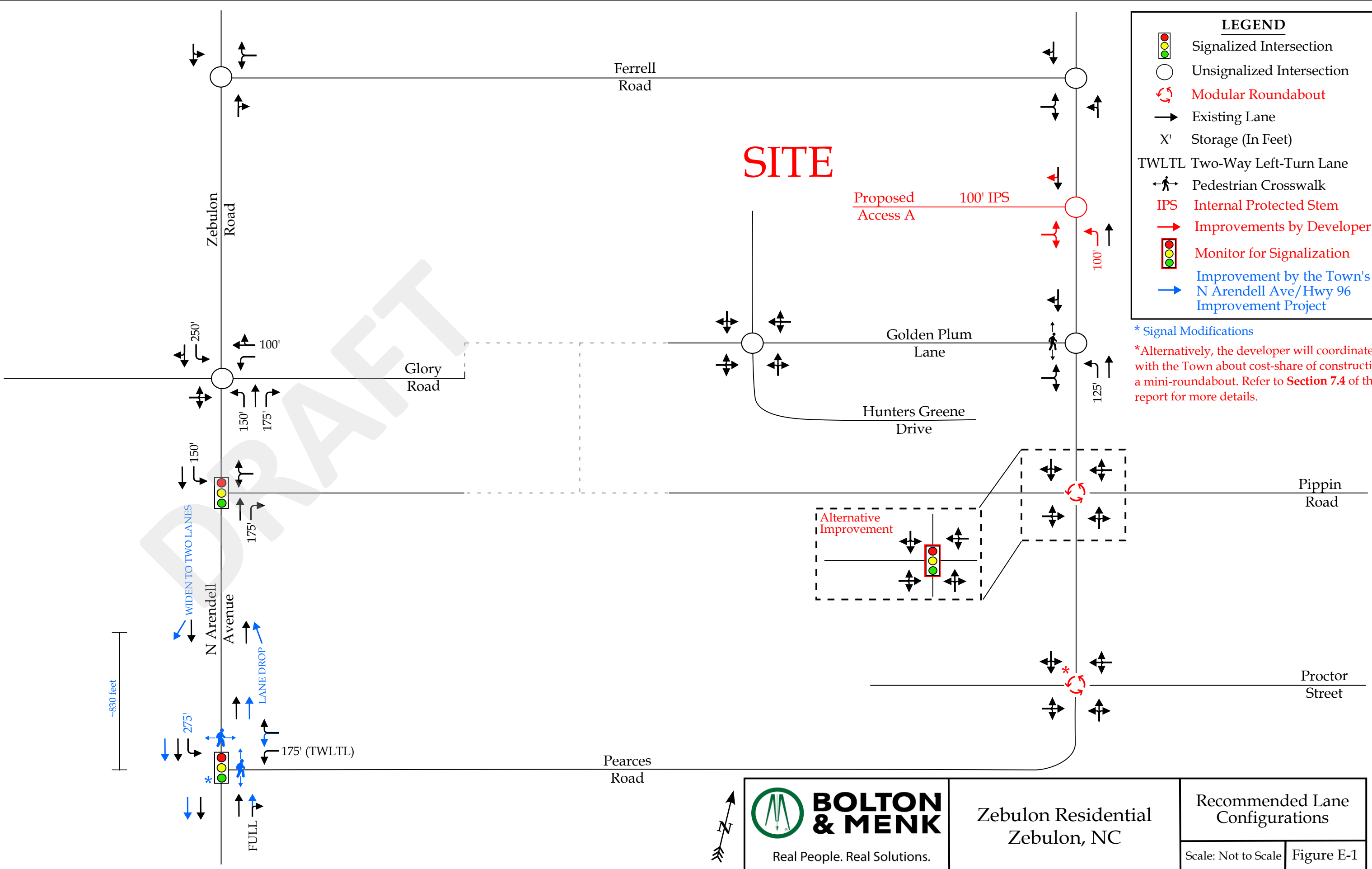
- Construct a modular roundabout.
- OR
- Monitor the intersection for signalization.

Pearces Road [NB/SB] and Proctor Street [EB/WB]

- Construct a modular roundabout.
- OR
- The developer will coordinate with the Town about cost-sharing for the construction of a mini-roundabout with a fee-in-lieu that is proportionate to the development's impacts.

Pearces Road [NB/SB] and Proposed Access A [EB]

- Construct the eastbound approach [Proposed Access A] with one (1) ingress lane and (1) egress lane.
- Provide stop-control for the eastbound approach.
- Provide 100 feet of IPS.
- Construct a northbound left-turn lane along Pearces Road with approximately 100 feet of storage and appropriate deceleration and taper length.



LEGEND

- Signalized Intersection
- Unsignalized Intersection
- Modular Roundabout
- Existing Lane
- Storage (In Feet)
- TWLTL Two-Way Left-Turn Lane
- Pedestrian Crosswalk
- IPS Internal Protected Stem
- Improvements by Developer
- Monitor for Signalization
- Improvement by the Town's N Arendell Ave/Hwy 96 Improvement Project

* Signal Modifications
 * Alternatively, the developer will coordinate with the Town about cost-share of constructing a mini-roundabout. Refer to Section 7.4 of the report for more details.

~830 feet

WIDEN TO TWO LANES

FULL

175' (TWLTL)

Alternative Improvement

Proposed 100' IPS Access A



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 Zebulon, NC

Recommended Lane Configurations	
Scale: Not to Scale	Figure E-1

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DRAFT – TRAFFIC IMPACT ANALYSIS
ZEBULON RESIDENTIAL
ZEBULON, NORTH CAROLINA

1. INTRODUCTION

The contents of this report present the findings of the Traffic Impact Analysis (TIA) conducted for the proposed residential development to be located along Pearces Road, east of Zebulon Road (NC 96) in Zebulon, 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.

It should be noted that a Memorandum of Understanding (MOU) was originally submitted on June 12th, 2024; however, an MOU update (hereinafter referenced as MOU) was submitted on August 21st, 2024, and approved by the North Carolina Department of Transportation (NCDOT) and the Town of Zebulon (Town) to address changes to the land use and proposed daycare site trip distribution percentages for the proposed development. It should be noted that this TIA includes the most updated site plan provided by the project team with changes to the proposed residential development densities and an additional street stub to the west, which were approved in the MOU. Refer to **Appendix A** for the approved MOU.

The proposed development, anticipated to be completed in 2031, is assumed to consist of a maximum of 340 single-family detached units, 200 single-family attached units, and a 160-student daycare center. It should be noted that the preliminary site plan shows a lower number of total residential units (517 units) than the proposed maximum total residential units (540 units). The site plan currently shows site access is proposed via the following:

- One (1) full-movement driveway along Pearces Road
- Cross Access with Golden Plum Lane via Hunters Greene Drive
- Street stub to the north (future potential interconnectivity)
- Street stub to the west (future potential interconnectivity)

Per the Town of Zebulon’s Unified Development Ordinance (UDO), the minimum number of vehicular access points should be 2 + 1 per every additional 100 lots for developments with 201+ lots (unless conditions per UDO Section 6.10.1 are met). However, this report only analyzes the two proposed access points. This provides a worst-case scenario as additional driveways would alleviate traffic at the driveways modeled.

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

- Existing Traffic Conditions (2024)
- No-Build Traffic Conditions (2031)
- Build Traffic Conditions (2031)

It should be noted that this study analyzes the build out year (2031) for the future analysis scenario instead of build +1 analysis scenario (typically preferred based on the Town’s UDO). This methodology was approved by the Town as part of the MOU and follows typical NCDOT Congestion Management guidelines. Refer to **Appendix A** for a copy of the approved MOU.

1.1. Site Location and Study Area

The development is proposed to be located along Pearces Road in Zebulon, North Carolina. Refer to **Figure 1** for the site location map.

The study area for the TIA was determined through coordination with the NCDOT and the Town and consists of the following existing intersections:

- Pearces Road and Ferrell Road
- Pearces Road and Golden Plum Lane
- Pearces Road and Pippin Road
- Pearces Road and Proctor Street
- Pearces Road and N Arendell Avenue
- Zebulon Road and Pippin Road
- Zebulon Road and Glory Road

- Zebulon Road and Ferrell Road
- Golden Plum Lane and Hunters Greene Drive

Refer to **Appendix A** for the approved scoping documentation.

1.2. Proposed Land Use and Site Access

The proposed development is expected to be located along Pearces Road and consist of a maximum of 340 single-family detached units, 200 single-family attached units, and a 160-student daycare center. It should be noted that the preliminary site plan shows a lower number of total residential units (517 units) than the proposed maximum total residential units (540 units). The site plan currently shows site access is proposed via the following:

- One (1) full-movement driveway along Pearces Road
- Cross Access with Golden Plum Lane via Hunters Greene Drive
- Street stub to the north (future potential interconnectivity)
- Street stub to the west (future potential interconnectivity)

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 residential, undeveloped and agricultural uses. Wakelon Elementary School is located at the intersection of Zebulon Road (NC 96) and Pippin Road. South of the proposed development, along NC 96, are interstate ramps that connect to I-26. I-26 West connects Zebulon to Raleigh and other surrounding communities. I-26 East/US 264 East connect Zebulon to I-95 in Rocky Mount and Wilson.

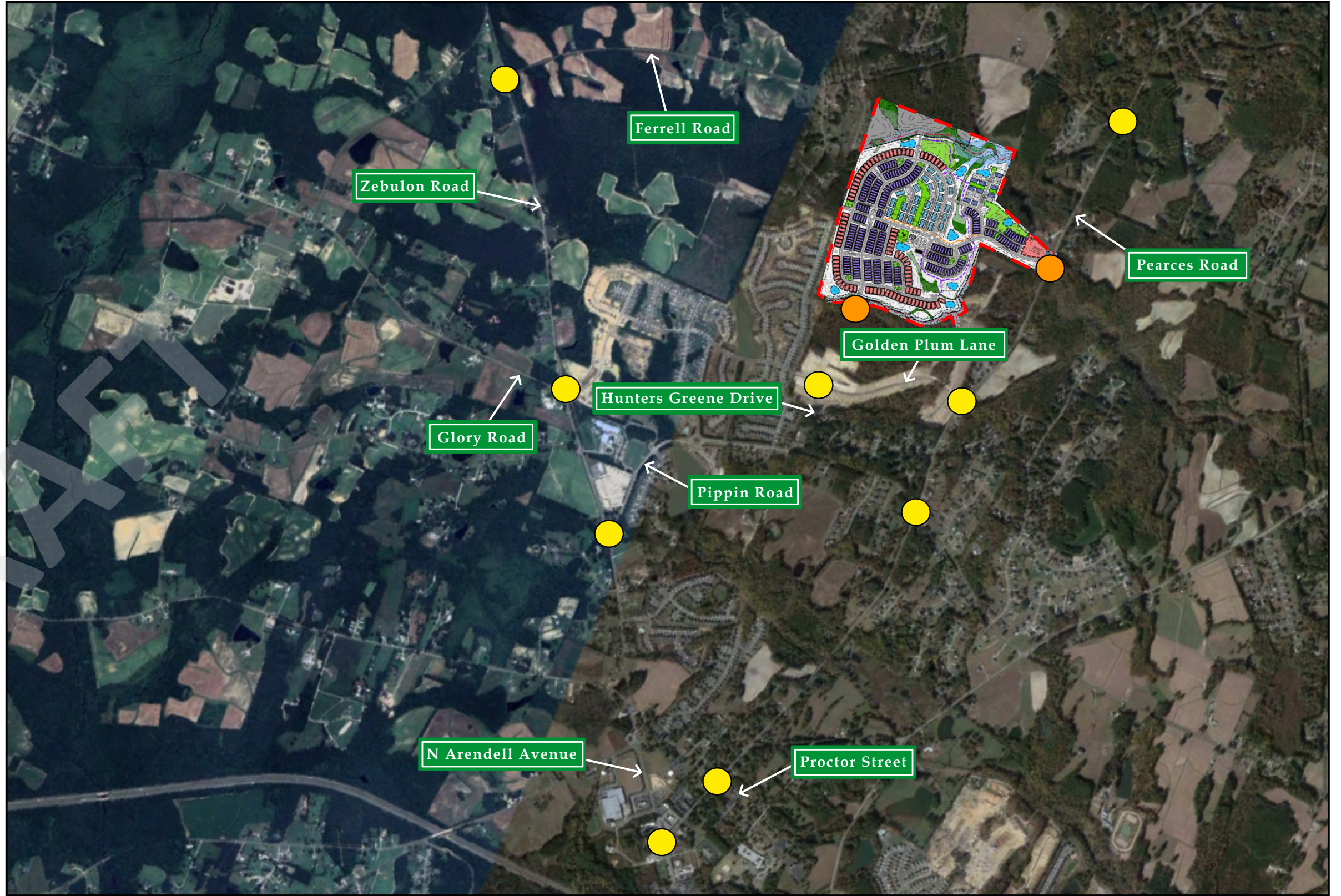
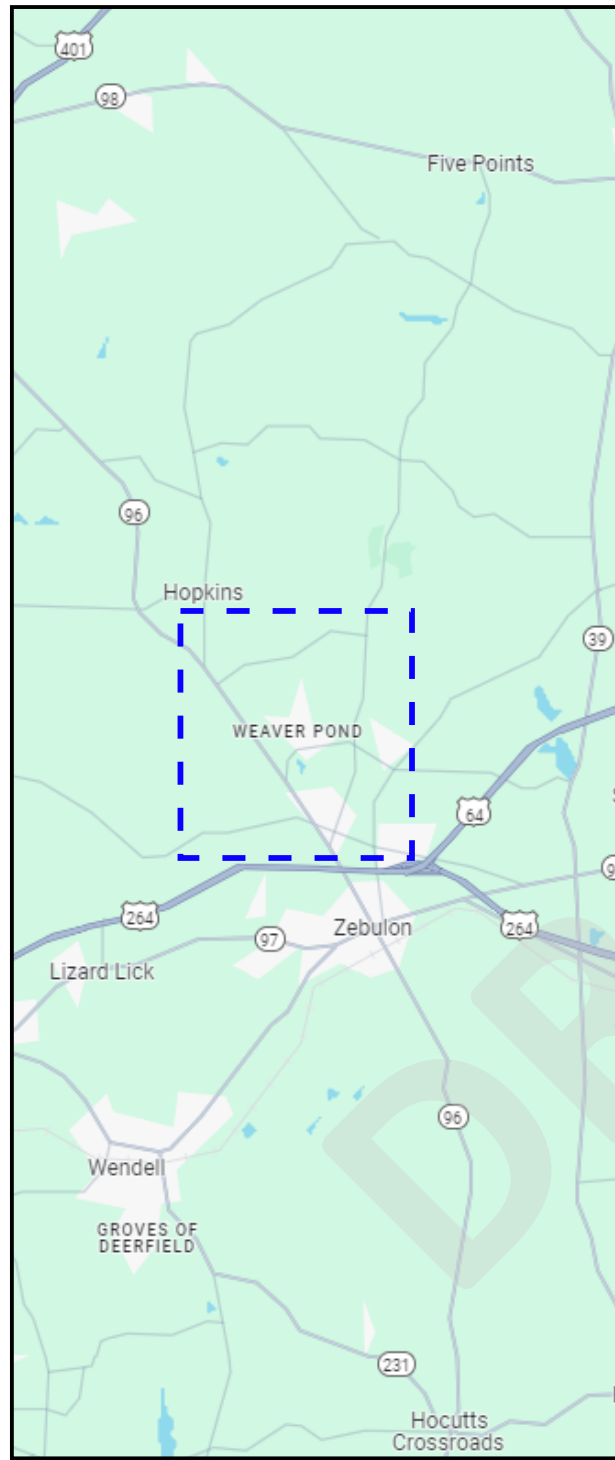
1.4. Existing Roadways

Existing lane configurations (number of traffic lanes on each intersection approach), speed limits, 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	Maintained By	2021 AADT (vpd)
Pearces Road	SR-1001	2-lane undivided	35 mph / 45 mph	NCDOT	6,800 (north of Proctor Street) / 4,200 (south of Ferrell Road)
Ferrell Road	SR-2336	2-lane undivided	Not Posted	NCDOT	1,000*
Golden Plum Lane	N/A	2-lane undivided	25 mph	Town	1,010*
Pippin Road	SR-2337	2-lane undivided	35 mph / 45 mph	Town	1,970*
Proctor Street	SR-2320	2-lane undivided	25 mph / 35 mph	NCDOT	2,700
Zebulon Road / N Arendell Avenue	NC 96	2-lane undivided	35 mph / 45 mph	NCDOT	10,500 (north of Pippin Road) / 12,500 (north of Pearces Road)
Glory Road	SR-2333	2-lane undivided	25 mph / Not Posted	NCDOT / Town	1,340*
Hunters Greene Drive	N/A	2-lane undivided	25 mph	Town	140*

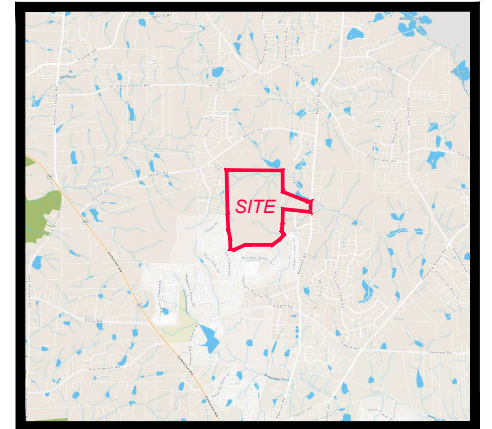
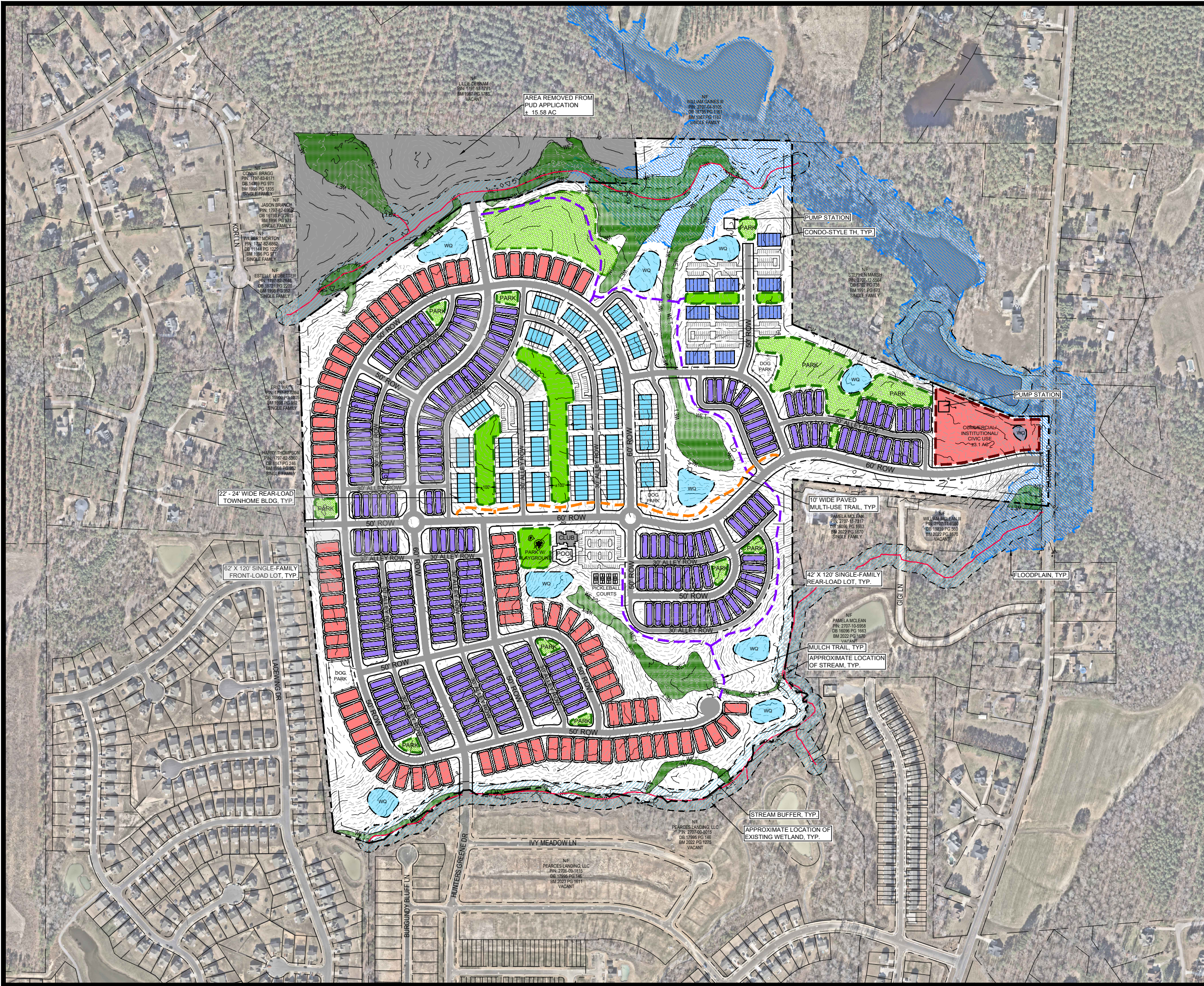
*ADT based on the traffic counts from 2024 and assuming the weekday PM peak hour volume is 10% of the average daily traffic.



LEGEND

- Proposed Site Location
- Study Area
- Study Intersection
- Proposed Site Access

 <p>BOLTON & MENK Real People. Real Solutions.</p>	<p>Zebulon Residential Zebulon, NC</p>	<p>Site Location Map</p>	
	<p>Scale: Not to Scale</p>		<p>Figure 1</p>



VICINITY MAP
NTS

PEARCES RD CONCEPT PLAN

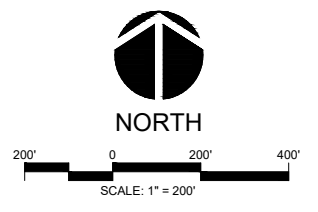
ZEBULON, NC
OCTOBER 22, 2024

SITE DATA

TOTAL PROJECT AREA=	±160.62 AC
PIN=	1797914808, 2707125054
EXISTING ZONING=	R-30 (WAKE COUNTY)
TOTAL INSTITUTIONAL/ COMM=	±3.1 AC
TOTAL UNITS=	±517 (3.21 DU/ AC)
TOWNHOMES=	±53 UNITS (CONDO-STYLE) ±144 UNITS (REAR-LOAD)
SINGLE FAMILY LOTS=	±231 (42' X 120' REAR-LOAD) ±89 (62' X 120' REAR-LOAD)
TOTAL LF OF ROADS=	±7,380 LF (60' ROW) ±10,240 LF (50' ROW) ±12,140 LF (30' ALLEY ROW)
OPEN SPACE REQUIRED=	±16.1 AC MIN. (10% OF DEV. AREA)

LEGEND








	18' WIDE CONDO-STYLE TOWNHOME
	22' - 24' WIDE REAR-LOAD TOWNHOME
	42' X 120' SINGLE-FAMILY REAR-LOAD LOT
	62' X 120' SINGLE-FAMILY FRONT-LOAD LOT
	POCKET PARK
	COMMON LAWN/ AMENITY SITE
	MULCH TRAIL
	10' WIDE PAVED MULTI-USE TRAIL



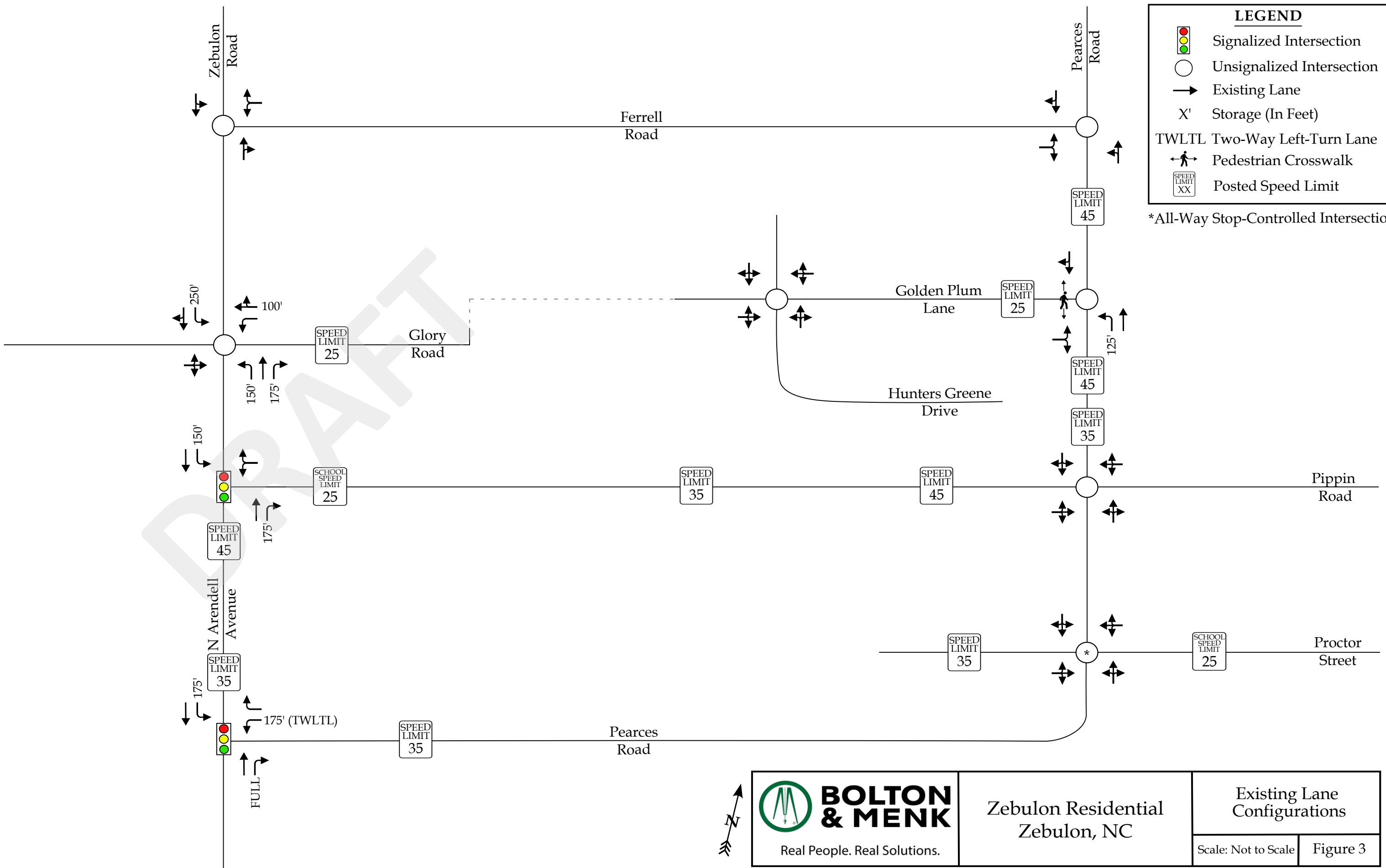
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LEGEND

-  Signalized Intersection
-  Unsignalized Intersection
-  Existing Lane
-  Storage (In Feet)
-  TWLTL Two-Way Left-Turn Lane
-  Pedestrian Crosswalk
-  Posted Speed Limit

*All-Way Stop-Controlled Intersection



 BOLTON & MENK Real People. Real Solutions.	Zebulon Residential Zebulon, NC	Existing Lane Configurations	
	Scale: Not to Scale		Figure 3

2. EXISTING PEAK HOUR CONDITIONS (2024)

2.1. Existing Peak Hour Traffic Volumes (2024)

Existing peak hour traffic volumes were determined based on traffic counts conducted at the study intersections listed below, in May of 2024 by Burns Service Inc. (BSI) during typical weekday AM (7:00 AM – 9:00 AM) and PM (4:00 PM – 6:00 PM) peak periods while schools were in session.

- Pearces Road and Ferrell Road
- Pearces Road and Golden Plum Lane
- Pearces Road and Pippin Road
- Pearces Road and Proctor Street
- Pearces Road and N Arendell Avenue
- Zebulon Road and Pippin Road
- Zebulon Road and Glory Road
- Zebulon Road and Ferrell Road
- Golden Plum Lane and Hunters Greene Drive

Due to existing developments between the study intersections, existing peak hour traffic volumes were not balanced between intersections. Additionally, all u-turns at unsignalized intersections were added to the left-turn traffic volumes due to inadequate turning radii and low u-turn volumes.



Signal information obtained from NCDOT shows that the existing intersection of Pearces Road (WB) and N Arendell Avenue (NB/SB) is signalized for three (3) of four (4) approaches. Traffic count data showed low volumes for the unsignalized leg (EB) approach of the intersection, likely due to lack of curb & gutter and no driveway delineation (vehicles not restricted where they enter/exit commercial sites west of N Arendell Avenue). Based on low volumes and limitations in Synchro, the signalized intersection of Pearces Road and N Arendell Avenue was analyzed as a three (3) leg intersection under existing peak hour traffic conditions, as shown in the signal plans. It should be noted that the methodology discussed above was approved by the Town and NCDOT as part of the MOU.

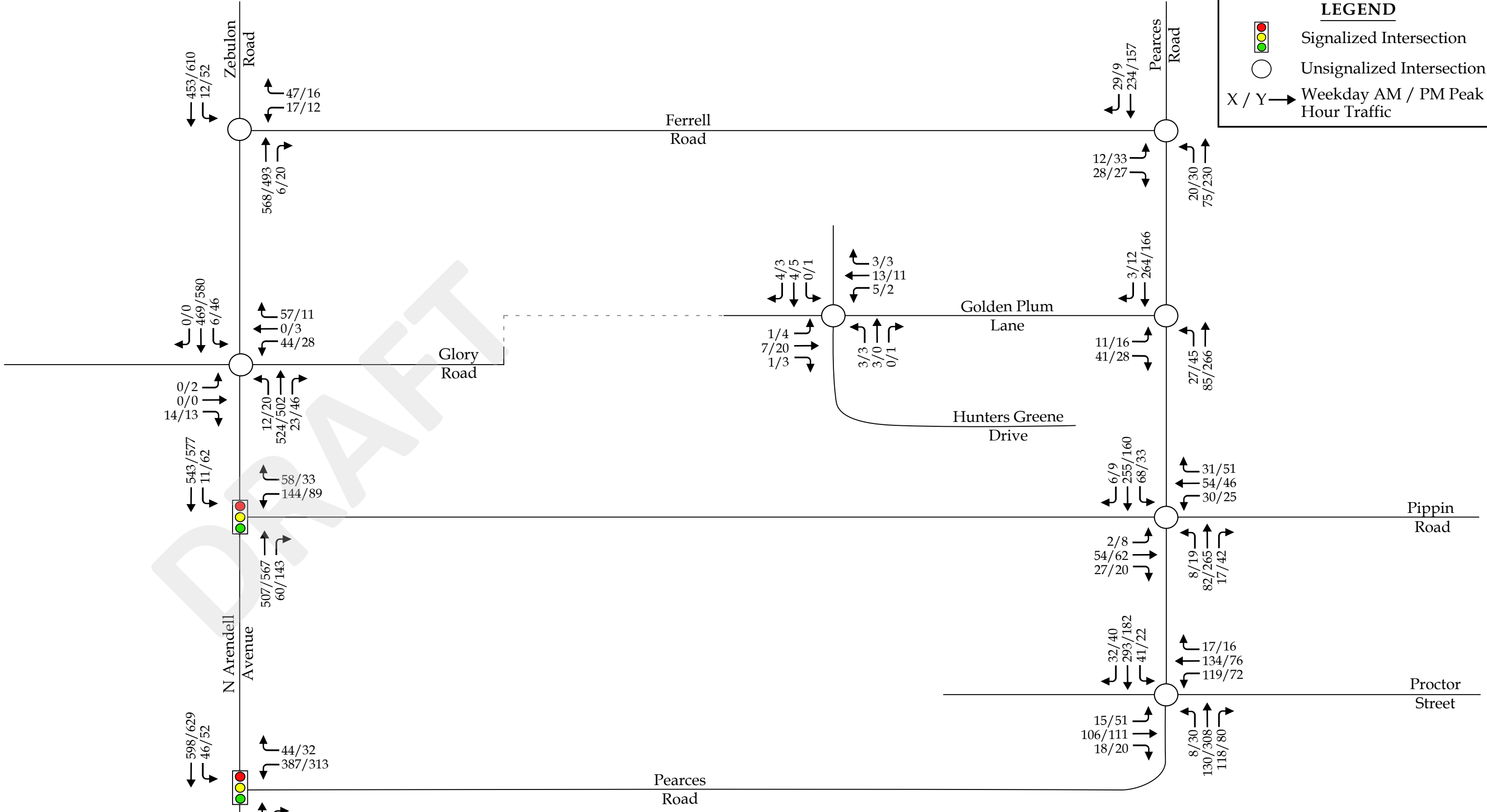
Refer to **Figure 4** for existing weekday AM and PM peak hour traffic volumes (2024). A copy of the count data is located in **Appendix B** of this report.

2.2. Analysis of Existing Peak Hour Traffic Conditions (2024)

The existing weekday AM and PM peak hour traffic volumes (2024) 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**. It should be noted that the intersection of Zebulon Road and Glory Road has existing pavement for two (2) egress lanes along the westbound approach of Glory Road. At the time of the traffic counts, there were no pavement markers delineating the lane configuration. Through coordination with NCDOT and the Town, it was determined that the existing lane configuration of the westbound approach of Glory Road would be a shared through/right lane with approximately 100 feet of storage and an exclusive left-turn lane. Refer to **Appendix D** for the final lane recommendations at this intersection provided by NCDOT. The results of the analysis are presented in **Section 7** of this report.

LEGEND

-  Signalized Intersection
-  Unsignalized Intersection
- X / Y → Weekday AM / PM Peak Hour Traffic



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.



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Existing Peak Hour Traffic (2024)	
Scale: Not to Scale	Figure 4

3. NO-BUILD PEAK HOUR CONDITIONS (2031)

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 2031 projected weekday AM and PM peak hour traffic volumes. Refer to **Figure 5** for projected peak hour traffic (2031).

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:

- Clifton Grove (also referred to as Pearces Road Residential)
- Weavers Point
- Pearces Landing

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
Clifton Grove	To be located off Pearces Road and Pippin Road in Zebulon, NC	2024	232 Single-Family Detached Units	October 2020 by Timmons Group
Weavers Point	North of Pippin Road and east of Zebulon Road in Zebulon, NC	2024	105 Single-Family Detached Units	Traffic Assessment Performed July 2022 by RKA
Pearces Landing	Along Golden Plum Lane, west of Pearces Road in Zebulon, NC	N/A <i>Assumed to be constructed prior to the build-out of the proposed development.</i>	212 Single-Family Detached Units & 165 Single-Family Attached Units	No TIA Performed <i>Trips were generated and distributed throughout the roadway network.</i>

Through coordination with the Town and NCDOT, it was determined that of the total 377 units for the Pearces Landing development, 177 units have been issued a certificate of occupancy. This ratio was used to determine the remaining development and associated site trips for the development that have yet to be constructed/occupied. The remaining Pearces Landing site trips were estimated using methodology contained within the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*, 11.1 Edition. The Pearces Landing site trips were distributed throughout the study network following the same approved regional distribution as the proposed Zebulon residential development.

The adjacent development traffic from the Clifton Grove and Weavers Point developments was rerouted to utilize Golden Plum Lane, where applicable. At the time of the traffic analysis for these developments, the Golden Plum Lane connection had not been constructed at Pearces Road; however, since it is constructed now, site traffic for these developments would likely utilize Golden Plum Lane which provides a more direct route to the various developments. All adjacent development methodology and assumptions were approved by the Town and NCDOT as part of the MOU.

The total adjacent development trips are shown in **Figure 6**. Refer to **Appendix D** for the adjacent development information.

3.3. Future Roadway Improvements

Based on coordination with the Town and NCDOT, it was determined that planned roadway improvements associated with the Town's N Arendell Avenue/Hwy 96 Improvements project would be considered under future conditions. This project includes widening improvements along N Arendell Avenue, pedestrian improvements, pavement marking updates, signal updates, and extending the existing southbound (N Arendell Avenue) left-turn lane storage at the intersection of Pearces Road and N Arendell Avenue. Since final design signal plans have not been provided, the intersection of Pearces Road and N Arendell Avenue was analyzed with a protected southbound left-turn phase and signal timings were optimized. Refer to **Appendix E** for the future roadway plans found on the Town's Interactive Development Map.

During scoping, the Town indicated that there has been consideration for a mini-roundabout at the intersection of Pearces Road and Proctor Street; however, since there are no plans for a mini-roundabout yet, it was not included in no-build (2031) traffic conditions.

3.4. No-Build Peak Hour Traffic Volumes (2031)

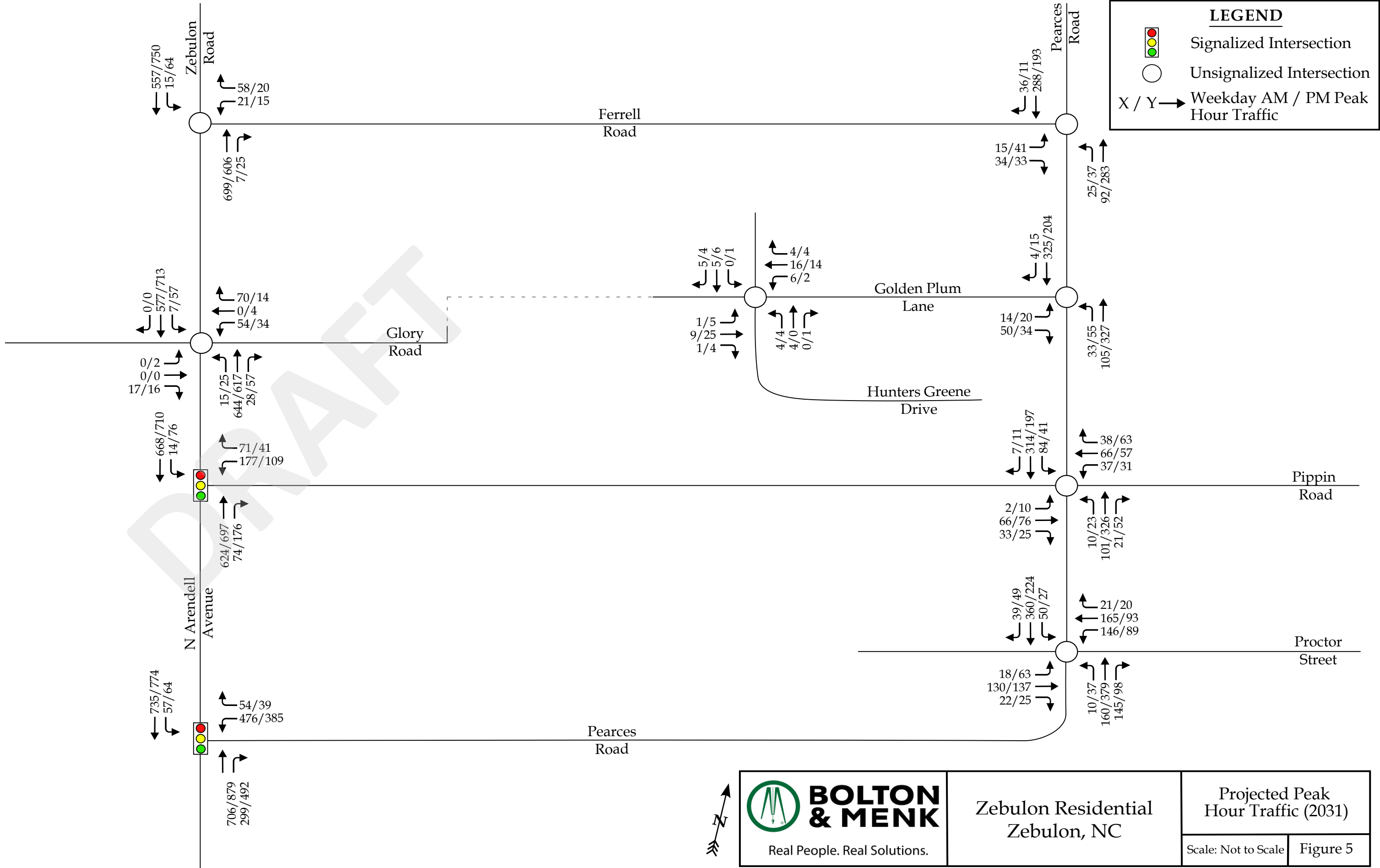
The no-build traffic volumes (2031) were determined by projecting the existing peak hour traffic (2024) to the year 2031 and adding the adjacent development trips. Refer to **Figure 7** for an illustration of the no-build peak hour traffic volumes (2031) at the study intersections.

3.5. Analysis of No-Build Peak Hour Traffic Conditions (2031)

The no-build AM and PM peak hour traffic volumes (2031) at the study intersections were analyzed with future geometric roadway conditions and traffic control. The analysis results are presented in **Section 7** of this report.

LEGEND

- Signalized Intersection
- Unsignalized Intersection
- X / Y → Weekday AM / PM Peak Hour Traffic





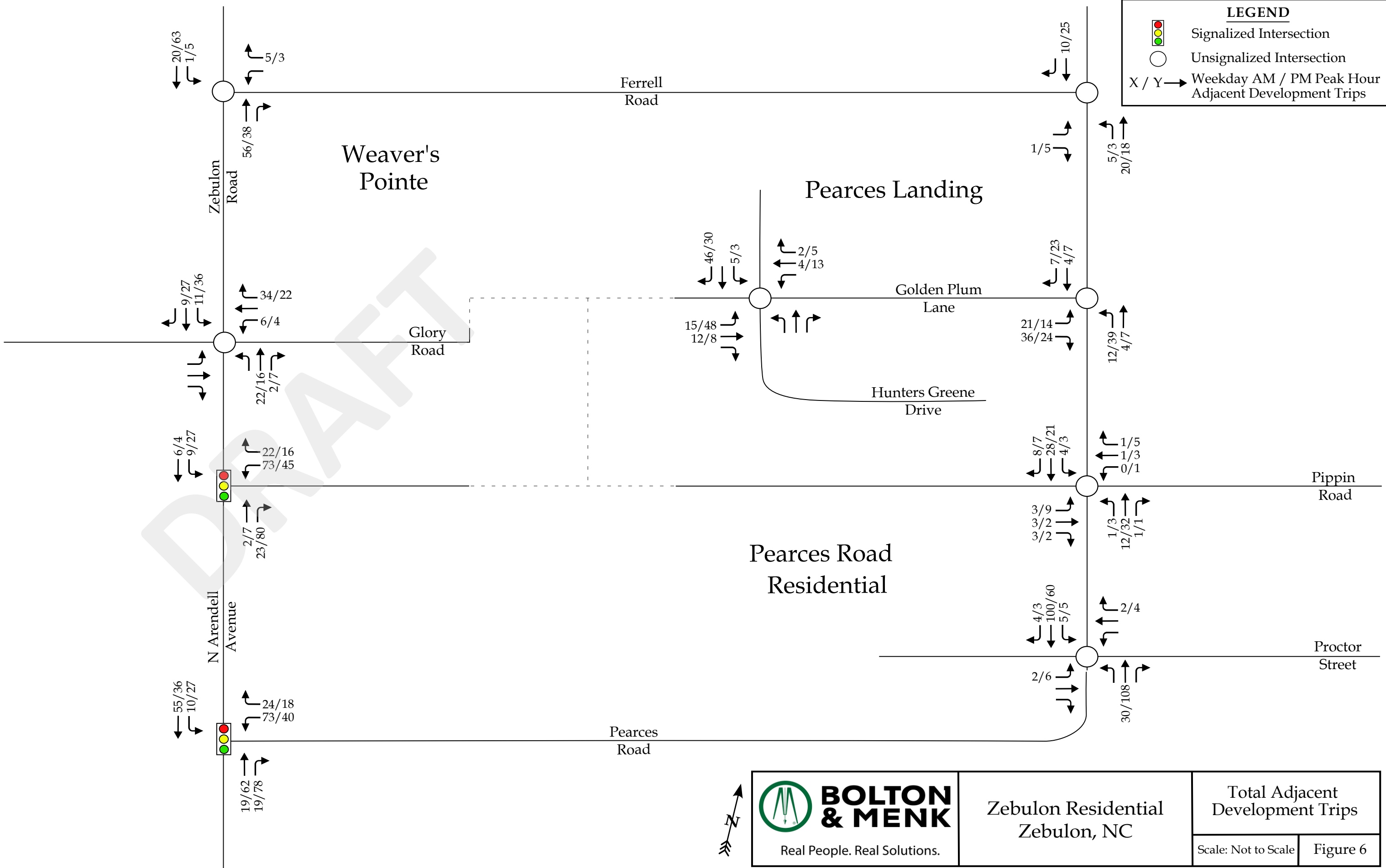
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Projected Peak
Hour Traffic (2031)
Scale: Not to Scale | Figure 5

LEGEND

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





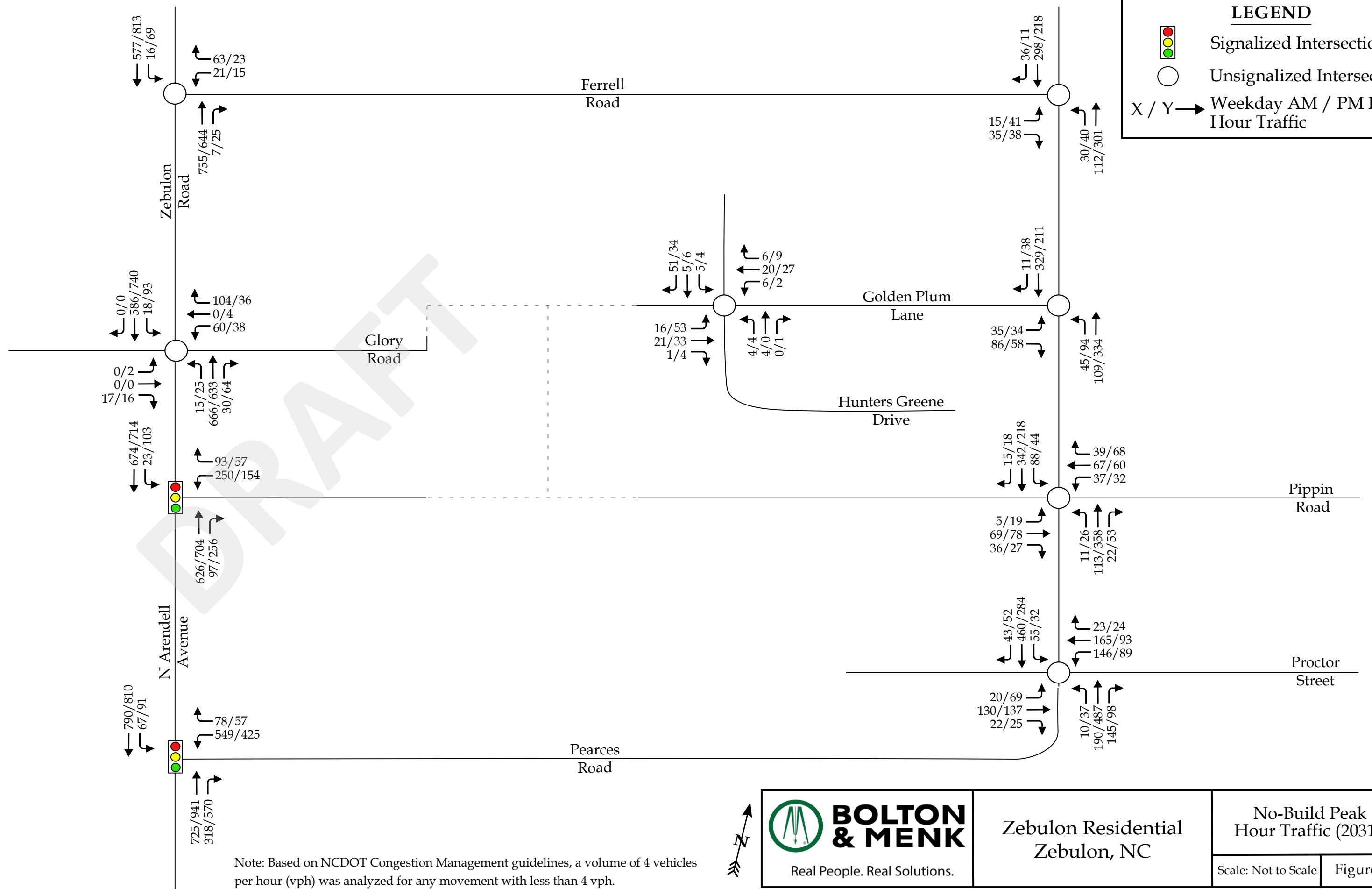

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Total Adjacent Development Trips	
Scale: Not to Scale	Figure 6

LEGEND

-  Signalized Intersection
-  Unsignalized Intersection
- X / Y → Weekday AM / PM Peak Hour Traffic



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.



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No-Build Peak Hour Traffic (2031)
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 340 single-family detached units, 200 single-family attached units, and a 160-student daycare center. The project team indicated that the planned number of total residential units is lower than the proposed maximum total residential units (540 units) considered in this study, which provides a conservative analysis [results in higher estimated site trips for the proposed development]. 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*, 11.1 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 Detached (210)	340 units	3,112	57	170	198	116
Single-Family Attached (215)	200 units	1,474	25	73	68	48
Day Care Center (565)	160 students	618	60	54	52	59
Total Trips		5,204	142	297	318	223
<i>Pass-By Trips: Daycare (0% AM & 44% PM)*</i>			--	--	-24	-24
Total Primary Trips			142	297	294	199

*Pass-By Rate based on NCDOT Trip Generation Rate Equation Recommendations (TripGen V11) ITE Code 565.

It is estimated that the proposed development will generate approximately 5,204 total site trips on the roadway network during a typical 24-hour weekday period. Of the daily traffic volume, it is anticipated that 439 trips (142 entering and 297 exiting) will occur during the weekday AM peak hour and 541 trips (318 entering and 223 exiting) will occur during the weekday PM peak hour.

Internal capture of trips between the residential and daycare land uses were not considered to provide a conservative estimate; however, it is likely that trips will be made within the site between the two land uses. Therefore, a distribution of daycare trips will be provided to/from the surrounding residential developments.

Pass-by trips were taken into consideration. Pass-by trips are made by the traffic already using the adjacent roadway, entering the site as an intermediate stop on their way to another destination. Pass-by percentages are applied to site trips after adjustments for internal capture. Pass-by trips are expected to account for approximately 48 trips (24 entering and 24 exiting) during the weekday PM peak hour. Due to the low potential for pass-by in the weekday AM peak hour and NCDOT recommendations, a pass-by rate of 44% was used only in the weekday PM peak hour based on the ITE land use 565. It should be noted that the pass-by trips were balanced, as it is likely that these trips would enter and exit in the same hour.

The total primary site trips are the calculated site trips after the reduction for pass-by trips. Primary site trips are expected to generate approximately 439 trips (142 entering and 297 exiting) during the weekday AM peak hour and 493 trips (294 entering and 199 exiting) 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 in the vicinity of the study area, and engineering judgement. The regional distributions outlined below, and on the following page, were approved by the Town and NCDOT as part of the MOU.

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

- 30% to/from the north via Zebulon Road
- 5% to/from the north via Pearces Road
- 60% to/from the south via N Arendell Avenue
- 5% to/from the east via Pippin Road

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

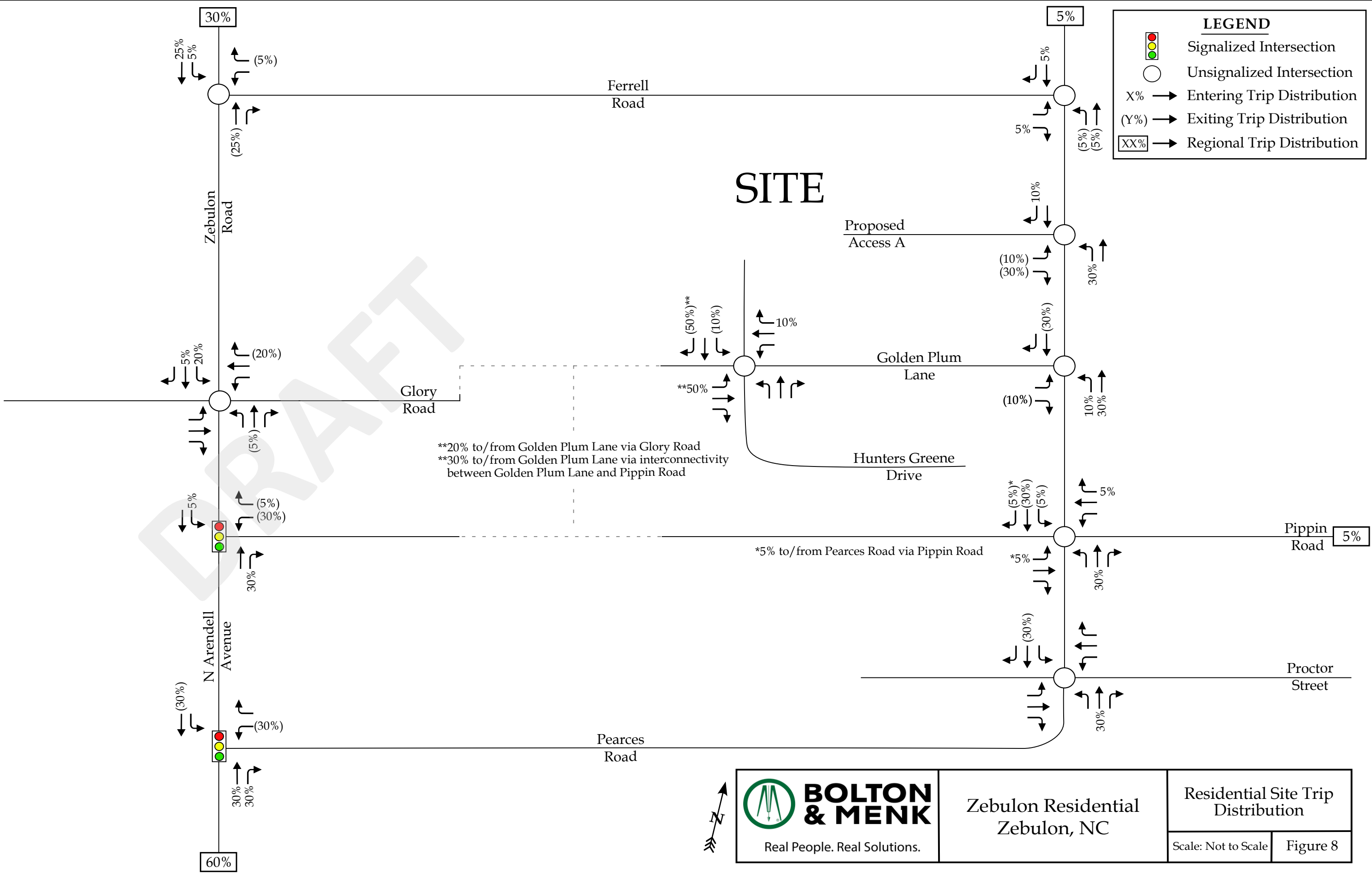
- 5% to/from the north via Zebulon Road
- 5% to/from the north via Pearces Road
- 20% to/from the south via N Arendell Avenue
- 10% to/from the east via Pippin Road
- 15% to/from the east via Proctor Street
- 25% to/from the residential developments along Glory Road/Golden Plum Lane (between Zebulon Road and Hunters Greene Drive)
- 5% to/from the residential developments along Golden Plum Lane (between Hunters Greene Drive and Pearces Road) via interconnectivity and cross access to the site
- 10% to/from the residential developments along Pippin Road (between Zebulon Road and Pearces Road)
- 5% to/from the proposed Zebulon Residential development via internal connections

It should be noted that no distribution was assigned to the Wakelon Elementary School; however, it would be expected that a percentage of the traffic from a residential development would travel to/from the school during the AM peak hour. A conservative estimate of proposed site trips at the study area intersections is provided by assuming the school is not an original destination for the proposed site trips.

Refer to **Figure 8** and **Figure 9** for an illustration of the residential and daycare site trip distribution, respectively. The residential site trip assignment is shown in **Figure 10** and the primary daycare site trip assignment is shown in **Figure 11**.

The pass-by site trips were distributed based on existing traffic patterns. Refer to **Figure 12** for the PM pass-by site trip distribution and **Figure 13** for the PM pass-by site trips.

The total site trips were determined by adding the primary site trips and the pass-by site trips. Refer to **Figure 14** for the total peak hour site trips at the study intersections for the proposed development.



LEGEND

- Signalized Intersection
- Unsignalized Intersection
- X% Entering Trip Distribution
- (Y%) Exiting Trip Distribution
- XX% Regional Trip Distribution

**20% to/from Golden Plum Lane via Glory Road
 **30% to/from Golden Plum Lane via interconnectivity between Golden Plum Lane and Pippin Road

*5% to/from Pearces Road via Pippin Road

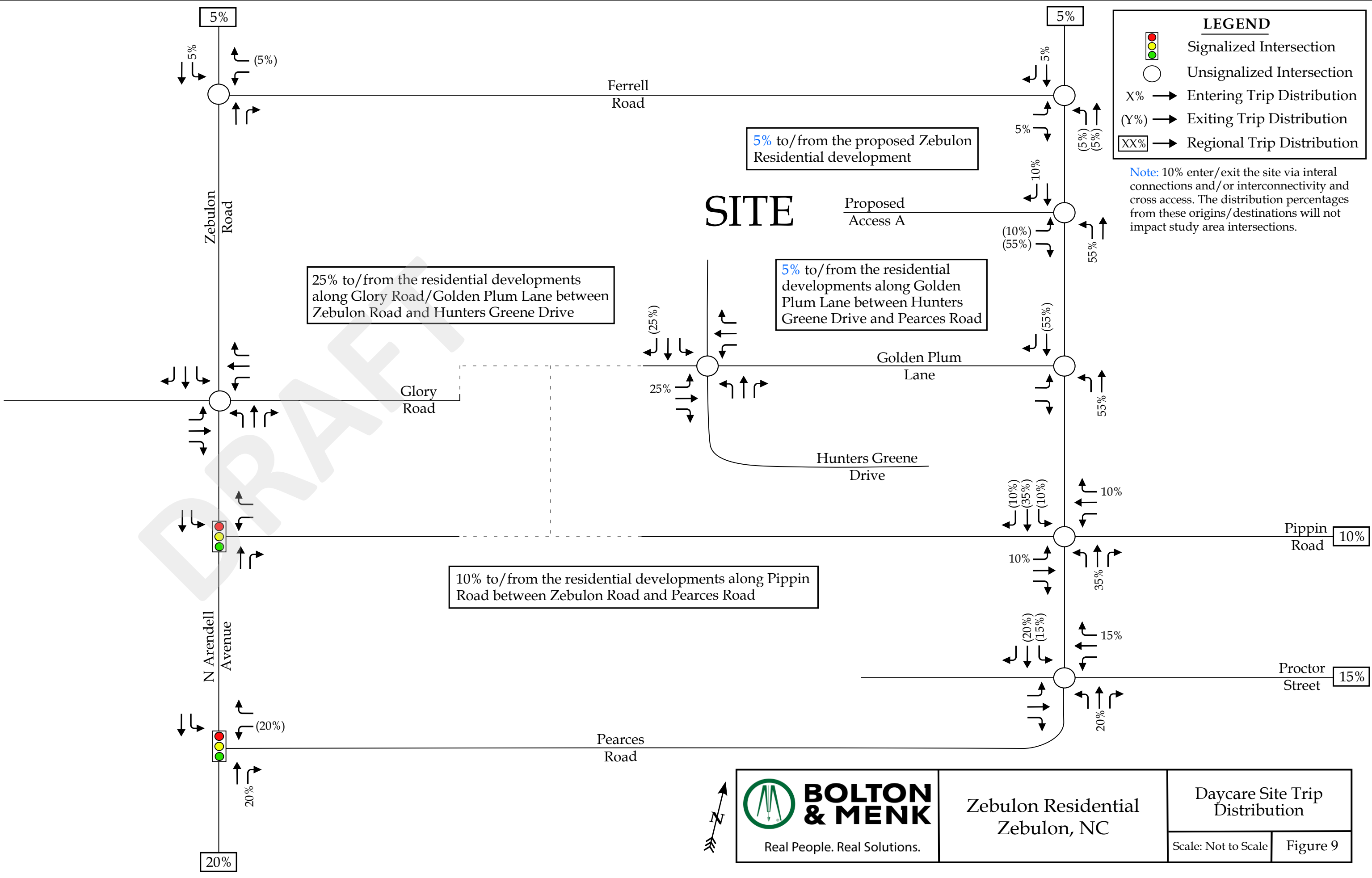


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

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 Zebulon, NC

Residential Site Trip Distribution

Scale: Not to Scale	Figure 8
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LEGEND

-  Signalized Intersection
-  Unsignalized Intersection
- X% → Entering Trip Distribution
- (Y%) → Exiting Trip Distribution
- XX% → Regional Trip Distribution

Note: 10% enter/exit the site via internal connections and/or interconnectivity and cross access. The distribution percentages from these origins/destinations will not impact study area intersections.

5% to/from the proposed Zebulon Residential development

25% to/from the residential developments along Glory Road/Golden Plum Lane between Zebulon Road and Hunters Greene Drive

5% to/from the residential developments along Golden Plum Lane between Hunters Greene Drive and Pearces Road

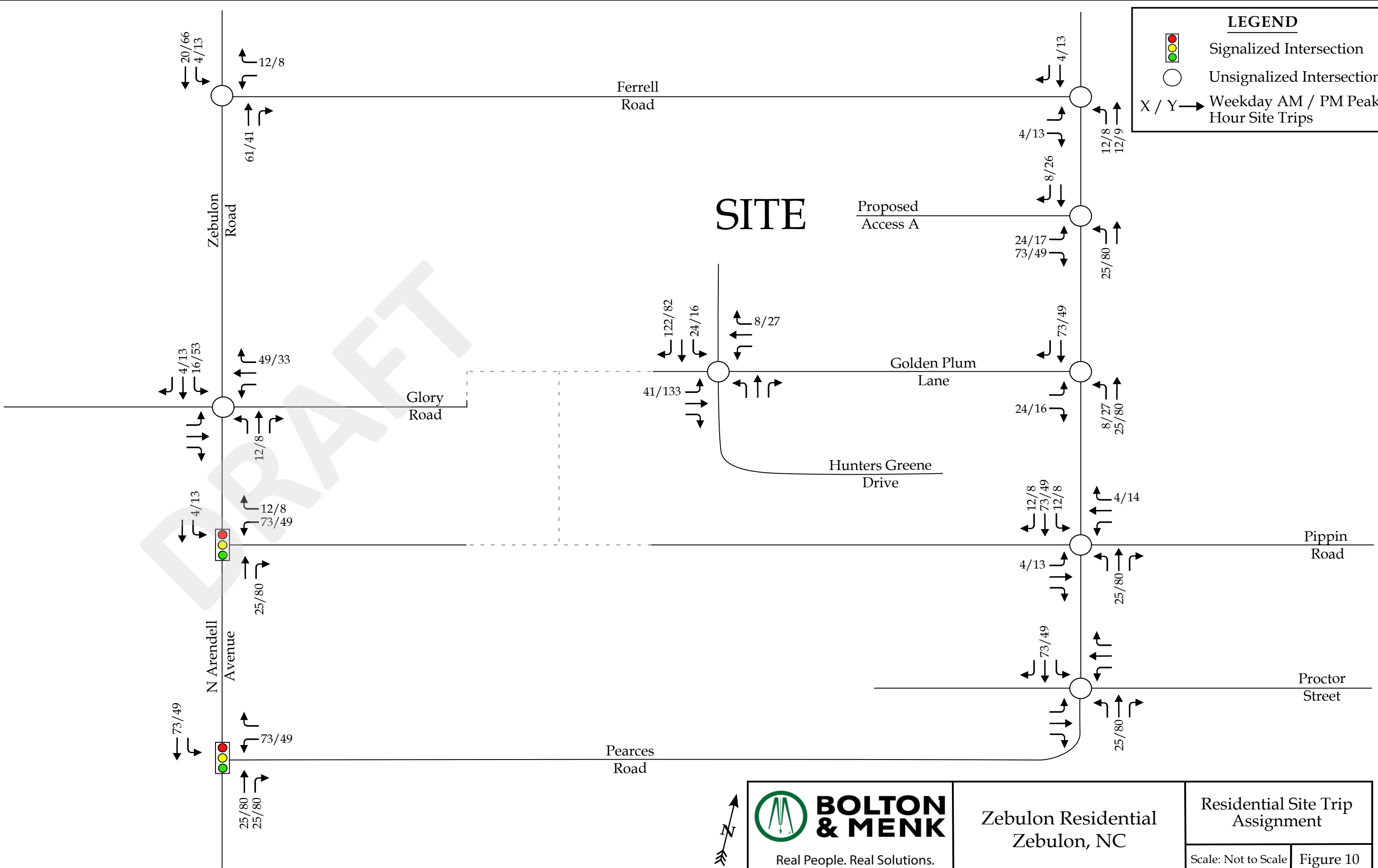
10% to/from the residential developments along Pippin Road between Zebulon Road and Pearces Road





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Daycare Site Trip Distribution
Scale: Not to Scale Figure 9



LEGEND

-  Signalized Intersection
-  Unsignalized Intersection
- X / Y → Weekday AM / PM Peak Hour Site Trips

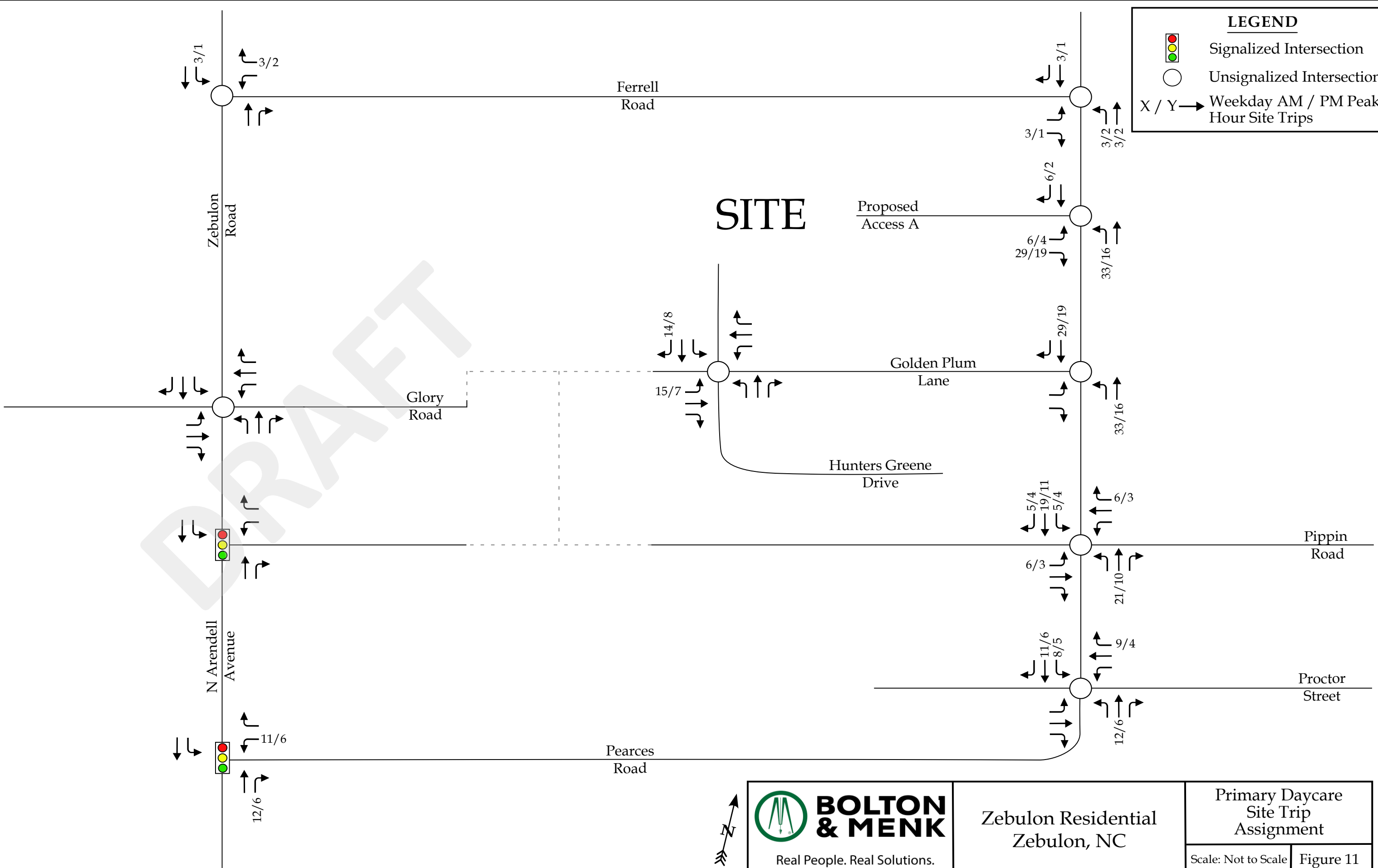


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
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Residential Site Trip
Assignment

Scale: Not to Scale | Figure 10



LEGEND

-  Signalized Intersection
-  Unsignalized Intersection
- X / Y → Weekday AM / PM Peak Hour Site Trips






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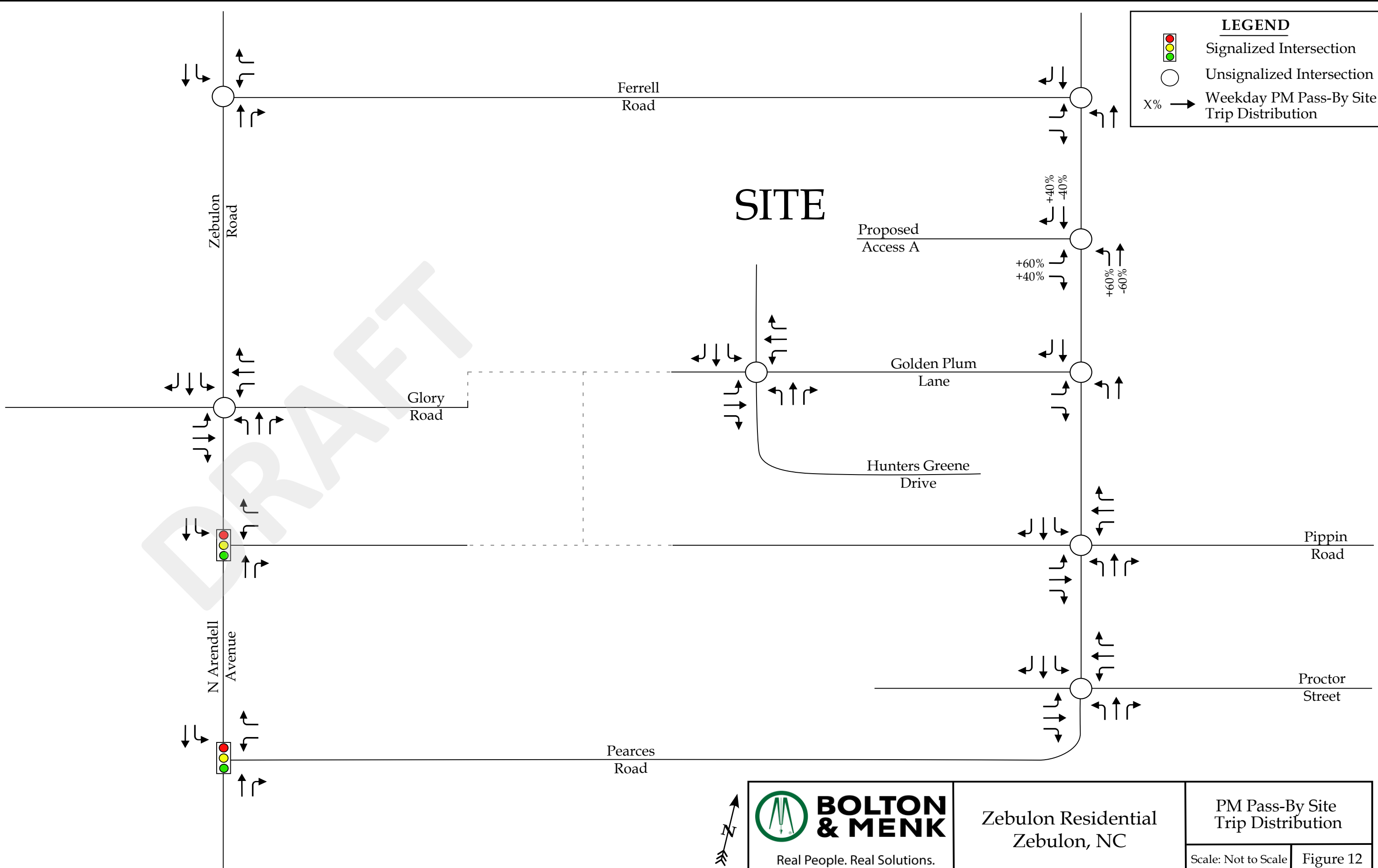
Zebulon Residential
Zebulon, NC


Primary Daycare
Site Trip
Assignment

Scale: Not to Scale | Figure 11



LEGEND

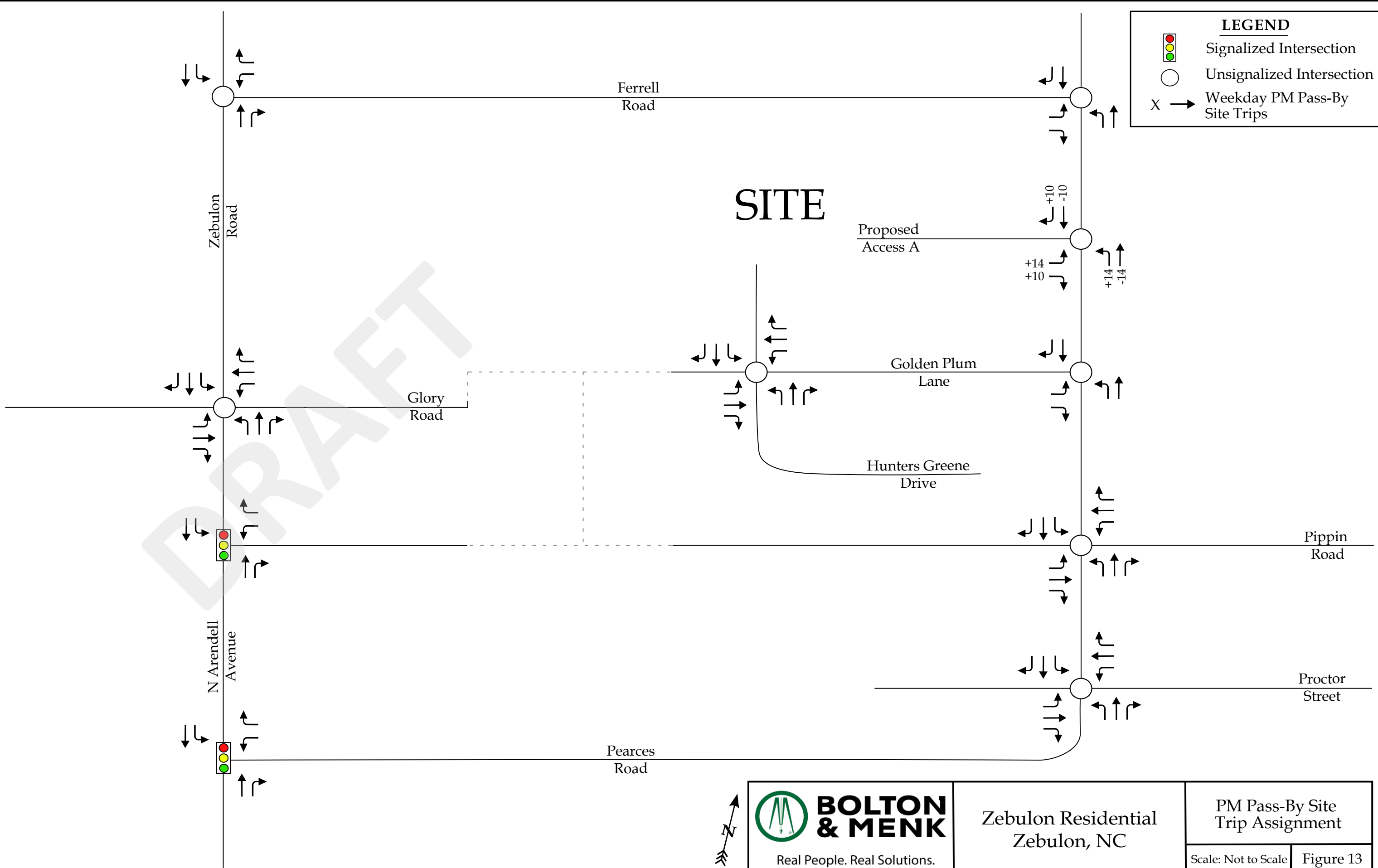
-  Signalized Intersection
-  Unsignalized Intersection
- X%  Weekday PM Pass-By Site Trip Distribution




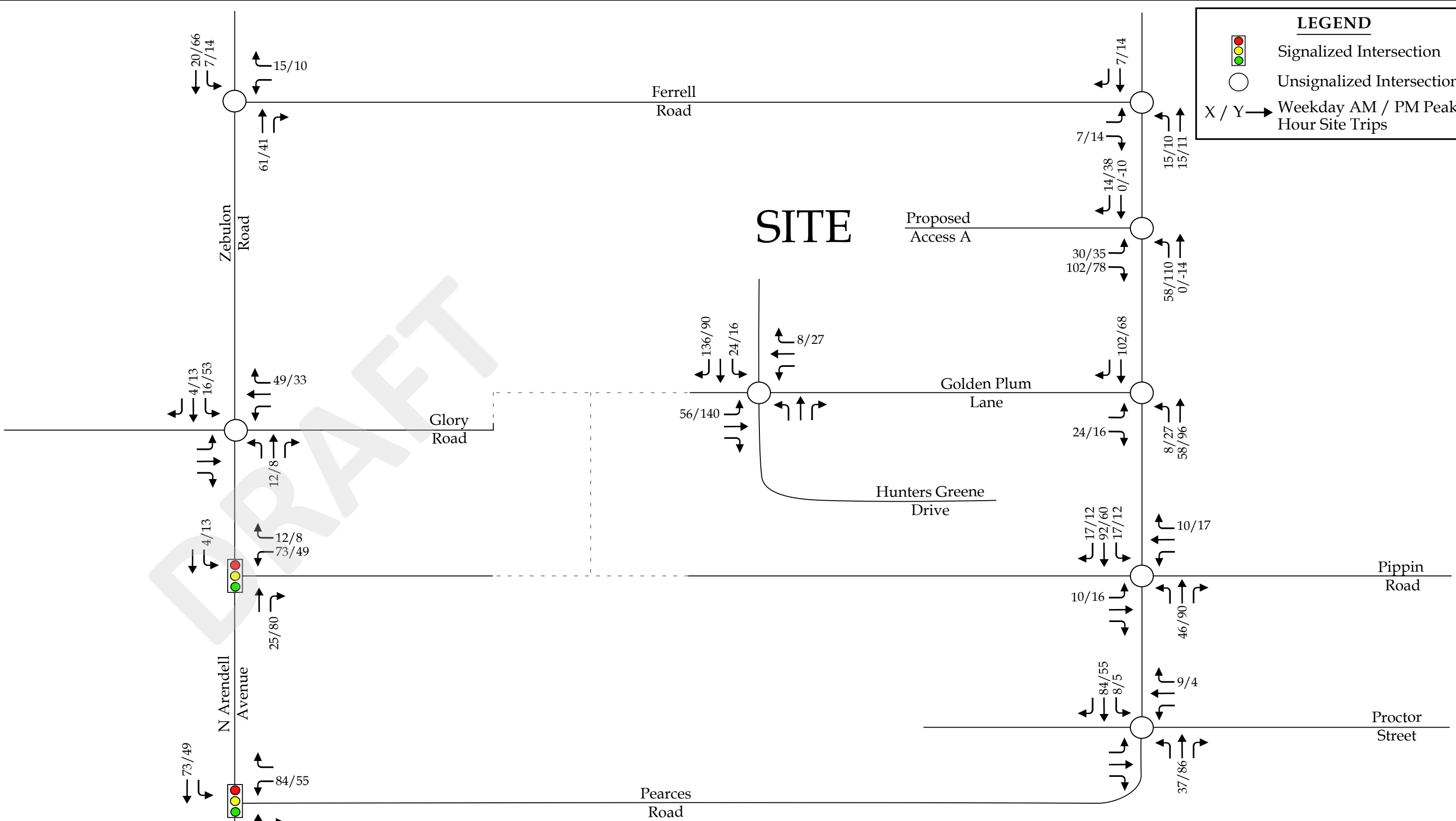
 BOLTON & MENK Real People. Real Solutions.	Zebulon Residential Zebulon, NC	PM Pass-By Site Trip Distribution	
		Scale: Not to Scale	Figure 12

LEGEND

-  Signalized Intersection
-  Unsignalized Intersection
- X → Weekday PM Pass-By Site Trips



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		Scale: Not to Scale	Figure 13



LEGEND

- Signalized Intersection
- Unsignalized Intersection
- X / Y → Weekday AM / PM Peak Hour Site Trips



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Zebulon, NC

Total Site Trip Assignment	
Scale: Not to Scale	Figure 14

5. BUILD TRAFFIC CONDITIONS (2031)

5.1. Build Peak Hour Traffic Volumes (2031)



To estimate traffic conditions with the site fully built-out, the total site trips were added to the no-build traffic volumes (2031) to determine the build traffic volumes (2031). Refer to **Figure 15** for an illustration of the build peak hour traffic volumes (2031) with the proposed site fully developed.

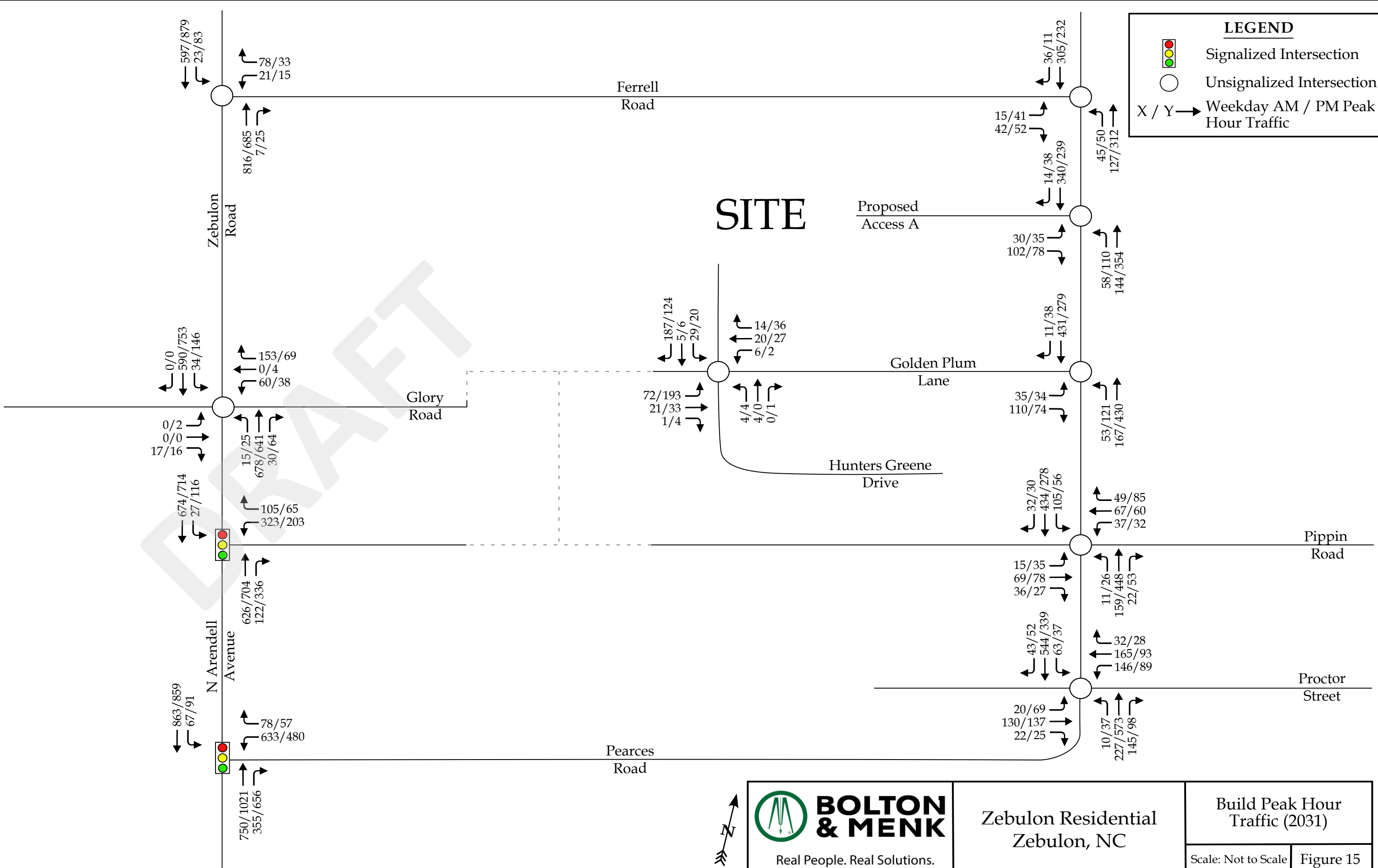
5.2. Analysis of Build Peak Hour Traffic Conditions (2031)

Study intersections were analyzed with the build traffic volumes (2031) using the same methodology previously discussed for 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 7** of this report.

DRAFT

LEGEND

-  Signalized Intersection
-  Unsignalized Intersection
- X / Y → Weekday AM / PM Peak Hour Traffic



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Build Peak Hour Traffic (2031)	
Scale: Not to Scale	Figure 15

6. 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. The computer software packages, Synchro (Version 11.1) and SIDRA (Version 9), were used to complete the analyses for the study area intersections. Please note that the two-way stop-control 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/ROUNDABOUT 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

6.1. Adjustments to Analysis Guidelines

Capacity analysis at all study intersections was completed according to the NCDOT Congestion Management Guidelines and the Town’s Unified Development Ordinance (UDO) Guidelines, with the exception of the Town’s build +1 analysis scenario. The Town approved the build out year (2031) for the future analysis scenario as part of the MOU.

Per the Town’s UDO, LOS C should be maintained on arterials or high-order streets and LOS D on any other designated nonlocal/nonresidential street. Where the existing level of service is below these standards, mitigation for the development was identified to maintain the existing level of service, mitigate the impacts of the proposed development traffic, and additional improvements were identified to raise the level of service to the standard indicated. Improvements recommended to mitigate the impacts of proposed development traffic are denoted as “with Improvements”; however, improvements identified that go beyond mitigating proposed development traffic, but are required to meet the Town’s UDO guidelines, are denoted as “with UDO Improvements”. These identified improvements are not recommended on behalf of the development.

7. CAPACITY ANALYSIS

7.1. Pearces Road [NB/SB] and Ferrell Road [EB]

The existing unsignalized intersection of Pearces Road and Ferrell Road was analyzed under existing (2024), no-build (2031), and build (2031) traffic conditions with the lane configurations and traffic control shown in Table 5. 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 P.

Table 5: Analysis Summary of Pearces Road and Ferrell Road

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach (seconds)	Overall (seconds)	Approach (seconds)	Overall (seconds)
Existing (2024)	EB NB SB	1 LT-RT 1 LT-TH 1 TH-RT	B ² (11) A ¹ (8) --	N/A	B ² (11) A ¹ (8) --	N/A
No-Build (2031)	EB NB SB	1 LT-RT 1 LT-TH 1 TH-RT	B ² (11) A ¹ (8) --	N/A	B ² (13) A ¹ (8) --	N/A
Build (2031)	EB NB SB	1 LT-RT 1 LT-TH 1 TH-RT	B ² (12) A ¹ (8) --	N/A	B ² (14) A ¹ (8) --	N/A

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

Capacity analysis of existing (2024), no-build (2031), and build (2031) traffic conditions indicates that the major-street left-turn movement and the minor-street approach at the intersection of Pearces Road and Ferrell Road are expected to operate at LOS B or better during the weekday AM and PM peak hours. No improvements are recommended at this intersection due to acceptable levels of service and minimal queueing.

7.2. Pearces Road [NB/SB] and Golden Plum Lane [EB]

The existing unsignalized intersection of Pearces Road and Golden Plum Lane was analyzed under existing (2024), no-build (2031), and build (2031) traffic conditions with the lane configurations and traffic control shown in **Table 6**. 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 P**.

Table 6: Analysis Summary of Pearces Road and Golden Plum Lane

ANALYSIS SCENARIO	A P P R O A C H	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach (seconds)	Overall (seconds)	Approach (seconds)	Overall (seconds)
Existing (2024)	EB NB SB	1 LT-RT 1 LT, 1 TH 1 TH-RT	B ² (11) A ¹ (8) --	N/A	B ² (11) A ¹ (8) --	N/A
No-Build (2031)	EB NB SB	1 LT-RT 1 LT, 1 TH 1 TH-RT	B ² (13) A ¹ (8) --	N/A	B ² (14) A ¹ (8) --	N/A
Build (2031)	EB NB SB	1 LT-RT 1 LT, 1 TH 1 TH-RT	C ² (16) A ¹ (9) --	N/A	C ² (17) A ¹ (8) --	N/A

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

Capacity analysis of existing (2024), no-build (2031), and build (2031) traffic conditions indicates that the major-street left-turn movement and the minor-street approach at the intersection of Pearces Road and Golden Plum Lane are expected to operate at LOS C or better during the weekday AM and PM peak hours. No improvements are recommended at this intersection due to acceptable levels of service and minimal queueing.

7.3. Pearces Road [NB/SB] and Pippin Road [EB/WB]

The existing unsignalized intersection of Pearces Road and Pippin Road was analyzed under existing (2024), no-build (2031), and build (2031) traffic conditions with the lane configurations and traffic control shown in Table 7. Refer to Table 7 for a summary of the analysis results. Refer to Appendix H for the Synchro and SIDRA capacity analysis reports. SimTraffic queuing reports can be found in Appendix P.

Table 7: Analysis Summary of Pearces Road and Pippin Road

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach (seconds)	Overall (seconds)	Approach (seconds)	Overall (seconds)
Existing (2024)	EB	1 LT-TH-RT	B ² (15)	N/A	C ² (16)	N/A
	WB	1 LT-TH-RT	C ² (16)			
	NB	1 LT-TH-RT	A ¹ (8)			
	SB	1 LT-TH-RT	A ¹ (8)			
No-Build (2031)	EB	1 LT-TH-RT	C ² (20)	N/A	D ² (29)	N/A
	WB	1 LT-TH-RT	D ² (26)			
	NB	1 LT-TH-RT	A ¹ (8)			
	SB	1 LT-TH-RT	A ¹ (8)			
Build (2031)	EB	1 LT-TH-RT	E ² (35)	N/A	F ² (84)	N/A
	WB	1 LT-TH-RT	E ² (49)			
	NB	1 LT-TH-RT	A ¹ (9)			
	SB	1 LT-TH-RT	A ¹ (8)			
Build (2031) – with Improvements (Modular Roundabout*)	EB	1 LT-TH-RT	A ³ (7)	A (8)	A ³ (6)	A (8)
	WB	1 LT-TH-RT	A ³ (5)			
	NB	1 LT-TH-RT	A ³ (5)			
	SB	1 LT-TH-RT	A ³ (9)			
Build (2031) – with Alternative Improvements (Signalization)	EB	1 LT-TH-RT	B (18)	B (13)	B (18)	B (12)
	WB	1 LT-TH-RT	B (20)			
	NB	1 LT-TH-RT	A (7)			
	SB	1 LT-TH-RT	B (12)			

Improvements shown in bold.

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

*Analyzed utilizing SIDRA software as a mini-roundabout.

Capacity analysis of all traffic conditions indicates that the major-street left-turn movement is expected to operate at LOS A during the weekday AM and PM peak hours. Under existing

(2024) and no-build (2031) traffic conditions, the minor-street approaches at the intersection of Pearces Road and Pippin Road are expected to operate at LOS D or better during the weekday AM and PM peak hours. Under build (2031) conditions, the minor-street approaches are expected to degrade in level of service and operate at poor levels of service (LOS E or F) during the weekday AM and PM peak hours.

Poor levels of service are not uncommon for a stop-controlled minor-street approach during the peak hours when major-street (Pearces Road) volumes are the heaviest. SimTraffic reports that maximum queues for any given approach are not expected to exceed approximately 130 feet (5-6 vehicles) under build (2031) traffic conditions during either peak hour. When comparing no-build (2031) and build (2031) traffic conditions, maximum queues are expected to have a negligible increase (two vehicles) with site traffic associated with the development.

Per the Town's UDO, various traffic control and lane configuration improvements were evaluated to mitigate poor levels of service on the minor-street approach and are outlined below:

- Eastbound and westbound left-turn lanes – These improvements would mitigate failing levels of service on the minor-street to LOS D, except for the eastbound approach during the PM peak hour which would be expected to operate at LOS E. Adding turn lanes on the stop-controlled approach at two-way stop-control intersections can increase driver confusion and result in unsafe conditions. Due to unacceptable levels of service during the PM peak hour and potential safety issues, turn lanes are not recommended.
- Mini-roundabout - Due to skewed angle at the intersection that has resulted in additional pavement along the turn radii, a mini-roundabout was considered utilizing SIDRA software. Capacity analysis of build (2031) traffic conditions indicate that the intersection, with a mini-roundabout, is expected to operate at an overall LOS A during both peak hours.
- Signalization – The build (2031) weekday AM and PM peak hour traffic volumes were analyzed utilizing the criteria contained in the *Manual on Uniform Traffic Control Devices* (MUTCD) and the peak hour warrant [Warrant 3] was not met. Due to the lack

of commercial development in the immediate area (primarily residential), it is not likely the 4- or 8-hour warrants would be met (typically preferred for signalization by NCDOT); however, a traffic signal was considered. Capacity analysis of build (2031) with alternative improvement traffic conditions indicate that the intersection is expected to operate at an overall LOS B during both peak hours with the provision of a traffic signal.

Based on the United States Department of Transportation (USDOT) Federal Highway Administration (FHA), a mini-roundabout typically has a diameter of 43-79 feet with a smaller island that can be driven over when necessary [typically by heavy vehicles]. A variation of this would be a modular roundabout that can be constructed on top of existing intersections, repurposing existing pavement. This would be an innovative solution that saves money and construction time. Heavy vehicle percentages from the existing traffic counts show minimal truck activity at this intersection, which supports the construction of a modular roundabout. To provide options, it is recommended that the development provide mitigation at this intersection by constructing a modular roundabout or the provision of a traffic signal.

7.4. Pearces Road [NB/SB] and Proctor Street [EB/WB]

The existing unsignalized intersection of Pearces Road and Proctor Street was analyzed under existing (2024), no-build (2031), and build (2031) 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 and SIDRA capacity analysis reports. SimTraffic queuing reports can be found in **Appendix P**.

Table 8: Analysis Summary of Pearces Road and Proctor Street

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach (seconds)	Overall (seconds)	Approach (seconds)	Overall (seconds)
Existing (2024)	EB	1 LT-TH-RT	B ³ (13)	C (17)	B ³ (13)	C (17)
	WB	1 LT-TH-RT	C ³ (17)		B ³ (13)	
	NB	1 LT-TH-RT	B ³ (15)		C ³ (23)	
	SB	1 LT-TH-RT	C ³ (21)		B ³ (14)	
No-Build (2031)	EB	1 LT-TH-RT	C ³ (20)	F (87)	C ³ (23)	F (99)
	WB	1 LT-TH-RT	E ³ (38)		C ³ (21)	
	NB	1 LT-TH-RT	E ³ (35)		F ³ (188)	
	SB	1 LT-TH-RT	F ³ (168)		E ³ (38)	
Build (2031)	EB	1 LT-TH-RT	C ³ (23)	F (147)	D ³ (26)	F (165)
	WB	1 LT-TH-RT	E ³ (47)		C ³ (24)	
	NB	1 LT-TH-RT	F ³ (54)		F ³ (312)	
	SB	1 LT-TH-RT	F ³ (286)		F ³ (66)	
Build (2031) - with Improvements (Modular Roundabout*)	EB	1 LT-TH-RT	B ⁴ (11)	B (13)	A ⁴ (8)	B (13)
	WB	1 LT-TH-RT	A ⁴ (8)		B ⁴ (11)	
	NB	1 LT-TH-RT	A ⁴ (8)		C ⁴ (18)	
	SB	1 LT-TH-RT	C ⁴ (20)		A ⁴ (9)	

Improvements shown in bold.

3. Level of service for all-way stop-control approach.

4. Level of service for roundabout approach.

*Analyzed utilizing SIDRA software as a mini-roundabout.

Capacity analysis of existing (2024) traffic conditions indicates that all approaches at the intersection of Pearces Road and Proctor Street operate at LOS C or better during the weekday AM and PM peak hours. Under no-build (2031) and build (2031) conditions, the intersection approaches are expected to operate at poor levels of service (LOS E or F) during the weekday AM and PM peak hours.

Per the Town's UDO, various traffic control and lane configuration improvements were evaluated to mitigate poor levels of service and are outlined below:

- Two-Way Stop-Control – Adjusting the traffic control to allow for the major-street approaches (northbound/southbound) to be free-flowing would result in high delays on the minor-street approaches and is not recommended.
- Turn lanes – Left and right-turn lanes were considered on the major-street approaches (northbound and southbound) and while this improvement would provide mitigation to the impacts of the proposed development site traffic, it would still result in LOS E and F on multiple approaches. Additionally, adding turn lanes to all-way stops can increase driver confusion and result in unsafe conditions; therefore, turn lanes are not recommended.
- Signalization – The build (2031) weekday AM and PM peak hour traffic volumes were analyzed utilizing the criteria contained in the *Manual on Uniform Traffic Control Devices* (MUTCD) and the peak hour warrant [Warrant 3] was met. Due to the lack of commercial development in the immediate area (primarily residential), it is not likely the 4- or 8-hour warrants would be met (typically preferred for signalization by NCDOT). Since the 4- or 8- hour warrants are not expected to be met, a signal is not recommended.
- Mini-roundabout - Capacity analysis of build (2031) traffic conditions indicates that the intersection, with a mini-roundabout, is expected to operate at an overall LOS B during both peak hours.

During scoping, the Town indicated that there has been discussion regarding the implementation of a mini-roundabout at this intersection. Based on the United States Department of Transportation (USDOT) Federal Highway Administration (FHWA), a mini-roundabout typically has a diameter of 43-79 feet with a smaller island that can be driven over when necessary [typically by heavy vehicles]. A variation of this would be a modular roundabout that can be constructed on top of existing intersections, repurposing existing pavement. This would be an innovative solution that saves money and construction time. Heavy vehicle percentages from the existing traffic counts report minimal truck activity at this intersection, which supports the construction of a modular roundabout. Constructing a

modular roundabout is recommended to mitigate the expected traffic from the proposed development.

If the construction of a mini-roundabout at this intersection is pursued by the Town, the developer will coordinate with the Town about cost-sharing opportunities. The proposed development site trips are expected to account for less than 10% of the total traffic at this intersection during the weekday AM and PM peak hours. Due to the minimal impacts from the development and minimum amount of added traffic, it is recommended that the developer contributes to the mini-roundabout improvements at this intersection with a fee-in-lieu that is proportionate to the development's impact if this is desired instead of a modular roundabout.

DRAFT

7.5. Pearces Road [WB] and N Arendell Avenue [NB/SB]

The existing signalized intersection of Pearces Road and N Arendell Avenue was analyzed under existing (2024) traffic conditions with the existing lane configurations and traffic control. No-build (2031) and build (2031) traffic conditions were analyzed with the future lane configurations and traffic control shown in **Table 9**. 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 P**.

Table 9: Analysis Summary of Pearces Road and N Arendell Avenue

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)
Existing (2024)	WB NB SB	1 LT, 1 RT 1 TH, 1 RT 1 LT, 1 TH	D (41) B (11) B (16)	B (19)	C (25) B (13) B (17)	B (16)
No-Build (2031)	WB NB SB	1 LT, <u>1 LT-RT</u> 1 TH, <u>1 TH-RT</u> 1 LT, <u>2 TH</u>	D (39) C (21) B (12)	C (22)	D (55) C (23) B (10)	C (24)
Build (2031)	WB NB SB	1 LT, <u>1 LT-RT</u> 1 TH, <u>1 TH-RT</u> 1 LT, <u>2 TH</u>	D (42) C (23) B (13)	C (24)	E (73) C (32) B (10)	C (32)

Background improvements associated with the Town’s N Arendell Ave/Hwy 96 Improvement project are underlined.

Capacity analysis of existing (2024) traffic conditions indicates that the intersection of Pearces Road and N Arendell Avenue operates at an overall LOS B during the weekday AM and PM peak hours. Under no-build (2031) and build (2031) traffic conditions with the Town’s improvements, the intersection is expected to operate at an overall LOS C during the weekday AM and PM peak hours.

As mentioned previously, the southbound left-turn phase was analyzed as protected only, per Congestion Management Guidelines, under future traffic conditions. Upon the

completion of these roadway improvements, a new signal plan and coordination timings plan will be implemented.

SimTraffic reports indicate maximum queues for the exclusive westbound left-turn lane along Pearces Road are not expected to exceed approximately 263 feet (10-11 vehicles) under build (2031) traffic conditions during either peak hour. Additionally, queues on the westbound approach are not expected to back into the adjacent intersection. The westbound left-turn lane extends to a two-way left-turn lane which can provide additional storage for the westbound left-turn movement during peak periods when maximum queues occur.

Due to the future roadway improvements planned for this intersection as part of the Town's N Arendell Ave/Hwy 96 Improvement project, there are no additional recommendations at this intersection.

DRAFT

7.6. Zebulon Road [NB/SB] and Pippin Road [WB]

The existing signalized intersection of Zebulon Road and Pippin Road was analyzed under existing (2024), no-build (2031), and build (2031) traffic conditions with 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 P**.

Table 10: Analysis Summary of Zebulon Road and Pippin 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)
Existing (2024)	WB NB SB	1 LT-RT 1 TH, 1 RT 1 LT, 1 TH	C (23) B (13) B (12)	B (14)	C (28) B (16) A (8)	B (13)
No-Build (2031)	WB NB SB	1 LT-RT 1 TH, 1 RT 1 LT, 1 TH	C (29) C (26) C (24)	C (26)	D (40) B (20) B (12)	B (19)
Build (2031)	WB NB SB	1 LT-RT 1 TH, 1 RT 1 LT, 1 TH	D (36) C (28) C (22)	C (28)	D (40) C (21) B (16)	C (22)

Capacity analysis of existing (2024), no-build (2031), and build (2031) traffic conditions indicates that the intersection of Zebulon Road and Pippin Road is expected to operate at an overall LOS C or better during the weekday AM and PM peak hours.

SimTraffic reports indicate that on occasion, maximum queues could extend outside of the existing storage for the northbound right-turn and southbound left-turn lanes; however, the average queues are expected to be contained within the storage provided. No improvements are recommended at this intersection due to acceptable levels of service.

7.7. Zebulon Road [NB/SB] and Glory Road [EB/WB]

The existing unsignalized intersection of Zebulon Road and Glory Road was analyzed under existing (2024), no-build (2031), and build (2031) traffic conditions with the 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 P**.

Table 11: Analysis Summary of Zebulon Road and Glory Road

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach (seconds)	Overall (seconds)	Approach (seconds)	Overall (seconds)
Existing (2024)	EB	1 LT-TH-RT	C ² (18)	N/A	C ² (23)	N/A
	WB	1 LT, 1 TH-RT	C ² (23)		E ² (38)	
	NB	1 LT, 1 TH, 1 RT	A ¹ (9)		A ¹ (9)	
	SB	1 LT, 1 TH-RT	A ¹ (9)		A ¹ (9)	
No-Build (2031)	EB	1 LT-TH-RT	D ² (27)	N/A	E ² (43)	N/A
	WB	1 LT, 1 TH-RT	E ² (50)		F ² (117)	
	NB	1 LT, 1 TH, 1 RT	A ¹ (9)		A ¹ (10)	
	SB	1 LT, 1 TH-RT	A ¹ (9)		A ¹ (10)	
Build (2031)	EB	1 LT-TH-RT	D ² (34)	N/A	F ² (63)	N/A
	WB	1 LT, 1 TH-RT	F ² (53)		F ² (143)	
	NB	1 LT, 1 TH, 1 RT	A ¹ (9)		A ¹ (10)	
	SB	1 LT, 1 TH-RT	A ¹ (10)		B ¹ (10)	
Build (2031) - with UDO Improvements (Signalization)	EB	1 LT-TH-RT	C (30)	B (18)	C (34)	B (17)
	WB	1 LT, 1 TH-RT	C (35)		D (37)	
	NB	1 LT, 1 TH, 1 RT	B (19)		B (20)	
	SB	1 LT, 1 TH-RT	B (10)		B (12)	

Improvements identified to meet Town guidelines are shown in bold.

Note: Due to rounding of delays, LOS A and LOS B overlap at 10 seconds, per Table 4.

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

Capacity analysis of existing (2024) traffic conditions indicates that minor-street approaches operate at LOS C during the weekday AM peak hour and LOS E on the westbound approach during the weekday PM peak hour. Under all traffic conditions, the major-street left-turn movement is expected to operate at LOS B or better during the weekday AM and PM peak hours. Under no-build (2031) and build (2031) conditions, the minor-street approach is

expected to operate at poor levels of service (LOS E or F) during the weekday AM and PM peak hours.

Poor levels of service are not uncommon for a stop-controlled minor-street approach when heavy volumes are experienced on the major-street (Zebulon Road). While the minor-street approaches are expected to experience high delays, westbound and eastbound maximum queues are not expected to exceed 130 feet (approximately 5 vehicles) and average queues are not expected to exceed 50 feet (approximately 2 vehicles) during either peak hour under build (2031) traffic conditions.

Per the Town's UDO, various traffic control and lane configuration improvements were identified to mitigate poor levels of service and are outlined below:

- Turn lanes – Additional turn lanes along the eastbound approach and modifications to the existing lane striping on the westbound approach were considered; however, these improvements would not provide a significant decrease in delays and queues.
- Signalization – The build (2031) weekday AM and PM peak hour traffic volumes were analyzed utilizing the criteria contained in the *Manual on Uniform Traffic Control Devices* (MUTCD) and the peak hour warrant [Warrant 3] was met. Due to the lack of commercial development in the immediate area (primarily residential), it is not likely the 4- or 8-hour warrants would be met (typically preferred for signalization by NCDOT).

In order to identify improvements based on the Town's UDO, a traffic signal was analyzed under build (2031) with UDO improvements traffic conditions and modeled per Congestion Management Guidelines. Capacity analysis indicates that the intersection is expected to operate at an overall LOS B during the weekday AM and PM peak hours under signalized conditions.

It should be noted that the traffic assessment letters for the adjacent development (Weaver's Pointe) and the already constructed Weavers's Ridge development both indicated that this intersection should be monitored for signalization. Additionally, the proposed development site trips are expected to only account for approximately 6% or less of the total traffic volumes at this intersection during either peak hour.

Due to minimal proposed traffic utilizing the intersection and the commitment from adjacent developments to monitor for signalization, no improvements are recommended for the proposed development.

DRAFT

7.8. Zebulon Road [NB/SB] and Ferrell Road [WB]

The existing unsignalized intersection of Zebulon Road and Ferrell Road was analyzed under existing (2024), no-build (2031), and build (2031) traffic conditions with the 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 P**.

Table 12: Analysis Summary of Zebulon Road and Ferrell Road

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach (seconds)	Overall (seconds)	Approach (seconds)	Overall (seconds)
Existing (2024)	WB NB SB	1 LT-RT 1 TH-RT 1 LT-TH	C ² (18) -- A ¹ (9)	N/A	C ² (21) -- A ¹ (9)	N/A
No-Build (2031)	WB NB SB	1 LT-RT 1 TH-RT 1 LT-TH	D ² (28) -- A ¹ (10)	N/A	E ² (39) -- A ¹ (10)	N/A
Build (2031)	WB NB SB	1 LT-RT 1 TH-RT 1 LT-TH	D ² (34) -- B ¹ (10)	N/A	E ² (48) -- A ¹ (10)	N/A
Build (2031) - with UDO Improvements (Modular Roundabout*)	WB NB SB	1 LT-RT 1 TH-RT 1 LT-TH	A ³ (10) B ³ (12) A ³ (8)	B (10)	A ³ (7) B ³ (11) C ³ (17)	B (14)

Improvements identified to meet Town guidelines are shown in bold.

Note: Due to rounding of delays, LOS A and LOS B overlap at 10 seconds, per Table 4.

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

*Analyzed utilizing SIDRA software as a mini-roundabout.

Capacity analysis of existing (2024) traffic conditions indicates that the minor-street approach at the intersection of Zebulon Road and Ferrell Road operates at LOS C during the weekday AM and PM peak hours. Under all traffic conditions, the major-street left-turn movement is expected to operate at LOS B or better during the weekday AM and PM peak hours. Under no-build (2031) and build (2031) traffic conditions the major-street left-turn movement and the minor-street approach are expected to operate at LOS D or better during the weekday AM

peak hour and the minor-street approach is expected to operate at LOS E during the weekday PM peak hour.

Poor levels of service are not uncommon for a stop-controlled minor-street approach when heavy volumes are experienced on the major-street (Zebulon Road). While the minor-street approaches are expected to experience high delays, westbound maximum queues are not expected to exceed 112 feet (approximately 4-5 vehicles) during either peak hour under build (2031) traffic conditions.

Per the Town's UDO, various traffic control and lane configuration improvements were identified to mitigate poor levels of service and are outlined below:

- Turn lanes - Turn lanes along all approaches were considered; however, these improvements would not provide mitigation for LOS E expected on the minor-street approach during the PM peak hour.
- Signalization - The build (2031) weekday AM and PM peak hour traffic volumes were analyzed utilizing the criteria contained in the *Manual on Uniform Traffic Control Devices* (MUTCD) and the peak hour warrant [Warrant 3] was met. Due to the lack of commercial development in the immediate area (primarily residential), it is not likely the 4- or 8-hour warrants would be met (typically preferred for signalization by NCDOT).
- Mini-roundabout - A mini-roundabout was analyzed under build (2031) with UDO improvements traffic conditions. Capacity analysis indicates that the intersection, with a mini-roundabout, is expected to operate at an overall LOS B during both peak hours.

Based on the United States Department of Transportation (USDOT) Federal Highway Administration (FHA), a mini-roundabout typically has a diameter of 43-79 feet with a smaller island that can be driven over when necessary [typically by heavy vehicles]. A variation of this would be a modular roundabout that can be constructed on top of existing intersections, repurposing existing pavement. This would be an innovative solution that saves money and construction time. Additionally, the proposed development site trips are expected

to only account for approximately 8% or less of the total traffic volumes at this intersection during either peak hour.

Due to minimal proposed site traffic utilizing the intersection and since the LOS doesn't degrade between no-build (2031) and build (2031) traffic conditions, there are no improvements recommended for the proposed development.

DRAFT

7.9. Golden Plum Lane [EB/WB] and Hunters Greene Drive [NB/SB]

The existing unsignalized intersection of Golden Plum Lane and Hunters Greene Drive was analyzed under existing (2024), no-build (2031), and build (2031) traffic conditions with lane configurations and traffic control shown in **Table 13**. Refer to **Table 13** for a summary of the analysis results. Refer to **Appendix N** for the Synchro capacity analysis reports. SimTraffic queuing reports can be found in **Appendix P**.

Table 13: Analysis Summary of Golden Plum Lane and Hunters Greene Drive

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach (seconds)	Overall (seconds)	Approach (seconds)	Overall (seconds)
Existing (2024)	EB	1 LT-TH-RT	A ¹ (7)	N/A	A ¹ (7)	N/A
	WB	1 LT-TH-RT	A ¹ (7)			
	NB	1 LT-TH-RT	A ² (9)			
	SB	1 LT-TH-RT	A ² (9)			
No-Build (2031)	EB	1 LT-TH-RT	A ¹ (7)	N/A	A ¹ (7)	N/A
	WB	1 LT-TH-RT	A ¹ (7)			
	NB	1 LT-TH-RT	A ² (9)			
	SB	1 LT-TH-RT	A ² (9)			
Build (2031)	EB	1 LT-TH-RT	A ¹ (7)	N/A	A ¹ (8)	N/A
	WB	1 LT-TH-RT	A ¹ (7)			
	NB	1 LT-TH-RT	B ² (11)			
	SB	1 LT-TH-RT	B ² (10)			

Note: Due to rounding of delays, LOS A and LOS B overlap at 10 seconds, per Table 4.

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

Capacity analysis of existing (2024), no-build (2031), and build (2031) traffic conditions indicates that the major-street left-turn movement and the minor-street approach at the intersection of Golden Plum Lane and Hunters Greene Drive are expected to operate at LOS B or better during the weekday AM and PM peak hours. No improvements are recommended at this intersection due to acceptable levels of service and minimal queuing.

7.10. Pearces Road [NB/SB] and Proposed Access A [EB]

The proposed unsignalized intersection of Pearces Road and Proposed Access A was analyzed under build (2031) traffic conditions with lane configurations and traffic control shown in **Table 14**. Refer to **Table 14** for a summary of the analysis results. Refer to **Appendix O** for the Synchro capacity analysis reports. SimTraffic queuing reports can be found in **Appendix P**.

Table 14: Analysis Summary of Pearces Road and Proposed Access A

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach (seconds)	Overall (seconds)	Approach (seconds)	Overall (seconds)
Build (2031)	EB NB SB	1 LT-RT 1 LT, 1 TH 1 TH-RT	B ² (13) A ¹ (8) --	N/A	C ² (15) A ¹ (8) --	N/A

Improvements shown in bold.

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

Capacity analysis of build (2031) conditions indicates that the major-street left-turn movement and the minor-street approach at the intersection of Pearces Road and Proposed Access A are expected to operate at LOS C or better during the weekday AM and PM peak hours. SimTraffic reports indicate maximum queues along the eastbound approach (internal to the site) are not expected to exceed approximately 90 feet during either peak hour. NCDOT typically prefers a minimum of 100 feet of Internal Protected Stem (IPS) length. Therefore, an IPS of 100 feet is recommended.

Turn lanes were considered based on the criteria contained in the NCDOT *Policy on Street and Driveway Access to North Carolina Highways* (Driveway Manual). Based on the Driveway Manual, a northbound left-turn lane with 75 feet of storage is warranted; however, NCDOT typically prefers a minimum of 100 feet for both right-turn and left-turn lanes. Therefore, a northbound left-turn lane with 100 feet of storage is recommended. Refer to **Appendix Q** for the Turn Lane Warrant Chart.

7.11. Development Entry Points Evaluation

As mentioned previously, per the Town's UDO, the minimum number of vehicular access points should be 2 + 1 per every additional 100 lots for development with 201+ lots (unless conditions per UDO Section 6.10.I are met). The site plan currently shows site access is proposed via the following:

- One (1) full-movement driveway along Pearces Road
- Cross Access with Golden Plum Lane via Hunters Greene Drive
- Street stub to the north (future potential interconnectivity)
- Street stub to the west (future potential interconnectivity)

The proposed full-movement access along Pearces Road, discussed in **Section 7.10**, is expected to operate at LOS C or better during both peak hours. The intersection of Pearces Road and Golden Plum Lane, discussed in **Section 7.2**, is expected to operate at LOS C or better during both peak hours. Per the Town's UDO, Section 6.13.7, evidence of LOS D operations would indicate the need for additional access points. Additionally, it was assumed that all proposed site traffic along Golden Plum Lane would enter/exit the site at Hunters Greene Drive; however, the proposed driveways currently under construction by the adjacent development (Pearces Landing) along Golden Plum Lane will provide alternative routes to Hunters Greene Drive for proposed site traffic.

As seen on the preliminary site plan, **Figure 2**, the parcel for the development has 400 feet of road frontage along Pearces Road, which would only allow for the construction of one (1) access point. Based on the analysis of build (2031) traffic conditions, the proposed development driveways are expected to operate at acceptable levels of service with minimal queuing.

Therefore, while the proposed development does not meet the 'Required Points of Access' per the UDO Table 6.10.7.I, the results of this TIA conclude that there will not be capacity analysis or queuing issues at the access points that are provided that would indicate the need for additional site access.

8. CONCLUSIONS

This Traffic Impact Analysis was conducted to determine the potential traffic impacts of the proposed development to be located along Pearces Road, east of Zebulon Road (NC 96) in Zebulon, North Carolina. The proposed development is expected to consist of residential and daycare land uses and be built out in 2031. Site access is proposed via the following:

- One (1) full-movement driveway along Pearces Road
- Cross Access with Golden Plum Lane via Hunters Greene Drive
- Street stub to the north (future potential interconnectivity)
- Street stub to the west (future potential interconnectivity)

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

- Existing Traffic Conditions (2024)
- No-Build Traffic Conditions (2031)
- Build Traffic Conditions (2031)

Trip Generation

It is estimated that the proposed development will generate approximately 5,204 total site trips on the roadway network during a typical 24-hour weekday period. Of the daily traffic volume, it is anticipated that 439 trips (142 entering and 297 exiting) will occur during the weekday AM peak hour and 541 trips (318 entering and 223 exiting) will occur during the weekday PM peak hour.

Adjustments to Analysis Guidelines

Capacity analysis at all study intersections was completed according to the NCDOT Congestion Management Guidelines and the Town's Unified Development Ordinance (UDO) Guidelines, with the exception of the Town's build +1 analysis scenario. Refer to **Section 6.1** of this report for a detailed description of any adjustments to these guidelines made throughout the analysis.

Intersection Capacity Analysis Summary

Study area intersections (including the proposed site driveways) are expected to operate at acceptable levels-of-service under existing and build year conditions with improvements discussed in **Section 7**. Recommendations to mitigate site traffic and address safety concerns are provided in **Section 9**.

9. 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 **Figure 16** for an illustration of the recommended lane configuration for the proposed development.

Background Improvements by the Town's N Arendell Ave/Hwy 96 Improvement Project:

Pearces Road [WB] and N Arendell Avenue [NB/SB]

- Extend the existing southbound left-turn lane along N Arendell Avenue to approximately 275 feet of storage and appropriate deceleration and taper length.
- Restripe the existing westbound right-turn lane along Pearces Road to a shared left/right turn lane.
- Restripe the existing northbound right-turn lane along N Arendell Avenue to a shared through/right turn lane.
- Construct an additional northbound receiving lane along N Arendell Avenue that drops to one lane approximately 830 feet north of Pearces Road.
- Construct an additional southbound through lane along N Arendell Avenue that will drop to one lane approximately 830 feet north of Pearces Road.
- Construct an additional southbound receiving lane along N Arendell Avenue that extends to the existing dual southbound through lanes south of Hendricks Drive.
- Provide a pedestrian crosswalk on the northern leg of the intersection crossing N Arendell Avenue.
- Provide a pedestrian crosswalk on the eastern leg of the intersection crossing Pearces Road.
- Modify signal timings to accommodate new lane configurations.

Recommended Improvements by Developer:

Pearces Road [NB/SB] and Pippin Road [EB/WB]

- Construct a modular roundabout.

OR

- Monitor the intersection for signalization.

Pearces Road [NB/SB] and Proctor Street [EB/WB]

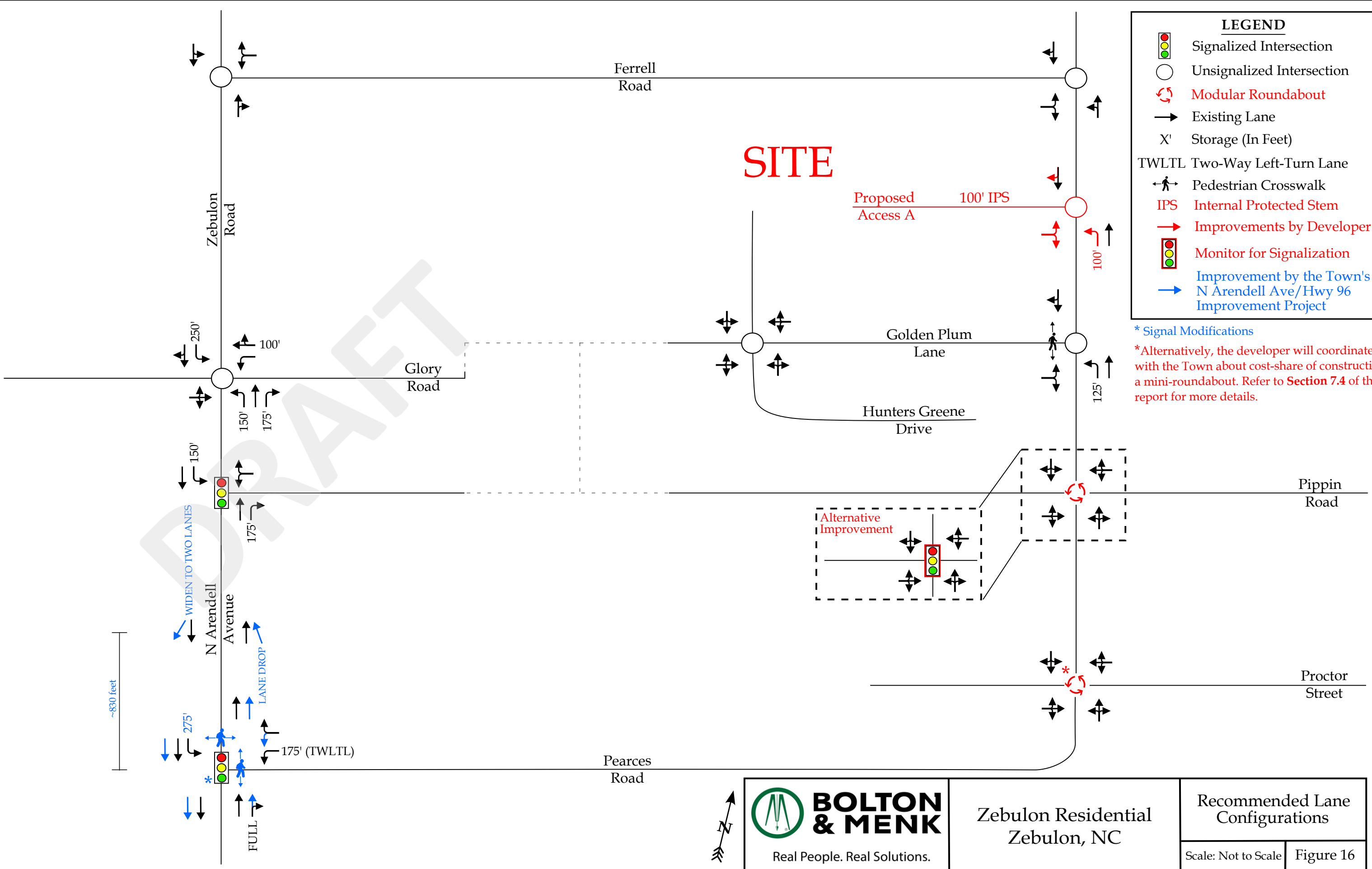
- Construct a modular roundabout.

OR

- The developer will coordinate with the Town about cost-sharing for the construction of a mini-roundabout with a fee-in-lieu that is proportionate to the development's impacts.

Pearces Road [NB/SB] and Proposed Access A [EB]

- Construct the eastbound approach [Proposed Access A] with one (1) ingress lane and one (1) egress lane.
- Provide stop-control for the eastbound approach.
- Provide 100 feet of IPS.
- Construct a northbound left-turn lane along Pearces Road with approximately 100 feet of storage and appropriate deceleration and taper length.



LEGEND

- Signalized Intersection
- Unsignalized Intersection
- Modular Roundabout
- Existing Lane
- Storage (In Feet)
- TWLTL Two-Way Left-Turn Lane
- Pedestrian Crosswalk
- IPS Internal Protected Stem
- Improvements by Developer
- Monitor for Signalization
- Improvement by the Town's N Arendell Ave/Hwy 96 Improvement Project

* Signal Modifications
 * Alternatively, the developer will coordinate with the Town about cost-share of constructing a mini-roundabout. Refer to Section 7.4 of the report for more details.

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Zebulon Residential
 Zebulon, NC

Recommended Lane Configurations	
Scale: Not to Scale	Figure 16

~830 feet

WIDEN TO TWO LANES
 LANE DROP
 175' (TWLTL)
 FULL

Alternative Improvement