ZEBULON
NORTH CAROLINA

TOWN OF ZEBULON
PLANNING BOARD MEETING
March 11, 2024
6:00 PM

I. CALL TO ORDER

II. APPROVAL OF THE AGENDA

III. ELECTION OF VICE-CHAIR

IV. ADOPTION OF MINUTES

- **a.** September 18, 2023
- **b.** October 9, 2023
- **c.** December 11, 2023

V. OLD BUSINESS

- **a. PD 2024-01 Zebulon South –** The Town has received a Planned Development request to develop 320 residential units (townhomes and single-family detached units) on 118.62 acres at 751 S Wakefield Rd, 700 S Arendell Ave, 0 S Wakefield St, and 0 S Arendell.

VI. DEVELOPMENT UPDATES

VII. ADJOURNMENT

Zebulon
Planning Board
Minutes
September 18, 2023

Present: David Lowry, Laura Johnson, Michael Germano, Domenick Schilling, Stephanie Jenkins, Peggy Alexander, Michael Clark-Planning, Stacie Paratore-Deputy Town Clerk, Adam Culpepper-Planning, Cate Farrell-Planning, Sam Slater-Town Attorney

David Lowry called the meeting to order.

APPROVAL OF AGENDA
Laura Johnson made a motion, second by Domenick Schilling to approve the agenda. There was no discussion and the motion passed unanimously.

ADOPTION OF MINUTES
Michael Germano made a motion, second by Stephanie Jenkins to approve the May 8, 2023 minutes. There was no discussion and the motion passed unanimously.

NEW BUSINESS

A. CZ 2023-04 1620 N. Arendell Avenue

Cate Farrell stated this was a conditional rezoning request for a 1.117-acre parcel from Residential Suburban (R2) to Heavy Commercial – Conditional (HC-C) District for the development of a Veterinary Clinic.

The standards under section 2.2.6.K for a conditional rezoning were:

1. Health, safety and welfare
2. Appropriate for location
3. Reasonable in the public interest
4. Concept plan consistent with regulations
5. Other relevant factors

The public hearing notification process was detailed. The aerial map, zoning map, future land use plan, timeline, concept plan and proposed elevations were shown. The applicant proposed the following conditions:

- Reduction in the distance the pet exercise zone can be from a residentially zoned parcel.
- Modification on a type D buffer

Cate Farrell spoke about the separation requirements and explained the applicant asked for a reduction from 200ft to 75ft for the separation of the outdoor pet exercise area and a six feet opaque fence to help with screening. The location of the outdoor area was shown being located on the side of Green Pace Rd and was screened from the main corridor of Arendell Avenue. It was explained the buffer was a modified type D buffer and the applicant was asking for a modification from a 40ft buffer to a 10ft buffer on the southeast side and a 20ft. buffer on the northeast side. A fence was proposed along the frontage for additional screening.

The proposed road improvements included adding a second lane along the Arendell Avenue frontage and an addition of a sidewalk and planting strip. No Traffic Impact Analysis ("TIA") was needed since the proposed use would not meet the threshold of 50 peak trips or 150 daily trips.

The applicant received 60 points under the Town's Utility Allocation Policy. There were details given about the amenities added to receive points.

David Lowry asked for clarification on the reason for the buffer change. Staff stated the change gave more room for parking, the building, the dog walking area and the stormwater retention.

There was a clarification that the sidewalk along Green Pace would be 5ft wide with a 5ft planting strip.

Michael Germano stated he had concerns about there being so many opaque fences along Arendell and no visual connection. It was suggested the applicant remove the opaque fence.

There was discussion about traffic concerns.

Michael Germano asked if the applicant was willing to reduce the buffer. Graham Smith stated the applicant was agreeable to reduce the buffer.

Michael Germano made a motion, second by Peggy Alexander to recommend approval of CZ 2023-04 with the modification to reduce the buffer along the south property line and remove the fence. There was no further discussion and the motion passed unanimously.

B. Discussion about the update of the Comprehensive and Future Land Use Plans

Michael Clark spoke about the goals of the Town's 2030 Strategic Plan of vibrant downtown, small town life and growing smart and how the goals would tie into the Comprehensive and Land Use Plans. The purpose of the plans was given. A chart was shown reflecting the population growth of towns in Wake County from 1990 and future population growth was shown. The demographics of those living in Zebulon were reflected on a graph.

There was discussion about the need for public transportation.

Race, ethnicity, economics and education information for those living in Town was detailed. There was a discussion about economic resources and opportunities and how to diversify employment options.

A map showing the land use makeup and the Planning Board was asked to look at the patterns for vacant/agricultural land, residential, commercial, and industrial.

Some of the significant issues the Town faced were utilities, land use patterns, non-residential uses, economics, infrastructure and traffic. There was a detailed discussion about the Planning Board's thoughts on each issue.

Mr. Clark stated the Economic Development Strategic Plan had started and would focus on the big picture economic plan. The Town Sub Area Plan would start in the spring and would focus on details and uses downtown.

The next step for the plans included an in-person public work session in October on Land Use and Design. The Planning Board was asked to think about what kind of Town Zebulon should be with a population of 50,000 and their likes and dislikes about where they live.

DEVELOPMENT UPDATES
Adam Culpepper provided development updates.

Peggy Alexander made a motion, second by Michael Germano to adjourn. There was no discussion and the motion passed unanimously.

Adopted this the 11th day of March 2024.

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David Lowry—Chair

SEAL

_____
Stacie Paratore, CMC—Deputy Town Clerk

Zebulon
Planning Board
Minutes
October 9, 2023

Present: David Lowry, Laura Johnson, Michael Germano, Domenick Schilling, Stephanie Jenkins, Peggy Alexander, Michael Clark-Planning, Stacie Paratore-Deputy Town Clerk, Sam Slater-Town Attorney

David Lowry called the meeting to order.

APPROVAL OF AGENDA
Laura Johnson made a motion, second by Stephanie Jenkins to approve the agenda. There was no discussion and the motion passed unanimously.

ADOPTION OF MINUTES
Michael Germano asked to clarify his comments to the August 14, 2023 minutes.

Michael Germano made a motion, second by Stephanie Jenkins to approve the August 14, 2023 minutes as amended. There was no discussion and the motion passed unanimously.

NEW BUSINESS

A. PD 2023-01 Chamblee Lake

Michael Clark stated this was a Planned Development request to develop 355 residential units on 136 acres at 1509 Chamblee Road. The current zoning was Wake County R-30.

The standards under section 2.2.24.J for a rezoning were:

1. Health, safety and welfare
2. Appropriate for location
3. Reasonable in the public interest
4. Other relevant factors

The public hearing notification process was detailed. The aerial map, zoning map, future land use plan, timeline, concept plan and proposed elevations were shown. The applicant exceeded the UDO requirements for architecture guidelines. The proposed road improvements were at the following locations:

- Chamblee Road and Site Drive #1
- Chamblee Road and Site Drive #2
- Chamblee Road and Site Drive #3
- Perry Curtis Road and Site Drive #4
- Perry Curtis Road and NC 96
- Wake County Line Road and NC 39
- Perry Curtis Road/Wake County Line Road and Chamblee Road
- NC 39 and Old US 264 Hwy

There was discussion about the concerns over neighboring wells, smart growth, police and fire response times and the fiscal analysis. Staff explained the estimated total tax value of the development would exceed $102 million.

Ryan Acres from McAdams Company provided more details about the nearby wells and gave details about stormwater runoff. There was information given about how the stormwater runoff on the site would be controlled.

Domenick made a motion, second by Laura Johnson to recommend approval of PD 2023-01 Chamblee Lake. There was no discussion and the motion passed unanimously.

OLD BUSINESS

A. Discussion about the updates of the Comprehensive and Future Land Use Plans

The Planning Board was asked what they liked and disliked about where they lived. Some likes included family friendly neighborhood, amenities for kids, community center, walkability, and small-town feel. Some dislikes that were mentioned included needing more commercial opportunities, traffic, lack of restaurants and entertainment, similar homes and lack of public transportation.

There was a detailed discussion about density and mixed use and examples were given.

Michel Clark printed the future land use map for each Planning Board member and asked them to color code the land uses and zoning districts for the next meeting.

The first Community Engagement Session was scheduled for October 30, 2023 at 6:00pm at the Community Center.

DEVELOPMENT UPDATES

Michael Clark provided development updates.

Michael Germano made a motion, second by Domenick Schilling to adjourn. There was no discussion and the motion passed unanimously.

Adopted this the 11th day of March 2024.

_____
David Lowry—Chair

SEAL

_____
Stacie Paratore, CMC—Deputy Town Clerk

Zebulon
Planning Board
Minutes
December 11, 2023

Present: David Lowry, Michael Germano, Domenick Schilling, Stephanie Jenkins, Michael Clark-Planning, Stacie Paratore-Deputy Town Clerk, Sam Slater-Town Attorney

Absent: Laura Johnson

David Lowry called the meeting to order.

APPROVAL OF AGENDA
Michael Germano made a motion, second by Stephanie Jenkins to approve the agenda. There was no discussion and the motion passed unanimously.

OLD BUSINESS

A. 2-Year Land Use Plan and Transportation Plan Updates

Michael Clark gave a Land Use Planning update. The results from the public engagement were detailed. During the group discussion most supported mixed use, the option for single family neighborhoods, micro-commercial in neighborhoods and more walkable or short drive to the grocery store and other needs.

Different areas and housing options were shown, and the Planning Board gave their opinions of each. There was discussion about the commercial needs for Zebulon residents.

The Planning Board was asked a series of questions regarding mixed use, urban development, uses within neighborhoods and changes to the Future Land Use Map and there was detailed conversation about each topic.

The Planning Board discussed prioritizing mixed use development and gave specific areas including Green Pace and Arendell and Five County Stadium area.

Michael Clark showed the increase of population and certificates of occupancy on a graph. The population projections to 2050 were detailed.

There was more discussion about the appropriate scale of density in Zebulon and the Planning Board's thoughts on density bonuses.

DEVELOPMENT UPDATES
Michael Clark provided development updates.

Michael Germano made a motion, second by Stephanie Jenkins to adjourn. There was no discussion and the motion passed unanimously.

Adopted this the 11th day of March 2024.

_____
David Lowry—Chair

SEAL

_____
Stacie Paratore, CMC—Deputy Town Clerk

ZEBULON
NORTH CAROLINA

STAFF REPORT
PLANNED DEVELOPMENT 2024-01
ZEBULON SOUTH
MARCH 11, 2024

Topic:	**PD 2024-01 Zebulon South, Project Number: 886895**
Speaker:	Adam Culpepper, Senior Planner
From:	Michael J. Clark, AICP, CNU-A, Planning Director
Prepared by:	Catherine Farrell, Planner II
Approved by:	Joseph M. Moore II, PE, Town Manager

Executive Summary:
The Board of Commissioners will consider a Planned Development Rezoning for 751 S Wakefield St (PIN# 2704492511), 700 S Arendell Ave (PIN# 2705512202), 0 S Wakefield (PIN# 2705413075). This is a legislative case.

Background:
The Town received a Planned Development request to develop 320 residential units (townhomes and single-family detached units) on 116.14 acres. The land is owned by Harold Narron and Fred Corbett (PIN# 2704492511); Joseph Temple Sr and Alexander Harrison (PIN# 2705512202); Watson Family II LLC (PIN# 2705413075), and is currently in the Town of Zebulon ETJ, and zoned R-2 and R-4. The applicant is seeking annexation simultaneously with this rezoning request.

A Joint Public Hearing was held on February 12, 2024. On the same date, the Planning Board voted to table their decision to March 11, 2024.

Discussion:
The Board shall consider the following questions to determine whether the rezoning is consistent with the intent of the Unified Development Ordinance (Section 2.2.24.J):

1. Does the request advance the public health, safety, or welfare?
2. Is the request appropriate for its proposed location, and is consistent with the purposes, goals, objectives, and Town's policies?
3. Is the request reasonable and in the public interest?
4. Are there other factors which the Board of Commissioners determines relevant?

Policy Analysis:
Grow Zebulon: Comprehensive Land Use Plan (Land Use Plan):
The Land Use Plan (adopted June 2021) designated this area "Suburban Residential" and "General Residential". These designations allow a mixture of product types, with increased open space to preserve an overall suburban character, and encourages some density with the inclusion of single family attached lots (Land Use and Development Page 13 & 14, Attached).

Suburban Residential characteristics include a greater focus on the home and less on driveways consuming a large percentage of the front lawn. These characteristics are preserved through alley-loaded town homes while reserving front-loaded homes to wider lots.

General Residential characteristics include a denser residential buildings. This may include single family detached and single family attached.

Grow Zebulon: Comprehensive Transportation Plan (Transportation Plan):
The Transportation Plan calls for the construction of a 4-lane median divided arterial road section along the properties fronting S Wakefield St, and a 2-lane median divided arterial road connecting Hwy 96 to S Wakefield Road. The development satisfies both requirements.

Play Zebulon: Parks and Recreation Master Plan (Park Master Plan):
The Park Master Plan does identify a greenways in this general vicinity. The applicant has proposed the addition of the greenway through the site. They are working with Staff to make sure that it aligns with the Parks Master Plan.

Unified Development Ordinance (UDO):
The UDO (Section 2.2.13) allows flexibility from some standards in exchange for a higher quality development more aggressively accomplishing other goals, such as amenities and diverse housing. The applicant proposes a highly amenitized mixed-product residential neighborhood with multiple attached, and detached home options providing a broader range of housing values.

Fiscal Analysis:
When complete, this development will generate approximately $405,000 per year in property tax revenue.

Staff Recommendation:
Staff recommends the Planning Board recommend approval the proposed planned development request as amended by the applicant, finding that the request is consistent with the Standards of Section 2.2.25.J of the UDO and the Comprehensive Land Use Plan.

Attachments:
1. Application
2. Site Plan
3. Planned Development Narrative
4. Utility Allocation Worksheet
5. TIA Review Letter from Town Engineer
6. TIA Applicant Response
7. TIA
8. Future Land Use and Character Map
9. Aerial Map
10. Zoning Map
11. Site Pictures
12. Public Hearing Notice Affidavit

13. UDO Section 3.5.5 Planned Development
14. Comprehensive Land Use Plan (Excerpts)
15. Comprehensive Transportation Plan (Excerpts)

Town of Zebulon
Planning Department
1003 N. Arendell Avenue, Zebulon, NC 27597
Phone: (919) 823-1810 Fax: (919) 887-2824
www.townofzebulon.org

PLANNED DEVELOPMENT APPLICATION

GENERAL INFORMATION:

A Planned Development in accordance with Section 2.2.13 and 3.5.5 of the UDO is intended to provide flexibility by establishing site specific regulations including permitted uses, dimensional standards, phasing schedules and additional details to allow for a development that is better than what would otherwise be permitted under the strict interpretation of the UDO. All site-specific standards and conditions must be consistent with the objectives of these regulations, the adopted Comprehensive Land Use Plan, Transportation Plan, and Vision 2030 Strategic Plan. The review process established in this part provides for the accommodation of such uses by a reclassification of property into a Planned Development, subject to site-specific standards and conditions.

INSTRUCTIONS:

PRE-APPLICATION MEETING: A pre-application meeting with staff in accordance with Section 2.3.2 of the UDO to verify the application requirements, processes, and procedures regarding a proposed request. To schedule a meeting, applicants must e-mail a pdf map, drawing, model, site or sketch plan to Assistant Planning Director Meade Bradshaw (mbradshaw@TownofZebulon.org) no later than five (5) working days prior to the desired meeting day.

NEIGHBORHOOD MEETING: Neighborhood meetings are required in accordance with Section 2.3.4 of the UDO prior to application submission. The applicant is required to notify property owners and any neighborhood association that represents citizens within that area within 300 feet of the subject property via first class mail a minimum of 10 days in advance of the neighborhood meeting. The applicant shall use their own return address on the envelopes as the meeting is a private meeting between the developer and the neighbors. The applicant shall submit the "Certified List of Property Owners" and "Neighborhood Meeting Packet" forms included in this application packet with their initial submittal.

ANNEXATION REQUIREMENTS: If a property or portion thereof subject to this rezoning is outside the corporate limits and ETJ, an annexation petition is **required** to be submitted on the same day as this application in accordance with section 2.2.2 of the UDO.

APPLICATION PROCEDURE – The applicant requesting a Planned Development must submit a written application to the Zebulon Planning Department using the forms included in this packet.

- Completed Application Form
- 8 Full Size Plan Sets and 1 PDF set on USB drive. (see site plan checklist)
- Comprehensive Planned Development Document
- Petition Fee (Please See Fee Schedule)
- One (1) Legal Description (metes and bounds) of subject property
- Registered survey of subject property
- Certified List of Property Owners within 150 feet of subject property
- Owner's Consent Form
- Neighborhood Meeting Packet
- Stamped envelopes addressed to Certified List of Property Owners all the homeowners associations of those properties within 150 feet of the outer boundary subject property or properties affixed with the following return address:

  Town of Zebulon
  Planning Department
  1003 N. Arendell Ave
  Zebulon, NC 27597

PUBLIC HEARING PROCEDURE – Upon submittal of a complete application, the Planning Department will schedule the application for a joint public hearing before the Planning Board and the Board of Commissioners. APPLICANTS ARE STRONGLY ENCOURAGED TO CONTACT PLANNING STAFF AS SOON AS POSSIBLE TO ADDRESS ANY QUESTIONS ABOUT THE PUBLIC HEARING. Notices of the public hearing will be mailed to all adjacent property owners of the property being considered for a Planned Development Amendment. At the public hearing, the applicant, proponents, and opponents will be given the opportunity to offer evidence in favor of or against the proposal. After completion of the public hearing, the Planning Board will deliberate and forward its recommendation to the Board of Commissioners for final consideration. Deadline dates and Joint Public Hearing dates can be found on the Town of Zebulon's website.

ZEBULON
North Carolina

APPLICATION FOR PLANNED DEVELOPMENT

PART 1. DESCRIPTION OF REQUEST/PROPERTY

Street Address of the Property:		Acreage:
751 S Wakefield St & 700 S Arendell Ave		118.6 acres
Parcel Identification Number (NC PIN):	Deed Book:	Deed Page(s):
2704492511, 2705512202, 2705413075	see attached	see attached
Existing Zoning of the Property:	Proposed Zoning of the Property:	
R2, R4	Planned Development	
Existing Use of the Property:	Proposed Use of the Property:	
Agriculture	single family attached & detached residential	

Reason for rezoning to a Planned Unit Development:

Deacon Development Corp. is under contract to purchase the properties that are subject to this application. The applicant desires to develop the properties into a high quality master planned community that will provide a variety of housing types and amenities. By utilizing the Planned Development ("PD") zoning, the master plan containing site specific regulations will guide the development resulting in a well-integrated mix of housing types, lot sizes and densities with open space and preservation of environmentally sensitive area. The flexibility offered by a PD will result in a more efficient use of the land and network of utilities and streets.

PART 2. APPLICANT/AGENT INFORMATION

Name of Applicant/Agent:		
Andrew Suriano Deacon Development		
Street Address of Applicant/Agent:		
PO Box 1080		
City:	State:	Zip Code:
Wake Forest	NC	27588
Email of Applicant/Agent:	Telephone Number of Applicant/Agent:	Fax Number of Applicant/Agent:
andrew@deaconcompanies.com	919-608-3542	

Are you the owner of the property?	Are you the owner's agent?	
☐ Yes ☑ No	☑ Yes ☐ No	**Note: If you are not the owner of the property, you must obtain the Owner's consent and signature giving you permission to submit this application.**

PART 3. PROPERTY OWNER INFORMATION

Name of Property Owner:		
see attached		
Street Address of Property Owner:		
City:	State:	Zip Code:
Email of Property Owner:	Telephone Number of Property Owner:	Fax Number of Property Owner:

I hereby state that the facts related in this application and any documents submitted herewith are complete, true, correct, and accurate to the best of my knowledge.

Signature of Applicant:	*Print Name:*	*Date:*
Andrew Suriano	Andrew Suriano	10/31/2022
Signature of Owner:	*Print Name:*	*Date:*

PIN 2704492511
751 S Wakefield St
DB 3452 PG 715
Narron, Harold Corbett, C Fred
3941 Zebulon Rd
Zebulon, NC 27597
Email:
Phone:

PIN 2705512202
700 S Arendell Ave
DB 8545 PG 1076
Temple, Joseph Wood Sr Hughes, Harrison Alexander
PO Box 548
Zebulon, NC 27597-0548
Email:
Phone:

PIN 2705413075
0 S Wakefield St
DB 8099 PG 2738
Watson Family II LLC
6220 Forestville Rd
Raleigh, NC 27604
Email:
Phone:

LEGISLATIVE CONSIDERATIONS – PLANNED DEVELOPMENT

The applicant shall propose site-specific standards and conditions that take into account the following considerations, which are considerations that are relevant to the legislative determination of whether or not the proposed planned development is in the public interest. Therese considerations do not exclude the legislative consideration of any other factor that is relevant to the public interest. Failure to adequately address the findings below may result in denial of the application. Please provide responses to the following standards as outlined in Section 2.2.13 of the Unified Development Ordinance.

1. Please provide details on how the proposed Planned Development advances the public health, safety, or welfare
Consistent with the Grow Zebulon Comprehensive Land Use Plan ("LUP"), the master planned community will provide both quality and a variety of residential choices for existing residents of Zebulon and newcomers to the community. The development will provide a safe internal street system that is pedestrian friendly. Active open space amenities together with a system of trails will promote a healthy lifestyle for the residents and provide community gathering areas. Transportation improvements associated with the development will increase connectivity and improve the safety of the community's transportation network. The PD allows for extensive preservation of environmentally sensitive areas that will be accessible via a system of trails integrated into the development.
2. Please provide details on how the proposed Planned Development is appropriate for its proposed location, and is consistent with the purposes, goals, objectives, and policies of the Town's adopted policy guidance.
The LUP classifications for the property are Suburban Residential ("SR") and General Residential ("GR"). The LUP specifically identifies a PD as being a primary land use type in the SR and GR LUP classifications. The proposed PD is consistent with the LUP. The development will have an integrated mix of housing types, consistent with the LUP's recommendations for providing a diverse stock of residential choices. 35% of the residential uses are proposed to be attached single family dwellings. The balance of the residential dwellings will be single family homes on lots that range from 4,800 sq. ft to 7,200 sq. ft. The diverse housing choices will promote varied price points, consistent with the LUP. The development will include extensive open space and recreational areas, consistent with the LUP.
3. Please provide details on how the proposed Planned Development is reasonable and in the public interest.
The development will be consistent with the goals and policies for housing and neighborhoods found in the LUP. The development as proposed is consistent with the LUP map classifications. The development will be a master planned community that provides quantity and diversity of housing options. Active and passive open spaces and recreational features will provide the residents with excellent on-site amenities. Improvements to the transportation network will increase community connectivity and provide a safe internal street system that is pedestrian friendly.
4. Please provide details on how the proposed Planned Unit Development provides for innovative land planning and site design concepts that support a high quality of life and achieve a high quality of development, environmental sensitivity, energy efficiency, and other Town goals and objectives.
PD allows for development flexibility and promotes innovative land planning and site design. The master plan utilizes existing wetlands, open space and larger lots as an external buffers of the development, mitigating affects of the development on the surrounding community. Open space, common amenities and an integrated system of walking trails support a high quality of life for the residents of the development. The site design incorporates in a variety of lot sizes supporting the LUP's goal of increasing a diverse housing stock for the community
5. Please provide details on how the proposed planned unit development provides improved means of access, open space, and design amenities;
The development includes the construction of a street connecting S. Wakefield Street and S. Arendell Street, improving community connectivity. The internal street network includes three (3) access points to existing public roads promoting access options for residents of the development. The development provides over eleven (11) acres of open space, including over five (5) acres of active open space. Walking trails traverse open space and environmentally sensitive areas providing a unique amenity for a development of this size. An on-site swimming pool and clubhouse provide pedestrian accessible amenities for the residents of the development.

6. Please provide details on how the proposed Planned Unit Development provides a well-integrated mix of residential and nonresidential land uses in the same development, including a mix of housing types, lot sizes, and densities;

Three hundred and forty (340) residential lots are proposed. 35% of the lots are designed for single family attached homes and 65% are designed for detached single family homes. The master plan contains four (4) minimum lot sizes: 20' x 100' (2,200 SF); 40' x 120' (4,800 SF); 50' x 120' (6,000 SF); and 60' x 120' (7,200 SF). 10% of the total area is development is designed as open space that includes active and passive recreational opportunities. The maximum density proposed is 2.9 dwelling units per acre.

7. Please provide details on how the proposed Planned Unit Development creates a system of incentives for redevelopment and infill in order to revitalize established areas;

The development will be a quality master planned community and substantial real estate investment on the fringe of downtown Zebulon. Retail and services offered in downtown Zebulon will benefit, as residents of the development will be a short distance from downtown. The development will help mitigate the presence of the solar farm to the North of the development and result in increased property values for surrounding properties.

8. Please provide details on how the proposed Planned Unit Development promotes a vibrant public realm by placing increased emphasis on active ground floor uses, pedestrian-oriented building façade design, intensive use of sidewalks, and establishment of public gathering areas;

A major benefit of a master planned community is that it creates a sense of place in contrast with a traditional residential subdivision. The active open space includes a playground, swimming pool, clubhouse, and dog park, providing public gathering spaces and on-site amenities. The development will have an extensive network of sidewalks and a walking trail through the open space and in close proximity to environmentally sensitive areas.

9. Please provide details on how the proposed Planned Unit Development provides for efficient use of land resulting in smaller networks of utilities and streets and thereby lowering development and housing costs; and

The properties have significant amounts of environmentally sensitive areas. These areas are substantially preserved by the design of the master plan. The environmentally sensitive areas, to a large degree, or located on the perimeter of the development, allowing for concentration of infrastructure improvements in the central area of the development.

10. Please provide details on how the proposed Planned Unit Development provides quality design and environmentally sensitive development that respects surrounding established land use character and respects and takes advantage of a site's natural and man-made features, such as trees, estuaries, shorelines, special flood hazard area, and historic features.

The master plan utilizes existing wetlands, open space and larger lots as an external buffers of the development, mitigating affects of the development on the surrounding community while preserving environmentally significant land features. Stormwater control measures are strategically located near environmentally sensitive areas, which provide additional buffer areas internal to the development and externally to the surrounding community.

11. Other factors as the Board of Commissioners may determine to be relevant.

The development is consistent with the LUP and the Town's Unified Development Ordinance. It will offer residents a variety of housing choices in a quality master planned community on the fringe of downtown Zebulon.

ZEBULON
North Carolina

OWNER'S CONSENT FORM

Name of Project: Zebulon South Submittal Date: 11/01/2022

OWNER'S AUTHORIZATION

I hereby give CONSENT to Andrew Suriano, Deacon Development (type, stamp or print clearly full name of agent) to act on my behalf, to submit or have submitted this application and all required material and documents, and to attend and represent me at all meetings and public hearings pertaining to the application(s) indicated above. Furthermore, I hereby give consent to the party designated above to agree to all terms and conditions which may arise as part of the approval of this application.

I hereby certify I have full knowledge the property I have an ownership interest in is the subject of this application. I acknowledge and agree that, pursuant to Section 2.2.13. of the Town of Zebulon Unified Development Ordinance, that lands subject to a Planned Development shall be subject to all the standards, conditions, and plans approved as part of that application. These standards, plans, and approved conditions are perpetually binding on the land as an amendment to this Ordinance and the Official Zoning Map, and may only be changed in accordance with the procedures established in this Ordinance. Development located outside the Town of Zebulon's corporate limits shall comply with all Town policies related to annexation and the extension of utilities. I understand that all other applicable standards and regulations of the UDO will remain applicable to the subject lands unless specifically listed as conditions or deviations as part of this request. I understand that any false, inaccurate or incomplete information provided by me or my agent will result in the denial, revocation or administrative withdrawal of this application, request, approval or permits. I acknowledge that additional information may be required to process this application. I further consent to the Town of Zebulon to publish, copy or reproduce any copyrighted document submitted as a part of this application for any third party. I further agree to all terms and conditions, which may be imposed as part of the approval of this application.

DocuSigned by:
Johnny Watson
2604BF66B31645F...
Signature of Owner

Johnny Watson
Print Name

10/28/2022 | 11:22 AM PDT
Date

CERTIFICATION OF PROPERTY OWNER

I hereby certify the statements or information made in any paper or plans submitted herewith are true and correct to the best of my knowledge. I understand this application, related material and all attachments become official records of the Planning Department of the Town of Zebulon, North Carolina, and will not be returned.

DocuSigned by:
Johnny Watson
2604BF66B31645F...
Signature of Owner

Johnny Watson
Print Name

10/28/2022 | 11:22 AM PDT
Date

*Owner of record as shown by the Wake County Revenue Department (www.wakegov.com). An option to purchase does not constitute ownership. If ownership has been recently transferred, a copy of the deed must accompany this form.

ZEBULON
North Carolina

APPLICATION FOR
PLANNED DEVELOPMENT
Temple

OWNER'S CONSENT FORM

Name of Project: Zebulon South Submittal Date: 11/01/2022

OWNER'S AUTHORIZATION

I hereby give CONSENT to Andrew Suriano, Deacon Development (type, stamp or print clearly full name of agent) to act on my behalf, to submit or have submitted this application and all required material and documents, and to attend and represent me at all meetings and public hearings pertaining to the application(s) indicated above. Furthermore, I hereby give consent to the party designated above to agree to all terms and conditions which may arise as part of the approval of this application.

I hereby certify I have full knowledge the property I have an ownership interest in is the subject of this application. I acknowledge and agree that, pursuant to Section 2.2.13. of the Town of Zebulon Unified Development Ordinance, that lands subject to a Planned Development shall be subject to all the standards, conditions, and plans approved as part of that application. These standards, plans, and approved conditions are perpetually binding on the land as an amendment to this Ordinance and the Official Zoning Map, and may only be changed in accordance with the procedures established in this Ordinance. Development located outside the Town of Zebulon's corporate limits shall comply with all Town policies related to annexation and the extension of utilities. I understand that all other applicable standards and regulations of the UDO will remain applicable to the subject lands unless specifically listed as conditions or deviations as part of this request. I understand that any false, inaccurate or incomplete information provided by me or my agent will result in the denial, revocation or administrative withdrawal of this application, request, approval or permits. I acknowledge that additional information may be required to process this application. I further consent to the Town of Zebulon to publish, copy or reproduce any copyrighted document submitted as a part of this application for any third party. I further agree to all terms and conditions, which may be imposed as part of the approval of this application.

DocuSigned by: Joseph W Temple, Jr. 9855D8DF446046E...
DocuSigned by: Holly T Hughes
DocuSigned by: Harrison Alexander Hughes D3D78AE6EE94487...

Signature of Owner	Print Name	Date
	Joseph W Temple, Jr.	10/31/2022 | 8:20 AM PDT
	Holly T Hughes Harrison Alexander Hughes	10/29/2022 | 7:28 AM CDT
		10/31/2022 | 10:26 AM CDT

CERTIFICATION OF PROPERTY OWNER

I hereby certify the statements or information made in any paper or plans submitted herewith are true and correct to the best of my knowledge. I understand this application, related material and all attachments become official records of the Planning Department of the Town of Zebulon, North Carolina, and will not be returned.

DocuSigned by: Joseph W Temple, Jr. 9855D8DF446046E...
DocuSigned by: Holly T Hughes
DocuSigned by: Harrison Alexander Hughes D3D78AE6EE94487...

Signature of Owner	Print Name	Date
	Joseph W Temple, Jr.	10/31/2022 | 8:20 AM PDT
	Holly T Hughes Harrison Alexander Hughes	10/29/2022 | 7:28 AM CDT
		10/31/2022 | 10:26 AM CDT

*Owner of record as shown by the Wake County Revenue Department (www.wakegov.com). An option to purchase does not constitute ownership. If ownership has been recently transferred, a copy of the deed must accompany this form.

ZEBULON
North Carolina

APPLICATION FOR
PLANNED DEVELOPMENT
Narron

OWNER'S CONSENT FORM

Name of Project: Zebulon South Submittal Date: 11/01/2022

OWNER'S AUTHORIZATION

I hereby give CONSENT to Andrew Suriano, Deacon Development (type, stamp or print clearly full name of agent) to act on my behalf, to submit or have submitted this application and all required material and documents, and to attend and represent me at all meetings and public hearings pertaining to the application(s) indicated above. Furthermore, I hereby give consent to the party designated above to agree to all terms and conditions which may arise as part of the approval of this application.

I hereby certify I have full knowledge the property I have an ownership interest in is the subject of this application. I acknowledge and agree that, pursuant to Section 2.2.13. of the Town of Zebulon Unified Development Ordinance, that lands subject to a Planned Development shall be subject to all the standards, conditions, and plans approved as part of that application. These standards, plans, and approved conditions are perpetually binding on the land as an amendment to this Ordinance and the Official Zoning Map, and may only be changed in accordance with the procedures established in this Ordinance. Development located outside the Town of Zebulon's corporate limits shall comply with all Town policies related to annexation and the extension of utilities. I understand that all other applicable standards and regulations of the UDO will remain applicable to the subject lands unless specifically listed as conditions or deviations as part of this request. I understand that any false, inaccurate or incomplete information provided by me or my agent will result in the denial, revocation or administrative withdrawal of this application, request, approval or permits. I acknowledge that additional information may be required to process this application. I further consent to the Town of Zebulon to publish, copy or reproduce any copyrighted document submitted as a part of this application for any third party. I further agree to all terms and conditions, which may be imposed as part of the approval of this application.

DocuSigned by:
Charles K. Corbett
Signature of Owner

Charles K. Corbett
Print Name

10/28/2022 | 10:57 AM PDT
Date

CERTIFICATION OF PROPERTY OWNER

I hereby certify the statements or information made in any paper or plans submitted herewith are true and correct to the best of my knowledge. I understand this application, related material and all attachments become official records of the Planning Department of the Town of Zebulon, North Carolina, and will not be returned.

DocuSigned by:
Charles K. Corbett
Signature of Owner

Charles K. Corbett
Print Name

10/28/2022 | 10:57 AM PDT
Date

*Owner of record as shown by the Wake County Revenue Department (www.wakegov.com). An option to purchase does not constitute ownership. If ownership has been recently transferred, a copy of the deed must accompany this form.

CONCEPT PLAN REQUIREMENTS

Every applicant requesting Planned Development approval shall submit **8 copies** and **1 pdf (e-mail or USB Drive)** of a concept plan drawing with the application for a Planned Development. The concept plan shall contain sufficient information to adequately determine the type of development being proposed. The concept plan drawing shall include, at a minimum, the following features unless otherwise specified by the Planning Department:

ITEM		CHECK IF SUBMITTED
1.	Plot plan showing all existing and planned structures, building setback lines, perimeter boundaries, and easements.	✓
2.	Elevation drawings of all buildings indicating the proposed exterior finish materials.	✓
3.	Landscaping plan, lighting, fencing, screening, and walls, indicating all heights and locations.	✓
4.	Location of all ingress and egress.	✓
5.	Off-street parking and loading facilities, with calculations showing how the quantities were obtained.	✓
6.	All pedestrian walks and open areas for use by residents, tenants, or the public.	✓
7.	Proposed land uses indicating areas in square feet.	✓
8.	The location and types of all signs, including lighting and heights, with elevation drawings.	N/A
9.	Existing and/or proposed street names.	✓
10.	Proposed potable or reuse water, wastewater connections, and storm sewer line; proposed grading and drainage patterns; proposed water and sewer allocations.	✓
11.	Such additional items and conditions, including design standards as the Planning Board and Board of Commissioners deems necessary.	✓
12.	Trip generation data and TIA	✓

PROPOSED USES

An application has been duly filed requesting that the property described in this application be rezoned from R2 & R4 to Planned Development. It is understood and acknowledged that if the property is rezoned as requested, the property described in this request will be perpetually bound to the use(s) authorized and subject to such conditions as imposed, unless subsequently changed or amended as provided for in the Unified Development Ordinance. It is further understood and acknowledged that final plans for any specific development to be made pursuant to any such Planned Development shall be submitted for site or subdivision plan approval. Use additional pages as needed.

The Rezoned Lands may be used for, and only for, the uses listed immediately below. The permitted uses are subject to the limitations and regulations stated in the Use Table and any additional limitations or regulations stated below. For convenience, some relevant sections of the Unified Development Ordinance may be referenced; such references do not imply that other sections of the Unified Development Ordinance do not apply.

1.	Single Family Attached Dwelling	25.	
2.	Single Family Detached Dwelling	26.	
3.		27.	
4.		28.	
5.		29.	
6.		30.	
7.		31.	
8.		32.	
9.		33.	
10.		34.	
11.		35.	
12.		36.	
13.		37.	
14.		38.	
15.		39.	
16		40.	
17.		41.	
18.		42.	
19.		43.	
20.		44.	
21.		45.	
22.		46.	
23.		47.	
24.		48.	

PROPOSED DEVELOPMENT CONDITIONS

The applicant hereby requests that the Zebulon Board of Commissioners, pursuant to Section 3.3.5 of the Unified Development Ordinance, approve the Proposed Planned Development with above listed use(s), subject to the following condition(s), requested deviations, and proposed alternative means of compliance. (Attach additional pages as needed)

ADJACENT OWNERS

Provide a certified list of property owners subject to this application and all properties owners within 150-feet feet of the subject property, and any HOA Contacts for developments which fall within 300-feet of the subject property.

Parcel Address	Parcel ID Number	Owner's Name
717 S ARENDELL AVE	2705518689	CHURCH OF GOD EASTERN NC STATE OFFICE
609 S ARENDELL AVE	2705526056	MCNABB, INEZ PITTS HEIRS
0 MORPHUS BRIDGE RD	2704287413	RAPER, F WAYNE TRUSTEE RAPER, JEAN D TRUSTEE
1051 PULLEY GORDON RD	2704484644	AGARWAL ASSOCIATES LLC
729 S ARENDELL AVE	2705516356	VILLALPANDO, MIGUEL ANGEL
707 S WAKEFIELD ST	2705305594	BLOUNT, BARBARA ANN
700 S ARENDELL AVE	2705512202	TEMPLE, JOSEPH WOOD SR HUGHES, HARRISON ALEXANDER
0 S WAKEFIELD ST	2705413075	WATSON FAMILY II LLC
604 S ARENDELL AVE	2705429117	DEAN, ATWELL STUART
301 SIR DAVID DR	2705303716	BARRERA, EMILIO VILLEGAS ARMENTA, BERTHA CORTEZ
751 S WAKEFIELD ST	2704492511	NARRON, HAROLD CORBETT, C FRED
745 S ARENDELL AVE	2705610110	HILL, TIMOTHY GORDON HILL, LILLIAN AVENT
812 S WAKEFIELD ST	2704392692	CARRILLO, JOSE SANTOS CARRILLO, MARY D
738 S WAKEFIELD ST	2705303119	SHAW, SHIRLEY D
300 SIR DAVID DR	2705302989	C W S SYSTEMS INC
737 S ARENDELL AVE	2705518284	HOLLAND, JIMMY LEON HOLLAND, HELEN M
728 S WAKEFIELD ST	2705303434	GILL, WILLIAM E GILL, GENEVIEVE M
720 S WAKEFIELD ST	2705303532	GILL, W E GILL, GENEVIEVE M
0 N ARENDELL AVE	2705513114	TEMPLE, J M
697 S WAKEFIELD ST	2705306724	BRADSHAW, BETTIE SUE
631 S WAKEFIELD ST	2705306922	CONYERS, BEVERLY A CONYERS, CASSANDRA L
614 S ARENDELL AVE	2705520074	CREECH, ROBERT E CREECH, KATHEY P
828 S WAKEFIELD ST	2704297696	SILBER, EVA TRUSTEE EVA SILBER LIVING TRUST THE
610 S WAKEFIELD ST	2705302674	HERNANDEZ, LYDIA FABIOLA MATEO
601 S WAKEFIELD ST	2705315336	SANTOS, ALEJANDRO WILIBALDO ROSALES CASTILLO, ELIA ORTEGA
753 S ARENDELL AVE	2705601920	FOX, JEFFERY M FOX, PENNY M
701 S WAKEFIELD ST	2705305694	STANCIL, L J
505 S WAKEFIELD ST	2705410911	VINSON, MARTHA H
709 S WAKEFIELD ST	2705306404	HINTON, MARY E HEIRS HOLDER, MARY A HEIRS
755 S ARENDELL AVE	2705601533	ESTRADA, JILBER VELAZQUEZ
611 S WAKEFIELD ST	2705316119	MCCULLERS, JAMIE
1028 S ARENDELL AVE	2704693410	JAYS ARENDELL PROPERTIES LLC
621 S WAKEFIELD ST	2705316027	GARCIA, LAURA A REYES, GERARDO REYES

HOA CONTACTS

Development Name	Contact Person	Address
Lindsey Pointe	DAVID BULLOCK CONSTRUCTION INC	2805 AUBURN KNIGHTDALE RD RALEIGH NC 27610-9712

ADJACENT OWNERS

Provide a certified list of property owners subject to this application and all properties owners within 150-feet feet of the subject property, and any HOA Contacts for developments which fall within 300-feet of the subject property.

Parcel Address	Parcel ID Number	Owner's Name
1131 PULLEY GORDON RD	2704485074	MARTIN, COY BERKLEY SR MARTIN, COY BERKLEY JR
916 S ARENDELL AVE	2704597445	PARKER, LARRY N PARKER, TAMMY M
748 S WAKEFIELD ST	2705302076	TISDALE, ALICE KIRK DUNN, MARY FRANCES
900 S ARENDELL AVE	2705509203	PARKER, LARRY N
908 S ARENDELL AVE	2705506134	LONG, RANDALL S
0 PULLEY GORDON RD	2704574734	PARKER, LARRY N PARKER, TAMMY M
734 S WAKEFIELD ST	2705302314	HICKS, MELVILLE HOWARD JR

HOA CONTACTS

Development Name	Contact Person	Address

Beginning at an existing iron pipe along the eastern right of way of Pulley Gordon Road, having a North Carolina State Plane Coordinate (NAD 1983-2011) value of North 749044.53 feet, East 2203638.58 feet. Thence S89° 06' 44"W, 43.52’ to a point in the centerline of Pulley Gordon Road; thence with the centerline of Pulley Gordon Road N31° 40' 13"W, 17.82' to a point; thence with a curve to the right having a radius of 745.63’, a length of 258.84’, and a chord bearing and distance of N21° 43' 32"W, 257.54’ to a point; thence N11° 46' 51"W, 141.30' to a point in the centerline of South Wakefield Street; thence with the centerline of South Wakefield Street with a curve to the left having a radius of 898.66’, a length of 224.11’, and a chord bearing and distance of N1° 14' 44"E, 223.53’ to a point; thence N5° 53' 55"W, 188.25' to a point; thence with a curve to the right having a radius of 2330.34’, a length of 135.93’, and a chord bearing and distance of N4° 13' 39"W, 135.91' to a point; thence N2° 33' 23"W, 47.94' to a point; thence with a curve to the right having a radius of 1695.94’, a length of 104.97’, and a chord bearing and distance of N0° 47' 00"W, 104.96’ to a point; thence with a curve to the left having a radius of 4451.25’, a length of 133.35’, and a chord bearing and distance of N0° 07' 54"E, 133.35’ to a point; thence N0° 43' 36"W, 120.66' to a point; thence leaving the centerline of the aforesaid road S88° 41' 25"E, 331.00' to an existing iron pipe; thence N0° 50' 44"W, 407.57' to an existing iron pipe; thence N89° 19' 57"W, 330.04' to a point in the centerline of South Wakefield Street; thence with the centerline of South Wakefield Street N0° 43' 36"W, 59.99' to a point; thence leaving the aforesaid centerline S89° 19' 57"E, 330.02' to an existing iron pipe; thence N0° 44' 29"W, 389.63' to an existing iron pipe; thence N89° 53' 37"W, 129.83' to an existing iron pipe; thence N3° 52' 53"E, 233.74' to an existing iron pipe; thence S89° 15' 00"E, 1384.54' to an existing iron pipe; thence N1° 20' 40"E, 480.67' to an existing iron pipe; thence N78° 36' 17"E, 124.17' to an existing iron pipe; thence continuing N78° 36' 17"E, 30.59' to a point in the centerline of South Arendell Avenue; thence with the centerline of South Arendell Avenue S28° 50' 24"E, 761.08' to a point; thence S28° 50' 24"E, 425.02' to a point; thence S29° 13' 43"E, 667.05' to a point; thence leaving the centerline of the aforesaid road N88° 26' 36"W, 584.64' to an existing iron pipe; thence S89° 11' 28"W, 68.13' to a 5/8” capped iron rod set; thence S2° 12' 27"E, 1759.55' to a 5/8” capped iron rod set; thence S88° 17' 33"W, 346.50' to an existing iron pipe; thence N3° 17' 33"E, 478.27' to an existing iron pipe; thence S89° 06' 44"W, 1540.50' to the Beginning, containing 118.61 acres more, or less.

SAVE AND EXCEPT the cemetery that exist on the above-described property, described as Beginning at the southeast corner of the cemetery, having a North Carolina State Plane Coordinate (NAD 1983-2011) value as North 751140.59’, East 2205340.06’. Thence N90° 00' 00"W, 30.56' to a point; thence N0° 00' 00"E, 32.27' to a point; thence N90° 00' 00"E, 30.56' to a point; thence S0° 00' 00"E, 32.27' to the Beginning, containing 986 square feet more, or less.

THIS DESCRIPTION IS PROVIDED WITHOUT THE BENEFIT OF A TITLE COMMIMENT

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

5410 Trinity Road
Suite 102
Raleigh, NC 27607

P 919.866.4951
F 919.859.5663
www.timmons.com

September 22, 2022

Notice of Proposed Zoning Change

Wake County PINs 2705-41-3075, 2704-49-2511, & 2705-51-2202

Dear Property Owner:

On behalf of the applicant and property owners, Timmons Group would like to invite you to attend a neighborhood information meeting concerning the following proposal. Timmons Group will be submitting a request to rezone the property located between the intersections of S Wakefield Street and Morphus Bridge Road and the intersection at S Arendell Ave and Perry Curtis Road. The parcels under consideration are shown on the attached map.

The existing zoning is Zebulon Residential Neighborhood District (R4) & Residential Suburban District (R2), and the proposed zoning classification requested is Zebulon Planned Development District (PD). The proposed rezoning will not change the existing zoning status of surrounding properties. The proposed development will consist of a variety of lot sizes, including attached and detached single family.

Per Town of Zebulon ordinance requirements, we are notifying you of this meeting because your property is located within the written notification area for public hearings. While this meeting is not a public hearing, it is an opportunity for you to meet with the owners and/or applicants to hear about their intention to rezone the land. You are encouraged to ask questions and express concerns so that we may help you to understand the proposed project more fully. There will not be an in-person meeting.

The meeting participation options are as follows:

1. An online virtual meeting to be held on October 05, 2022 at 6:00 pm.
    a) Virtual meeting link: **https://timmons.zoom.us/j/99067768952?pwd=MGU0WGRRampkMWgvOGhOYVgrUEgzQT09**

    b) Password: **942736**

    c) Instructions: You may join from any browser. Upon joining, you be placed in the waiting room until the meeting host allows entrance. At the start of the meeting, we will take some time to gather the required information (Name, Address, Email and Phone number) though the chat feature on screen.

2. A toll-free conference call for audio only access to the virtual meeting held on October 05, 2022 at 6:00 pm.

   a) Call about five (5) minutes prior to the aforementioned date and time:

      - Phone Number: +1 646 558 8656

   b) You may be asked to dial the following information:

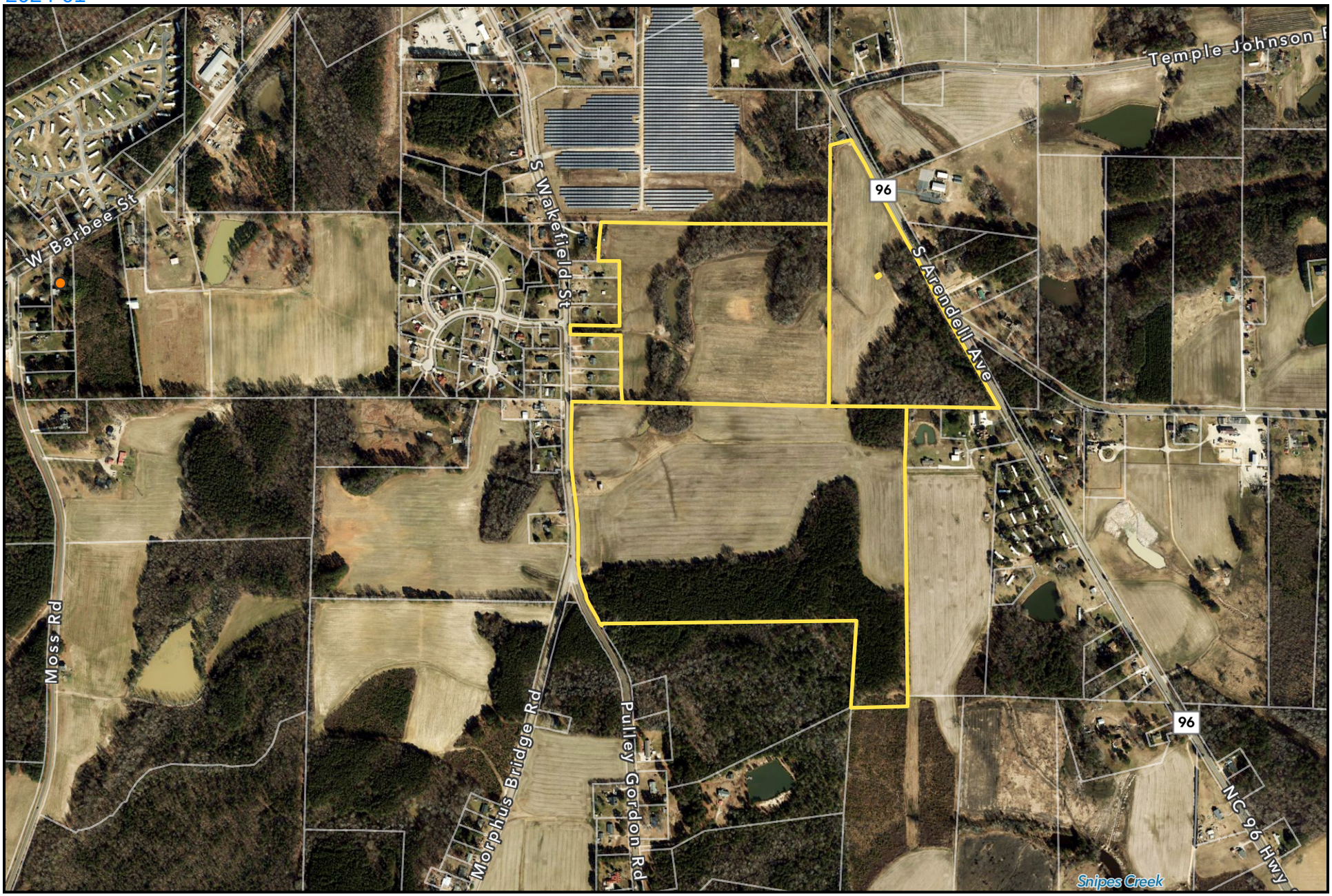
      - Meeting ID: **990 6776 8952**
      - Password: **942736**

If you have any questions about this neighborhood information meeting, or if you are unable to attend and would like to leave comments for our consideration, please feel free to contact me at 919-866-4509 or beth.blackmon@timmons.com.

Thank you for your interest.

Sincerely,

Beth Blackmon, PE
Sr. Project Manager



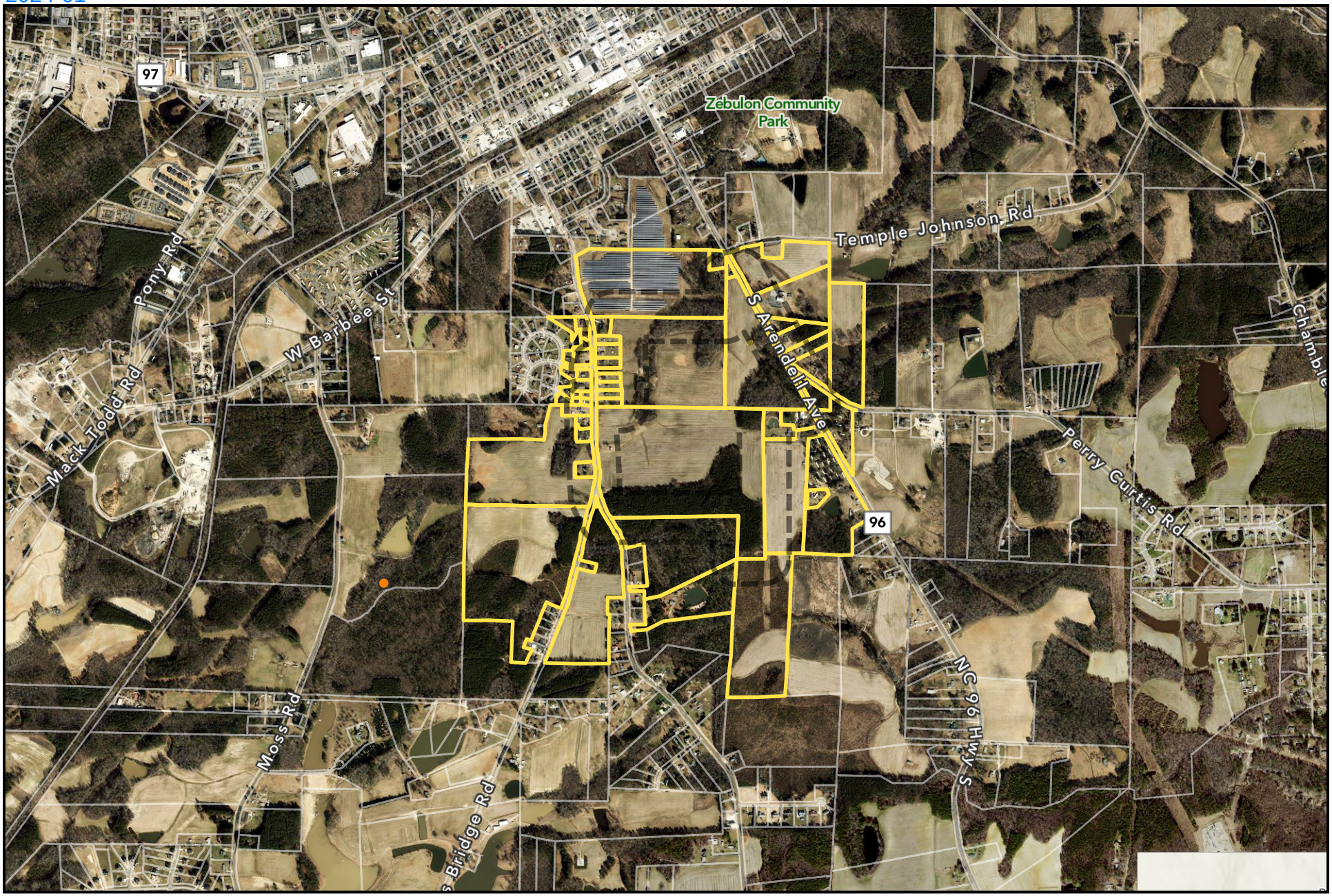
Zebulon South Neighborhood Meeting

N

0 400 800 1600 ft

1 inch equals 800 feet

Disclaimer
*iMaps makes every effort to produce and publish the most current and accurate information possible. However, the maps are produced for information purposes, and are **NOT** surveys. No warranties, expressed or implied ,are provided for the data therein, its use,or its interpretation.*



Zebulon South Mailing List

N

0 800 1600 3200 ft

1 inch equals 1,600 feet

Disclaimer
*iMaps makes every effort to produce and publish the most current and accurate information possible. However, the maps are produced for information purposes, and are **NOT** surveys. No warranties, expressed or implied ,are provided for the data therein, its use,or its interpretation.*

PIN_NUM	OWNER	ADDR1	ADDR2
2704484644	AGARWAL ASSOCIATES LLC	2000 KILLEARN MILL CT	CARY NC 27513-4293
2705303716	BARRERA, EMILIO VILLEGAS ARMENTA, BE	301 SIR DAVID DR	ZEBULON NC 27597-6801
2705305594	BLOUNT, BARBARA ANN	707 S WAKEFIELD ST	ZEBULON NC 27597-2567
2705306724	BRADSHAW, BETTIE SUE	697 S WAKEFIELD ST	ZEBULON NC 27597-2565
2705302989	C W S SYSTEMS INC	500 W MONROE ST STE 3600	CHICAGO IL 60661-3779
2704392692	CARRILLO, JOSE SANTOS CARRILLO, MARY	812 S WAKEFIELD ST	ZEBULON NC 27597-2568
2705518689	CHURCH OF GOD EASTERN NC STATE OFFI	PO BOX 100	KENLY NC 27542-0100
2705306922	CONYERS, BEVERLY A CONYERS, CASSAND	631 S WAKEFIELD ST	ZEBULON NC 27597-2565
2705520074	CREECH, ROBERT E CREECH, KATHEY P	13713 POSSUM TRACK RD	RALEIGH NC 27614-9381
2705311337	DAVID BULLOCK CONSTRUCTION INC	2805 AUBURN KNIGHTDALE RD	RALEIGH NC 27610-9712
2705429117	DEAN, ATWELL STUART	604 S ARENDELL AVE	ZEBULON NC 27597-8202
2705601533	ESTRADA, JILBER VELAZQUEZ	106 WOODGATE DR	GARNER NC 27529-2738
2705601920	FOX, JEFFERY M FOX, PENNY M	753 S ARENDELL AVE	ZEBULON NC 27597-8205
2705301515	FUENTES, BAYRON JOSUE LOPEZ HILARIO,	709 CHANCE CIR	ZEBULON NC 27597-6809
2705316027	GARCIA, LAURA A REYES, GERARDO REYES	621 S WAKEFIELD ST	ZEBULON NC 27597-2565
2705302523	GILL, W E	PO BOX 474	ZEBULON NC 27597-0474
2705303532	GILL, W E GILL, GENEVIEVE M	PO BOX 474	ZEBULON NC 27597-0474
2705302424	GILL, WILLIAM E GILL, GENEVIEVE M	PO BOX 474	ZEBULON NC 27597-0474
2705303434	GILL, WILLIAM E GILL, GENEVIEVE M	PO BOX 474	ZEBULON NC 27597-0474
2705301927	HANNAH, KRYSTAL	304 SIR DAVID DR	ZEBULON NC 27597-6800
2705302674	HERNANDEZ, LYDIA FABIOLA MATEO	610 S WAKEFIELD ST	ZEBULON NC 27597-2564
2705302314	HICKS, MELVILLE HOWARD JR	PO BOX 660	ZEBULON NC 27597-0660
2705610110	HILL, TIMOTHY GORDON HILL, LILLIAN AVI	745 S ARENDELL AVE	ZEBULON NC 27597-8205
2705306404	HINTON, MARY E HEIRS HOLDER, MARY A	709 S WAKEFIELD ST	ZEBULON NC 27597-2567
2705518284	HOLLAND, JIMMY LEON HOLLAND, HELEN	737 S ARENDELL AVE	ZEBULON NC 27597-8205
2704693410	JAYS ARENDELL PROPERTIES LLC	2709 BELMONT VIEW LOOP	CARY NC 27519-7725
2705506134	LONG, RANDALL S	908 S ARENDELL AVE	ZEBULON NC 27597-8208
2704485074	MARTIN, COY BERKLEY SR MARTIN, COY B	2202 NC 561 HWY	LOUISBURG NC 27549-8469
2705316119	MCCULLERS, JAMIE	611 S WAKEFIELD ST	ZEBULON NC 27597-2565
2705526056	MCNABB, INEZ PITTS HEIRS	1900 LITTLE ELM TRL APT 70	CEDAR PARK TX 78613-2834
2704492511	NARRON, HAROLD CORBETT, C FRED	3941 ZEBULON RD	ZEBULON NC 27597-8187
2705509203	PARKER, LARRY N	900 S ARENDELL AVE	ZEBULON NC 27597-8208
2704597445	PARKER, LARRY N PARKER, TAMMY M	900 S ARENDELL AVE	ZEBULON NC 27597-8208
2704574734	PARKER, LARRY N PARKER, TAMMY M	900 S ARENDELL AVE	ZEBULON NC 27597-8208
2704287413	RAPER, F WAYNE TRUSTEE RAPER, JEAN D	1317 MORPHUS BRIDGE RD	WENDELL NC 27591-8377
2705312399	ROSSMAN, MAXINE	108 REGGIE OWENS DR	HARBINGER NC 27941-9704
2705315336	SANTOS, ALEJANDRO WILIBALDO ROSALES	PO BOX 332	WENDELL NC 27591-0332
2705303119	SHAW, SHIRLEY D	738 S WAKEFIELD ST	ZEBULON NC 27597-2566
2704297696	SILBER, EVA TRUSTEE EVA SILBER LIVING T	5117 MELBOURNE RD	RALEIGH NC 27606-1747
2705301759	SPRUILL, JOSEPH PAUL SPRUILL, CONNIE S	305 SIR DAVID DR	ZEBULON NC 27597-6801
2705305694	STANCIL, L J	701 S WAKEFIELD ST	ZEBULON NC 27597-2567
2705513114	TEMPLE, J M	PO BOX 548	ZEBULON NC 27597-0548
2705614179	TEMPLE, JOSEPH WOOD	PO BOX 548	ZEBULON NC 27597-0548
2705512202	TEMPLE, JOSEPH WOOD SR HUGHES, HAR	PO BOX 548	ZEBULON NC 27597-0548
2705302076	TISDALE, ALICE KIRK DUNN, MARY FRANCI	748 S WAKEFIELD ST	ZEBULON NC 27597-2566
2705300426	VILLAFRANCA, IRIS	713 CHANCE CIR	ZEBULON NC 27597-6809
2705516356	VILLALPANDO, MIGUEL ANGEL	110 LEGEND VALLEY LN UNIT 13	ZEBULON NC 27597-9503
2705410911	VINSON, MARTHA H	500 PERRY CURTIS RD	ZEBULON NC 27597-8877
2705413075	WATSON FAMILY II LLC	6220 FORESTVILLE RD	RALEIGH NC 27604-8618
2705520074	Current Resident	614 S ARENDELL AVE	ZEBULON NC 27597
2705303532	Current Resident	720 S WAKEFIELD ST	ZEBULON NC 27597
2705303434	Current Resident	728 S WAKEFIELD ST	ZEBULON NC 27597
2705302314	Current Resident	734 S WAKEFIELD ST	ZEBULON NC 27597
2704485074	Current Resident	1131 PULLEY GORDON RD	ZEBULON NC 27597
2705312399	Current Resident	600 S WAKEFIELD ST	ZEBULON NC 27597

2705315336	Current Resident	601 S WAKEFIELD ST	ZEBULON NC 27597
	Current Resident	100 Bingo Blvd	ZEBULON NC 27597
	Current Resident	100 Bingo Blved LT 27	ZEBULON NC 27597
	Current Resident	100 Green Grove Ln	ZEBULON NC 27597
	Current Resident	100 Green Grove Ln LT 5	ZEBULON NC 27597
	Current Resident	100 Legend Valley Ln	ZEBULON NC 27597
	Current Resident	100 Legend Valley Ln LT 12	ZEBULON NC 27597
	Current Resident	100 Long Park Dr	ZEBULON NC 27597
	Current Resident	100 Long Park Dr LOT 1	ZEBULON NC 27597
	Current Resident	100 Rocky Road Dr	ZEBULON NC 27597
	Current Resident	100 Rocky Road Dr LT 19	ZEBULON NC 27597
	Current Resident	100 Royal View Dr	ZEBULON NC 27597
	Current Resident	100 Royal View Dr LT 34	ZEBULON NC 27597
	Current Resident	1007 S Arendell Ave	ZEBULON NC 27597
	Current Resident	1014 S Arendell Ave	ZEBULON NC 27597
	Current Resident	1020 S Arendell Ave	ZEBULON NC 27597
	Current Resident	1028 S Arendell Ave	ZEBULON NC 27597
	Current Resident	105 Rocky Road Dr	ZEBULON NC 27597
	Current Resident	105 Rocky Road Dr LT 15	ZEBULON NC 27597
	Current Resident	106 Long Park Dr	ZEBULON NC 27597
	Current Resident	106 Long Park Dr LT 11	ZEBULON NC 27597
	Current Resident	108 Long Park Dr	ZEBULON NC 27597
	Current Resident	108 Long Park Dr LT 10	ZEBULON NC 27597
	Current Resident	110 Bingo Blvd	ZEBULON NC 27597
	Current Resident	110 Bingo Blvd LT 28	ZEBULON NC 27597
	Current Resident	110 Green Grove Ln	ZEBULON NC 27597
	Current Resident	110 Green Grove Ln LT 6	ZEBULON NC 27597
	Current Resident	110 Legend Valley Ln LT 13	ZEBULON NC 27597
	Current Resident	110 Long Park Dr	ZEBULON NC 27597
	Current Resident	110 Long Park Dr LT 9	ZEBULON NC 27597
	Current Resident	110 Rocky Road Dr	ZEBULON NC 27597
	Current Resident	111 Rocky Road Dr LT 20	ZEBULON NC 27597
	Current Resident	110 Royal View Dr	ZEBULON NC 27597
	Current Resident	110 Royal View Dr LT 23	ZEBULON NC 27597
	Current Resident	1100 S Arendell Ave	ZEBULON NC 27597
	Current Resident	115 Rocky Road Dr	ZEBULON NC 27597
	Current Resident	115 Rocky Road Dr LT 16	ZEBULON NC 27597
	Current Resident	120 Bingo Blvd	ZEBULON NC 27597
	Current Resident	120 Bingo Blvd LT 29	ZEBULON NC 27597
	Current Resident	120 Legend Valley Ln	ZEBULON NC 27597
	Current Resident	120 Legend Valley Ln LT 14	ZEBULON NC 27597
	Current Resident	120 Long Park Dr	ZEBULON NC 27597
	Current Resident	120 Long Park Dr LT 8	ZEBULON NC 27597
	Current Resident	120 Rocky Road Dr	ZEBULON NC 27597
	Current Resident	120 Rocky Road Dr LT 21	ZEBULON NC 27597
	Current Resident	120 Royal View Dr	ZEBULON NC 27597
	Current Resident	120 Royal View Dr LT 24	ZEBULON NC 27597
	Current Resident	125 Legend Valley Ln	ZEBULON NC 27597
	Current Resident	125 Legend Valley Ln LT 33	ZEBULON NC 27597
	Current Resident	125 Rocky Road Dr	ZEBULON NC 27597
	Current Resident	125 Rocky Road Dr LT 17	ZEBULON NC 27597
	Current Resident	130 Bingo Blvd	ZEBULON NC 27597
	Current Resident	130 Bingo Blvd LT 30	ZEBULON NC 27597
	Current Resident	130 Long Park Dr	ZEBULON NC 27597
	Current Resident	130 Long Park Dr LT 7	ZEBULON NC 27597
	Current Resident	130 Rocky Road Dr	ZEBULON NC 27597

Current Resident	130 Rocky Road Dr LT 22	ZEBULON NC 27597
Current Resident	130 Royal View Dr	ZEBULON NC 27597
Current Resident	130 Royal View Dr LT 25	ZEBULON NC 27597
Current Resident	135 Rocky Road Dr	ZEBULON NC 27597
Current Resident	135 Rocky Road Dr LT 18	ZEBULON NC 27597
Current Resident	140 Bingo Blvd	ZEBULON NC 27597
Current Resident	140 Bingo Blvd LT 31	ZEBULON NC 27597
Current Resident	140 Royal View Dr	ZEBULON NC 27597
Current Resident	150 Bingo Blvd	ZEBULON NC 27597
Current Resident	150 Bingo Blvd LT 32	ZEBULON NC 27597
Current Resident	805 S Arendell Ave	ZEBULON NC 27597
Current Resident	805 S Arendell Ave Lot LT 4	ZEBULON NC 27597
Current Resident	845 S Arendell Ave	ZEBULON NC 27597

NORTH CAROLINA
WAKE COUNTY

AFFIDAVIT OF MAILING

I, Elizabeth Ange, Project Engineer III with Timmons Group, being first duly sworn, deposes and says as follows:

1. That I am a project engineer regarding a rezoning petition to be filed with the Town of Zebulon (the "Town"), for a project known as "Zebulon South" (the "Project").

2. In accordance with the Town's Unified Development Ordinance (the "UDO"), a Neighborhood Meeting for the Project was scheduled for and did occur on October 5, 2022.

3. In accordance with the Town's UDO, a notice of the Neighborhood Meeting was mailed to those individuals and property addresses identified on the exhibit attached hereto. To the best of my knowledge, the individuals identified on the attached exhibit are all of the landowners and occupants within 300 linear feet of the outer perimeter of the site where the Project is proposed.

4. The notice of the Neighborhood Meeting was mailed no less than ten days prior to the date of the Neighborhood Meeting.

This the 22 day of September, 2022.

Elizabeth Ange
Project Engineer III
Timmons Group
5410 Trinity Road, Suite 102
Raleigh, NC 27607

NORTH CAROLINA
COUNTY OF Wake

BEFORE ME, the undersigned authority, this day personally appeared Elizabeth Ange, who, being first duly sworn, deposes and says that she has read the foregoing Affidavit of Mailing and knows the facts contained therein to be true and correct to the best of her knowledge and belief.

SWORN TO AND SUBSCRIBED before me this Oct. 12, 2022.

Karen L. Haas, Notary Public

My commission expires: 8/8/26

(SEAL)

Karen L. Haas
NOTARY PUBLIC
Wake County
North Carolina
My Commission Expires August 8, 2026

202122500189


COLLECTION TIMES
ATTENTION

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Meeting Sign-in Sheet			
Project:	Zebulon South	**Meeting Date:**	5-Oct-22
Faciliator:	Timmons Group	**Place/ Room:**	Zoom

Name	Address	Phone	Email	Sent presentation to
Beth Blackmon	5410 Trinity Rd, Suite 102, Raleigh NC 27607	919-866-4509	beth.blackmon@timmons.com	
Elizabeth Ange	5410 Trinity Rd, Suite 102, Raleigh NC 27607	984-255-2366	elizabeth.ange@timmons.com	
John Adcock	PO Box 1478, Fuquay-Varina, NC 27526	919-552-6600	john@adcocklawfirm.com	
Andrew Suriano	PO Box 1080, Wake Forest, NC 27588	919-608-3542	andrew@deaconcompanies.com	
Jeff Hochanadel	5410 Trinity Rd, Suite 102, Raleigh NC 27607	919-866-4511	jeff.hochanadel@timmons.com	
Hunter Mullins	5410 Trinity Rd, Suite 102, Raleigh NC 27607	919-532-3272	hunter.mullins@timmons.com	
Lynn Mcnabb	1900 Little Elm Trail Apt. 70, Cedar Park Tx		mcnabbvolunteer1@aol.com	X
Tracie Hicks	PO Box 251, Pittsfield, ID	919-868-7592	tracie.hicks@whitetailproperties.com	
Jane Mccullers	611 S Wakefield St, Zebulon NC 27597		jamie.mccullers@yahoo.com	X
Temple	PO Box 548, Zebulon NC 27597			
Chuck, Fred Corbett				
Apurva			JAYSArendellProperties@gmail.com	X
Jack Yen			jackyen@gmail.com	X

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Summary of Discussion From the Neighborhood Meeting			
Project:	Zebulon South	**Meeting Date:**	Wednesday, October 5, 2022
Applicant:	Timmons Group - Beth Blackmon	**Place/ Room:**	Zoom
Contact Information:	beth.blackmon@timmons.com 919-866-4509	**Time:**	6:00 PM

Summary of questions/ comments and responses from the neighborhood meeting:

Questions/ Concern #1: Is there a chance that I might have to move?

Applicant Response: No ma'am, your property is not on site and we are not allowed to put anything on your property. Additionally, there is environmental, streams and wetlands, behind your home and will likely not be putting anything except recreation area behind you.

Questions/ Concern #2: Are you going to build the thoroughfare road? That will be good for the town!

Applicant Response: Yes, because it shows on the transportation plan, it is required to be built. It is a 2 lane divided road.

Questions/ Concern #3: What's the plan for this site? Will there be a new development?

Applicant Response: There are 3 properties and the developer is going to submit a rezoning application to rezone to PD, Planned Development. The PD allows for an initiative design. As of right now, it is proposed to be a residential development with single family housing and townhomes. The proposed density is 2.67 du/a. 314 lots are proposed, 108 are rear load lots.

ZEBULON SOUTH NEIGHBORHOOD MEETING

October 5, 2022

TIMMONS GROUP

AGENDA

- INTRODUCTIONS
- PURPOSE OF MEETING
- THE DEVELOPMENT PROCESS
- PROJECT INFORMATION
  - LOCATION
  - CURRENT ZONING
  - FUTURE LAND USE MAP
  - COMPREHENSIVE TRANSPORTATION PLAN
  - EXISTING CONDITIONS
- PD REZONING TIMELINE
- Q&A

TIMMONS GROUP

INTRODUCTIONS

TIMMONS GROUP:

Beth Blackmon, PE

Sr. Project Manager

919-866-4509

beth.blackmon@timmons.com

ADCOCK LAW FIRM:

John Adcock, Esq.

919-552-6600

john@adcocklawfirm.com

Attendees

TIMMONS GROUP

PURPOSE

WHO RECEIVED NOTIFICATION?

Property owners within 300 feet of the proposal

WHY ARE WE HOLDING THIS MEETING?

Unified Development Ordinance requirement to meet with adjacent property owners

To have an opportunity before submittal to receive feedback

To improve the proposal with that feedback

HOW WILL WE DO THAT?

Following tonight's meeting, the applicant & Town staff will discuss your comments

Look for ways to improve the proposal using your comments

TIMMONS GROUP

THE DEVELOPMENT PROCESS

PLANNED DEVELOPMENT REZONING (PD)

Master plan rezoning with concept plan and conditions to guide future development

PRELIMINARY SUBDIVISION PLAT/CONSTRUCTION DOCUMENTS

Detailed subdivision plans to establish streets, lot layout and utilities

Proposing single family detached homes and attached townhomes

Both rear load and front load homes will be proposed

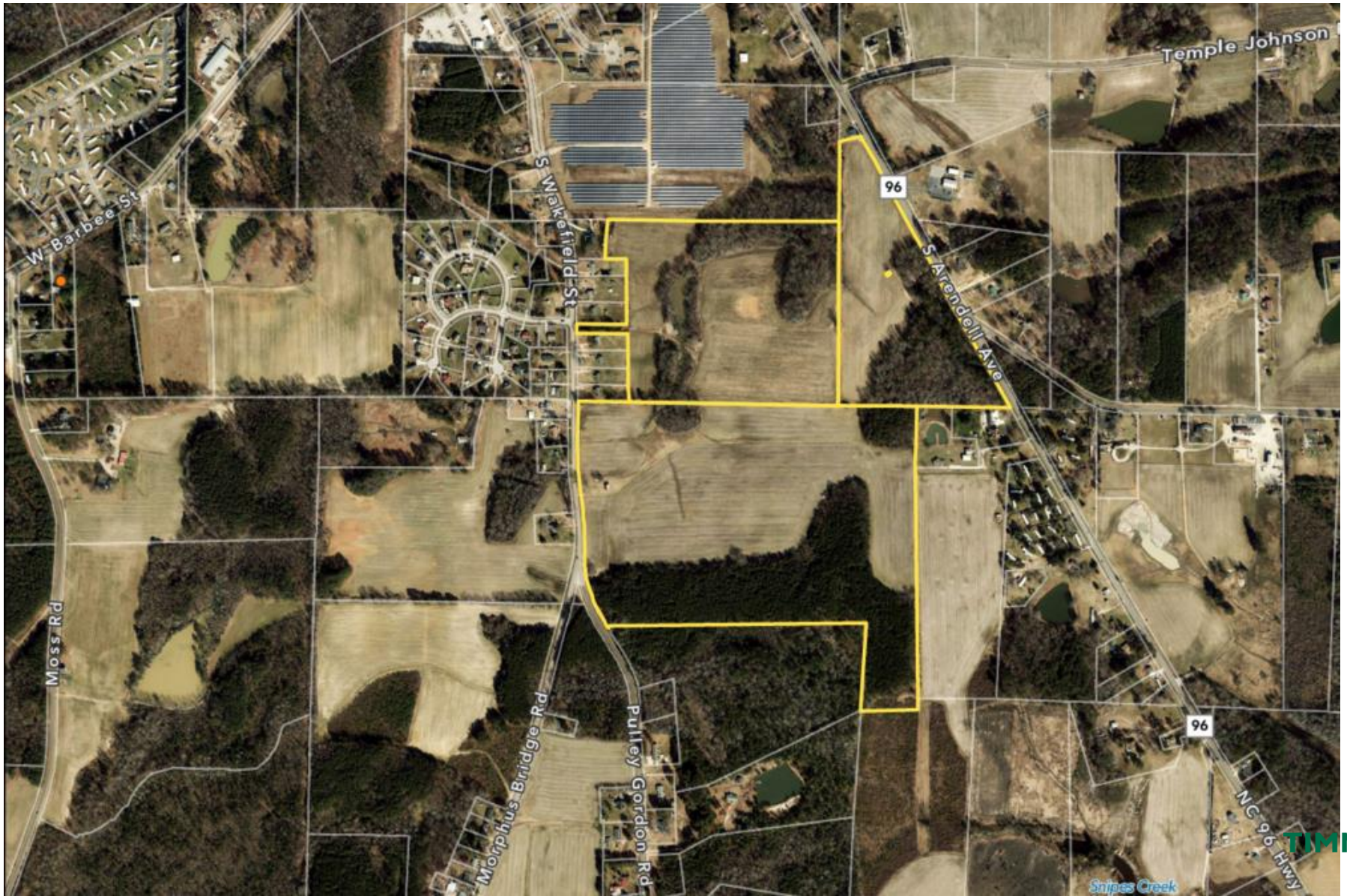
Reviewed by staff for conformance with PD master plan rezoning

Detailed plans to be utilized for construction of infrastructure

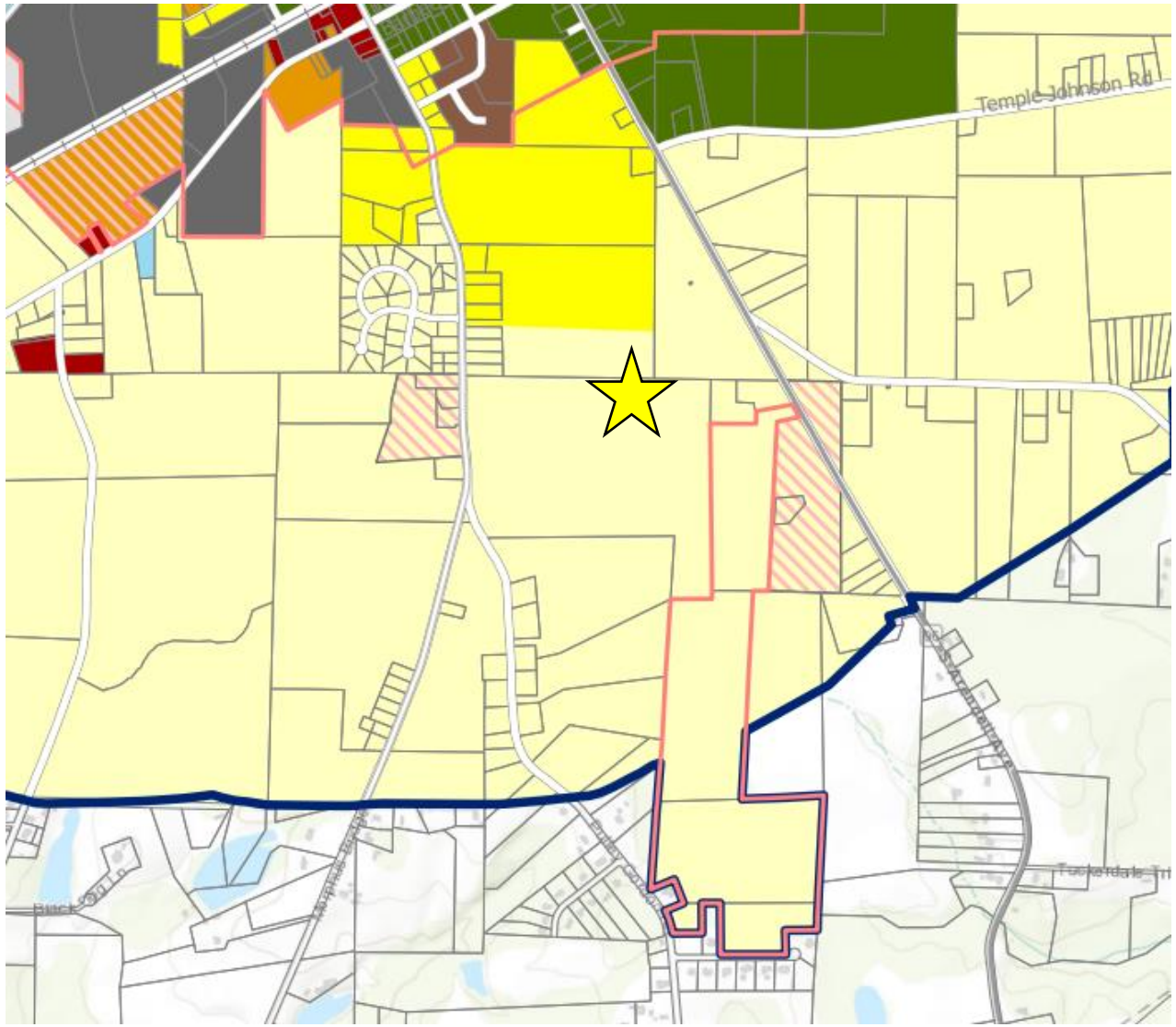
Including erosion control, road improvements, streets, utilities and stormwater

TIMMONS GROUP

LOCATION


Temple Johnson
96
S Wakefield St
W Barbee St
S Arendell Ave
Moss Rd
Morphus Bridge Rd
Pulley Gordon Rd
96
NC 96 Hwy
Swipes Creek

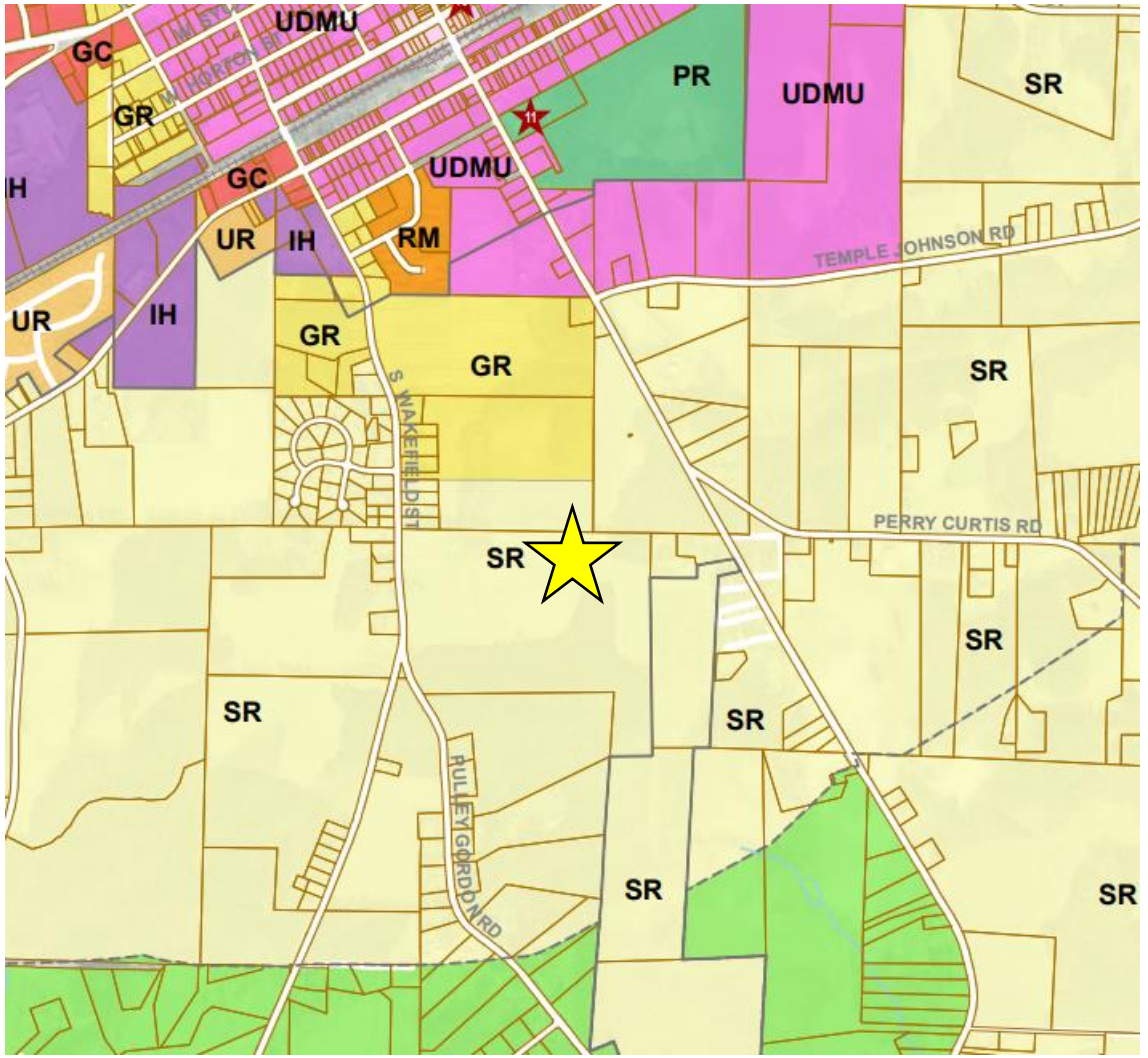
CURRENT ZONING



R2, RESIDENTIAL SUBURBAN
R4, RESIDENTIAL NEIGHBORHOOD

TIMMONS GROUP

FUTURE LAND USE MAP

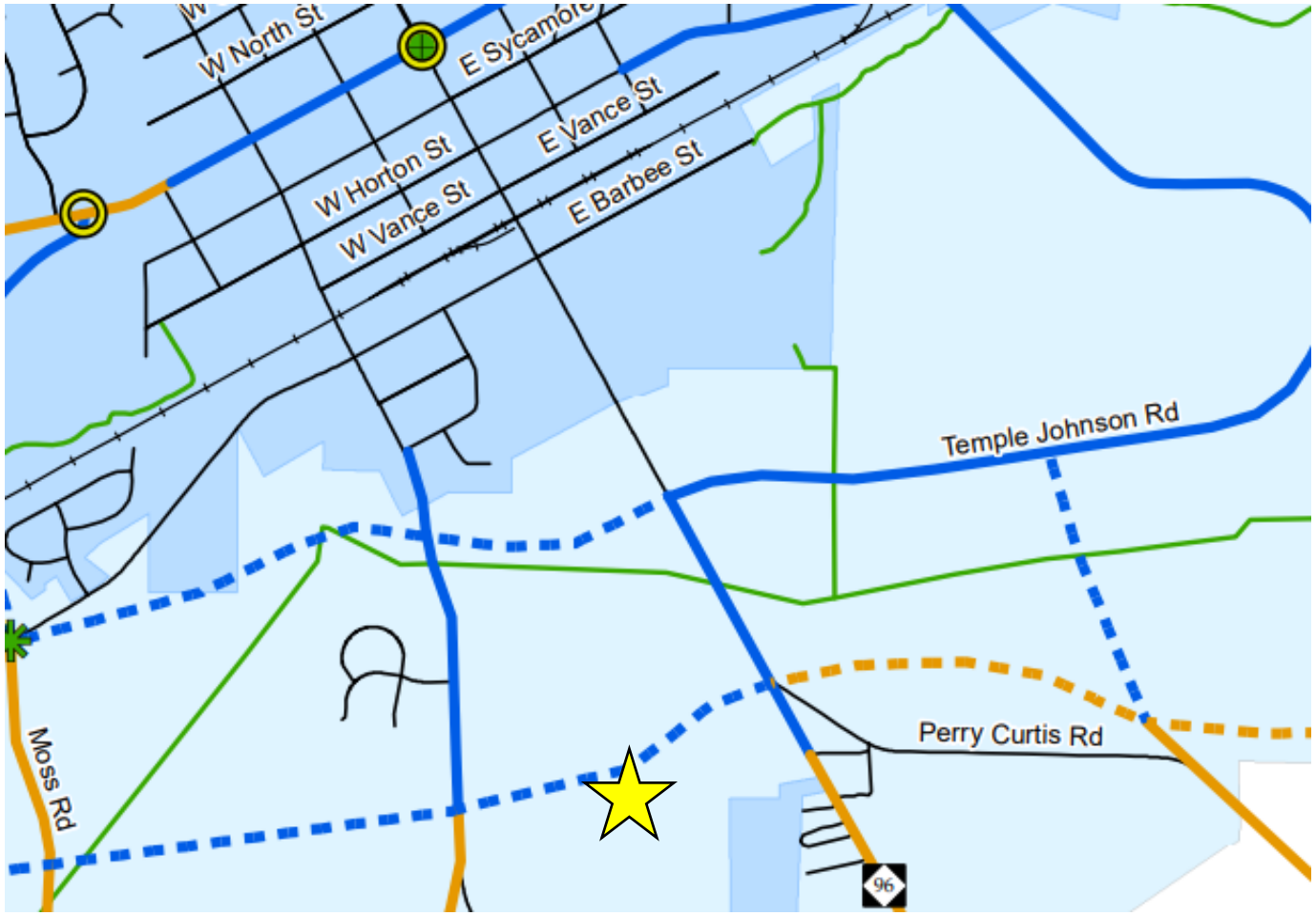


Suburban Residential (SR)

General Residential (GR)

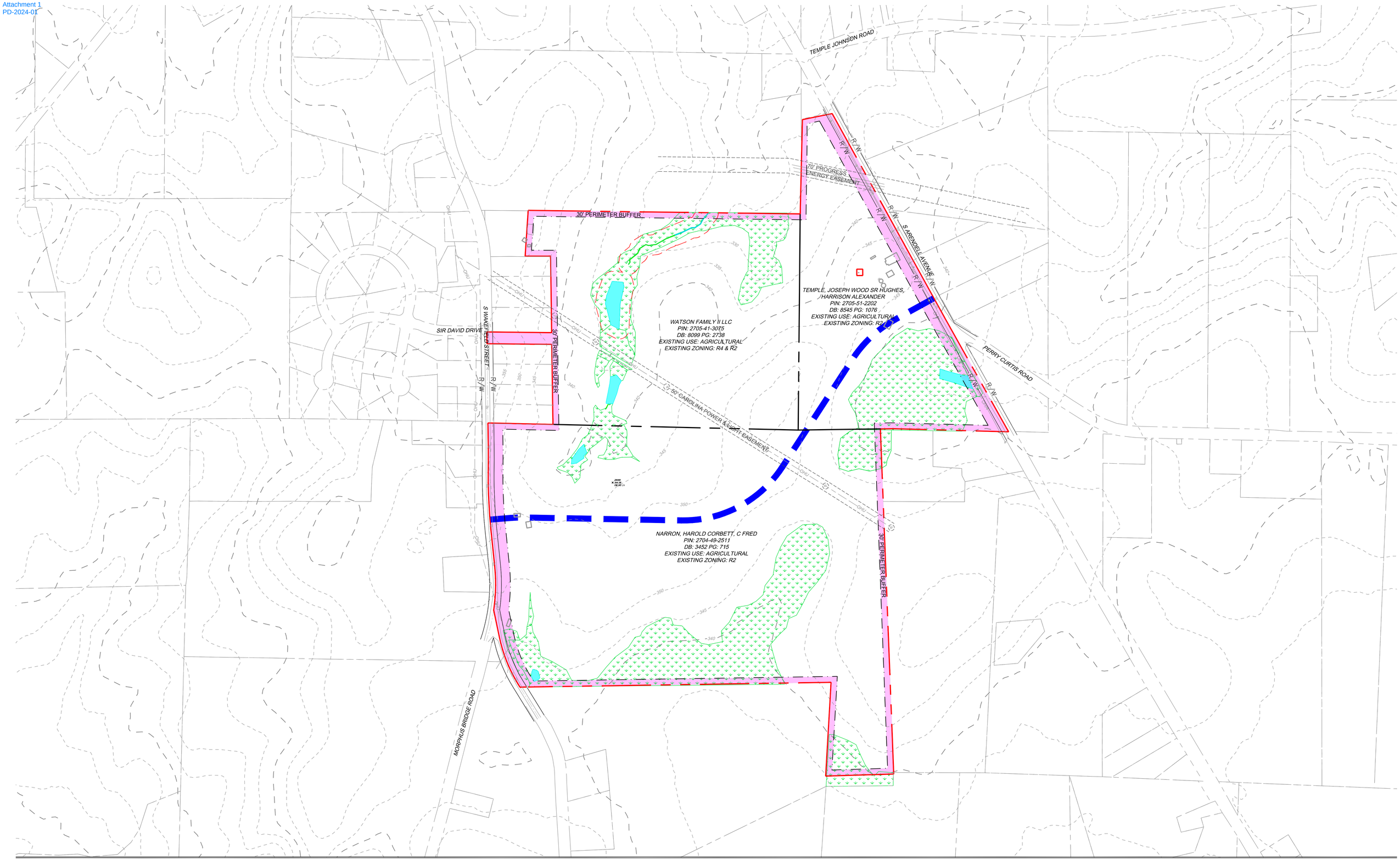
TIMMONS GROUP

COMPREHENSIVE TRANSPORTATION PLAN



- 4-Lane Divided Widening / Altering
- 4-Lane Divided New Roadway
- 2-Lane Divided Widening / Altering
- 2-Lane Divided New Roadway
- 2-Lane Undivided New Roadway
- Greenway

TIMMONS GROUP



ZEBULON SOUTH

Existing Conditions - October 4, 2022

SCALE 1"=200'

0 200' 400'

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

JOB NUMBER 49084-331

PD REZONING TIMELINE

NEIGHBORHOOD MEETING DATE:

October 5, 2022

ANTICIPATED APPLICATION SUBMITTAL DATE:

November 1, 2022

ANTICIPATED JOINT PUBLIC HEARING MEETING:

January 23, 2023

ANTICIPATED PLANNING BOARD RECOMMENDATION:

January 30, 2023

ANTICIPATED BOARD OF COMMISSIONERS DECISION:

February 6, 2023

TIMMONS GROUP

Q & A

TIMMONS GROUP:

Beth Blackmon, PE

Sr Project Manager

919-866-4509

beth.blackmon@timmons.com

ADCOCK LAW FIRM:

John Adcock, Esq.

919-552-6600

john@adcocklawfirm.com

ZEBULON PLANNING DEPARTMENT CONTACT:

Michael Clark

Planning Director

919-828-1808

mclark@townofzebulon.org

TIMMONS GROUP

ONS GROUP

RALEIGH NC 275
Research Triangle Region
28 SEP 2022 PM 3 L

ROSSMAN, MAXINE
108 REGGIE OWENS DR
HARBINGER NC 27941-9704

276 NEE 1 421I0210/03/22
FORWARD TIME EXP RTN TO SEND
ROSSMAN
600 S WAKEFIELD ST
ZEBULON NC 27597-2564

RETURN TO SENDER

INT

27597>6003
27941-970408

Returned Letter

ONS GROUP

RALEIGH NC 275
Research Triangle Region
28 SEP 2022 PM 3 L

ROSSMAN, MAXINE
108 REGGIE OWENS DR
HARBINGER NC 27941-9704

276 NEE 1 421I0210/03/22
FORWARD TIME EXP RTN TO SEND
ROSSMAN
600 S WAKEFIELD ST
ZEBULON NC 27597-2564

RETURN TO SENDER

INT

27597>6003
27941-970408

RALEIGH NC 275
Research Triangle Region
28 SEP 2022 PM 3 L

Current Resident
110 Royal View Dr LT 23
ZEBULON NC 27597

NIXIE 276 CE 1 0210/08/22
RETURN TO SENDER
VACANT
UNABLE TO FORWARD
BC: 27607600327 *0880-02677-28-41

27597 VAC
27607>6003

28 SEP 2022 PM 3 L

TEMPLE, JOSEPH WOOD
PO BOX 548
ZEBULON NC 27597-0548

NIXIE 276 NEE 1 22I0210/01/22
RETURN TO SENDER
NOT DELIVERABLE AS ADDRESSED
UNABLE TO FORWARD
MANUAL PROC REQ *0880-02599-28-41

INT
27607>6003
27597-054848

28 SEP 2022 PM 3 L

Temple

TEMPLE, JOSEPH WOOD
HARRISON ALEXANDER
PO BOX 548
ZEBULON NC 27597-0548

Joseph

* 276 NCE 1 22C0210/08/22
RETURN TO SENDER
NOT DELIVERABLE AS ADDRESSED
UNABLE TO FORWARD
BC: 27607600327 *0880-03099-28-41

K1: 940092278028l2

FWD
27607>6003
27597-054

RALEIGH NC 275
Research Triangle Region
28 SEP 2022 PM 3 L

Joseph Temple

TEMPLE, J M
PO BOX 548
ZEBULON NC 27597-0548

(4)

* 276 NCE 1 22C0210/08/22
RETURN TO SENDER
NOT DELIVERABLE AS ADDRESSED
UNABLE TO FORWARD
BC: 27607600327 *0880-02709-28-41

^1: 9400922780281 2

FWD
27607>6003
27597-054848

BEHNKE, DEBRA ANN
4313 FRIENDSHIP RD
APEX NC 27539-8759

NSN

NIXIE 276 CE 1 0210/08/22
RETURN TO SENDER
NO SUCH NUMBER
UNABLE TO FORWARD
BC: 27607600327 *0880-02774-03-43

NSN
27539-7591
27607>6003

HINTON, MARY E HEIRS HOLDER, MARY
A HEIRS
709 S WAKEFIELD ST
ZEBULON NC 27597-2567

NIXIE 276 4E 1 0210/05/22
RETURN TO SENDER
NO SUCH STREET
UNABLE TO FORWARD
BC: 27607600327 *0780-00772-28-41

9092086081191B8

NSS
27597-2567
27607>6003

RALEIGH NC 275
Research Triangle Region
28 SEP 2022 PM 3 L

Current Resident
720 S WAKEFIELD ST
ZEBULON NC 27597

NIXIE 276 CE 1 0210/05/22
RETURN TO SENDER
NO MAIL RECEPTACLE
UNABLE TO FORWARD
BC: 27607600327 *0880-02957-28-41

NMP
27597-2566
27607>6003

28 SEP 2022 PM 3 L

Current Resident
728 S WAKEFIELD ST
ZEBULON NC 27597

NIXIE 276 CE 1 0210/05/22
RETURN TO SENDER
NO MAIL RECEPTACLE
UNABLE TO FORWARD
BC: 27607600327 *0880-02713-28-41

NMP
27597-2566
27607>6003

Research Triangle Region
28 SEP 2022 PM 4 L

Current Resident
734 S WAKEFIELD ST
ZEBULON NC 27597

NIXIE 276 CE 1 0210/05/22
RETURN TO SENDER
NO MAIL RECEPTACLE
UNABLE TO FORWARD
BC: 27607600327 *0980-01557-28

NMP
27597-2566
27607>6003

NS GROUP

RALEIGH NC 275
Research Triangle Region
28 SEP 2022 PM 2 L

Current Resident
111 Rocky Road Dr LT 20
ZEBULON NC 27597

NIXIE 276 4E 1 0210/05/22

RETURN TO SENDER
NO SUCH NUMBER
UNABLE TO FORWARD

BC: 27607600327 *0780-00779-28-41

1009208808211988

NSN
27607-0557 11

ONS GROUP

RALEIGH NC 275
Research Triangle Region
16 SEP 2022 PM 3 L

ONS GROUP

RALEIGH NC 275
Research Triangle Region
28 SEP 2022 PM 3 L

Current Resident
110 Royal View Dr
ZEBULON NC 27597

NIXIE 276 4E 1 0210/09/22
RETURN TO SENDER
VACANT
UNABLE TO FORWARD
MANUAL PROC REQ *0880-02688-28-41

27597-9568 VAC
56998>9999

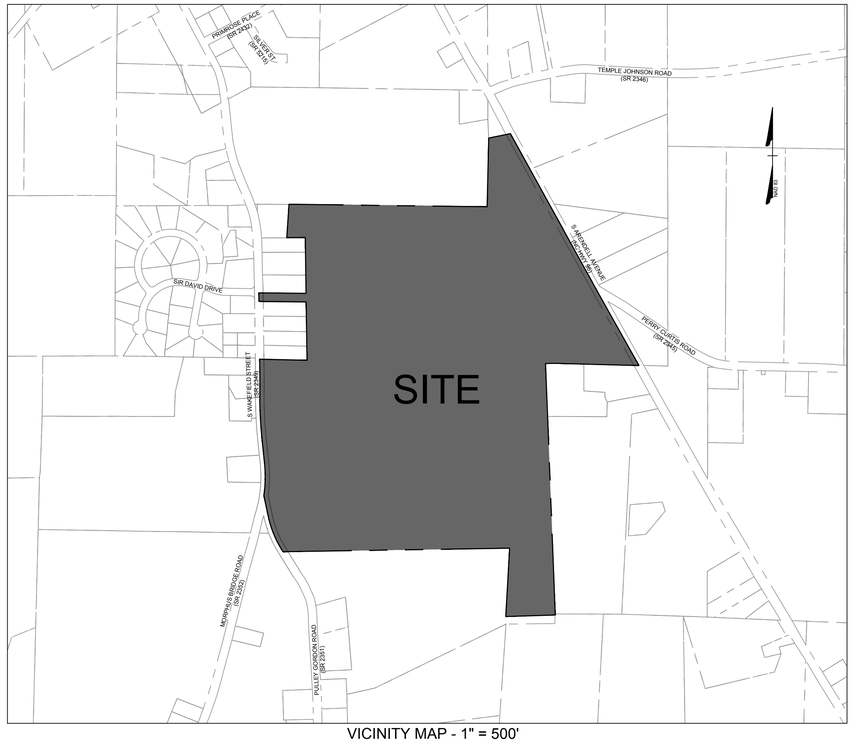
ZEBULON SOUTH

PRELIMINARY PLAN

TOWN OF ZEBULON, WAKE COUNTY, NORTH CAROLINA

SITE DATA

PROJECT:	ZEBULON SOUTH
ENGINEER:	TIMMONS GROUP 5410 TRINITY ROAD, SUITE 102 RALEIGH, NC 27607 PHONE: 919-866-4509 FAX: 919-859-5663 BETH BLACKMON, PE EMAIL: BETH.BLACKMON@TIMMONS.COM
DEVELOPER:	DEACON DEVELOPMENT GROUP PO BOX 1080 WAKE FOREST, NC 27588 PHONE: 919 608-3542 ANDREW SURIANO ANDREW@DEACONCOMPANIES.COM
PROPERTY LOCATION:	751 S WAKEFIELD ROAD 700 S ARENDELL AVE 0 S WAKEFIELD STREET 0 S ARENDELL AVE
PIN:	2705-41-3075, 2704-49-2511, & 2705-51-2202, 2705-51-3114
EXISTING ZONING:	R4 & R2
PROPOSED ZONING:	PD
EXISTING USE:	AGRICULTURAL
TOTAL TRACT AREA:	118.62 ACRES



VICINITY MAP - 1" = 500'

Sheet List Table

Sheet Number	Sheet Title
CVR	COVER
C1.0	EXISTING CONDITIONS
C2.0	OVERALL SITE PLAN
C2.1	DETAILED SITE PLAN SHEET 1 OF 4
C2.2	DETAILED SITE PLAN SHEET 2 OF 4
C2.3	DETAILED SITE PLAN SHEET 3 OF 4
C2.4	DETAILED SITE PLAN SHEET 4 OF 4
C3.0	OVERALL UTILITY PLAN
C3.1	DETAILED UTILITY PLAN SHEET 1 OF 4
C3.2	DETAILED UTILITY PLAN SHEET 2 OF 4
C3.3	DETAILED UTILITY PLAN SHEET 3 OF 4
C3.4	DETAILED UTILITY PLAN SHEET 4 OF 4
C4.0	OVERAL GRADING & DRAINAGE PLAN
C4.1	DETAILED GRADING & DRAINAGE PLAN SHEET 1 OF 4
C4.2	DETAILED GRADING & DRAINAGE PLAN SHEET 2 OF 4
C4.3	DETAILED GRADING & DRAINAGE PLAN SHEET 3 OF 4
C4.4	DETAILED GRADING & DRAINAGE PLAN SHEET 4 OF 4
C5.0	OVERALL LANDSCAPE PLAN
C5.1	DETAILED LANDSCAPE PLAN SHEET 1 OF 4
C5.2	DETAILED LANDSCAPE PLAN SHEET 2 OF 4
C5.3	DETAILED LANDSCAPE PLAN SHEET 3 OF 4
C5.4	DETAILED LANDSCAPE PLAN SHEET 4 OF 4
C6.0	LIGHTING PLAN
C7.0	OVERALL SIGNS & MARKINGS PLAN
C7.1	DETAILED SIGNS & MARKINGS PLAN SHEET 1 OF 4
C7.2	DETAILED SIGNS & MARKINGS PLAN SHEET 2 OF 4
C7.3	DETAILED SIGNS & MARKINGS PLAN SHEET 3 OF 4
C7.4	DETAILED SIGNS & MARKINGS PLAN SHEET 4 OF 4
C8.0	DETAILED AMENITY PLAN
C8.1	DETAILED AMENITY PLAN
C9.1	SINGLE FAMILY CONCEPTUAL ELEVATIONS
C9.2	TOWNHOME CONCEPTUAL ELEVATIONS
C9.3	CONCEPUTUAL AMENITY

OWNERS OF RECORD

PIN: 2704-49-2511
NARRON, HAROLD CORBETT, C FRED
3941 ZEBULON RD
ZEBULON, NC 27597

PIN: 2705-41-3075
WATSON FAMILY LLC.
6220 FORESTVILLE RD
RALEIGH, NC 27604

PIN: 2705-51-2202
TEMPLE, JOSEPH WOOD SR HUGHES, HARRISON ALEXANDER
PO BOX 548
ZEBULON, NC 27597

PIN: 2705-51-3114
TEMPLE, J M
1424 S HOLLYBROOK RD
WENDELL NC 27591-9584

811 Know what's below. Call before you dig.

THIS DRAWING PREPARED AT THE
RALEIGH OFFICE
5410 Trinity Road, Suite 102 | Raleigh, NC 27607
TEL 919.866.4951 FAX 919.833.8124 www.timmons.com

YOUR VISION ACHIEVED THROUGH OURS.

REVISION DESCRIPTION

DATE

DATE 02/22/2024
DRAWN BY 331
DESIGNED BY E. ANGE
CHECKED BY B. BLACKMON
SCALE 1" = 500'

TIMMONS GROUP

NORTH CAROLINA LICENSE NO. C-1652

ZEBULON SOUTH

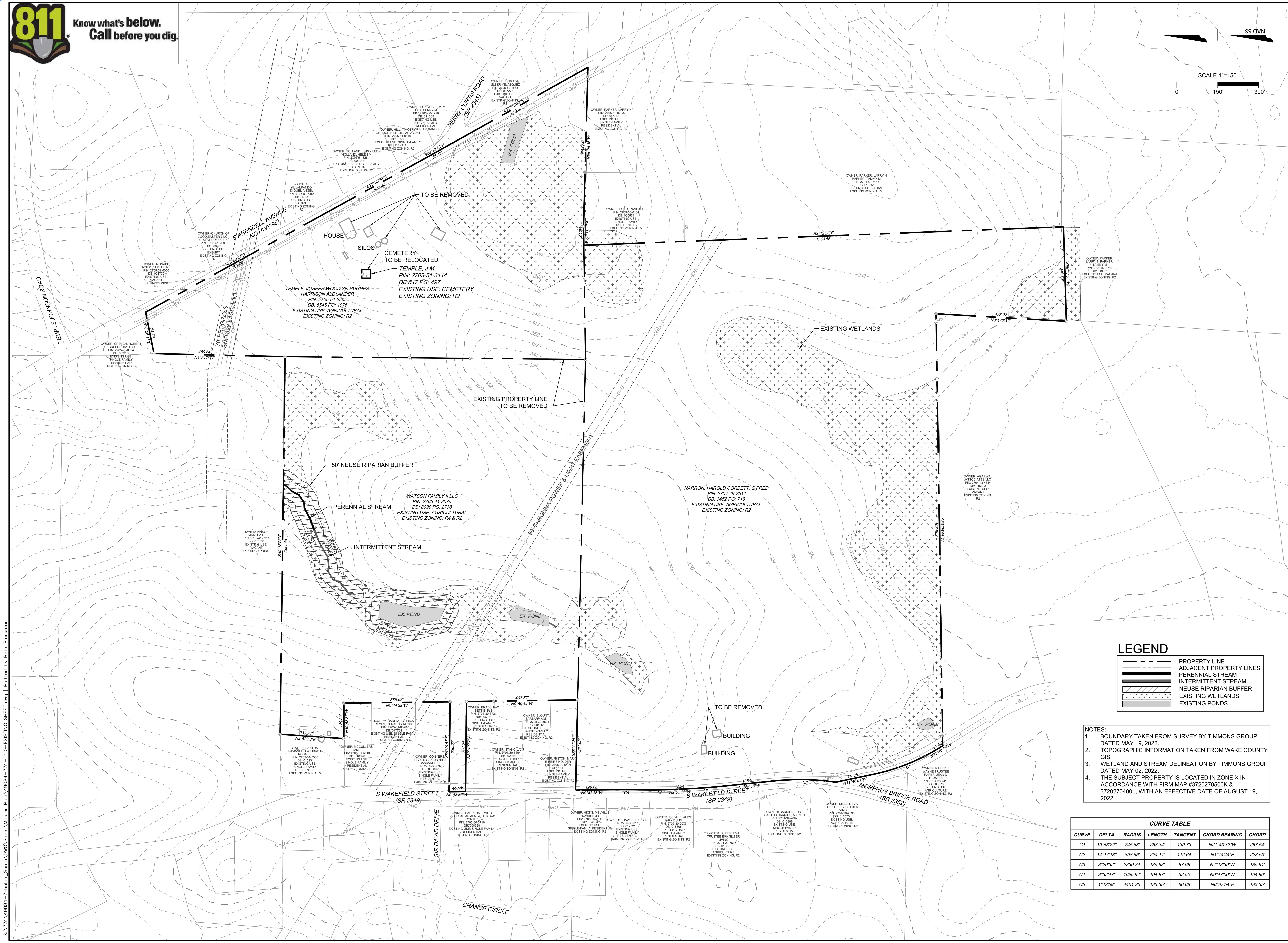
751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA

COVER

JOB NO. 49084
SHEET NO. CVR

S:\331\49084-Zebulon_South\DWG\Sheet\Master Plan\49084-331-C0.0-COVR.dwg | Plotted by Beth Blackmon

Attachment 2
PD-2024-01



LEGEND

— · —	PROPERTY LINE
- - -	ADJACENT PROPERTY LINES
▬	PERENNIAL STREAM
▬	INTERMITTENT STREAM
▨	NEUSE RIPARIAN BUFFER
▦	EXISTING WETLANDS
▭	EXISTING PONDS

NOTES:
1. BOUNDARY TAKEN FROM SURVEY BY TIMMONS GROUP DATED MAY 19, 2022.
2. TOPOGRAPHIC INFORMATION TAKEN FROM WAKE COUNTY GIS.
3. WETLAND AND STREAM DELINEATION BY TIMMONS GROUP DATED MAY 02, 2022.
4. THE SUBJECT PROPERTY IS LOCATED IN ZONE X IN ACCORDANCE WITH FIRM MAP #3720270500K & 3720270400L, WITH AN EFFECTIVE DATE OF AUGUST 19, 2022.

CURVE TABLE

CURVE	DELTA	RADIUS	LENGTH	TANGENT	CHORD BEARING	CHORD
C1	19°53'22"	745.63'	258.84'	130.73'	N21°43'32"W	257.54'
C2	14°17'18"	898.66'	224.11'	112.64'	N1°14'44"E	223.53'
C3	3°20'32"	2330.34'	135.93'	67.98'	N4°13'39"W	135.91'
C4	3°32'47"	1695.94'	104.97'	52.50'	N0°47'00"W	104.96'
C5	1°42'59"	4451.25'	133.35'	66.68'	N0°07'54"E	133.35'

S:\331\49084–Zebulon_South\DWG\Sheet\Master Plan\49084–331–C1.0–EXISTING SHEET.dwg | Plotted by Beth Blackmon

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YOUR VISION ACHIEVED THROUGH OURS.

REVISION DESCRIPTION	DATE

DATE 02/22/2024
DRAWN BY 331
DESIGNED BY E. ANGE
CHECKED BY B. BLACKMON
SCALE 1" = 150'

TIMMONS GROUP

NORTH CAROLINA LICENSE NO. C-1652

ZEBULON SOUTH

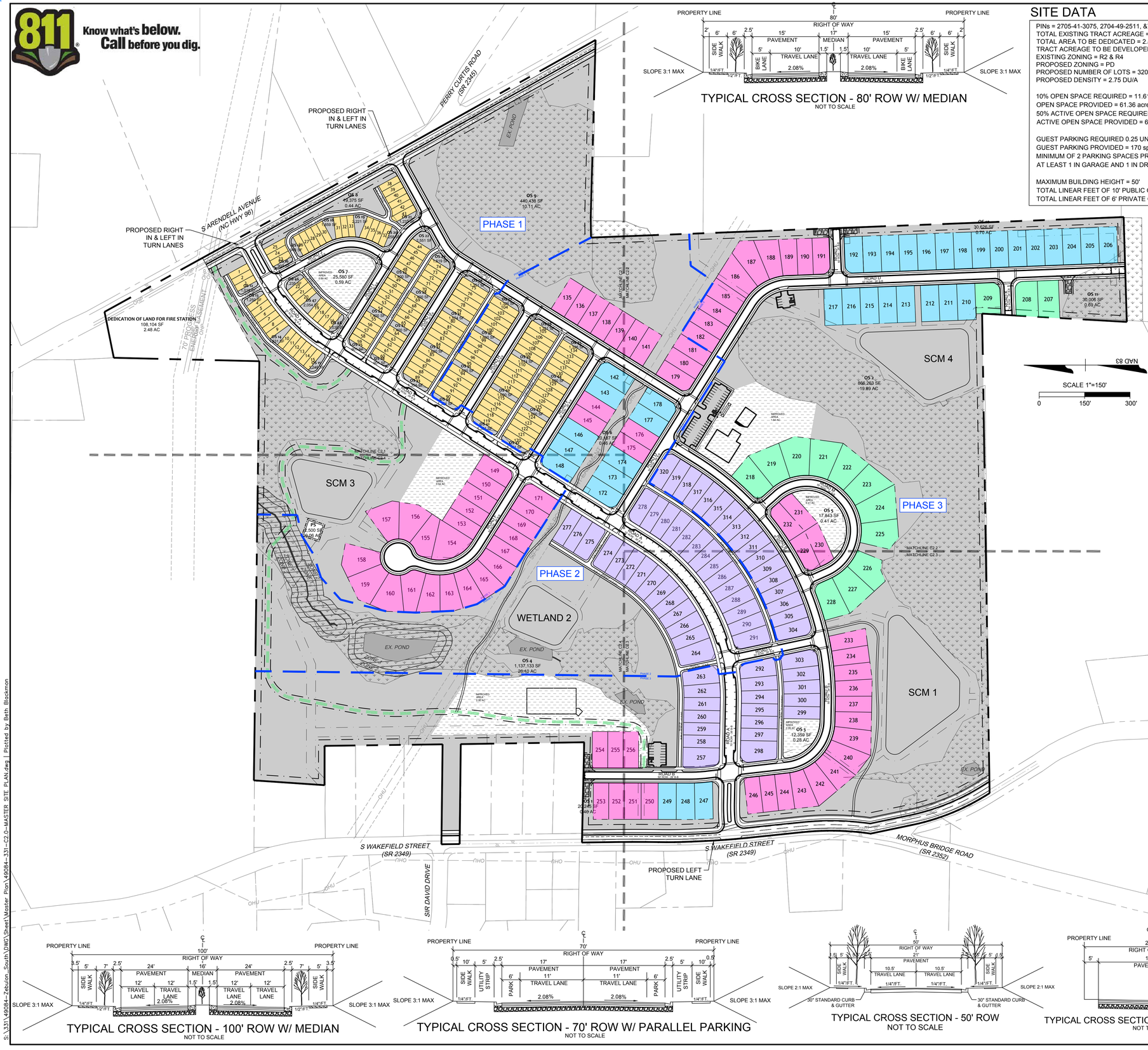
751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA

EXISTING CONDITIONS

JOB NO. 49084
SHEET NO. C1.0

Attachment 2
PD-2024-01

811 Know what's below. Call before you dig.



TYPICAL CROSS SECTION - 80' ROW W/ MEDIAN
NOT TO SCALE

SITE DATA

PINs = 2705-41-3075, 2704-49-2511, &705-51-2202 & 2705-51-3114
TOTAL EXISTING TRACT ACREAGE = 118.62 AC
TOTAL AREA TO BE DEDICATED = 2.48 AC
TRACT ACREAGE TO BE DEVELOPED = 116.14 AC
EXISTING ZONING = R2 & R4
PROPOSED ZONING = PD
PROPOSED NUMBER OF LOTS = 320
PROPOSED DENSITY = 2.75 DU/A

10% OPEN SPACE REQUIRED = 11.61 acres
OPEN SPACE PROVIDED = 61.36 acres (52.83%)
50% ACTIVE OPEN SPACE REQUIRED = 5.81 acres
ACTIVE OPEN SPACE PROVIDED = 6.27 acres

GUEST PARKING REQUIRED 0.25 UNITS = 80 spaces
GUEST PARKING PROVIDED = 170 spaces
MINIMUM OF 2 PARKING SPACES PROVIDED ON EACH LOT, AT LEAST 1 IN GARAGE AND 1 IN DRIVEWAY

MAXIMUM BUILDING HEIGHT = 50'
TOTAL LINEAR FEET OF 10' PUBLIC GREENWAY = 3,415'
TOTAL LINEAR FEET OF 6' PRIVATE GREENWAY = 2,040'

LOT DATA

134 - REAR LOAD SINGLE FAMILY ATTACHED
MINIMUM LOT SIZE PROVIDED: 1,523'
AVERAGE LOT SIZE PROVIDED: 1,880'
MINIMUM LOT WIDTH: 18'
DRIVEWAY LENGTH: 20'
MINIMUM DRIVEWAY WIDTH: 10'

64 - REAR LOAD SINGLE FAMILY
MINIMUM LOT SIZE PROVIDED: 4,920'
AVERAGE LOT SIZE PROVIDED: 5,410'
MINIMUM LOT WIDTH: 40'
DRIVEWAY LENGTH: 20'
MINIMUM DRIVEWAY WIDTH: 10'

72 - FRONT LOAD SINGLE FAMILY LOTS
MINIMUM LOT SIZE PROVIDED: 6,114'
AVERAGE LOT SIZE PROVIDED: 6,963'
MINIMUM LOT WIDTH: 50'
DRIVEWAY LENGTH: 20'
MINIMUM DRIVEWAY WIDTH: 10'

36 - FRONT LOAD SINGLE FAMILY LOTS
MINIMUM LOT SIZE PROVIDED: 7,046'
AVERAGE LOT SIZE PROVIDED: 7,192'
MINIMUM LOT WIDTH: 60'
DRIVEWAY LENGTH: 20'
MINIMUM DRIVEWAY WIDTH: 16'

14 - REAR LOAD SINGLE FAMILY
MINIMUM LOT SIZE PROVIDED: 8,343
AVERAGE LOT SIZE PROVIDED: 9,878'
MINIMUM LOT WIDTH: 70'
DRIVEWAY LENGTH: 20'
MINIMUM DRIVEWAY WIDTH: 10'

OPEN SPACE TABLE

OS 1	20,245 SF	0.47 AC
OS 2	866,263 SF	19.89 AC
OS 3	12,359 SF	0.28 AC
OS 4	1,137,133 SF	26.10 AC
OS 5	17,843 SF	0.41 AC
OS 6	20,187 SF	0.46 AC
OS 7	25,580 SF	0.59 AC
OS 8	19,375 SF	0.44 AC
OS 9	440,438 SF	10.11 AC
OS 10	30,626 SF	0.70 AC
OS 11	30,006 SF	0.69 AC
OS 12	1,019 SF	0.02 AC
OS 13	1,250 SF	0.03 AC
OS 14	1,631 SF	0.04 AC
OS 15	1,245 SF	0.03 AC
OS 16	902 SF	0.02 AC
OS 17	948 SF	0.02 AC
OS 18	1,859 SF	0.04 AC
OS 19	2,221 SF	0.05 AC
OS 20	1,258 SF	0.03 AC
OS 21	1,233 SF	0.03 AC
OS 22	2,551 SF	0.06 AC
OS 23	1,400 SF	0.03 AC
OS 24	1,400 SF	0.03 AC
OS 25	901 SF	0.02 AC
OS 26	901 SF	0.02 AC
OS 27	1,400 SF	0.03 AC
OS 28	1,400 SF	0.03 AC
OS 29	1,519 SF	0.03 AC
OS 30	1,351 SF	0.03 AC
OS 31	1,574 SF	0.04 AC
OS 32	1,600 SF	0.04 AC
OS 33	1,351 SF	0.03 AC
OS 34	1,351 SF	0.03 AC
OS 35	1,600 SF	0.04 AC
OS 36	1,600 SF	0.04 AC
OS 37	1,326 SF	0.03 AC
OS 38	1,351 SF	0.03 AC
OS 39	1,574 SF	0.04 AC
OS 40	1,600 SF	0.04 AC
OS 41	1,351 SF	0.03 AC
OS 42	1,351 SF	0.03 AC
OS 43	1,600 SF	0.04 AC
OS 44	1,600 SF	0.04 AC
OS 45	1,326 SF	0.03 AC
OS 46	1,235 SF	0.03 AC
OS 47	2,054 SF	0.05 AC
OS 48	1,035 SF	0.02 AC
TOTAL	2,672,929 SF	61.36 AC

STREET TABLE

STREET NAME	ROW	LENGTH (LF)
ROAD A	70	2,775
ROAD B	50	2,023
ROAD C	50	320
ROAD D	50	2,112
ROAD E	50	175
ROAD F	50	1,060
ROAD G	50	464
ROAD H	50	464
ROAD I	50	537
ROAD J	50	439
ROAD K	50	134
ROAD L	50	1,314
ROAD M	50	698
ALLEY A	20	1,125
ALLEY B	20	967
ALLEY C	20	464
ALLEY D	20	464
ALLEY E	20	464
ALLEY F	20	563
ALLEY G	20	248
ALLEY H	20	533
ALLEY I	20	123
ALLEY J	20	116
ALLEY K	20	165
ALLEY L	20	165
TOTAL W/ ALLEYS		17,912
TOTAL W/O ALLEYS		12,515

SETBACK TABLE

FRONT LOADED SINGLE FAMILY
FRONT: 20'
REAR: 15'
SIDE: 5'
CORNER: 10'

REAR LOADED SINGLE FAMILY
FRONT: 10' MAX
REAR: 20'
SIDE: 3'
CORNER: 10'

SINGLE FAMILY ATTACHED:
FRONT: 10' MAX
BUILDING SEPARATION: 10'
REAR: 20'

IMPERVIOUS AREA DATA

IMPERVIOUS IN TOWNHOME LOTS (134 LOTS W/ 1,300 SF/LOT)	4.00 AC
IMPERVIOUS IN 40' LOTS (64 LOTS W/ 3,000 SF/LOT)	4.41 AC
IMPERVIOUS IN 50' LOTS (72 LOTS W/ 3,750 SF/LOT	6.20 AC
IMPERVIOUS IN 60' LOTS (36 LOTS W/ 4,600 SF/LOT)	3.80 AC
IMPERVIOUS IN 70' LOTS (14 LOTS W/ 5,000 SF/LOT)	1.61 AC
IMPERVIOUS IN ROADWAY	13.05 AC
CLUBHOUSE AREA	2.00 AC
AMENITY AREAS, GREENWAY, & PUMP STATION	3.00 AC
TOTAL IMPERVIOUS	38.06 AC
PERCENT IMPERVIOUS	32.7%

LEGEND

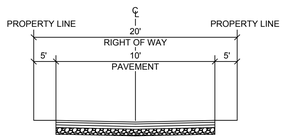
- PROPERTY LINE
- ADJACENT PROPERTY LINE
- PERIMETER BUFFER
- PROPOSED RIGHT-OF-WAY
- PROPOSED LOT LINE
- DRAINAGE EASEMENT
- SANITARY SEWER EASEMENT
- EXISTING WETLANDS
- NEUSE RIPARIAN BUFFER
- ACTIVE OPEN SPACE
- PASSIVE OPEN SPACE
- PHASE LINE
- PAVED PUBLIC GREENWAY
- PAVED PRIVATE TRAIL

A HOMEOWNER'S ASSOCIATION (HOA) WILL OWN AND MAINTAIN ALL OPEN SPACE PARCELS AND WILL BE RESPONSIBLE FOR MAINTAINING ALL LANDSCAPING REQUIRED BY THE TOWN OF ZEBULON UNIFIED DEVELOPMENT ORDINANCE (UDO).

TYPICAL CROSS SECTION - 100' ROW W/ MEDIAN
NOT TO SCALE

TYPICAL CROSS SECTION - 70' ROW W/ PARALLEL PARKING
NOT TO SCALE

TYPICAL CROSS SECTION - 50' ROW
NOT TO SCALE



TYPICAL CROSS SECTION - PUBLIC REAR ALLEY
NOT TO SCALE

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SCALE 1" = 150'

TIMMONS GROUP

NORTH CAROLINA LICENSE NO. C-1652

ZEBULON SOUTH

751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA

OVERALL SITE PLAN

JOB NO. 49084
SHEET NO. C2.0

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NAD 83

SCALE 1"=60'
0 60' 120'

LEGEND
- PROPERTY LINE
- ADJACENT PROPERTY LINE
- PERIMETER BUFFER
- PROPOSED RIGHT-OF-WAY
- PROPOSED LOT LINE
- DRAINAGE EASEMENT
- SANITARY SEWER EASEMENT
- EXISTING WETLANDS
- NEUSE RIPARIAN BUFFER
- ACTIVE OPEN SPACE
- PASSIVE OPEN SPACE
- PHASE LINE
- PAVED PUBLIC GREENWAY
- PAVED PRIVATE TRAIL

OWNER: ESTRADA, JILBER VELAZQUEZ
PIN: 2705-60-1533
DB: 017278
EXISTING USE: VACANT
EXISTING ZONING: R2

OWNER: FOX, JEFFERY M FOX, PENNY M
PIN: 2705-60-1920
DB: 011335
EXISTING USE: SINGLE-FAMILY RESIDENTIAL
EXISTING ZONING: R2

PERRY CURTIS ROAD (SR 2345)

OWNER: PARKER, LARRY N
PIN: 2705-50-9203
DB: 017718
EXISTING USE: SINGLE-FAMILY RESIDENTIAL
EXISTING ZONING: R2

OWNER: HILL, TIMOTHY GORDON HILL, LILLIAN AVENT
PIN: 2705-61-0110
DB: 00589
EXISTING USE: SINGLE-FAMILY RESIDENTIAL
EXISTING ZONING: R2

OWNER: HOLLAND, JIMMY LEON HOLLAND, HELEN M
PIN: 2705-51-8284
DB: 003248
EXISTING USE: SINGLE-FAMILY RESIDENTIAL
EXISTING ZONING: R2

OWNER: VILLALPANDO, MIGUEL ANGEL
PIN: 2705-51-6356
DB: 017231
EXISTING USE: VACANT
EXISTING ZONING: R2

2-LANE DIVIDED ULTIMATE CROSS-SECTION (80' ROW)

OWNER: CHURCH OF GOD EASTERN NC STATE OFFICE
PIN: 2705-51-8689
DB: 008901
EXISTING USE: EXEMPT
EXISTING ZONING: R2

S ARENDELL AVENUE (NC HWY 96)

OWNER: MCNABB, IZNEZ PITTS HEIRS
PIN: 2705-52-6056
DB: 001779
EXISTING USE: VACANT
EXISTING ZONING: R2

DEDICATION OF LAND FOR FIRE STATION
108,104 SF
2.48 AC

OWNER: H, ROBERT E
ATHY P
52-0074
9289
INGLE-FAMILY
NTIAL
ONING: R2

70' PROGRESS ENERGY EASEMENT

ROAD A 70' ROW - 39' B-B
ROAD J 50' ROW - 26' B-B
ROAD I 50' ROW - 26' B-B
ROAD G 50' ROW - 26' B-B
ROAD H 50' ROW - 26' B-B
ROAD L 50' ROW - 26' B-B
ROAD F 70' ROW - 39' B-B

OS 7 25,580 SF 0.59 AC TOT LOT
IMPROVED AREA 0:59 AC
OS 8 19,375 SF 0.44 AC
OS 9 440,438 SF 10.11 AC
OS 10 2,221 SF
OS 11 2,551 SF
OS 12 1,019 SF
OS 13 1,259 SF
OS 14 1,400 SF
OS 15 1,245 SF
OS 16 902 SF
OS 17 1,819 SF
OS 18 1,400 SF
OS 19 1,233 SF
OS 20 1,258 SF
OS 21 1,351 SF
OS 22 1,574 SF
OS 23 1,400 SF
OS 24 1,600 SF
OS 25 1,600 SF
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OS 40 1,600 SF
OS 41 1,600 SF
OS 42 1,600 SF
OS 43 1,600 SF
OS 44 1,600 SF
OS 45 1,600 SF
OS 46 1,235 SF
OS 47 2,054 SF
OS 48 1,035 SF
OS 49 1,826 SF
OS 50 1,600 SF
OS 51 1,600 SF
OS 52 1,600 SF
OS 53 1,600 SF
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OS 60 1,600 SF
OS 61 1,600 SF
OS 62 1,600 SF
OS 63 1,600 SF
OS 64 1,600 SF
OS 65 1,600 SF
OS 66 1,600 SF
OS 67 1,600 SF
OS 68 1,600 SF

VAR. WIDTH PUBLIC DRAINAGE EASEMENT
20' PRIVATE DRAINAGE EASEMENT
VAR. WIDTH PUBLIC DRAINAGE EASEMENT
VAR. WIDTH PUBLIC DRAINAGE EASEMENT
VAR. WIDTH PUBLIC DRAINAGE EASEMENT
10' PUBLIC GREENWAY & EASEMENT
20' PRIVATE DRAINAGE EASEMENT
30' PUBLIC CITY OF RALEIGH UTILITY EASEMENT
10' PUBLIC GREENWAY & EASEMENT
POCKET PARK
20' PRIVATE DRAINAGE EASEMENT

PHASE 1
PHASE 2

MATCHLINE C2.1
MATCHLINE C2.2
MATCHLINE C2,1
MATCHLINE C2.4

10' MUP

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TIMMONS GROUP

ZEBULON SOUTH
751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA
NORTH CAROLINA LICENSE NO. C-1652
DETAILED SITE PLAN SHEET 1 OF 4

REVISION DESCRIPTION	DATE

DATE: 02/22/2024
DRAWN BY: 331
DESIGNED BY: E. ANGE
CHECKED BY: B. BLACKMON
SCALE: 1" = 60'
JOB NO.: 49084
SHEET NO.: C2.1

S:\331\49084-Zebulon_South\DWG\Street\Master Plan\49084-331-C2.0-MASTER SITE PLAN.dwg | Plotted by: Beth Blackmon

OWNER: LONG, RANDALL S
PIN: 2705-50-6134
DB: 000574
EXISTING USE: SINGLE-FAMILY RESIDENTIAL
EXISTING ZONING: R2

OWNER: PARKER, LARRY N PARKER, TAMMY M
PIN: 2704-59-7445
DB: 018351
EXISTING USE: VACANT
EXISTING ZONING: R2

OWNER: PARKER, LARRY N PARKER, TAMMY M
PIN: 2704-57-4743
DB: 018351
EXISTING USE: VACANT
EXISTING ZONING: R2

OWNER: AGARWAL ASSOCIATES LLC
PIN: 2704-48-4644
DB: 015693
EXISTING USE: VACANT
EXISTING ZONING: R2

MATCHLINE C2.1
MATCHLINE C2.2

MATCHLINE C2.2
MATCHLINE C2.3

30' PUBLIC CITY OF RALEIGH UTILITY EASEMENT

TEMPORARY TURNAROUND & EASEMENT

20' PRIVATE DRAINAGE EASEMENT

ROAD E
50' ROW - 26' B-B

ROAD D
50' ROW - 26' B-B

ROAD K
50' ROW - 26' B-B

ROAD A
70' ROW - 36' B-B

ROAD M
50' ROW - 26' B-B

ROAD B
50' ROW - 36' B-B

PHASE 2
PHASE 3

20' PRIVATE ACCESS & MAINTENANCE EASEMENT

10' TYPE A BUFFER

SCM 4

COVERED MAIL KIOSK

RESORT STYLE POOL

IMPROVED AREA
1.54 AC

CABANA WITH BATHROOMS & CHANGING ROOMS ONLY

IMPROVED AREA
0.41 AC

POCKET PARK

VAR. WIDTH PUBLIC DRAINAGE EASEMENT

10' MUP

PUBLIC GREENWAY EASEMENT

OS 1
30,626 SF
0.70 AC

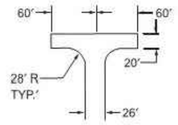
OS 2
866,263 SF
19.89 AC

OS 3
30,787 SF
0.71 AC

OS 4
17,843 SF
0.41 AC

OS 5
30,000 SF
0.69 AC

120' HAMMERHEAD



DEAD-END FIRE APPARATUS ACCESS ROAD TURNAROUND
NOTE. TURNAROUNDS MUST ADHERE TO APPENDIX D OF NC FIRE CODE & WEIGHT CAPACITY OF 80,000 LBS.

NAD 83

SCALE 1"=60'
0 60' 120'

LEGEND

- PROPERTY LINE
- ADJACENT PROPERTY LINE
- PERIMETER BUFFER
- PROPOSED RIGHT-OF-WAY
- PROPOSED LOT LINE
- DRAINAGE EASEMENT
- SANITARY SEWER EASEMENT
- EXISTING WETLANDS
- NEUSE RIPARIAN BUFFER
- ACTIVE OPEN SPACE
- PASSIVE OPEN SPACE
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- PAVED PUBLIC GREENWAY
- PAVED PRIVATE TRAIL

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1" = 60'

ZEBULON SOUTH
NORTH CAROLINA LICENSE NO. C-1652
751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA
DETAILED SITE PLAN SHEET 2 OF 4

JOB NO.
49084

SHEET NO.
C2.2

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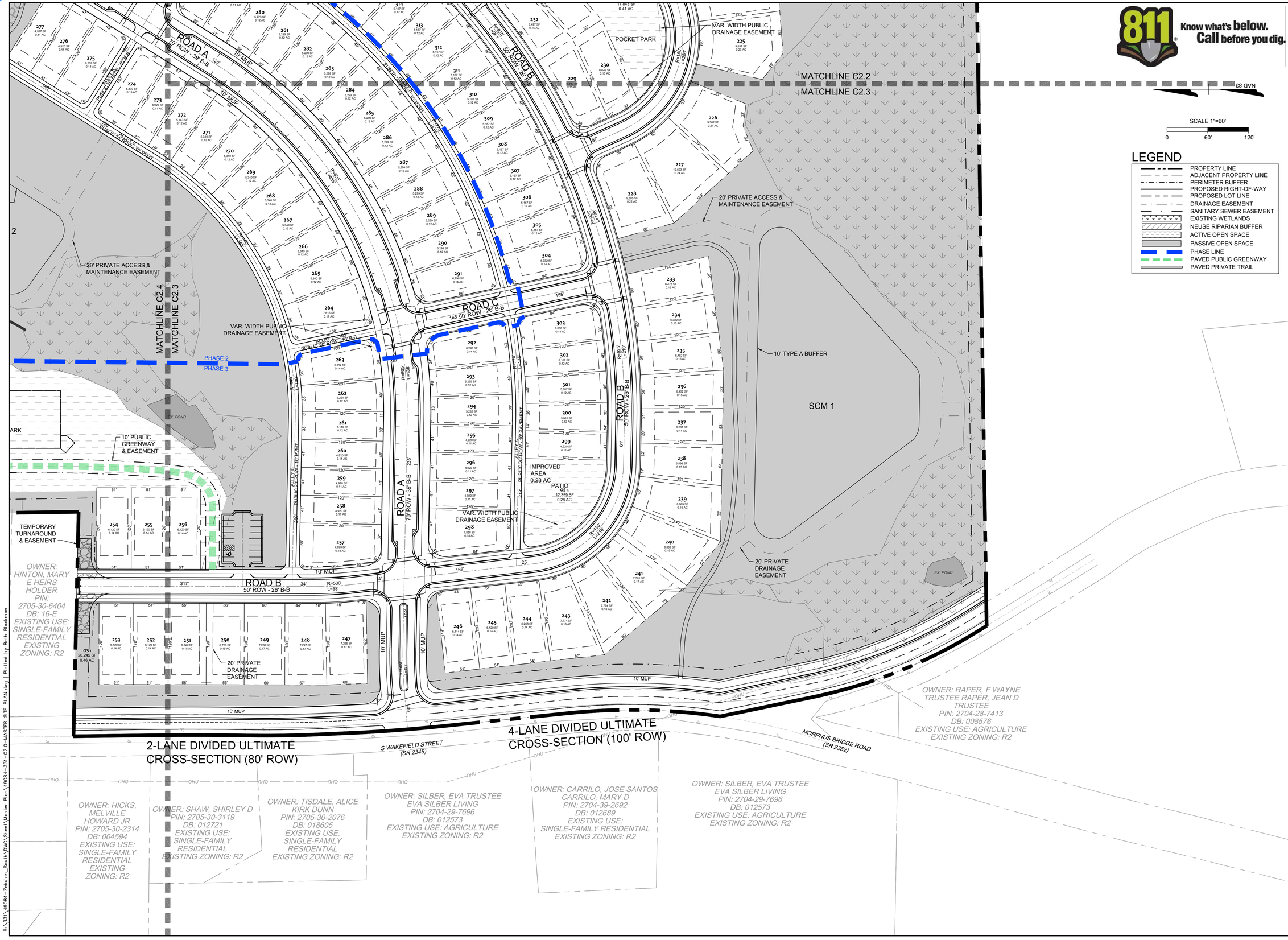

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SCALE 1"=60'
0 60' 120'

LEGEND

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ZEBULON SOUTH

751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA

DETAILED SITE PLAN SHEET 3 OF 4

JOB NO. 49084
SHEET NO. C2.3

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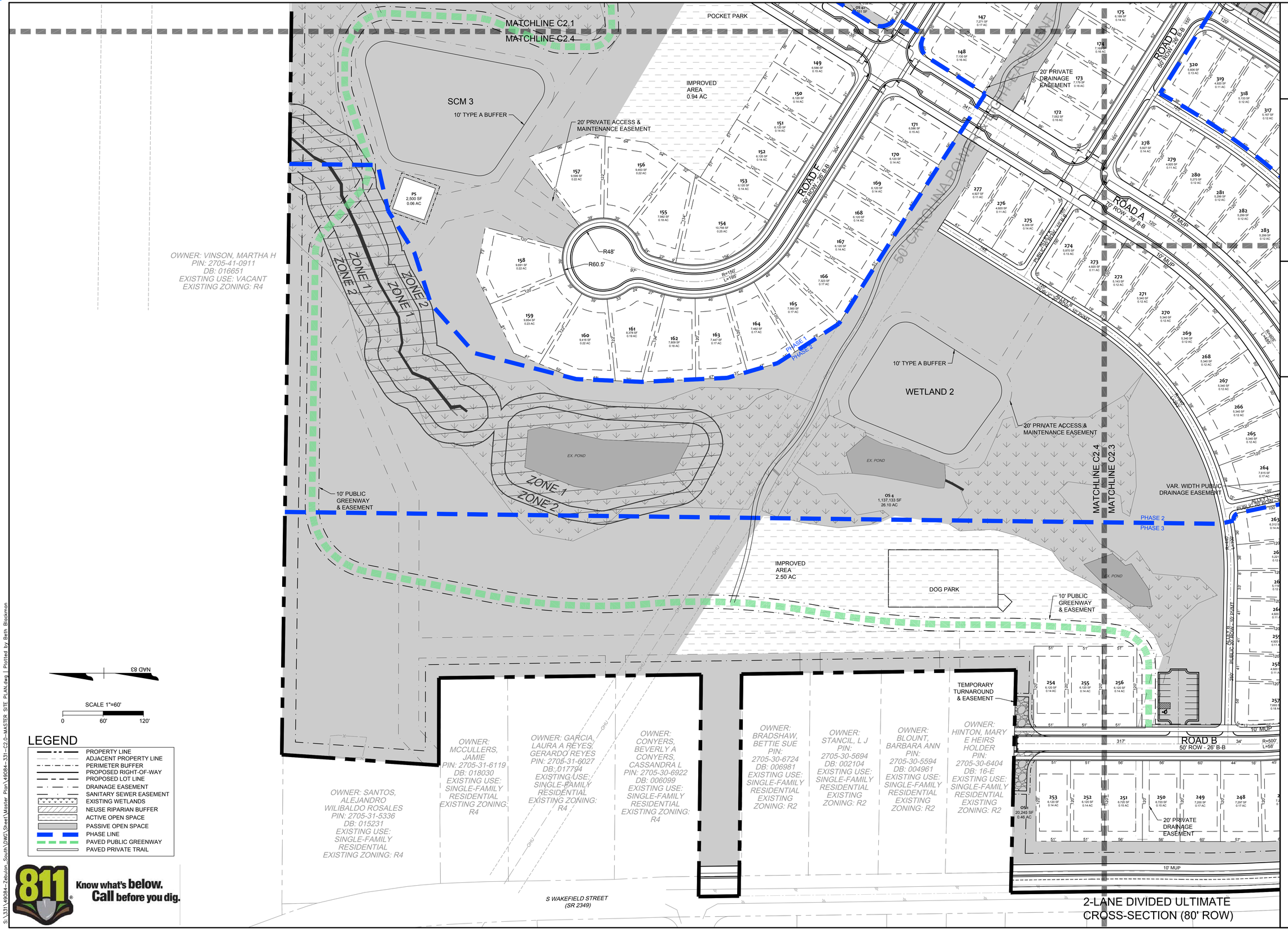

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751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA
DETAILED SITE PLAN SHEET 4 OF 4

JOB NO. 49084
SHEET NO. C2.4

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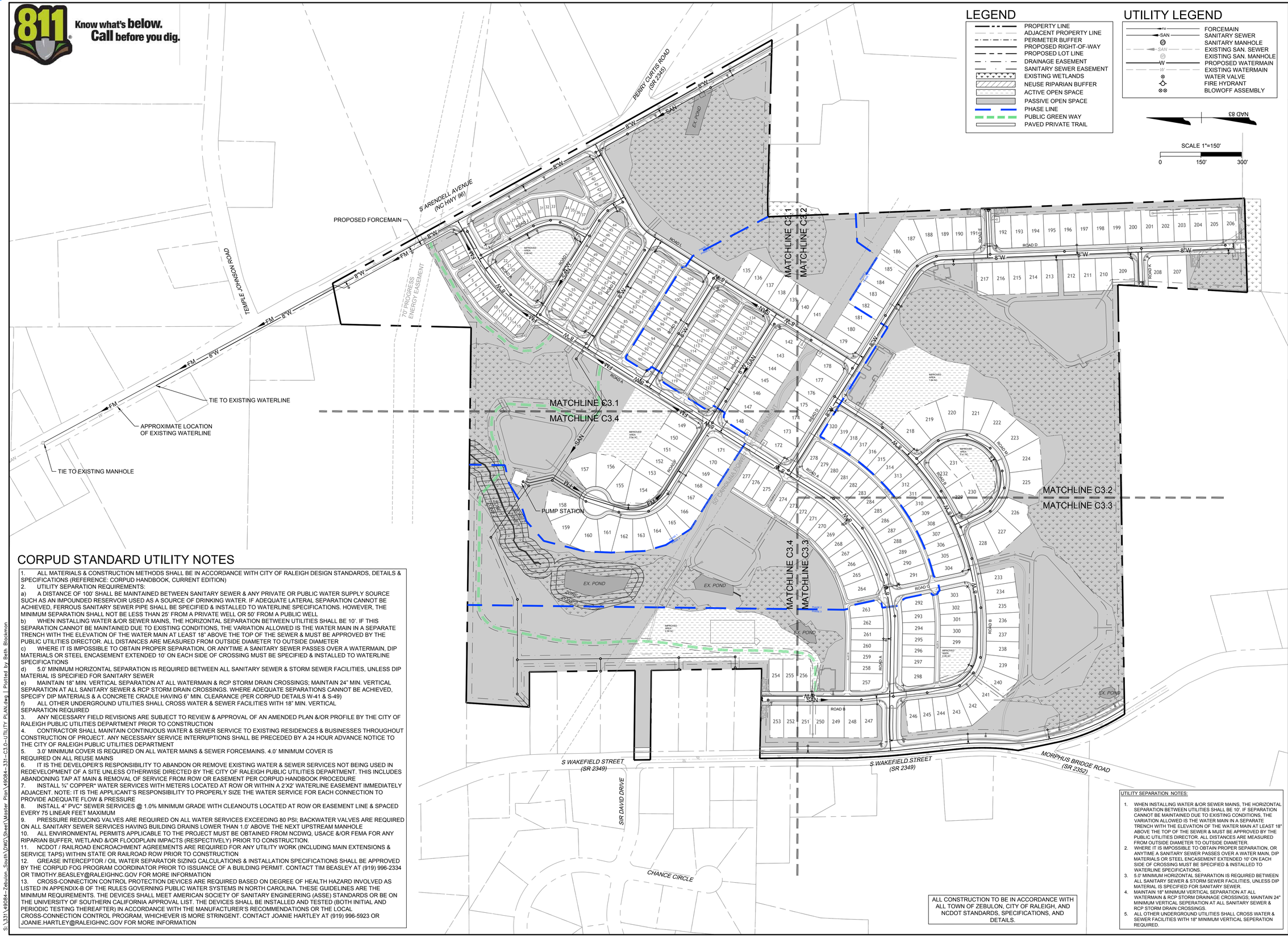

LEGEND

- PROPERTY LINE
- ADJACENT PROPERTY LINE
- PERIMETER BUFFER
- PROPOSED RIGHT-OF-WAY
- PROPOSED LOT LINE
- DRAINAGE EASEMENT
- SANITARY SEWER EASEMENT
- EXISTING WETLANDS
- NEUSE RIPARIAN BUFFER
- ACTIVE OPEN SPACE
- PASSIVE OPEN SPACE
- PHASE LINE
- PUBLIC GREEN WAY
- PAVED PRIVATE TRAIL

UTILITY LEGEND

- FM — FORCEMAIN
- SAN — SANITARY SEWER
- SANITARY MANHOLE
- SAN — EXISTING SAN. SEWER
- EXISTING SAN. MANHOLE
- W — PROPOSED WATERMAIN
- W — EXISTING WATERMAIN
- WATER VALVE
- FIRE HYDRANT
- BLOWOFF ASSEMBLY

NAD 83

SCALE 1"=150'
0 150' 300'

CORPUD STANDARD UTILITY NOTES

1. ALL MATERIALS & CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH CITY OF RALEIGH DESIGN STANDARDS, DETAILS & SPECIFICATIONS (REFERENCE: CORPUD HANDBOOK, CURRENT EDITION)
2. UTILITY SEPARATION REQUIREMENTS:
a) A DISTANCE OF 100' SHALL BE MAINTAINED BETWEEN SANITARY SEWER & ANY PRIVATE OR PUBLIC WATER SUPPLY SOURCE SUCH AS AN IMPOUNDED RESERVOIR USED AS A SOURCE OF DRINKING WATER. IF ADEQUATE LATERAL SEPARATION CANNOT BE ACHIEVED, FERROUS SANITARY SEWER PIPE SHALL BE SPECIFIED & INSTALLED TO WATERLINE SPECIFICATIONS. HOWEVER, THE MINIMUM SEPARATION SHALL NOT BE LESS THAN 25' FROM A PRIVATE WELL OR 50' FROM A PUBLIC WELL
b) WHEN INSTALLING WATER &/OR SEWER MAINS, THE HORIZONTAL SEPARATION BETWEEN UTILITIES SHALL BE 10'. IF THIS SEPARATION CANNOT BE MAINTAINED DUE TO EXISTING CONDITIONS, THE VARIATION ALLOWED IS THE WATER MAIN IN A SEPARATE TRENCH WITH THE ELEVATION OF THE WATER MAIN AT LEAST 18" ABOVE THE TOP OF THE SEWER & MUST BE APPROVED BY THE PUBLIC UTILITIES DIRECTOR. ALL DISTANCES ARE MEASURED FROM OUTSIDE DIAMETER TO OUTSIDE DIAMETER
c) WHERE IT IS IMPOSSIBLE TO OBTAIN PROPER SEPARATION, OR ANYTIME A SANITARY SEWER PASSES OVER A WATERMAIN, DIP MATERIALS OR STEEL ENCASEMENT EXTENDED 10' ON EACH SIDE OF CROSSING MUST BE SPECIFIED & INSTALLED TO WATERLINE SPECIFICATIONS
d) 5.0' MINIMUM HORIZONTAL SEPARATION IS REQUIRED BETWEEN ALL SANITARY SEWER & STORM SEWER FACILITIES, UNLESS DIP MATERIAL IS SPECIFIED FOR SANITARY SEWER
e) MAINTAIN 18" MIN. VERTICAL SEPARATION AT ALL WATERMAIN & RCP STORM DRAIN CROSSINGS; MAINTAIN 24" MIN. VERTICAL SEPARATION AT ALL SANITARY SEWER & RCP STORM DRAIN CROSSINGS. WHERE ADEQUATE SEPARATIONS CANNOT BE ACHIEVED, SPECIFY DIP MATERIALS & A CONCRETE CRADLE HAVING 6" MIN. CLEARANCE (PER CORPUD DETAILS W-41 & S-49)
f) ALL OTHER UNDERGROUND UTILITIES SHALL CROSS WATER & SEWER FACILITIES WITH 18" MIN. VERTICAL SEPARATION REQUIRED
3. ANY NECESSARY FIELD REVISIONS ARE SUBJECT TO REVIEW & APPROVAL OF AN AMENDED PLAN &/OR PROFILE BY THE CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PRIOR TO CONSTRUCTION
4. CONTRACTOR SHALL MAINTAIN CONTINUOUS WATER & SEWER SERVICE TO EXISTING RESIDENCES & BUSINESSES THROUGHOUT CONSTRUCTION OF PROJECT. ANY NECESSARY SERVICE INTERRUPTIONS SHALL BE PRECEDED BY A 24 HOUR ADVANCE NOTICE TO THE CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT
5. 3.0' MINIMUM COVER IS REQUIRED ON ALL WATER MAINS & SEWER FORCEMAINS. 4.0' MINIMUM COVER IS REQUIRED ON ALL REUSE MAINS
6. IT IS THE DEVELOPER'S RESPONSIBILITY TO ABANDON OR REMOVE EXISTING WATER & SEWER SERVICES NOT BEING USED IN REDEVELOPMENT OF A SITE UNLESS OTHERWISE DIRECTED BY THE CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT. THIS INCLUDES ABANDONING TAP AT MAIN & REMOVAL OF SERVICE FROM ROW OR EASEMENT PER CORPUD HANDBOOK PROCEDURE
7. INSTALL ¾" COPPER* WATER SERVICES WITH METERS LOCATED AT ROW OR WITHIN A 2'X2' WATERLINE EASEMENT IMMEDIATELY ADJACENT. NOTE: IT IS THE APPLICANT'S RESPONSIBILITY TO PROPERLY SIZE THE WATER SERVICE FOR EACH CONNECTION TO PROVIDE ADEQUATE FLOW & PRESSURE
8. INSTALL 4" PVC* SEWER SERVICES @ 1.0% MINIMUM GRADE WITH CLEANOUTS LOCATED AT ROW OR EASEMENT LINE & SPACED EVERY 75 LINEAR FEET MAXIMUM
9. PRESSURE REDUCING VALVES ARE REQUIRED ON ALL WATER SERVICES EXCEEDING 80 PSI; BACKWATER VALVES ARE REQUIRED ON ALL SANITARY SEWER SERVICES HAVING BUILDING DRAINS LOWER THAN 1.0' ABOVE THE NEXT UPSTREAM MANHOLE
10. ALL ENVIRONMENTAL PERMITS APPLICABLE TO THE PROJECT MUST BE OBTAINED FROM NCDWQ, USACE &/OR FEMA FOR ANY RIPARIAN BUFFER, WETLAND &/OR FLOODPLAIN IMPACTS (RESPECTIVELY) PRIOR TO CONSTRUCTION.
11. NCDOT / RAILROAD ENCROACHMENT AGREEMENTS ARE REQUIRED FOR ANY UTILITY WORK (INCLUDING MAIN EXTENSIONS & SERVICE TAPS) WITHIN STATE OR RAILROAD ROW PRIOR TO CONSTRUCTION
12. GREASE INTERCEPTOR / OIL WATER SEPARATOR SIZING CALCULATIONS & INSTALLATION SPECIFICATIONS SHALL BE APPROVED BY THE CORPUD FOG PROGRAM COORDINATOR PRIOR TO ISSUANCE OF A BUILDING PERMIT. CONTACT TIM BEASLEY AT (919) 996-2334 OR TIMOTHY.BEASLEY@RALEIGHNC.GOV FOR MORE INFORMATION
13. CROSS-CONNECTION CONTROL PROTECTION DEVICES ARE REQUIRED BASED ON DEGREE OF HEALTH HAZARD INVOLVED AS LISTED IN APPENDIX-B OF THE RULES GOVERNING PUBLIC WATER SYSTEMS IN NORTH CAROLINA. THESE GUIDELINES ARE THE MINIMUM REQUIREMENTS. THE DEVICES SHALL MEET AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE) STANDARDS OR BE ON THE UNIVERSITY OF SOUTHERN CALIFORNIA APPROVAL LIST. THE DEVICES SHALL BE INSTALLED AND TESTED (BOTH INITIAL AND PERIODIC TESTING THEREAFTER) IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS OR THE LOCAL CROSS-CONNECTION CONTROL PROGRAM, WHICHEVER IS MORE STRINGENT. CONTACT JOANIE HARTLEY AT (919) 996-5923 OR JOANIE.HARTLEY@RALEIGHNC.GOV FOR MORE INFORMATION

ALL CONSTRUCTION TO BE IN ACCORDANCE WITH ALL TOWN OF ZEBULON, CITY OF RALEIGH, AND NCDOT STANDARDS, SPECIFICATIONS, AND DETAILS.

UTILITY SEPARATION NOTES:

1. WHEN INSTALLING WATER &/OR SEWER MAINS, THE HORIZONTAL SEPARATION BETWEEN UTILITIES SHALL BE 10'. IF SEPARATION CANNOT BE MAINTAINED DUE TO EXISTING CONDITIONS, THE VARIATION ALLOWED IS THE WATER MAIN IN A SEPARATE TRENCH WITH THE ELEVATION OF THE WATER MAIN AT LEAST 18" ABOVE THE TOP OF THE SEWER & MUST BE APPROVED BY THE PUBLIC UTILITIES DIRECTOR. ALL DISTANCES ARE MEASURED FROM OUTSIDE DIAMETER TO OUTSIDE DIAMETER.
2. WHERE IT IS IMPOSSIBLE TO OBTAIN PROPER SEPARATION, OR ANYTIME A SANITARY SEWER PASSES OVER A WATER MAIN, DIP MATERIALS OR STEEL ENCASEMENT EXTENDED 10' ON EACH SIDE OF CROSSING MUST BE SPECIFIED & INSTALLED TO WATERLINE SPECIFICATIONS.
3. 5.0' MINIMUM HORIZONTAL SEPARATION IS REQUIRED BETWEEN ALL SANITARY SEWER & STORM SEWER FACILITIES, UNLESS DIP MATERIAL IS SPECIFIED FOR SANITARY SEWER.
4. MAINTAIN 18" MINIMUM VERTICAL SEPARATION AT ALL WATERMAIN & RCP STORM DRAINAGE CROSSINGS; MAINTAIN 24" MINIMUM VERTICAL SEPERATION AT ALL SANITARY SEWER & RCP STORM DRAIN CROSSINGS.
5. ALL OTHER UNDERGROUND UTILITIES SHALL CROSS WATER & SEWER FACILITIES WITH 18" MINIMUM VERTICAL SEPERATION REQUIRED.

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REVISION DESCRIPTION

DATE

DATE 02/22/2024
DRAWN BY 331
DESIGNED BY E. ANGE
CHECKED BY B. BLACKMON
SCALE 1" = 150'

TIMMONS GROUP
NORTH CAROLINA LICENSE NO. C-1652

ZEBULON SOUTH
751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA
OVERALL UTILITY PLAN

JOB NO. 49084
SHEET NO. C3.0

S:\331\49084-Zebulon_South\CWG\Sheet\Master Plan\49084-331-C3.0-UTILITY PLAN.dwg | Plotted by Beth Blackmon

811 Know what's below. Call before you dig.

NAD 83

SCALE 1"=60'
0 60' 120'

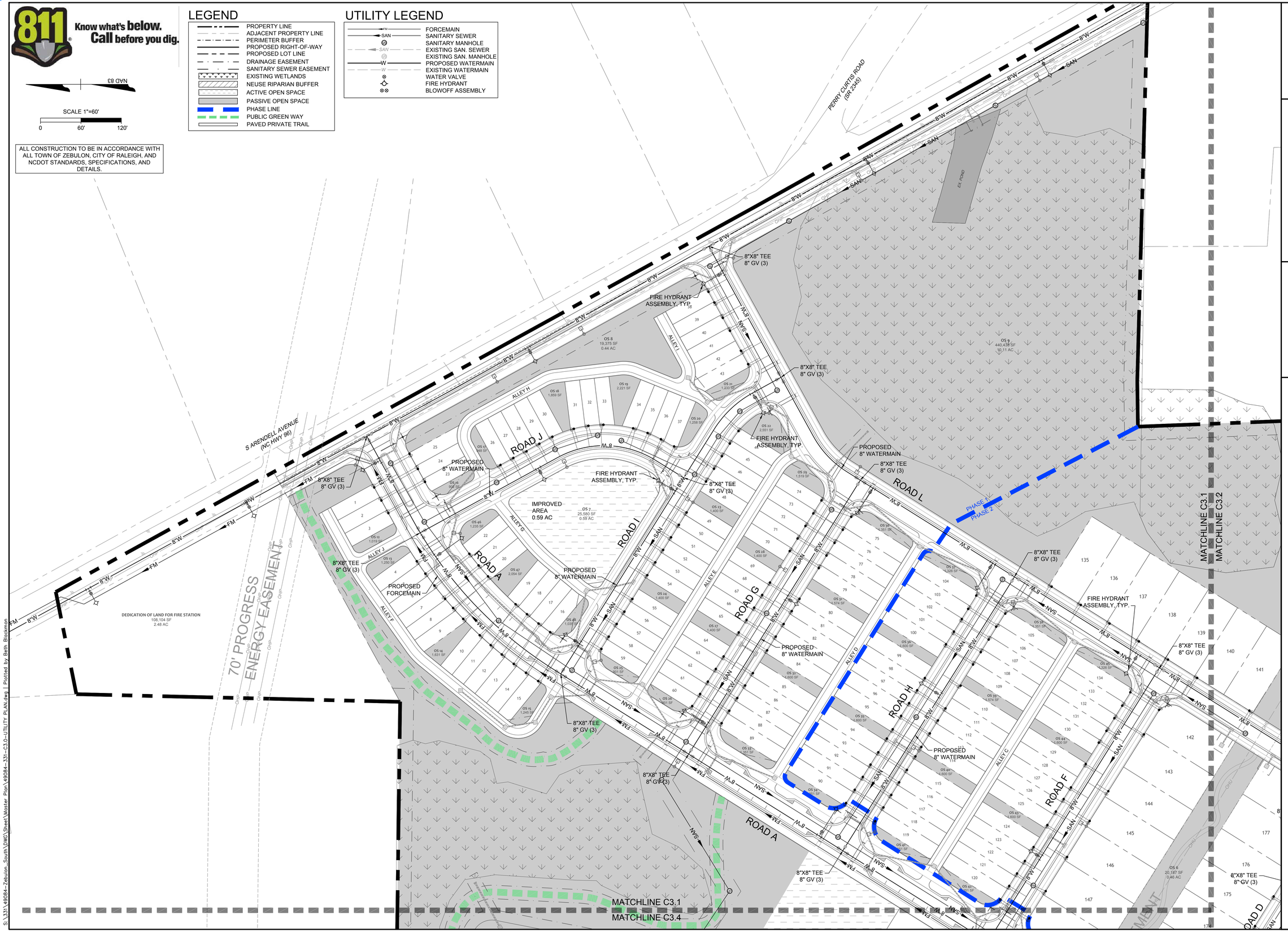
ALL CONSTRUCTION TO BE IN ACCORDANCE WITH ALL TOWN OF ZEBULON, CITY OF RALEIGH, AND NCDOT STANDARDS, SPECIFICATIONS, AND DETAILS.

LEGEND

- PROPERTY LINE
- ADJACENT PROPERTY LINE
- PERIMETER BUFFER
- PROPOSED RIGHT-OF-WAY
- PROPOSED LOT LINE
- DRAINAGE EASEMENT
- SANITARY SEWER EASEMENT
- EXISTING WETLANDS
- NEUSE RIPARIAN BUFFER
- ACTIVE OPEN SPACE
- PASSIVE OPEN SPACE
- PHASE LINE
- PUBLIC GREEN WAY
- PAVED PRIVATE TRAIL

UTILITY LEGEND

- FORCEMAIN
- SANITARY SEWER
- SANITARY MANHOLE
- EXISTING SAN. SEWER
- EXISTING SAN. MANHOLE
- PROPOSED WATERMAIN
- EXISTING WATERMAIN
- WATER VALVE
- FIRE HYDRANT
- BLOWOFF ASSEMBLY



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SCALE 1" = 60'

TIMMONS GROUP

NORTH CAROLINA LICENSE NO. C-1652

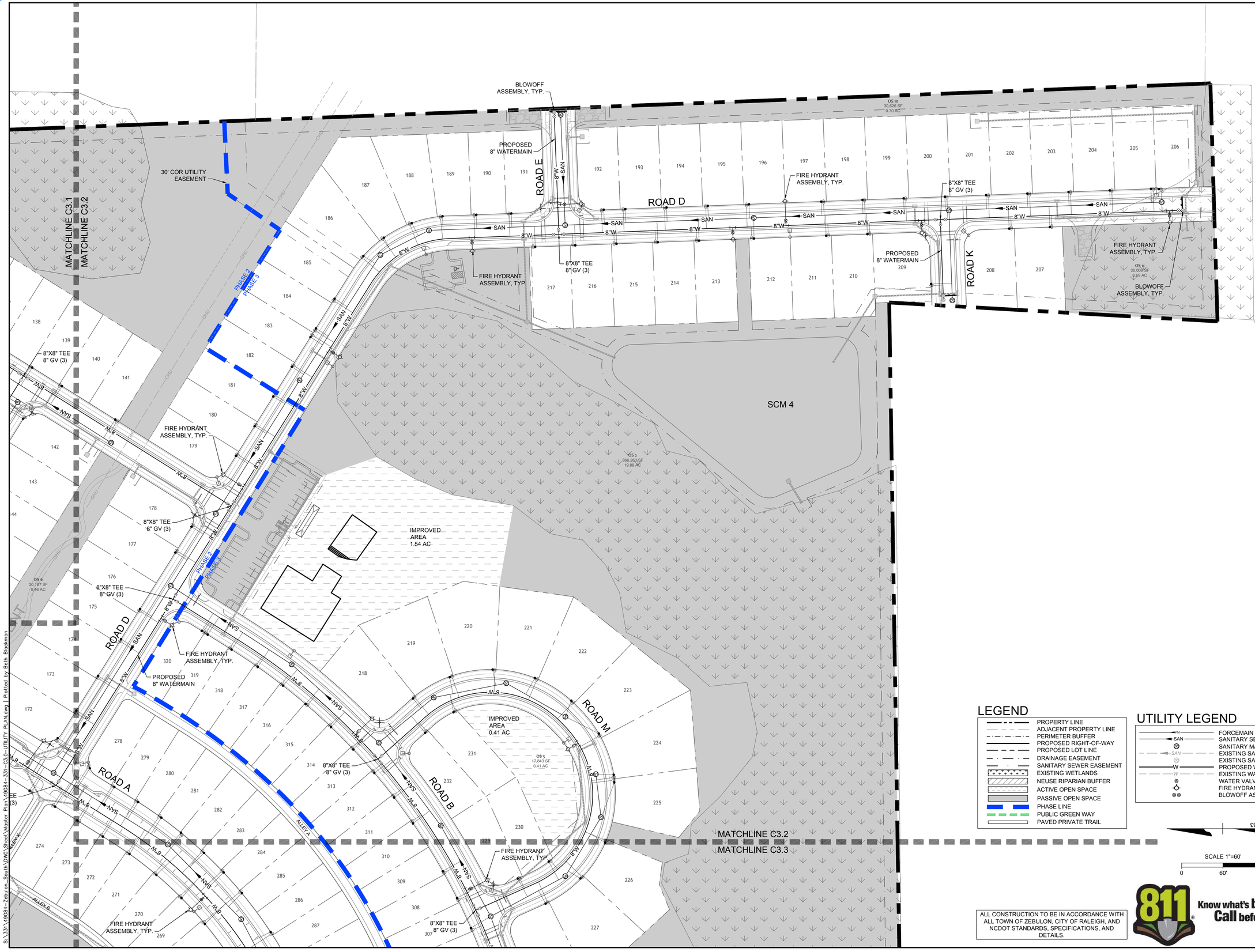
ZEBULON SOUTH

751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA

DETAILED UTILITY PLAN SHEET 1 OF 4

JOB NO. 49084
SHEET NO. C3.1

S:\33\49084-Zebulon_South\DWG\Sheet\Master Plan\49084-331-C3.0-UTILITY PLAN.dwg | Plotted by Beth Blackmon



LEGEND

- PROPERTY LINE
- ADJACENT PROPERTY LINE
- PERIMETER BUFFER
- PROPOSED RIGHT-OF-WAY
- PROPOSED LOT LINE
- DRAINAGE EASEMENT
- SANITARY SEWER EASEMENT
- EXISTING WETLANDS
- NEUSE RIPARIAN BUFFER
- ACTIVE OPEN SPACE
- PASSIVE OPEN SPACE
- PHASE LINE
- PUBLIC GREEN WAY
- PAVED PRIVATE TRAIL

UTILITY LEGEND

- FM — FORCEMAIN
- SAN — SANITARY SEWER
- SANITARY MANHOLE
- SAN — EXISTING SAN. SEWER
- EXISTING SAN. MANHOLE
- W — PROPOSED WATERMAIN
- W — EXISTING WATERMAIN
- WATER VALVE
- FIRE HYDRANT
- BLOWOFF ASSEMBLY

NAD 83

SCALE 1"=60'
0 60' 120'

ALL CONSTRUCTION TO BE IN ACCORDANCE WITH ALL TOWN OF ZEBULON, CITY OF RALEIGH, AND NCDOT STANDARDS, SPECIFICATIONS, AND DETAILS.

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SCALE 1" = 60'

ZEBULON SOUTH
751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA
DETAILED UTILITY PLAN SHEET 2 OF 4

JOB NO. 49084
SHEET NO. C3.2

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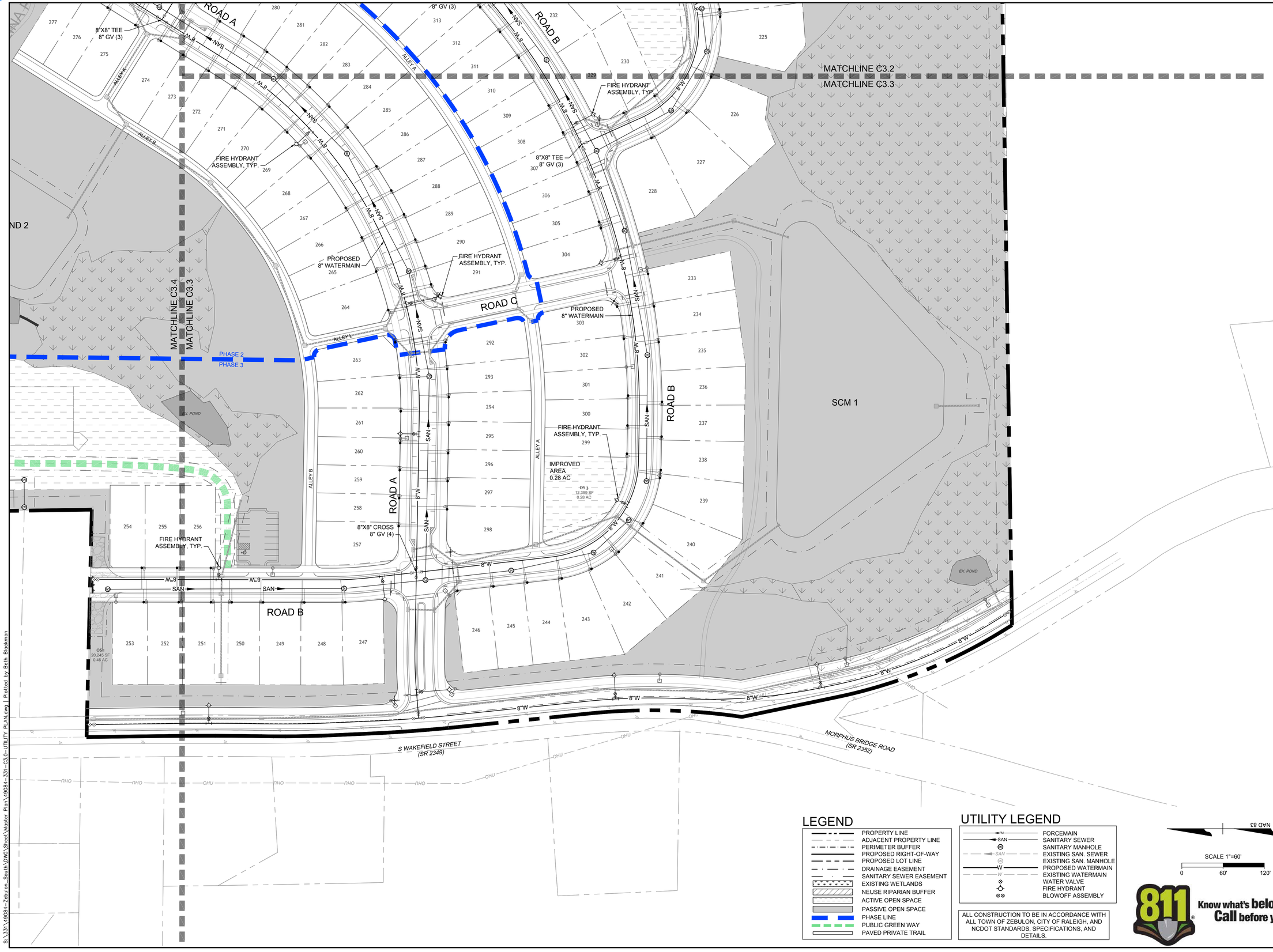

LEGEND

- PROPERTY LINE
- ADJACENT PROPERTY LINE
- PERIMETER BUFFER
- PROPOSED RIGHT-OF-WAY
- PROPOSED LOT LINE
- DRAINAGE EASEMENT
- SANITARY SEWER EASEMENT
- EXISTING WETLANDS
- NEUSE RIPARIAN BUFFER
- ACTIVE OPEN SPACE
- PASSIVE OPEN SPACE
- PHASE LINE
- PUBLIC GREEN WAY
- PAVED PRIVATE TRAIL

UTILITY LEGEND

- FORCEMAIN
- SANITARY SEWER
- SANITARY MANHOLE
- EXISTING SAN. SEWER
- EXISTING SAN. MANHOLE
- PROPOSED WATERMAIN
- EXISTING WATERMAIN
- WATER VALVE
- FIRE HYDRANT
- BLOWOFF ASSEMBLY

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ZEBULON SOUTH
751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA
DETAILED UTILITY PLAN SHEET 3 OF 4

JOB NO. 49084
SHEET NO. C3.3

S:\331\49084- Zebulon_South\DWG\Sheet\Master Plan\49084-331-C3.0-UTILITY PLAN.dwg | Plotted by: Beth Blackmon

MATCHLINE C3.1
MATCHLINE C3.4

SCM 3

30' COR UTILITY EASEMENT

IMPROVED AREA 0.94 AC

PS 2,500 SF 0.06 AC

PROPOSED FORCEMAIN

FIRE HYDRANT ASSEMBLY, TYP.

PROPOSED 8" WATERMAIN

8"X8" CROSS 8" GV (4)

9"X8" TEE 8" GV (3)

ROAD F

ROAD A

ROAD D

ROAD B

50' CAROLINA POWER & LIGHT EASEMENT

ZONE 1
ZONE 2

EX. POND

WETLAND 2

OS 4
1,137,133 SF
26.10 AC

OS 3
20,245 SF
0.46 AC

IMPROVED AREA 2.50 AC

ALLEY K

ALLEY B

ALLEY L

PHASE 1
PHASE 2
PHASE 3

MATCHLINE C3.4
MATCHLINE C3.3

S WAKEFIELD STREET
(SR 2349)

NAD 83

SCALE 1"=60'
0 60' 120'

811 Know what's below. Call before you dig.

LEGEND

- PROPERTY LINE
- ADJACENT PROPERTY LINE
- PERIMETER BUFFER
- PROPOSED RIGHT-OF-WAY
- PROPOSED LOT LINE
- DRAINAGE EASEMENT
- SANITARY SEWER EASEMENT
- EXISTING WETLANDS
- NEUSE RIPARIAN BUFFER
- ACTIVE OPEN SPACE
- PASSIVE OPEN SPACE
- PHASE LINE
- PUBLIC GREEN WAY
- PAVED PRIVATE TRAIL

UTILITY LEGEND

- FM — FORCEMAIN
- SAN — SANITARY SEWER
- SANITARY MANHOLE
- SAN — EXISTING SAN. SEWER
- EXISTING SAN. MANHOLE
- W — PROPOSED WATERMAIN
- W — EXISTING WATERMAIN
- WATER VALVE
- FIRE HYDRANT
- BLOWOFF ASSEMBLY

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NORTH CAROLINA LICENSE NO. C-1652

ZEBULON SOUTH

751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA

DETAILED UTILITY PLAN SHEET 4 OF 4

JOB NO. 49084
SHEET NO. C3.4

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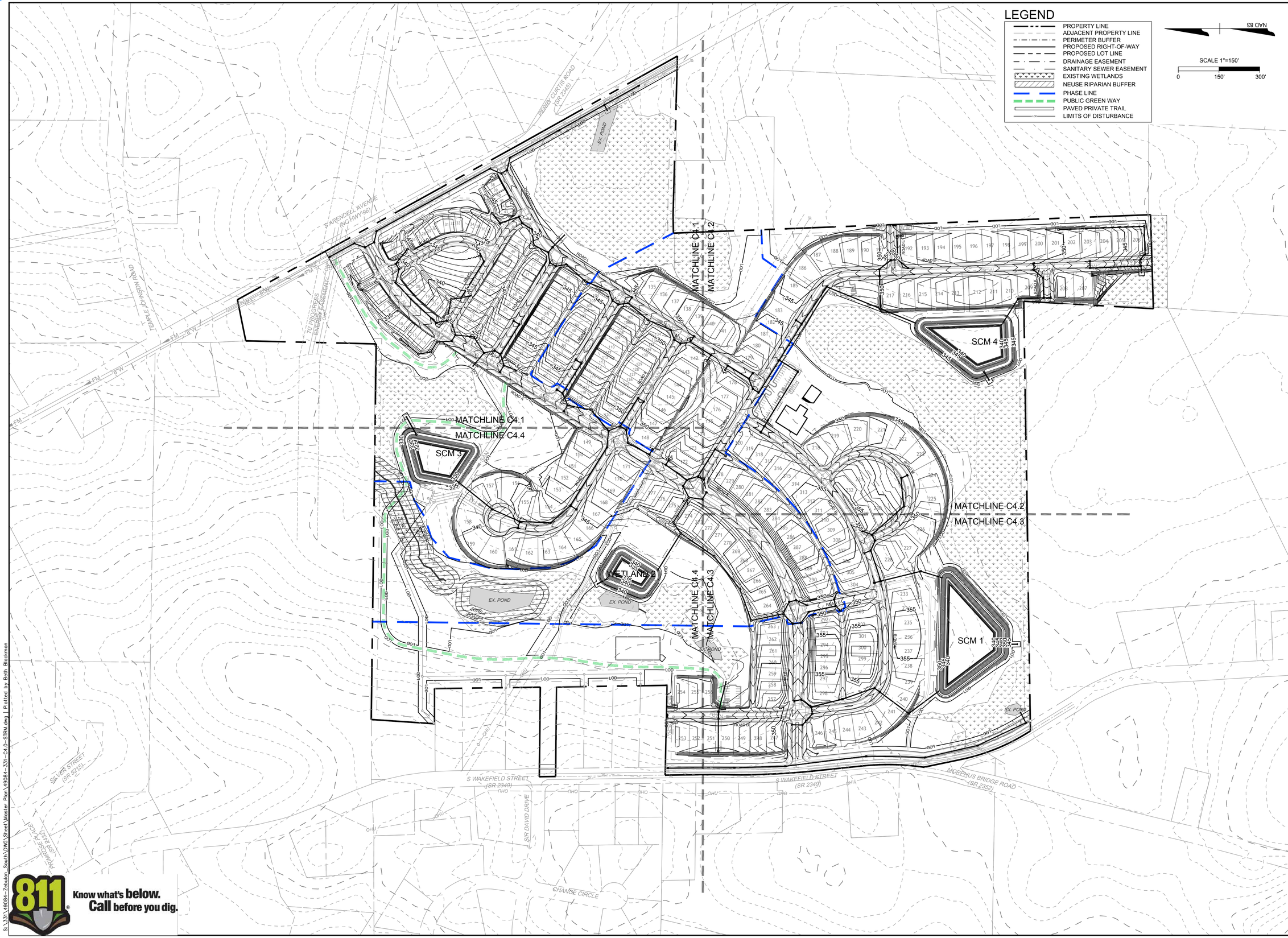

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SCALE: 1" = 150'

TIMMONS GROUP

NORTH CAROLINA LICENSE NO. C-1652

ZEBULON SOUTH

751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA

OVERAL GRADING & DRAINAGE PLAN

JOB NO. 49084
SHEET NO. C4.0

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NAD 83

SCALE 1"=60'
0 60' 120'

LEGEND

- PROPERTY LINE
- ADJACENT PROPERTY LINE
- PERIMETER BUFFER
- PROPOSED RIGHT-OF-WAY
- PROPOSED LOT LINE
- DRAINAGE EASEMENT
- SANITARY SEWER EASEMENT
- EXISTING WETLANDS
- NEUSE RIPARIAN BUFFER
- PHASE LINE
- PUBLIC GREEN WAY
- PAVED PRIVATE TRAIL
- LIMITS OF DISTURBANCE

PERRY CURTIS ROAD (SR 2345)
S ARENDELL AVENUE (NC HWY 96)
ROAD J
ROAD A
ROAD L
ROAD G
ROAD H
ROAD F
ROAD D
ALLEY H
ALLEY J
ALLEY G
ALLEY F
ALLEY E
ALLEY D
ALLEY C
VAR. WIDTH PUBLIC DRAINAGE EASEMENT
20' PRIVATE DRAINAGE EASEMENT
DEDICATION OF LAND FOR FIRE STATION
108,104 SF
2.48 AC
PHASE 1
PHASE 2
MATCHLINE C4.1
MATCHLINE C4.4
MATCHLINE C4.1
MATCHLINE C4.2

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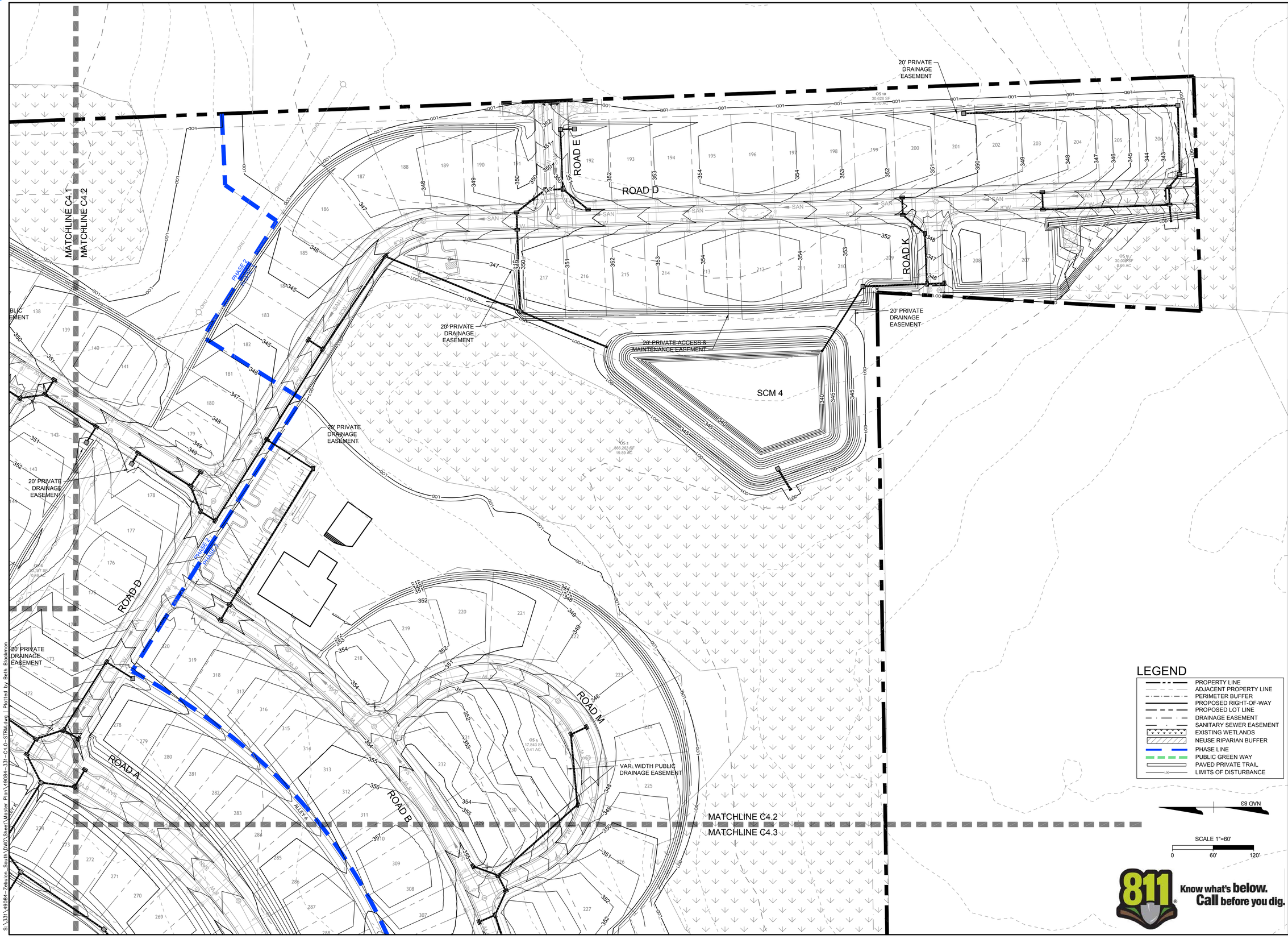
NORTH CAROLINA LICENSE NO. C-1652

ZEBULON SOUTH

751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA

DETAILED GRADING & DRAINAGE PLAN SHEET 1 OF 4

JOB NO. 49084
SHEET NO. C4.1



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ZEBULON SOUTH

751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA

DETAILED GRADING & DRAINAGE PLAN SHEET 2 OF 4

REVISION DESCRIPTION	DATE

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DESIGNED BY: E. ANGE
CHECKED BY: B. BLACKMON
SCALE: 1" = 60'

JOB NO. 49084
SHEET NO. C4.2

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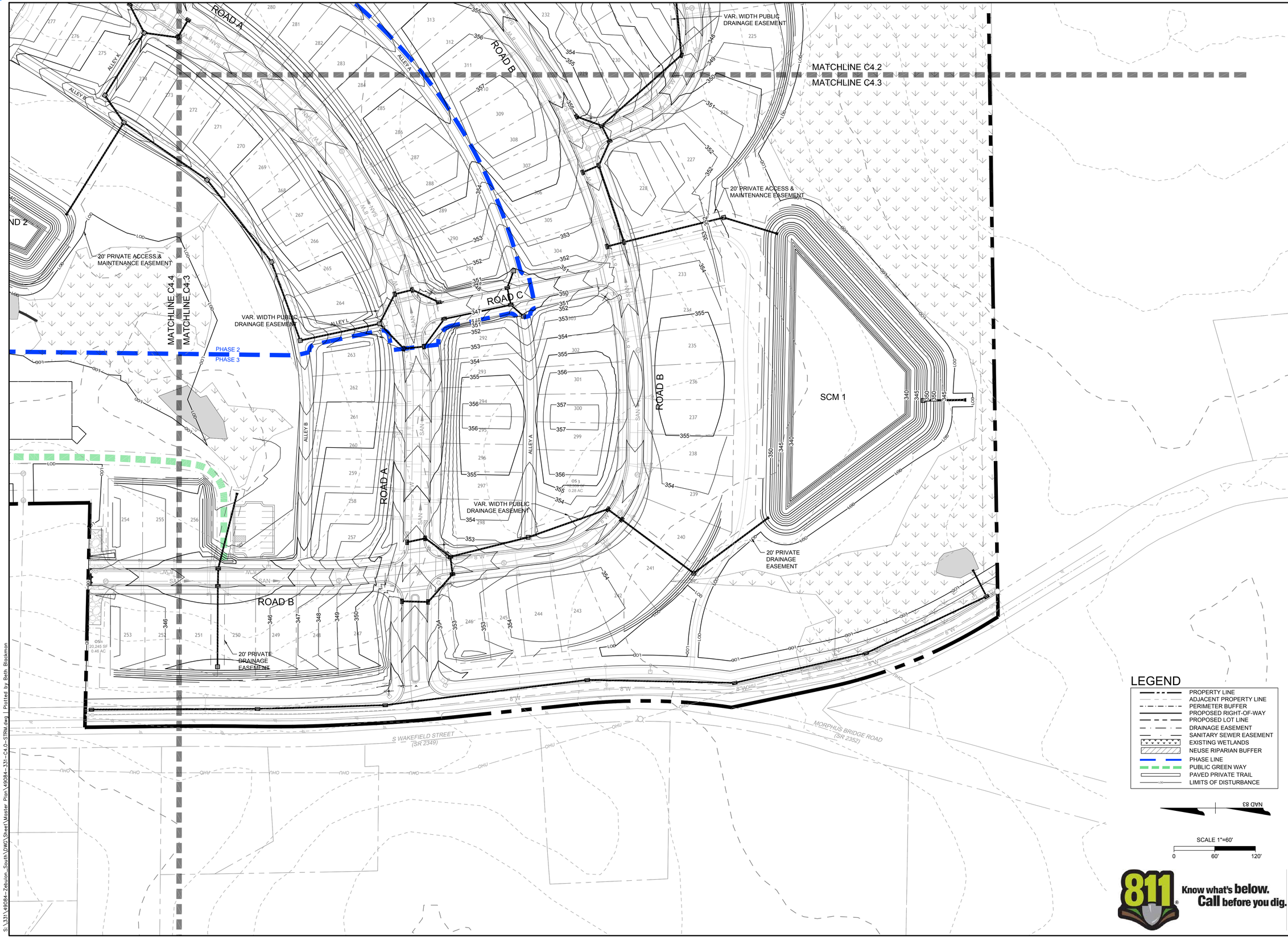

LEGEND

- PROPERTY LINE
- ADJACENT PROPERTY LINE
- PERIMETER BUFFER
- PROPOSED RIGHT-OF-WAY
- PROPOSED LOT LINE
- DRAINAGE EASEMENT
- SANITARY SEWER EASEMENT
- EXISTING WETLANDS
- NEUSE RIPARIAN BUFFER
- PHASE LINE
- PUBLIC GREEN WAY
- PAVED PRIVATE TRAIL
- LIMITS OF DISTURBANCE

NAD 83

SCALE 1"=60'
0 60' 120'

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SCALE: 1" = 60'

ZEBULON SOUTH

751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA

DETAILED GRADING & DRAINAGE PLAN SHEET 3 OF 4

JOB NO. 49084
SHEET NO. C4.3

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MATCHLINE C4.1
MATCHLINE C4.4

SCM 3

20' PRIVATE ACCESS & MAINTENANCE EASEMENT

ROAD F

ROAD D

20' PRIVATE DRAINAGE EASEMENT

ROAD A

ALLEY K

ALLEY G

WETLAND 2

20' PRIVATE ACCESS & MAINTENANCE EASEMENT

MATCHLINE C4.4
MATCHLINE C4.3

VAR. WIDTH PUBLIC DRAINAGE EASEMENT

ALLEY L

ALLEY B

10' PUBLIC GREENWAY & EASEMENT

PHASE 2
PHASE 3

OS 4
1,137,133 SF
26.10 AC

OS1
20,245 SF
0.46 AC

ROAD B

20' PRIVATE DRAINAGE EASEMENT

S WAKEFIELD STREET
(SR 2349)

LEGEND

- PROPERTY LINE
- ADJACENT PROPERTY LINE
- PERIMETER BUFFER
- PROPOSED RIGHT-OF-WAY
- PROPOSED LOT LINE
- DRAINAGE EASEMENT
- SANITARY SEWER EASEMENT
- EXISTING WETLANDS
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- LIMITS OF DISTURBANCE

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ZEBULON SOUTH
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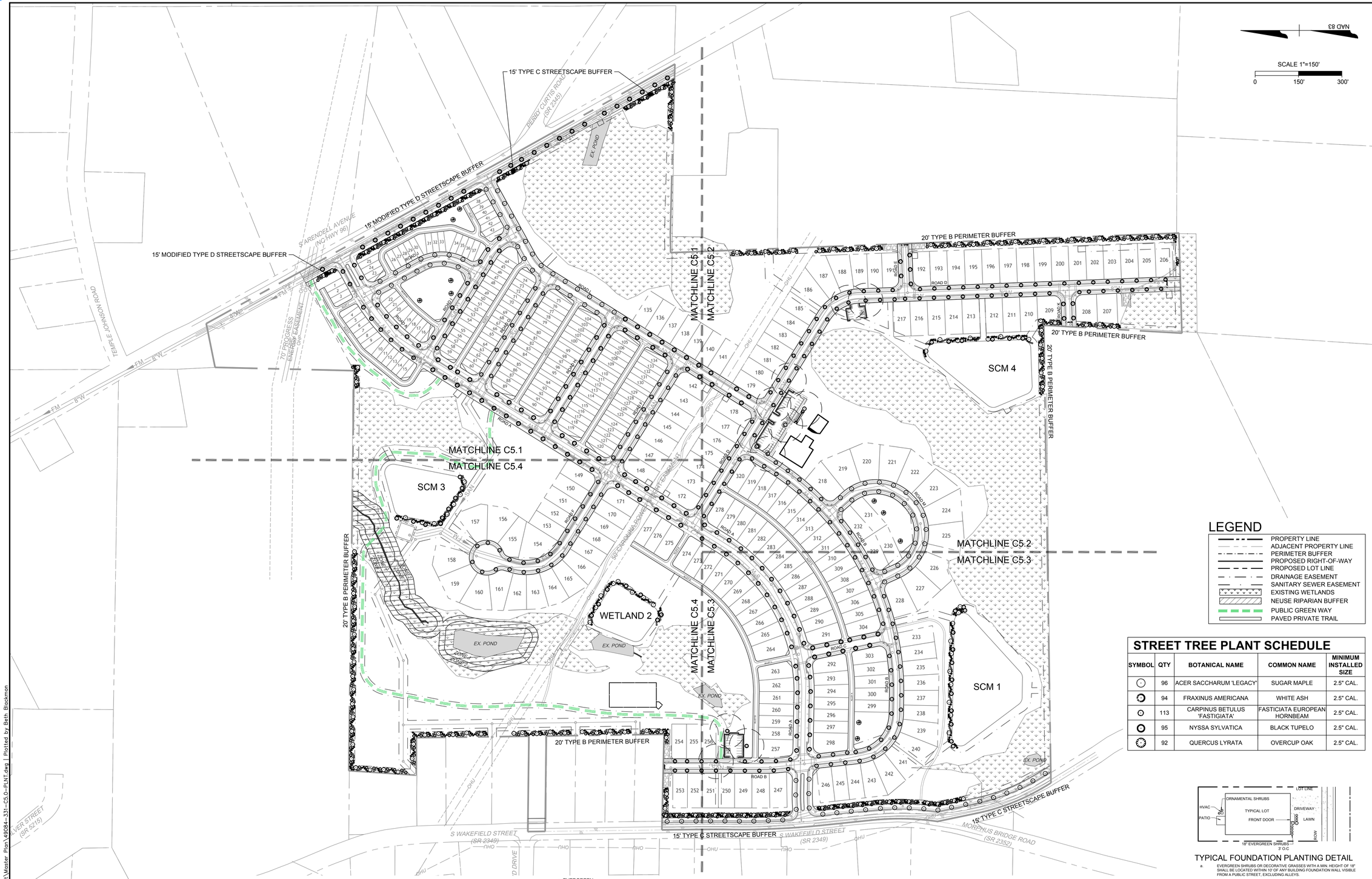
NORTH CAROLINA LICENSE NO. C-1652

DETAILED GRADING & DRAINAGE PLAN SHEET 4 OF 4

JOB NO. 49084
SHEET NO. C4.4



LEGEND

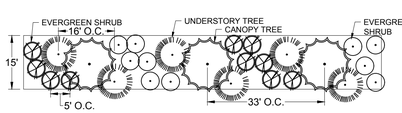
- PROPERTY LINE
- ADJACENT PROPERTY LINE
- PERIMETER BUFFER
- PROPOSED RIGHT-OF-WAY
- PROPOSED LOT LINE
- DRAINAGE EASEMENT
- SANITARY SEWER EASEMENT
- EXISTING WETLANDS
- NEUSE RIPARIAN BUFFER
- PUBLIC GREEN WAY
- PAVED PRIVATE TRAIL

STREET TREE PLANT SCHEDULE

SYMBOL	QTY	BOTANICAL NAME	COMMON NAME	MINIMUM INSTALLED SIZE
	96	ACER SACCHARUM 'LEGACY'	SUGAR MAPLE	2.5" CAL.
	94	FRAXINUS AMERICANA	WHITE ASH	2.5" CAL.
	113	CARPINUS BETULUS 'FASTIGIATA'	FASTICIATA EUROPEAN HORNBEAM	2.5" CAL.
	95	NYSSA SYLVATICA	BLACK TUPELO	2.5" CAL.
	92	QUERCUS LYRATA	OVERCUP OAK	2.5" CAL.

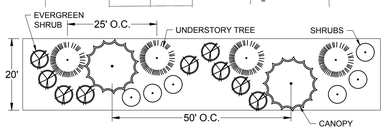
TYPICAL FOUNDATION PLANTING DETAIL

a. EVERGREEN SHRUBS OR DECORATIVE GRASSES WITH A MIN. HEIGHT OF 18" SHALL BE LOCATED WITHIN 10' OF ANY BUILDING FOUNDATION WALL VISIBLE FROM A PUBLIC STREET, EXCLUDING ALLEYS.



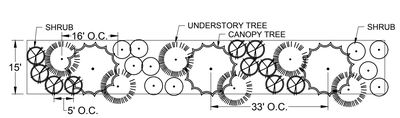
15' MODIFIED TYPE D STREETSCAPE BUFFER (100' SECTION)

PRESERVING EXISTING VEGETATION & SUPPLEMENTING WHERE NECESSARY 1"=20'
100% EVERGREEN SHRUBS
75% EVERGREEN UNDERSTORY TREES



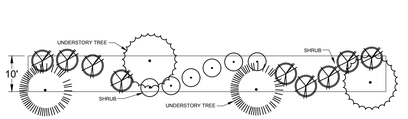
20' TYPE B PERIMETER BUFFER (100' SECTION)

PRESERVING EXISTING VEGETATION & SUPPLEMENTING WHERE NECESSARY 1"=20'



15' TYPE C STREETSCAPE BUFFER (100' SECTION)

PRESERVING EXISTING VEGETATION & SUPPLEMENTING WHERE NECESSARY 1"=20'



10' TYPE A SEPARATION BUFFER (100' SECTION)

PRESERVING EXISTING VEGETATION & SUPPLEMENTING WHERE NECESSARY 1"=20'

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REVISION DESCRIPTION

DATE

DATE 02/22/2024
DRAWN BY 331
DESIGNED BY E. ANGE
CHECKED BY B. BLACKMON
SCALE 1" = 150'

TIMMONS GROUP

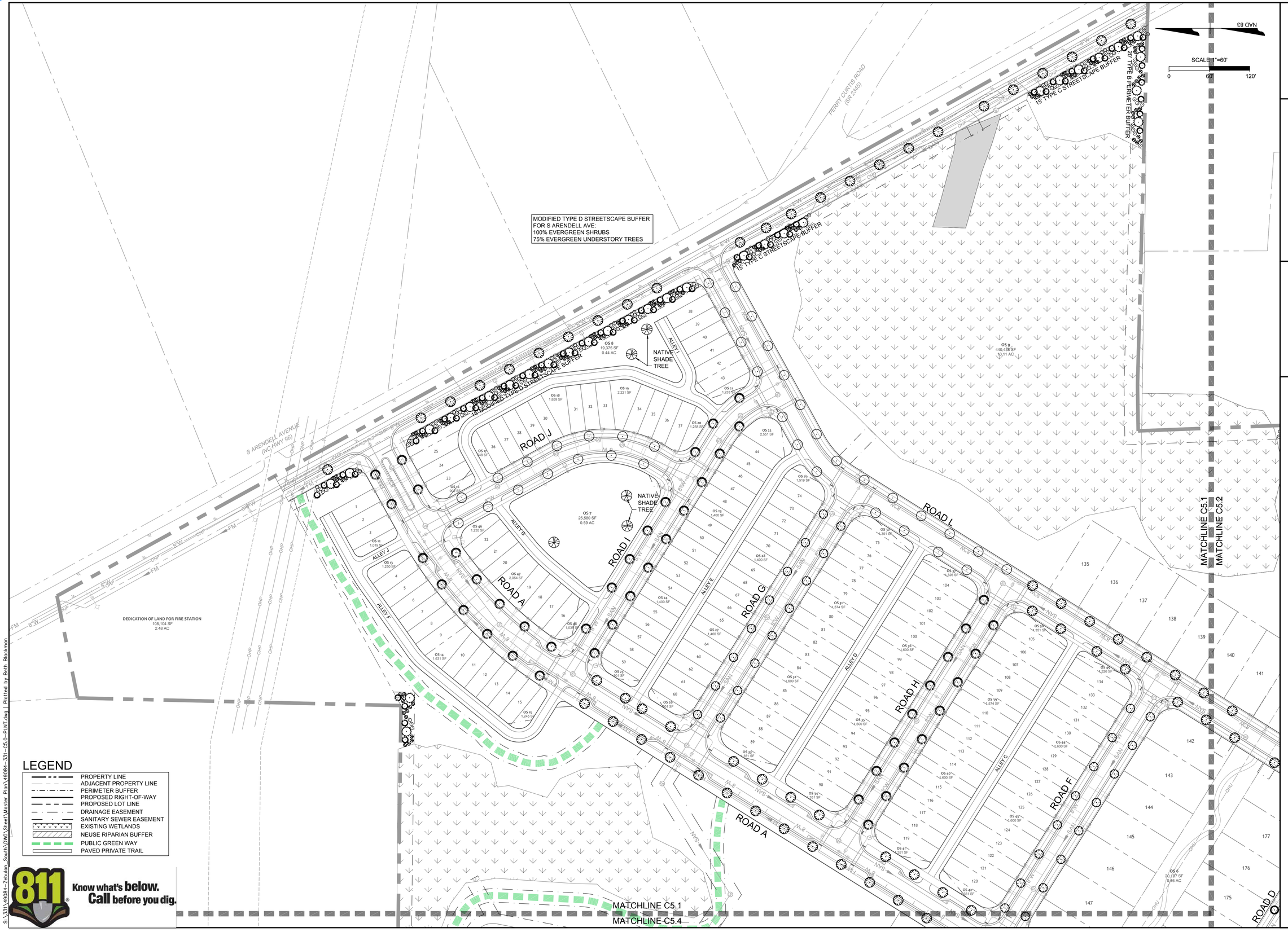
NORTH CAROLINA LICENSE NO. C-1652

ZEBULON SOUTH

751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA

OVERALL LANDSCAPE PLAN

JOB NO. 49084
SHEET NO. C5.0



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SCALE: 1" = 60'

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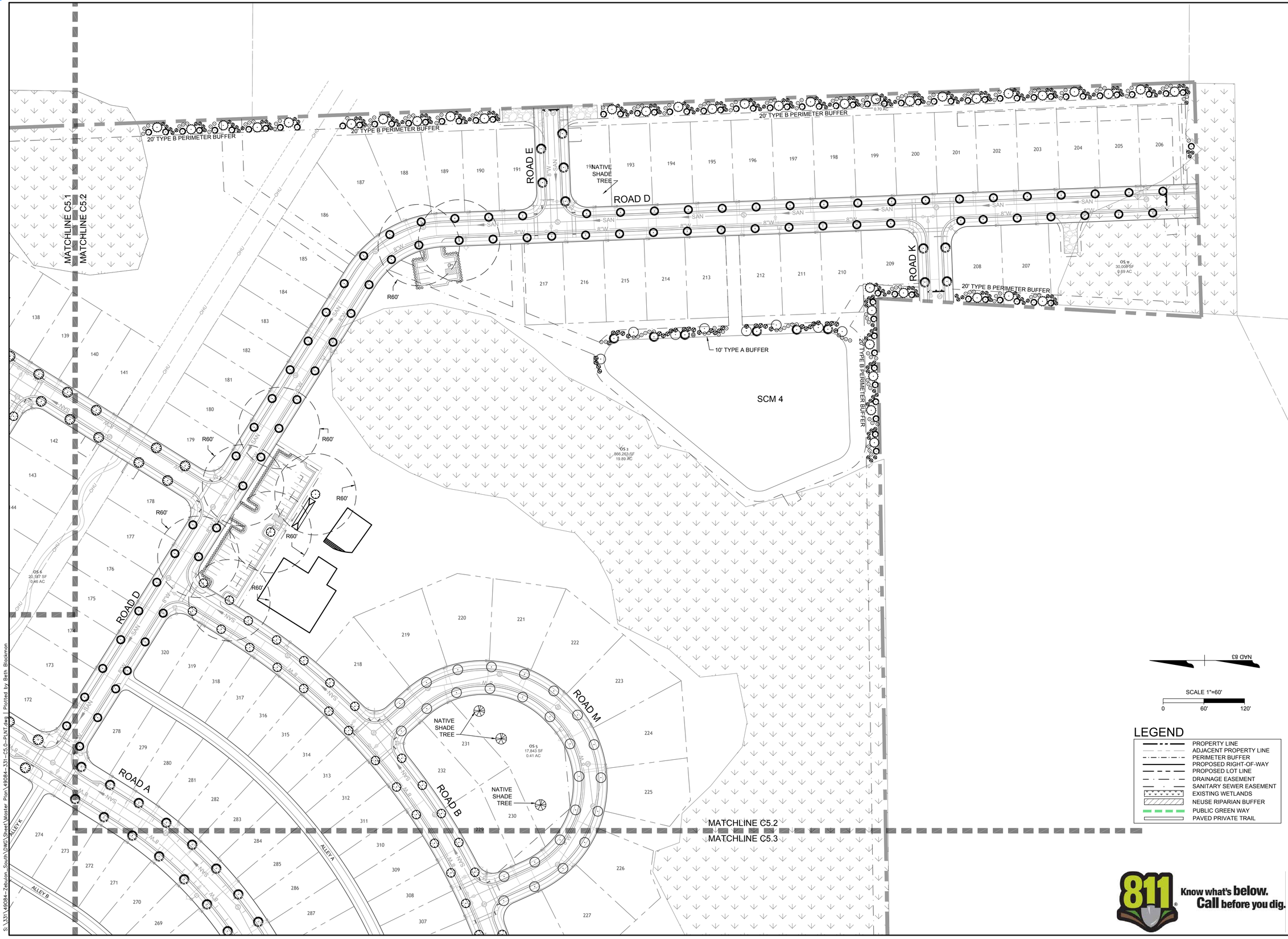
NORTH CAROLINA LICENSE NO. C-1652

ZEBULON SOUTH
751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA
DETAILED LANDSCAPE PLAN SHEET 1 OF 4

JOB NO. 49084
SHEET NO. C5.1



NAD 83

SCALE 1"=60'
0 60' 120'

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DETAILED LANDSCAPE PLAN SHEET 2 OF 4

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JOB NO. 49084
SHEET NO. C5.2

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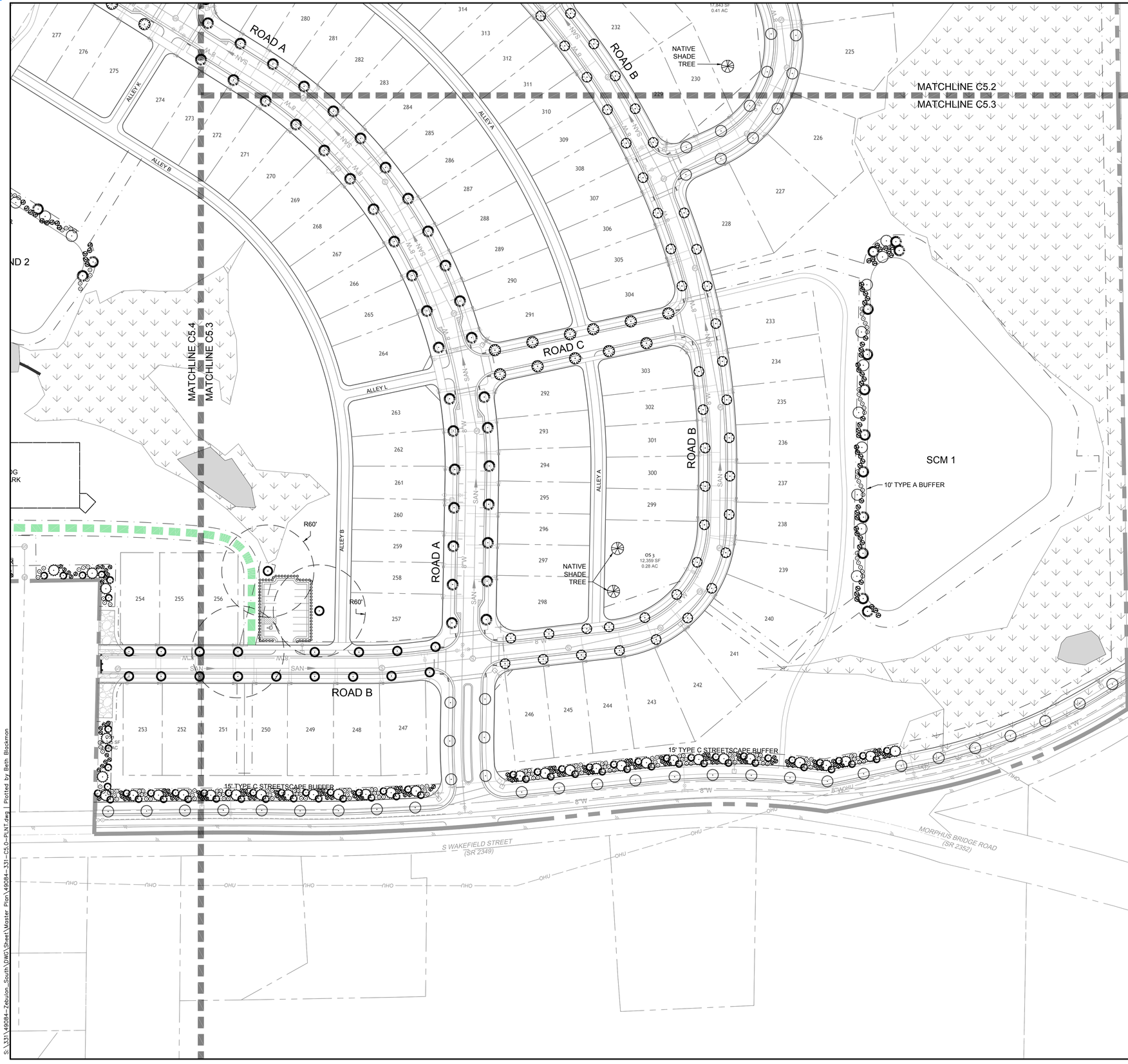

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751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA

DETAILED LANDSCAPE PLAN SHEET 3 OF 4

JOB NO. 49084
SHEET NO. C5.3

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MATCHLINE C5.1
MATCHLINE C5.4

SCM 3

PS
2,500 SF
0.06 AC

ROAD F

ROAD A

ROAD L

ALLEY K

ALLEY B

ALLEY L

WETLAND 2

10' TYPE A BUFFER

OS 4
1,137,133 SF
26.10 AC

DOG
PARK

20' TYPE B PERIMETER BUFFER

15' TYPE C STREETSCAPE BUFFER

ROAD B

R60'

MATCHLINE C5.4
MATCHLINE C5.3

S WAKEFIELD STREET
(SR 2349)

NAD 83

SCALE 1"=60'
0 60' 120'

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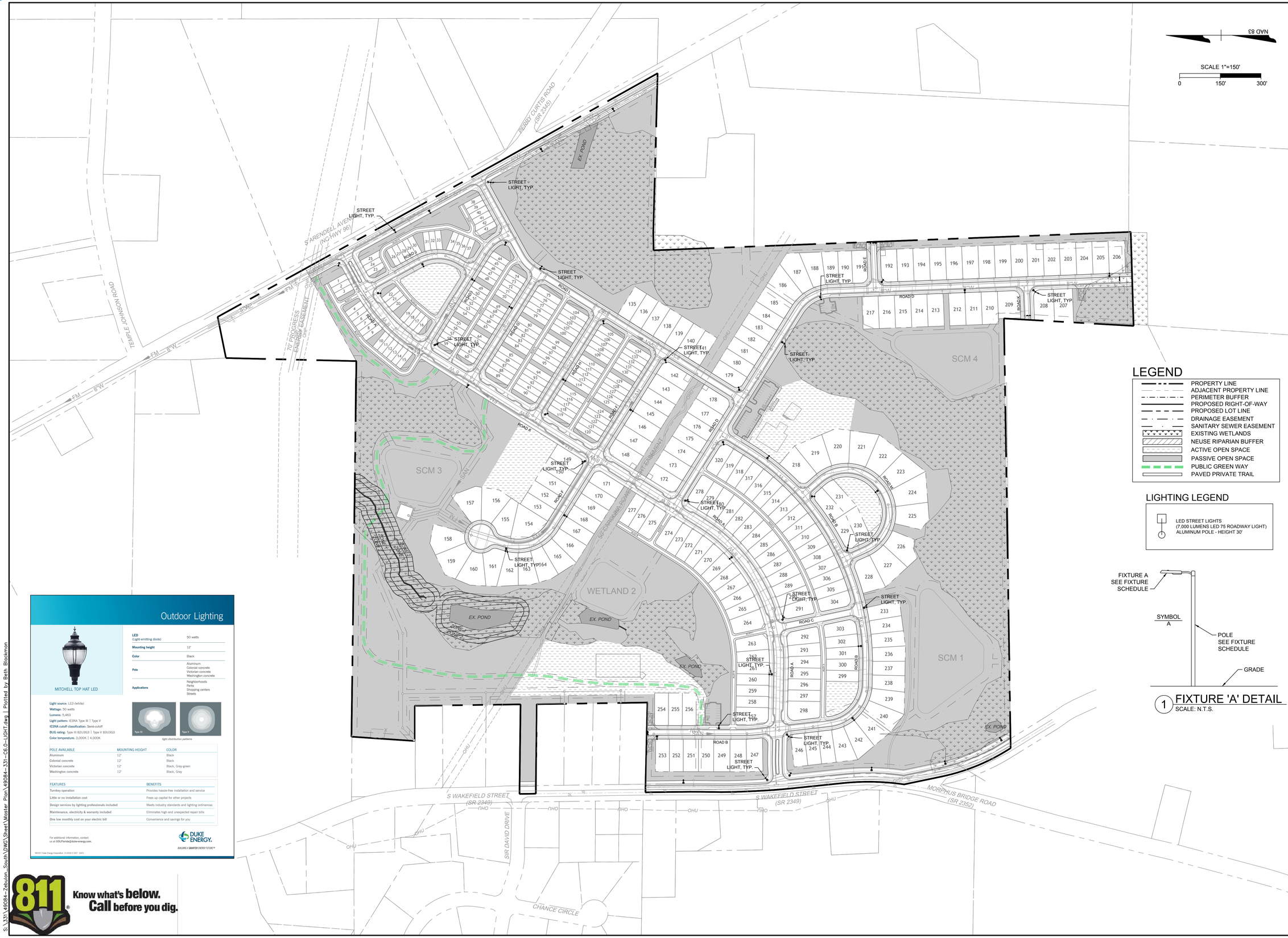
ZEBULON SOUTH

751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA

DETAILED LANDSCAPE PLAN SHEET 4 OF 4

JOB NO.
49084

SHEET NO.
C5.4



1 FIXTURE 'A' DETAIL
SCALE: N.T.S.

Outdoor Lighting

MITCHELL TOP HAT LED

LED (Light-emitting diode)	50 watts
Mounting height	12'
Color	Black
Pole	Aluminum Colonial concrete Victorian concrete Washington concrete
Applications	Neighborhoods Parks Shopping centers Streets

Light source: LED (white)
Wattage: 50 watts
Lumens: 5,463
Light pattern: IESNA Type III | Type V
IESNA cutoff classification: Semi-cutoff
BUG rating: Type III B2U3G3 | Type V B3U3G3
Color temperature: 3,000K | 4,000K

light distribution patterns

POLE AVAILABLE	MOUNTING HEIGHT	COLOR
Aluminum	12'	Black
Colonial concrete	12'	Black
Victorian concrete	12'	Black, Grey-green
Washington concrete	12'	Black, Grey

FEATURES	BENEFITS
Turnkey operation	Provides hassle-free installation and service
Little or no installation cost	Frees up capital for other projects
Design services by lighting professionals included	Meets industry standards and lighting ordinances
Maintenance, electricity & warranty included	Eliminates high and unexpected repair bills
One low monthly cost on your electric bill	Convenience and savings for you

For additional information, contact us at DGLFlorida@duke-energy.com.

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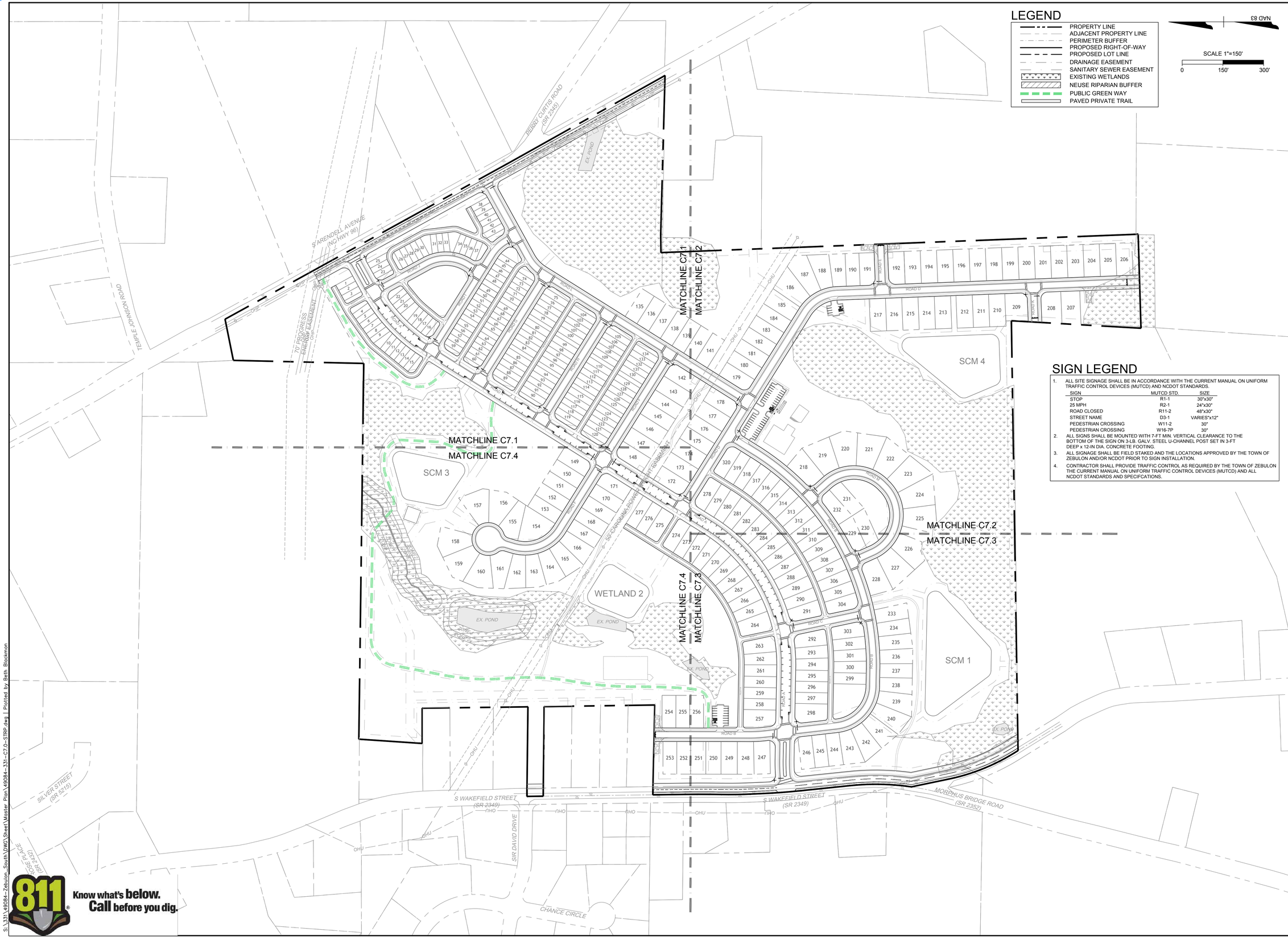
NORTH CAROLINA LICENSE NO. C-1652

ZEBULON SOUTH
751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA

LIGHTING PLAN

REVISION DESCRIPTION	DATE

DATE 02/22/2024
DRAWN BY 331
DESIGNED BY E. ANGE
CHECKED BY B. BLACKMON
SCALE 1" = 150'
JOB NO. 49084
SHEET NO. C6.0



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ZEBULON SOUTH

751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA

OVERALL SIGNS & MARKINGS PLAN

JOB NO. 49084

SHEET NO. C7.0

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NAD 83

SCALE 1"=60'
0 60' 120'

SIGN LEGEND

1. ALL SITE SIGNAGE SHALL BE IN ACCORDANCE WITH THE CURRENT MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AND NCDOT STANDARDS.

SIGN	MUTCD STD.	SIZE
STOP	R1-1	30"x30"
25 MPH	R2-1	24"x30"
ROAD CLOSED	R11-2	48"x30"
STREET NAME	D3-1	VARIES"x12"
PEDESTRIAN CROSSING	W11-2	30"
PEDESTRIAN CROSSING	W16-7P	30"

2. ALL SIGNS SHALL BE MOUNTED WITH 7-FT MIN. VERTICAL CLEARANCE TO THE BOTTOM OF THE SIGN ON 3-LB. GALV. STEEL U-CHANNEL POST SET IN 3-FT DEEP x 12-IN DIA. CONCRETE FOOTING.
3. ALL SIGNAGE SHALL BE FIELD STAKED AND THE LOCATIONS APPROVED BY THE TOWN OF ZEBULON AND/OR NCDOT PRIOR TO SIGN INSTALLATION.
4. CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL AS REQUIRED BY THE TOWN OF ZEBULON THE CURRENT MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AND ALL NCDOT STANDARDS AND SPECIFCATIONS.

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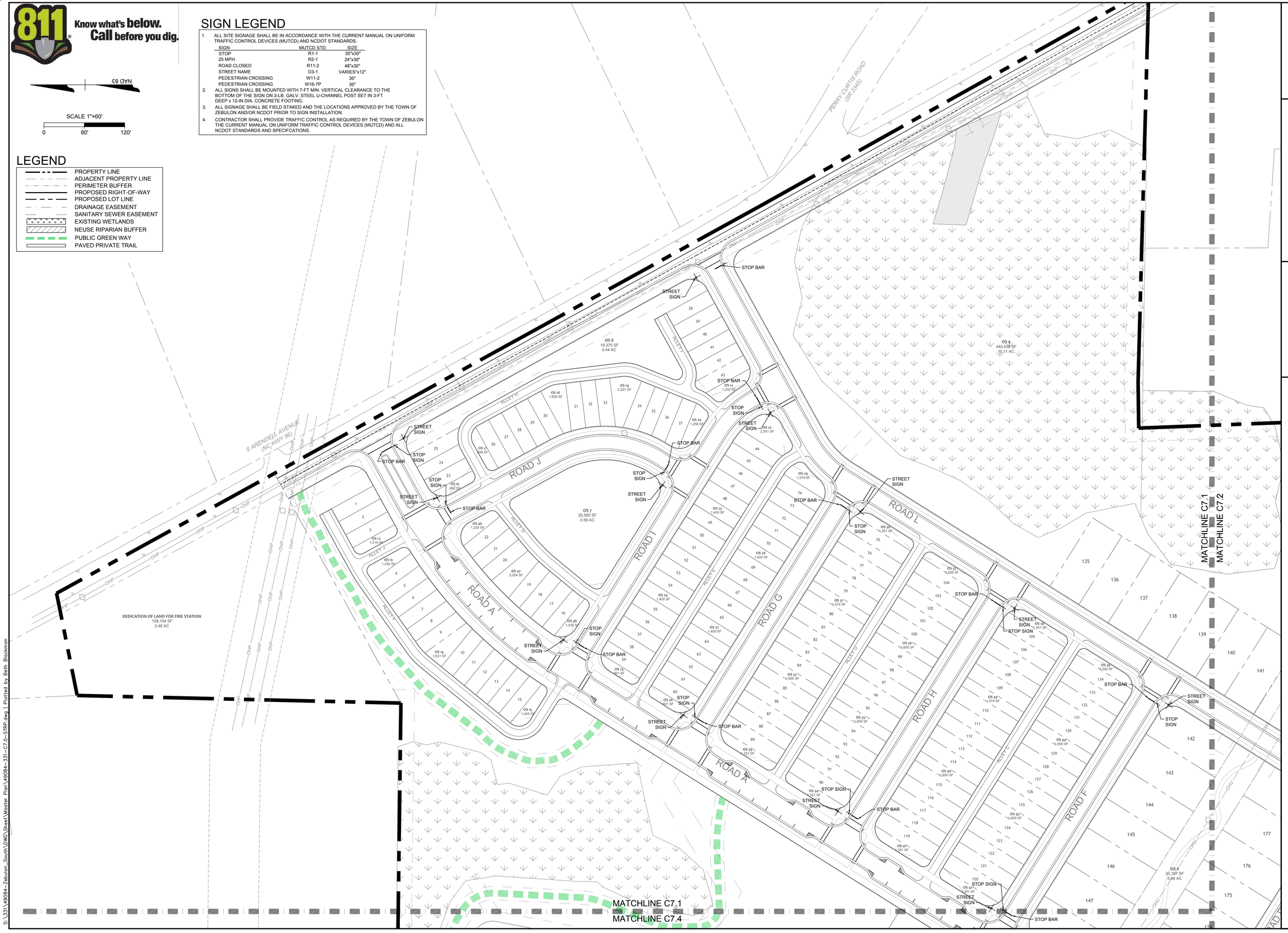
- PUBLIC GREEN WAY
- PAVED PRIVATE TRAIL



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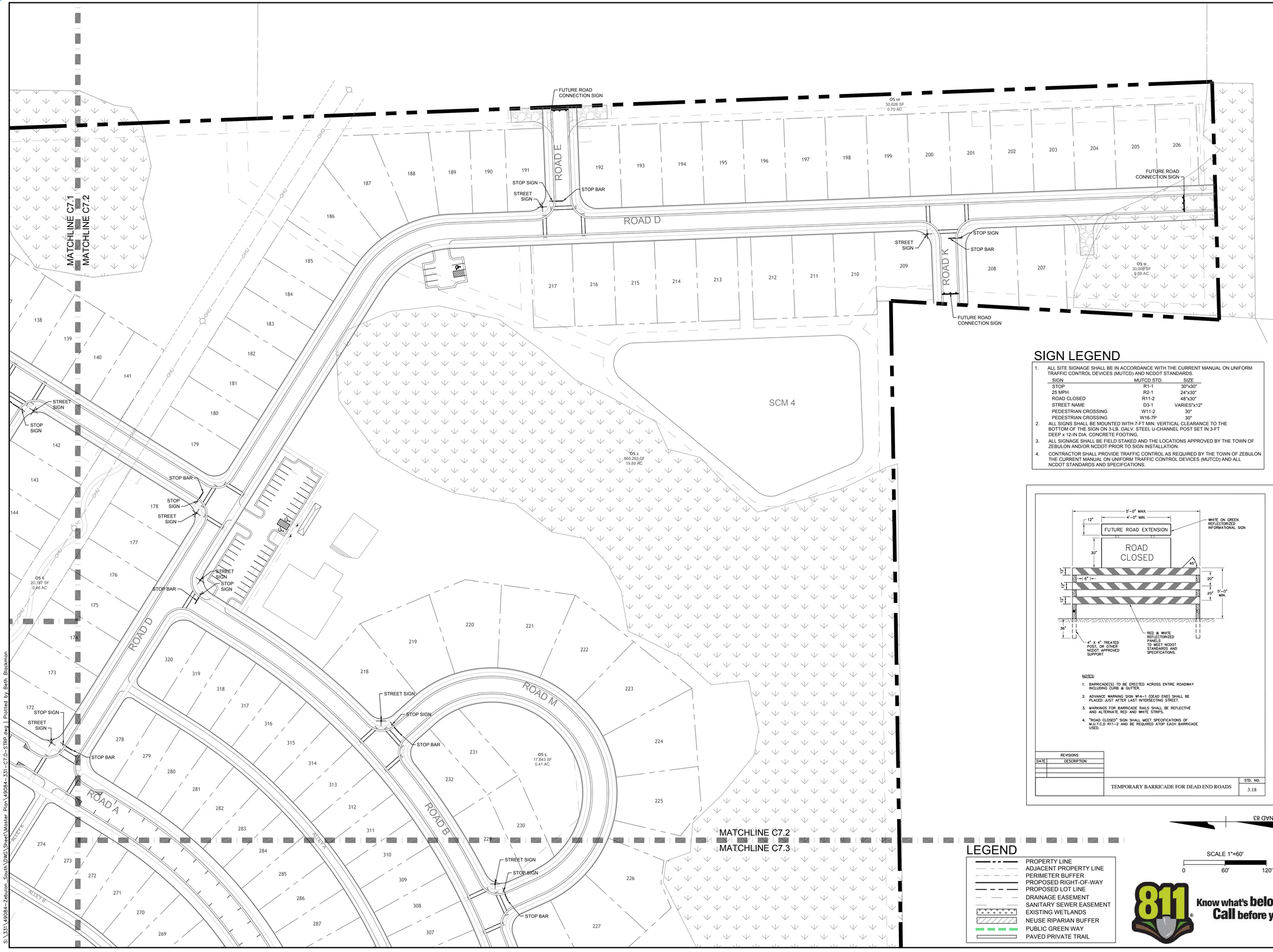
ZEBULON SOUTH

751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA

DETAILED SIGNS & MARKINGS PLAN SHEET 1 OF 4

JOB NO. 49084
SHEET NO. C7.1



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NOTES:

1. BARRICADE(S) TO BE ERECTED ACROSS ENTIRE ROADWAY INCLUDING CURB & GUTTER.
2. ADVANCE WARNING SIGN W14-1 (DEAD END) SHALL BE PLACED JUST AFTER LAST INTERSECTING STREET.
3. MARKINGS FOR BARRICADE RAILS SHALL BE REFLECTIVE AND ALTERNATE RED AND WHITE STRIPS.
4. "ROAD CLOSED" SIGN SHALL MEET SPECIFICATIONS OF M.U.T.C.D R11-2 AND BE REQUIRED ATOP EACH BARRICADE USED.

REVISIONS	
DATE	DESCRIPTION

TEMPORARY BARRICADE FOR DEAD END ROADS — STD. NO. 3.18

NAD 83

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- PUBLIC GREEN WAY
- PAVED PRIVATE TRAIL

SCALE 1"=60'
0 60' 120'

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ZEBULON SOUTH

751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA

DETAILED SIGNS & MARKINGS PLAN SHEET 2 OF 4

REVISION DESCRIPTION	DATE

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CHECKED BY: B. BLACKMON
SCALE: 1" = 60'
JOB NO.: 49084
SHEET NO.: C7.2

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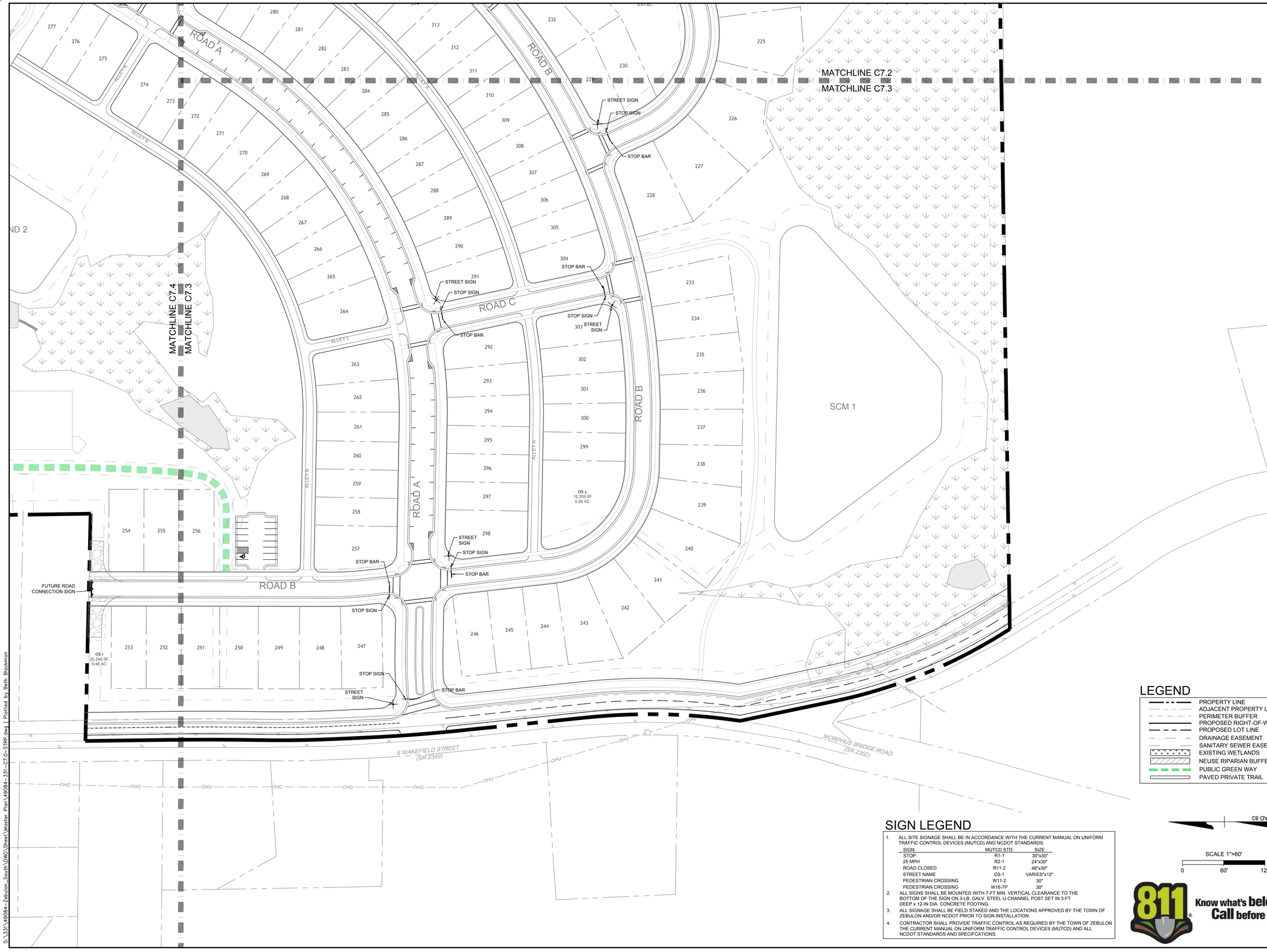

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DETAILED SIGNS & MARKINGS PLAN SHEET 3 OF 4

JOB NO. 49084
SHEET NO. C7.3

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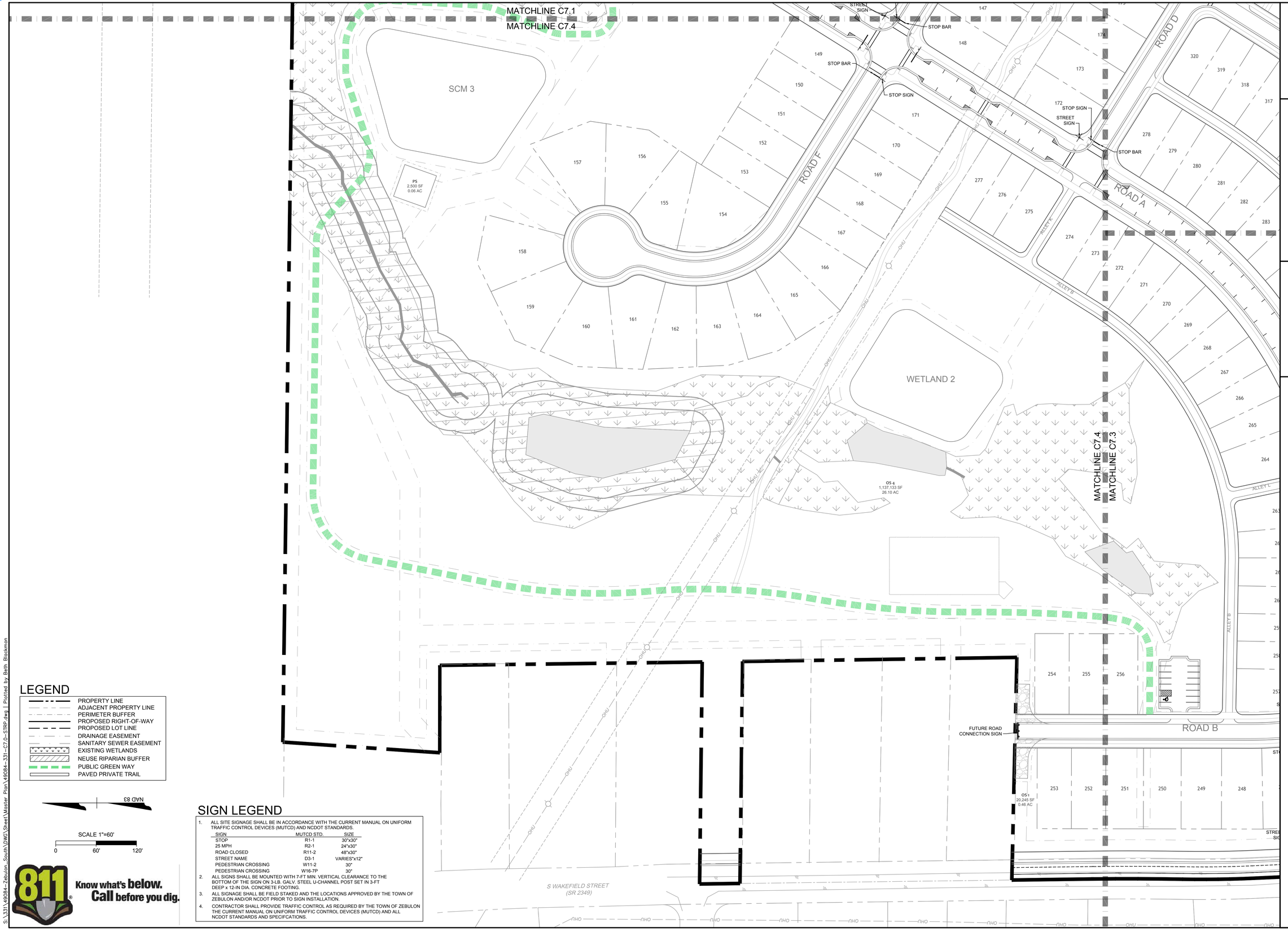

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2. ALL SIGNS SHALL BE MOUNTED WITH 7-FT MIN. VERTICAL CLEARANCE TO THE BOTTOM OF THE SIGN ON 3-LB. GALV. STEEL U-CHANNEL POST SET IN 3-FT DEEP x 12-IN DIA. CONCRETE FOOTING.
3. ALL SIGNAGE SHALL BE FIELD STAKED AND THE LOCATIONS APPROVED BY THE TOWN OF ZEBULON AND/OR NCDOT PRIOR TO SIGN INSTALLATION.
4. CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL AS REQUIRED BY THE TOWN OF ZEBULON THE CURRENT MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AND ALL NCDOT STANDARDS AND SPECIFICATIONS.

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TIMMONS GROUP

REVISION DESCRIPTION

DATE

DATE 02/22/2024
DRAWN BY 331
DESIGNED BY E. ANGE
CHECKED BY B. BLACKMON
SCALE 1" = 60'

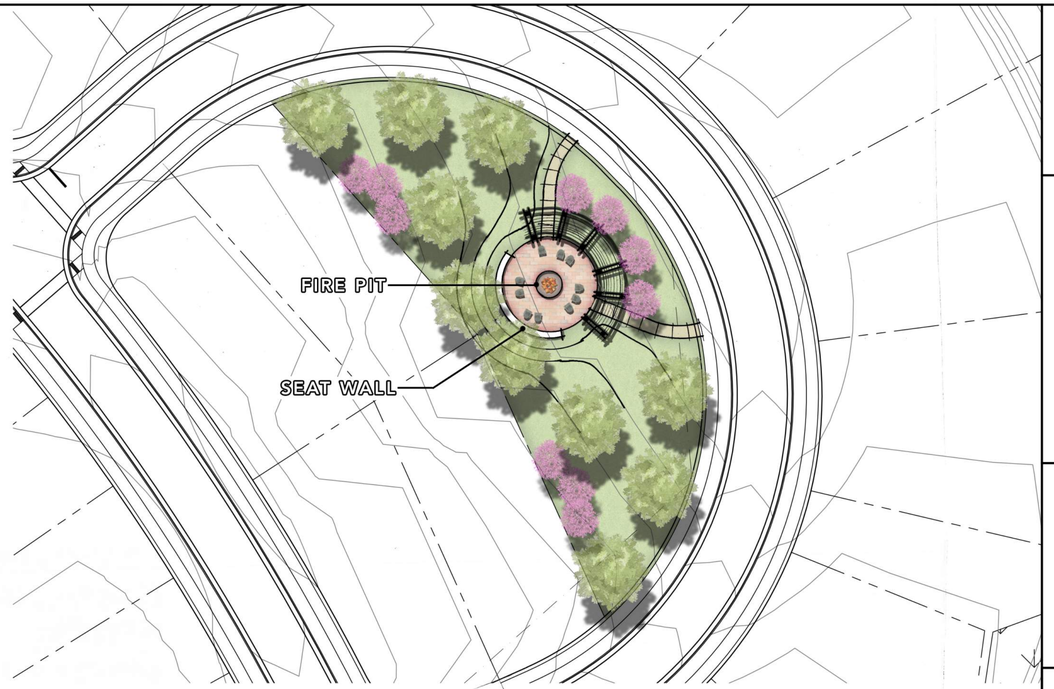
ZEBULON SOUTH

751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA
NORTH CAROLINA LICENSE NO. C-1652

DETAILED SIGNS & MARKINGS PLAN SHEET 4 OF 4

JOB NO. 49084
SHEET NO. C7.4

POLLINATOR GARDEN AREA SCALE: 1"=30'



FIRE PIT AREA SCALE: 1"=30'

TOT-LOT AREA SCALE: 1"=30'

NOTE:
AMENITY CENTER AND POCKET PARK DESIGNS ARE CONCEPTUAL IN NATURE AND SUBJECT TO CHANGE BASED UPON FINAL DESIGN AND REVIEW. ELEMENTS SHOWN ARE INTENDED TO DEPICT POSSIBLE OPEN SPACE CONFIGURATIONS AND ARRANGEMENT OF SITE ELEMENTS.

FOOD TRUCK AREA SCALE: 1"=30'

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ZEBULON SOUTH
751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA
DETAILED AMENITY PLAN

JOB NO. 49084
SHEET NO. C8.0

CLUBHOUSE AREA SCALE: 1"=30'

DOG PARK AREA SCALE: 1"=40'

NOTE:
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ZEBULON SOUTH
751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA
DETAILED AMENITY PLAN

JOB NO. 49084
SHEET NO. C8.1

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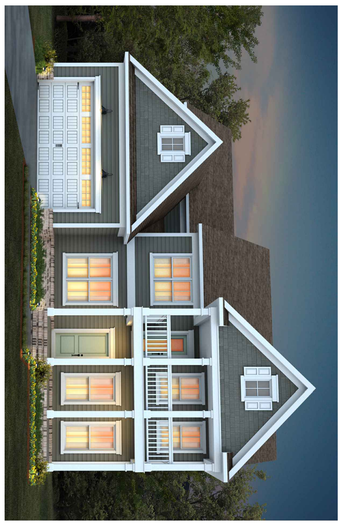
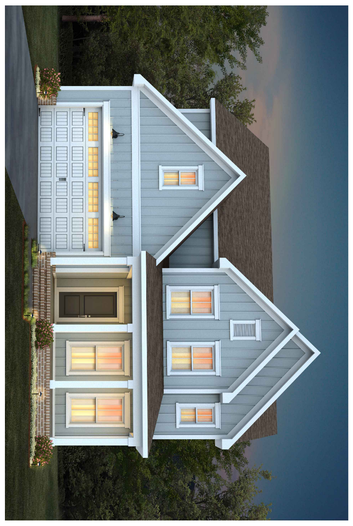

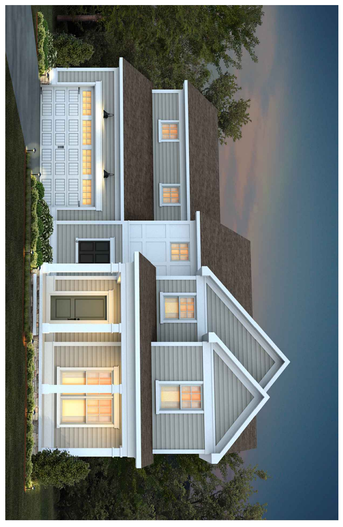

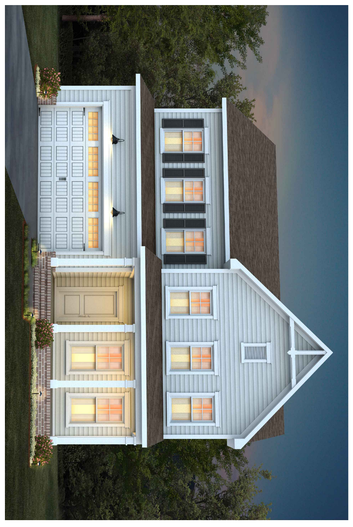

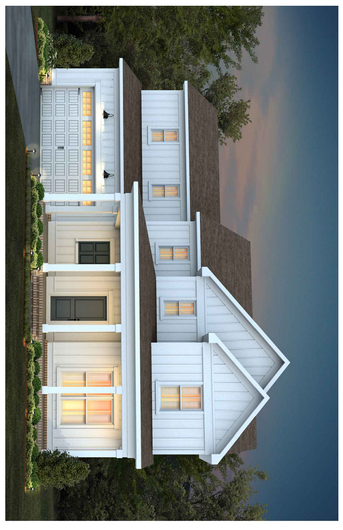
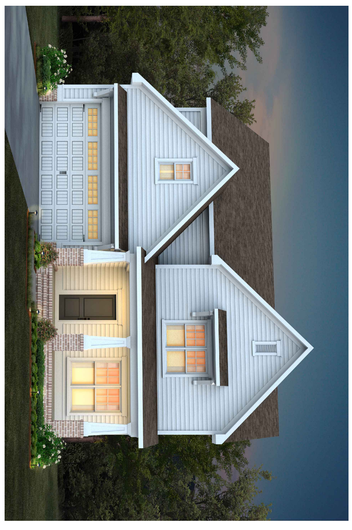




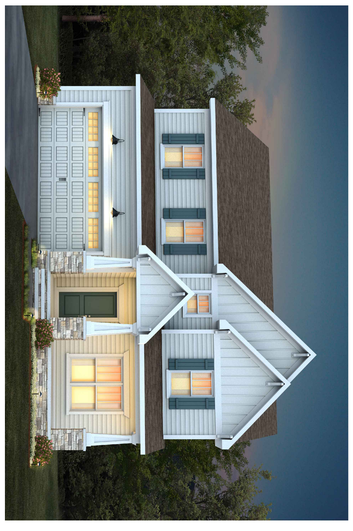

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JOB NO. 49084

SHEET NO. C9.1

ZEBULON SOUTH

751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA

SINGLE FAMILY CONCEPTUAL ELEVATIONS

SCALE	CHECKED BY	DESIGNED BY	DRAWN BY	DATE
N/A	B. BLACKMON	E. ANGE	331	02/22/2024

DATE	REVISION DESCRIPTION

Plotted: 07

Attachment 2
PD-2024-01

FRONT DOOR EXAMPLES

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CHECKED BY	B. BLACKMON
SCALE	N/A

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NORTH CAROLINA LICENSE NO. C-1652

ZEBULON SOUTH

751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA

TOWNHOME CONCEPTUAL ELEVATIONS

JOB NO.	49084
SHEET NO.	C9.2

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Attachment 2
PD-2024-01

AMENITY PERSPECTIVES - PULTE GROUP

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AMENITY PERSPECTIVES - PULTE GROUP

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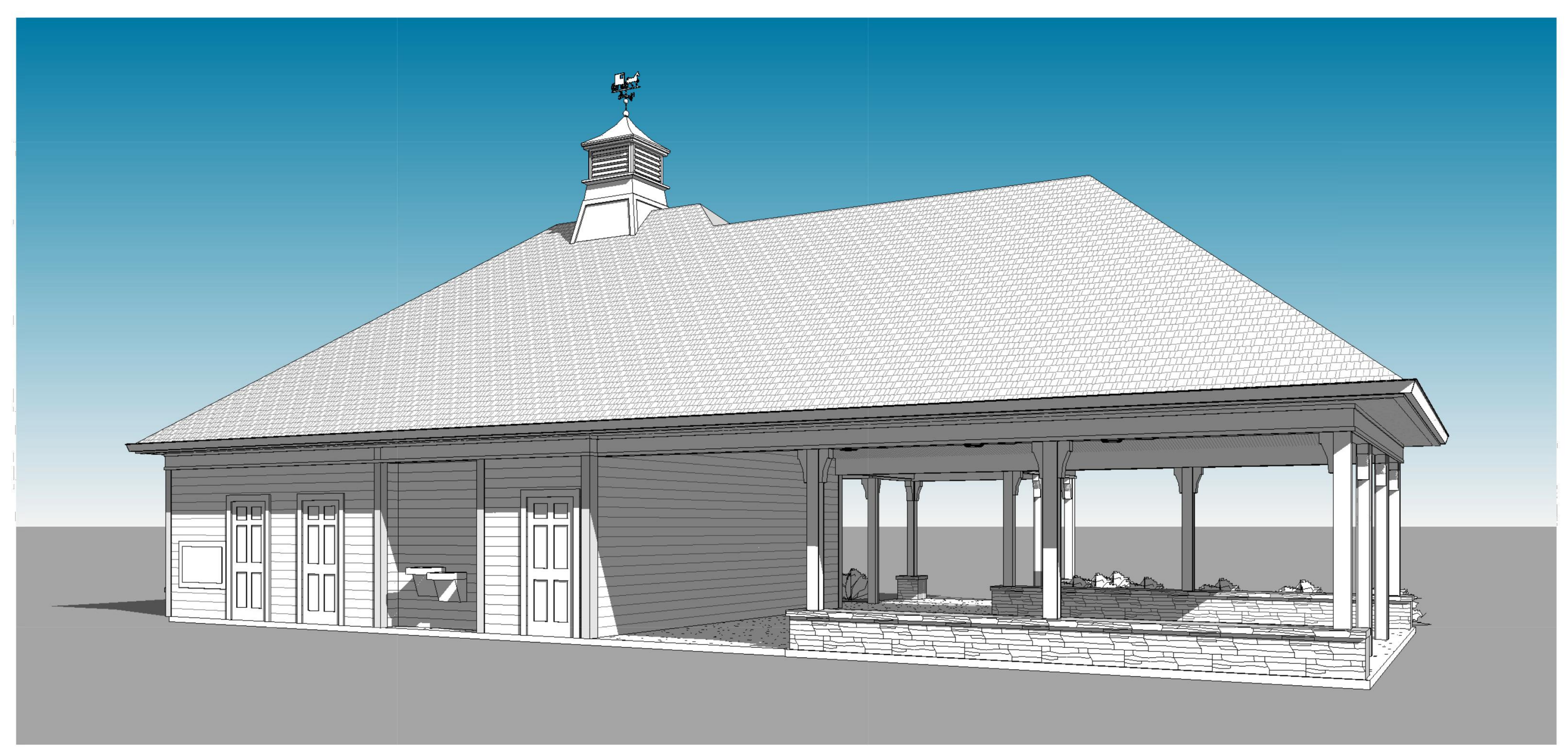

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NORTH CAROLINA LICENSE NO. C-1652

ZEBULON SOUTH
751 S WAKEFIELD STREET, ZEBULON, WAKE COUNTY, NORTH CAROLINA

CONCEPTUAL AMENITY

JOB NO.	49084
SHEET NO.	C9.3

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ZEBULON SOUTH

Comprehensive Planned Development Document

715 S. Wakefield Street and S. Arendell Avenue
Zebulon, North Carolina

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Zebulon South

Prepared For:

TOWN OF ZEBULON
November 2022
August 2023
November 2023
January 2024
February 2024

Prepared By:

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Table of Contents

1.0 Introduction

Zebulon South is a proposed residential community utilizing the Town of Zebulon Planned Development Zoning as outlined in the Unified Development Ordinance (UDO). The assemblage is made up of three parcels with frontage on both S. Wakefield Street and S. Arendell Avenue. The total existing tract area is about 118.6 acres.

The development is bordered to the north by an existing solar farm. To the east across S. Arendell Avenue are existing single-family homes and a church. South and southeast of the property are existing single-family homes and agricultural fields as well as wooded properties. Existing single-family homes and agricultural fields are located west of the property.

Zebulon South PD will be a phased development of a high-quality master planned community that will provide a variety of housing types and amenities. By utilizing the PD zoning, the master plan containing site specific regulations will guide the development resulting in a well-integrated mix of housing types, lot sizes and densities with open space and preservation of environmentally sensitive areas. The flexibility offered by a PD zoning will result in a more efficient use of the land and network of utilities and streets.

The proposed community will consist of single family detached and attached residential development. The current zoning is R-2 and R-4. The Grow Zebulon Comprehensive Land Use Plan (LUP) designations are General Residential (GR) and Suburban Residential (SR) for the property. The LUP specifically identifies a PD as being a primary land use type in the SR and GR LUP classifications. The development will have an integrated mix of housing types, consistent with the LUP's recommendations for providing a diverse stock of residential choices. The diverse housing choices will promote varied price points, consistent with the LUP. The proposed zoning is Planned Development (PD) which is consistent with the LUP designations.

With over 50% open space (five times the minimum requirement) and at least 15% tree save (three times the minimum requirement), Zebulon South preserves a significant amount of environmentally sensitive areas in the design of the Master Plan, consistent with Land Use and Development Policy E, General Policies G1 and G6, Residential Policy R4, and Parks and Open Space Policy P5. The preserved areas, to a large degree, are located on the perimeter of the development, allowing for concentration of infrastructure improvements in the central area of the development. The Master Plan utilizes existing wetlands, open space and larger lots as buffer for the development, mitigating effects of the development on the surrounding community. Open space, common amenities and an integrated system of walking trails, including a publicly accessible greenway, support a high quality of life for the residents in and around the development. Open space shall exceed the Town of Zebulon minimum requirement for PD zoning.

The development includes the construction of a collector street connecting S. Wakefield Street and S. Arendell Street as shown on the Grow Zebulon Comprehensive Transportation Plan, at a location where it will clearly be a safe distance from the Perry Curtis/S. Arendell intersection, improving connectivity for the community. This is consistent with Land Use and Development Goal 3, Land Use and Development Policy G, General Policy G3, and Residential Policy R3. The internal street network includes three access points to existing public roads promoting access options for residents of the development.

Finally, the proposed project will provide an additional benefit for all current and future area residents: dedication of land for a needed second fire station in the growing southern Zebulon. The location of the land dedication is shown on the master plan, is centrally located to serve growth that is already occurring in Southern Zebulon and will be an important step for the development of Zebulon's second fire station.

2.0 Vicinity Map

Zebulon South PD is located between S. Wakefield Street and S. Arendell Ave as shown on the vicinity map in Figure 1.

FIGURE 1

3.0 Permitted Uses

Zebulon South PD proposes to allow the development of residential uses including Single Family Detached and Single Family Attached along with accessory uses as permitted in the R6 zoning district. Figure 2 below provides a listing of the proposed permitted uses. The uses are subject to the regulations of the Town of Zebulon UDO.

Use Category	Specific Use	PD
Residential Uses	Single Family Detached and permitted accessory uses	P
	Single Family Attached and permitted accessory uses	P

FIGURE 2

In addition, on the portion of the Master Plan designated as the "Dedication of Land for Fire Station," all uses permitted in R6 shall be permitted, including the "Fire/EMS/Police Station" use.

4.0 Design Controls

Development Area – 118.6 acres

Density:

Maximum Density: 2.95 dwelling units per acre

Units: 350 dwelling units

(maximum 210 SF detached & 140 SF attached)

Building Height:

Maximum Building Height / # of stories: 50 feet / 3 stories

Building Setbacks:

Single Family Detached Front Loaded:

Front:	20'
Side:	5'
Corner Side:	10'
Rear:	15'

Single Family Detached Rear Loaded:

Front:	10' max
Side:	3'
Corner Side:	10'
Rear:	20'

Single Family Attached Rear Loaded:

Front:	10' max
Building Separation:	10'
Rear:	20'

Buffers:

Streetscape Buffers:	15' Type C Streetscape Buffer (Wakefield St) 15' Modified Type D* Streetscape Buffer (Arendell Ave) *For additional opacity, this buffer shall be comprised of 100% evergreen shrubs and 75% evergreen understory trees
Perimeter Buffers:	20' Type B Perimeter Buffer

Existing vegetation shall be utilized to the extent possible. All streetscape and perimeter buffers shall be provided in accordance with the Town of Zebulon UDO. Landscaped perimeter and street buffers shall include native and adaptive species only.

Disturbance within the buffer is only allowed as follows:

a. Construction of driveways, public streets and walkways perpendicular to the buffer strip shall be allowed where such construction is necessary for safe ingress and egress to the site. The nature and limits of such construction must be designated on the approved master subdivision plan.

b. Notwithstanding any other provision pertaining to buffers, City of Raleigh public utilities and easements shall be allowed, parallel and otherwise, within buffers, and the area within such easements shall still count towards buffer and undisturbed buffer calculations.

5.0 Architectural Standards

To encourage multiple architectural styles, buildings will be any variety of Craftsman, Traditional, Colonial, etc. While each of the architectural offerings proposed will have its own identity, a number of common threads will link the homes in the development, including color palettes, materials, roofing, and decorative garage doors. Elevations have been included in an effort to represent the bulk, massing, scale and architectural style of the development.

Requirements for All Homes:

Roofs:

Roof lines shall vary to reduce the scale of the structure and add visual interest. Roof shapes (flat, hip, mansard, gable, or shed for example) and material shall be architecturally compatible with façade elements and the rest of the structure. Shed roofs may be used on porches and dormers.

3-tab/235 shingles are not permitted.

Façades:

The principal structure's front façade must incorporate recesses and projections along at least 50% of the length of the façade. Windows, awnings, and porch area shall total at least 50% of the façade length abutting a public street.

Façades shall incorporate a repeating pattern of change in color, texture, and material modules.

No venting will be provided on any front facades except that when a bathroom is located on the front of the unit, a vent of a similar color to either the siding or the trim may be provided on the front of the unit.

Entryways:

Doors shall have built-in windows; alternatively, a solid door is allowed provided side lights (side windows) are installed immediately adjacent to the solid door. Double front doors are allowed as an option.

Front doors shall be illuminated.

Variations in color schemes and textures are encouraged in order to articulate entryways so as to give greater recognition to these features.

An option to include an overhang on rear exterior doors shall be provided. When this option is chosen by homeowner, the overhang shall extend at least 24 inches.

Windows:

All street-facing exterior windows shall have trim and screens. Trim shall be a minimum of 3 inches wide.

Materials and Color Palette:

Predominant exterior building materials shall be high quality materials including brick, wood, stone, fiber cement, and/or wood composite.

Vinyl siding is not permitted; however, vinyl windows, decorative elements and trim are permitted.

Trim color shall be distinct from façade color.

Front and side porches with open foundations shall have brick or stone piers and openings shall be fully screened with evergreen plantings.

A varied color palette shall be utilized on homes throughout the subdivision and shall include siding, trim, shutter, and accent colors complementing the siding colors.

Porch railings, if included on homes, shall be a complimentary color of the house and shall be made of either aluminum, or composite material.

Accessory buildings, if constructed, shall be of similar materials and colors as the primary single-family home.

All homes will have two or more of the following design features on the front façade (not including foundation):

a. stone
b. brick
c. lap siding
d. shakes
e. board and batten
f. window pediments
g. recessed windows
h. side and/or front window box bays
i. roof gables
j. roof dormers
k. roofline cornices
l. metal roofing as accent
m. columns
n. shutters
o. other decorative features approved by the Planning Director

Screening:

All residential structures shall have screening by vinyl privacy fence installed on the sides or rear of the structure to prevent visibility of roll out refuse carts from the public right-of-way or adjacent properties.

Vegetative screening for HVAC units shall be provided.

Requirements for Single-family Detached Front Loaded Homes:

1. Each home shall have a minimum of one story and a maximum of three stories.
2. Each home may have a raised slab foundation. Raised slab foundation shall contain stone or brick.
3. Finished floor elevations shall comply with UDO Section 4.3.3.P.1.
4. UDO 4.3.3.P.2 - Single-family detached dwellings shall be configured so that each side of the dwelling includes some form of ingress or egress capable of allowing emergency exit from or entrance into the dwelling. Windows, doors, or other wall penetrations shall be credited towards these standards. Skylights shall also be credited towards these standards in cases where there is sufficient access to the ground from the room.
5. Front porches shall extend beyond the front plane of the garage by a minimum of 12" on 25% of the homes constructed. Front Porches shall be allowed to extend beyond the minimum front setback a maximum of 10".
6. Garage doors must have windows, decorative details or carriage-style hardware.
7. Each garage will either have one light on each side or two lights above the garage door.
8. Eaves shall project at least 8 inches from the wall of the structure.
9. All gutter downspouts shall discharge to the side or rear of the structure.
10. The front elevation and all sides that abut a public street shall contain a minimum of 10% masonry (brick or stone) and shall contain a minimum of two siding materials (i.e. stone and hardiplank or brick and shake).

11. A minimum 18-inch masonry (brick or stone) water table on the front façade shall be provided.
12. On at least 30% of units, masonry (brick or stone) shall extend the full height of the ground floor.
13. Each front porch shall contain a covered stoop.
14. No single family detached home shall be constructed with a front elevation or color palette that is identical to the home on either side of it.

Requirements for Single-family Detached Rear Loaded Homes:

15. Each home shall have a minimum of one story and a maximum of three stories.
16. Each home may have a raised slab foundation or crawl space. Raised slab foundation shall contain stone or brick.
17. Finished floor elevations shall comply with UDO Section 4.3.3.P.1.
18. UDO 4.3.3.P.2 - Single-family detached dwellings shall be configured so that each side of the dwelling includes some form of ingress or egress capable of allowing emergency exit from or entrance into the dwelling. Windows, doors, or other wall penetrations shall be credited towards these standards. Skylights shall also be credited towards these standards in cases where there is sufficient access to the ground from the room.
19. Eaves shall project at least 8 inches from the wall of the structure.
20. All gutter downspouts shall discharge to the side or rear of the structure.
21. The front elevation of each unit shall contain a minimum of 10% masonry (brick or stone) and shall contain a minimum of two siding materials (i.e. stone and hardiplank or brick and shake).
22. A minimum 24-inch masonry (brick or stone) water table on the front façade shall be provided.
23. All sides of a principal structure that face an abutting public street shall have architectural and decorative features as described above.
24. No single family detached home shall be constructed with a front elevation or color palette that is identical to the home on either side of it.

Requirements for Single-family Attached Rear Loaded Homes:

25. Each home shall have a minimum of two stories and a maximum of three stories.
26. Each home may have a raised slab foundation.
27. The front elevation and all sides that abut a public street shall contain a minimum of 10% masonry (brick or stone) and shall contain a minimum of two siding materials (i.e. stone and hardiplank or brick and shake).
28. No two consecutive units within a single building shall contain the exact same front elevation regarding materials or color palette.
29. All sides of a principal structure that face an abutting public street shall have architectural and decorative features as described above.
30. The building façade cannot be a single mass; it must be broken up by home articulations of at least 12 inches, at minimum, between every two homes.
31. The roofline of each attached building cannot be a single mass; it must be broken up either horizontally and/or vertically between, at a minimum every two homes.

Requirements for Amenities:

A mail kiosk shall be located adjacent to the clubhouse and pool. The kiosk shelter shall be designed with similar architectural style, materials and color palette as the homes in the neighborhood. Cluster mailboxes shall meet the requirements of Section 6.12.7 of the Town of Zebulon UDO.

The clubhouse shall match residential buildings with regard to style, materials and color palette.

Architectural Guidelines:

We commit to the architectural requirements in Section 5.2.4 of the UDO. We will work with Town Planning and Building staff to provide additional architectural features with the exception of Section 5.2.4.E.3.e. Garage doors will not be required to be located at least two or more feet behind the front porch or the primary entrance to the dwelling.

6.0 Parking and Loading

All parking and loading areas shall comply with applicable requirements of the Town of Zebulon UDO Section 5.8. Guest parking shall be constructed for each phase to meet the requirements of that phase, and the total number of guest parking spaces shall exceed the minimum requirement by 76 spaces, which is almost double the requirement.

7.0 Signs

All signage shall comply with applicable standards and requirements of the Town of Zebulon UDO Section 5.11.

8.0 Infrastructure

8.1 Public Water

Public water will be provided via extensions of the existing City of Raleigh water system. Existing water is located in S. Arendell Avenue closer to the Town of Zebulon near Temple Johnson Road. Water infrastructure will be extended from the current terminus and along the site frontage of S. Arendell Avenue and S. Wakefield Street. Infrastructure shall be extended throughout the site as required for development to provide public water to all lots.

8.2 Sanitary Sewer

Public sanitary sewer will be provided via extensions of the existing City of Raleigh sanitary system. A pump station will be constructed on site. Existing gravity sanitary sewer is located north of the site closer to the Town of Zebulon near Temple Johnson Road. The forcemain connection will be made to this existing gravity sewer. The gravity sanitary sewer infrastructure will be extended throughout the site as required.

8.3 Streets and Alleys

All streets shall be in conformance with the Town of Zebulon Transportation Plan and shall be constructed to Town of Zebulon standards and specifications. The project proposes an 70' right-of-way two-lane collector street with on-street parking protected by bump-outs and 10' multiuse paths on either side for additional pedestrian and cyclist safety, and has has been shown on the Master Plan connecting S. Wakefield Street and S. Arendell Avenue. This section will create the connectivity envisioned in the CTP, with a cross section that will fit in the proposed neighborhood. The collector street construction shall follow the phasing of the project. Each section shall be constructed within the phase which it is located.

The ultimate cross section of S. Arendell Avenue is an 80' right-of-way 2-lane median divided roadway. The ultimate cross section of S. Wakefield Street starts as an 80' right-of-way 2-lane median divided roadway that transitions on the south side of the proposed collector street to a 100' right-of way 4-lane median divided roadway. This project shall construct half of the cross-section along the property frontage. The Parks and Recreation Master Plan proposes a greenway along each of these roads. These greenways shall be incorporated as a 10' mixed use path along the roadway in place of a traditional 5' sidewalk.

Alleys shall be located within a 20' right-of-way with 10' of asphalt pavement width.

8.4 Pedestrian Connectivity

Zebulon South has over 6 miles of greenways, multiuse paths, trails, and sidewalks. Sidewalks shall be provided on both sides of all streets throughout Zebulon South PD. Alleys shall not have sidewalks. Multiuse paths will also be provided on Wakefield St and S Arendell Ave, and will connect the greenway to Wakefield St. Multiuse paths are provided on both sides of Road A. The neighborhood sections shall also be connected for pedestrians by several 6' paved private trails, which will include at least three (3) exercise stations along the trails.

The public greenway shown on the Town's Comprehensive Transportation Plan shall be constructed through the site along the north side of the development. A private trail shall connect the sidewalk system to the public greenway approximately as shown on the Master Plan.

9.0 Stormwater Management

The proposed development will meet all applicable requirements and standards as outlined in the Town of Zebulon Street and Storm Drainage Standard and Specifications Manual. Zebulon South PD will meet all stormwater quantity and quality reduction requirements. Proposed stormwater control measures (SCMs) will typically consist of wet ponds and other approved measures. SCMs will be located within open space areas and be maintained by the HOA. At least one stormwater control pond shall contain a fountain. At least seventy-five percent (75%) of any required plants in the Stormwater Control Measure ponds, excluding grasses, shall be pollinator plants such as native milkweeds and other nectar-rich flowers.

10.0 Natural Resources and Environmental Data

The development site consists mostly of agricultural fields along with wooded areas surrounding the streams, wetlands and existing pond.

Existing streams and wetlands have been delineated and buffered as required by Town, State and Federal agencies. The site is located within the Neuse River Basin. Any impacts requiring permits shall be obtained and permitted through the Town of Zebulon, NC Division of Water Resources and US Army Corps of Engineers as applicable.

No special flood hazard areas are located onsite per FEMA FIRM Map 3720270500k & 3720270400L dated 7/19/2022.

11.0 Pocket Parks and Open Space

Active and passive open spaces and recreational features will provide the residents with excellent on-site amenities. An integrated system of walking trails traverses open space and environmentally sensitive areas providing a unique amenity for the development. The development provides over eleven acres of open space, including over five acres of active open space. An on-site swimming pool and clubhouse provide pedestrian accessible amenities for the residents of the development.

Pool:

- Minimum 1,000 square foot water surface area

Clubhouse:

- No meeting space, bathrooms and changing rooms only

Tot Lot:

- Minimum 600 square feet including ASTM fall zones
- IPEMA Certified Playground Equipment
- Target age: 2-12 years

Yard Games:

- At least one amenity area shall provide a yard game, such as cornhole or outdoor ping pong
- Target age: 12+

Dog Park:

- Minimum 6,000 square feet of fenced area
- Fence shall be a minimum of 4’ tall galvanized or vinyl-coated chain link fence
- Shall include a minimum of two benches, one trash can and one dog waste station

Pocket Park:

- Minimum of 8,000 square feet of area for multi-purpose play
- May include benches, paths, trashcans and enhanced landscaping
- Located adjacent to the greenway, along the Arendell/Wakefield St connector
- Pollinator Garden

Private Trails:

- Minimum 6' wide paved trail connecting from sidewalk system to Public Greenway as illustrated on Master Plan. At least two (2) dog waste stations and three (3) exercise stations will be provided along trails.

12.0 Homeowner's Association

Prior to the issuance of the first certificate of occupancy for the development, a Homeowner's Association (HOA) shall be formed to govern the affairs of the development. The HOA shall be responsible for maintaining the common areas of the development including any shared stormwater facilities, landscaping, hardscape structures (such as signage, irrigation, lighting, and fountains) and recreation amenities. The Homeowners Association shall appoint one resident to the advisory board at 25% resident occupied, one resident at 50% occupied and one resident at 75% occupied.

13.0 Residential Lot Landscaping

Individual residential lots shall be landscaped per Town of Zebulon UDO for foundation plantings and site landscaping.

Foundation plantings consisting of evergreen shrubs or decorative grasses with a minimum heigh of 18 inches shall be located within 10 feet of any foundation wall visible from a public street excluding alleys. Shrubs shall maintain a maximum on-center placement of three feet.

Site landscaping consisting of one canopy tree for every 2,000 square feet of lot area is required. Canopy trees may be located anywhere within the residential lot except where limited by easements, sight distance triangles or buffer areas.

HVACs and ground-based mechanical equipment shall be screened utilizing evergreen shrubs on sides visible from a public street.

14.0 Consistency with Comprehensive Plan and Land Use Map

Zebulon South PD is consistent with the Town of Zebulon Comprehensive Plan and Land Use Map goals and objectives. The development is located in SR and GR land use categories where PD zoning is a recommended land use type particularly where a mix of housing types and varying densities is proposed.

Proposing both single-family detached and attached product supports the Town's desire for a variety of housing types and price points. This draws new residents and provides additional housing choices for existing residents.

The site design incorporates in a variety of lot sizes supporting the goal of increasing a diverse housing stock for the Town. The variety ensures additional housing choices as well as a variety of price points.

Providing more concentrated development while preserving environmentally sensitive areas and perimeter buffers provides a transition to the existing single-family homes and agricultural properties adjacent to the development.

The integrated system of streets, sidewalks, trails and greenways provide a cohesive pedestrian and vehicular network adhering to the Town's Comprehensive Transportation Plan and provided a thoughtfully planned neighborhood.

15.0 Compliance with the UDO

This Master Plan shall be the primary governing document for the development of Zebulon South PD. All standards and regulations in this Master Plan shall control over general standards of the UDO. Provided, however, that if a specific regulation is not addressed in this Master Plan, UDO regulations shall control. Zebulon South PD will comply with all other relevant portions of the Town of Zebulon Unified Development Ordinance.

16.0 Preliminary Residential Plan Review

Pursuant to UDO Section 3.5.5.B.4, the applicant requests an exemption from subsequent residential preliminary plan review. This PD includes a master plan that is detailed and meets the requirements for a residential preliminary plan. Therefore, upon approval of this PD, the applicant shall be exempt from subsequent residential preliminary plan review.

17.0 Additional Zoning Conditions

In addition to conditions contained throughout the visual and written document, additional written voluntary conditions have been offered to ensure a quality development.

1. Uses shall be limited to single family detached, single family attached, and accessory uses as permitted in the R6 zoning district.

2. Minimum driveway stem length shall be 20'.

3. Single family detached rear load lots shall have a minimum lot size of 4,800 sf.

4. Single family detached front load lots shall have a minimum lot size of 6,000 sf.

5. Single family attached lots shall have a minimum lot size of 1,260 sf.

6. The minimum lot width for front loaded lots shall be 50' reduced from 70'.

7. All single family detached rear loaded homes shall have a sidewalk connection from the front door or porch to the public sidewalk.

8. The clubhouse and pool shall be completed before the 150th Certificate of Occupancy for any dwelling is issued.

9. Zebulon South will apply a maximum 35% impervious requirement for the development as a whole (based on total acreage).

10. The applicant commits to provide a minimum 15% Tree Save, three times the minimum requirement.

11. All planned improvements to roadways and right-of-way owned and maintained by the NC Department of Transportation (NCDOT), including improvements that require off-site property acquisition and/or easements, are subject to NCDOT approval during subsequent phases of development. If any improvements are not approved by NCDOT, alternative designs may be administratively approved by Town staff.

12. If a bus pickup location is approved by Wake County Public Schools in the neighborhood, one bust stop area, including a shelter, a bench, a trash can, and at least 5 bicycle spaces shall be provided with the second phase of development.

13. To support community gatherings and active neighborhoods, the applicant commits to providing one neighborhood congregation area, to include:

    a. a minimum of two (2) larger parking spaces designed for food trucks or delivery vehicles (mobile vendors), with an electrical outlet available;
    b. one (1) covered seating area with at least 10 designated public seating spaces will be provided adjacent to the Mobile Vendor spaces.
    c. at least one (1) outdoor grill will be provided adjacent to the covered seating area,

    This area may be classified as active open space under UDO § 5.7.

14. The development shall include a minimum of three (3) affordable single-family detached ownership units (the "Affordable Units"), which shall be located on different streets in the neighborhood. The Developer shall vet qualified buyers for the Affordable Units and shall ensure, in the first sale of the Affordable Units, that they are affordable households earning no more than eighty percent (80%) of the Area Median Income (AMI). Prior to Subdivision closeout, the Developer shall submit documentation of compliance with this zoning condition. Following the first sale of each of the Affordable Units, Developer shall have no further obligations under this condition.

15. Final alignment of the greenway will be reviewed and approved by TRC during construction drawings.

16. Unless not approved by Wake County, the grave site(s) located at 0 N Arendell Ave (PIN 2705513114) shall be relocated prior to approval of construction drawings.

18.0 Fire Station Land Dedication

The owner shall designate, for the benefit of the Town, a minimum of 2 acres of land (including any existing and future right-of-way) located on Hwy 96/Arendell Ave abutting the property lines of Wake County PINs 2705410911 (Deed book 16651/page 25) and 2705520074 (Deed book 9289/page 1838) for the future development of a Town of Zebulon Fire Station (the "Fire Station Land"). The location of the Fire Station Land is identified on the Master Plan, and the surveyed boundary line will be identified and approved by the Town prior to Final Plat approval for the phase of development adjacent to the Fire Station Land. After approval of the boundary line, but no later than the approval of the Final Plat for the phase of development adjacent to the Fire Station Land, the developer shall dedicate to the Town an easement (or superior title) by deed or other instrument, approved by the Town Attorney as to form, for the Fire Station Land. The actual design, construction, and installation of the fire station and associated amenities, or other permitted public use as determined by the Town, shall be done by the Town, or another public entity and are not commitments of this zoning case. This zoning condition may also be satisfied by the Town Manager, or his/her designee, stating, in writing, that the Town does not wish to accept the land for the development of a fire station or other public use.

19.0 Transportation Impact Analysis Summary

A Traffic Impact Analysis (TIA) was conducted by the Timmons Group in accordance with the Zebulon (Town) Unified Development Ordinance (UDO) and the North Carolina Department of Transportation (NCDOT) capacity analysis guidelines. A full copy of the TIA was submitted for review and approval with the PD submittal, and a voluntary additional analysis incorporating anticipated traffic from the nearby recently-approved Chamblee Lake PD was submitted for review and approval with the applicant's final master plan submittal. The listed recommended improvements are subject to further review and final approval by NCDOT.

Study Area

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

- NC 96 and Site Access #1
- NC 96 and Site Access #2
- S Wakefield St and Site Access # 3
- NC 97 and S Wakefield St
- NC 97 and NC 96
- NC 96 and W Barbee St
- NC 96 and Perry Curtis Rd

Recommended Improvements

Based on the analysis of the TIA (including improvements to be installed by the Chamblee Lake development), the following improvements have been recommended to be constructed by the developer to both mitigate traffic impacts by the proposed development.

NC 96 and Site Access #1

- Site Access 1 to include a two-lane cross-section with one eastbound egress lane and one westbound ingress lane.
- Provide stop control on the eastbound approach of the site drive.
- Construct a southbound right-turn lane on NC 96 with a minimum of 50 feet of full-width storage and appropriate deceleration and taper.
- Construct a northbound left-turn lane on NC 96 with a minimum of 100 feet of full-width storage and appropriate deceleration and taper.

NC 96 and Site Access #2

- Site Access 2 to include a two-lane cross-section with one eastbound egress lane and one westbound ingress lane.
- Provide stop control on the eastbound approach of the site drive.
- Construct a southbound right-turn lane on NC 96 with a minimum of 50 feet of full-width storage and appropriate deceleration and taper.
- Construct a northbound left-turn lane on NC 96 with a minimum of 100 feet of full-width storage and appropriate deceleration and taper.

Wakefield St and Site Access #3

- Site Access 3 to include a two-lane cross-section with one westbound egress lane and one eastbound ingress lane.
- Provide stop control on the westbound approach of the site drive.
- Construct a southbound left-turn lane on Wakefield Street with a minimum of 50 feet of full-width storage and appropriate deceleration and taper.

ZEBULON
NORTH CAROLINA

MUNICIPAL UTILITY ALLOCATION POLICY

Statement of Purpose and Goals

Introduction

Drinking water supplies throughout the greater City of Raleigh distribution system are finite, subject to disruption by drought and/or other calamity and Zebulon's allocation is contractually limited. The Town staff, the Planning Board, and the Board of Commissioners have given a great deal of thought and study as to the best utilization of this valuable resource to benefit current and future citizens.

The Town of Zebulon's municipal water and sewer capacity is a valuable resource that must be conserved and apportioned to new development projects that promote the Town's policy of ensuring a diversified tax base and housing supply. Such an allocation policy will tend to promote diversity of housing available to a wide cross section of citizens of diverse socio-economic backgrounds and promote economic viability and sustainability by providing for retail and other commercial development within the Town of Zebulon.

In order to preserve and enhance property values, manage its limited water supply as a vital natural resource, promote economic development, and incentivize smart growth practices, the allocation of Zebulon's potable water capacity shall hereafter be in accordance with this policy.

Land Use and the Tax Base

The local government expense of providing fire and police protection, schools, parks, social services, water and sewage systems and other essential public services to residential neighborhoods is generally greater than the ad valorem tax revenue generated by such neighborhoods. On the other hand, the cost of providing services to commercial and industrial development is generally less than the tax revenue accruing to the local government. Having a predominantly residential tax base would require the Town of Zebulon over time to assess a higher tax levy to raise funds to provide essential services or to reduce the level of public services provided. This is one reason among many why local governments including Zebulon strive to achieve a balance of both residential and non-residential growth.

Zebulon's historical development is transitioning from industrial to residential, leading to a current tax base of approximately 40% residential and 60% commercial/industrial. The following table shows Zebulon's tax base over the past five years [1]

Zebulon Tax Base (Past Five Years)

Fiscal Year	Commercial	Residential
2021-2022	60%	40%
2020-2021	65%	35%
2019-2020	72%	28%
2018-2019	73%	27%
2017-2018	71%	29%

[1] "Tax Base Components | Wake County Government," *Wake County North Carolina*, https://www.wakegov.com/departments-government/tax-administration/data-files-statistics-and-reports/tax-base-components

As shown in the table above, the residential tax base has steadily increased proportionally over the past five years. This trend in the tax base data, combined with the vested planned residential development in the coming years, demonstrates the need for the Town to address this shift through policy. The Zebulon Board of Commissioners believes that it is fiscally responsible and otherwise in the public interest to promote and encourage non-residential development in the jurisdiction as an alternative to rapid residential development to keep the ratio between the two development types well balanced. A goal of maintaining a tax base of 60% residential and 40% commercial/industrial is hereby established.

Development Goals for the Full Build-Out of Zebulon

Communities without a wide variety of housing types and styles also put pressure on the Wake County Public School System which remains committed to having students of a wide range of socio-economic backgrounds attend each local school. In addition to the goal of maintaining a balanced tax base, the Town of Zebulon is committed to achieving a balance of housing types within its jurisdiction.

This commitment is consistent with both the Town's Strategic Plan and Comprehensive Plan. The *Town of Zebulon: Vision 2030 Strategic Plan* lists "Growing Smart" as one of its three focus areas, calling for the planning of appropriate land uses and affordability of the community. The *Grow Zebulon Comprehensive Land Use Plan* identifies six guiding principles for the town. Two of those principles are "Zebulon will be BALANCED" and "Zebulon will be PRUDENT." A balance should be achieved for the Town's tax base, its land uses, and its housing types to allow for an affordable community with employment and business opportunities that will help the community prosper. The achievement of balance in Zebulon will contribute to the Town being prudent. As stated previously, a local government's cost of providing services to commercial properties is generally less than that of residential properties. Having a balanced tax base that is not proportionally over-saturated with residential properties will contribute to keeping the Town financially sound.

Below are three development goals that are integral to the utility allocation policy and the future of the Town. These development goals apply to the entire, future Zebulon jurisdiction including the ETJ, short-range and long-range urban service areas.

GOAL #1: Maintain 60%-40% ratio of residential to non-residential tax values.

Upon Adoption-January 2021
60% Residential - 40% Non-Residential

GOAL #2: Residential Housing Percentage Breakdown
SFD|TH|MF – 75%|10%|15% (Note – Duplex counted as MF)

Upon Adoption-January 2021
80.5% | 0.5% | 19%

GOAL #3: Encourage Mixed Use Development to improve pedestrian connectivity to non-residential activity.

Policy and Procedures

Water Allocation

All existing parcels of real property within the corporate limits of Zebulon, regardless of proposed acreage, shape, or location as of the adoption of this ordinance are entitled to **115 gallons per day** of water allocation to build and sustain a single family or a limited business or commercial use. No additional water allocation will be awarded for proposed development except in accordance with the requirements of this policy.

Wastewater Connection

All projects considered for utility allocation must provide a wastewater system connection with adequate receiving capacity, as determined by the Wake County Health Department and/or City of Raleigh Public Utilities Department and approved by the Town of Zebulon Planning Director.

General Conditions & Requirements

- All proposed projects must be within the existing corporate limits or have filed a valid and complete petition for Voluntary Annexation.
- All proposed projects under consideration must have a complete application submitted for the appropriate Master Plan, Subdivision, Site Plan, Special Use Permit, Conditional Zoning Request, Zoning Compliance Permit, Building Permit, or any other necessary approval.
- All projects are subject to a Utility Allocation or Developer's Agreement approved by the Town's Board of Commissioners. If the Developer/Applicant fails to meet all terms of that agreement the unused allocation will be reclaimed, no new building permits will be issued, and no new connections to the water or wastewater systems will be permitted. Active building permits will have certificates of occupancy held until mitigating measures are agreed to by all parties.
- Projects with proven vested rights upon adoption of this ordinance will be permitted to finish their projects as previously approved.
- Public water may be utilized for irrigation purposes so long as the Primary Use associated with the site has previously gained water allocation through the Town.
- Any third parties who buy land to build upon are bound by the approved Utility Allocation Agreement or Development Agreement for that property. If the agreement is not fulfilled, the above terms and conditions still apply regardless of who owns the land.

Compliance Required

This policy allocates municipal water in gallons per day for new development proposals, master plans, site plans, building plans, and/or structures seeking construction approval. Each phase of a phased development must comply with the terms and development schedule of an approved Utility Allocation Agreement before the next phase can begin or the development risks loss of previously reserved allocation.

Previously dedicated but unused allocation can be reclaimed by the Town's Board of Commissioners for:

(1) the lack of compliance with any existing Utility Allocation or Developer's Agreement;

(2) violation of applicable town policy provision, ordinance standard, condition of approval;

(3) violation of federal or state regulation; or

(4) other good cause.

Utility Allocation Application Process

Upon receiving a new development proposal requesting water capacity, the Planning Staff shall direct the Developer/Applicant to demonstrate the project's qualifications. A Developer/Applicant shall state on the appropriate application, and stipulate within an approved Utility Allocation Agreement, the use or uses proposed to be built as part of the project along with the construction design and materials. Town action on the request will be deferred until the application is complete and the requested information has been provided.

Proposed projects shall complete the UTILITY ALLOCATION WORKSHEET according to its instructions to determine the total number of points achieved. The Utility Allocation Application package will be reviewed for completeness and compliance by the Technical Review Committee (TRC) in conjunction with the applicable development approval for the subject property (conditional rezoning, planned development, site plan, etc.).

Qualification for water allocation is judged by:

- The level of developer investment
- Anticipated increases in the Town's ad valorem tax base
- Construction and dedication of public infrastructure
- Provision of employment opportunities for Zebulon citizens
- Provisions of diversified housing stock
- Preservation of open space
- Protection of existing tree canopy
- Conservation of existing habitat
- The provision of recreational amenities for current or future Zebulon residents

Projects must be awarded **60 TOTAL POINTS** or more to merit water allocation.

Points are awarded in two categories, BASE POINTS and BONUS POINTS. BONUS POINTS are broken down into six categories.

1. Nonconformity Abatement and Public Infrastructure Improvements
2. Green Development Standards
3. Gateway and Transit Improvements
4. Amenities
5. Affordable Housing
6. Other

Unless a project can gain all necessary BONUS POINTS from a single improvement identified in the approved list, improvements must be made from at least two of the categories of BONUS POINTS.

All features and/or improvements that earn a projects BONUS POINTS must be clearly shown on a development plan for each application type.

Expiration of Allocation Award

A developer/applicant who has secured allocation according to this policy and hasn't progressed in construction plan approval, building permit approval, or on-site construction for a period of 12 months will lose the award of allocation without benefit.

Annual Review of Policy & Appeals

This policy shall be reviewed in January of each year and, when appropriate, readjusted by the Town's Board of Commissioners. The Town's overall progress on policy goals will be considered and the multipliers and/or point thresholds readjusted accordingly.

Appeals of any provision of this ordinance shall be decided upon by the Town's Board of Commissioners upon receiving a recommendation from the Planning Board.

BASE POINTS: List of Preferred Land Uses and Required Characteristics:

The uses listed below have been determined to be the most desirable and important uses for the Town of Zebulon to promote and maintain economic and housing diversity. Only projects that completely meet the stated performance characteristics will be considered for utility allocation. Please select one of the following Base Point classifications.

60 Base Points	**Single Family Homes (Expedited Subdivision or Recombination)** Newly constructed Single Family Homes built upon new lots created via the minor subdivision, exempt subdivision, expedited subdivision (3 or fewer lots) or recombination process.
60 Base Points	**Change of Use** This category captures renovation, rehabilitation, up-fit or retrofit of existing buildings or portions of buildings that pre-date this policy and require a code summary sheet, change in building occupancy, certificate of occupancy, building permit and/or building inspections and do not increase the utility demand from the previous use of the building.
45 Base Points	**Business Office/Finance/ Insurance / Professional Services Center - Large** Qualifying projects must exceed 100,000 square feet of heated floor space and create at least 150 employment positions that exceed the average annual Wake County salary according to Wake County Economic Development or the Employment Security Commission. Employees perform professional, scientific, and technical services for others. Such services require a high degree of expertise and training and provide high salaried employment opportunities. Examples include software engineering, legal, medical, accounting, consulting, architectural, biomedical, chemical, research and development, and administrative services. Finance or Insurance Centers shall also pool financial risks by underwriting insurance and annuities. Some establishments support employee benefit programs. Examples include bank or credit union headquarters, brokerages, investments, insurance, financing, and data processing establishments.
45 Base Points	**Manufacturing/Industrial Employment Center** Manufacturing or Industrial establishments in this category exceed 200,000 square feet of floor space located in plants, factories, or mills and employ power-

	driven machines and materials-handling equipment. They may also employ workers who assemble or create new products by hand, without the characteristic machinery-intensive enterprise. Many manufacturing establishments process products of agriculture, forestry, fishing, mining, or quarrying as well as products of other manufacturing establishments. Most manufacturing establishments have some form of captive services (e.g., research and development, and administrative operations, such as accounting, payroll, or management) in conjunction on-site.
45 Base Points	**Governmental Uses/Public Administration** This category encompasses centers for all government functions; it includes federal, state, and local government agencies that administer, oversee, and manage public programs and budgets and have executive, legislative, or judicial authority. Establishments develop policy, create laws, adjudicate civil and criminal legal cases, and provide for public safety and national defense.
40 Base Points	**Single Use Retail** Newly constructed single use, stand-alone building used primarily for retail, restaurant, or similar commercial use.
40 Base Points	**Hotels, Motels, or other Accommodation Service Establishments** This category serves lodging and short-term accommodations for travelers. They may offer a wide range of services, from overnight sleeping space to full-service hotel suites. They may offer these services in conjunction with other activities, such as entertainment or recreation. Stays in these establishments are generally less than one month. This classification does not include boarding or rooming houses.
40 Base Points	**Arts/Entertainment/Museums** These establishments operate facilities or provide services for a variety of cultural, entertainment, and performing art functions. Establishments include those that produce, promote, or participate in live performances, events, or exhibits intended for public viewing; those that preserve and exhibit objects and sites of historical, cultural, or educational interest; and those that operate facilities or provide services to serve activities associated with the aforementioned.
40 Base Points	**Amusement, Sports or Recreational Establishment** Establishments in this category operate either indoor or outdoor facilities offering family activities (i.e. sports, recreation, or amusement) and provide services, such as facilitating amusement in places operated by others, operating recreational sports groups and leagues. Examples include golf courses, indoor sports venues, bowling alleys, miniature golf courses, athletic clubs, skating rinks and arcades. This category may be used in conjunction with a commercial or residential development as a mixed use development.
40 Base Points	**Mixed Use Development (Transit Oriented)** Newly constructed or substantially rehabilitated collection of vertically mixed retail, office and residential uses in multi-story buildings centered within a one-half mile radius of an existing rail or bus transit station or the intersection of

	Horton Street and North Arendell Avenue in Downtown Zebulon. In order to qualify as mixed use, developments must dedicate at least one-third of the total heated square footage to residential use and the remainder to a mix of retail and office uses. All three use types must be represented and at least 10% of the heated square footage must be dedicated to street level, storefront retail uses.
40 Base Points	**Mixed Use Development (Urban Infill)** Newly constructed or substantially rehabilitated collection of mixed retail, office and residential uses in a multi-story building on a previously developed parcel within the corporate limits. In order to qualify as mixed use, developments must dedicate at least one-third of the total heated square footage to residential use and the remainder to a mix of retail and office uses. All three use types must be represented and at least 10% of the heated square footage must be dedicated to street level, storefront retail uses.
40 Base Points	**Mixed Use Development (Greenfield)** Newly constructed collection of mixed retail, office and residential uses in a multi-story building or buildings on a previously undeveloped parcel. In order to qualify as mixed use, developments must dedicate at least one-third of the total heated square footage to residential use and the remainder to a mix of retail and office uses. All three use types must be represented and at least 10% of the heated square footage must be dedicated to street level, storefront retail uses.
35 Base Points	**Housing Services for the Elderly Establishments** This category offers housing services for the aged, not requiring a license from the North Carolina Department of Health and Human Services, such as independent retirement housing, multi-unit assisted housing with services (MAHS), and continuing care retirement centers. All facilities must provide, but not necessarily be limited to, the following services/facilities: On-site laundry facilities, on site management, guaranteed transportation services at least four days per week, on-site exercise facilities, on-site computer access, and a clubhouse/common lounge area for all residents.
35 Base Points	**Mixture of Use Development (Retail/Office-Institutional/Commercial)** Newly constructed collection of horizontally arranged uses including retail, office-institutional and commercial within a master planned project on a previously undeveloped parcel or parcels totaling at least 10 acres. Mixture of use projects must include at least two (2) use types with at least 25% of the space devoted to each use type included in the development.
30 Base Points	**Retail/Commercial Center** Newly constructed center of at least 50,000 square feet, typically containing an anchor such as a grocery store and other smaller spaces and/or outparcels for subordinate uses. Uses are entirely consumer-driven and include all manner of retail, service and office possibilities.
30 Base Points	**Business Office/Finance/ Insurance / Professional Services Center – Medium** Qualifying projects must exceed 50,000 square feet of heated floor space and create at least 75 employment positions that exceed the average annual Wake County salary according to Wake County Economic Development or the

	Employment Security Commission. Employees perform professional, scientific, and technical services for others. Such services require a high degree of expertise and training and provide high salaried employment opportunities. Examples include software engineering, legal, medical, accounting, consulting, architectural, biomedical, chemical, research and development, and administrative services. Finance or Insurance Centers shall also pool financial risks by underwriting insurance and annuities. Some establishments support employee benefit programs. Examples include bank or credit union headquarters, brokerages, investments, insurance, financing, and data processing establishments.
30 Base Points	**Business Office/Finance/ Insurance / Professional Services Center – Small** Qualifying projects 50,000 square feet of heated floor space or less. Employees perform professional, scientific, and technical services for others. Such services require a high degree of expertise and training and provide high salaried employment opportunities. Examples include software engineering, legal, medical, accounting, consulting, architectural, biomedical, chemical, research and development, and administrative services. Finance or Insurance Centers shall also pool financial risks by underwriting insurance and annuities. Some establishments support employee benefit programs. Examples include bank or credit union headquarters, brokerages, investments, insurance, financing, and data processing establishments.
30 Base Points	**Multi-Tenant Retail Center** Newly constructed center 50,000 square feet or less, typically containing a more than one tenant space within a single structure. Uses are entirely consumer-driven and include all manner of retail, service and office possibilities.
30 Base Points	**Single Use Office** Newly constructed single use, stand-alone building used primarily for office and professional.
30 Base Points	**Bungalow Court or Pocket Neighborhood** Newly constructed Bungalow Court or Pocket Neighborhood per the standards of the Unified Development Ordinance.
30 Base Points	**Distribution/Trucking Center** Newly constructed center of at least 500,000 square feet where products and resources are transported to and delivered from via truck or rail.
25 Base Points	**Warehouse** Newly constructed center of at least 500,000 square feet where products and resources are stored.
25 Base Points	**Religious Institutions** Any facility such as a church, temple, synagogue, mosque or monastery used for worship by a non-profit organization and their customarily related uses.
20 Base Points	**Intensive Industrial Uses:** Uses classified as Special Land Uses within the Industrial Classification.

20 Base Points	**Multi-Family Residential & Condo Units**
20 Base Points	**Major Subdivision 4- 25 Lots** Any subdivision of land of four (4) – 25 Lots.
10 Base Points	**Major Subdivision 26 lots or more** Any subdivision of land of 26 or more lots. 10
Board Determination	**All Other Uses Not Categorized** This category of use captures all other uses not categorized elsewhere. Allocations for such uses are left to the discretion of the Town's Board of Commissioners upon recommendation of the Planning Board and acted on a case-by-case basis.

BONUS POINTS

Proposed projects can gain BONUS POINTS by agreeing to provide any of the following items over and above the UDO or Standard Specification requirements for their development proposal.

NOTE: No bonus points are given for UDO requirements.

CATEGORY 1 – Non-Conformity Abatement and Public Infrastructure Improvements

Section 1A - Abatement of Nonconformities		(Max - 3 points)
	Abatement of any existing non-conforming structures	3
	Abatement of any existing non-conforming use of land	2
	Abatement of any existing non-conforming lots	1

Section 1B - Roadway Infrastructure Not Warranted by TIA/UDO/CTP		(Max - 10 points)
	Construction of full cross section of existing off-site public street	5
	Nearby intersection improvements	5
	Traffic signal improvements	4
	Signage or striping improvements	1

Section 1C - Off-Site Public Greenway Improvements		(Max - 10 points)
	Construct more than 4000 linear feet of 10-foot-wide path	10
	Construct more than 3000 linear feet of 10-foot-wide path	8
	Construct more than 2000 linear feet of 10-foot-wide path	6
	Construct more than 1000 linear feet of 10-foot-wide path	4
	Construct 500 to 1000 linear feet of 10-foot-wide path	2

Section 1D – Off-Site Bike-Ped Improvements		(Max – 5 points)
	Construction of off-site sidewalk improvements (Subject to TRC Approval)	2
	Construction of off-site bike lane improvements (Subject to TRC Approval)	3

CATEGORY 2. Green Development Standards/ Building & Site Design

Section 2A - Conservation of Natural Habitat Meeting Active Open Space Requirements as Defined in the UDO		(Max - 10 points)
	One point per acre up to 10 acres	1 - 10

Section 2B - Parking		(Max – 15 points)
	Structured Parking Facilities - must reduce footprint by 20%	10
	EV Charging Stations (two-port)	5
	Provision of on-street public parking (1 point per stall up to 10 Max)	1 - 10 10

Section 2C - Stormwater SCM's		(Max – 10 points)
	Stormwater - Restored Riparian Buffer	10
	Construct a fountain or other stormwater amenity within the BMP/SCM (as approved by Staff)	4 4
	Stormwater - Landscaped Green Roof	5
	Stormwater - Underground capture system for on-site irrigation	5
	Stormwater - Bioretention	5
	Stormwater - Wetland	5 5
	Exclusive use of porous pavement in parking areas where suitable	2

Section 2D - Building/Site Design		(Max - 20 points)
	Compliance with residential design guidelines per Section 5.2 of the UDO	10 10
	Non-Residential building design that incorporates an active upper story.	5
	Pedestrian oriented and walkable site design which promotes alternatives to vehicular travel within the development. (Subject to TRC Approval)	5

Section 2E - Infill/Redevelopment		(Max – 16 points)
	Development or Redevelopment within DTC	10
	Development or Redevelopment within DTP	6
	Redevelopment of previously vacant building space over 20,000 square feet	6
	Redevelopment of previously vacant building space under 20,000 square feet	5

Section 2F - Historic Preservation		
	Historic Structure Preservation via Deed Restriction (Determined by TRC)	10
	Restoration of Historic Structure (Must be approved by TRC)	5

Section 2G – LEED Certification		(Max – 10 points)
	LEED Certification for Neighborhood Development (LEED ND)	10
	Platinum LEED Certification	10
	Gold LEED Certification	8
	Silver LEED Certification	6
	Bronze LEED Certification	4
	LEED Certified Certification	2

CATEGORY 3 – Outdoor Enhancement and Transit Improvements

Section 3A – Outdoor Enhancement		(Max – 12 points)
	Construction of a Parkway Street Section on a Collector level street	5

	Construction or Preservation of Gateway Landscaping or Structure (Subject to Comprehensive Plan Consistency and TRC approval)	5
	Outdoor Display of Public Art (Subject to TRC Approval)	4
	Public Facing Outdoor Mural (Subject to TRC Approval)	4
	Maintenance of Roadside Gateway Plant Bed (requires maintenance agreement)	3
	Planting Pollinator Garden (225 Square Foot Minimum)	3 3
	Exclusive use of xeriscaping techniques and drought tolerant species	3
	Enhanced Roadside Landscaping (Subject to TRC Approval)	2
	Enhanced Buffer Landscaping (Subject to TRC Approval)	2
	Construction of a Parkway Street Section on a Local level street	2
	Installation of Native Shade Tree Species (per Tree up to 10 Trees)	1 9

Section 3B – Transit (Pursuant to location being adjacent to a planned or active transit route)		(Max - 8 points)
	Provision of more than 50 designated Park & Ride Stalls	8
	Provision of 25 designated Park & Ride Stalls	5
	Provision of 10 designated Park & Ride Stalls	3
	Provision of mass transit easement w/ structure (bus stop with shelter & bench)	2

CATEGORY 4 - Amenities

Section 4A - Private Greenway		(Max - 3 points)
	Construction of more than 3000 linear feet private greenway meeting Town of Zebulon standards	3
	Construction of more than 2000 linear feet of private greenway meeting Town of Zebulon standards	2 2
	Construction of more than 1000 linear feet of private greenway meeting Town of Zebulon standards	1

Section 4B – Pool (Combinations may be approved by TRC)		(Max - 8 points)
	Olympic Pool and Aquatic Center	8
	Junior Olympic Pool	5
	Lap Pool (four lane minimum)	3
	Resort Style Pool	2 2
	Any Other Pool	1

Section 4C - Outdoor Deck/Patio		(Max - 3 points)
	Deck/Patio - More than 3000 square feet	3
	Deck/Patio - More than 2000 square feet	2
	Deck/Patio - More than 1000 square feet	1 1

Section 4D - Pool Amenities	(Max - 2 points)

	Jacuzzi/Hot Tub/Whirlpool	2
	Water Playground with apparatus	2
	Sauna/Steam room	2

Section 4E - Clubhouse		(Max - 10 points)
	Commercial Coffee Shop with at least 10 designated public seating spaces.	10
	With full kitchen and over 4000 square feet of meeting space	10
	With full kitchen and less than 4000 square feet of meeting space	9
	Meeting space without kitchen more than 3500 square feet	8
	Meeting space without kitchen 2500 - 3499 square feet	7
	Meeting Space without kitchen 1500 - 2499 square feet	5
	Meeting Space without kitchen less than 1500 square feet	4
	No meeting space, bathrooms and changing rooms only	3 3
	Outdoor Kitchen or Grills	2 2

Section 4F - Additional Active Recreation		(Max - 10 points)
	Gymnasium (regulation size indoor basketball court)	10
	Baseball/Softball Field (regulation size)	5
	Football/Soccer Field (regulation size)	5
	Skate Park	5
	Tennis Courts (two regulation courts, fenced)	5
	Multi-Use Hardcourt (two regulation basketball courts, street hockey, fenced)	5
	Pickleball Court (three regulation courts, fenced)	5
	Pocket Park – 5,000 square feet	3 3
	IPEMA Certified Playground Equipment	4 4
	Lighted Field of Play for nighttime use	3
	Electronic Scoreboard or Covered Dugouts or Bleachers	3
	Community Garden – 15-foot by 15-foot, with water access and potting shed.	3

Section 4G – Additional Urban Open Space Enhancements (Within Non Residential Zoning Districts)		(Max – 10 points)
	Fountain	2
	Canopy Including Fixed Permanent Seating	2
	Drinking Fountain with Pet Fountain	2
	Permanent Game Tables	1
	Permanent Tables with Shade Cover	1
	All Weather Bulletin Board	1
	Covered or Internal Bicycle Parking	1
	Artist-Design Bicycle Racks	1
	Little Free Library	1
	Drinking Fountain	1
	Public Work Bike Stand With Tools	1

CATEGORY 5 – Affordable Housing

Inclusion of a percentage of the provided housing stock of a proposed development cost no more than 30% of a household income not exceeding 80% of the Area Median Income (AMI)		(Max – 10 Points
	15% Affordable Housing	10
	10% Affordable Housing	5

CATEGORY 6 – Other

(Max 5 Points)

	Integrated public safety operation systems (EX. Flock Safety or others as approved by the Police Department)	3
	Smart Waste and Recycling Stations	2

Total 68

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Date: January 23, 2024

To: Adam Culpepper, Senior Planner, Town of Zebulon
Andrew Suriano, Managing Partner, Deacon Development Group
Beth Blackmon, Senior Project Manager, Timmons Group
Jeff Hochanadel, Principal, Timmons Group
Ashley Honeycutt Terrazas, Associate, Parker Poe

From: Sravya Suryadevara, PE, Traffic Engineering Director, WSP USA Inc.

Subject: Zebulon South Supplemental Traffic Impact Analysis Review

---

Per your request, WSP has performed a review of the Zebulon South development traffic impact study resubmitted by Timmons Group, dated January 2024 and the supplemental memo, also dated January 2024. We have the following comments:

- Based on the updated site plan, the number of units has changed for the site since the TIA was completed. Please add a note in the body of the TIA report discussing this change and confirming that the analysis is still valid because it is more conservative than the current site plan.
- Please confirm site access locations in the Build Synchro files matches the site plan. If Site Access 2 is within 165 feet of Perry Curtis Road, this access will need to be right-in/right-out only. This is based on the 2003 NCDOT's Policy on Street and Driveway Access.
- For tables 3-1, 3-2, and 5-1 in the TIA and tables 1 and 2 in the supplemental, please provide a footnote to describe the meaning of the "#" symbol in the queue lengths.
- For tables 3-1, 3-2, 5-1, and 5-2 in the TIA and tables 1 and 2 in the supplemental, please designate which intersections are unsignalized/signalized to aid in the differentiation of queues which are in feet and queues which are number of cars.
- For tables 3-1, 3-2, 5-1, and 5-2 in the TIA and tables 1 and 2 in the supplemental, please add units for queues.
- Include NCDOT comments from July 2022 referenced in section 6 in the appendix of the TIA if available.
- Please add a complete list of recommended improvements to the supplemental memo for clarity, even though the recommendations do not change from the TIA.
- The following comment responses were provided by Timmons Group based on the initial submittal review. Please add these explanations in the body of the TIA report to provide a full picture of the analysis methodology:
    - Include discussion on why count data was not balanced between intersections and why Perry Curtis Road volumes were used for site access 1 and 2.

      TG Response: Traffic volumes were not balanced to the presence of commercial site driveways and various side streets. To provide the most accurate analyses, corridor volumes were not balanced. Site Access 1 and 2 volumes were balanced with Perry Curtis due to the driveways' proximities.
    - Please provide justification for the 3% growth rate used for background volume development.

      TG Response: The 3% growth rate is based on published AADTs.

- In the Build scenario turn lane analysis, it's mentioned that both S Wakefield Street and NC 96 will have 2026 AADTs higher than 4,000 vpd. Please clarify if this is based on the existing AADT value and an assumption of growth or if this is based on the existing AADT including an assumed growth rate.

  TG Response: NC-96's AADT currently exceeds 4,000 VPD. Per future projections, this value is not projected to decrease. S Wakefield Street AADT projections are based on recent AADT counts (grown at 3% annually to 2026) and 30% of daily site trips on S Wakefield Street north of Site Access 3.

- Site access roads are listed as needing 100-feet of IPS. Please ~~define IPS as internal protected stem in the text and~~ reference the standards that guide this recommendation.

  TG Response: ~~IPS was defined as "internal protected stem" in the updated TIA~~. IPS requirements are defined in the NCDOT's Driveway Manual.

- The alignment of the S Wakefield Street/Morphius Bridge and Pully Gordon Road intersection is not ideal for safe operations, but no improvements are required currently.

We do not anticipate any of the above comments to impact the analysis or recommendations in the TIA. If you have any questions about this review, please do not hesitate to contact me at (984) 389-2944 or sravya.suryadevara@wsp.com.

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January 2nd, 2023

Michael Clark
Planning Director
Town of Zebulon
1003 N. Arendell Avenue
Zebulon, NC 27597
919-823-1808
mclark@townofzebulon.org

RE: Zebulon South Memo

Dear Mr. Clark,

This memorandum is a supplement to the Zebulon South Traffic Impact Analysis (TIA). The TIA was initially scoped with the Town of Zebulon (Town) and NCDOT in March 2022. Originally sealed June 28th, 2022, the NCDOT provided final comments on July 26th, 2022. On November 27th, 2023, WSP provided Town comments to Timmons Group. The TIA was updated and resubmitted (sealed January 2nd, 2023). At the time of scoping, there were no approved area developments that would contribute trips during the Background or Build analyses. In the interim, the Chamblee Lake Planned Development TIA was approved. Due to traffic concerns expressed by Town Council and area citizens, the project team determined that additional analyses should be conducted including the proposed Chamblee Lake Planned Development. This memorandum's purpose is to determine 1) the Zebulon South Development site trip impacts to study area intersections (including the Chamblee Lake Planned Development), and 2) if improvement recommendations are changed from the original TIA.

The following intersections were analyzed:

- NC-97 (Gannon Ave) / SR-2349 (South Wakefield Street);
- NC-97 (Gannon Ave) / NC-96 (Arendell Ave);
- NC-96 (Arendell Ave) / SR-2348 (West Barbee Street);
- NC-96 (Arendell Ave) / Site Access 1*;
- NC-96 (Arendell Ave) / Site Access 2*;
- NC-96 (Arendell Ave) / SR-2347 (Perry Curtis Road); and
- SR-2349 (South Wakefield Street) / Site Access 3*.

* Build conditions only

Upgraded 2026 Background and Build + Improvement AM and PM peak hour capacity analyses were performed including the Chamblee Lake Planned Development site trips. As discussed below, it was determined that with the Chamblee Lake Planned Development site trip addition, all study area intersection approaches are projected to perform acceptably. Therefore, no additional improvement recommendations were necessary.

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2026 Background

Table 1 below summarizes the intersection LOS and delay based on existing intersection geometry (see **Figure A**) and the 2026 Background traffic volumes (see **Figure D**). 2026 Background volumes were calculated by summing 2026 ambient traffic volumes (**Figure B –** Zebulon South TIA **Figure 3-1**) and Chamblee Lake Planned Development traffic volumes (**Figure C**^ and **Appendix B**). The corresponding SYNCHRO outputs are located in **Appendix A**. As shown in **Table 1**, all intersection approaches are projected to operate acceptably during both 2026 Background peak hours. Optimized timings were used for all signalized intersection analyses (adhering to NCDOT minimum cycle length requirements).

^ For purposes of analysis (and to be more conservative), it was assumed that all traffic projected along Horton Street turned right onto NC-96 south of NC-97. Traffic was then split between northbound left and through at NC-97. All traffic wishing to travel west (towards US-264) will likely utilize NC-39.

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Table 1: Intersection Approach Level of Service and Delay
2026 Background Traffic Volumes

Intersection	Approach / Overall	AM PEAK HOUR		PM PEAK HOUR		Movement	Turn Lane Storage (ft)	AM PEAK HOUR	PM PEAK HOUR
		Delay [1] (sec/veh)	LOS [1]	Delay [1] (sec/veh)	LOS [1]			*95th Percentile Queue Length	*95th Percentile Queue Length
1: S Wakefield Street & NC-97 (Gannon Avenue)	Eastbound	22.4	C	31.1	C	EB Left	125	10	11
						EB Thru/Right		380	#744
						EB Approach		--	--
	Westbound	13.9	B	11.3	B	WB Left	125	63	72
						WB Thru/Right		265	237
						WB Approach		--	--
	Northbound	31.8	C	46.4	D	NB Left/Thru/Right		199	169
						NB Approach		--	--
	Southbound	23.4	C	31.2	C	SB Left/Thru/Right		35	63
						SB Approach		--	--
	Overall	20.2	C	25.1	C	Overall		--	--
2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue)	Eastbound	33.2	C	38.0	D	EB Left	200	46	73
						EB Thru		367	#336
						EB Right	100	69	100
						EB Approach		--	--
	Westbound	23.6	C	28.4	C	WB Left	350	#238	#276
						WB Thru/Right		166	348
						WB Approach		--	--
	Northbound	40.1	D	38.7	D	NB Left	125	124	96
						NB Thru/Right		#352	#462
						NB Approach		--	--
	Southbound	29.7	C	27.8	C	SB Left	250	36	#77
						SB Thru/Right		203	230
						SB Approach		--	--
	Overall	31.5	C	33.2	C	Overall		--	--
3: NC-96 (Arendell Avenue) & Barbee Street	Eastbound	14.9	B	22.1	C	EB Left/Thru/Right		0.5	1.9
						EB Approach		--	--
	Westbound	14.1	B	16.7	C	WB Left/Thru/Right		0.1	0.2
						WB Approach		--	--
	Northbound	1.0	A	1.0	A	NB Left/Thru/Right		0.1	0.1
						NB Approach		--	--
	Southbound	0.2	A	0.1	A	SB Left/Thru/Right		0	0
						SB Approach		--	--
6: NC-96 (Arendell Avenue) & Perry Curtis Road	Westbound	11.1	B	11.1	B	WB Left/Right		0.6	0.4
						WB Approach		--	--
	Northbound	0.0	A	0.0	A	NB Thru/Right		0	0
						NB Approach		--	--
	Southbound	1.8	A	2.6	A	SB Left/Thru		0.1	0.4
						SB Approach		--	--

[1] *Overall intersection LOS and delay not reported for TWSC intersections.*

* - 95th percentile queues for unsignalized intersections reported in number of vehicles.

2026 Build + Improvements

The Zebulon South trip generation and distribution are located in the Zebulon South TIA (see **Section 4** and **Figure 4-2**, respectively). 2026 Build traffic volumes (see **Figure E**) were calculated by summing the 2026 Background traffic volumes (**Figure D**) and projected Zebulon South site trips (**Figure 4-2** – Zebulon South TIA). **Table 2** below summarizes the intersection LOS and delay based on the future lane configuration (see **Figure F**) and 2026 Build traffic volumes (see **Figure E**). The corresponding SYNCHRO outputs are located in **Appendix A**. As shown in **Table 2**, all intersection approaches are projected to operate acceptably during the 2026 Build + Improvements AM and PM peak hours. Optimized timings were used for all signalized intersection analyses (adhering to NCDOT minimum cycle length requirements). Because all approaches are projected to operate acceptably, no additional study area intersection improvements are recommended.

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Table 2: Intersection Approach Level of Service and Delay
2026 Build + Improvements Traffic Volumes

Intersection	Approach / Overall	AM PEAK HOUR		PM PEAK HOUR		Movement	Turn Lane Storage (ft)	AM PEAK HOUR	PM PEAK HOUR
		Delay [1] (sec/veh)	LOS [1]	Delay [1] (sec/veh)	LOS [1]			*95th Percentile Queue Length	*95th Percentile Queue Length
1: S Wakefield Street & NC-97 (Gannon Avenue)	Eastbound	25.1	C	41.0	D	EB Left	125	10	11
						EB Thru/Right		405	#825
						EB Approach		--	--
	Westbound	15.9	B	12.9	B	WB Left	125	68	90
						WB Thru/Right		287	244
						WB Approach		--	--
	Northbound	35.1	D	54.8	D	NB Left/Thru/Right		#273	#232
						NB Approach		--	--
	Southbound	23.0	C	30.9	C	SB Left/Thru/Right		35	63
						SB Approach		--	--
	Overall	23.0	C	31.9	C	Overall		--	--
2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue)	Eastbound	38.5	D	47.1	D	EB Left	200	48	77
						EB Thru		#439	#389
						EB Right	100	76	121
						EB Approach		--	--
	Westbound	27.9	C	33.2	C	WB Left	350	#268	#321
						WB Thru/Right		185	385
						WB Approach		--	--
	Northbound	41.6	D	40.2	D	NB Left	125	134	106
						NB Thru/Right		#407	#494
						NB Approach		--	--
	Southbound	27.7	C	28.0	C	SB Left	250	36	#83
						SB Thru/Right		200	243
						SB Approach		--	--
	Overall	34.8	C	37.4	D	Overall		--	--
3: NC-96 (Arendell Avenue) & Barbee Street	Eastbound	17.0	C	30.0	D	EB Left/Thru/Right		0.6	2.8
						EB Approach		--	--
	Westbound	16.1	C	20.2	C	WB Left/Thru/Right		0.1	0.2
						WB Approach		--	--
	Northbound	0.9	A	1.0	A	NB Left/Thru/Right		0.1	0.2
						NB Approach		--	--
	Southbound	0.2	A	0.1	A	SB Left/Thru/Right		0	0
						SB Approach		--	--
4: NC-96 (Arendell Avenue) & Site Access 1	Eastbound	13.1	B	16.0	C	EB Left/Right		0.4	0.3
						EB Approach		--	--
	Northbound	0.1	A	0.3	A	NB Left/Thru		0	0
						NB Approach		--	--
	Southbound	0.0	A	0.0	A	SB Thru		0	0
						SB Right	50	0	0
						SB Approach		--	--
5: NC-96 (Arendell Avenue) & Site Access 2	Eastbound	12.3	B	14.9	B	EB Left/Right		0.4	0.3
						EB Approach		--	--
	Northbound	0.1	A	0.6	A	NB Left/Thru		0	0.1
						NB Approach		--	--
	Southbound	0.0	A	0.0	A	SB Thru		0	0
						SB Right	50	0	0
						SB Approach		--	--
6: NC-96 (Arendell Avenue) & Perry Curtis Road	Westbound	11.3	B	11.3	B	WB Left/Right		0.7	0.5
						WB Approach		--	--
	Northbound	0.0	A	0.0	A	NB Thru/Right		0	0
						NB Approach		--	--
	Southbound	1.9	A	2.6	A	SB Left/Thru		0.1	0.4
						SB Approach		--	--
7: S Wakefield Street & Site Access 3	Westbound	10.1	B	9.9	A	WB Left/Right		0.3	0.2
						WB Approach		--	--
	Northbound	0.0	A	0.0	A	NB Thru/Right		0	0
						NB Approach		--	--
	Southbound	1.1	A	1.8	A	SB Left	50	0	0.1
						SB Thru		0	0
						SB Approach		--	--

[1] *Overall intersection LOS and delay not reported for TWSC intersections.*

* - 95th percentile queues for unsignalized intersections reported in number of vehicles.

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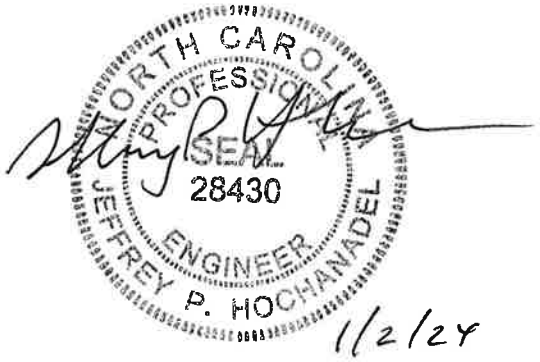
Conclusions

Per the provided analyses, it was determined that inclusion of Chamblee Lake Planned Development site trips does not result in changes to original Zebulon South TIA recommendations.

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

Sincerely,



Jeffrey P. Hochanadel, PE, PTOE
Principal | North Carolina Transportation Group Leader

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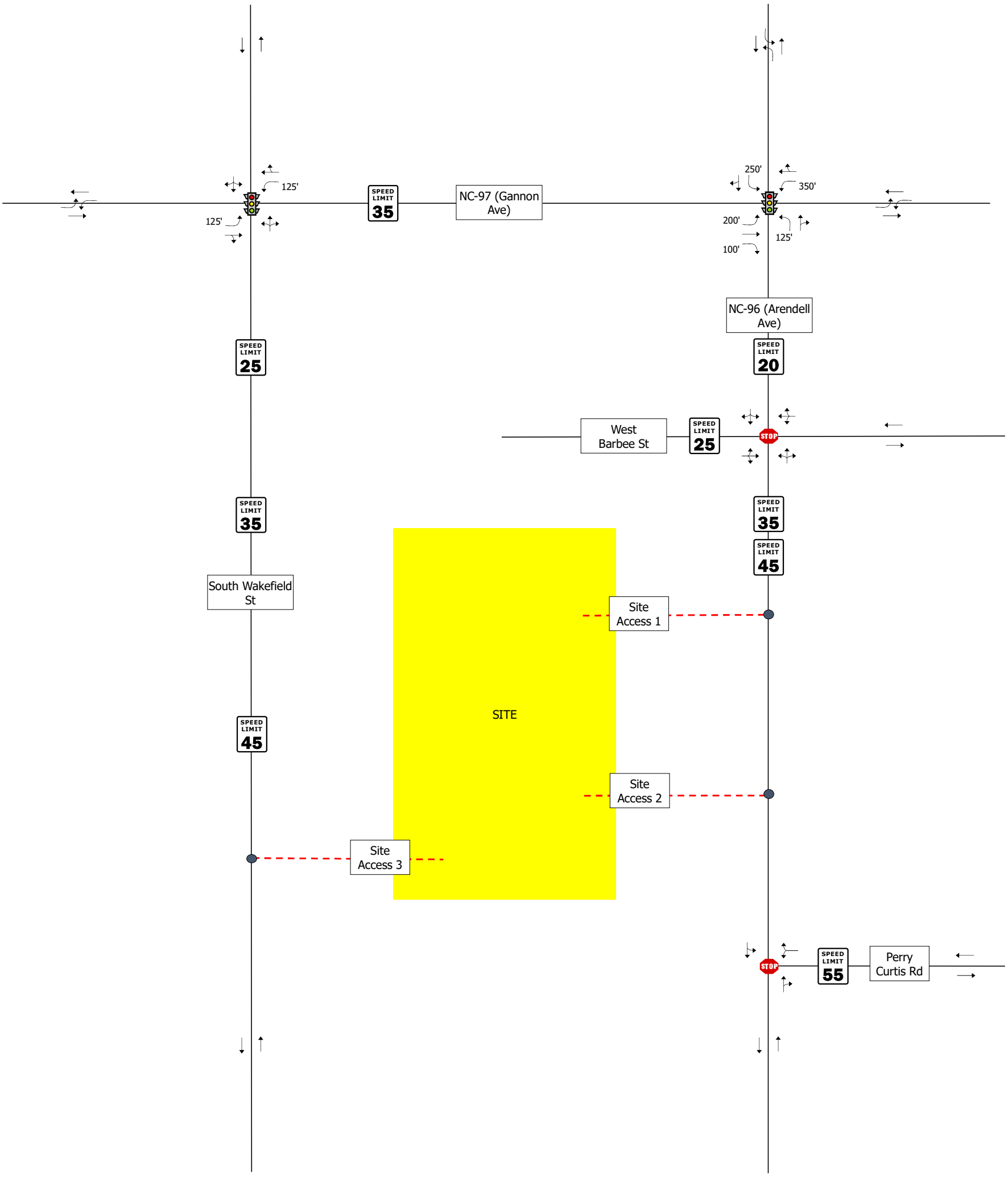
LIST OF TABLES

LIST OF FIGURES

APPENDICES

NOT TO SCALE



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

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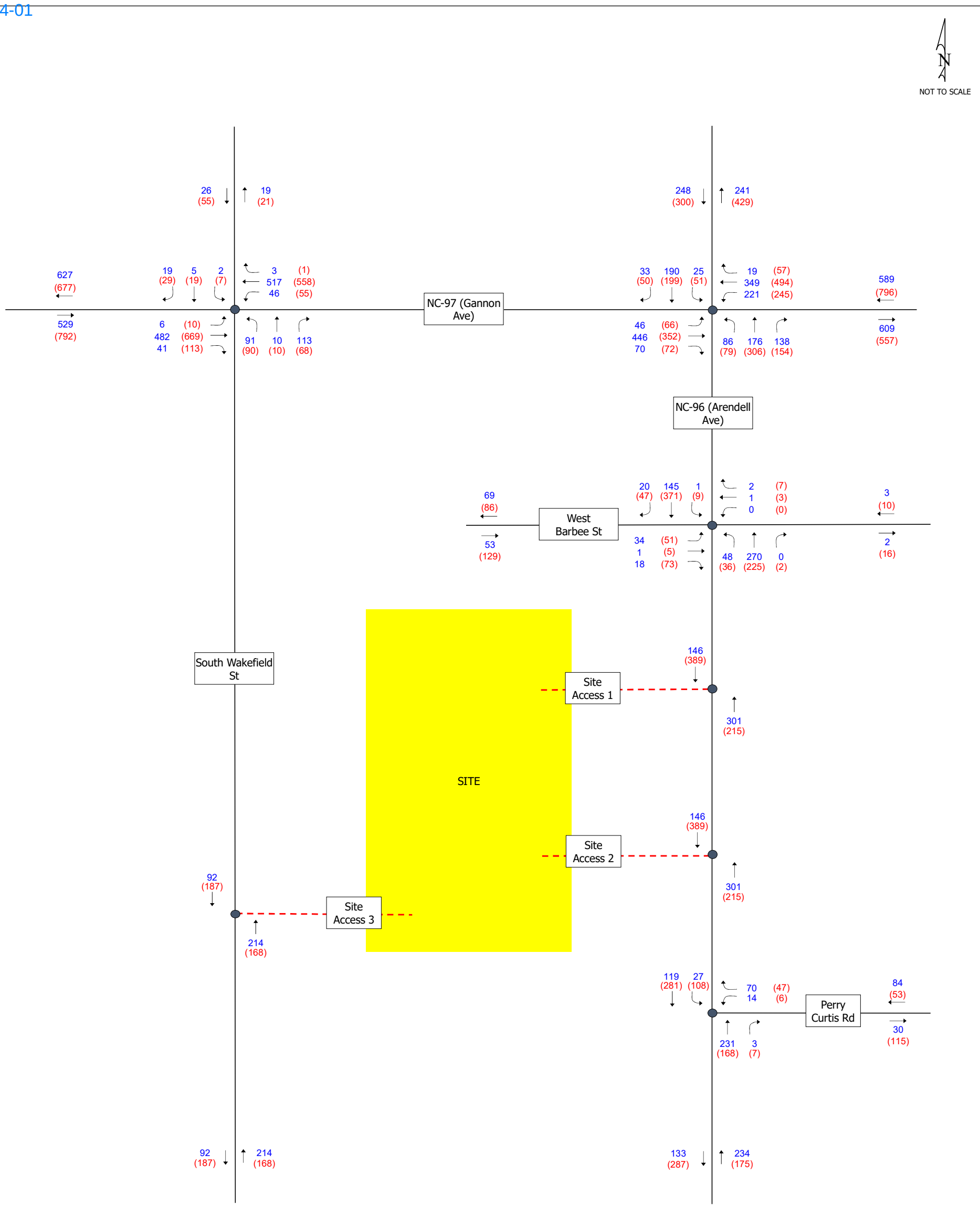
Zebulon South Traffic Impact Analysis

2022 Existing Lane Configuration

Figure A



LEGEND:

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

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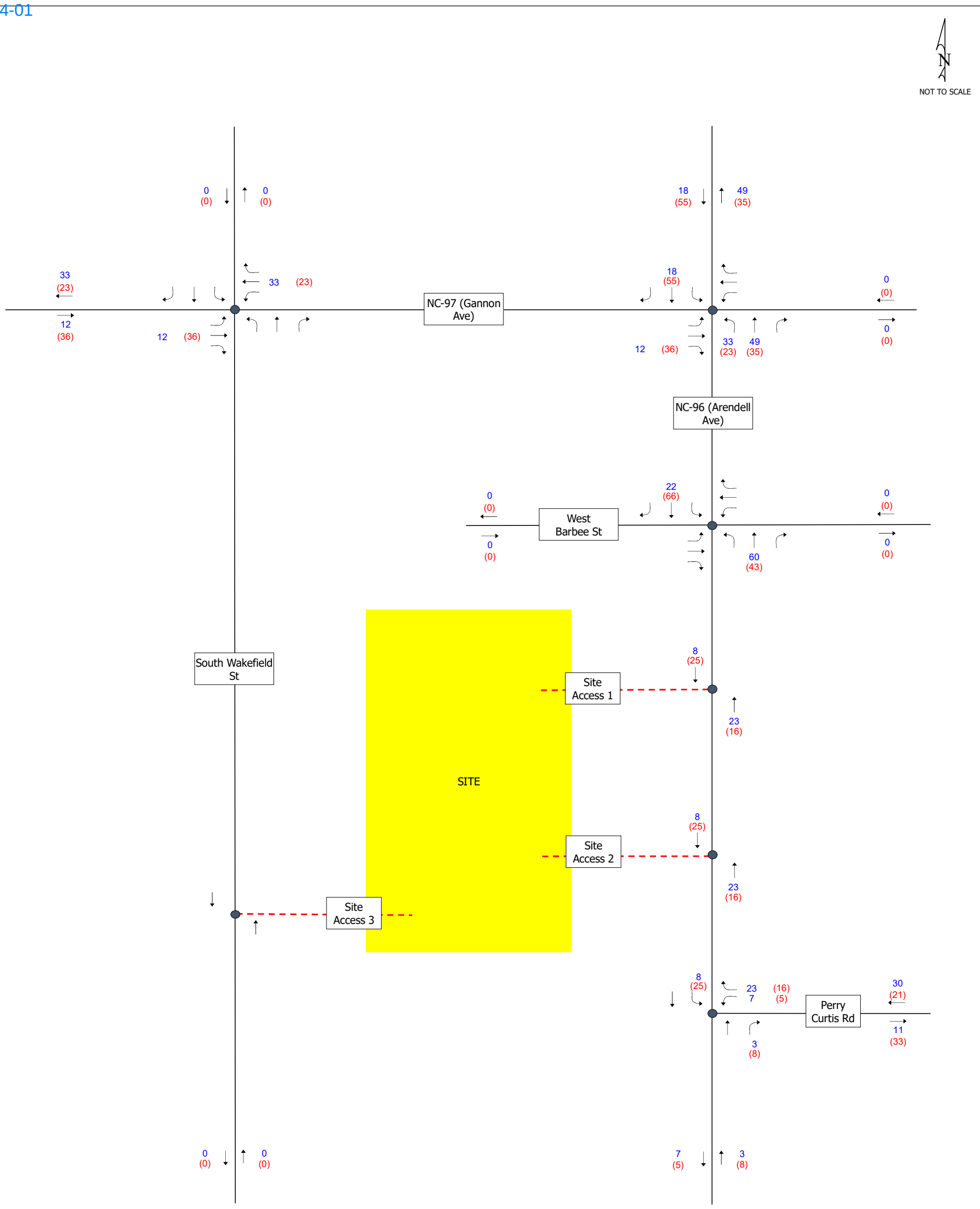
Zebulon South Traffic Impact Analysis

2026 Ambient Traffic Volumes

Figure B



LEGEND:

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

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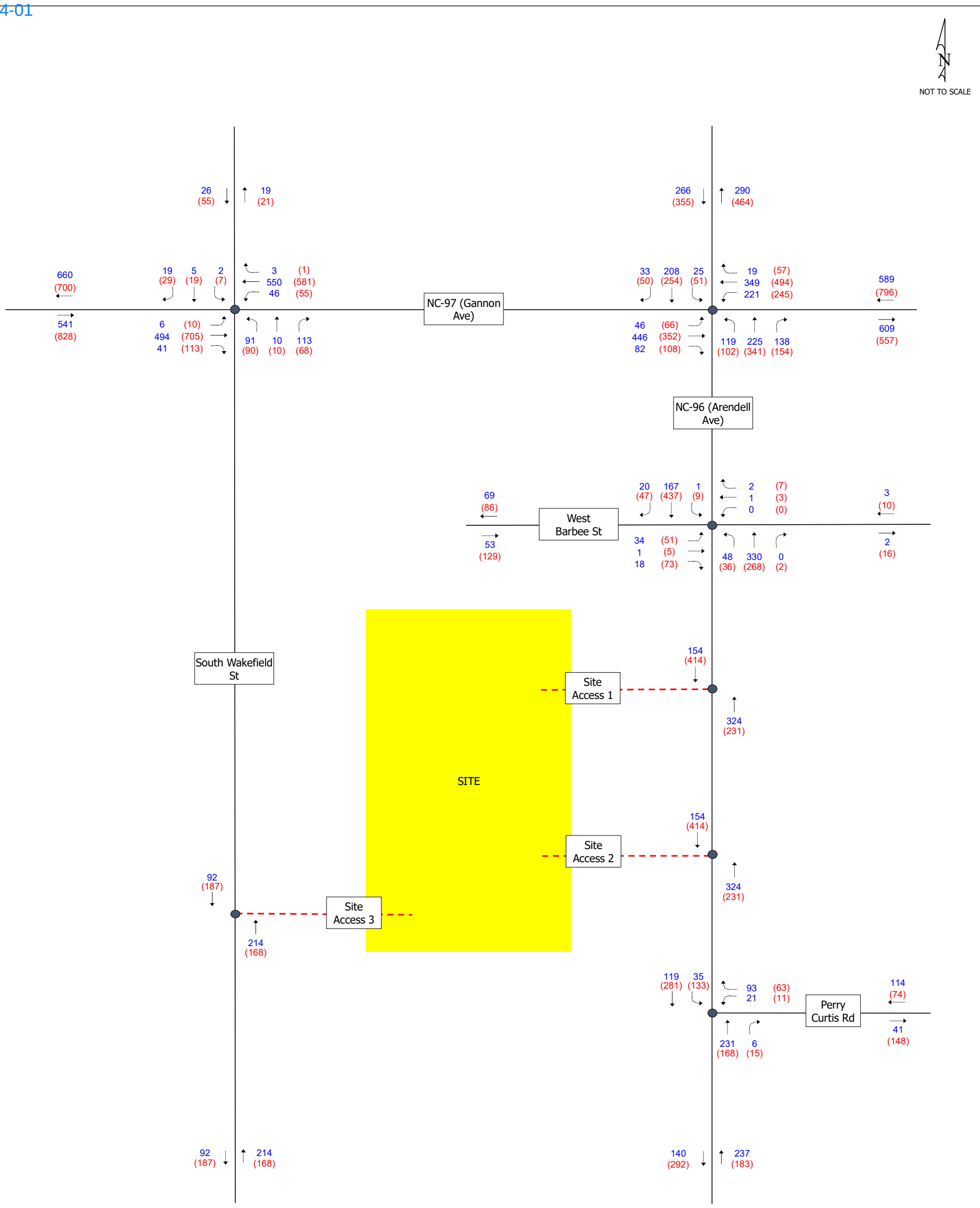
Zebulon South Traffic Impact Analysis

Chamblee Lake Planned Development Traffic Volumes

Figure C



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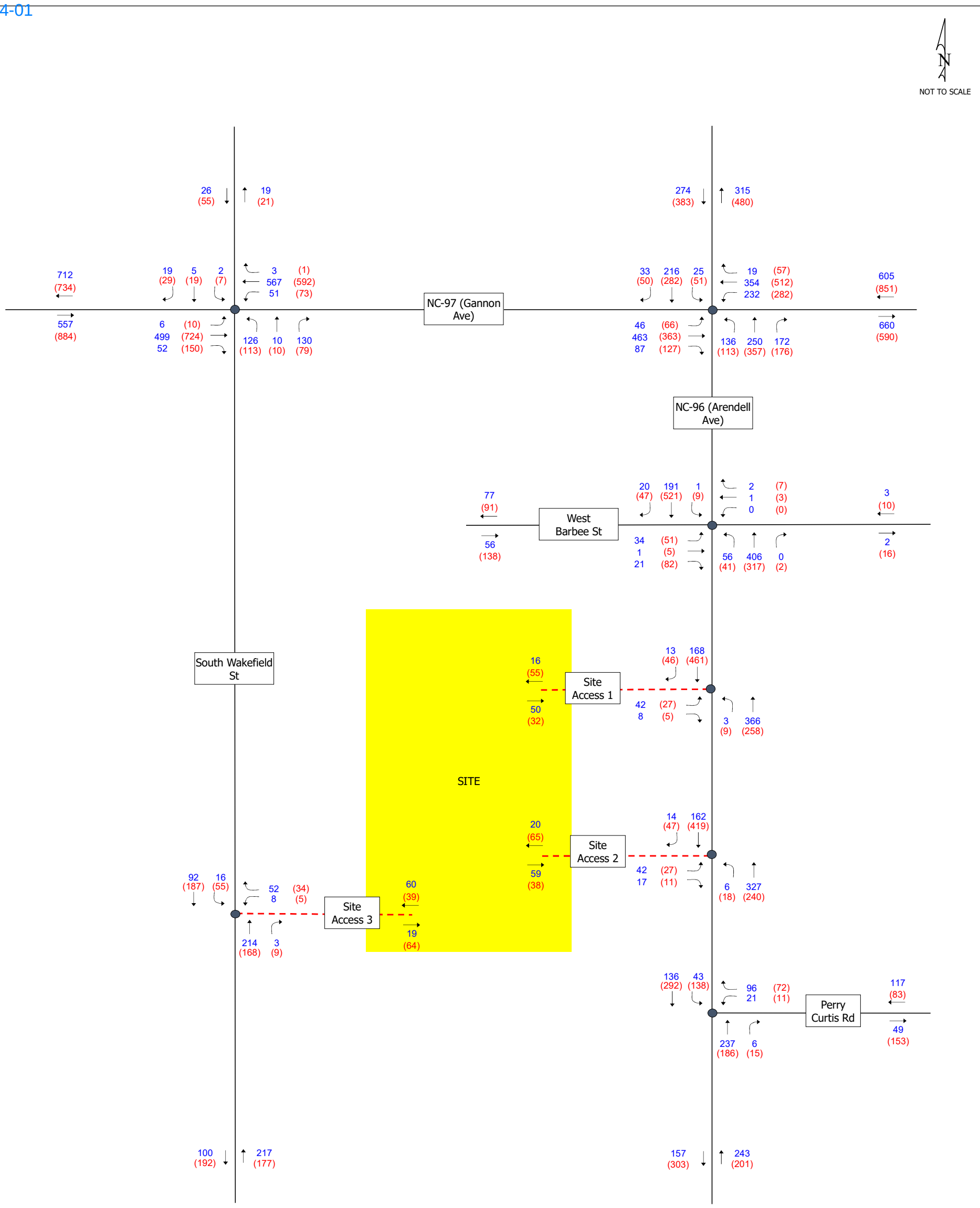
Zebulon South Traffic Impact Analysis

2026 Background Traffic Volumes

Figure D



LEGEND:

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

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Zebulon South Traffic Impact Analysis

2026 Build Traffic Volumes

Figure E

NOT TO SCALE

NC-97 (Gannon Ave)

NC-96 (Arendell Ave)

West Barbee St

South Wakefield St

SITE

125'
125'
250'
350'
200'
125'
100'

50' Storage
Site Access 1
50' Storage
Site Access 2
50' Storage
Site Access 3

SPEED LIMIT 35
SPEED LIMIT 25
SPEED LIMIT 20
SPEED LIMIT 35
SPEED LIMIT 45
SPEED LIMIT 45
SPEED LIMIT 25
SPEED LIMIT 55

STOP

Perry Curtis Rd

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

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Zebulon South Traffic Impact Analysis

Future Lane Configuration

Figure F

Appendix A – Synchro Output

2026 Background Traffic Volumes

Zebulon South TIA
1: S Wakefield Street & NC-97 (Gannon Avenue) 12/14/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	494	41	46	550	4	91	10	113	4	5	19
Future Volume (vph)	6	494	41	46	550	4	91	10	113	4	5	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			0%			3%			1%	
Storage Length (ft)	125		0	125		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.988			0.999			0.929			0.909	
Flt Protected	0.950			0.950				0.979			0.994	
Satd. Flow (prot)	1778	1850	0	1770	1861	0	0	1669	0	0	1675	0
Flt Permitted	0.432			0.950				0.848			0.952	
Satd. Flow (perm)	809	1850	0	1770	1861	0	0	1445	0	0	1604	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		774			1453			1831			462	
Travel Time (s)		15.1			28.3			49.9			12.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	7	549	46	51	611	4	101	11	126	4	6	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	595	0	51	615	0	0	238	0	0	31	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	0.99	0.99	0.99	1.00	1.00	1.00	1.02	1.02	1.02	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	17.0	17.0		14.0	17.0		14.0	14.0		14.0	14.0	
Total Split (s)	47.0	47.0		14.0	61.0		29.0	29.0		29.0	29.0	
Total Split (%)	52.2%	52.2%		15.6%	67.8%		32.2%	32.2%		32.2%	32.2%	
Maximum Green (s)	40.0	40.0		7.0	54.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0			-2.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode	Min	Min		None	Min		None	None		None	None	
Act Effct Green (s)	28.8	28.8		10.3	35.5			17.7			17.7	
Actuated g/C Ratio	0.45	0.45		0.16	0.55			0.27			0.27	
v/c Ratio	0.02	0.72		0.18	0.60			0.60			0.07	
Control Delay	13.3	22.6		35.1	12.1			31.8			23.4	

Zebulon South TIA

1: S Wakefield Street & NC-97 (Gannon Avenue)

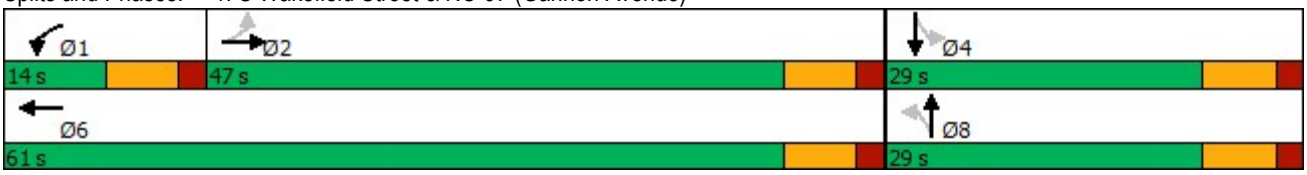
12/14/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	13.3	22.6		35.1	12.1			31.8			23.4	
LOS	B	C		D	B			C			C	
Approach Delay		22.4			13.9			31.8			23.4	
Approach LOS		C			B			C			C	
Queue Length 50th (ft)	2	221		21	142			94			10	
Queue Length 95th (ft)	10	380		63	265			199			35	
Internal Link Dist (ft)		694			1373			1751			382	
Turn Bay Length (ft)	125			125								
Base Capacity (vph)	575	1317		281	1518			612			680	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.01	0.45		0.18	0.41			0.39			0.05	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 64.6
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 20.2 Intersection LOS: C
Intersection Capacity Utilization 65.7% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1: S Wakefield Street & NC-97 (Gannon Avenue)



Zebulon South TIA
2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue) 12/14/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	446	82	221	349	19	119	225	138	25	208	33
Future Volume (vph)	46	446	82	221	349	19	119	225	138	25	208	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			-2%			2%	
Storage Length (ft)	200		100	350		0	125		0	250		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.992			0.943			0.979	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1844	1567	1787	1866	0	1787	1774	0	1752	1805	0
Flt Permitted	0.522			0.950			0.463			0.259		
Satd. Flow (perm)	963	1844	1567	1787	1866	0	871	1774	0	478	1805	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			20			35	
Link Distance (ft)		1453			677			1822			478	
Travel Time (s)		28.3			13.2			62.1			9.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	51	496	91	246	388	21	132	250	153	28	231	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	51	496	91	246	409	0	132	403	0	28	268	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes						Yes	
Headway Factor	1.01	1.01	1.01	0.99	0.99	0.99	0.99	0.99	0.99	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Prot	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2				8			4		
Detector Phase	2	2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	24.0	24.0	24.0	14.0	17.0		24.0	24.0		14.0	14.0	
Total Split (s)	37.0	37.0	37.0	22.0	59.0		31.0	31.0		31.0	31.0	
Total Split (%)	41.1%	41.1%	41.1%	24.4%	65.6%		34.4%	34.4%		34.4%	34.4%	
Maximum Green (s)	30.0	30.0	30.0	15.0	52.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	3.0	3.0	3.0	2.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode	Min	Min	Min	None	Min		None	None		None	None	
Walk Time (s)	7.0	7.0	7.0				7.0	7.0				
Flash Dont Walk (s)	10.0	10.0	10.0				10.0	10.0				
Pedestrian Calls (#/hr)	0	0	0				0	0				
Act Effct Green (s)	27.0	27.0	27.0	15.5	47.6		22.9	22.9		22.9	22.9	

Zebulon South TIA

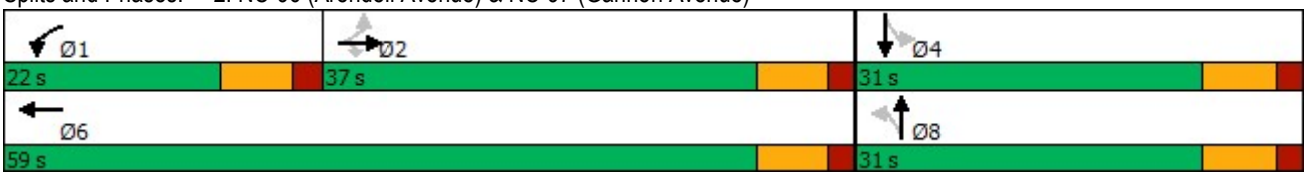
2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue)

12/14/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.33	0.33	0.33	0.19	0.59		0.28	0.28		0.28	0.28	
v/c Ratio	0.16	0.81	0.17	0.72	0.37		0.53	0.80		0.21	0.52	
Control Delay	21.4	36.7	21.0	45.9	10.1		35.5	41.7		28.7	29.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	21.4	36.7	21.0	45.9	10.1		35.5	41.7		28.7	29.8	
LOS	C	D	C	D	B		D	D		C	C	
Approach Delay		33.2			23.6			40.1			29.7	
Approach LOS		C			C			D			C	
Queue Length 50th (ft)	20	245	35	129	109		61	203		12	123	
Queue Length 95th (ft)	46	367	69	#238	166		124	#352		36	203	
Internal Link Dist (ft)		1373			597			1742			398	
Turn Bay Length (ft)	200		100	350			125			250		
Base Capacity (vph)	391	749	637	385	1311		287	585		158	596	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.13	0.66	0.14	0.64	0.31		0.46	0.69		0.18	0.45	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 80.8			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 31.5		Intersection LOS: C	
Intersection Capacity Utilization 78.5%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue)



Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	34	4	18	4	4	4	48	330	4	4	167	20
Future Vol, veh/h	34	4	18	4	4	4	48	330	4	4	167	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	38	4	20	4	4	4	53	367	4	4	186	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	684	682	197	692	691	369	208	0	0	371	0	0
Stage 1	205	205	-	475	475	-	-	-	-	-	-	-
Stage 2	479	477	-	217	216	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	363	372	844	358	368	677	1363	-	-	1188	-	-
Stage 1	797	732	-	570	557	-	-	-	-	-	-	-
Stage 2	568	556	-	785	724	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	343	352	844	332	348	677	1363	-	-	1188	-	-
Mov Cap-2 Maneuver	343	352	-	332	348	-	-	-	-	-	-	-
Stage 1	758	729	-	542	530	-	-	-	-	-	-	-
Stage 2	532	529	-	759	721	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.9	14.1	1	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1363	-	-	425	407	1188	-	-
HCM Lane V/C Ratio	0.039	-	-	0.146	0.033	0.004	-	-
HCM Control Delay (s)	7.7	0	-	14.9	14.1	8	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	0.1	0	-	-

Intersection	
Int Delay, s/veh	3.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	93	231	6	35	119
Future Vol, veh/h	21	93	231	6	35	119
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	103	257	7	39	132

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	471	261	0	0	264	0
Stage 1	261	-	-	-	-	-
Stage 2	210	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	551	778	-	-	1300	-
Stage 1	783	-	-	-	-	-
Stage 2	825	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	533	778	-	-	1300	-
Mov Cap-2 Maneuver	533	-	-	-	-	-
Stage 1	783	-	-	-	-	-
Stage 2	799	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.1	0	1.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	717	1300	-
HCM Lane V/C Ratio	-	-	0.177	0.03	-
HCM Control Delay (s)	-	-	11.1	7.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0.1	-

Zebulon South TIA

1: S Wakefield Street & NC-97 (Gannon Avenue) 12/05/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	705	113	55	581	4	90	10	68	7	19	29
Future Volume (vph)	10	705	113	55	581	4	90	10	68	7	19	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			0%			3%			1%	
Storage Length (ft)	125		0	125		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.979			0.999			0.945			0.929	
Flt Protected	0.950			0.950				0.974			0.993	
Satd. Flow (prot)	1778	1833	0	1770	1861	0	0	1689	0	0	1710	0
Flt Permitted	0.418			0.950				0.815			0.956	
Satd. Flow (perm)	783	1833	0	1770	1861	0	0	1413	0	0	1646	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		774			1453			1831			462	
Travel Time (s)		15.1			28.3			49.9			12.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	783	126	61	646	4	100	11	76	8	21	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	909	0	61	650	0	0	187	0	0	61	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	0.99	0.99	0.99	1.00	1.00	1.00	1.02	1.02	1.02	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	17.0	17.0		14.0	17.0		14.0	14.0		14.0	14.0	
Total Split (s)	52.0	52.0		14.0	66.0		24.0	24.0		24.0	24.0	
Total Split (%)	57.8%	57.8%		15.6%	73.3%		26.7%	26.7%		26.7%	26.7%	
Maximum Green (s)	45.0	45.0		7.0	59.0		17.0	17.0		17.0	17.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0			-2.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode	Min	Min		None	Min		None	None		None	None	
Act Effct Green (s)	46.7	46.7		9.2	57.2			16.2			16.2	
Actuated g/C Ratio	0.56	0.56		0.11	0.68			0.19			0.19	
v/c Ratio	0.03	0.89		0.31	0.51			0.68			0.19	
Control Delay	10.7	31.4		42.3	8.4			46.4			31.2	

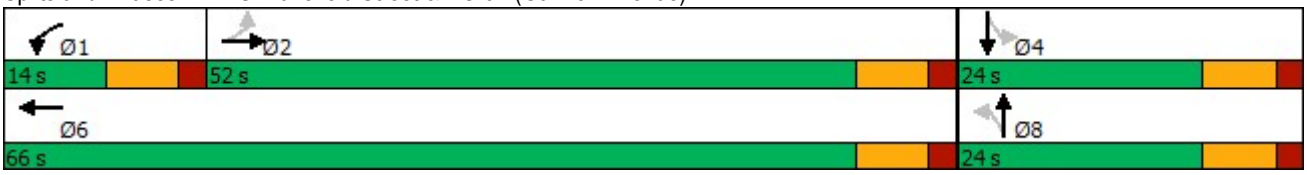
Zebulon South TIA
1: S Wakefield Street & NC-97 (Gannon Avenue) 12/05/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	10.7	31.4		42.3	8.4			46.4			31.2	
LOS	B	C		D	A			D			C	
Approach Delay		31.1			11.3			46.4			31.2	
Approach LOS		C			B			D			C	
Queue Length 50th (ft)	3	452		32	153			97			29	
Queue Length 95th (ft)	11	#744		72	237			169			63	
Internal Link Dist (ft)		694			1373			1751			382	
Turn Bay Length (ft)	125			125								
Base Capacity (vph)	448	1051		194	1385			327			381	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.02	0.86		0.31	0.47			0.57			0.16	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 83.6
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 25.1 Intersection LOS: C
Intersection Capacity Utilization 70.4% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: S Wakefield Street & NC-97 (Gannon Avenue)



Zebulon South TIA
2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue) 12/05/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	352	108	245	494	57	102	341	154	51	254	50
Future Volume (vph)	66	352	108	245	494	57	102	341	154	51	254	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			-2%			2%	
Storage Length (ft)	200		100	350		0	125		0	250		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.985			0.953			0.975	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1844	1567	1787	1853	0	1787	1793	0	1752	1798	0
Flt Permitted	0.433			0.950			0.418			0.170		
Satd. Flow (perm)	799	1844	1567	1787	1853	0	786	1793	0	313	1798	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			20			35	
Link Distance (ft)		1453			677			1822			478	
Travel Time (s)		28.3			13.2			62.1			9.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	73	391	120	272	549	63	113	379	171	57	282	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	73	391	120	272	612	0	113	550	0	57	338	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes						Yes	
Headway Factor	1.01	1.01	1.01	0.99	0.99	0.99	0.99	0.99	0.99	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Prot	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2				8			4		
Detector Phase	2	2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	24.0	24.0	24.0	14.0	17.0		24.0	24.0		14.0	14.0	
Total Split (s)	30.0	30.0	30.0	22.0	52.0		38.0	38.0		38.0	38.0	
Total Split (%)	33.3%	33.3%	33.3%	24.4%	57.8%		42.2%	42.2%		42.2%	42.2%	
Maximum Green (s)	23.0	23.0	23.0	15.0	45.0		31.0	31.0		31.0	31.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	3.0	3.0	3.0	2.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode	Min	Min	Min	None	Min		None	None		None	None	
Walk Time (s)	7.0	7.0	7.0				7.0	7.0				
Flash Dont Walk (s)	10.0	10.0	10.0				10.0	10.0				
Pedestrian Calls (#/hr)	0	0	0				0	0				
Act Effct Green (s)	22.2	22.2	22.2	16.2	43.5		29.5	29.5		29.5	29.5	

Zebulon South TIA

2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue)

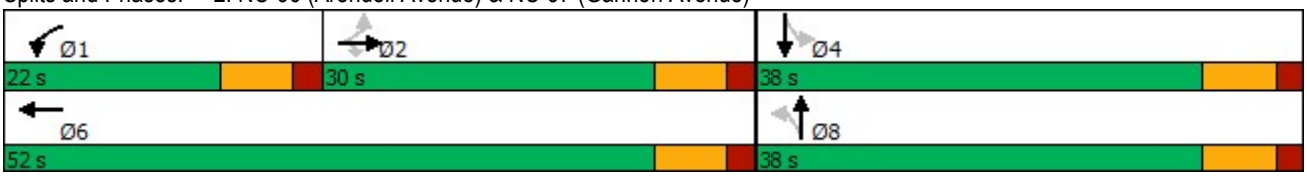
12/05/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.27	0.27	0.27	0.19	0.52		0.35	0.35		0.35	0.35	
v/c Ratio	0.34	0.79	0.29	0.78	0.63		0.41	0.86		0.52	0.53	
Control Delay	31.3	42.4	27.5	51.2	18.3		26.5	41.3		41.7	25.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	31.3	42.4	27.5	51.2	18.3		26.5	41.3		41.7	25.4	
LOS	C	D	C	D	B		C	D		D	C	
Approach Delay		38.0			28.4			38.7			27.8	
Approach LOS		D			C			D			C	
Queue Length 50th (ft)	33	203	53	149	235		47	281		25	147	
Queue Length 95th (ft)	73	#336	100	#276	348		96	#462		#77	230	
Internal Link Dist (ft)		1373			597			1742			398	
Turn Bay Length (ft)	200		100	350			125			250		
Base Capacity (vph)	244	564	479	371	1065		317	724		126	726	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.30	0.69	0.25	0.73	0.57		0.36	0.76		0.45	0.47	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 83.2			
Natural Cycle: 75			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.86			
Intersection Signal Delay: 33.2		Intersection LOS: C	
Intersection Capacity Utilization 87.6%		ICU Level of Service E	
Analysis Period (min) 15			

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

Splits and Phases: 2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue)



Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	51	5	73	4	4	7	36	268	4	9	437	47
Future Vol, veh/h	51	5	73	4	4	7	36	268	4	9	437	47
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	57	6	81	4	4	8	40	298	4	10	486	52

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	918	914	512	956	938	300	538	0	0	302	0	0
Stage 1	532	532	-	380	380	-	-	-	-	-	-	-
Stage 2	386	382	-	576	558	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	252	273	562	238	264	740	1030	-	-	1259	-	-
Stage 1	531	526	-	642	614	-	-	-	-	-	-	-
Stage 2	637	613	-	503	512	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	235	257	562	192	249	740	1030	-	-	1259	-	-
Mov Cap-2 Maneuver	235	257	-	192	249	-	-	-	-	-	-	-
Stage 1	506	520	-	612	585	-	-	-	-	-	-	-
Stage 2	596	584	-	421	506	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.1	16.7	1	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1030	-	-	352	324	1259	-	-
HCM Lane V/C Ratio	0.039	-	-	0.407	0.051	0.008	-	-
HCM Control Delay (s)	8.6	0	-	22.1	16.7	7.9	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.9	0.2	0	-	-

Intersection	
Int Delay, s/veh	2.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	11	63	168	15	133	281
Future Vol, veh/h	11	63	168	15	133	281
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	70	187	17	148	312

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	804	196	0	0	204	0
Stage 1	196	-	-	-	-	-
Stage 2	608	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	352	845	-	-	1368	-
Stage 1	837	-	-	-	-	-
Stage 2	543	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	306	845	-	-	1368	-
Mov Cap-2 Maneuver	306	-	-	-	-	-
Stage 1	837	-	-	-	-	-
Stage 2	472	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.1	0	2.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	670	1368	-
HCM Lane V/C Ratio	-	-	0.123	0.108	-
HCM Control Delay (s)	-	-	11.1	8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0.4	-

2026 Build + Improvement Traffic Volumes

Zebulon South TIA
1: S Wakefield Street & NC-97 (Gannon Avenue) 12/05/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	499	52	51	567	4	126	10	130	4	5	19
Future Volume (vph)	6	499	52	51	567	4	126	10	130	4	5	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			0%			3%			1%	
Storage Length (ft)	125		0	125		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.986			0.999			0.934			0.909	
Flt Protected	0.950			0.950				0.977			0.994	
Satd. Flow (prot)	1778	1846	0	1770	1861	0	0	1674	0	0	1675	0
Flt Permitted	0.405			0.950				0.833			0.951	
Satd. Flow (perm)	758	1846	0	1770	1861	0	0	1428	0	0	1602	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		774			1453			1831			462	
Travel Time (s)		15.1			28.3			49.9			12.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	7	554	58	57	630	4	140	11	144	4	6	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	612	0	57	634	0	0	295	0	0	31	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	0.99	0.99	0.99	1.00	1.00	1.00	1.02	1.02	1.02	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	17.0	17.0		14.0	17.0		14.0	14.0		14.0	14.0	
Total Split (s)	46.0	46.0		14.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	51.1%	51.1%		15.6%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	39.0	39.0		7.0	53.0		23.0	23.0		23.0	23.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0			-2.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode	Min	Min		None	Min		None	None		None	None	
Act Effct Green (s)	30.6	30.6		10.1	37.4			21.0			21.0	
Actuated g/C Ratio	0.44	0.44		0.14	0.54			0.30			0.30	
v/c Ratio	0.02	0.76		0.22	0.64			0.68			0.06	
Control Delay	14.0	25.3		37.3	14.0			35.1			23.0	

Zebulon South TIA

1: S Wakefield Street & NC-97 (Gannon Avenue)

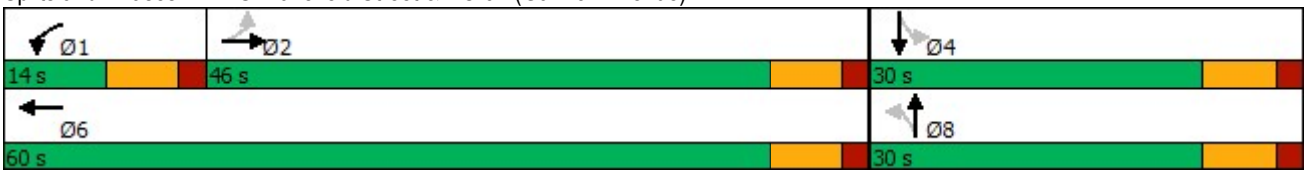
12/05/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	14.0	25.3		37.3	14.0			35.1			23.0	
LOS	B	C		D	B			D			C	
Approach Delay		25.1			15.9			35.1			23.0	
Approach LOS		C			B			D			C	
Queue Length 50th (ft)	2	262		26	182			131			11	
Queue Length 95th (ft)	10	405		68	287			#273			35	
Internal Link Dist (ft)		694			1373			1751			382	
Turn Bay Length (ft)	125			125								
Base Capacity (vph)	483	1177		257	1463			575			646	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.01	0.52		0.22	0.43			0.51			0.05	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 69.7
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 23.0 Intersection LOS: C
Intersection Capacity Utilization 72.9% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: S Wakefield Street & NC-97 (Gannon Avenue)



Zebulon South TIA
2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue) 12/05/2023

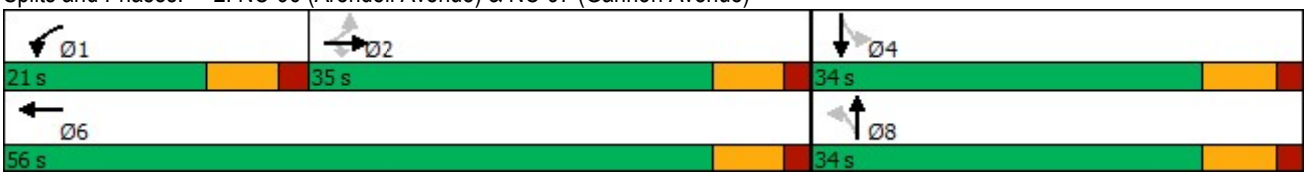
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	463	87	232	354	19	136	250	172	25	216	33
Future Volume (vph)	46	463	87	232	354	19	136	250	172	25	216	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			-2%			2%	
Storage Length (ft)	200		100	350		0	125		0	250		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.992			0.939			0.980	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1844	1567	1787	1866	0	1787	1767	0	1752	1807	0
Flt Permitted	0.520			0.950			0.466			0.205		
Satd. Flow (perm)	959	1844	1567	1787	1866	0	877	1767	0	378	1807	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			20			35	
Link Distance (ft)		1453			677			1822			478	
Travel Time (s)		28.3			13.2			62.1			9.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	51	514	97	258	393	21	151	278	191	28	240	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	51	514	97	258	414	0	151	469	0	28	277	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes						Yes	
Headway Factor	1.01	1.01	1.01	0.99	0.99	0.99	0.99	0.99	0.99	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Prot	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2				8			4		
Detector Phase	2	2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	24.0	24.0	24.0	14.0	17.0		24.0	24.0		14.0	14.0	
Total Split (s)	35.0	35.0	35.0	21.0	56.0		34.0	34.0		34.0	34.0	
Total Split (%)	38.9%	38.9%	38.9%	23.3%	62.2%		37.8%	37.8%		37.8%	37.8%	
Maximum Green (s)	28.0	28.0	28.0	14.0	49.0		27.0	27.0		27.0	27.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	3.0	3.0	3.0	2.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode	Min	Min	Min	None	Min		None	None		None	None	
Walk Time (s)	7.0	7.0	7.0				7.0	7.0				
Flash Dont Walk (s)	10.0	10.0	10.0				10.0	10.0				
Pedestrian Calls (#/hr)	0	0	0				0	0				
Act Effct Green (s)	27.4	27.4	27.4	15.3	47.8		26.3	26.3		26.3	26.3	

Zebulon South TIA
2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue) 12/05/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.33	0.33	0.33	0.18	0.57		0.31	0.31		0.31	0.31	
v/c Ratio	0.16	0.86	0.19	0.79	0.39		0.55	0.85		0.24	0.49	
Control Delay	22.9	43.1	22.5	53.8	11.8		33.9	44.1		28.7	27.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.9	43.1	22.5	53.8	11.8		33.9	44.1		28.7	27.6	
LOS	C	D	C	D	B		C	D		C	C	
Approach Delay		38.5			27.9			41.6			27.7	
Approach LOS		D			C			D			C	
Queue Length 50th (ft)	20	267	39	142	122		70	244		12	125	
Queue Length 95th (ft)	48	#439	76	#268	185		134	#407		36	200	
Internal Link Dist (ft)		1373			597			1742			398	
Turn Bay Length (ft)	200		100	350			125			250		
Base Capacity (vph)	346	666	566	344	1146		306	617		132	631	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.15	0.77	0.17	0.75	0.36		0.49	0.76		0.21	0.44	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 84.2			
Natural Cycle: 70			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.86			
Intersection Signal Delay: 34.8		Intersection LOS: C	
Intersection Capacity Utilization 83.4%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue)



Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	34	4	21	4	4	4	56	406	4	4	191	20
Future Vol, veh/h	34	4	21	4	4	4	56	406	4	4	191	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	38	4	23	4	4	4	62	451	4	4	212	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	812	810	223	822	819	453	234	0	0	455	0	0
Stage 1	231	231	-	577	577	-	-	-	-	-	-	-
Stage 2	581	579	-	245	242	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	298	314	817	293	310	607	1333	-	-	1106	-	-
Stage 1	772	713	-	502	502	-	-	-	-	-	-	-
Stage 2	499	501	-	759	705	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	278	293	817	267	290	607	1333	-	-	1106	-	-
Mov Cap-2 Maneuver	278	293	-	267	290	-	-	-	-	-	-	-
Stage 1	724	710	-	471	471	-	-	-	-	-	-	-
Stage 2	460	470	-	730	702	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17	16.1	0.9	0.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1333	-	-	365	339	1106	-	-
HCM Lane V/C Ratio	0.047	-	-	0.18	0.039	0.004	-	-
HCM Control Delay (s)	7.8	0	-	17	16.1	8.3	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.6	0.1	0	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	42	8	4	366	168	13
Future Vol, veh/h	42	8	4	366	168	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	47	9	4	407	187	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	602	187	201	0	-	0
Stage 1	187	-	-	-	-	-
Stage 2	415	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	463	855	1371	-	-	-
Stage 1	845	-	-	-	-	-
Stage 2	666	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	461	855	1371	-	-	-
Mov Cap-2 Maneuver	461	-	-	-	-	-
Stage 1	842	-	-	-	-	-
Stage 2	666	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.1	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1371	-	498	-	-
HCM Lane V/C Ratio	0.003	-	0.112	-	-
HCM Control Delay (s)	7.6	0	13.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	42	17	6	327	162	14
Future Vol, veh/h	42	17	6	327	162	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	47	19	7	363	180	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	557	180	196	0	-	0
Stage 1	180	-	-	-	-	-
Stage 2	377	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	491	863	1377	-	-	-
Stage 1	851	-	-	-	-	-
Stage 2	694	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	488	863	1377	-	-	-
Mov Cap-2 Maneuver	488	-	-	-	-	-
Stage 1	846	-	-	-	-	-
Stage 2	694	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.3	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1377	-	558	-	-
HCM Lane V/C Ratio	0.005	-	0.117	-	-
HCM Control Delay (s)	7.6	0	12.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	3.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	96	237	6	43	136
Future Vol, veh/h	21	96	237	6	43	136
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	107	263	7	48	151

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	514	267	0	0	270	0
Stage 1	267	-	-	-	-	-
Stage 2	247	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	521	772	-	-	1293	-
Stage 1	778	-	-	-	-	-
Stage 2	794	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	500	772	-	-	1293	-
Mov Cap-2 Maneuver	500	-	-	-	-	-
Stage 1	778	-	-	-	-	-
Stage 2	761	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.3	0	1.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	703	1293	-
HCM Lane V/C Ratio	-	-	0.185	0.037	-
HCM Control Delay (s)	-	-	11.3	7.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.1	-

Intersection	
Int Delay, s/veh	1.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	8	52	214	4	16	92
Future Vol, veh/h	8	52	214	4	16	92
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	58	238	4	18	102

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	378	240	0	0	242	0
Stage 1	240	-	-	-	-	-
Stage 2	138	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	624	799	-	-	1324	-
Stage 1	800	-	-	-	-	-
Stage 2	889	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	615	799	-	-	1324	-
Mov Cap-2 Maneuver	615	-	-	-	-	-
Stage 1	800	-	-	-	-	-
Stage 2	877	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.1	0	1.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	768	1324	-
HCM Lane V/C Ratio	-	-	0.087	0.013	-
HCM Control Delay (s)	-	-	10.1	7.8	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Zebulon South TIA

1: S Wakefield Street & NC-97 (Gannon Avenue) 12/05/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	724	150	73	592	4	113	10	79	7	19	29
Future Volume (vph)	10	724	150	73	592	4	113	10	79	7	19	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			0%			3%			1%	
Storage Length (ft)	125		0	125		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.974			0.999			0.947			0.929	
Flt Protected	0.950			0.950				0.973			0.993	
Satd. Flow (prot)	1778	1823	0	1770	1861	0	0	1691	0	0	1710	0
Flt Permitted	0.413			0.950				0.812			0.953	
Satd. Flow (perm)	773	1823	0	1770	1861	0	0	1411	0	0	1641	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		774			1453			1831			462	
Travel Time (s)		15.1			28.3			49.9			12.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	804	167	81	658	4	126	11	88	8	21	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	971	0	81	662	0	0	225	0	0	61	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	0.99	0.99	0.99	1.00	1.00	1.00	1.02	1.02	1.02	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	17.0	17.0		14.0	17.0		14.0	14.0		14.0	14.0	
Total Split (s)	52.0	52.0		14.0	66.0		24.0	24.0		24.0	24.0	
Total Split (%)	57.8%	57.8%		15.6%	73.3%		26.7%	26.7%		26.7%	26.7%	
Maximum Green (s)	45.0	45.0		7.0	59.0		17.0	17.0		17.0	17.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0			-2.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode	Min	Min		None	Min		None	None		None	None	
Act Effct Green (s)	48.3	48.3		9.1	59.1			17.5			17.5	
Actuated g/C Ratio	0.56	0.56		0.11	0.68			0.20			0.20	
v/c Ratio	0.03	0.96		0.44	0.52			0.79			0.18	
Control Delay	10.8	41.4		46.3	8.8			54.8			30.9	

Zebulon South TIA

1: S Wakefield Street & NC-97 (Gannon Avenue)

12/05/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	10.8	41.4		46.3	8.8			54.8			30.9	
LOS	B	D		D	A			D			C	
Approach Delay		41.0			12.9			54.8			30.9	
Approach LOS		D			B			D			C	
Queue Length 50th (ft)	3	~557		44	164			121			29	
Queue Length 95th (ft)	11	#825		90	244			#232			63	
Internal Link Dist (ft)		694			1373			1751			382	
Turn Bay Length (ft)	125			125								
Base Capacity (vph)	430	1016		185	1318			311			362	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.03	0.96		0.44	0.50			0.72			0.17	

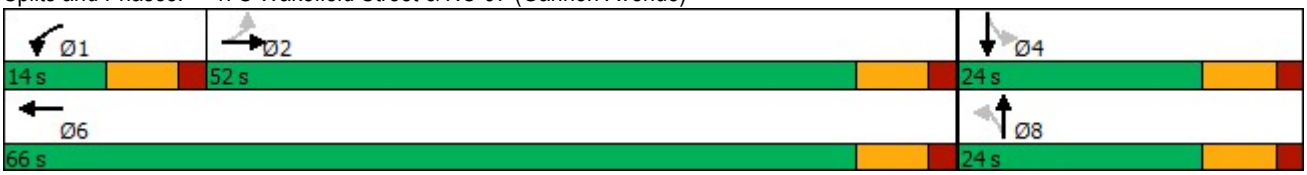
Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 86.6
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 31.9 Intersection LOS: C
Intersection Capacity Utilization 83.8% ICU Level of Service E
Analysis Period (min) 15

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

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

Splits and Phases: 1: S Wakefield Street & NC-97 (Gannon Avenue)



Zebulon South TIA
2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue) 12/05/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	363	127	282	512	57	113	357	176	51	282	50
Future Volume (vph)	66	363	127	282	512	57	113	357	176	51	282	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			-2%			2%	
Storage Length (ft)	200		100	350		0	125		0	250		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.985			0.950			0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1844	1567	1787	1853	0	1787	1787	0	1752	1802	0
Flt Permitted	0.425			0.950			0.392			0.146		
Satd. Flow (perm)	784	1844	1567	1787	1853	0	737	1787	0	269	1802	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			20			35	
Link Distance (ft)		1453			677			1822			478	
Travel Time (s)		28.3			13.2			62.1			9.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	73	403	141	313	569	63	126	397	196	57	313	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	73	403	141	313	632	0	126	593	0	57	369	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes						Yes	
Headway Factor	1.01	1.01	1.01	0.99	0.99	0.99	0.99	0.99	0.99	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Prot	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2				8			4		
Detector Phase	2	2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	24.0	24.0	24.0	14.0	17.0		24.0	24.0		14.0	14.0	
Total Split (s)	27.0	27.0	27.0	23.0	50.0		40.0	40.0		40.0	40.0	
Total Split (%)	30.0%	30.0%	30.0%	25.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Maximum Green (s)	20.0	20.0	20.0	16.0	43.0		33.0	33.0		33.0	33.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	3.0	3.0	3.0	2.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode	Min	Min	Min	None	Min		None	None		None	None	
Walk Time (s)	7.0	7.0	7.0				7.0	7.0				
Flash Dont Walk (s)	10.0	10.0	10.0				10.0	10.0				
Pedestrian Calls (#/hr)	0	0	0				0	0				
Act Effct Green (s)	21.3	21.3	21.3	17.5	43.9		32.1	32.1		32.1	32.1	

Zebulon South TIA

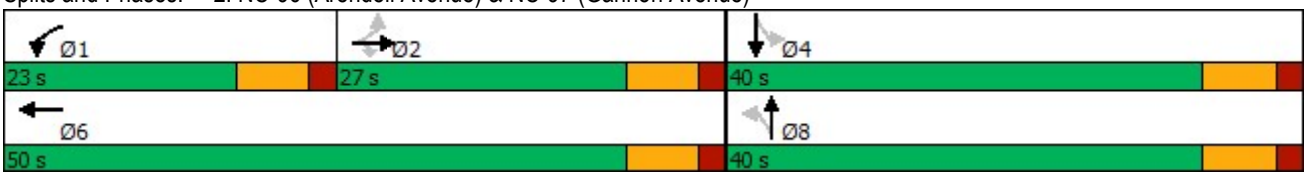
2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue)

12/05/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.25	0.25	0.25	0.20	0.51		0.37	0.37		0.37	0.37	
v/c Ratio	0.38	0.88	0.36	0.86	0.67		0.46	0.89		0.57	0.55	
Control Delay	35.0	54.9	31.1	58.3	20.7		27.1	43.0		47.6	25.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	35.0	54.9	31.1	58.3	20.7		27.1	43.0		47.6	25.0	
LOS	D	D	C	E	C		C	D		D	C	
Approach Delay		47.1			33.2			40.2			28.0	
Approach LOS		D			C			D			C	
Queue Length 50th (ft)	35	222	67	174	260		52	303		25	158	
Queue Length 95th (ft)	77	#389	121	#321	385		106	#494		#83	243	
Internal Link Dist (ft)		1373			597			1742			398	
Turn Bay Length (ft)	200		100	350			125			250		
Base Capacity (vph)	201	474	403	376	975		301	731		109	737	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.36	0.85	0.35	0.83	0.65		0.42	0.81		0.52	0.50	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 86.1			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 37.4		Intersection LOS: D	
Intersection Capacity Utilization 90.8%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue)



Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	51	5	82	4	4	7	41	317	4	9	521	47
Future Vol, veh/h	51	5	82	4	4	7	41	317	4	9	521	47
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	57	6	91	4	4	8	46	352	4	10	579	52

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1077	1073	605	1120	1097	354	631	0	0	356	0	0
Stage 1	625	625	-	446	446	-	-	-	-	-	-	-
Stage 2	452	448	-	674	651	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	197	220	498	184	213	690	951	-	-	1203	-	-
Stage 1	473	477	-	591	574	-	-	-	-	-	-	-
Stage 2	587	573	-	444	465	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	181	204	498	139	198	690	951	-	-	1203	-	-
Mov Cap-2 Maneuver	181	204	-	139	198	-	-	-	-	-	-	-
Stage 1	445	471	-	556	540	-	-	-	-	-	-	-
Stage 2	541	539	-	354	459	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	30	20.2	1	0.1
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	951	-	-	293	254	1203	-	-
HCM Lane V/C Ratio	0.048	-	-	0.523	0.066	0.008	-	-
HCM Control Delay (s)	9	0	-	30	20.2	8	0	-
HCM Lane LOS	A	A	-	D	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	2.8	0.2	0	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	27	5	9	258	461	46
Future Vol, veh/h	27	5	9	258	461	46
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	6	10	287	512	51

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	819	512	563	0	-	0
Stage 1	512	-	-	-	-	-
Stage 2	307	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	345	562	1008	-	-	-
Stage 1	602	-	-	-	-	-
Stage 2	746	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	341	562	1008	-	-	-
Mov Cap-2 Maneuver	341	-	-	-	-	-
Stage 1	595	-	-	-	-	-
Stage 2	746	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16	0.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1008	-	363	-	-
HCM Lane V/C Ratio	0.01	-	0.098	-	-
HCM Control Delay (s)	8.6	0	16	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	27	11	18	240	419	47
Future Vol, veh/h	27	11	18	240	419	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	12	20	267	466	52

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	773	466	518	0	-	0
Stage 1	466	-	-	-	-	-
Stage 2	307	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	367	597	1048	-	-	-
Stage 1	632	-	-	-	-	-
Stage 2	746	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	359	597	1048	-	-	-
Mov Cap-2 Maneuver	359	-	-	-	-	-
Stage 1	618	-	-	-	-	-
Stage 2	746	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.9	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1048	-	406	-	-
HCM Lane V/C Ratio	0.019	-	0.104	-	-
HCM Control Delay (s)	8.5	0	14.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Intersection	
Int Delay, s/veh	2.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	11	72	186	15	138	292
Future Vol, veh/h	11	72	186	15	138	292
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	80	207	17	153	324

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	846	216	0	0	224	0
Stage 1	216	-	-	-	-	-
Stage 2	630	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	333	824	-	-	1345	-
Stage 1	820	-	-	-	-	-
Stage 2	531	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	287	824	-	-	1345	-
Mov Cap-2 Maneuver	287	-	-	-	-	-
Stage 1	820	-	-	-	-	-
Stage 2	457	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.3	0	2.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	660	1345	-
HCM Lane V/C Ratio	-	-	0.14	0.114	-
HCM Control Delay (s)	-	-	11.3	8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.4	-

Intersection	
Int Delay, s/veh	1.8

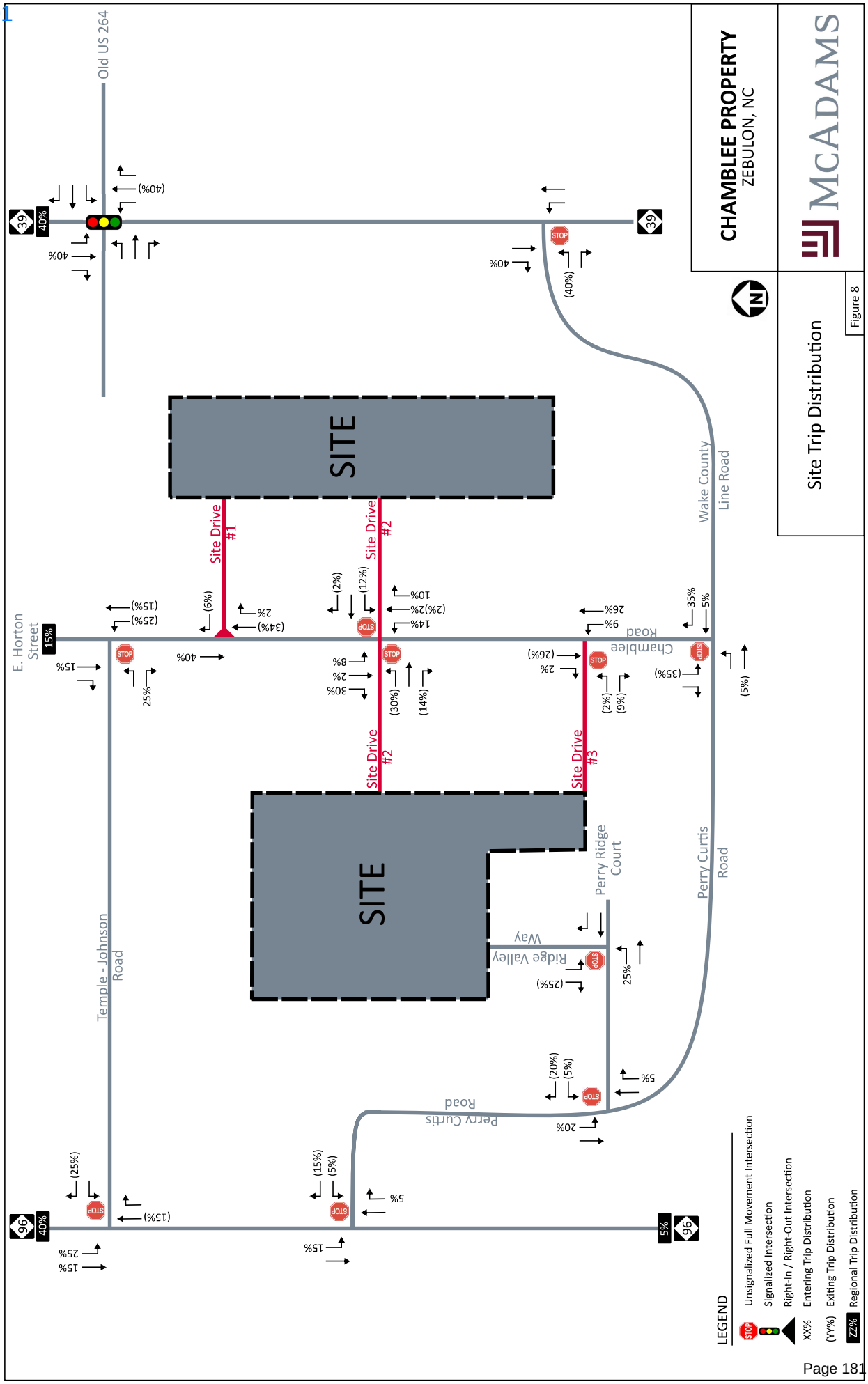
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	34	168	9	55	187
Future Vol, veh/h	5	34	168	9	55	187
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	38	187	10	61	208

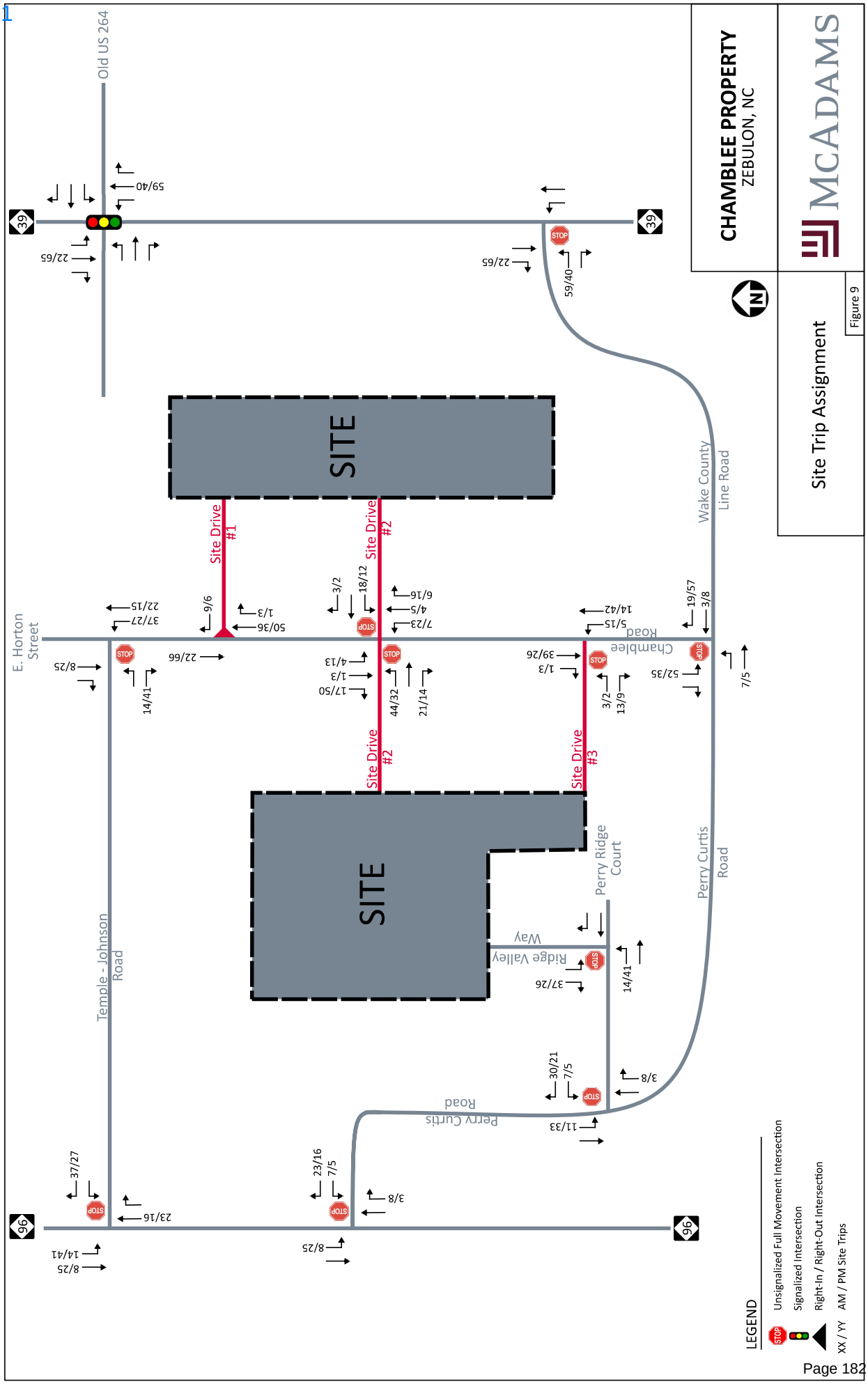
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	522	192	0	0	197	0
Stage 1	192	-	-	-	-	-
Stage 2	330	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	515	850	-	-	1376	-
Stage 1	841	-	-	-	-	-
Stage 2	728	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	492	850	-	-	1376	-
Mov Cap-2 Maneuver	492	-	-	-	-	-
Stage 1	841	-	-	-	-	-
Stage 2	696	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.9	0	1.8
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	777	1376	-
HCM Lane V/C Ratio	-	-	0.056	0.044	-
HCM Control Delay (s)	-	-	9.9	7.7	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Appendix B – Chamblee Lake Planned Development


CHAMBLEE PROPERTY
ZEBULON, NC
MCADAMS
Site Trip Distribution
Figure 8
SITE
SITE
Site Drive #1
Site Drive #2
Site Drive #2
Site Drive #3
Old US 264
E. Horton Street
Temple - Johnson Road
Wake County Line Road
Chamblee Road
Perry Curtis Road
Perry Ridge Court
Ridge Valley Way
Perry Curtis Road
39
96
15%
40%
5%
STOP
LEGEND
Unsignalized Full Movement Intersection
Signalized Intersection
Right-In / Right-Out Intersection
XX% Entering Trip Distribution
(YY%) Exiting Trip Distribution
ZZ% Regional Trip Distribution


CHAMBLEE PROPERTY
ZEBULON, NC
MCADAMS
Site Trip Assignment
Figure 9
SITE
SITE
Site Drive #1
Site Drive #2
Site Drive #2
Site Drive #3
Old US 264
E. Horton Street
Chamblee Road
Wake County Line Road
Temple - Johnson Road
Perry Curtis Road
Perry Ridge Court
Ridge Valley Way
Perry Curtis Road
39
96
STOP
LEGEND
Unsignalized Full Movement Intersection
Signalized Intersection
Right-In / Right-Out Intersection
XX / YY AM / PM Site Trips

To: Adam Culpepper, Town of Zebulon
From: Jeff Hochanadel, PE, PTOE (Timmons Group)
RE: Zebulon South TIA Response to Comments
Date: January 26, 2024

Timmons Group prepared the Zebulon South Traffic Impact Analysis (TIA) – sealed / submitted June 22nd, 2022, and submitted an updated TIA sealed / submitted on January 3rd, 2024. On January 24th, 2024, WSP issued comments (on the Town's behalf). Timmons Group (TG) reviewed WSP's comments (**in bold below**) and prepared the responses below.

Site Plan and Site Access:

1. **Based on the updated site plan, the number of units has changed for the site since the TIA was completed. Please add a note in the body of the TIA report discussing this change and confirming that the analysis is still valid because it is more conservative than the current site plan.**

   TG Response: This was noted on pages 1-1 and 4-1

2. **Please confirm site access locations in the Build Synchro files matches the site plan. If Site Access 2 is within 165 feet of Perry Curtis Road, this access will need to be right-in/right-out only. This is based on the 2003 NCDOT's Policy on Street and Driveway Access.**

   TG Response: Noted. The proposed centerline to centerline measurement between Site Access 2 and Perry Curtis Road is approximately 200-feet. Potential turning movement restrictions will be determined with the Town / NCDOT at the next stage of development when the Driveway permit is requested.

3. **For tables 3-1, 3-2, and 5-1 in the TIA and tables 1 and 2 in the supplemental, please provide a footnote to describe the meaning of the "#" symbol in the queue lengths.**

   TG Response: The subject tables were updated accordingly.

4. **For tables 3-1, 3-2, 5-1, and 5-2 in the TIA and tables 1 and 2 in the supplemental, please designate which intersections are unsignalized/signalized to aid in the differentiation of queues which are in feet and queues which are number of cars.**

   TG Response: The subject tables were updated accordingly.

5. **For tables 3-1, 3-2, 5-1, and 5-2 in the TIA and tables 1 and 2 in the supplemental, please add units for queues.**

   TG Response: Units were clarified in the table headers and footnotes. To match Synchro reporting, 95th percentile queues were reported in feet (for signalized intersections) and 95th percentile queues were reported in car lengths (for unsignalized intersections)

6. **Include NCDOT comments from July 2022 referenced in section 6 in the appendix of the TIA if available.**

   TG Response: This was added as Appendix F.

7. **Please add a complete list of recommended improvements to the supplemental memo for clarity, even though the recommendations do not change from the TIA.**

   TG Response: The memo was updated accordingly.

8. **The following comment responses were provided by Timmons Group based on the initial submittal review. Please add these explanations in the body of the TIA report to provide a full picture of the analysis methodology:**

   - **Include discussion on why count data was not balanced between intersections and why Perry Curtis Road volumes were used for site access 1 and 2. TG Response: Traffic volumes were not balanced to the presence of commercial site driveways and various side streets. To provide the most accurate analyses, corridor volumes were not balanced. Site Access 1 and 2 volumes were balanced with Perry Curtis due to the driveways' proximities.**

     TG Response: Additional explanation provided on page 2-2.

   - **Please provide justification for the 3% growth rate used for background volume development. TG Response: The 3% growth rate is based on published AADTs.**

     TG Response: Justification was provided on page 3-2.

   - **In the Build scenario turn lane analysis, it's mentioned that both S Wakefield Street and NC 96 will have 2026 AADTs higher than 4,000 vpd. Please clarify if this is based on the existing AADT value and an assumption of growth or if this is based on the existing AADT including an assumed**

growth rate. TG Response: NC-96's AADT currently exceeds 4,000 VPD. Per future projections, this value is not projected to decrease. S Wakefield Street AADT projections are based on recent AADT counts (grown at 3% annually to 2026) and 30% of daily site trips on S Wakefield Street north of Site Access 3.

TG Response: Additional description was provided in Section 5.1 for the three site access intersections (pages 5-1 and 5-2)

- **Site access roads are listed as needing 100-feet of IPS. Please define IPS as internal protected stem in the text and reference the standards that guide this recommendation. TG Response: IPS was defined as "internal protected stem" in the updated TIA. IPS requirements are defined in the NCDOT's Driveway Manual.**

  TG Response: Additional description provided on page 6-1

9. **The alignment of the S Wakefield Street/Morphius Bridge and Pully Gordon Road intersection is not ideal for safe operations, but no improvements are required currently.**

   TG Response: Noted. This intersection was not included in the previously negotiated TIA scope.

Zebulon South

Traffic Impact Analysis

Zebulon, North Carolina

January 2024

1/26/24

Prepared for:

Deacon Development Group

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Contact: Jeff Hochanadel, PE, PTOE

5410 Trinity Road, Suite 102 • Raleigh, NC 27607
(919) 866-4511 phone • (919) 859-5663 fax
www.timmons.com

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APPENDICES

1 INTRODUCTION

This report presents the Zebulon South traffic impact analysis (TIA) findings. The proposed development will be located between NC-96 and South Wakefield Street south of Barbee Street (see **Figure 1-1**). The proposed development was analyzed to consist of 225 single-family residential units and 125 multi-family residential units and will be constructed by 2026. The current site plan shows 186 single-family residential units and 134 multi-family residential units. This change results in a more conservative analysis.

Analyses were completed for the following scenarios:

- 2022 Existing traffic volumes;
- 2026 Background traffic volumes; and
- 2026 Build traffic volumes (Background + site trips).

The purpose of this TIA is to verify that the existing geometry provided within the study area is sufficient to accommodate the projected traffic volumes, and to determine what, if any, proposed site access connection improvements are necessary.

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

1. Data Collection – AM (7:00 – 9:00) and PM (4:00 – 6:00) peak hour turning movement counts were collected in April 2022 at the following intersections:

   - NC-97 (Gannon Ave) / SR-2349 (South Wakefield Street);
   - NC-97 (Gannon Ave) / NC-96 (Arendell Ave);
   - NC-96 (Arendell Ave) / SR-2348 (West Barbee Street); and
   - NC-96 (Arendell Ave) / SR-2347 (Perry Curtis Road).

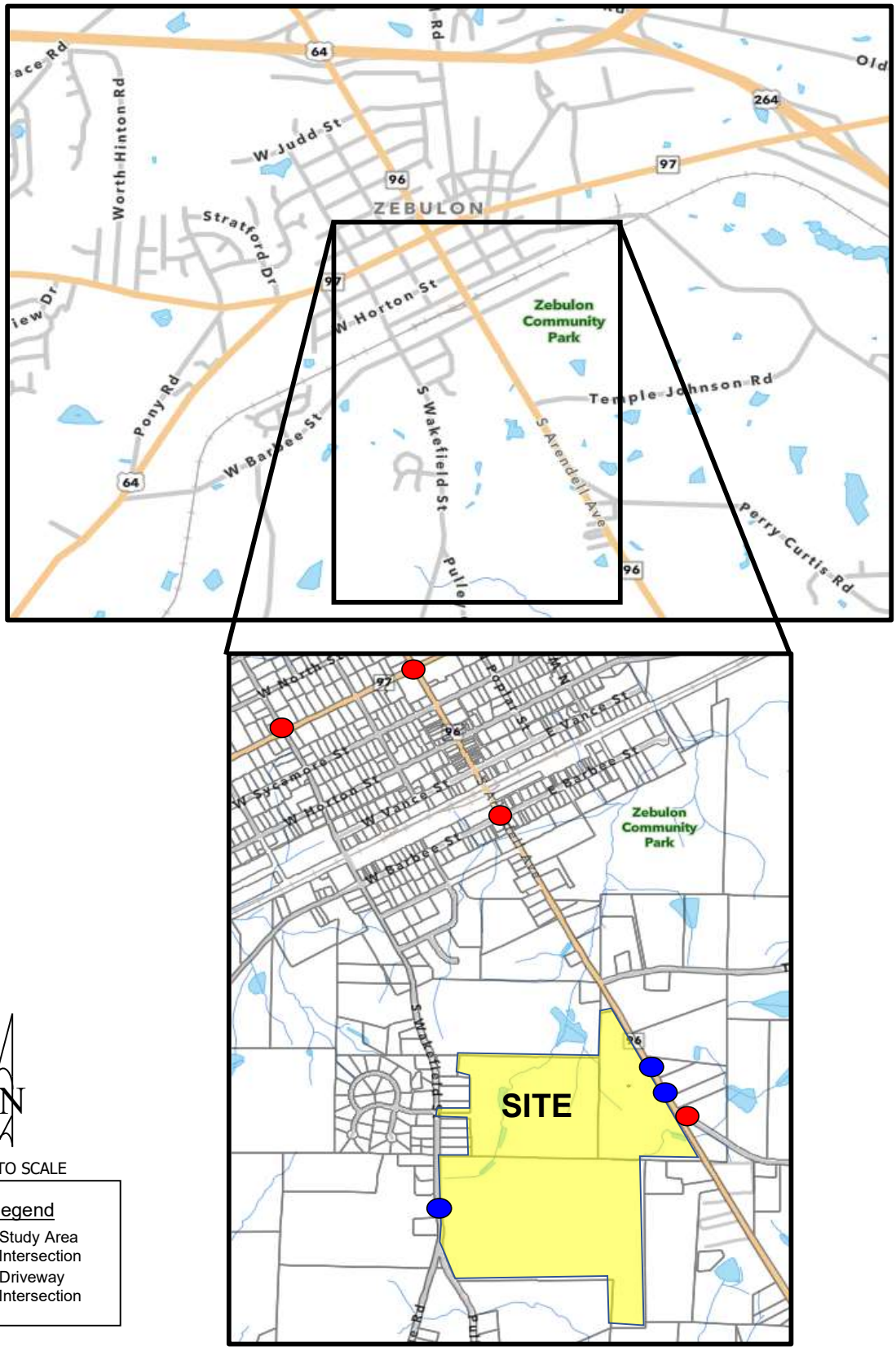
2. Trip Generation/Future Traffic – Traffic generated by the proposed development was estimated using the 10th Edition of the Institute of Transportation Engineers' *Trip Generation Manual*. Trip generation was calculated following the NCDOT standards and practices for trip generation. Projected traffic volumes were calculated using a 3% ambient growth rate. Per the scoping document, there are currently no approved developments within the project study area (see **Appendix A**).

3. Trip Distribution and Projections – The site-generated trip distribution was based on existing area traffic and Engineering judgement. It was assumed, for purposes of analysis, that projected trips for the Zebulon South development would follow similar patterns as existing traffic.

4. Traffic Capacity Analysis – Level of service analyses were performed using Synchro Version 11.1 for the following intersections:

   - NC-97 (Gannon Ave) / SR-2349 (South Wakefield Street) – signalized;
   - NC-97 (Gannon Ave) / NC-96 (Arendell Ave) – signalized;
   - NC-96 (Arendell Ave) / SR-2348 (West Barbee Street) – unsignalized;
   - NC-96 (Arendell Ave) / Site Access 1 – unsignalized;
   - NC-96 (Arendell Ave) / Site Access 2 – unsignalized;
   - NC-96 (Arendell Ave) / SR-2347 (Perry Curtis Road) – unsignalized; and
   - SR-2349 (South Wakefield Street) / Site Access 3 – unsignalized.

5. Review of Proposed Improvements – Roadway improvements proposed to accommodate projected site-generated traffic were evaluated.



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Zebulon South Traffic Impact Analysis

Site Location Map

Figure 1-1

2 EXISTING INFORMATION

The proposed development will be located NC-96 and South Wakefield Street south of West Barbee Street (see **Figure 1-1**).

2.1 STUDY LIMITS

Access to the proposed site will be provided via three (3) full movement connections: Two (2) to NC-96, and one (1) to South Wakefield Street. The preliminary site layout includes these proposed development site entrances (see **Figure 2-1**). All figures are located at the end of their respective chapter.

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

- NC-97 (Gannon Ave) / SR-2349 (South Wakefield Street) – signalized;
- NC-97 (Gannon Ave) / NC-96 (Arendell Ave) – signalized;
- NC-96 (Arendell Ave) / SR-2348 (West Barbee Street) – unsignalized;
- NC-96 (Arendell Ave) / Site Access 1 – unsignalized;
- NC-96 (Arendell Ave) / Site Access 2 – unsignalized;
- NC-96 (Arendell Ave) / SR-2347 (Perry Curtis Road) – unsignalized; and
- SR-2349 (South Wakefield Street) / Site Access 3 – unsignalized.

2.2 EXISTING ROADWAYS

NC-97 (W Gannon Ave) is an undivided facility with a varying two to three-lane cross section, running approximately east-west in the study area. The facility is classified by NCDOT as a minor arterial. Within the study area, NC-97 has a posted 35-mph speed limit and provides connection to downtown Zebulon. This facility primarily serves residential and commercial land uses within the study area. Per 2021 NCDOT Average Annual Daily Traffic (AADT) maps, NC-97 carries 14,500 vehicles per day (VPD) west of NC-96.

NC-96 (Arendell Ave) is a two-lane undivided facility, that runs approximately north-south in the study area. The facility is classified by NCDOT as a minor arterial. Within the study area, NC-96 has a posted 20-mph speed limit north of West Barbee St, 35-mph speed limit south of West Barbee St, and 45-mph speed limit south of the town limits. This facility primarily serves residential and commercial land uses within the study area. Per 2021 NCDOT AADT maps, NC-96 carries 6,700 VPD south of NC-97.

SR-2349 (South Wakefield Street) is a two-lane undivided facility, that runs approximately north-south in the study area. The facility is classified by NCDOT as a local road. Within the study area, NC-96 has a posted 25-mph speed limit north of West Horton St, a posted 35-mph speed limit south of West Horton Street and north of Primrose Place, and a 45 mph speed limit south of Primrose Place. This facility provides a connection to Zebulon. Per 2015 NCDOT AADT maps, South Wakefield Street carries 3,800 VPD south of NC-97.

SR-2348 (West Barbee Street) is a two-lane undivided facility, that runs approximately east-west in the study area. The facility is classified by NCDOT as a local road. Within the study area, West Barbee Street has a posted 25-mph speed limit and serves primarily residential and commercial land uses. Per 2015 NCDOT AADT maps, the facility carries 1,800 VPD east of South Wakefield Street.

SR-2347 (Perry Curtis Road) is a two-lane undivided facility that runs approximately east-west in the project study area, providing access to NC-96. The facility is classified by NCDOT as a local road. Within the study area, Perry Curtis Road primarily serves residential land uses and has a posted 55-mph speed limit. Per 2015 NCDOT AADT maps, the facility carries 1300 VPD east of NC-96.

2.3 EXISTING INTERSECTIONS

Using available aerial imagery, Timmons Group compiled the existing geometry for each study area intersection. The existing intersection geometry is shown in **Figure 2-2**.

NC-97 / South Wakefield Street is a two-phase signalized intersection. The north and southbound intersection approaches include a single shared left / through / right-turn lane. The east and westbound intersection approaches include of an exclusive left-turn lane and a shared through / right-turn lane.

NC-97 / NC-96 is an eight-phase signalized intersection. The north, south, and westbound intersection approaches include an exclusive left-turn lane and a shared through / right-turn lane. The eastbound approach includes exclusive right-turn, through, and left-turn lanes.

NC-96 / West Barbee Street is an unsignalized intersection with the east and westbound approaches encountering the stopped condition. All approaches include a single shared lane that serves all movements.

NC-96 / Perry Curtis Road is an unsignalized intersection with the westbound approach encountering the stopped condition. The northbound approach includes a shared through / right-turn lane. The southbound approach includes a shared through / left-turn lane. The westbound approach includes a shared left / right-turn lane.

2.4 TRAFFIC VOLUMES

Timmons Group calculated peak hour volumes at the study area intersections using the collected AM (7:00 – 9:00) and PM (4:00 – 6:00) peak period turning movement counts undertaken in April 2022. Collected traffic count data is summarized in **Figure 2-3**. The complete traffic count data is found in **Appendix B**.

Traffic volumes were not balanced to the presence of commercial site driveways and various side streets. To provide the most accurate analyses, corridor volumes were not balanced. Site Access 1 and 2 volumes were balanced with Perry Curtis due to the driveways' proximities.

2.5 CAPACITY ANALYSIS

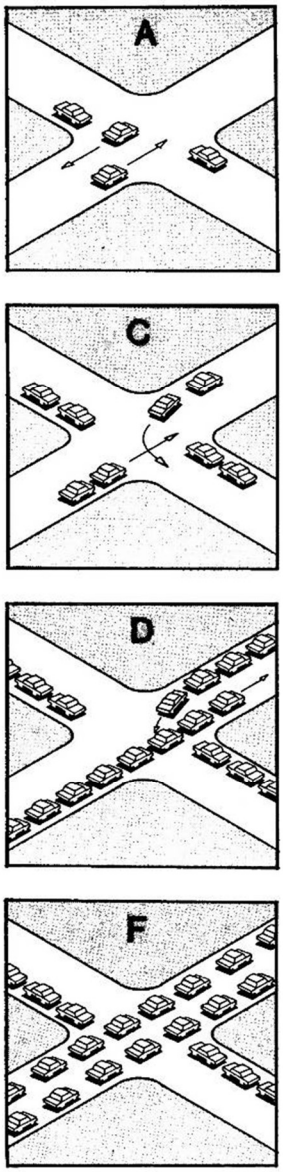
Using field observations, aerial photography, and traffic count data, traffic operations were analyzed during 2022 (existing) and 2026 (without and with the proposed development site trips).

Capacity analysis allows traffic engineers to determine the impacts of traffic on the surrounding roadway network. The Transportation Research Board's (TRB) *Highway Capacity Manual* (HCM) methodologies govern how the capacity analyses are conducted and how the results are interpreted. There are six letter grades of Levels of Service (LOS) from A to F, with LOS A representing the best operating conditions and LOS F the worst operating conditions. At signalized intersections, an overall intersection LOS E is generally considered unacceptable. At unsignalized intersections, a LOS E is generally considered acceptable only if the side street encounters delay. Nevertheless, side streets typically function at a LOS F during peak traffic periods, because the traffic volumes often do not warrant a traffic signal to assist side street traffic. **Table 2-1** shows in detail how each of these levels of service are interpreted.

Table 2-1: Level of Service Definitions

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

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



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

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

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

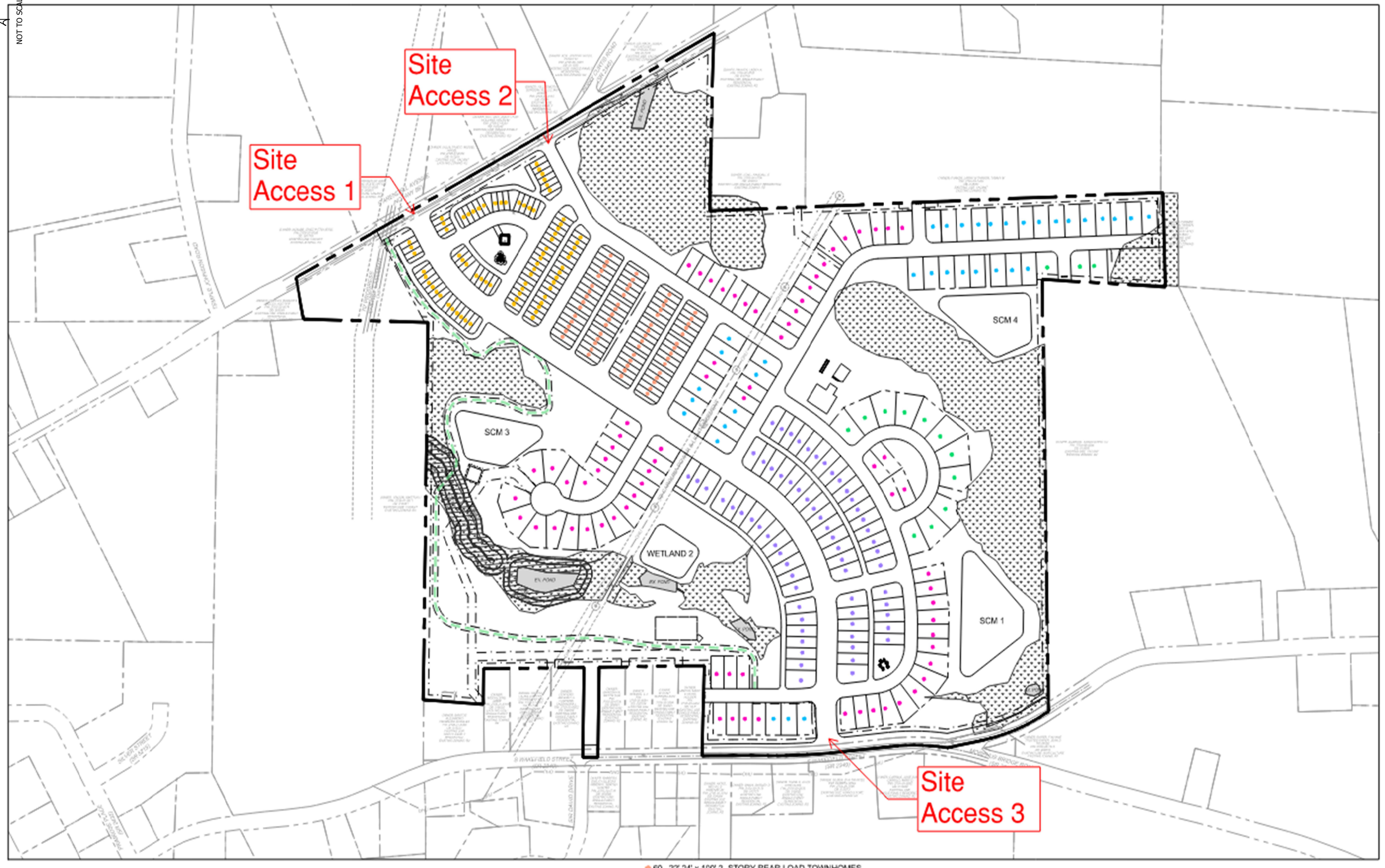
Source: Exhibit 16-2 and Exhibit 17-2 from TRB's "Highway Capacity Manual 2000"

Capacity analyses were performed to assess operational conditions. Study area intersections were analyzed using Synchro Version 11.1 based on Highway Capacity Manual (HCM) methodologies with the following assumptions:

- Existing grades;
- 12-foot lane widths;
- No parking activity, bus stops, or pedestrians;
- Peak hour factor (PHF) of 0.90;
- Heavy vehicle percentages 2%; and
- Minimum turning movement volume of 4 vehicles per hour (VPH) for all allowed movements; and
- Existing traffic signal plan signal data (see **Appendix C**).

Zebulon South Traffic Impact Analysis
Preliminary Site Layout

NOT TO SCALE



ZEBULON SOUTH

Preliminary Concept Sketch - December 14, 2023

AREA: 118.6 AC
PINS: 2705-41-3075, 2704-49-2511, & 2705-51-2202
EXISTING ZONING: R4 & R2
PROPOSED ZONING: PD
OVERALL DENSITY: 2.7 DUA

10% OPEN SPACE = 11.75 AC
50% ACTIVE OPEN SPACE = 5.88 AC

- 60 - 22',24' x 100' 2- STORY REAR LOAD TOWNHOMES
- 74 - 22' x 70' 3- STORY REAR LOAD TOWNHOMES
- 64 - 41' x 120' 4,800 SF REAR LOAD SINGLE FAMILY
- 72 - 51' x 120' 6,120 SF SINGLE FAMILY LOTS
- 36 - 60' x 120' 7,200 SF SINGLE FAMILY LOTS
- 14 - 70' x 120' 8,400 SF SINGLE FAMILY LOTS

TOTAL TOWNHOME LOTS: 134 LOTS (42%)
TOTAL SINGLE FAMILY LOTS: 186 LOTS (58%)
TOTAL # OF LOTS: 320

SCALE 1"=150'
0 150' 300'

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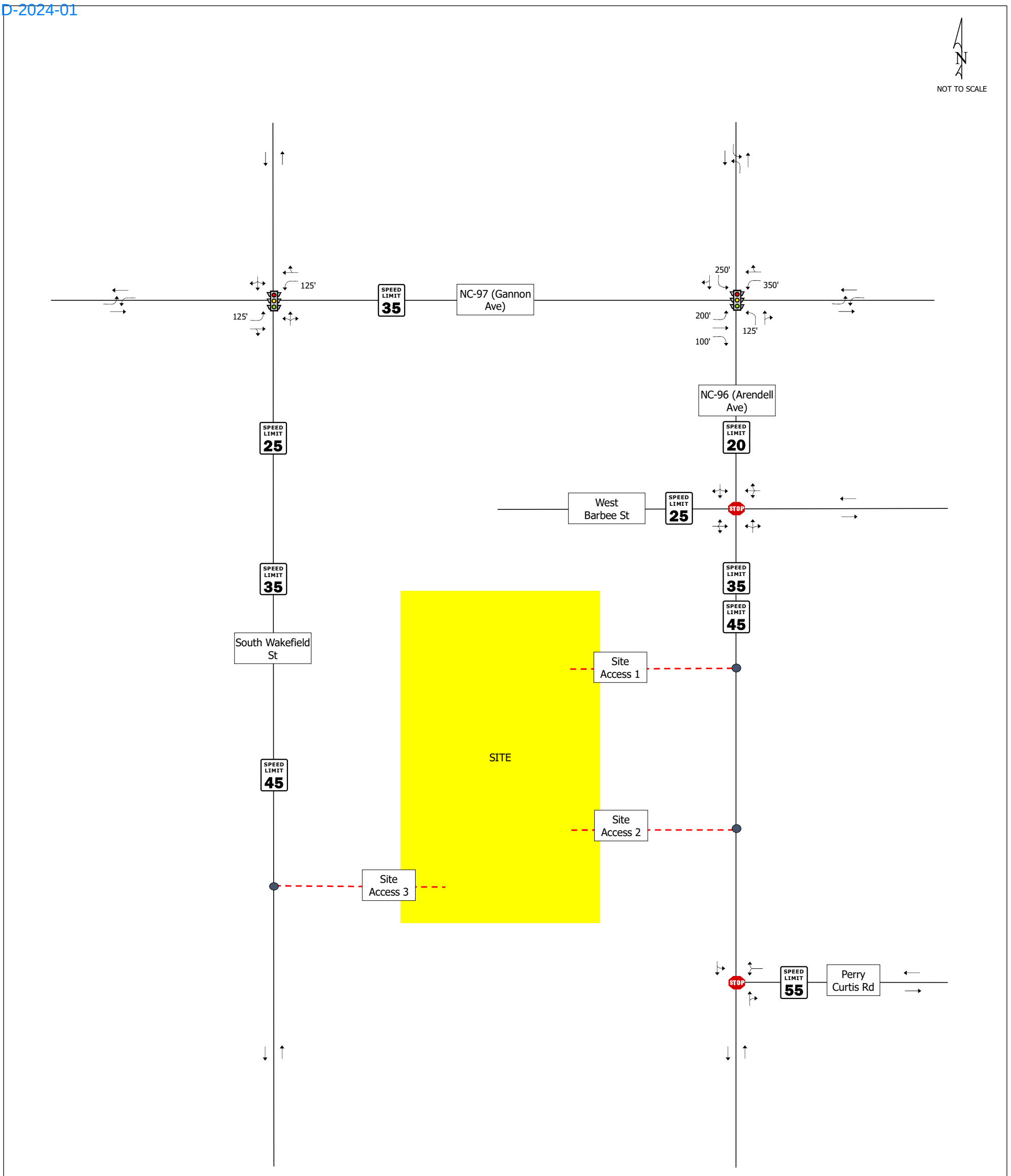

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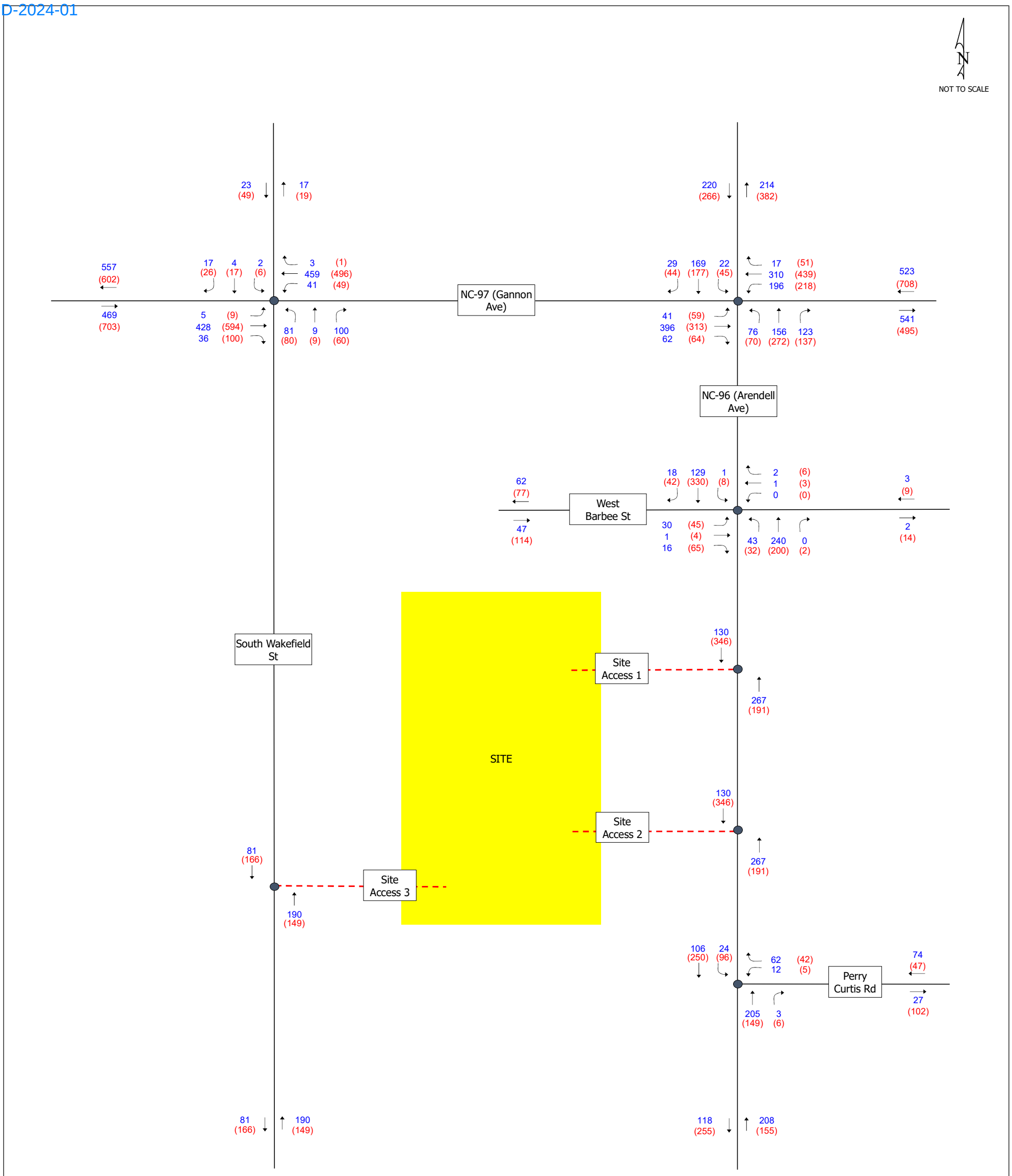
Zebulon South Traffic Impact Analysis

2022 Existing Lane Configuration

Figure 2-2



LEGEND:

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

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Zebulon South Traffic Impact Analysis

2022 Existing Traffic Volumes

Figure 2-3

3 EXISTING AND BACKGROUND CONDITIONS AND ANALYSIS

3.1 2022 EXISTING ANALYSES

Table 3-1 summarizes the 2022 Existing intersection LOS and delay based on the geometry shown in **Figure 2-2** and the 2022 Existing traffic volumes shown in **Figure 2-3**. The corresponding Synchro output is included in **Appendix D**.

The signalized intersection of NC-97 / South Wakefield Street is currently operating at an overall LOS B during both 2022 Existing peak hours. All intersection approaches are currently operating at a LOS C or better during both peak hours.

The signalized intersection of NC-97 / NC-96 is currently operating at an overall LOS C during both 2022 Existing peak hours. All intersection approaches are currently operating at a LOS D or better during both peak hours.

All NC-96 / West Barbee Street unsignalized intersection approaches are currently operating at a LOS C or better during the 2022 Existing AM and PM peak hours.

All NC-96 / Perry Curtis Road unsignalized intersection approaches are currently operating at a LOS B or better during the 2022 Existing AM and PM peak hours.

Table 3-1: Intersection Level of Service and Delay Summary
2022 Existing Traffic Volumes

Intersection	Approach / Overall	AM PEAK HOUR		PM PEAK HOUR		Movement	Turn Lane Storage (ft)	AM PEAK HOUR	PM PEAK HOUR
		Delay [1] (sec/veh)	LOS [1]	Delay [1] (sec/veh)	LOS [1]			95th Percentile Queue Length (ft)*	95th Percentile Queue Length (ft)*
1: S Wakefield Street & NC-97 (Gannon Avenue) *Signalized*	Eastbound	11.6	B	10.8	B	EB Left	125	5	6
						EB Thru/Right		170	291
						EB Approach		--	--
	Westbound	11.2	B	7.7	A	WB Left	125	21	24
						WB Thru/Right		168	170
						WB Approach		--	--
	Northbound	18.1	B	24.6	C	NB Left/Thru/Right		94	113
						NB Approach		--	--
	Southbound	11.0	B	17.9	B	SB Left/Thru/Right		18	44
						SB Approach		--	--
	Overall	12.5	B	11.3	B	Overall		--	--
2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue)) *Signalized*	Eastbound	31.2	C	32.6	C	EB Left	200	34	52
						EB Thru		#399	#321
						EB Right	100	47	56
						EB Approach		--	--
	Westbound	21.4	C	40.3	D	WB Left	350	125	#175
						WB Thru/Right		271	#599
						WB Approach		--	--
	Northbound	27.3	C	33.1	C	NB Left	125	54	50
						NB Thru/Right		233	357
						NB Approach		--	--
	Southbound	31.9	C	26.0	C	SB Left	250	22	35
						SB Thru/Right		170	184
						SB Approach		--	--
	Overall	27.2	C	34.7	C	Overall		--	--
3: NC-96 (Arendell Avenue) & Barbee Street *Unsignalized*	Eastbound	12.7	B	15.7	C	EB Left/Thru/Right		0.4	1.1
						EB Approach		--	--
	Westbound	12.3	B	13.9	B	WB Left/Thru/Right		0.1	0.1
						WB Approach		--	--
	Northbound	1.1	A	1.1	A	NB Left/Thru/Right		0.1	0.1
						NB Approach		--	--
	Southbound	0.2	A	0.2	A	SB Left/Thru/Right		0	0
						SB Approach		--	--
6: NC-96 (Arendell Avenue) & Perry Curtis Road *Unsignalized*	Westbound	10.3	B	10.0	B	WB Left/Right		0.4	0.2
						WB Approach		--	--
	Northbound	0.0	A	0.0	A	NB Thru/Right		0	0
						NB Approach		--	--
	Southbound	1.4	A	2.2	A	SB Left/Thru		0.1	0.2
						SB Approach		--	--

[1] *Overall intersection LOS and delay not reported for TWSC intersections.*

* - 95th percentile queues for unsignalized intersections reported in number of vehicles.

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

3.2 2026 BACKGROUND TRAFFIC VOLUMES

Figure 3-1 shows the 2026 ambient traffic volumes calculated using a 3% growth rate (based on published AADTs) for four (4) years.

Per the scoping document, there are currently no approved area develepments or public improvement projects within the study area (see **Appendix A**).

3.3 2026 BACKGROUND ANALYSIS

Table 3-2 summarizes the intersection LOS and delay based on the geometry shown in **Figure 2-2** and the 2026 Background traffic volumes shown in **Figure 3-1**. The corresponding Synchro output is included in **Appendix D**.

The signalized intersection of NC-97 / South Wakefield Street is projected to operate at an overall LOS B and C during the 2026 Background AM and PM peak hours, respectively. All intersection approaches are projected to operate at a LOS D or better during both peak hours.

The signalized intersection of NC-97 / NC-96 is projected to operate at an overall LOS C during the 2026 Background peak hours. All intersection approaches are projected to operate at a LOS D or better during both peak hours.

All NC-96 / West Barbee Street unsignalized intersection approaches are projected to operate at a LOS C or better during the 2026 Background AM and PM peak hours.

All NC-96 / Perry Curtis Road unsignalized intersection approaches are projected to operate at a LOS B or better during the 2026 Background AM and PM peak hours.

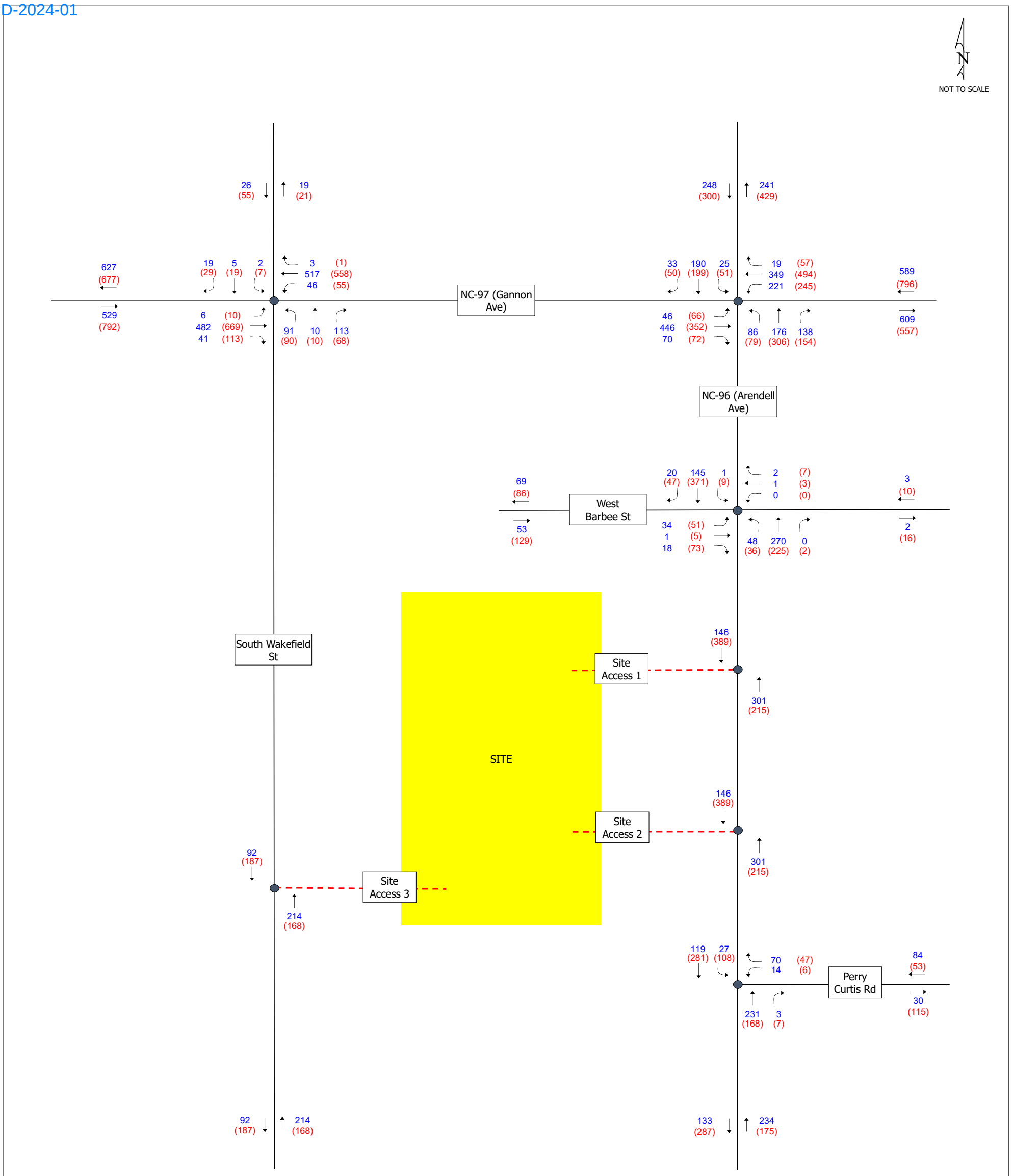
Table 3-2: Intersection Level of Service and Delay Summary
2026 Background Traffic Volumes

Intersection	Approach / Overall	AM PEAK HOUR		PM PEAK HOUR		Movement	Turn Lane Storage (ft)	AM PEAK HOUR	PM PEAK HOUR
		Delay [1] (sec/veh)	LOS [1]	Delay [1] (sec/veh)	LOS [1]			95th Percentile Queue Length (ft)*	95th Percentile Queue Length (ft)*
1: S Wakefield Street & NC-97 (Gannon Avenue) *Signalized*	Eastbound	22.3	C	25.1	C	EB Left	125	10	10
						EB Thru/Right		368	#602
						EB Approach		--	--
	Westbound	13.4	B	10.0	A	WB Left	125	63	72
						WB Thru/Right		241	184
						WB Approach		--	--
	Northbound	31.3	C	54.1	D	NB Left/Thru/Right		199	#213
						NB Approach		--	--
	Southbound	23.3	C	33.8	C	SB Left/Thru/Right		35	67
						SB Approach		--	--
	Overall	20.0	B	22.7	C	Overall		--	--
2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue)) *Signalized*	Eastbound	31.6	C	36.6	D	EB Left	200	45	72
						EB Thru		360	#309
						EB Right	100	60	70
						EB Approach		--	--
	Westbound	21.6	C	27.2	C	WB Left	350	#226	#276
						WB Thru/Right		155	339
						WB Approach		--	--
	Northbound	38.6	D	37.1	D	NB Left	125	92	74
						NB Thru/Right		#304	#422
						NB Approach		--	--
	Southbound	30.8	C	26.4	C	SB Left	250	36	66
						SB Thru/Right		195	189
						SB Approach		--	--
	Overall	29.8	C	31.8	C	Overall		--	--
3: NC-96 (Arendell Avenue) & Barbee Street *Unsignalized*	Eastbound	13.6	B	18.3	C	EB Left/Thru/Right		0.4	1.5
						EB Approach		--	--
	Westbound	13.0	B	14.9	B	WB Left/Thru/Right		0.1	0.1
						WB Approach		--	--
	Northbound	1.1	A	1.1	A	NB Left/Thru/Right		0.1	0.1
						NB Approach		--	--
	Southbound	0.2	A	0.2	A	SB Left/Thru/Right		0	0
						SB Approach		--	--
6: NC-96 (Arendell Avenue) & Perry Curtis Road *Unsignalized*	Westbound	10.7	B	10.4	B	WB Left/Right		0.4	0.3
						WB Approach		--	--
	Northbound	0.0	A	0.0	A	NB Thru/Right		0	0
						NB Approach		--	--
	Southbound	1.4	A	2.2	A	SB Left/Thru		0.1	0.3
						SB Approach		--	--

[1] *Overall intersection LOS and delay not reported for TWSC intersections.*

* - 95th percentile queues for unsignalized intersections reported in number of vehicles.

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



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Zebulon South Traffic Impact Analysis

2026 Background Traffic Volumes

Figure 3-1

4 SITE TRIP GENERATION AND DISTRIBUTION

Proposed development site trips were estimated based on the proposed land uses supplied by the developer and subsequently distributed onto the surrounding roadway network.

4.1 TRIP GENERATION

The site-generated trips shown in **Table 4-1** are based on trip generation information provided in the 10th Edition of the Institute of Transportation Engineers' (ITE's) *Trip Generation Manual* and the anticipated development size. The trip generation was calculated using the proposed number of residential units as the independent variable and the provided equation (per NCDOT standards). The proposed development was analyzed to consist of 225 single-family residential units and 125 multi-family residential units and will be constructed by 2026. The current site plan shows 186 single-family residential units and 134 multi-family residential units. This change results in a more conservative analysis.

Table 4-1: Trip Generation Summary

ITE Land Use Code	Independent Variable	ADT	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
210- Single Family Detached Housing	225	2193	41	124	165	139	82	221
220- Multifamily Housing (Low-Rise)	125	904	14	45	59	45	27	72
Total		3097	55	169	224	184	109	293

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

AM peak hour trips generated totaled 55 incoming and 169 outgoing where PM peak hour trips totaled 184 incoming and 109 outgoing. Average daily traffic (ADT) volumes generated by the development totaled 3,097 VPD. No reduction in trips were included due to internal capture or pass-by trips.

4.2 TRIP DISTRIBUTION

The directional traffic patterns, or trip distribution, of the site-generated traffic was determined using the existing traffic characteristics and engineering judgement. It was assumed, for purposes of this study, that all site traffic would enter and exit the study area in a similar manner as the existing traffic. Area trip distribution is based on traffic counts performed by Timmons Group. Total trips into and out of the study area using NC-96, NC-97, South Wakefield Street, and Perry Curtis Road form the basis for the percentage distribution. The percentages were routed, via shortest path, to and from the proposed development. The distribution percentages were then applied to the generated trips to predict routes and project traffic volumes for the 2026 Build scenario. Trip distribution percentages are shown in **Figure 4-1** and trip distribution volumes are shown in **Figure 4-2**.

N

NOT TO SCALE

NC-97 (Gannon Ave)

NC-96 (Arendell Ave)

West Barbee St

South Wakefield St

SITE

Site Access 1

Site Access 2

Site Access 3

Perry Curtis Rd

LEGEND:

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

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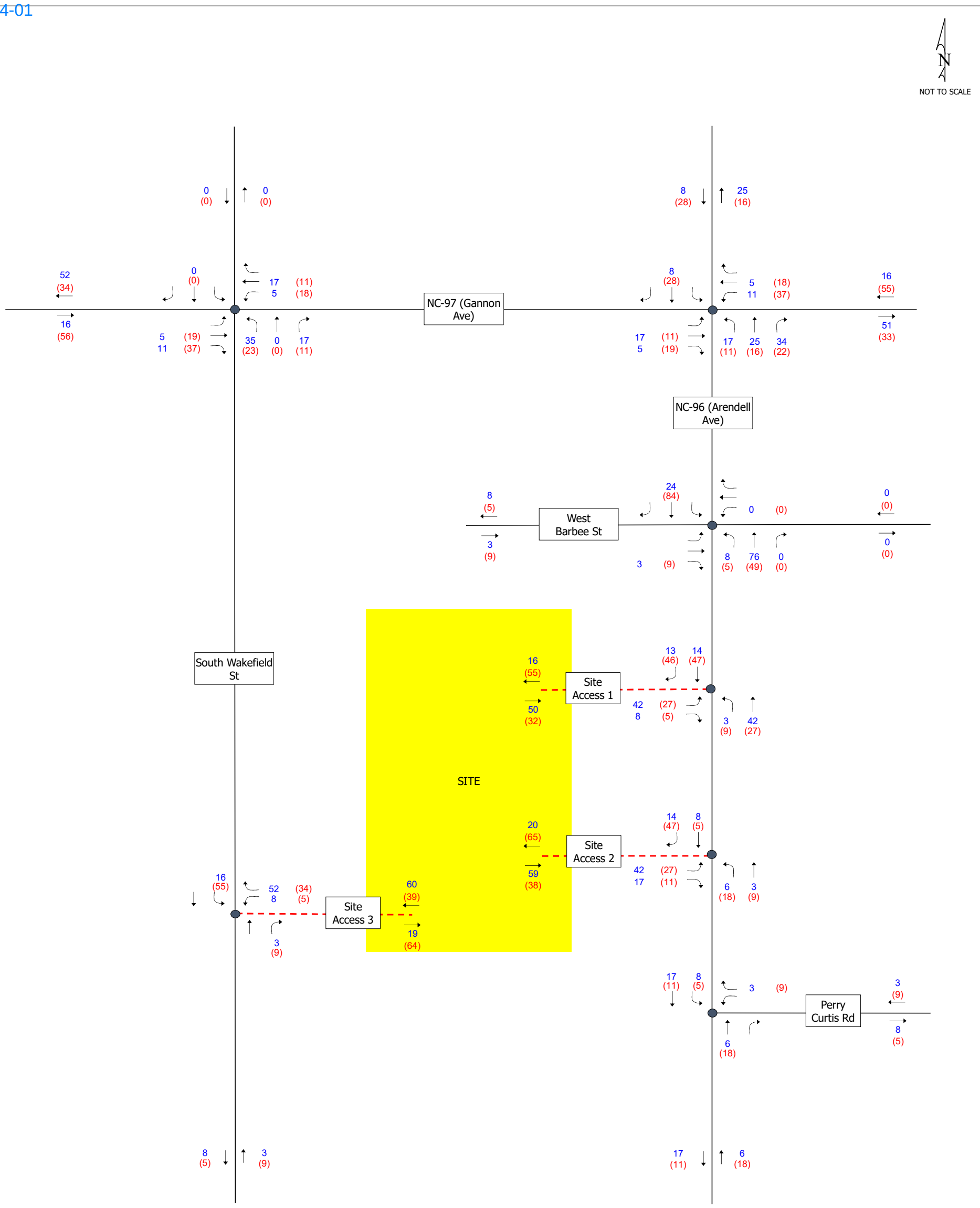
Zebulon South Traffic Impact Analysis

Trip Distribution Percentages

Figure 4-1



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Zebulon South Traffic Impact Analysis

Trip Distribution Volumes

Figure 4-2

5 2026 BUILD CONDITION AND ANALYSIS

To complete the 2026 Build analyses (including proposed development), the estimated site trips were added to the 2026 Background traffic volumes. The projected total volumes, along with the existing intersection geometry, were used to complete the capacity analyses. The 2026 Background traffic volumes (**Figure 3-1**) were added to the projected site trips (**Figure 4-2**) to generate the 2026 Build traffic volumes (background + site) shown in **Figure 5-1**.

To summarize, the 2026 Build traffic volumes shown in **Figure 5-1** contain the following:

- Existing 2022 traffic volumes grown by a 3% per year ambient growth rate for 4 years; and
- Site trips generated by the subject development.

5.1 2026 BUILD ANALYSIS

Table 5-1 summarizes the intersection LOS and delay based on the geometry shown in **Figure 2-2** and the 2026 Build traffic volumes shown in **Figure 5-1**. The corresponding Synchro output is included in **Appendix D**.

The signalized intersection of NC-97 / South Wakefield Street is projected to operate at an overall LOS C during both 2026 Build peak hours. All intersection approaches are projected to operate at a LOS D or better during both peak hours. No improvements are recommended at this intersection due to the proposed development's construction.

The signalized intersection of NC-97 / NC-96 is projected to operate at an overall LOS C and D during the 2026 Build AM and PM peak hours, respectively. All intersection approaches are projected to operate at a LOS D or better during both peak hours. No improvements are recommended at this intersection due to the proposed development's construction.

All NC-96 / West Barbee Street unsignalized intersection approaches are projected to operate at a LOS C or better during the 2026 Background AM and PM peak hours. No improvements are recommended at this intersection due to the proposed development's construction.

All NC-96 / Site Access 1 unsignalized intersection approaches are projected to operate at a LOS C or better during the 2026 Background AM and PM peak hours. Per the NCDOT Policy on Street and Driveway Access to North Carolina Highways Manual:

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

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

The 2026 AADT along NC-96 currently exceeds 4,000 VPD and is not projected to decrease. Because of this, turn lanes were considered at Site Access 1. Per the NCDOT Nomograph (see **Appendix E**) and projected 2026 peak hour volumes, a 50-foot southbound right-turn lane (with appropriate taper) is recommended. As shown in **Table 5-2**, all intersection movements are projected to operate acceptably following the turn-lane's construction. No additional improvements are recommended at this intersection due to the proposed development's construction.

All NC-96 / Site Access 2 unsignalized intersection approaches are projected to operate at a LOS B or better during the 2026 Background AM and PM peak hours. The 2026 AADT along NC-96 currently exceeds 4,000 VPD and is not projected to decrease.Because of this, turn lanes were considered at Site Access 2. Per the NCDOT Nomograph (see **Appendix E**) and projected 2026 peak hour volumes, a 50-foot southbound right-turn lane (with appropriate taper) is recommended. As shown in **Table 5-2**, all intersection movements are projected to operate acceptably following the turn-lane's construction. No additional improvements are recommended at this intersection due to the proposed development's construction.

All NC-96 / Perry Curtis Road unsignalized intersection approaches are projected to operate at a LOS B or better during the 2026 Background AM and PM peak hours. No improvements are recommended at this intersection due to the proposed development's construction.

All South Wakefield Street/ Site Access 3 unsignalized intersection approaches are projected to operate at a LOS B or better during the 2026 Background AM and PM peak hours. The 2026 AADT along South Wakefield Street is projected to exceed 4,000 VPD (based on recent AADT counts grown at 3% annually to 2026 and 30% of daily site trips on S Wakefield Street north of Site Access 3). Because of this, turn lanes were considered at Site Access 3. Per the NCDOT Nomograph (see **Appendix E**) and projected 2026 peak hour volumes, a 50-foot southbound left-turn lane (with appropriate taper) is recommended. As shown in **Table 5-2**, all intersection movements are projected to operate acceptably following the turn-lane's construction. No additional improvements are recommended at this intersection due to the proposed development's construction.

Table 5-1: Intersection Level of Service and Delay Summary
2026 Build Traffic Volumes

Intersection	Approach / Overall	AM PEAK HOUR		PM PEAK HOUR		Movement	Turn Lane Storage (ft)	AM PEAK HOUR	PM PEAK HOUR
		Delay [1] (sec/veh)	LOS [1]	Delay [1] (sec/veh)	LOS [1]			95th Percentile Queue Length (ft)*	95th Percentile Queue Length (ft)*
1: S Wakefield Street & NC-97 (Gannon Avenue) *Signalized*	Eastbound	25.4	C	37.5	D	EB Left	125	10	11
						EB Thru/Right		403	#774
						EB Approach		--	--
	Westbound	15.7	B	12.9	B	WB Left	125	68	90
						WB Thru/Right		272	229
						WB Approach		--	--
	Northbound	33.9	C	53.0	D	NB Left/Thru/Right		#264	#234
						NB Approach		--	--
	Southbound	22.5	C	30.8	C	SB Left/Thru/Right		34	63
						SB Approach		--	--
	Overall	22.9	C	30.0	C	Overall		--	--
2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue)) *Signalized*	Eastbound	33.6	C	42.2	D	EB Left	200	45	75
						EB Thru		378	#365
						EB Right	100	63	87
						EB Approach		--	--
	Westbound	25.9	C	29.9	C	WB Left	350	#268	#309
						WB Thru/Right		168	356
						WB Approach		--	--
	Northbound	41.6	D	42.1	D	NB Left	125	106	85
						NB Thru/Right		#370	#481
						NB Approach		--	--
	Southbound	29.4	C	29.1	C	SB Left	250	36	#84
						SB Thru/Right		195	212
						SB Approach		--	--
	Overall	32.6	C	35.7	D	Overall		--	--
3: NC-96 (Arendell Avenue) & Barbee Street *Unsignalized*	Eastbound	15.4	C	23.7	C	EB Left/Thru/Right		0.6	2.2
						EB Approach		--	--
	Westbound	14.7	B	17.7	C	WB Left/Thru/Right		0.1	0.2
						WB Approach		--	--
	Northbound	1.1	A	1.1	A	NB Left/Thru/Right		0.1	0.1
						NB Approach		--	--
	Southbound	0.2	A	0.1	A	SB Left/Thru/Right		0	0
						SB Approach		--	--
4: NC-96 (Arendell Avenue) & Site Access 1 *Unsignalized*	Eastbound	12.9	B	15.7	C	EB Left/Right		0.4	0.3
						EB Approach		--	--
	Northbound	0.1	A	0.3	A	NB Left/Thru		0	0
						NB Approach		--	--
	Southbound	0.0	A	0.0	A	SB Thru/Right		0	0
						SB Approach		--	--
5: NC-96 (Arendell Avenue) & Site Access 2 *Unsignalized*	Eastbound	12.1	B	14.7	B	EB Left/Right		0.4	0.3
						EB Approach		--	--
	Northbound	0.1	A	0.6	A	NB Left/Thru		0	0.1
						NB Approach		--	--
	Southbound	0.0	A	0.0	A	SB Thru/Right		0	0
						SB Approach		--	--
6: NC-96 (Arendell Avenue) & Perry Curtis Road *Unsignalized*	Westbound	10.8	B	10.5	B	WB Left/Right		0.5	0.3
						WB Approach		--	--
	Northbound	0.0	A	0.0	A	NB Thru/Right		0	0
						NB Approach		--	--
	Southbound	1.6	A	2.2	A	SB Left/Thru		0.1	0.3
						SB Approach		--	--
7: S Wakefield Street & Site Access 3 *Unsignalized*	Westbound	10.1	B	9.9	A	WB Left/Right		0.3	0.2
						WB Approach		--	--
	Northbound	0.0	A	0.0	A	NB Thru/Right		0	0
						NB Approach		--	--
	Southbound	1.1	A	1.8	A	SB Left/Thru		0	0.1
						SB Approach		--	--

[1] *Overall intersection LOS and delay not reported for TWSC intersections.*

* - 95th percentile queues for unsignalized intersections reported in number of vehicles.

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

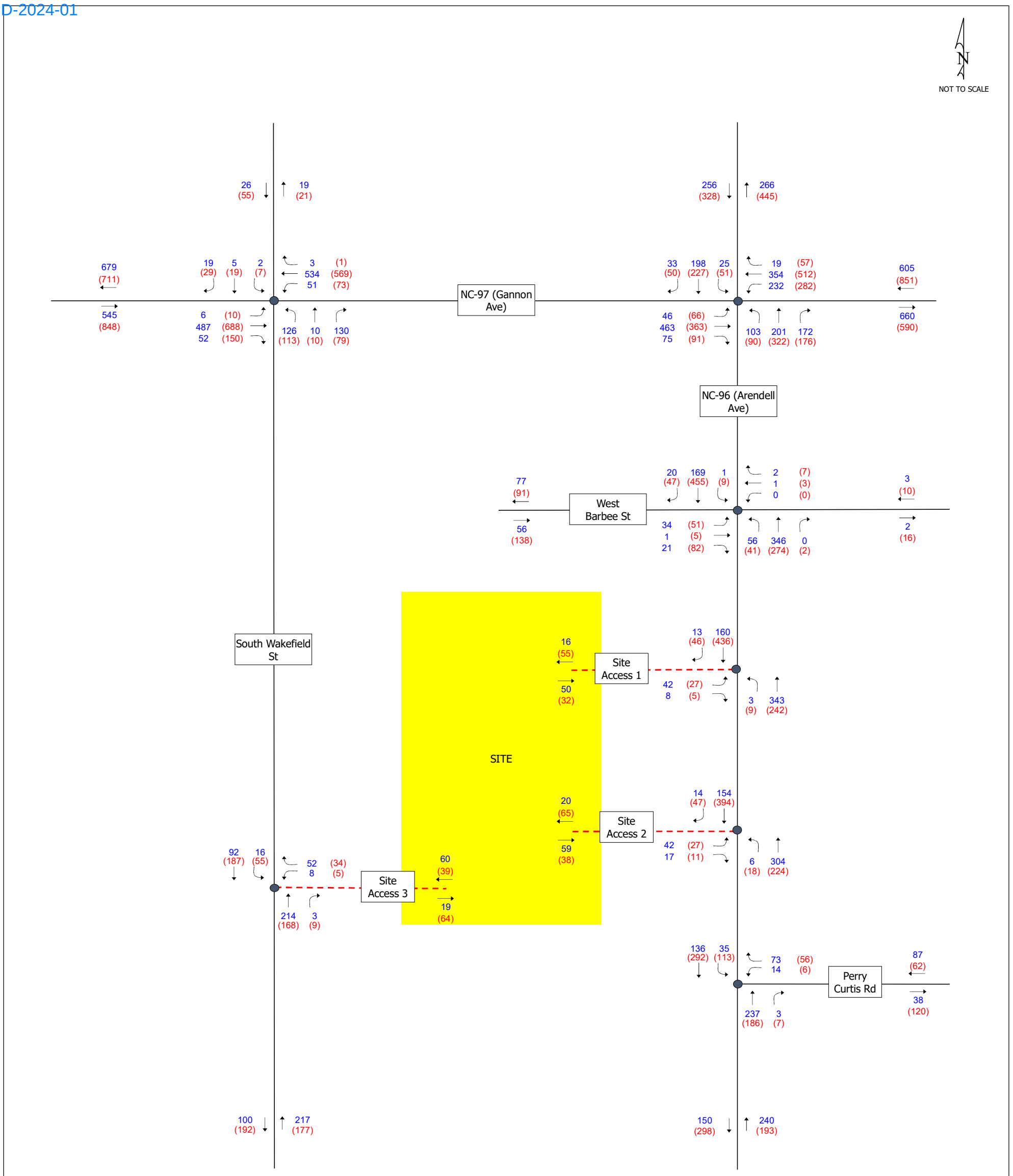
Table 5-2: Intersection Level of Service and Delay Summary
2026 Build + Improvement Traffic Volumes

Intersection	Approach / Overall	AM PEAK HOUR		PM PEAK HOUR		Movement	Turn Lane Storage (ft)	AM PEAK HOUR 95th Percentile Queue Length (ft)*	PM PEAK HOUR 95th Percentile Queue Length (ft)*
		Delay [1] (sec/veh)	LOS [1]	Delay [1] (sec/veh)	LOS [1]				
4: NC-96 (Arendell Avenue) & Site Access 1 *Unsignalized*	Eastbound	12.7	B	15.3	C	EB Left/Right		0.4	0.3
						EB Approach		--	--
	Northbound	0.1	A	0.3	A	NB Left/Thru		0	0
						NB Approach		--	--
	Southbound	0.0	A	0.0	A	SB Thru		0	0
						SB Right	50	0	0
						SB Approach		--	--
5: NC-96 (Arendell Avenue) & Site Access 2 *Unsignalized*	Eastbound	12.0	B	14.3	B	EB Left/Right		0.4	0.3
						EB Approach		--	--
	Northbound	0.1	A	0.6	A	NB Left/Thru		0	0.1
						NB Approach		--	--
	Southbound	0.0	A	0.0	A	SB Thru		0	0
						SB Right	50	0	0
						SB Approach		--	--
7: S Wakefield Street & Site Access 3 *Unsignalized*	Westbound	10.1	B	9.9	A	WB Left/Right		0.3	0.2
						WB Approach		--	--
	Northbound	0.0	A	0.0	A	NB Thru/Right		0	0
						NB Approach		--	--
	Southbound	1.1	A	1.8	A	SB Left	50	0	0.1
						SB Thru		0	0
						SB Approach		--	--

[1] *Overall intersection LOS and delay not reported for TWSC intersections.*

* - 95th percentile queues for unsignalized intersections reported in number of vehicles.

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



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Zebulon South Traffic Impact Analysis

2026 Build Traffic Volumes

Figure 5-1

6 CONCLUSIONS AND RECOMMENDATIONS

Capacity analyses were performed for the following scenarios:

- 2022 Existing traffic volumes
- 2026 Background traffic volumes
- 2026 Build traffic volumes (Background + site trips)

In closing, the following improvements (see **Figure 6-1**) are recommended in conjunction with the construction of the proposed development*:

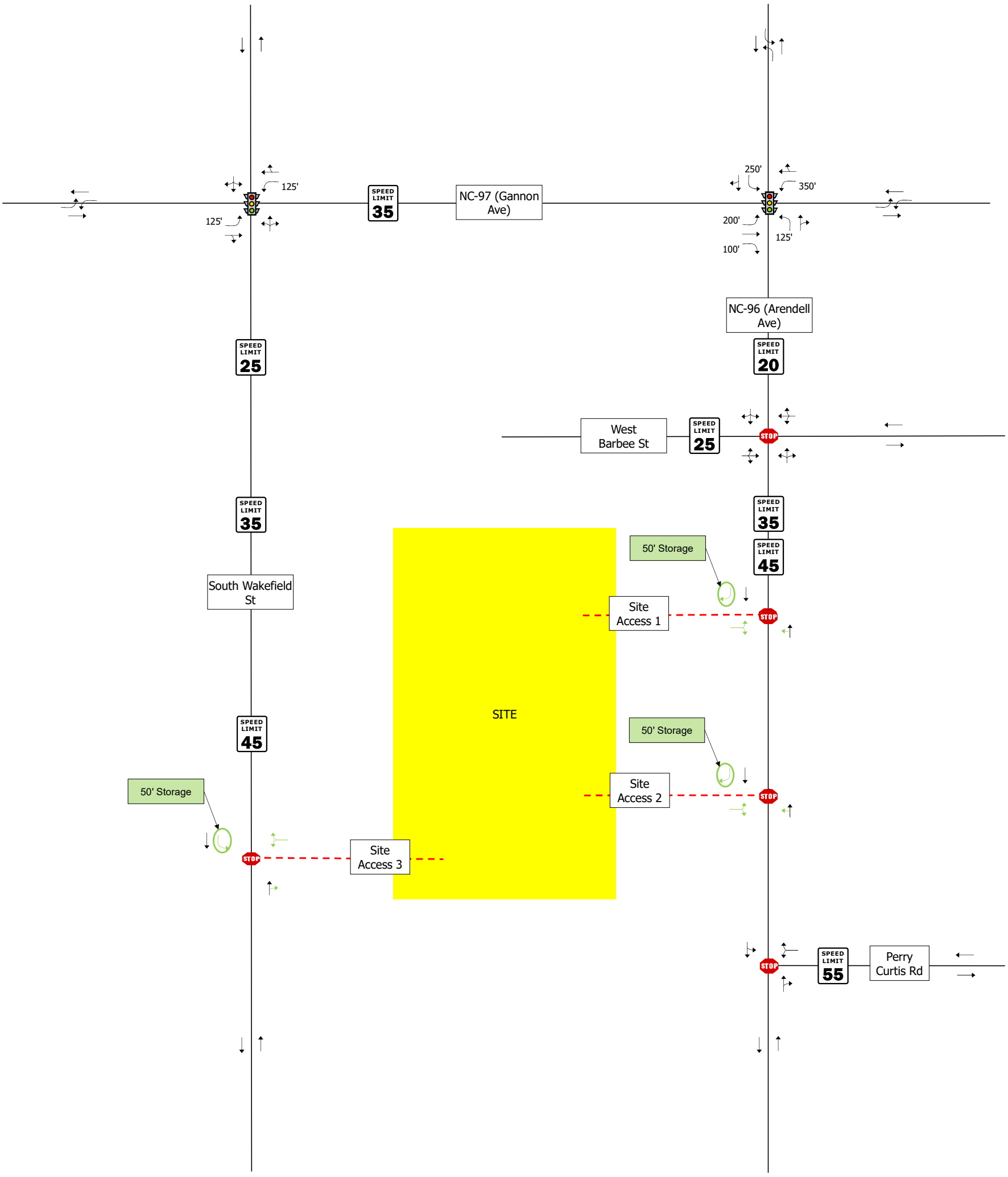
- NC-97 / South Wakefield Street
  - None
- NC-97 / NC-96
  - None
- NC-96 / West Barbee Street
  - None
- NC-96 / Site Access 1
  - 50-foot southbound right-turn lane (with appropriate taper)
  - 100-feet IPS (Internal Protected Stem) along Site Access 1**
- NC-96 / Site Access 2
  - 50-foot southbound right-turn lane (with appropriate taper)
  - 100-feet IPS along Site Access 2**
- NC-96 / Perry Curtis Road
  - None
- South Wakefield Street / Site Access 3
  - 50-foot southbound left-turn lane (with appropriate taper)
  - 100-feet IPS along Site Access 3**

* NCDOT comments provided in July 2022 **(see Appendix F)** required additional improvements at the intersections of NC-96 / Site Access 1 and NC-96 / Site Access 2. These improvements were not analyzed or included to represent a more conservative scenario.

** IPS requirements are defined in the NCDOT's Driveway Manual.

N

NOT TO SCALE



LEGEND:

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

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Zebulon South Traffic Impact Analysis

2026 Proposed Lane Configuration

Figure 6-1

Appendix A – Scoping Information

From:	Brennan, Sean P
To:	Jeff Hochanadel; Meade Bradshaw; Warren, Jeremy L; Ishak, Doumit Y; Bunting, Clarence B; Lineberger, Nicholas C; Walker, Braden M
Cc:	Cliff Lawson; Beth Blackmon
Subject:	Re: [External] Zebulon South TIA Scoping
Date:	Friday, April 1, 2022 10:20:18 AM
Attachments:	49084-331C-SPLAYO3-Layout1.pdf

Jeff,

Isn't there a 3rd site access that connects to S Wakefield St? So you might want to include S Wakefield and W Gannon Ave as well.

I have some concerns with the site access to S Arendell located across from Perry Curtis Rd. The geometry of that intersection makes adding a 4th leg difficult.

Regards,

Sean Brennan, PE
Senior Assistant District Engineer
Division 5/District 1
Department of Transportation

919-733-3213 office
919-715-5778 fax
spbrennan@ncdot.gov

4009 District Drive (Physical Address)
Raleigh, NC 27607

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Raleigh, NC 27699-1575

cid:image001.png@01D10DA4.5CC88DA0

From: Jeff Hochanadel <Jeff.Hochanadel@timmons.com>
Sent: Thursday, March 31, 2022 4:51 PM
To: Meade Bradshaw <Mbradshaw@townofzebulon.org>; Brennan, Sean P <spbrennan@ncdot.gov>; Warren, Jeremy L <jlwarren@ncdot.gov>; Ishak, Doumit Y <dishak@ncdot.gov>; Bunting, Clarence B <cbunting@ncdot.gov>; Lineberger, Nicholas C <nclineberger@ncdot.gov>; Walker, Braden M <bmwalker1@ncdot.gov>

Cc: Cliff Lawson <cliff.lawson@timmons.com>; Beth Blackmon <Beth.Blackmon@timmons.com>
Subject: [External] Zebulon South TIA Scoping

All,

Timmons Group would like to scope a TIA for the subject residential development in Zebulon, NC. Per the attached conceptual site plan, the proposed development will consist of 148 townhomes and 166 single-family lots to be constructed off NC-96 (Arendell Avenue). I am ok scoping this via email or we could set up a virtual meeting to discuss the subject project.

Our scoping assumptions include the following:

- Study Area Intersections:
  - NC-97 (Gannon Avenue) / NC-96 (Arendell Avenue)
  - W Barbee Street / NC-96 (Arendell Avenue)
  - Site Access 1 / NC-96 (Arendell Avenue)
  - Site Access 2 / NC-96 (Arendell Avenue)
  - Perry Curtis Road / NC-96 (Arendell Avenue)

- Growth Rate:
  - 3%

- Approved Area Developments:
  - None

- STIP Projects:
  - None

- Build-Out Years:
  - Phase 1 – 2024
  - Phase 2 – 2026

Once we have determined the final project scope, I will be happy to submit the NCDOT TIA Scoping Checklist (as needed).

Please do not hesitate to contact me with any questions.

Thanks!
Jeff

Jeff Hochanadel, PE, PTOE
Principal | North Carolina Transportation Group Leader
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Cell: 919.426.8405
jeff.hochanadel@timmons.com
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Appendix B – Traffic Counts

TRAFFIC DATA COLLECTION

File Name : Zebulon(NC 96 and Barbee)
Site Code :
Start Date : 4/5/2022
Page No : 1

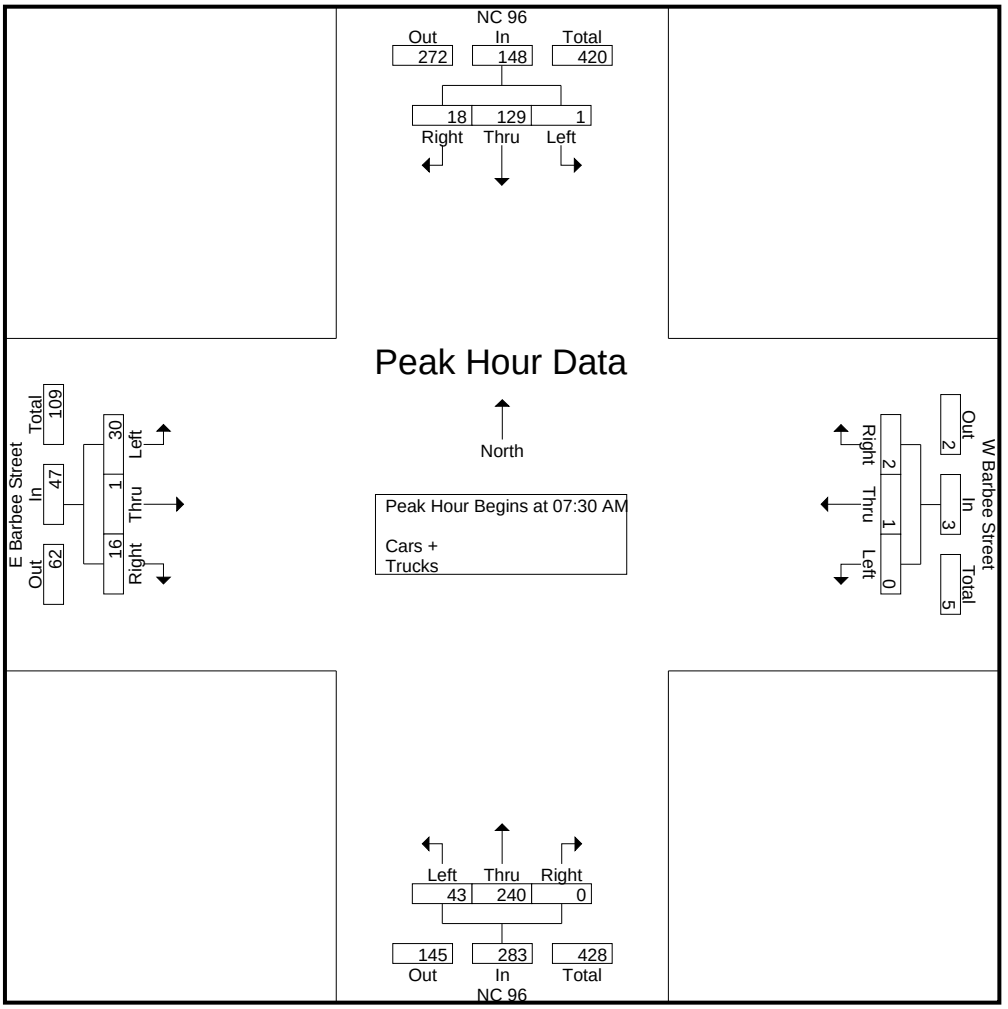
Groups Printed- Cars + - Trucks

	NC 96 Southbound				W Barbee Street Westbound				NC 96 Northbound				E Barbee Street Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
07:00 AM	7	15	0	22	1	0	0	1	1	47	7	55	7	1	5	13	91
07:15 AM	3	18	1	22	1	1	0	2	1	67	11	79	2	0	5	7	110
07:30 AM	5	27	0	32	0	0	0	0	0	62	12	74	2	1	5	8	114
07:45 AM	7	33	0	40	1	0	0	1	0	73	9	82	6	0	10	16	139
Total	22	93	1	116	3	1	0	4	2	249	39	290	17	2	25	44	454
08:00 AM	2	34	0	36	1	0	0	1	0	53	12	65	7	0	5	12	114
08:15 AM	4	35	1	40	0	1	0	1	0	52	10	62	1	0	10	11	114
08:30 AM	5	26	1	32	1	0	0	1	0	52	7	59	4	0	10	14	106
08:45 AM	8	26	0	34	0	0	0	0	0	50	14	64	6	1	6	13	111
Total	19	121	2	142	2	1	0	3	0	207	43	250	18	1	31	50	445
Grand Total	41	214	3	258	5	2	0	7	2	456	82	540	35	3	56	94	899
Apprch %	15.9	82.9	1.2		71.4	28.6	0		0.4	84.4	15.2		37.2	3.2	59.6		
Total %	4.6	23.8	0.3	28.7	0.6	0.2	0	0.8	0.2	50.7	9.1	60.1	3.9	0.3	6.2	10.5	
Cars +	37	195	3	235	5	2	0	7	2	436	81	519	34	3	53	90	851
% Cars +	90.2	91.1	100	91.1	100	100	0	100	100	95.6	98.8	96.1	97.1	100	94.6	95.7	94.7
Trucks	4	19	0	23	0	0	0	0	0	20	1	21	1	0	3	4	48
% Trucks	9.8	8.9	0	8.9	0	0	0	0	0	4.4	1.2	3.9	2.9	0	5.4	4.3	5.3

TRAFFIC DATA COLLECTION

File Name : Zebulon(NC 96 and Barbee)
Site Code :
Start Date : 4/5/2022
Page No : 2

	NC 96 Southbound				W Barbee Street Westbound				NC 96 Northbound				E Barbee Street Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	5	27	0	32	0	0	0	0	0	62	**12**	74	2	**1**	5	8	114
07:45 AM	**7**	33	0	**40**	**1**	0	0	**1**	0	**73**	9	**82**	6	0	**10**	**16**	**139**
08:00 AM	2	34	0	36	1	0	0	1	0	53	12	65	**7**	0	5	12	114
08:15 AM	4	**35**	**1**	40	0	**1**	0	1	0	52	10	62	1	0	10	11	114
Total Volume	18	129	1	148	2	1	0	3	0	240	43	283	16	1	30	47	481
% App. Total	12.2	87.2	0.7		66.7	33.3	0		0	84.8	15.2		34	2.1	63.8		
PHF	.643	.921	.250	.925	.500	.250	.000	.750	.000	.822	.896	.863	.571	.250	.750	.734	.865



TRAFFIC DATA COLLECTION

File Name : Zebulon(NC 96 and Barbee)
Site Code :
Start Date : 4/5/2022
Page No : 1

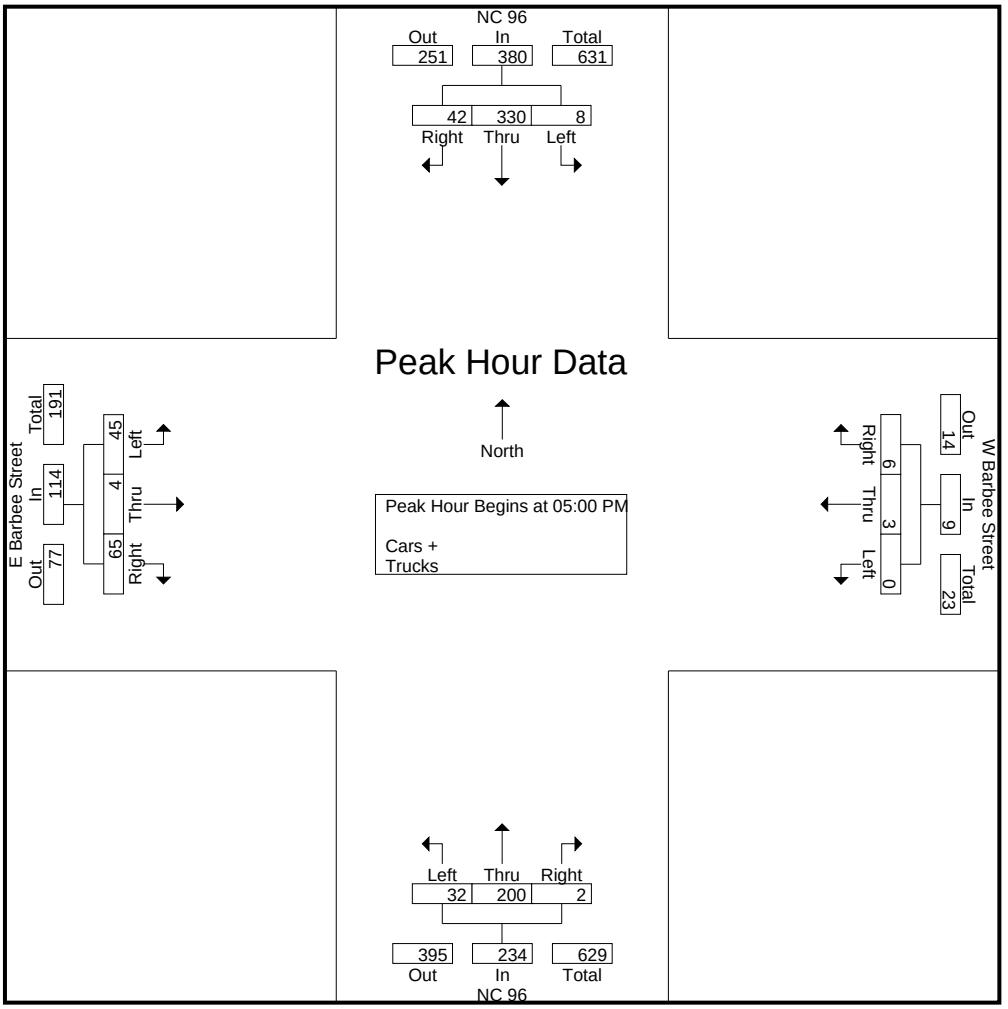
Groups Printed- Cars + - Trucks

	NC 96 Southbound				W Barbee Street Westbound				NC 96 Northbound				E Barbee Street Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
04:00 PM	11	71	1	83	0	1	1	2	0	47	6	53	13	1	13	27	165
04:15 PM	14	57	2	73	0	0	0	0	1	52	14	67	14	0	16	30	170
04:30 PM	12	72	0	84	1	1	0	2	0	49	6	55	22	2	12	36	177
04:45 PM	14	75	0	89	2	2	0	4	0	44	12	56	14	2	12	28	177
Total	51	275	3	329	3	4	1	8	1	192	38	231	63	5	53	121	689
05:00 PM	12	80	3	95	0	1	0	1	0	42	11	53	15	0	7	22	171
05:15 PM	9	90	1	100	2	1	0	3	0	55	7	62	17	3	14	34	199
05:30 PM	8	75	1	84	1	1	0	2	1	52	7	60	18	1	11	30	176
05:45 PM	13	85	3	101	3	0	0	3	1	51	7	59	15	0	13	28	191
Total	42	330	8	380	6	3	0	9	2	200	32	234	65	4	45	114	737
Grand Total	93	605	11	709	9	7	1	17	3	392	70	465	128	9	98	235	1426
Apprch %	13.1	85.3	1.6		52.9	41.2	5.9		0.6	84.3	15.1		54.5	3.8	41.7		
Total %	6.5	42.4	0.8	49.7	0.6	0.5	0.1	1.2	0.2	27.5	4.9	32.6	9	0.6	6.9	16.5	
Cars +	87	593	11	691	9	7	1	17	3	379	66	448	127	9	96	232	1388
% Cars +	93.5	98	100	97.5	100	100	100	100	100	96.7	94.3	96.3	99.2	100	98	98.7	97.3
Trucks	6	12	0	18	0	0	0	0	0	13	4	17	1	0	2	3	38
% Trucks	6.5	2	0	2.5	0	0	0	0	0	3.3	5.7	3.7	0.8	0	2	1.3	2.7

TRAFFIC DATA COLLECTION

File Name : Zebulon(NC 96 and Barbee)
Site Code :
Start Date : 4/5/2022
Page No : 2

	NC 96 Southbound				W Barbee Street Westbound				NC 96 Northbound				E Barbee Street Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	12	80	**3**	95	0	**1**	0	1	0	42	**11**	53	15	0	7	22	171
05:15 PM	9	**90**	1	100	2	1	0	**3**	0	**55**	7	**62**	17	**3**	**14**	**34**	**199**
05:30 PM	8	75	1	84	1	1	0	2	**1**	52	7	60	**18**	1	11	30	176
05:45 PM	**13**	85	3	**101**	**3**	0	0	3	1	51	7	59	15	0	13	28	191
Total Volume	42	330	8	380	6	3	0	9	2	200	32	234	65	4	45	114	737
% App. Total	11.1	86.8	2.1		66.7	33.3	0		0.9	85.5	13.7		57	3.5	39.5		
PHF	.808	.917	.667	.941	.500	.750	.000	.750	.500	.909	.727	.944	.903	.333	.804	.838	.926



File Name : Zebulon(NC 96 and NC 97)
Site Code :
Start Date : 4/7/2022
Page No : 1

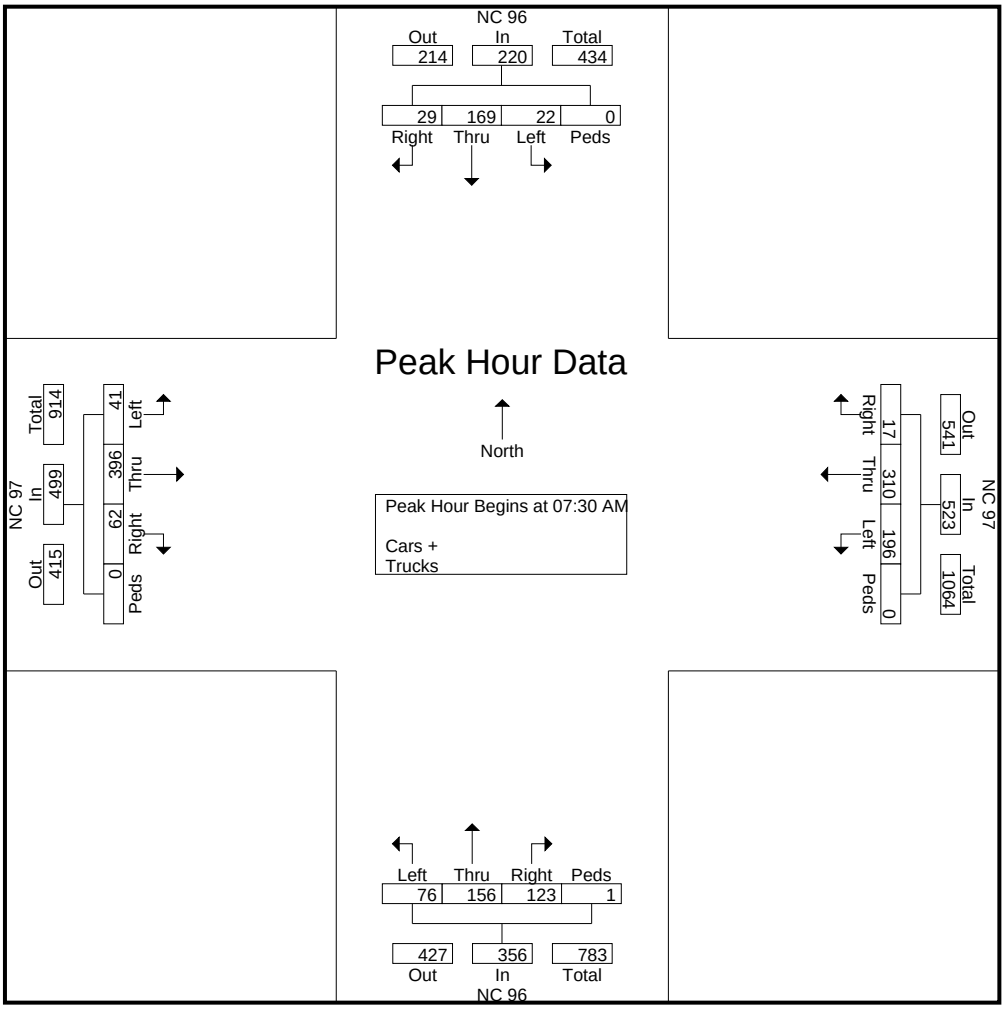
Groups Printed- Cars + - Trucks

	NC 96 Southbound					NC 97 Westbound					NC 96 Northbound					NC 97 Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	4	32	6	1	43	1	38	28	0	67	22	23	4	0	49	9	59	3	0	71	230
07:15 AM	9	59	7	0	75	1	56	42	0	99	30	21	8	0	59	16	62	7	0	85	318
07:30 AM	7	47	9	0	63	6	83	39	0	128	25	36	16	0	77	22	94	7	0	123	391
07:45 AM	9	42	4	0	55	4	94	52	0	150	46	35	26	0	107	11	111	9	0	131	443
Total	29	180	26	1	236	12	271	161	0	444	123	115	54	0	292	58	326	26	0	410	1382
08:00 AM	11	37	5	0	53	3	83	56	0	142	19	41	19	1	80	16	109	10	0	135	410
08:15 AM	2	43	4	0	49	4	50	49	0	103	33	44	15	0	92	13	82	15	0	110	354
08:30 AM	7	44	5	0	56	8	35	42	0	85	40	41	9	0	90	12	46	9	0	67	298
08:45 AM	7	46	10	0	63	9	55	44	0	108	39	36	6	0	81	11	57	1	0	69	321
Total	27	170	24	0	221	24	223	191	0	438	131	162	49	1	343	52	294	35	0	381	1383
Grand Total	56	350	50	1	457	36	494	352	0	882	254	277	103	1	635	110	620	61	0	791	2765
Apprch %	12.3	76.6	10.9	0.2		4.1	56	39.9	0		40	43.6	16.2	0.2		13.9	78.4	7.7	0		
Total %	2	12.7	1.8	0	16.5	1.3	17.9	12.7	0	31.9	9.2	10	3.7	0	23	4	22.4	2.2	0	28.6	
Cars +	55	336	48	1	440	34	482	341	0	857	244	260	100	1	605	104	599	60	0	763	2665
% Cars +	98.2	96	96	100	96.3	94.4	97.6	96.9	0	97.2	96.1	93.9	97.1	100	95.3	94.5	96.6	98.4	0	96.5	96.4
Trucks	1	14	2	0	17	2	12	11	0	25	10	17	3	0	30	6	21	1	0	28	100
% Trucks	1.8	4	4	0	3.7	5.6	2.4	3.1	0	2.8	3.9	6.1	2.9	0	4.7	5.5	3.4	1.6	0	3.5	3.6

TRAFFIC DATA COLLECTION

File Name : Zebulon(NC 96 and NC 97)
Site Code :
Start Date : 4/7/2022
Page No : 2

	NC 96 Southbound					NC 97 Westbound					NC 96 Northbound					NC 97 Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	7	**47**	**9**	0	**63**	**6**	83	39	0	128	25	36	16	0	77	**22**	94	7	0	123	391
07:45 AM	9	42	4	0	55	4	**94**	52	0	**150**	**46**	35	**26**	0	**107**	11	**111**	9	0	131	**443**
08:00 AM	**11**	37	5	0	53	3	83	**56**	0	142	19	41	19	**1**	80	16	109	10	0	**135**	410
08:15 AM	2	43	4	0	49	4	50	49	0	103	33	**44**	15	0	92	13	82	**15**	0	110	354
Total Volume	29	169	22	0	220	17	310	196	0	523	123	156	76	1	356	62	396	41	0	499	1598
% App. Total	13.2	76.8	10	0		3.3	59.3	37.5	0		34.6	43.8	21.3	0.3		12.4	79.4	8.2	0		
PHF	.659	.899	.611	.000	.873	.708	.824	.875	.000	.872	.668	.886	.731	.250	.832	.705	.892	.683	.000	.924	.902



File Name : Zebulon(NC 96 and NC 97)
Site Code :
Start Date : 4/7/2022
Page No : 1

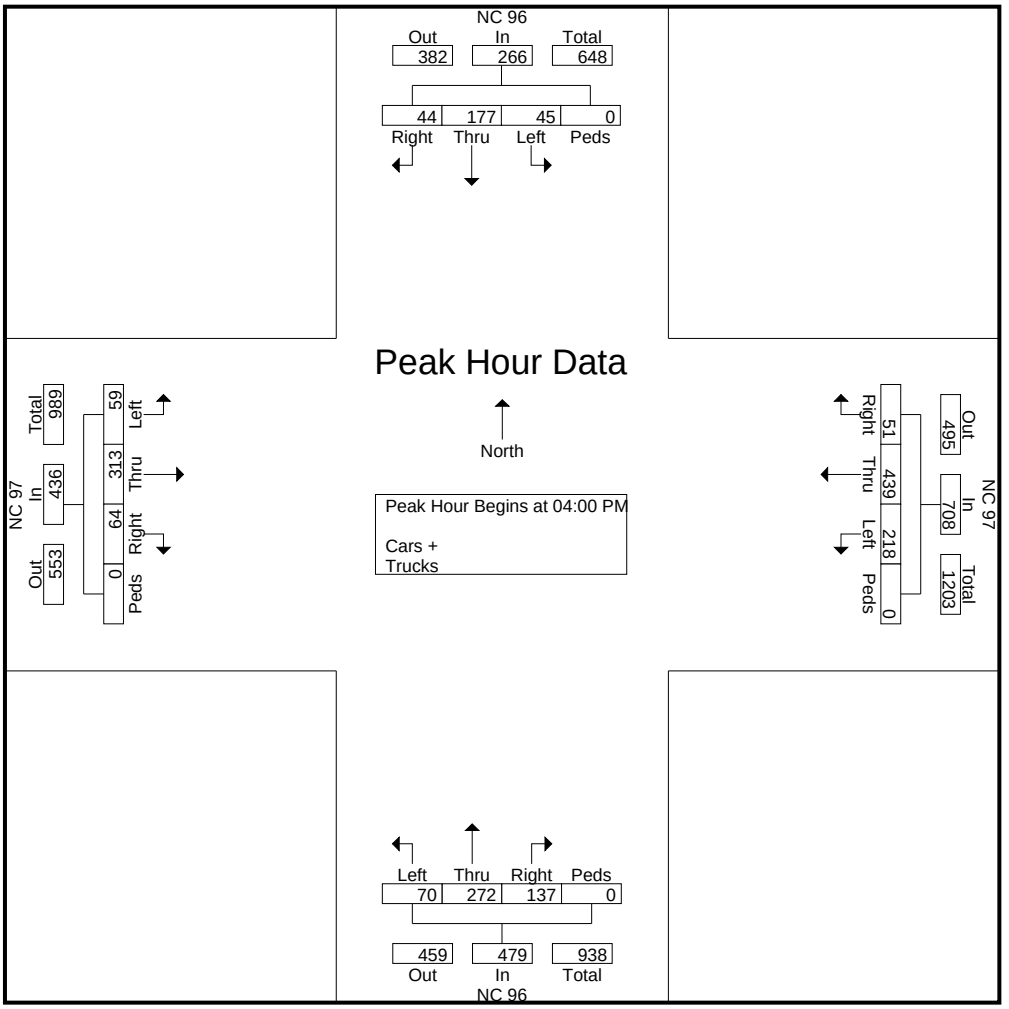
Groups Printed- Cars + - Trucks

	NC 96 Southbound					NC 97 Westbound					NC 96 Northbound					NC 97 Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	15	56	17	0	88	10	115	61	0	186	33	67	17	0	117	12	84	17	0	113	504
04:15 PM	7	38	7	0	52	10	98	40	0	148	34	64	25	0	123	19	93	15	0	127	450
04:30 PM	11	44	8	0	63	19	117	59	0	195	36	75	14	0	125	16	69	9	0	94	477
04:45 PM	11	39	13	0	63	12	109	58	0	179	34	66	14	0	114	17	67	18	0	102	458
Total	44	177	45	0	266	51	439	218	0	708	137	272	70	0	479	64	313	59	0	436	1889
05:00 PM	8	54	13	0	75	9	117	64	0	190	37	57	17	0	111	15	70	16	0	101	477
05:15 PM	12	47	9	0	68	9	111	56	0	176	29	56	13	1	99	21	87	11	0	119	462
05:30 PM	11	59	9	0	79	16	94	63	0	173	37	61	16	0	114	9	61	15	0	85	451
05:45 PM	12	48	8	0	68	10	106	48	0	164	52	62	13	0	127	17	60	16	0	93	452
Total	43	208	39	0	290	44	428	231	0	703	155	236	59	1	451	62	278	58	0	398	1842
Grand Total	87	385	84	0	556	95	867	449	0	1411	292	508	129	1	930	126	591	117	0	834	3731
Apprch %	15.6	69.2	15.1	0		6.7	61.4	31.8	0		31.4	54.6	13.9	0.1		15.1	70.9	14	0		
Total %	2.3	10.3	2.3	0	14.9	2.5	23.2	12	0	37.8	7.8	13.6	3.5	0	24.9	3.4	15.8	3.1	0	22.4	
Cars +	86	384	82	0	552	94	858	442	0	1394	284	497	124	1	906	126	581	117	0	824	3676
% Cars +	98.9	99.7	97.6	0	99.3	98.9	99	98.4	0	98.8	97.3	97.8	96.1	100	97.4	100	98.3	100	0	98.8	98.5
Trucks	1	1	2	0	4	1	9	7	0	17	8	11	5	0	24	0	10	0	0	10	55
% Trucks	1.1	0.3	2.4	0	0.7	1.1	1	1.6	0	1.2	2.7	2.2	3.9	0	2.6	0	1.7	0	0	1.2	1.5

TRAFFIC DATA COLLECTION

File Name : Zebulon(NC 96 and NC 97)
Site Code :
Start Date : 4/7/2022
Page No : 2

	NC 96 Southbound					NC 97 Westbound					NC 96 Northbound					NC 97 Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	**15**	**56**	**17**	0	**88**	10	115	**61**	0	186	33	67	17	0	117	12	84	17	0	113	**504**
04:15 PM	7	38	7	0	52	10	98	40	0	148	34	64	**25**	0	123	**19**	**93**	15	0	**127**	450
04:30 PM	11	44	8	0	63	**19**	**117**	59	0	**195**	**36**	**75**	14	0	**125**	16	69	9	0	94	477
04:45 PM	11	39	13	0	63	12	109	58	0	179	34	66	14	0	114	17	67	**18**	0	102	458
Total Volume	44	177	45	0	266	51	439	218	0	708	137	272	70	0	479	64	313	59	0	436	1889
% App. Total	16.5	66.5	16.9	0		7.2	62	30.8	0		28.6	56.8	14.6	0		14.7	71.8	13.5	0		
PHF	.733	.790	.662	.000	.756	.671	.938	.893	.000	.908	.951	.907	.700	.000	.958	.842	.841	.819	.000	.858	.937



File Name : Zebulon-Zebulon(NC 97 and Wakefield
Site Code :
Start Date : 4/5/2022
Page No : 1

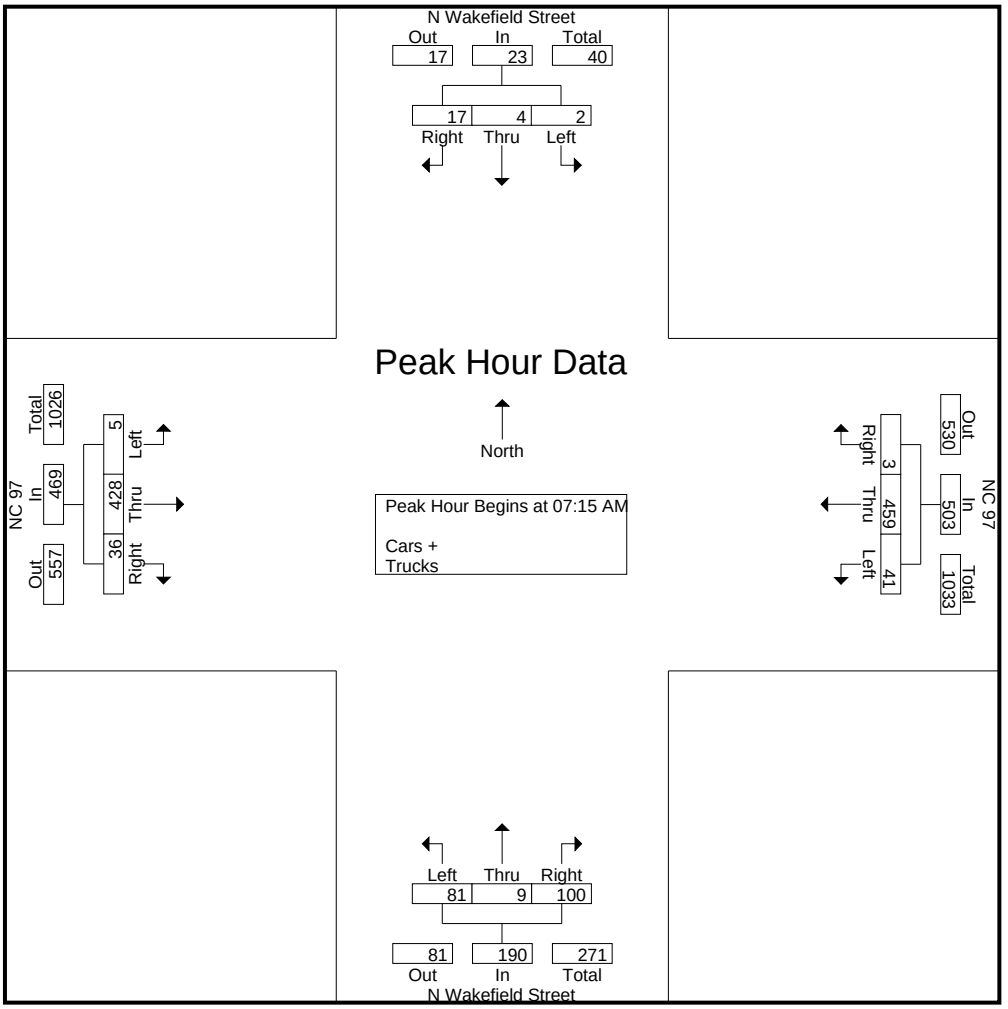
Groups Printed- Cars + - Trucks

	N Wakefield Street Southbound				NC 97 Westbound				N Wakefield Street Northbound				NC 97 Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
07:00 AM	2	1	0	3	0	85	8	93	30	1	16	47	6	59	2	67	210
07:15 AM	1	1	1	3	0	92	12	104	22	3	15	40	5	89	0	94	241
07:30 AM	3	0	0	3	1	104	8	113	25	3	26	54	14	127	0	141	311
07:45 AM	8	3	1	12	1	125	10	136	26	1	24	51	6	119	3	128	327
Total	14	5	2	21	2	406	38	446	103	8	81	192	31	394	5	430	1089
08:00 AM	5	0	0	5	1	138	11	150	27	2	16	45	11	93	2	106	306
08:15 AM	2	4	1	7	0	125	8	133	12	2	14	28	12	59	0	71	239
08:30 AM	1	1	0	2	0	115	6	121	22	1	16	39	15	78	1	94	256
08:45 AM	3	6	0	9	0	111	5	116	17	0	21	38	11	73	3	87	250
Total	11	11	1	23	1	489	30	520	78	5	67	150	49	303	6	358	1051
Grand Total	25	16	3	44	3	895	68	966	181	13	148	342	80	697	11	788	2140
Apprch %	56.8	36.4	6.8		0.3	92.7	7		52.9	3.8	43.3		10.2	88.5	1.4		
Total %	1.2	0.7	0.1	2.1	0.1	41.8	3.2	45.1	8.5	0.6	6.9	16	3.7	32.6	0.5	36.8	
Cars +	24	16	3	43	3	873	68	944	177	13	144	334	78	665	11	754	2075
% Cars +	96	100	100	97.7	100	97.5	100	97.7	97.8	100	97.3	97.7	97.5	95.4	100	95.7	97
Trucks	1	0	0	1	0	22	0	22	4	0	4	8	2	32	0	34	65
% Trucks	4	0	0	2.3	0	2.5	0	2.3	2.2	0	2.7	2.3	2.5	4.6	0	4.3	3

TRAFFIC DATA COLLECTION

File Name : Zebulon-Zebulon(NC 97 and Wakefield
Site Code :
Start Date : 4/5/2022
Page No : 2

	N Wakefield Street Southbound				NC 97 Westbound				N Wakefield Street Northbound				NC 97 Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	1	1	**1**	3	0	92	**12**	104	22	**3**	15	40	5	89	0	94	241
07:30 AM	3	0	0	3	**1**	104	8	113	25	3	**26**	**54**	**14**	**127**	0	**141**	311
07:45 AM	**8**	**3**	1	**12**	1	125	10	136	26	1	24	51	6	119	**3**	128	**327**
08:00 AM	5	0	0	5	1	**138**	11	**150**	**27**	2	16	45	11	93	2	106	306
Total Volume	17	4	2	23	3	459	41	503	100	9	81	190	36	428	5	469	1185
% App. Total	73.9	17.4	8.7		0.6	91.3	8.2		52.6	4.7	42.6		7.7	91.3	1.1		
PHF	.531	.333	.500	.479	.750	.832	.854	.838	.926	.750	.779	.880	.643	.843	.417	.832	.906



File Name : Zebulon-Zebulon(NC 97 and Wakefield
Site Code :
Start Date : 4/5/2022
Page No : 1

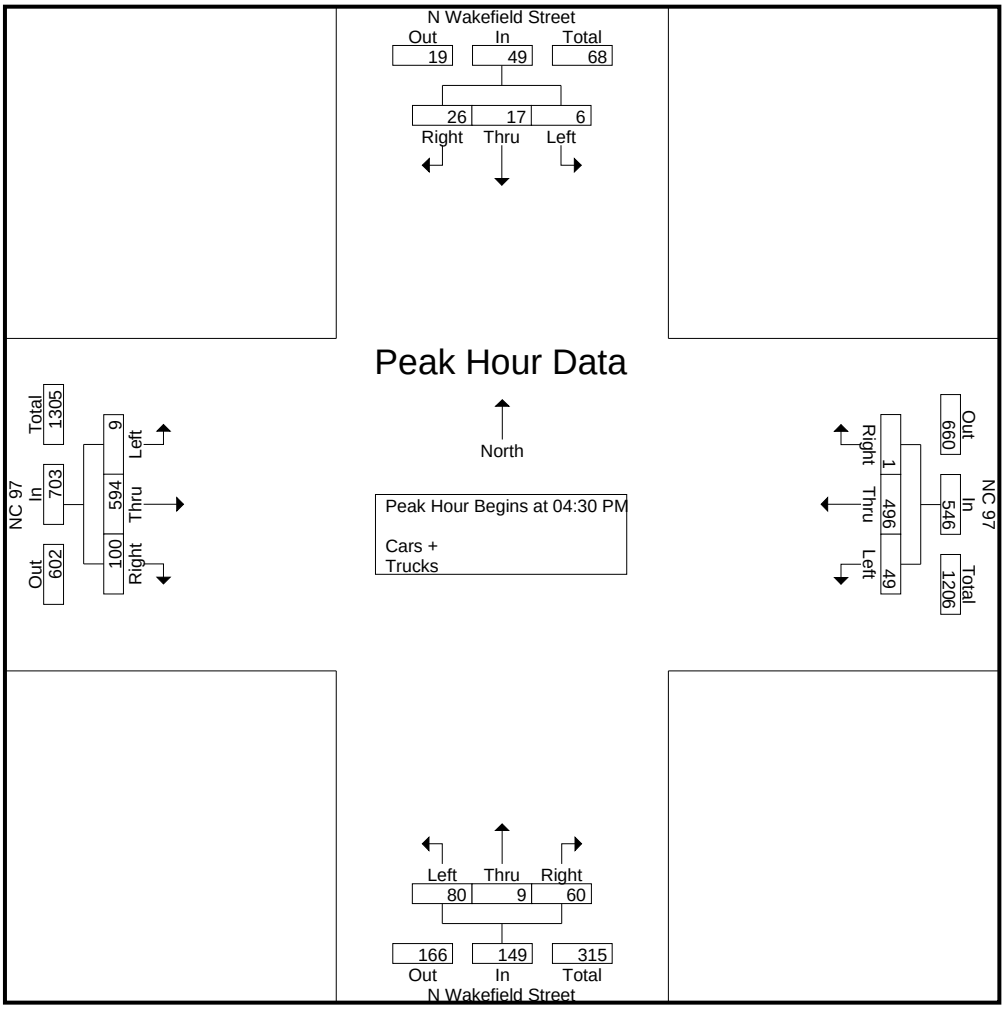
Groups Printed- Cars + - Trucks

	N Wakefield Street Southbound				NC 97 Westbound				N Wakefield Street Northbound				NC 97 Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
04:00 PM	9	10	1	20	0	132	10	142	22	2	20	44	22	127	2	151	357
04:15 PM	3	3	0	6	2	88	8	98	16	2	18	36	34	158	2	194	334
04:30 PM	7	4	2	13	0	118	12	130	12	1	20	33	27	158	6	191	367
04:45 PM	6	4	0	10	0	135	14	149	13	2	26	41	21	157	2	180	380
Total	25	21	3	49	2	473	44	519	63	7	84	154	104	600	12	716	1438
05:00 PM	8	5	3	16	1	113	13	127	13	4	16	33	18	151	0	169	345
05:15 PM	5	4	1	10	0	130	10	140	22	2	18	42	34	128	1	163	355
05:30 PM	11	1	3	15	0	113	10	123	16	1	16	33	24	136	0	160	331
05:45 PM	5	2	1	8	0	116	13	129	18	2	15	35	22	128	2	152	324
Total	29	12	8	49	1	472	46	519	69	9	65	143	98	543	3	644	1355
Grand Total	54	33	11	98	3	945	90	1038	132	16	149	297	202	1143	15	1360	2793
Apprch %	55.1	33.7	11.2		0.3	91	8.7		44.4	5.4	50.2		14.9	84	1.1		
Total %	1.9	1.2	0.4	3.5	0.1	33.8	3.2	37.2	4.7	0.6	5.3	10.6	7.2	40.9	0.5	48.7	
Cars +	53	33	11	97	3	914	88	1005	127	16	144	287	197	1120	15	1332	2721
% Cars +	98.1	100	100	99	100	96.7	97.8	96.8	96.2	100	96.6	96.6	97.5	98	100	97.9	97.4
Trucks	1	0	0	1	0	31	2	33	5	0	5	10	5	23	0	28	72
% Trucks	1.9	0	0	1	0	3.3	2.2	3.2	3.8	0	3.4	3.4	2.5	2	0	2.1	2.6

TRAFFIC DATA COLLECTION

File Name : Zebulon-Zebulon(NC 97 and Wakefield
Site Code :
Start Date : 4/5/2022
Page No : 2

	N Wakefield Street Southbound				NC 97 Westbound				N Wakefield Street Northbound				NC 97 Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	7	4	2	13	0	118	12	130	12	1	20	33	27	**158**	**6**	**191**	367
04:45 PM	6	4	0	10	0	**135**	**14**	**149**	13	2	**26**	41	21	157	2	180	**380**
05:00 PM	**8**	**5**	**3**	**16**	**1**	113	13	127	13	**4**	16	33	18	151	0	169	345
05:15 PM	5	4	1	10	0	130	10	140	**22**	2	18	**42**	**34**	128	1	163	355
Total Volume	26	17	6	49	1	496	49	546	60	9	80	149	100	594	9	703	1447
% App. Total	53.1	34.7	12.2		0.2	90.8	9		40.3	6	53.7		14.2	84.5	1.3		
PHF	.813	.850	.500	.766	.250	.919	.875	.916	.682	.563	.769	.887	.735	.940	.375	.920	.952



TRAFFIC DATA COLLECTION

File Name : Zebulon(NC96 and Perry)
Site Code :
Start Date : 4/12/2022
Page No : 1

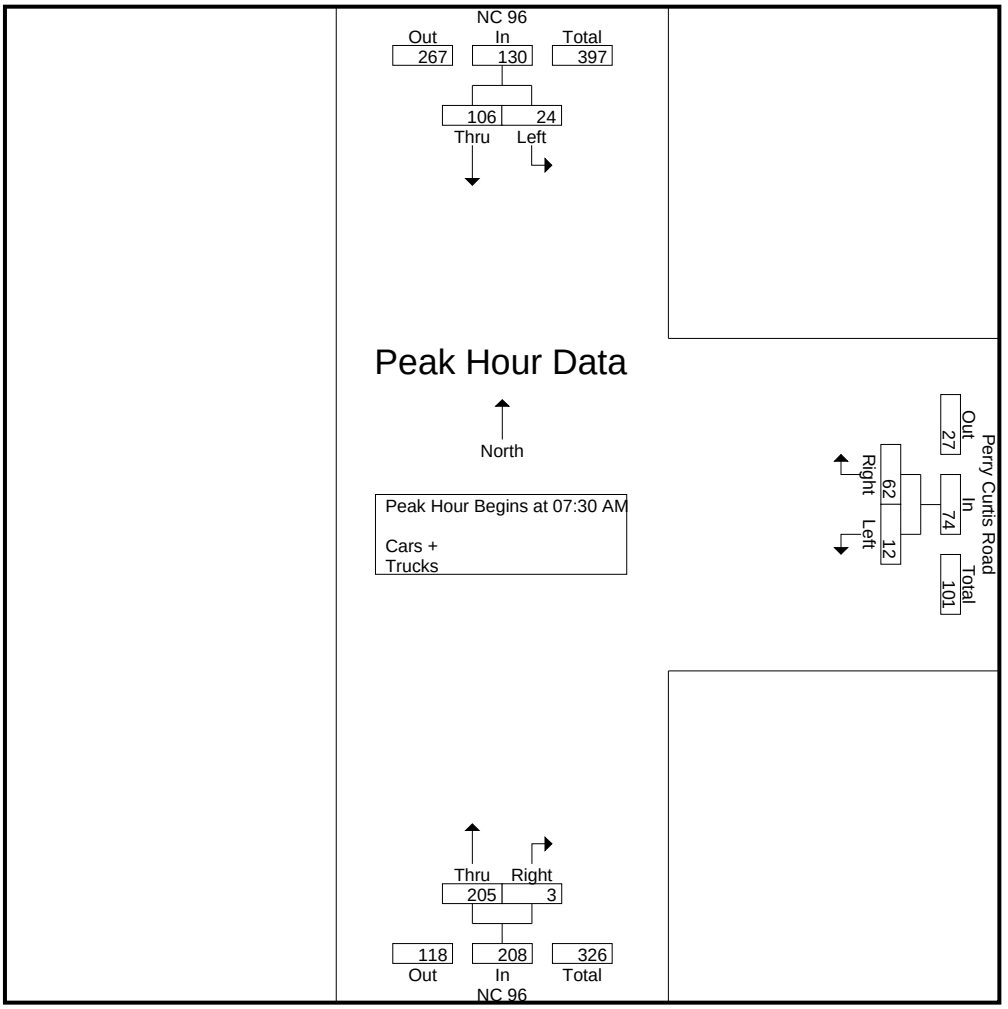
Groups Printed- Cars + - Trucks

	NC 96 Southbound			Perry Curtis Road Westbound			NC 96 Northbound			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. Total
07:00 AM	17	3	20	17	3	20	2	42	44	84
07:15 AM	20	2	22	13	0	13	0	64	64	99
07:30 AM	20	4	24	9	3	12	0	61	61	97
07:45 AM	31	5	36	19	3	22	1	57	58	116
Total	88	14	102	58	9	67	3	224	227	396
08:00 AM	27	6	33	13	2	15	1	49	50	98
08:15 AM	28	9	37	21	4	25	1	38	39	101
08:30 AM	17	8	25	8	2	10	2	47	49	84
08:45 AM	24	2	26	19	3	22	1	43	44	92
Total	96	25	121	61	11	72	5	177	182	375
Grand Total	184	39	223	119	20	139	8	401	409	771
Apprch %	82.5	17.5		85.6	14.4		2	98		
Total %	23.9	5.1	28.9	15.4	2.6	18	1	52	53	
Cars +	166	38	204	117	19	136	5	378	383	723
% Cars +	90.2	97.4	91.5	98.3	95	97.8	62.5	94.3	93.6	93.8
Trucks	18	1	19	2	1	3	3	23	26	48
% Trucks	9.8	2.6	8.5	1.7	5	2.2	37.5	5.7	6.4	6.2

TRAFFIC DATA COLLECTION

File Name : Zebulon(NC96 and Perry)
Site Code :
Start Date : 4/12/2022
Page No : 2

	NC 96 Southbound			Perry Curtis Road Westbound			NC 96 Northbound			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	20	4	24	9	3	12	0	**61**	**61**	97
07:45 AM	**31**	5	36	19	3	22	**1**	57	58	**116**
08:00 AM	27	6	33	13	2	15	1	49	50	98
08:15 AM	28	**9**	**37**	**21**	**4**	**25**	1	38	39	101
Total Volume	106	24	130	62	12	74	3	205	208	412
% App. Total	81.5	18.5		83.8	16.2		1.4	98.6		
PHF	.855	.667	.878	.738	.750	.740	.750	.840	.852	.888



TRAFFIC DATA COLLECTION

File Name : Zebulon(NC96 and Perry)
Site Code :
Start Date : 4/12/2022
Page No : 1

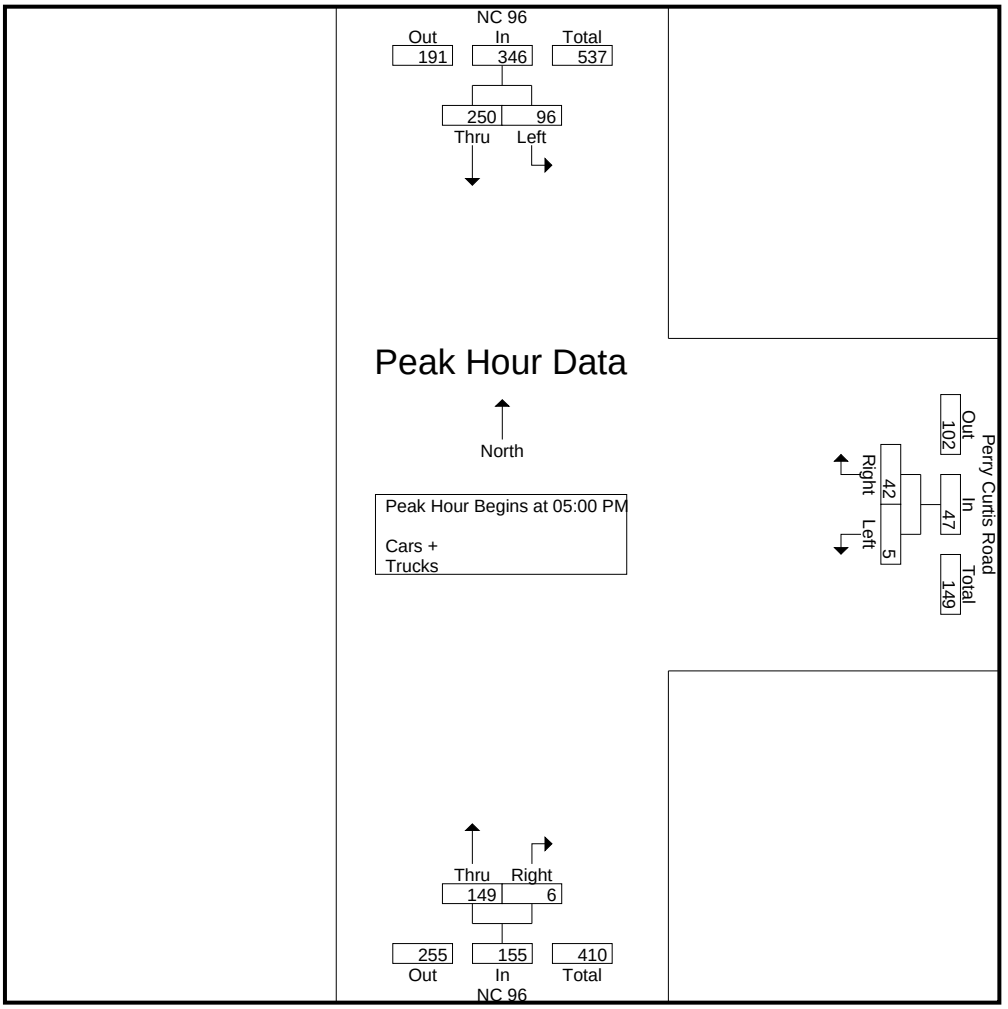
Groups Printed- Cars + - Trucks

	NC 96 Southbound			Perry Curtis Road Westbound			NC 96 Northbound			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. Total
04:00 PM	56	20	76	12	4	16	2	35	37	129
04:15 PM	50	12	62	21	2	23	1	37	38	123
04:30 PM	52	28	80	14	1	15	2	41	43	138
04:45 PM	63	24	87	17	1	18	0	32	32	137
Total	221	84	305	64	8	72	5	145	150	527
05:00 PM	49	24	73	13	2	15	1	31	32	120
05:15 PM	72	23	95	10	2	12	3	40	43	150
05:30 PM	64	19	83	8	0	8	1	36	37	128
05:45 PM	65	30	95	11	1	12	1	42	43	150
Total	250	96	346	42	5	47	6	149	155	548
Grand Total	471	180	651	106	13	119	11	294	305	1075
Apprch %	72.4	27.6		89.1	10.9		3.6	96.4		
Total %	43.8	16.7	60.6	9.9	1.2	11.1	1	27.3	28.4	
Cars +	461	178	639	104	11	115	11	280	291	1045
% Cars +	97.9	98.9	98.2	98.1	84.6	96.6	100	95.2	95.4	97.2
Trucks	10	2	12	2	2	4	0	14	14	30
% Trucks	2.1	1.1	1.8	1.9	15.4	3.4	0	4.8	4.6	2.8

TRAFFIC DATA COLLECTION

File Name : Zebulon(NC96 and Perry)
Site Code :
Start Date : 4/12/2022
Page No : 2

	NC 96 Southbound			Perry Curtis Road Westbound			NC 96 Northbound			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	49	24	73	**13**	**2**	**15**	1	31	32	120
05:15 PM	**72**	23	**95**	10	2	12	**3**	40	**43**	**150**
05:30 PM	64	19	83	8	0	8	1	36	37	128
05:45 PM	65	**30**	95	11	1	12	1	**42**	43	150
Total Volume	250	96	346	42	5	47	6	149	155	548
% App. Total	72.3	27.7		89.4	10.6		3.9	96.1		
PHF	.868	.800	.911	.808	.625	.783	.500	.887	.901	.913

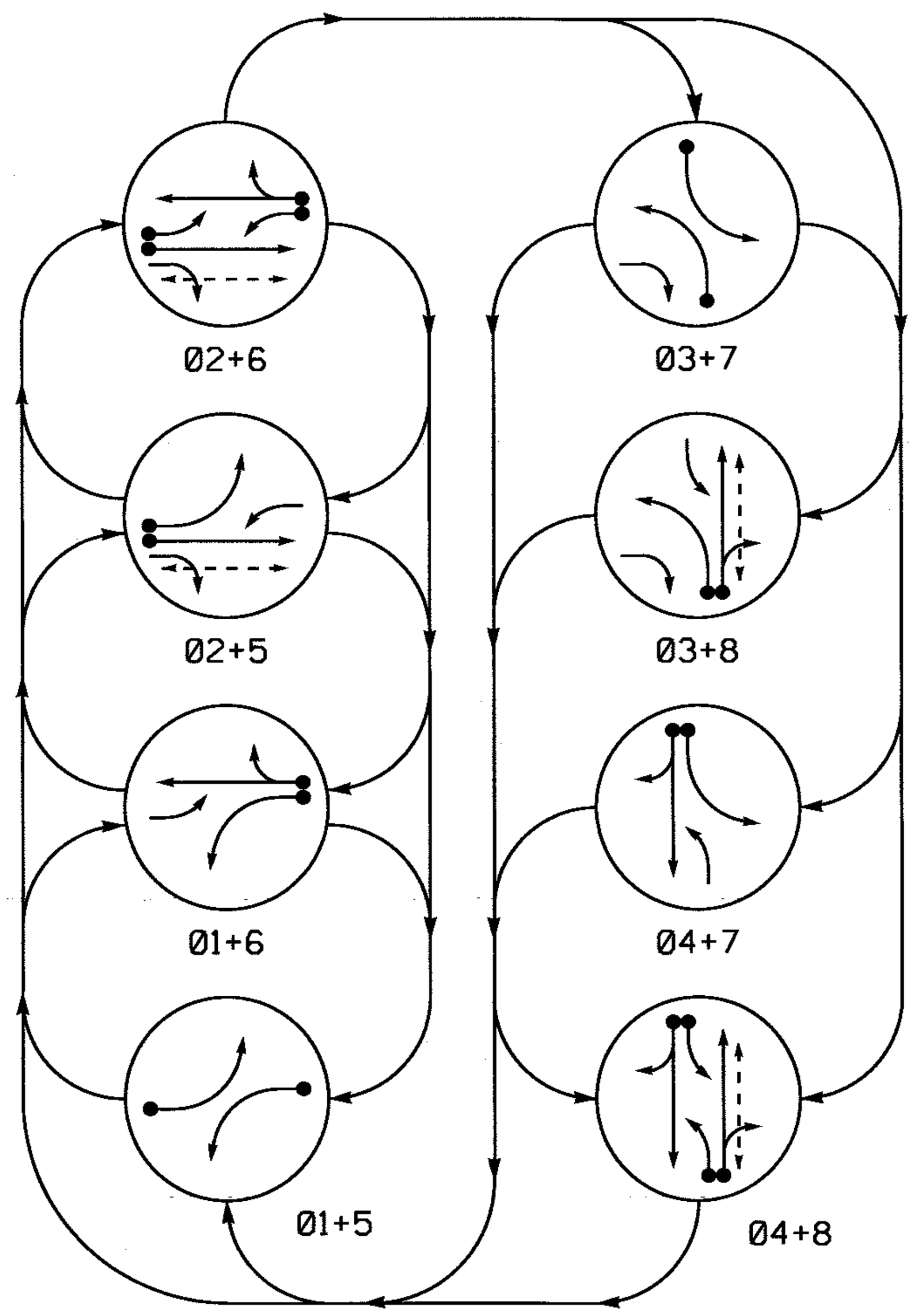


Appendix C – Signal Timing Plans

Attachment 7
PD-2024-01

PROJECT REFERENCE NO.	SHEET NO.
05-0156	Sig. 1

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	FLASH
11	←	←	F/Y ←	F/Y ←	←R	←R	←R	←R	←Y
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R / →	R / →	R	R	Y
31	←R	←R	←R	←R	←	←	F/Y ←	F/Y ←	←R
41, 42	R	R	R	R	R	R	G	G	R
51	←	F/Y ←	←	F/Y ←	←R	←R	←R	←R	←Y
61, 62	R	G	R	G	R	R	R	R	Y
71	←R	←R	←R	←R	←	F/Y ←	←	F/Y ←	←R
81, 82	R	R	R	R	R	G	R	G	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P81, P82	DW	DW	DW	DW	DW	W	DW	W	DRK

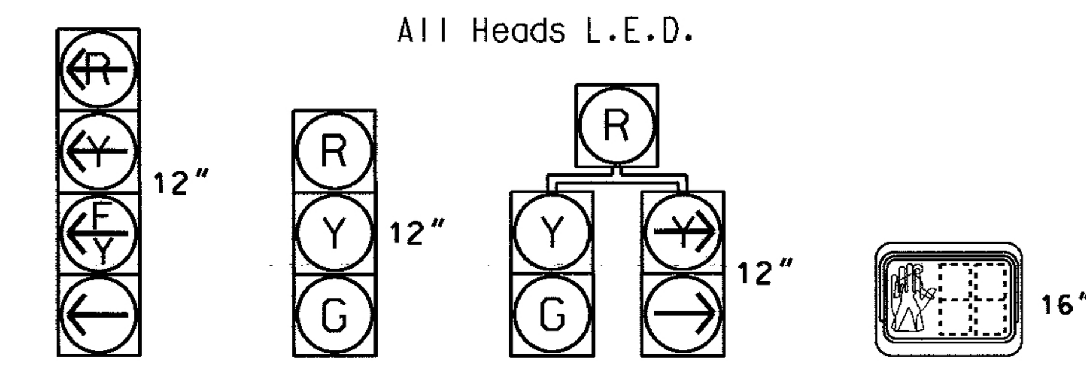
F/Y ← = Flashing Yellow Arrow
W - Walk
DW - Don't Walk
DRK - Dark

OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS: LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING: PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X60	+5	EXISTING	-	1	Y	Y	-	-	15	-	-
					6	Y	Y	-	-	-	-	Y
2A	6X6	70	EXISTING	-	2	Y	Y	-	-	-	-	-
3A	6X60	+5	EXISTING	-	3	Y	Y	-	-	15	-	-
					8	Y	Y	-	-	-	-	Y
4A	6X60	0	EXISTING	-	4	Y	Y	-	-	10	-	-
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	15	-	-
					2	Y	Y	-	-	-	-	Y
6A	6X6	70	EXISTING	-	6	Y	Y	-	-	-	-	-
7A	6X60	+5	EXISTING	-	7	Y	Y	-	-	15	-	-
					4	Y	Y	-	-	3	-	Y
8A	6X60	+5	EXISTING	-	8	Y	Y	-	-	10	-	-

SIGNAL FACE I.D.

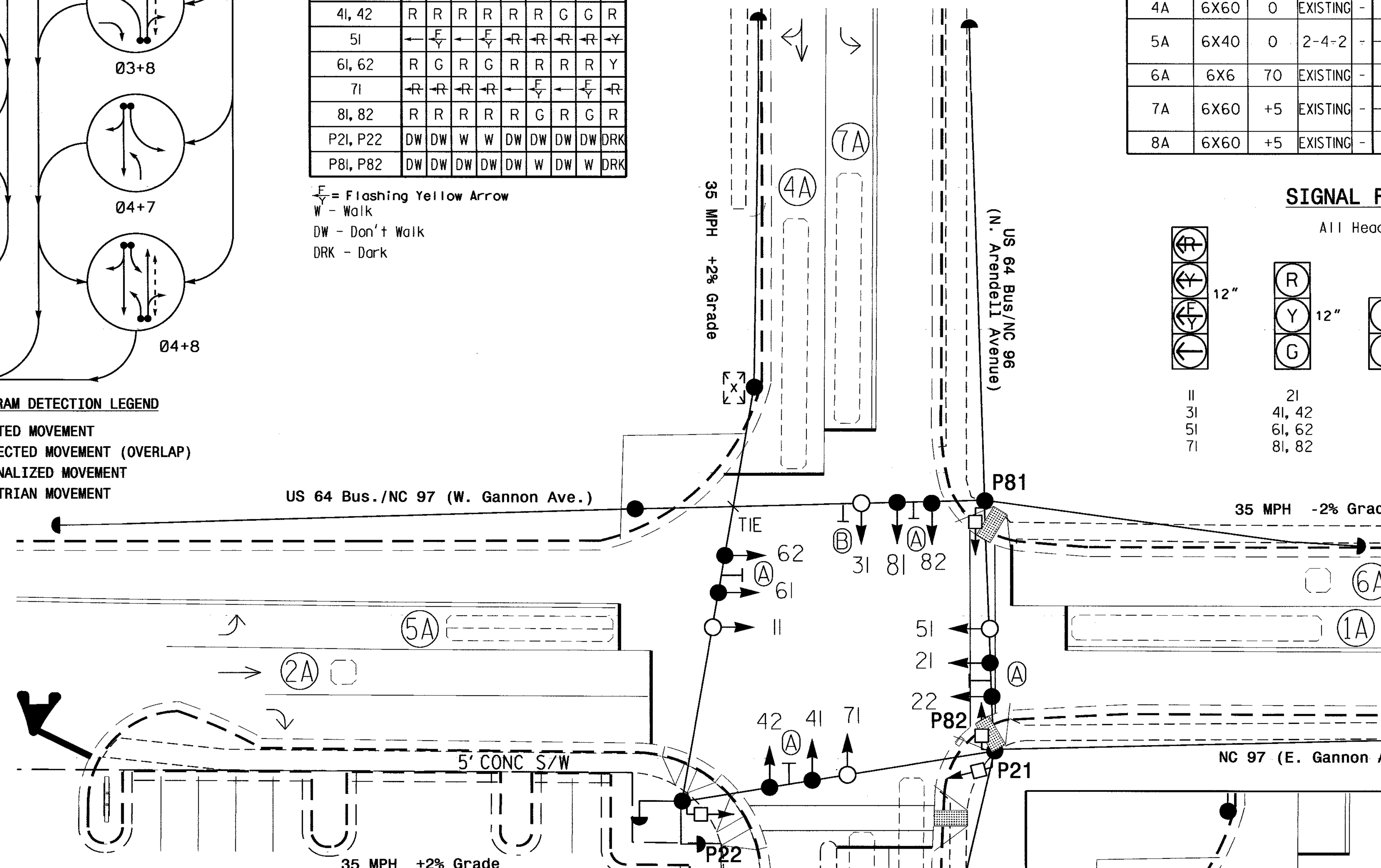
All Heads L.E.D.

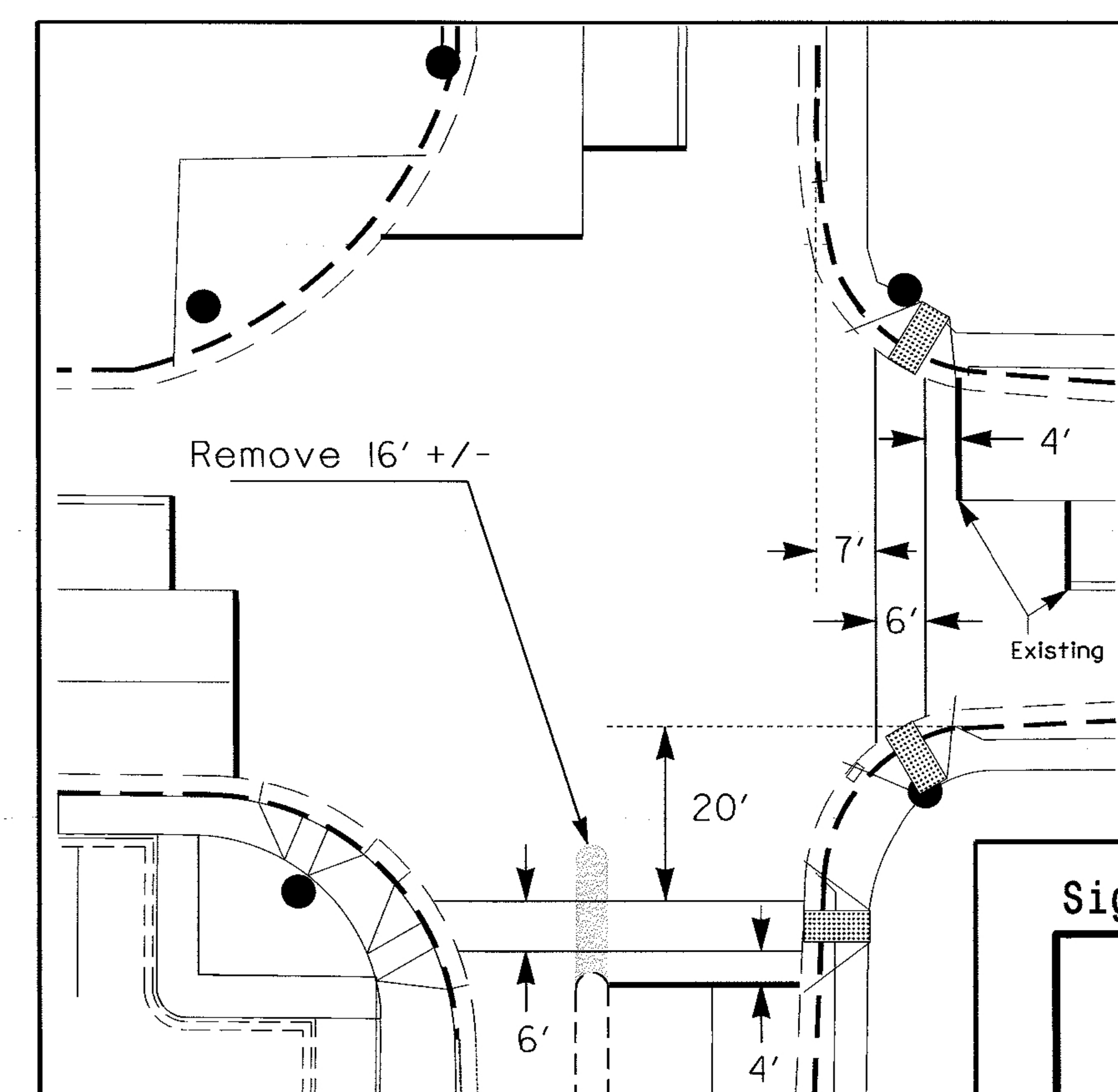


8 Phase
Fully Actuated
(Isolated)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Pavement markings are existing unless otherwise shown.





Proposed Stopbar and Crosswalk Locations

NC 96 (N. Arendell Avenue)
CONC. ISLAND
8A
3A
35 MPH -2% Grade

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
Ⓐ	Street Name Sign (D3-1)	Ⓐ
Ⓑ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓑ

OASIS 2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green 1 *	7	10	7	7	7	10	7	7
Extension 1 *	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
Max Green 1 *	15	30	25	30	15	30	15	30
Yellow Clearance	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
Red Clearance	2.8	1.8	2.4	1.5	2.4	1.8	2.3	1.5
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	7	-	-	-	-	-	7
Don't Walk 1	-	10	-	-	-	-	-	10
Seconds Per Actuation *	-	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	ON	-	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

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

12-JAN-2012 12:50
S:*ITS&SU*ITS Signals*Signal Design Section*Central Region*Div 5*05-0156*050156_sig_dsn_20120112.dgn
rziemba

Signal Upgrade

Prepared in the Offices of: Transportation Mobility and Safety Division, Signal Design Section, State of North Carolina Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 20 1"=20'

US 64 Bus./NC 97 (Gannon Ave.)
at
US 64 Bus./NC 96 (N. Arendell Ave.)

Division 5 Wake County Zebulon

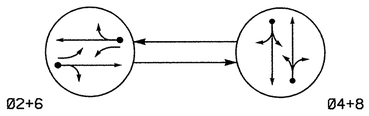
PLAN DATE: November 2011	REVIEWED BY:
PREPARED BY: Sterling	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 1/12/12 DATE
SIG. INVENTORY NO. 05-0156

PROJECT REFERENCE NO.	SHEET NO.
MOE	Sig. 1

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION			
SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
2I, 22	G	R	Y
4I, 42	R	G	R
6I, 62	G	R	Y
8I, 82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.

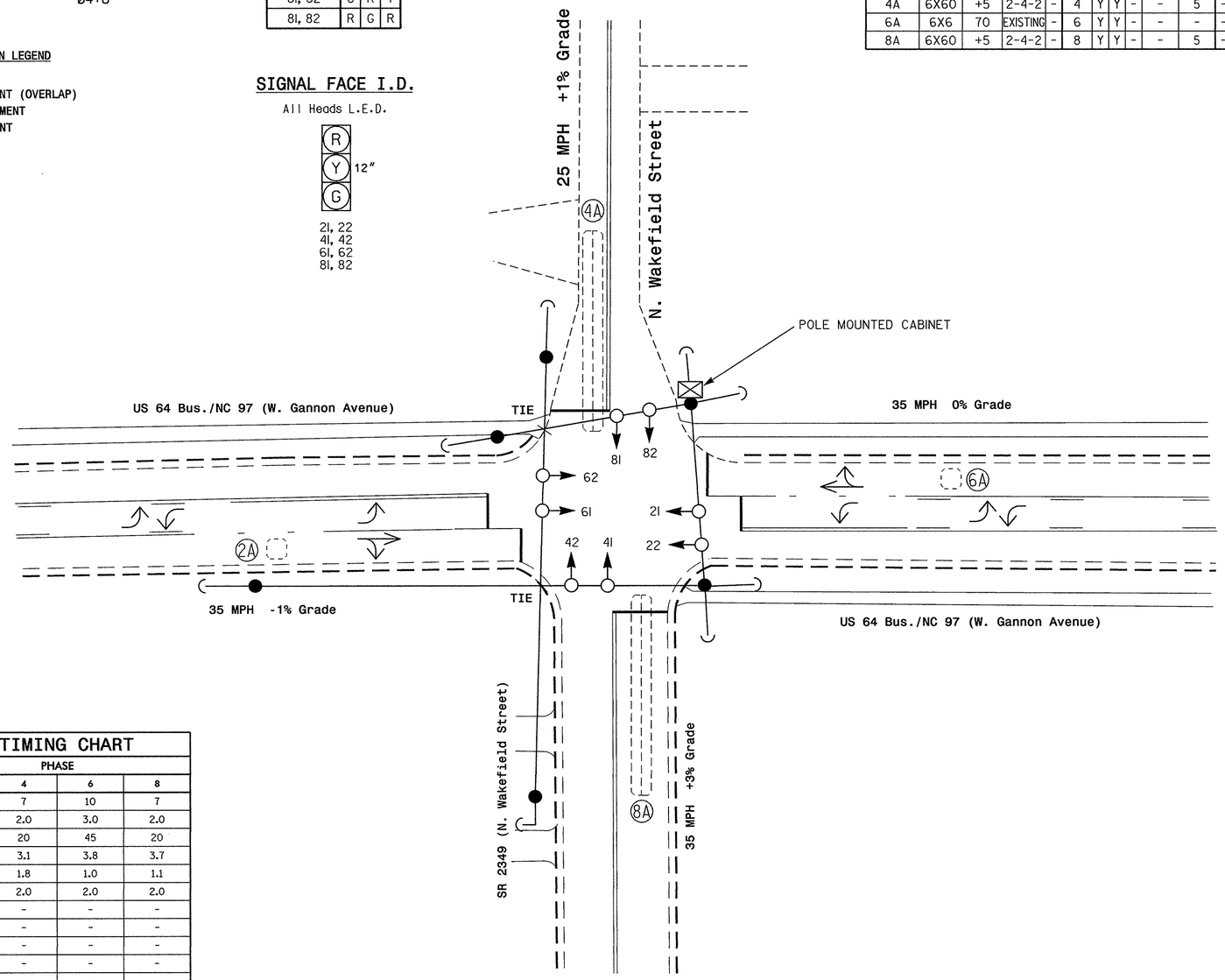
2I, 22
4I, 42
6I, 62
8I, 82

OASIS 2070L LOOP & DETECTOR INSTALLATION CHART												
INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	6X6	70	EXISTING	-	2	Y	Y	-	-	-	-	Y
4A	6X60	+5	2-4-2	-	4	Y	Y	-	-	5	-	Y
6A	6X6	70	EXISTING	-	6	Y	Y	-	-	-	-	Y
8A	6X60	+5	2-4-2	-	8	Y	Y	-	-	5	-	Y

2 Phase
Fully Actuated
(Isolated)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Pavement markings are existing.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	

OASIS 2070L TIMING CHART				
	PHASE			
FEATURE	2	4	6	8
Min Green 1 *	10	7	10	7
Extension 1 *	3.0	2.0	3.0	2.0
Max Green 1 *	45	20	45	20
Yellow Clearance	3.9	3.1	3.8	3.7
Red Clearance	1.0	1.8	1.0	1.1
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	YELLOW	-
Dual Entry	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON

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

Signal Upgrade

Prepared in the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering Branch
NC Department of Transportation
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 64 Bus./NC 97 (W. Gannon Avenue)
at
SR 2349 (N. Wakefield Street)

Division 5 Wake County Zebulon

PLAN DATE: January 2010 REVIEWED BY:
PREPARED BY: C.E. Carter REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 20 1"=20'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
SIGNATURE 1/29/10 DATE
SIG. INVENTORY NO. 05-1316

Appendix D – Synchro Output

2022 Existing Traffic Volumes

Zebulon South TIA

1: S Wakefield Street & NC-97 (Gannon Avenue) 12/04/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	428	36	41	459	4	81	9	100	4	4	17
Future Volume (vph)	5	428	36	41	459	4	81	9	100	4	4	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			0%			3%			1%	
Storage Length (ft)	125		0	125		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.988			0.999			0.929			0.905	
Flt Protected	0.950			0.950				0.979			0.993	
Satd. Flow (prot)	1778	1850	0	1770	1861	0	0	1669	0	0	1666	0
Flt Permitted	0.393			0.391				0.849			0.942	
Satd. Flow (perm)	736	1850	0	728	1861	0	0	1447	0	0	1580	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		774			1453			1831			462	
Travel Time (s)		15.1			28.3			49.9			12.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	476	40	46	510	4	90	10	111	4	4	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	516	0	46	514	0	0	211	0	0	27	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	0.99	0.99	0.99	1.00	1.00	1.00	1.02	1.02	1.02	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	14.9	14.9		14.8	14.8		11.8	11.8		11.9	11.9	
Total Split (s)	45.0	45.0		45.0	45.0		20.0	20.0		20.0	20.0	
Total Split (%)	69.2%	69.2%		69.2%	69.2%		30.8%	30.8%		30.8%	30.8%	
Maximum Green (s)	40.1	40.1		40.2	40.2		15.2	15.2		15.1	15.1	
Yellow Time (s)	3.9	3.9		3.8	3.8		3.7	3.7		3.1	3.1	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.1	1.1		1.8	1.8	
Lost Time Adjust (s)	0.1	0.1		0.2	0.2			0.2			0.1	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)	17.6	17.6		17.6	17.6			9.9			9.9	
Actuated g/C Ratio	0.46	0.46		0.46	0.46			0.26			0.26	
v/c Ratio	0.02	0.60		0.14	0.59			0.56			0.07	
Control Delay	6.6	11.6		7.9	11.5			18.1			11.0	

Zebulon South TIA

1: S Wakefield Street & NC-97 (Gannon Avenue)

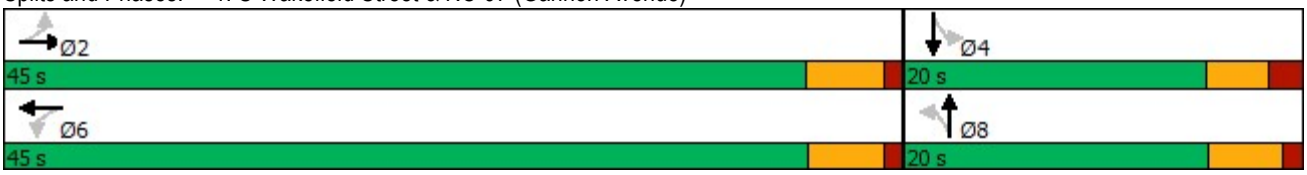
12/04/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	6.6	11.6		7.9	11.5			18.1			11.0	
LOS	A	B		A	B			B			B	
Approach Delay		11.6			11.2			18.1			11.0	
Approach LOS		B			B			B			B	
Queue Length 50th (ft)	1	65		4	65			31			3	
Queue Length 95th (ft)	5	170		21	168			94			18	
Internal Link Dist (ft)		694			1373			1751			382	
Turn Bay Length (ft)	125			125								
Base Capacity (vph)	706	1775		699	1786			591			645	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.01	0.29		0.07	0.29			0.36			0.04	

Intersection Summary

Area Type: Other
Cycle Length: 65
Actuated Cycle Length: 37.9
Natural Cycle: 40
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 12.5 Intersection LOS: B
Intersection Capacity Utilization 60.2% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1: S Wakefield Street & NC-97 (Gannon Avenue)



Zebulon South TIA
2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue) 12/04/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	396	62	196	310	17	76	156	123	22	169	29
Future Volume (vph)	41	396	62	196	310	17	76	156	123	22	169	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			-2%			2%	
Storage Length (ft)	200		100	350		0	125		0	250		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.992			0.934			0.978	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1844	1567	1787	1866	0	1787	1757	0	1752	1804	0
Flt Permitted	0.418			0.263			0.495			0.380		
Satd. Flow (perm)	771	1844	1567	495	1866	0	931	1757	0	701	1804	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			20			35	
Link Distance (ft)		1453			677			1822			478	
Travel Time (s)		28.3			13.2			62.1			9.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	46	440	69	218	344	19	84	173	137	24	188	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	440	69	218	363	0	84	310	0	24	220	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes						Yes	
Headway Factor	1.01	1.01	1.01	0.99	0.99	0.99	0.99	0.99	0.99	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	D.P+P	NA	pm+ov	D.P+P	NA		D.P+P	NA		D.P+P	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases	6		2	2			4			8		
Detector Phase	5	2	3	1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0	7.0	7.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	12.4	22.8	12.4	12.8	15.8		12.4	22.5		12.3	12.5	
Total Split (s)	15.0	30.0	25.0	15.0	30.0		25.0	40.0		15.0	30.0	
Total Split (%)	15.0%	30.0%	25.0%	15.0%	30.0%		25.0%	40.0%		15.0%	30.0%	
Maximum Green (s)	9.6	24.2	19.6	9.2	24.2		19.6	34.5		9.7	24.5	
Yellow Time (s)	3.0	4.0	3.0	3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.4	1.8	2.4	2.8	1.8		2.4	1.5		2.3	1.5	
Lost Time Adjust (s)	-0.4	-0.8	-0.4	-0.8	-0.8		-0.4	-0.5		-0.3	-0.5	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	3.0	2.0	2.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode	None	Min	None	None	Min		None	None		None	None	
Walk Time (s)		7.0						7.0				
Flash Dont Walk (s)		10.0						10.0				
Pedestrian Calls (#/hr)		0						0				
Act Effct Green (s)	36.0	23.5	36.9	33.5	31.9		22.3	21.8		24.3	16.3	

Zebulon South TIA

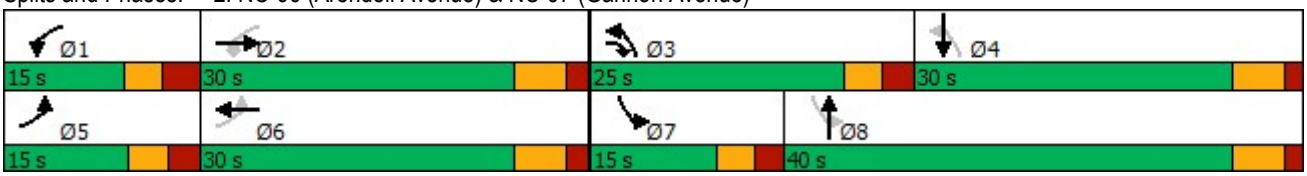
2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue)

12/04/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.48	0.31	0.49	0.45	0.42		0.30	0.29		0.32	0.22	
v/c Ratio	0.10	0.76	0.09	0.56	0.46		0.23	0.61		0.07	0.56	
Control Delay	12.7	36.0	13.3	19.2	22.7		17.6	29.9		15.7	33.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	12.7	36.0	13.3	19.2	22.7		17.6	29.9		15.7	33.6	
LOS	B	D	B	B	C		B	C		B	C	
Approach Delay		31.2			21.4			27.3			31.9	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	10	182	17	52	134		27	115		7	98	
Queue Length 95th (ft)	34	#399	47	125	271		54	233		22	170	
Internal Link Dist (ft)		1373			597			1742			398	
Turn Bay Length (ft)	200		100	350			125			250		
Base Capacity (vph)	518	636	1032	401	792		592	849		380	622	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.09	0.69	0.07	0.54	0.46		0.14	0.37		0.06	0.35	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 75.1			
Natural Cycle: 75			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 27.2		Intersection LOS: C	
Intersection Capacity Utilization 69.9%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue)



Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	30	4	16	4	4	4	43	240	4	4	129	18
Future Vol, veh/h	30	4	16	4	4	4	43	240	4	4	129	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	33	4	18	4	4	4	48	267	4	4	143	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	530	528	153	537	536	269	163	0	0	271	0	0
Stage 1	161	161	-	365	365	-	-	-	-	-	-	-
Stage 2	369	367	-	172	171	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	460	456	893	455	451	770	1416	-	-	1292	-	-
Stage 1	841	765	-	654	623	-	-	-	-	-	-	-
Stage 2	651	622	-	830	757	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	439	436	893	428	432	770	1416	-	-	1292	-	-
Mov Cap-2 Maneuver	439	436	-	428	432	-	-	-	-	-	-	-
Stage 1	807	763	-	628	598	-	-	-	-	-	-	-
Stage 2	617	597	-	806	755	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.7	12.3	1.1	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1416	-	-	524	504	1292	-	-
HCM Lane V/C Ratio	0.034	-	-	0.106	0.026	0.003	-	-
HCM Control Delay (s)	7.6	0	-	12.7	12.3	7.8	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.1	0	-	-

Intersection	
Int Delay, s/veh	2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	12	62	205	4	24	106
Future Vol, veh/h	12	62	205	4	24	106
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	69	228	4	27	118

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	402	230	0	0	232	0
Stage 1	230	-	-	-	-	-
Stage 2	172	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	604	809	-	-	1336	-
Stage 1	808	-	-	-	-	-
Stage 2	858	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	591	809	-	-	1336	-
Mov Cap-2 Maneuver	591	-	-	-	-	-
Stage 1	808	-	-	-	-	-
Stage 2	839	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.3	0	1.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	763	1336	-
HCM Lane V/C Ratio	-	-	0.108	0.02	-
HCM Control Delay (s)	-	-	10.3	7.7	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-

Zebulon South TIA
1: S Wakefield Street & NC-97 (Gannon Avenue) 12/04/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	594	100	49	496	4	80	9	60	6	17	26
Future Volume (vph)	9	594	100	49	496	4	80	9	60	6	17	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			0%			3%			1%	
Storage Length (ft)	125		0	125		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.978			0.999			0.946			0.929	
Flt Protected	0.950			0.950				0.974			0.994	
Satd. Flow (prot)	1778	1831	0	1770	1861	0	0	1691	0	0	1712	0
Flt Permitted	0.405			0.256				0.803			0.948	
Satd. Flow (perm)	758	1831	0	477	1861	0	0	1394	0	0	1632	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		774			1453			1831			462	
Travel Time (s)		15.1			28.3			49.9			12.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	10	660	111	54	551	4	89	10	67	7	19	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	771	0	54	555	0	0	166	0	0	55	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	0.99	0.99	0.99	1.00	1.00	1.00	1.02	1.02	1.02	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	14.9	14.9		14.8	14.8		11.8	11.8		11.9	11.9	
Total Split (s)	45.0	45.0		45.0	45.0		20.0	20.0		20.0	20.0	
Total Split (%)	69.2%	69.2%		69.2%	69.2%		30.8%	30.8%		30.8%	30.8%	
Maximum Green (s)	40.1	40.1		40.2	40.2		15.2	15.2		15.1	15.1	
Yellow Time (s)	3.9	3.9		3.8	3.8		3.7	3.7		3.1	3.1	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.1	1.1		1.8	1.8	
Lost Time Adjust (s)	0.1	0.1		0.2	0.2			0.2			0.1	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Act Effct Green (s)	28.4	28.4		28.4	28.4			10.0			10.1	
Actuated g/C Ratio	0.64	0.64		0.64	0.64			0.23			0.23	
v/c Ratio	0.02	0.66		0.18	0.46			0.53			0.15	
Control Delay	5.0	10.8		7.1	7.7			24.6			17.9	

Zebulon South TIA

1: S Wakefield Street & NC-97 (Gannon Avenue)

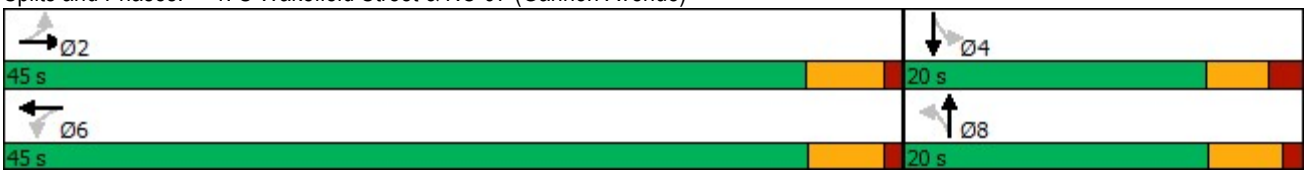
12/04/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	5.0	10.8		7.1	7.7			24.6			17.9	
LOS	A	B		A	A			C			B	
Approach Delay		10.8			7.7			24.6			17.9	
Approach LOS		B			A			C			B	
Queue Length 50th (ft)	1	122		6	73			33			10	
Queue Length 95th (ft)	6	291		24	170			113			44	
Internal Link Dist (ft)		694			1373			1751			382	
Turn Bay Length (ft)	125			125								
Base Capacity (vph)	664	1605		418	1631			509			596	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.02	0.48		0.13	0.34			0.33			0.09	

Intersection Summary

Area Type: Other
Cycle Length: 65
Actuated Cycle Length: 44.3
Natural Cycle: 50
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.66
Intersection Signal Delay: 11.3 Intersection LOS: B
Intersection Capacity Utilization 64.3% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1: S Wakefield Street & NC-97 (Gannon Avenue)



Zebulon South TIA
2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue) 12/04/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	313	64	218	439	51	70	272	137	45	177	44
Future Volume (vph)	59	313	64	218	439	51	70	272	137	45	177	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			-2%			2%	
Storage Length (ft)	200		100	350		0	125		0	250		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.984			0.950			0.970	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1844	1567	1787	1851	0	1787	1787	0	1752	1789	0
Flt Permitted	0.150			0.326			0.496			0.224		
Satd. Flow (perm)	277	1844	1567	613	1851	0	933	1787	0	413	1789	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			20			35	
Link Distance (ft)		1453			677			1822			478	
Travel Time (s)		28.3			13.2			62.1			9.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	66	348	71	242	488	57	78	302	152	50	197	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	66	348	71	242	545	0	78	454	0	50	246	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes						Yes	
Headway Factor	1.01	1.01	1.01	0.99	0.99	0.99	0.99	0.99	0.99	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	D.P+P	NA	pm+ov	D.P+P	NA		D.P+P	NA		D.P+P	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases	6		2	2			4			8		
Detector Phase	5	2	3	1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0	7.0	7.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	12.4	22.8	12.4	12.8	15.8		12.4	22.5		12.3	12.5	
Total Split (s)	15.0	30.0	25.0	15.0	30.0		25.0	40.0		15.0	30.0	
Total Split (%)	15.0%	30.0%	25.0%	15.0%	30.0%		25.0%	40.0%		15.0%	30.0%	
Maximum Green (s)	9.6	24.2	19.6	9.2	24.2		19.6	34.5		9.7	24.5	
Yellow Time (s)	3.0	4.0	3.0	3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.4	1.8	2.4	2.8	1.8		2.4	1.5		2.3	1.5	
Lost Time Adjust (s)	-0.4	-0.8	-0.4	-0.8	-0.8		-0.4	-0.5		-0.3	-0.5	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	3.0	2.0	2.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode	None	Min	None	None	Min		None	None		None	None	
Walk Time (s)		7.0						7.0				
Flash Dont Walk (s)		10.0						10.0				
Pedestrian Calls (#/hr)		0						0				
Act Effct Green (s)	33.0	21.2	34.9	31.4	27.2		28.8	26.0		29.9	22.9	

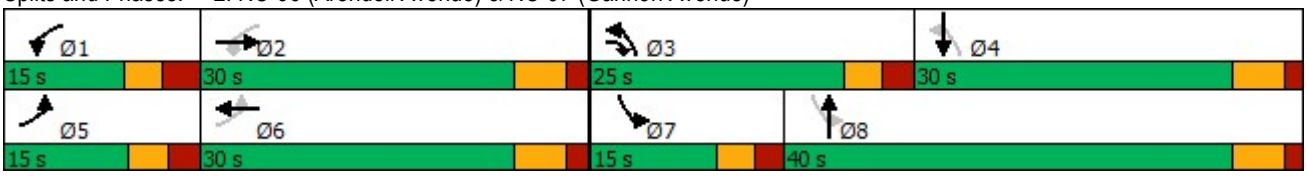
Zebulon South TIA
2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue) 12/04/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.41	0.27	0.44	0.39	0.34		0.36	0.33		0.37	0.29	
v/c Ratio	0.25	0.71	0.10	0.62	0.87		0.18	0.78		0.17	0.48	
Control Delay	18.4	38.4	17.4	26.0	46.7		15.2	36.2		15.3	28.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	18.4	38.4	17.4	26.0	46.7		15.2	36.2		15.3	28.2	
LOS	B	D	B	C	D		B	D		B	C	
Approach Delay		32.6			40.3			33.1			26.0	
Approach LOS		C			D			C			C	
Queue Length 50th (ft)	21	173	24	84	~306		23	227		15	107	
Queue Length 95th (ft)	52	#321	56	#175	#599		50	357		35	184	
Internal Link Dist (ft)		1373			597			1742			398	
Turn Bay Length (ft)	200		100	350			125			250		
Base Capacity (vph)	316	616	939	401	629		633	836		340	659	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.21	0.56	0.08	0.60	0.87		0.12	0.54		0.15	0.37	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 79.9			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 34.7		Intersection LOS: C	
Intersection Capacity Utilization 77.2%		ICU Level of Service D	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue)



Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	45	4	65	4	4	6	32	200	4	8	330	42
Future Vol, veh/h	45	4	65	4	4	6	32	200	4	8	330	42
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	50	4	72	4	4	7	36	222	4	9	367	47

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	711	707	391	743	728	224	414	0	0	226	0	0
Stage 1	409	409	-	296	296	-	-	-	-	-	-	-
Stage 2	302	298	-	447	432	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	348	360	658	331	350	815	1145	-	-	1342	-	-
Stage 1	619	596	-	712	668	-	-	-	-	-	-	-
Stage 2	707	667	-	591	582	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	330	344	658	282	334	815	1145	-	-	1342	-	-
Mov Cap-2 Maneuver	330	344	-	282	334	-	-	-	-	-	-	-
Stage 1	597	591	-	686	644	-	-	-	-	-	-	-
Stage 2	671	643	-	517	577	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.7	13.9	1.1	0.2
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1145	-	-	462	418	1342	-	-
HCM Lane V/C Ratio	0.031	-	-	0.274	0.037	0.007	-	-
HCM Control Delay (s)	8.2	0	-	15.7	13.9	7.7	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.1	0.1	0	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	42	149	6	96	250
Future Vol, veh/h	5	42	149	6	96	250
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	47	166	7	107	278

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	662	170	0	0	173	0
Stage 1	170	-	-	-	-	-
Stage 2	492	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	427	874	-	-	1404	-
Stage 1	860	-	-	-	-	-
Stage 2	615	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	389	874	-	-	1404	-
Mov Cap-2 Maneuver	389	-	-	-	-	-
Stage 1	860	-	-	-	-	-
Stage 2	560	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10	0	2.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	772	1404	-
HCM Lane V/C Ratio	-	-	0.068	0.076	-
HCM Control Delay (s)	-	-	10	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.2	-

2026 Background Traffic Volumes

Zebulon South TIA
1: S Wakefield Street & NC-97 (Gannon Avenue) 12/01/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	482	41	46	517	4	91	10	113	4	5	19
Future Volume (vph)	6	482	41	46	517	4	91	10	113	4	5	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			0%			3%			1%	
Storage Length (ft)	125		0	125		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.988			0.999			0.929			0.909	
Flt Protected	0.950			0.950				0.979			0.994	
Satd. Flow (prot)	1778	1850	0	1770	1861	0	0	1669	0	0	1675	0
Flt Permitted	0.447			0.950				0.848			0.951	
Satd. Flow (perm)	837	1850	0	1770	1861	0	0	1445	0	0	1602	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		774			1453			1831			462	
Travel Time (s)		15.1			28.3			49.9			12.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	7	536	46	51	574	4	101	11	126	4	6	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	582	0	51	578	0	0	238	0	0	31	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	0.99	0.99	0.99	1.00	1.00	1.00	1.02	1.02	1.02	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	17.0	17.0		14.0	17.0		14.0	14.0		14.0	14.0	
Total Split (s)	47.0	47.0		14.0	61.0		29.0	29.0		29.0	29.0	
Total Split (%)	52.2%	52.2%		15.6%	67.8%		32.2%	32.2%		32.2%	32.2%	
Maximum Green (s)	40.0	40.0		7.0	54.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0			-2.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode	Min	Min		None	Min		None	None		None	None	
Act Effct Green (s)	28.1	28.1		10.3	34.8			17.6			17.6	
Actuated g/C Ratio	0.44	0.44		0.16	0.55			0.28			0.28	
v/c Ratio	0.02	0.72		0.18	0.57			0.60			0.07	
Control Delay	13.3	22.4		34.7	11.5			31.3			23.3	

Zebulon South TIA

1: S Wakefield Street & NC-97 (Gannon Avenue)

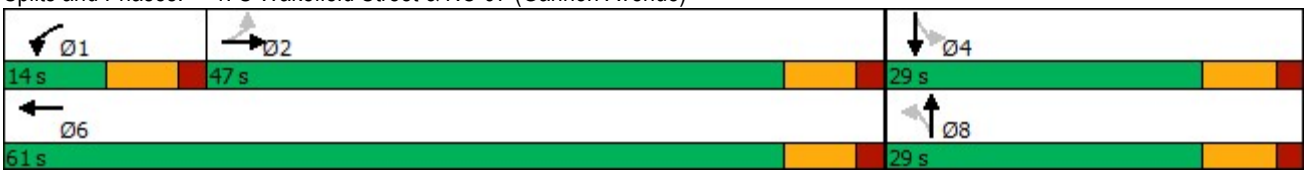
12/01/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	13.3	22.4		34.7	11.5			31.3			23.3	
LOS	B	C		C	B			C			C	
Approach Delay		22.3			13.4			31.3			23.3	
Approach LOS		C			B			C			C	
Queue Length 50th (ft)	2	213		20	129			92			10	
Queue Length 95th (ft)	10	368		63	241			199			35	
Internal Link Dist (ft)		694			1373			1751			382	
Turn Bay Length (ft)	125			125								
Base Capacity (vph)	598	1322		286	1526			622			690	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.01	0.44		0.18	0.38			0.38			0.04	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 63.8
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 20.0 Intersection LOS: B
Intersection Capacity Utilization 65.7% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1: S Wakefield Street & NC-97 (Gannon Avenue)



Zebulon South TIA
2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue) 12/01/2023

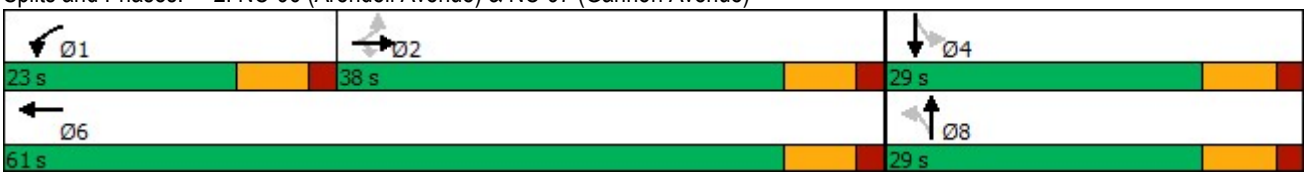
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	446	70	221	349	19	86	176	138	25	190	33
Future Volume (vph)	46	446	70	221	349	19	86	176	138	25	190	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			-2%			2%	
Storage Length (ft)	200		100	350		0	125		0	250		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.992			0.934			0.978	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1844	1567	1787	1866	0	1787	1757	0	1752	1804	0
Flt Permitted	0.522			0.950			0.481			0.314		
Satd. Flow (perm)	963	1844	1567	1787	1866	0	905	1757	0	579	1804	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			20			35	
Link Distance (ft)		1453			677			1822			478	
Travel Time (s)		28.3			13.2			62.1			9.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	51	496	78	246	388	21	96	196	153	28	211	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	51	496	78	246	409	0	96	349	0	28	248	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes						Yes	
Headway Factor	1.01	1.01	1.01	0.99	0.99	0.99	0.99	0.99	0.99	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Prot	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2				8			4		
Detector Phase	2	2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	24.0	24.0	24.0	14.0	17.0		24.0	24.0		14.0	14.0	
Total Split (s)	38.0	38.0	38.0	23.0	61.0		29.0	29.0		29.0	29.0	
Total Split (%)	42.2%	42.2%	42.2%	25.6%	67.8%		32.2%	32.2%		32.2%	32.2%	
Maximum Green (s)	31.0	31.0	31.0	16.0	54.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	3.0	3.0	3.0	2.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode	Min	Min	Min	None	Min		None	None		None	None	
Walk Time (s)	7.0	7.0	7.0				7.0	7.0				
Flash Dont Walk (s)	10.0	10.0	10.0				10.0	10.0				
Pedestrian Calls (#/hr)	0	0	0				0	0				
Act Effct Green (s)	26.8	26.8	26.8	15.8	47.8		20.7	20.7		20.7	20.7	

Zebulon South TIA
2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue) 12/01/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.34	0.34	0.34	0.20	0.61		0.26	0.26		0.26	0.26	
v/c Ratio	0.16	0.79	0.15	0.69	0.36		0.41	0.76		0.19	0.52	
Control Delay	20.7	34.6	19.9	42.3	9.1		32.4	40.2		28.8	31.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.7	34.6	19.9	42.3	9.1		32.4	40.2		28.8	31.0	
LOS	C	C	B	D	A		C	D		C	C	
Approach Delay		31.6			21.6			38.6			30.8	
Approach LOS		C			C			D			C	
Queue Length 50th (ft)	19	239	29	123	100		42	171		12	113	
Queue Length 95th (ft)	45	360	60	#226	155		92	#304		36	195	
Internal Link Dist (ft)		1373			597			1742			398	
Turn Bay Length (ft)	200		100	350			125			250		
Base Capacity (vph)	417	798	678	422	1370		285	553		182	568	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.12	0.62	0.12	0.58	0.30		0.34	0.63		0.15	0.44	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 78.8			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 29.8		Intersection LOS: C	
Intersection Capacity Utilization 75.9%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue)



Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	34	4	18	4	4	4	48	270	4	4	145	20
Future Vol, veh/h	34	4	18	4	4	4	48	270	4	4	145	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	38	4	20	4	4	4	53	300	4	4	161	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	592	590	172	600	599	302	183	0	0	304	0	0
Stage 1	180	180	-	408	408	-	-	-	-	-	-	-
Stage 2	412	410	-	192	191	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	418	420	872	413	415	738	1392	-	-	1257	-	-
Stage 1	822	750	-	620	597	-	-	-	-	-	-	-
Stage 2	617	595	-	810	742	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	396	399	872	385	394	738	1392	-	-	1257	-	-
Mov Cap-2 Maneuver	396	399	-	385	394	-	-	-	-	-	-	-
Stage 1	784	747	-	591	570	-	-	-	-	-	-	-
Stage 2	581	568	-	784	739	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.6	13	1.1	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1392	-	-	481	462	1257	-	-
HCM Lane V/C Ratio	0.038	-	-	0.129	0.029	0.004	-	-
HCM Control Delay (s)	7.7	0	-	13.6	13	7.9	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.1	0	-	-

Intersection	
Int Delay, s/veh	2.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	70	231	4	27	119
Future Vol, veh/h	14	70	231	4	27	119
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	78	257	4	30	132

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	451	259	0	0	261	0
Stage 1	259	-	-	-	-	-
Stage 2	192	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	566	780	-	-	1303	-
Stage 1	784	-	-	-	-	-
Stage 2	841	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	552	780	-	-	1303	-
Mov Cap-2 Maneuver	552	-	-	-	-	-
Stage 1	784	-	-	-	-	-
Stage 2	820	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.7	0	1.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	730	1303	-
HCM Lane V/C Ratio	-	-	0.128	0.023	-
HCM Control Delay (s)	-	-	10.7	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-

Zebulon South TIA

1: S Wakefield Street & NC-97 (Gannon Avenue) 12/01/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	669	113	55	558	4	90	10	68	7	19	29
Future Volume (vph)	10	669	113	55	558	4	90	10	68	7	19	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			0%			3%			1%	
Storage Length (ft)	125		0	125		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.978			0.999			0.945			0.929	
Flt Protected	0.950			0.950				0.974			0.993	
Satd. Flow (prot)	1778	1831	0	1770	1861	0	0	1689	0	0	1710	0
Flt Permitted	0.428			0.950				0.813			0.952	
Satd. Flow (perm)	801	1831	0	1770	1861	0	0	1410	0	0	1639	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		774			1453			1831			462	
Travel Time (s)		15.1			28.3			49.9			12.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	743	126	61	620	4	100	11	76	8	21	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	869	0	61	624	0	0	187	0	0	61	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	0.99	0.99	0.99	1.00	1.00	1.00	1.02	1.02	1.02	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	17.0	17.0		14.0	17.0		14.0	14.0		14.0	14.0	
Total Split (s)	56.0	56.0		14.0	70.0		20.0	20.0		20.0	20.0	
Total Split (%)	62.2%	62.2%		15.6%	77.8%		22.2%	22.2%		22.2%	22.2%	
Maximum Green (s)	49.0	49.0		7.0	63.0		13.0	13.0		13.0	13.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0			-2.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode	Min	Min		None	Min		None	None		None	None	
Act Effct Green (s)	45.2	45.2		9.3	55.7			14.3			14.3	
Actuated g/C Ratio	0.56	0.56		0.12	0.69			0.18			0.18	
v/c Ratio	0.02	0.84		0.30	0.48			0.75			0.21	
Control Delay	8.9	25.3		41.2	6.9			54.1			33.8	

Zebulon South TIA

1: S Wakefield Street & NC-97 (Gannon Avenue)

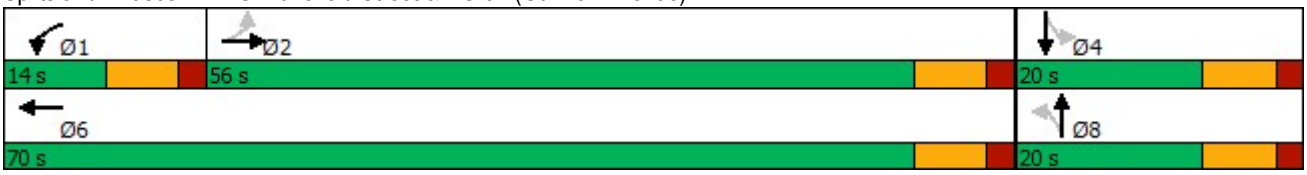
12/01/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	8.9	25.3		41.2	6.9			54.1			33.8	
LOS	A	C		D	A			D			C	
Approach Delay		25.1			10.0			54.1			33.8	
Approach LOS		C			A			D			C	
Queue Length 50th (ft)	3	380		32	124			99			29	
Queue Length 95th (ft)	10	#602		72	184			#213			67	
Internal Link Dist (ft)		694			1373			1751			382	
Turn Bay Length (ft)	125			125								
Base Capacity (vph)	524	1200		204	1497			272			316	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.02	0.72		0.30	0.42			0.69			0.19	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 80.3
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 22.7 Intersection LOS: C
Intersection Capacity Utilization 70.4% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: S Wakefield Street & NC-97 (Gannon Avenue)



Zebulon South TIA
2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue) 12/01/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	352	72	245	494	57	79	306	154	51	199	50
Future Volume (vph)	66	352	72	245	494	57	79	306	154	51	199	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			-2%			2%	
Storage Length (ft)	200		100	350		0	125		0	250		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.985			0.950			0.970	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1844	1567	1787	1853	0	1787	1787	0	1752	1789	0
Flt Permitted	0.433			0.950			0.489			0.199		
Satd. Flow (perm)	799	1844	1567	1787	1853	0	920	1787	0	367	1789	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			20			35	
Link Distance (ft)		1453			677			1822			478	
Travel Time (s)		28.3			13.2			62.1			9.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	73	391	80	272	549	63	88	340	171	57	221	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	73	391	80	272	612	0	88	511	0	57	277	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes						Yes	
Headway Factor	1.01	1.01	1.01	0.99	0.99	0.99	0.99	0.99	0.99	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Prot	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2				8			4		
Detector Phase	2	2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	24.0	24.0	24.0	14.0	17.0		24.0	24.0		14.0	14.0	
Total Split (s)	31.0	31.0	31.0	22.0	53.0		37.0	37.0		37.0	37.0	
Total Split (%)	34.4%	34.4%	34.4%	24.4%	58.9%		41.1%	41.1%		41.1%	41.1%	
Maximum Green (s)	24.0	24.0	24.0	15.0	46.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	3.0	3.0	3.0	2.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode	Min	Min	Min	None	Min		None	None		None	None	
Walk Time (s)	7.0	7.0	7.0				7.0	7.0				
Flash Dont Walk (s)	10.0	10.0	10.0				10.0	10.0				
Pedestrian Calls (#/hr)	0	0	0				0	0				
Act Effct Green (s)	22.5	22.5	22.5	16.2	43.8		28.0	28.0		28.0	28.0	

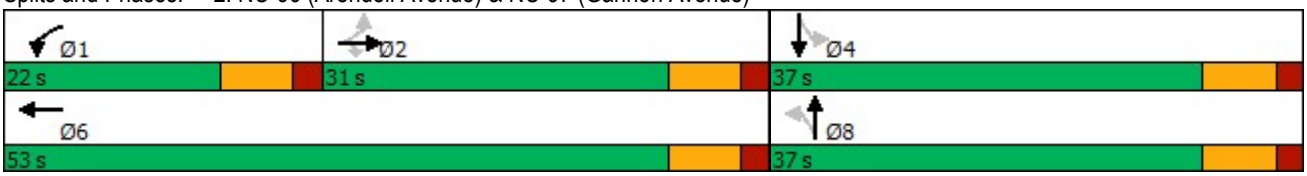
Zebulon South TIA
2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue) 12/01/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.27	0.27	0.27	0.20	0.53		0.34	0.34		0.34	0.34	
v/c Ratio	0.33	0.78	0.19	0.77	0.62		0.28	0.84		0.46	0.45	
Control Delay	30.2	40.1	25.4	49.6	17.3		23.6	39.4		36.1	24.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	30.2	40.1	25.4	49.6	17.3		23.6	39.4		36.1	24.5	
LOS	C	D	C	D	B		C	D		D	C	
Approach Delay		36.6			27.2			37.1			26.4	
Approach LOS		D			C			D			C	
Queue Length 50th (ft)	32	200	34	148	229		35	256		24	117	
Queue Length 95th (ft)	72	#309	70	#276	339		74	#422		66	189	
Internal Link Dist (ft)		1373			597			1742			398	
Turn Bay Length (ft)	200		100	350			125			250		
Base Capacity (vph)	259	598	508	379	1109		367	713		146	714	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.28	0.65	0.16	0.72	0.55		0.24	0.72		0.39	0.39	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 82
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 31.8 Intersection LOS: C
Intersection Capacity Utilization 85.8% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue)



Zebulon South TIA
3: NC-96 (Arendell Avenue) & Barbee Street 12/01/2023

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	51	5	73	4	4	7	36	225	4	9	371	47
Future Vol, veh/h	51	5	73	4	4	7	36	225	4	9	371	47
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	57	6	81	4	4	8	40	250	4	10	412	52

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	796	792	438	834	816	252	464	0	0	254	0	0
Stage 1	458	458	-	332	332	-	-	-	-	-	-	-
Stage 2	338	334	-	502	484	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	305	322	619	288	311	787	1097	-	-	1311	-	-
Stage 1	583	567	-	681	644	-	-	-	-	-	-	-
Stage 2	676	643	-	552	552	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	287	305	619	237	295	787	1097	-	-	1311	-	-
Mov Cap-2 Maneuver	287	305	-	237	295	-	-	-	-	-	-	-
Stage 1	559	561	-	652	617	-	-	-	-	-	-	-
Stage 2	637	616	-	470	546	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.3	14.9	1.1	0.2
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1097	-	-	413	381	1311	-	-
HCM Lane V/C Ratio	0.036	-	-	0.347	0.044	0.008	-	-
HCM Control Delay (s)	8.4	0	-	18.3	14.9	7.8	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.5	0.1	0	-	-

Intersection	
Int Delay, s/veh	2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	47	168	7	108	281
Future Vol, veh/h	6	47	168	7	108	281
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	52	187	8	120	312

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	743	191	0	0	195	0
Stage 1	191	-	-	-	-	-
Stage 2	552	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	383	851	-	-	1378	-
Stage 1	841	-	-	-	-	-
Stage 2	577	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	343	851	-	-	1378	-
Mov Cap-2 Maneuver	343	-	-	-	-	-
Stage 1	841	-	-	-	-	-
Stage 2	516	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.4	0	2.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	729	1378	-
HCM Lane V/C Ratio	-	-	0.081	0.087	-
HCM Control Delay (s)	-	-	10.4	7.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0.3	-

2026 Build Traffic Volumes

Zebulon South TIA
1: S Wakefield Street & NC-97 (Gannon Avenue) 12/01/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	487	52	51	534	4	126	10	130	4	5	19
Future Volume (vph)	6	487	52	51	534	4	126	10	130	4	5	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			0%			3%			1%	
Storage Length (ft)	125		0	125		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.985			0.999			0.934			0.909	
Flt Protected	0.950			0.950				0.977			0.994	
Satd. Flow (prot)	1778	1844	0	1770	1861	0	0	1674	0	0	1675	0
Flt Permitted	0.439			0.950				0.833			0.952	
Satd. Flow (perm)	822	1844	0	1770	1861	0	0	1428	0	0	1604	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		774			1453			1831			462	
Travel Time (s)		15.1			28.3			49.9			12.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	7	541	58	57	593	4	140	11	144	4	6	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	599	0	57	597	0	0	295	0	0	31	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	0.99	0.99	0.99	1.00	1.00	1.00	1.02	1.02	1.02	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	17.0	17.0		14.0	17.0		14.0	14.0		14.0	14.0	
Total Split (s)	45.0	45.0		14.0	59.0		31.0	31.0		31.0	31.0	
Total Split (%)	50.0%	50.0%		15.6%	65.6%		34.4%	34.4%		34.4%	34.4%	
Maximum Green (s)	38.0	38.0		7.0	52.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0			-2.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode	Min	Min		None	Min		None	None		None	None	
Act Effct Green (s)	29.8	29.8		10.2	36.6			21.2			21.2	
Actuated g/C Ratio	0.43	0.43		0.15	0.53			0.31			0.31	
v/c Ratio	0.02	0.75		0.22	0.61			0.68			0.06	
Control Delay	14.5	25.5		37.2	13.6			33.9			22.5	

Zebulon South TIA

1: S Wakefield Street & NC-97 (Gannon Avenue)

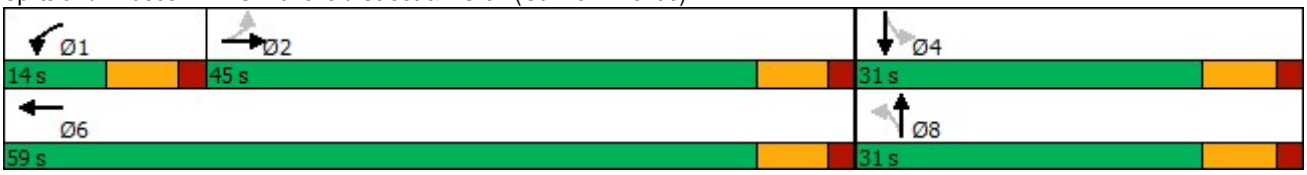
12/01/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	14.5	25.5		37.2	13.6			33.9			22.5	
LOS	B	C		D	B			C			C	
Approach Delay		25.4			15.7			33.9			22.5	
Approach LOS		C			B			C			C	
Queue Length 50th (ft)	2	252		26	164			129			11	
Queue Length 95th (ft)	10	403		68	272			#264			34	
Internal Link Dist (ft)		694			1373			1751			382	
Turn Bay Length (ft)	125			125								
Base Capacity (vph)	519	1164		261	1452			609			684	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.01	0.51		0.22	0.41			0.48			0.05	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 69.1
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 22.9 Intersection LOS: C
Intersection Capacity Utilization 71.3% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: S Wakefield Street & NC-97 (Gannon Avenue)



Zebulon South TIA
2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue) 12/01/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	463	75	232	354	19	103	201	172	25	198	33
Future Volume (vph)	46	463	75	232	354	19	103	201	172	25	198	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			-2%			2%	
Storage Length (ft)	200		100	350		0	125		0	250		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.992			0.931			0.978	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1844	1567	1787	1866	0	1787	1752	0	1752	1804	0
Flt Permitted	0.520			0.950			0.479			0.243		
Satd. Flow (perm)	959	1844	1567	1787	1866	0	901	1752	0	448	1804	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			20			35	
Link Distance (ft)		1453			677			1822			478	
Travel Time (s)		28.3			13.2			62.1			9.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	51	514	83	258	393	21	114	223	191	28	220	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	51	514	83	258	414	0	114	414	0	28	257	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes						Yes	
Headway Factor	1.01	1.01	1.01	0.99	0.99	0.99	0.99	0.99	0.99	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Prot	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2				8			4		
Detector Phase	2	2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	24.0	24.0	24.0	14.0	17.0		24.0	24.0		14.0	14.0	
Total Split (s)	38.0	38.0	38.0	21.0	59.0		31.0	31.0		31.0	31.0	
Total Split (%)	42.2%	42.2%	42.2%	23.3%	65.6%		34.4%	34.4%		34.4%	34.4%	
Maximum Green (s)	31.0	31.0	31.0	14.0	52.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	3.0	3.0	3.0	2.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode	Min	Min	Min	None	Min		None	None		None	None	
Walk Time (s)	7.0	7.0	7.0				7.0	7.0				
Flash Dont Walk (s)	10.0	10.0	10.0				10.0	10.0				
Pedestrian Calls (#/hr)	0	0	0				0	0				
Act Effct Green (s)	28.0	28.0	28.0	15.3	48.4		23.4	23.4		23.4	23.4	

Zebulon South TIA

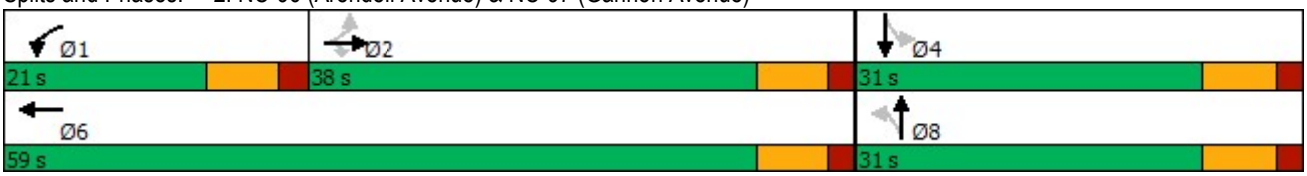
2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue)

12/01/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.34	0.34	0.34	0.19	0.59		0.29	0.29		0.29	0.29	
v/c Ratio	0.16	0.82	0.16	0.77	0.38		0.44	0.83		0.22	0.50	
Control Delay	20.8	37.0	20.2	51.0	10.2		32.1	44.3		29.4	29.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.8	37.0	20.2	51.0	10.2		32.1	44.3		29.4	29.4	
LOS	C	D	C	D	B		C	D		C	C	
Approach Delay		33.6			25.9			41.6			29.4	
Approach LOS		C			C			D			C	
Queue Length 50th (ft)	19	253	31	138	111		51	211		12	116	
Queue Length 95th (ft)	45	378	63	#268	168		106	#370		36	195	
Internal Link Dist (ft)		1373			597			1742			398	
Turn Bay Length (ft)	200		100	350			125			250		
Base Capacity (vph)	393	756	642	355	1252		291	566		144	583	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.13	0.68	0.13	0.73	0.33		0.39	0.73		0.19	0.44	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 82			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 32.6		Intersection LOS: C	
Intersection Capacity Utilization 80.8%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue)



Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	34	4	21	4	4	4	56	346	4	4	169	20
Future Vol, veh/h	34	4	21	4	4	4	56	346	4	4	169	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	38	4	23	4	4	4	62	384	4	4	188	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	721	719	199	731	728	386	210	0	0	388	0	0
Stage 1	207	207	-	510	510	-	-	-	-	-	-	-
Stage 2	514	512	-	221	218	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	343	354	842	337	350	662	1361	-	-	1170	-	-
Stage 1	795	731	-	546	538	-	-	-	-	-	-	-
Stage 2	543	536	-	781	723	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	321	332	842	309	328	662	1361	-	-	1170	-	-
Mov Cap-2 Maneuver	321	332	-	309	328	-	-	-	-	-	-	-
Stage 1	749	728	-	514	507	-	-	-	-	-	-	-
Stage 2	504	505	-	752	720	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.4	14.7	1.1	0.2
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1361	-	-	413	385	1170	-	-
HCM Lane V/C Ratio	0.046	-	-	0.159	0.035	0.004	-	-
HCM Control Delay (s)	7.8	0	-	15.4	14.7	8.1	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.6	0.1	0	-	-

Zebulon South TIA
4: NC-96 (Arendell Avenue) & Site Access 1

12/01/2023

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	42	8	4	343	160	13
Future Vol, veh/h	42	8	4	343	160	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	47	9	4	381	178	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	574	185	192	0	-	0
Stage 1	185	-	-	-	-	-
Stage 2	389	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	480	857	1381	-	-	-
Stage 1	847	-	-	-	-	-
Stage 2	685	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	478	857	1381	-	-	-
Mov Cap-2 Maneuver	478	-	-	-	-	-
Stage 1	844	-	-	-	-	-
Stage 2	685	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.9	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1381	-	514	-	-
HCM Lane V/C Ratio	0.003	-	0.108	-	-
HCM Control Delay (s)	7.6	0	12.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Zebulon South TIA
5: NC-96 (Arendell Avenue) & Site Access 2

12/01/2023

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	42	17	6	304	154	14
Future Vol, veh/h	42	17	6	304	154	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	47	19	7	338	171	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	531	179	187	0	-	0
Stage 1	179	-	-	-	-	-
Stage 2	352	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	509	864	1387	-	-	-
Stage 1	852	-	-	-	-	-
Stage 2	712	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	506	864	1387	-	-	-
Mov Cap-2 Maneuver	506	-	-	-	-	-
Stage 1	847	-	-	-	-	-
Stage 2	712	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.1	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1387	-	575	-	-
HCM Lane V/C Ratio	0.005	-	0.114	-	-
HCM Control Delay (s)	7.6	0	12.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Zebulon South TIA
6: NC-96 (Arendell Avenue) & Perry Curtis Road

12/01/2023

Intersection	
Int Delay, s/veh	2.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	73	237	4	35	136
Future Vol, veh/h	14	73	237	4	35	136
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	81	263	4	39	151

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	494	265	0	0	267	0
Stage 1	265	-	-	-	-	-
Stage 2	229	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	535	774	-	-	1297	-
Stage 1	779	-	-	-	-	-
Stage 2	809	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	517	774	-	-	1297	-
Mov Cap-2 Maneuver	517	-	-	-	-	-
Stage 1	779	-	-	-	-	-
Stage 2	782	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	1.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	717	1297	-
HCM Lane V/C Ratio	-	-	0.135	0.03	-
HCM Control Delay (s)	-	-	10.8	7.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-

Intersection	
Int Delay, s/veh	1.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	8	52	214	4	16	92
Future Vol, veh/h	8	52	214	4	16	92
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	58	238	4	18	102

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	378	240	0	0	242	0
Stage 1	240	-	-	-	-	-
Stage 2	138	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	624	799	-	-	1324	-
Stage 1	800	-	-	-	-	-
Stage 2	889	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	615	799	-	-	1324	-
Mov Cap-2 Maneuver	615	-	-	-	-	-
Stage 1	800	-	-	-	-	-
Stage 2	877	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.1	0	1.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	768	1324	-
HCM Lane V/C Ratio	-	-	0.087	0.013	-
HCM Control Delay (s)	-	-	10.1	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Zebulon South TIA
1: S Wakefield Street & NC-97 (Gannon Avenue) 12/05/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	688	150	73	569	4	113	10	79	7	19	29
Future Volume (vph)	10	688	150	73	569	4	113	10	79	7	19	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			0%			3%			1%	
Storage Length (ft)	125		0	125		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.973			0.999			0.947			0.929	
Flt Protected	0.950			0.950				0.973			0.993	
Satd. Flow (prot)	1778	1822	0	1770	1861	0	0	1691	0	0	1710	0
Flt Permitted	0.423			0.950				0.804			0.954	
Satd. Flow (perm)	792	1822	0	1770	1861	0	0	1397	0	0	1643	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		774			1453			1831			462	
Travel Time (s)		15.1			28.3			49.9			12.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	764	167	81	632	4	126	11	88	8	21	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	931	0	81	636	0	0	225	0	0	61	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	0.99	0.99	0.99	1.00	1.00	1.00	1.02	1.02	1.02	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	17.0	17.0		14.0	17.0		14.0	14.0		14.0	14.0	
Total Split (s)	52.0	52.0		14.0	66.0		24.0	24.0		24.0	24.0	
Total Split (%)	57.8%	57.8%		15.6%	73.3%		26.7%	26.7%		26.7%	26.7%	
Maximum Green (s)	45.0	45.0		7.0	59.0		17.0	17.0		17.0	17.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0			-2.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode	Min	Min		None	Min		None	None		None	None	
Act Effct Green (s)	46.2	46.2		9.2	56.7			17.5			17.5	
Actuated g/C Ratio	0.55	0.55		0.11	0.67			0.21			0.21	
v/c Ratio	0.03	0.93		0.42	0.51			0.78			0.18	
Control Delay	10.8	37.8		45.6	8.7			53.0			30.8	

Zebulon South TIA

1: S Wakefield Street & NC-97 (Gannon Avenue)

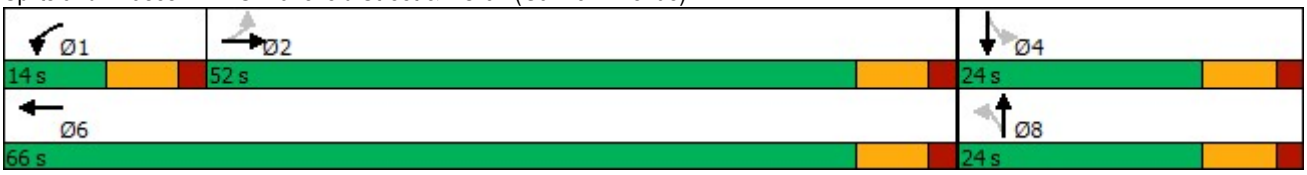
12/05/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	10.8	37.8		45.6	8.7			53.0			30.8	
LOS	B	D		D	A			D			C	
Approach Delay		37.5			12.9			53.0			30.8	
Approach LOS		D			B			D			C	
Queue Length 50th (ft)	3	489		44	154			121			29	
Queue Length 95th (ft)	11	#774		90	229			#234			63	
Internal Link Dist (ft)		694			1373			1751			382	
Turn Bay Length (ft)	125			125								
Base Capacity (vph)	449	1034		192	1371			320			376	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.02	0.90		0.42	0.46			0.70			0.16	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 84.4
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 30.0 Intersection LOS: C
Intersection Capacity Utilization 81.9% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: S Wakefield Street & NC-97 (Gannon Avenue)



Zebulon South TIA
2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue) 12/05/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	363	91	282	512	57	90	322	176	51	227	50
Future Volume (vph)	66	363	91	282	512	57	90	322	176	51	227	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-2%			-2%			2%	
Storage Length (ft)	200		100	350		0	125		0	250		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.985			0.947			0.973	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1844	1567	1787	1853	0	1787	1782	0	1752	1794	0
Flt Permitted	0.425			0.950			0.450			0.157		
Satd. Flow (perm)	784	1844	1567	1787	1853	0	847	1782	0	290	1794	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			20			35	
Link Distance (ft)		1453			677			1822			478	
Travel Time (s)		28.3			13.2			62.1			9.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	73	403	101	313	569	63	100	358	196	57	252	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	73	403	101	313	632	0	100	554	0	57	308	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes						Yes	
Headway Factor	1.01	1.01	1.01	0.99	0.99	0.99	0.99	0.99	0.99	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Prot	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2				8			4		
Detector Phase	2	2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	24.0	24.0	24.0	14.0	17.0		24.0	24.0		14.0	14.0	
Total Split (s)	29.0	29.0	29.0	24.0	53.0		37.0	37.0		37.0	37.0	
Total Split (%)	32.2%	32.2%	32.2%	26.7%	58.9%		41.1%	41.1%		41.1%	41.1%	
Maximum Green (s)	22.0	22.0	22.0	17.0	46.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	3.0	3.0	3.0	2.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode	Min	Min	Min	None	Min		None	None		None	None	
Walk Time (s)	7.0	7.0	7.0				7.0	7.0				
Flash Dont Walk (s)	10.0	10.0	10.0				10.0	10.0				
Pedestrian Calls (#/hr)	0	0	0				0	0				
Act Effct Green (s)	22.4	22.4	22.4	18.1	45.6		30.0	30.0		30.0	30.0	

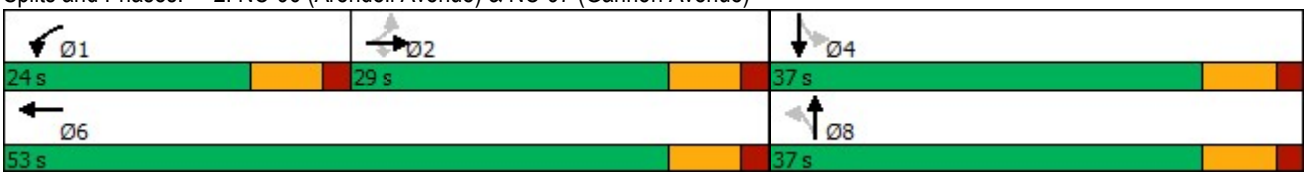
Zebulon South TIA
2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue) 12/05/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.26	0.26	0.26	0.21	0.53		0.35	0.35		0.35	0.35	
v/c Ratio	0.36	0.84	0.25	0.83	0.64		0.34	0.89		0.56	0.49	
Control Delay	32.8	47.5	27.8	53.4	18.3		25.2	45.2		48.5	25.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	32.8	47.5	27.8	53.4	18.3		25.2	45.2		48.5	25.5	
LOS	C	D	C	D	B		C	D		D	C	
Approach Delay		42.2			29.9			42.1			29.1	
Approach LOS		D			C			D			C	
Queue Length 50th (ft)	34	215	45	171	240		41	290		26	134	
Queue Length 95th (ft)	75	#365	87	#309	356		85	#481		#84	212	
Internal Link Dist (ft)		1373			597			1742			398	
Turn Bay Length (ft)	200		100	350			125			250		
Base Capacity (vph)	222	522	443	401	1050		320	673		109	677	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.33	0.77	0.23	0.78	0.60		0.31	0.82		0.52	0.45	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 85.7
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 35.7 Intersection LOS: D
Intersection Capacity Utilization 88.9% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: NC-96 (Arendell Avenue) & NC-97 (Gannon Avenue)



Zebulon South TIA
3: NC-96 (Arendell Avenue) & Barbee Street 12/05/2023

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	51	5	82	4	4	7	41	274	4	9	455	47
Future Vol, veh/h	51	5	82	4	4	7	41	274	4	9	455	47
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	57	6	91	4	4	8	46	304	4	10	506	52

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	956	952	532	999	976	306	558	0	0	308	0	0
Stage 1	552	552	-	398	398	-	-	-	-	-	-	-
Stage 2	404	400	-	601	578	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	238	259	547	222	251	734	1013	-	-	1253	-	-
Stage 1	518	515	-	628	603	-	-	-	-	-	-	-
Stage 2	623	602	-	487	501	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	220	242	547	172	234	734	1013	-	-	1253	-	-
Mov Cap-2 Maneuver	220	242	-	172	234	-	-	-	-	-	-	-
Stage 1	490	509	-	593	570	-	-	-	-	-	-	-
Stage 2	578	569	-	397	495	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	23.7	17.7	1.1	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1013	-	-	343	301	1253	-	-
HCM Lane V/C Ratio	0.045	-	-	0.447	0.055	0.008	-	-
HCM Control Delay (s)	8.7	0	-	23.7	17.7	7.9	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	2.2	0.2	0	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	27	5	9	242	436	46
Future Vol, veh/h	27	5	9	242	436	46
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	6	10	269	484	51

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	799	510	535	0	-	0
Stage 1	510	-	-	-	-	-
Stage 2	289	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	355	563	1033	-	-	-
Stage 1	603	-	-	-	-	-
Stage 2	760	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	351	563	1033	-	-	-
Mov Cap-2 Maneuver	351	-	-	-	-	-
Stage 1	596	-	-	-	-	-
Stage 2	760	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.7	0.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1033	-	373	-	-
HCM Lane V/C Ratio	0.01	-	0.095	-	-
HCM Control Delay (s)	8.5	0	15.7	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Zebulon South TIA
5: NC-96 (Arendell Avenue) & Site Access 2

12/05/2023

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	27	11	18	224	394	47
Future Vol, veh/h	27	11	18	224	394	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	12	20	249	438	52

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	753	464	490	0	-	0
Stage 1	464	-	-	-	-	-
Stage 2	289	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	377	598	1073	-	-	-
Stage 1	633	-	-	-	-	-
Stage 2	760	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	369	598	1073	-	-	-
Mov Cap-2 Maneuver	369	-	-	-	-	-
Stage 1	619	-	-	-	-	-
Stage 2	760	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.7	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1073	-	415	-	-
HCM Lane V/C Ratio	0.019	-	0.102	-	-
HCM Control Delay (s)	8.4	0	14.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Zebulon South TIA
6: NC-96 (Arendell Avenue) & Perry Curtis Road

12/05/2023

Intersection	
Int Delay, s/veh	2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	56	186	7	113	292
Future Vol, veh/h	6	56	186	7	113	292
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	62	207	8	126	324

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	787	211	0	0	215	0
Stage 1	211	-	-	-	-	-
Stage 2	576	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	360	829	-	-	1355	-
Stage 1	824	-	-	-	-	-
Stage 2	562	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	319	829	-	-	1355	-
Mov Cap-2 Maneuver	319	-	-	-	-	-
Stage 1	824	-	-	-	-	-
Stage 2	498	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.5	0	2.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	718	1355	-
HCM Lane V/C Ratio	-	-	0.096	0.093	-
HCM Control Delay (s)	-	-	10.5	7.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0.3	-

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	34	168	9	55	187
Future Vol, veh/h	5	34	168	9	55	187
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	38	187	10	61	208

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	522	192	0	0	197	0
Stage 1	192	-	-	-	-	-
Stage 2	330	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	515	850	-	-	1376	-
Stage 1	841	-	-	-	-	-
Stage 2	728	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	489	850	-	-	1376	-
Mov Cap-2 Maneuver	489	-	-	-	-	-
Stage 1	841	-	-	-	-	-
Stage 2	692	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.9	0	1.8
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	777	1376	-
HCM Lane V/C Ratio	-	-	0.056	0.044	-
HCM Control Delay (s)	-	-	9.9	7.7	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

2026 Build + Improvements Traffic Volumes

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	42	8	4	343	160	13
Future Vol, veh/h	42	8	4	343	160	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	47	9	4	381	178	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	567	178	192	0	-	0
Stage 1	178	-	-	-	-	-
Stage 2	389	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	485	865	1381	-	-	-
Stage 1	853	-	-	-	-	-
Stage 2	685	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	483	865	1381	-	-	-
Mov Cap-2 Maneuver	483	-	-	-	-	-
Stage 1	850	-	-	-	-	-
Stage 2	685	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.7	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1381	-	520	-	-
HCM Lane V/C Ratio	0.003	-	0.107	-	-
HCM Control Delay (s)	7.6	0	12.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	42	17	6	304	154	14
Future Vol, veh/h	42	17	6	304	154	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	47	19	7	338	171	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	523	171	187	0	-	0
Stage 1	171	-	-	-	-	-
Stage 2	352	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	514	873	1387	-	-	-
Stage 1	859	-	-	-	-	-
Stage 2	712	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	511	873	1387	-	-	-
Mov Cap-2 Maneuver	511	-	-	-	-	-
Stage 1	854	-	-	-	-	-
Stage 2	712	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1387	-	580	-	-
HCM Lane V/C Ratio	0.005	-	0.113	-	-
HCM Control Delay (s)	7.6	0	12	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	1.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	8	52	214	4	16	92
Future Vol, veh/h	8	52	214	4	16	92
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	58	238	4	18	102

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	378	240	0	0	242	0
Stage 1	240	-	-	-	-	-
Stage 2	138	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	624	799	-	-	1324	-
Stage 1	800	-	-	-	-	-
Stage 2	889	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	615	799	-	-	1324	-
Mov Cap-2 Maneuver	615	-	-	-	-	-
Stage 1	800	-	-	-	-	-
Stage 2	877	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.1	0	1.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	768	1324	-
HCM Lane V/C Ratio	-	-	0.087	0.013	-
HCM Control Delay (s)	-	-	10.1	7.8	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	27	5	9	242	436	46
Future Vol, veh/h	27	5	9	242	436	46
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	6	10	269	484	51

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	773	484	535	0	-	0
Stage 1	484	-	-	-	-	-
Stage 2	289	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	367	583	1033	-	-	-
Stage 1	620	-	-	-	-	-
Stage 2	760	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	363	583	1033	-	-	-
Mov Cap-2 Maneuver	363	-	-	-	-	-
Stage 1	613	-	-	-	-	-
Stage 2	760	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.3	0.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1033	-	386	-	-
HCM Lane V/C Ratio	0.01	-	0.092	-	-
HCM Control Delay (s)	8.5	0	15.3	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	27	11	18	224	394	47
Future Vol, veh/h	27	11	18	224	394	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	12	20	249	438	52

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	727	438	490	0	-	0
Stage 1	438	-	-	-	-	-
Stage 2	289	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	391	619	1073	-	-	-
Stage 1	651	-	-	-	-	-
Stage 2	760	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	382	619	1073	-	-	-
Mov Cap-2 Maneuver	382	-	-	-	-	-
Stage 1	637	-	-	-	-	-
Stage 2	760	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.3	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1073	-	430	-	-
HCM Lane V/C Ratio	0.019	-	0.098	-	-
HCM Control Delay (s)	8.4	0	14.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	34	168	9	55	187
Future Vol, veh/h	5	34	168	9	55	187
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	38	187	10	61	208

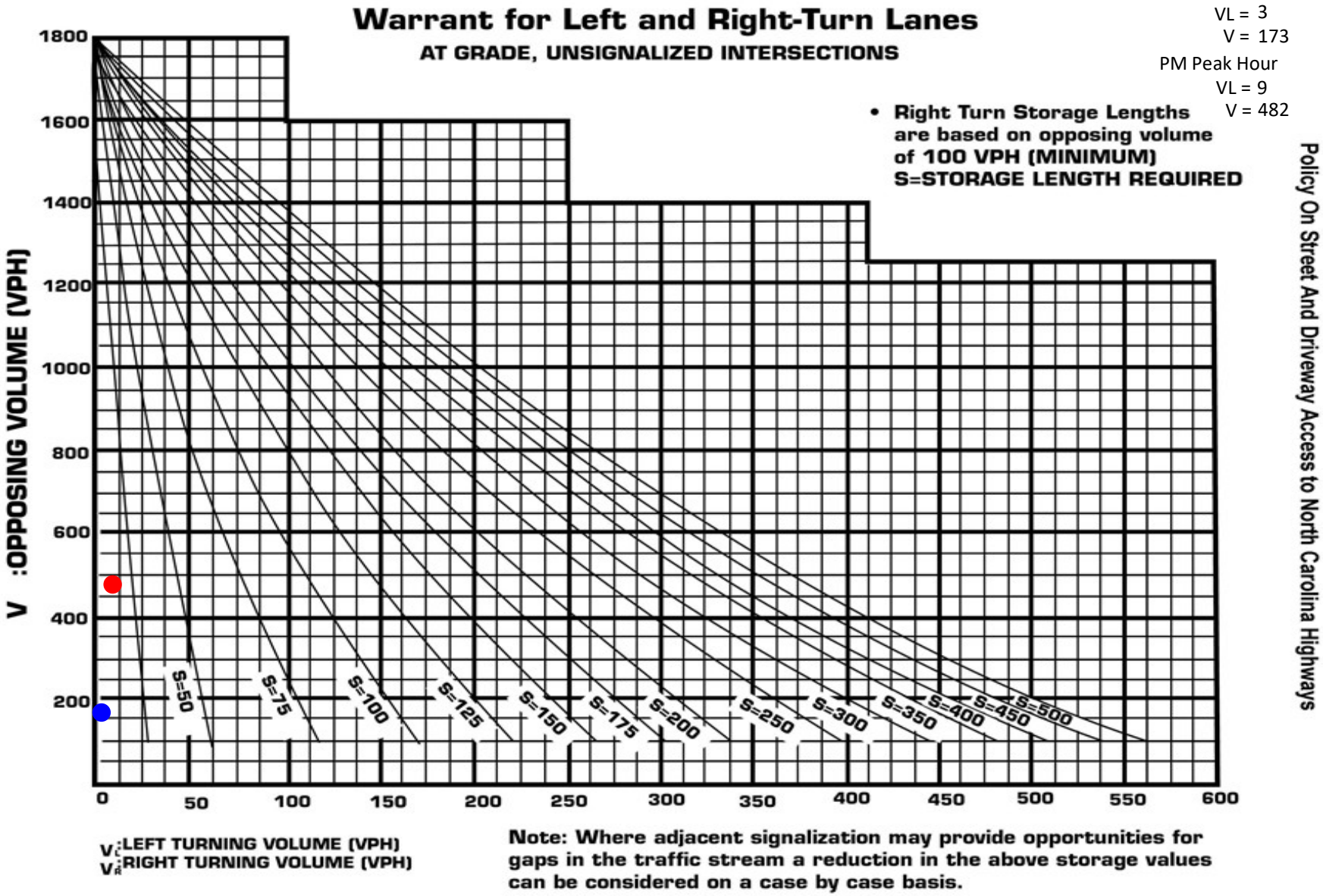
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	522	192	0	0	197	0
Stage 1	192	-	-	-	-	-
Stage 2	330	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	515	850	-	-	1376	-
Stage 1	841	-	-	-	-	-
Stage 2	728	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	492	850	-	-	1376	-
Mov Cap-2 Maneuver	492	-	-	-	-	-
Stage 1	841	-	-	-	-	-
Stage 2	696	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.9	0	1.8
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	777	1376	-
HCM Lane V/C Ratio	-	-	0.056	0.044	-
HCM Control Delay (s)	-	-	9.9	7.7	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Appendix E – NCDOT Nomographs

AM Peak Hour
VL = 3
V = 173
PM Peak Hour
VL = 9
V = 482



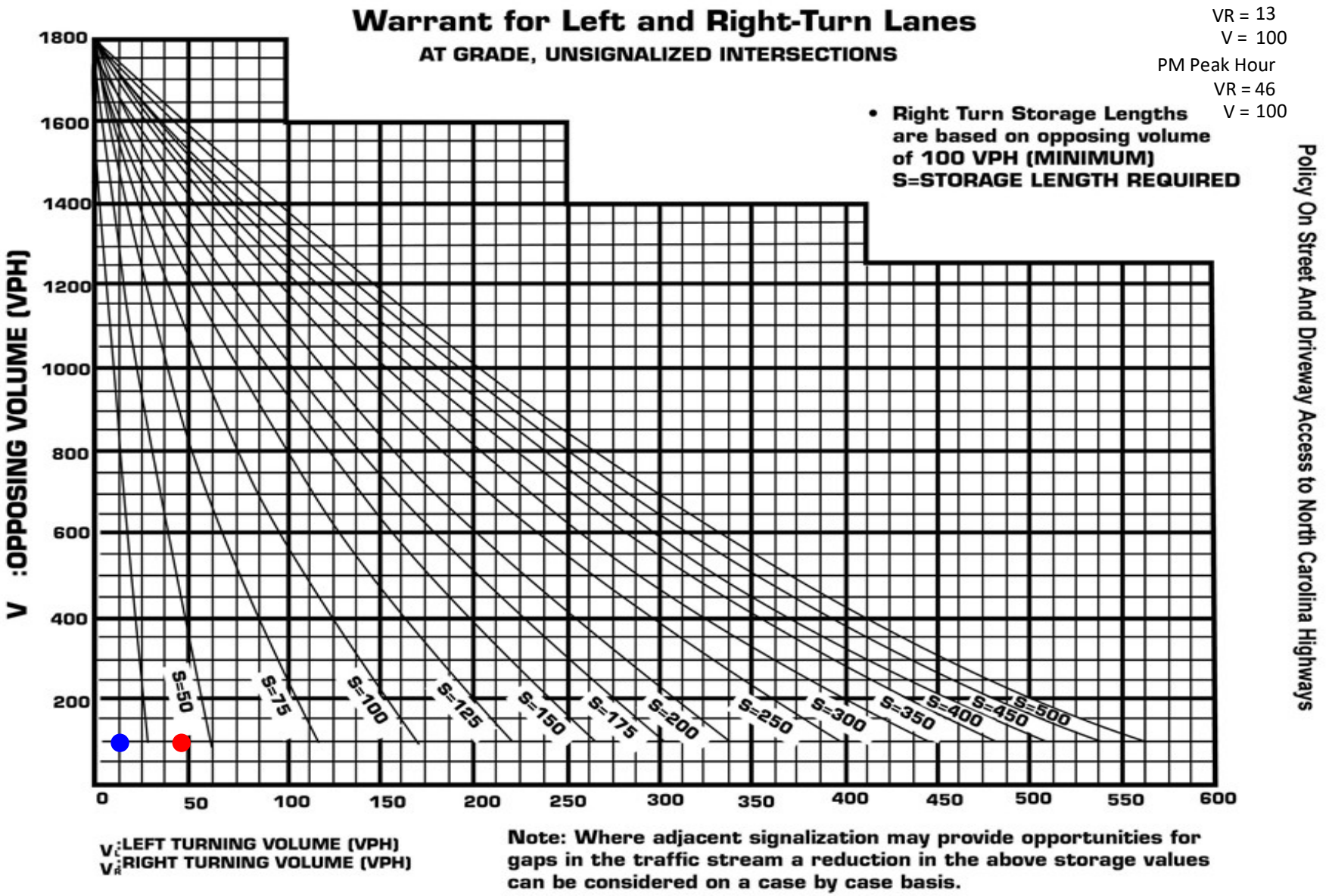
NC-96 (Arendell Ave) / Site Access 1

Northbound Left Turn

2026 Build AM and PM Peak Hours

LEGEND
● = AM Peak
● = PM Peak

AM Peak Hour
VR = 13
V = 100
PM Peak Hour
VR = 46
V = 100



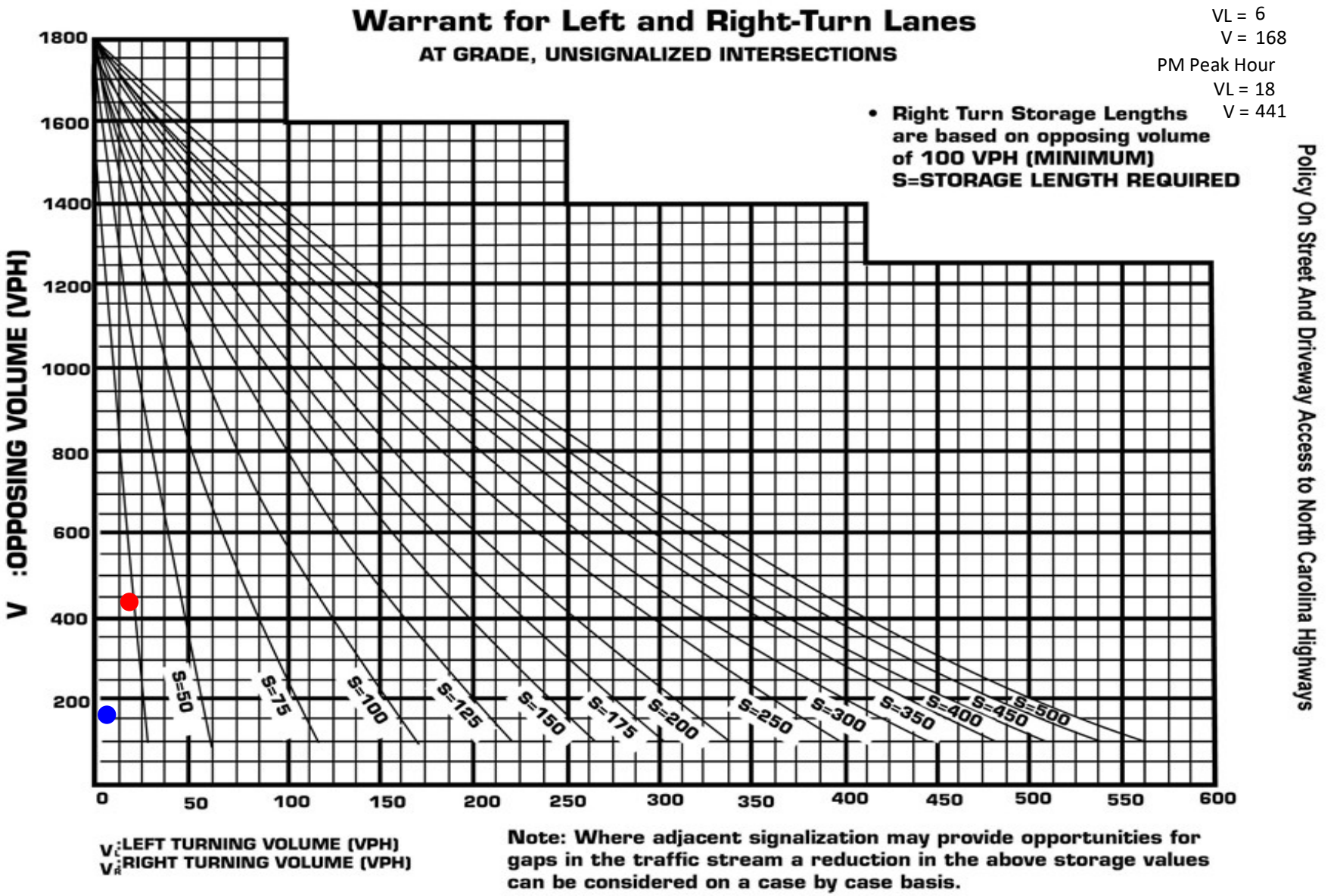
NC-96 (Arendell Ave) / Site Access 1

Southbound Right Turn

2026 Build AM and PM Peak Hours

LEGEND
● = AM Peak
● = PM Peak

AM Peak Hour
VL = 6
V = 168
PM Peak Hour
VL = 18
V = 441



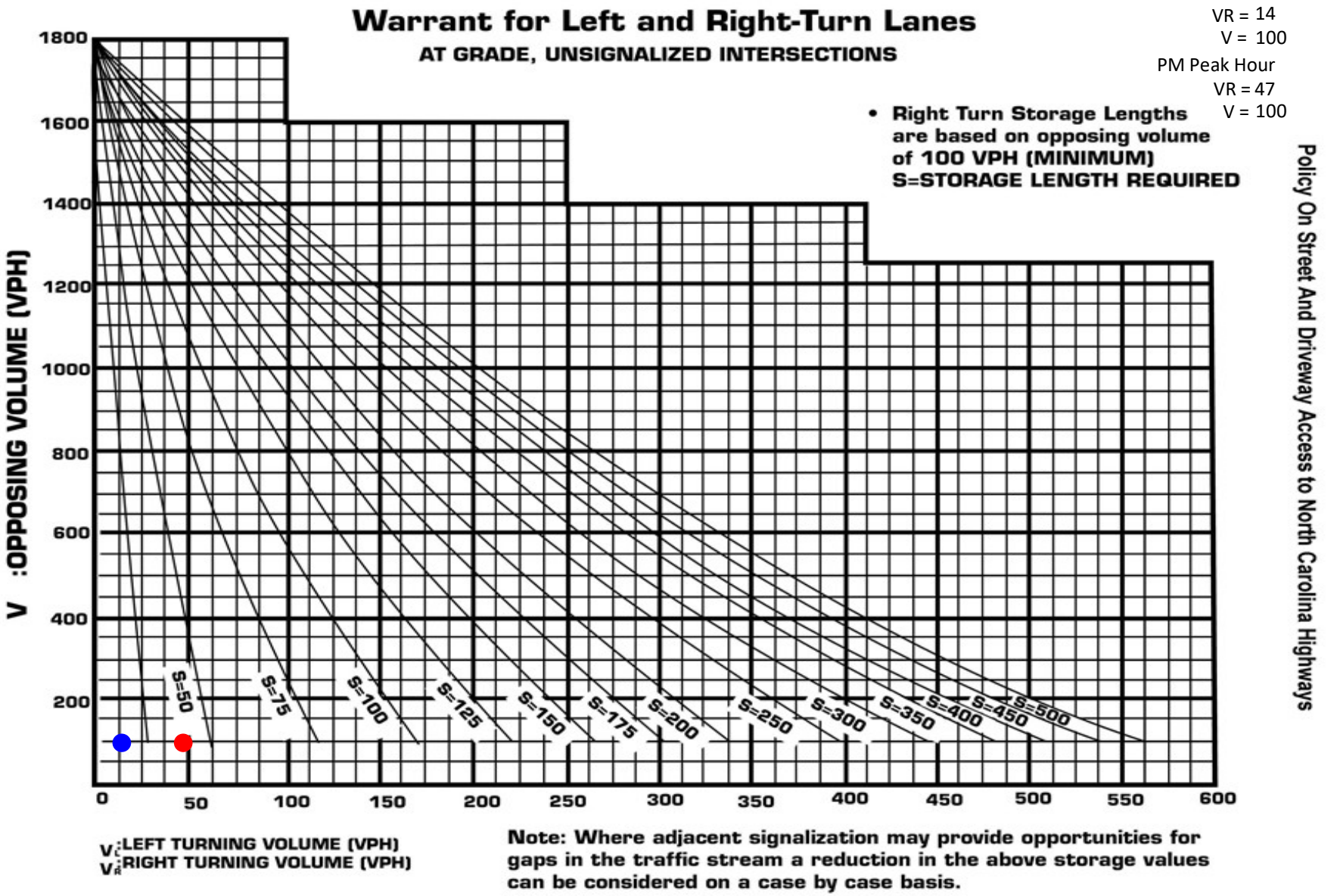
NC-96 (Arendell Ave) / Site Access 2

Northbound Left Turn

2026 Build AM and PM Peak Hours

LEGEND
● = AM Peak
● = PM Peak

AM Peak Hour
VR = 14
V = 100
PM Peak Hour
VR = 47
V = 100



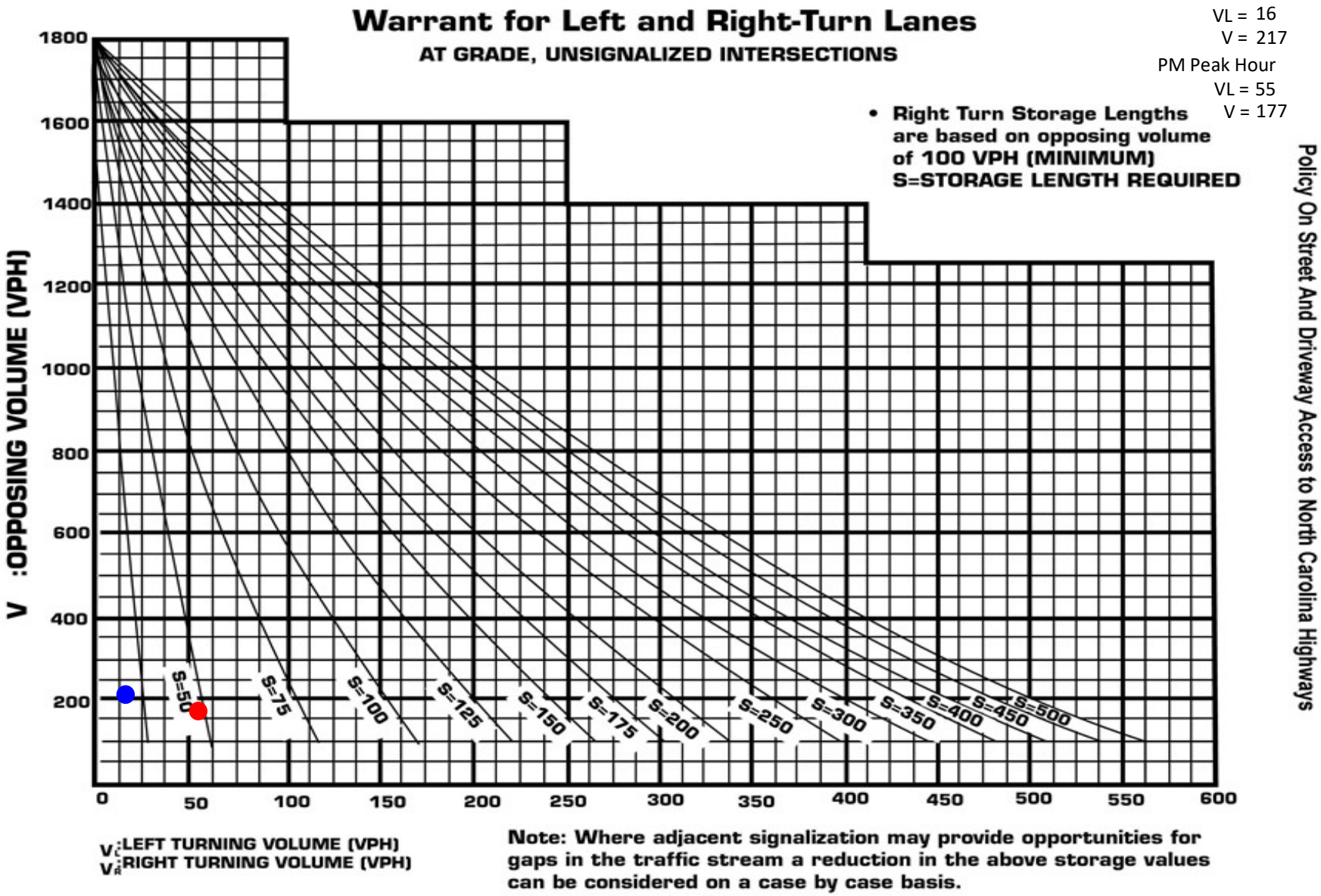
NC-96 (Arendell Ave) / Site Access 2

Southbound Right Turn

2026 Build AM and PM Peak Hours

LEGEND
● = AM Peak
● = PM Peak

AM Peak Hour
VL = 16
V = 217
PM Peak Hour
VL = 55
V = 177



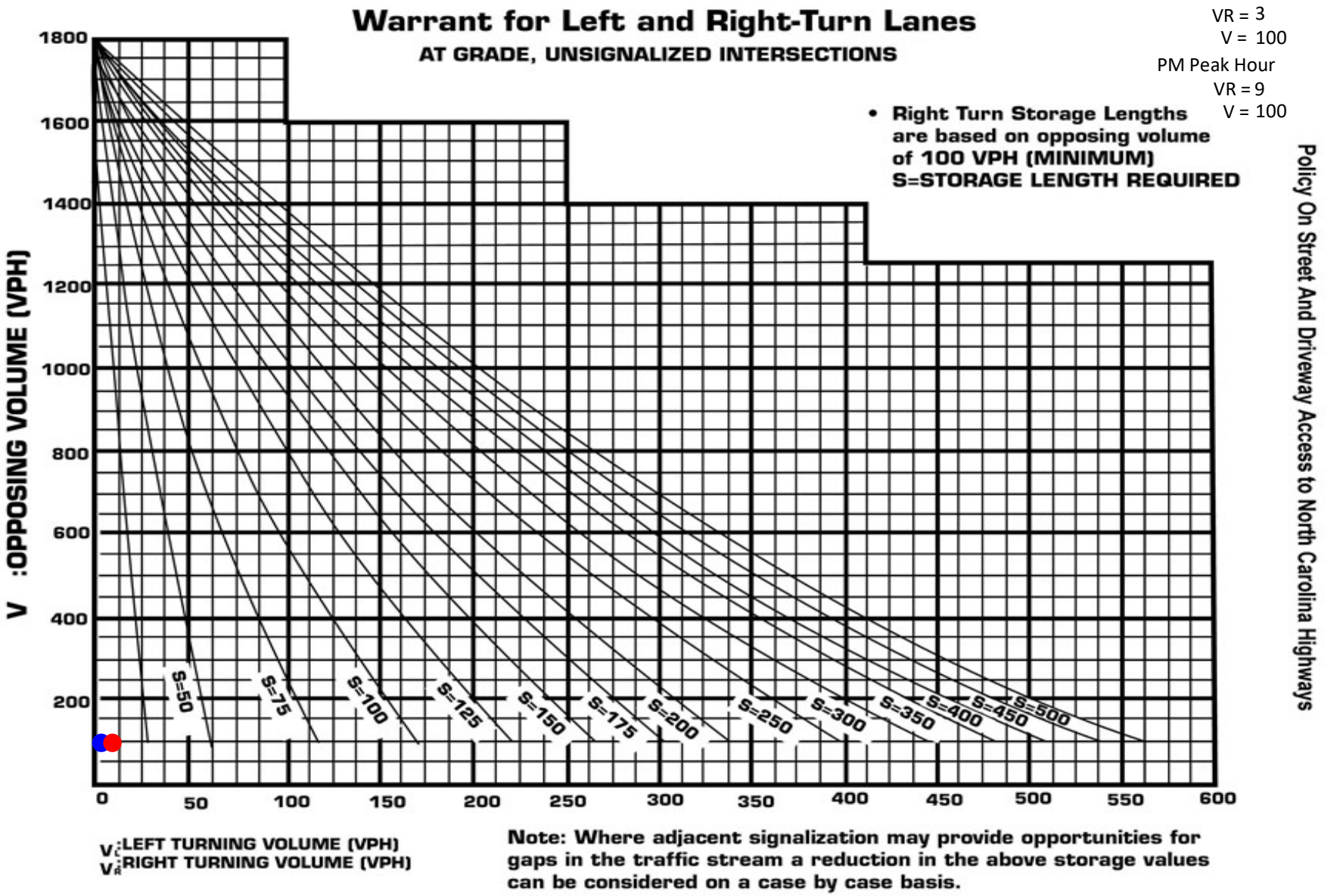
S Wakefield Street / Site Access 3

Southbound Left Turn

2026 Build AM and PM Peak Hours

LEGEND
● = AM Peak
● = PM Peak

AM Peak Hour
VR = 3
V = 100
PM Peak Hour
VR = 9
V = 100



S Wakefield Street / Site Access 3

Northbound Right Turn

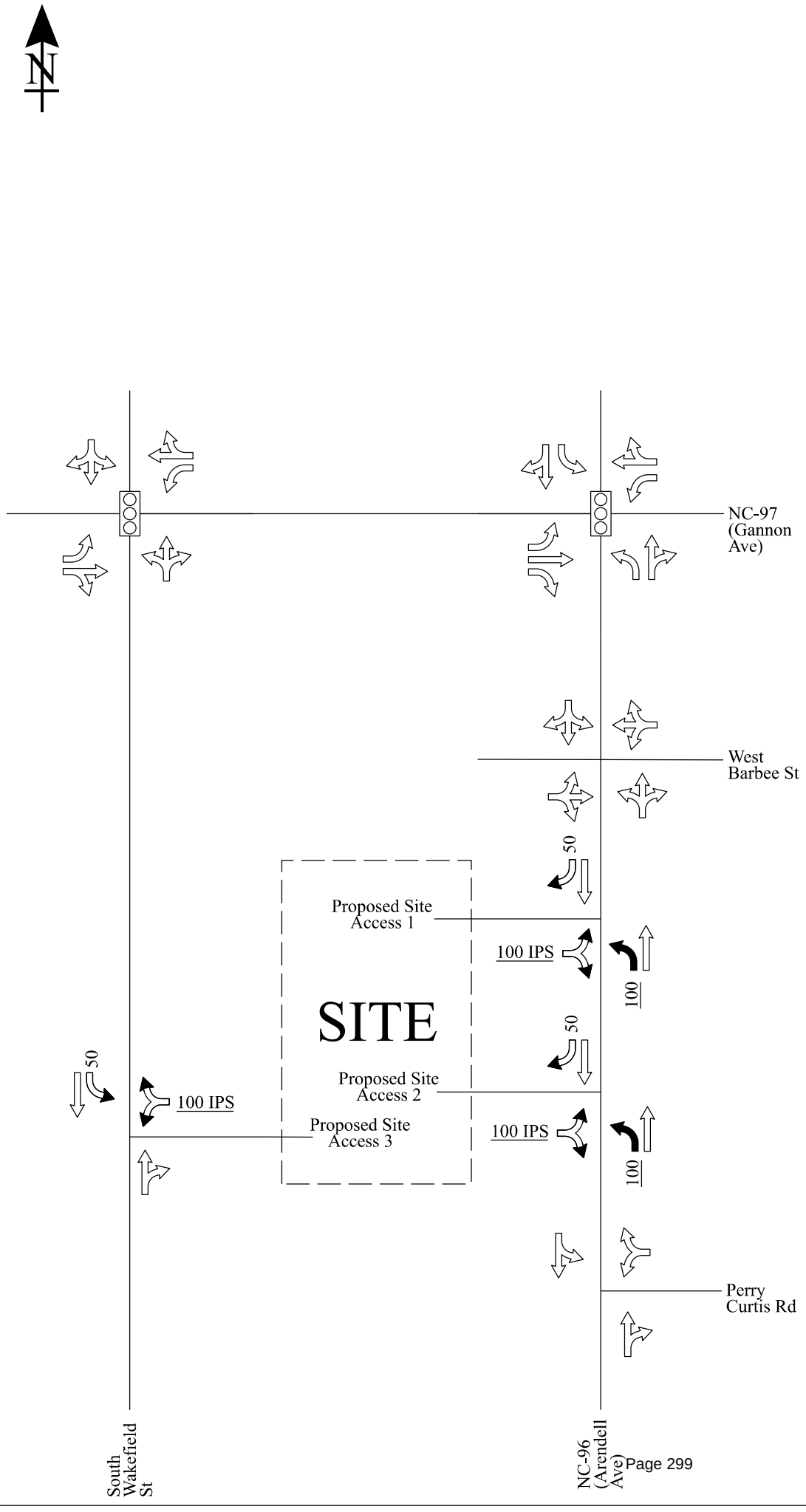
2026 Build AM and PM Peak Hours

LEGEND
● = AM Peak
● = PM Peak

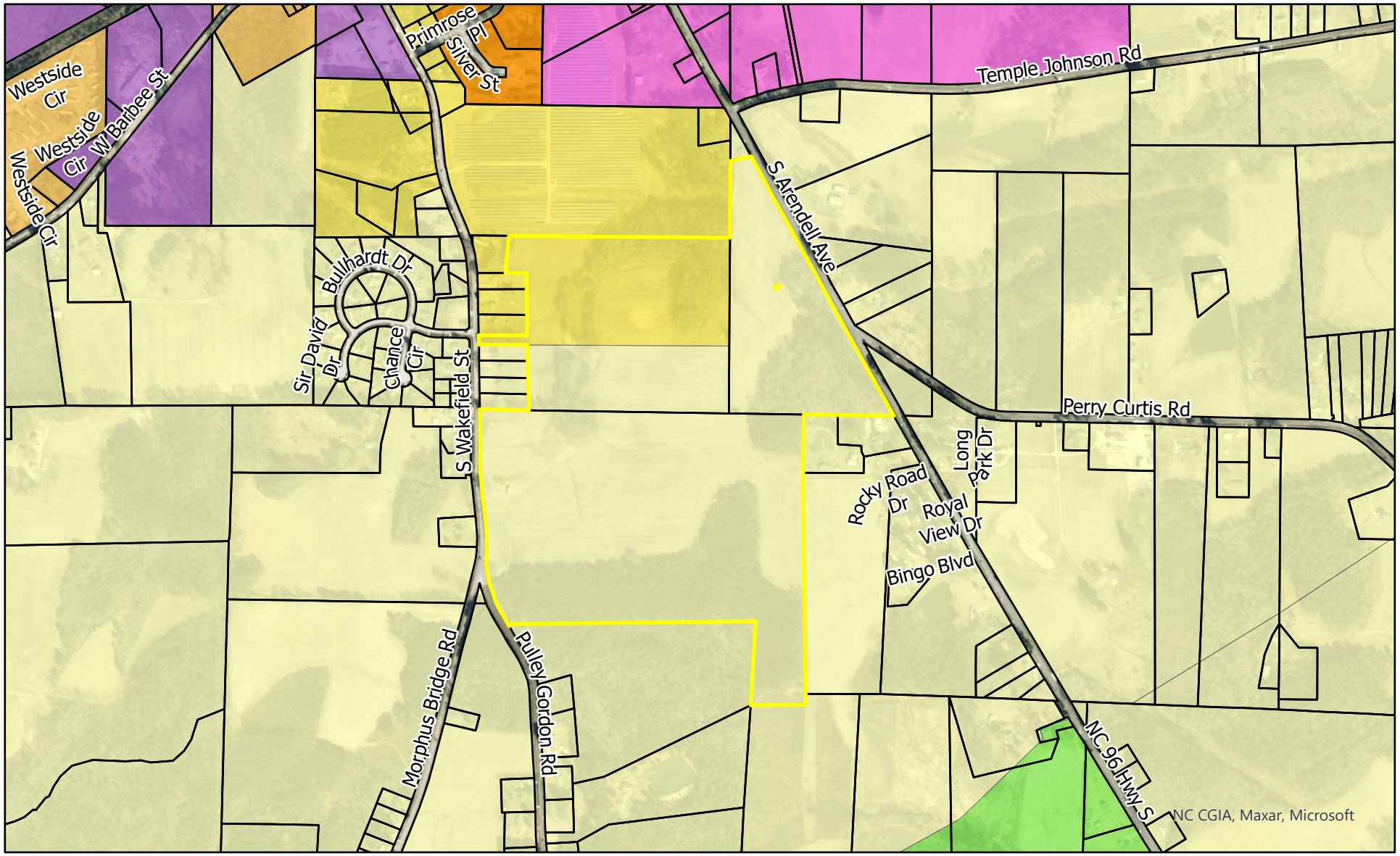
Appendix F – NCDOT Requirements

Zebulon South Residential
Zebulon, Wake County
SC-2022-226

- Existing Laneage
- Recommended Laneage
- Laneage Built By Others
- NCDOT Recommendation
- Existing Signal
- Signal Proposed By Others
- Developer Proposed Signal
- Monitor for Signal
- XXX Storage
- XXX NCDOT Recommended Storage
- <XXX> Distance Between Intersections
- IPS Internal Protected Stem
- All Distances in Feet
- Drawing Not to Scale



Future Land Use and Character Map

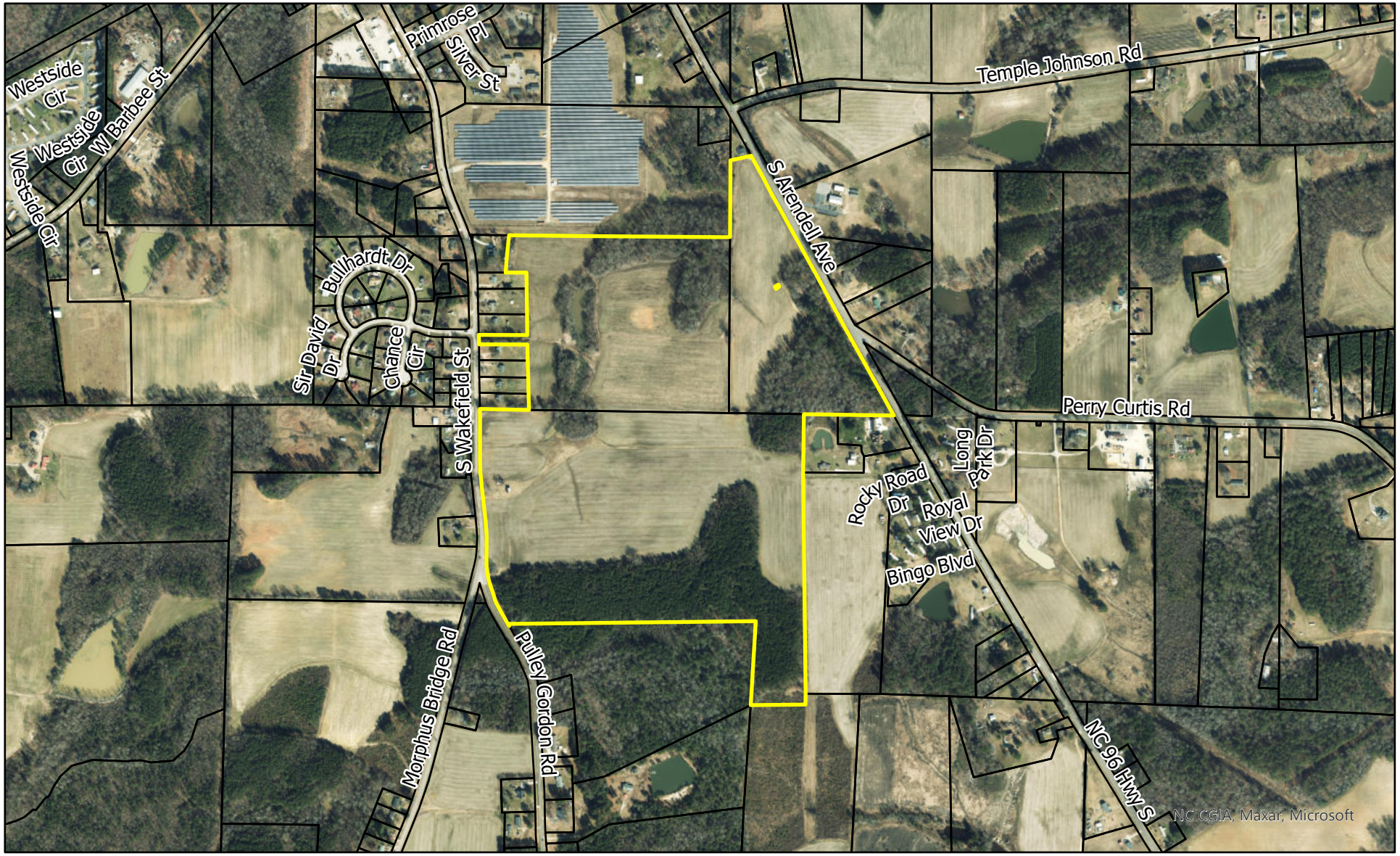


Planning ZEBULON NORTH CAROLINA

0 0.13 0.25 0.5 Miles

Zebulon South
Parcels
Zebulon_FutureLandUse
Land Use/Character
Rural Residential (RR)
Suburban Residential (SR)
General Residential (GR)
Urban Residential (UR)
Residential Mix (RM)
Industrial Heavy (IH)
Urban Downtown Mixed Use (UDMU)

Aerial Map

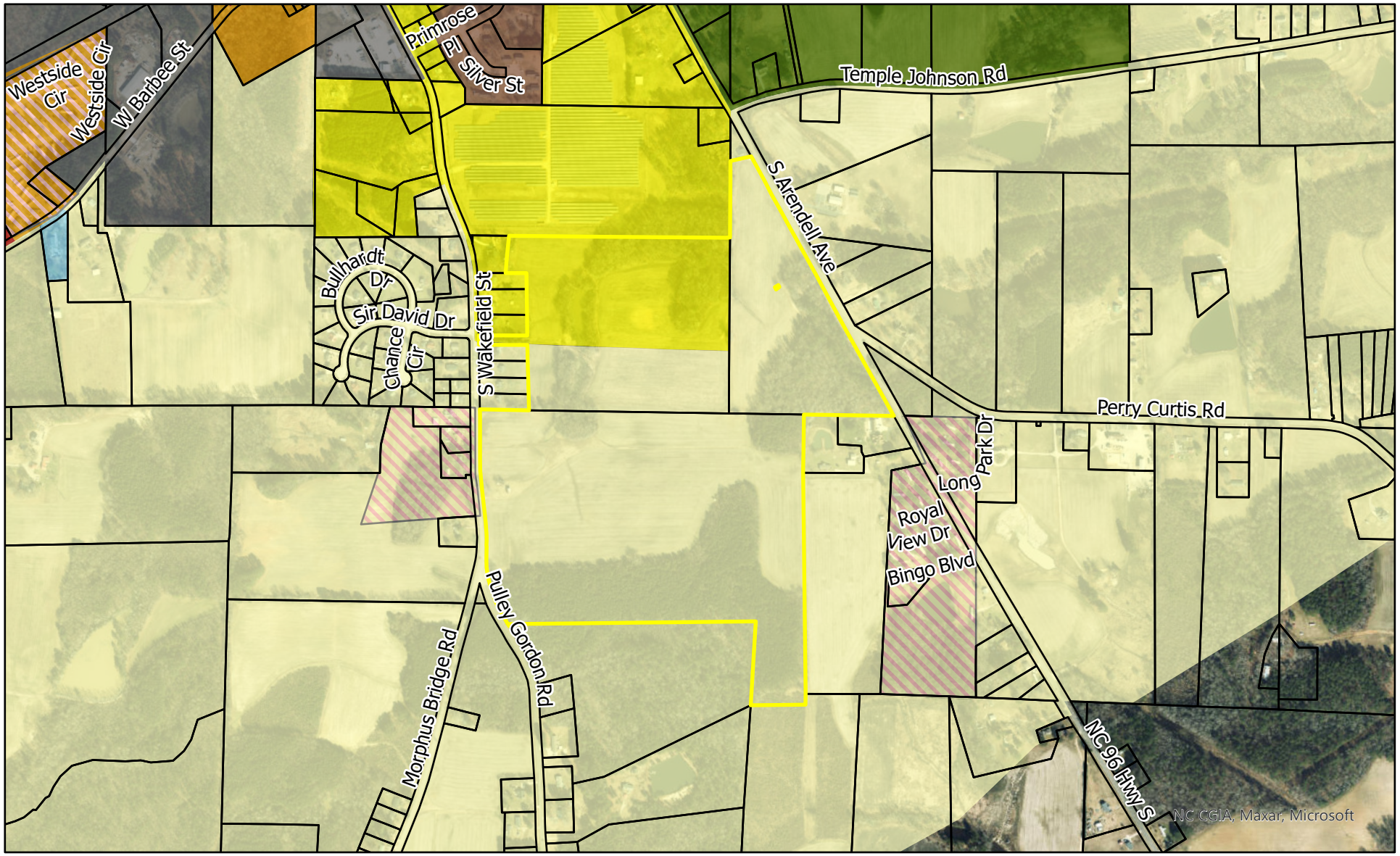


Planning
ZEBULON
NORTH CAROLINA

0 0.13 0.25 0.5 Miles

Parcels
Zebulon South

Zoning Map



Planning ZEBULON NORTH CAROLINA

0 0.13 0.25 0.5 Miles

Zebulon South
Parcels

Zoning Districts
R2, Residential Suburban
R4, Residential Neighborhood
R6, Residential Urban
RMF, Residential Multi-Family
HC, Heavy Commercial
HI, Heavy Industrial
OI, Office and Institutional
DTP, Downtown Periphery
MHO, Manufactured Home Overlay

Site photo taken from side closest to Hwy 96

Site photo taken from the S. Wakefield side of the site.

Some existing structures from the prior agricultural use on site

ZEBULON
NORTH CAROLINA

CASE # PD 2024-01 IDT# 886895– Zebulon South

PROJECT ADDRESS 751 S Wakefield St

PIN NUMBER: 2704492511/ 2705512202/ 2705413075

HEARING DATE: February 12, 2024

State of North Carolina

County of Wake

BEFORE ME, the undersigned Notary, Lisa M. Markland on this 30th day of January 2024, personally appeared Michael J. Clark, known to me to be a credible person and of lawful age, who being by me first duly sworn, on his oath, deposes and says:

I Michael J. Clark, acting as the Planning Director for the Town of Zebulon, affirm that the following Public Notice Procedures have been completed in accordance with applicable North Carolina General Statute and Town of Zebulon Unified Development Ordinance Section 2.3.6 have been satisfied for the above referenced hearing.

- First Class Mailing Sent on **1/29/2024** (see attached mailing list and copy of mailing)
- Advertisement in a Paper of General Circulation sent on **1/29/2024** (Wake weekly, publication dates **2/2 & 2/9/2024**)
- Posting Public Hearing Signage on Property on **1/29/2024** (pictures attached)
- Posted to Planning Department Website **1/29/2024**
- Sent to E-Mail Distribution List on **1/29/2024**

Michael J. Clark, AICP, CNU-A — Date: 1/30/2024

Subscribed and sworn to before me, this 30th day of January 2024.

[Notary Seal: LISA M. MARKLAND NOTARY PUBLIC WAKE COUNTY, NC]

[signature of Notary] — Lisa M. Markland [printed name of Notary]

NOTARY PUBLIC

My commission expires: 3/29, 2025.


PUBLIC HEARING NOTICE


PUBLIC HEARING NOTICE


PUBLIC HEARING NOTICE


PUBLIC HEARING NOTICE
A Public Hearing has been scheduled for this property. For more information, please contact the Town of Zebulon Planning Department.
Planned Development
Zebulon South
TownOfZebulon.org
(919) 823-1809
ZEBULON
NORTH CAROLINA


PUBLIC HEARING NOTICE
A Public Hearing has been scheduled for this property. For more information, please contact the Town of Zebulon Planning Department.
Planned Development
Zebulon South
Town@Zebulon.info
(919) 823-1809
ZEBULON

Notice of Public Hearing

Notice is hereby given pursuant to the provisions of Article 2.2.6 of the Town of Zebulon Unified Development Ordinance that a public hearing will be held on **February 12, 2024 at 6:00 PM** at the **Zebulon Municipal Complex, 1003 N. Arendell Avenue**, and will be conducted by the Board of Commissioners and Planning Board of the Town of Zebulon for the purpose of considering the following items:

IDT Project Number 886895 - PD 2024-01 – Zebulon South (751 S Wakefield St)
PIN # 2704492511, 2705512202, 2705413075 . A request by Andrew Suriano of Deacon Development on behalf of property owners Harold Narron and Fred Corbett, Joseph Temple Sr and Alexander Harrison, Watson Family II LLC, for a rezoning to the Planned Development (PD) zoning district for the development of a 320 unit Planned Development.

IDT Project Number 1195805 - RZ 2024-01 – 321 Hospital Rd
PIN # 2705191832. A request by Germano Architecture and Interiors, PLLC on behalf of the property owners MiCy LLC., for a Zoning Map Amendment to the General Commercial (GC) zoning district.

Public comments may be submitted to Deputy Town Clerk Stacie Paratore at SParatore@TownofZebulon.org no later than 12:00 Noon on the day of the hearing to be read into the record. Links will be provided along with the full application packet and documentation on the Planning Department web page at https://www.townofzebulon.org/departments/planning/public-hearing-information For questions or additional information, please contact us at (919) 823-1816.

Wake Weekly February 2nd & 9th

3.5.5. PLANNED DEVELOPMENT (PD) DISTRICT

A. PURPOSE AND INTENT

The Planned Development (PD) districts are established and intended to encourage innovative land planning and site design concepts that support a high quality of life and achieve a high quality of development, environmental sensitivity, energy efficiency, and other Town goals and objectives by:

a. Reducing or diminishing the inflexibility or uniform design that sometimes results from strict application of zoning and development standards designed primarily for individual lots;

b. Allowing greater freedom in selecting the means of providing access, open space, and design amenities;

c. Allowing greater freedom in providing a well-integrated mix of residential and nonresidential land uses in the same development, including a mix of housing types, lot sizes, and densities;

d. Creating a system of incentives for redevelopment and infill in order to revitalize established areas;

e. Promoting a vibrant public realm by placing increased emphasis on active ground floor uses, pedestrian-oriented building façade design, intensive use of sidewalks, and establishment of public gathering areas;

f. Providing for efficient use of land resulting in smaller networks of utilities and streets and thereby lowering development and housing costs; and

g. Promoting quality design and environmentally sensitive development that respects surrounding established land use character and respects and takes advantage of a site's natural and man-made features, such as trees, estuaries, shorelines, special flood hazard area, and historic features.

B. GENERAL STANDARDS FOR ALL PLANNED DEVELOPMENTS

1. HOW ESTABLISHED

A planned development is established in a manner similar to the establishment of a conditional zoning district in accordance with the procedures and requirements in Section 2.2.13, Planned Development.

2. MASTER PLAN REQUIRED

All development configured as a PD shall be subject to a master plan submitted and approved as part of the application to establish the district. The master plan shall:

a. Include a statement of planning objectives for the district;

b. Describe the specific ways in which any modifications to the generally applicable standards in this Ordinance will result in a development of higher quality than would have otherwise resulted if the development was established without any proposed modifications to the standards in this Ordinance.

c. Identify the general location of individual development areas, identified by land use(s) and/or development density or intensity;

d. Depict the general configuration and relationship of the principal elements of the proposed development, including general building types;

e. Identify for the entire district and each development area the acreage, types and mix of land uses, number of residential units (by use type), nonresidential floor area (by use type), residential density, and nonresidential intensity;

f. Identify the general location, amount, and type (whether designated for active, passive, or urban) of open space;

g. Identify the location of environmentally sensitive lands, wildlife habitat, and resource protection lands;

h. Identify the on-site transportation circulation system, including the general location of all public and private streets, existing or projected transit service, pedestrian and vehicular circulation features, and how they will connect with existing and planned systems;

i. Identify the general location of on-site potable water and wastewater facilities, and how they will connect to existing systems;

j. Identify the general location of on-site stormwater management facilities, and how they will connect to existing public systems; and

k. Identify the general location of all other on-site public facilities serving the development, including but not limited to parks, schools, bus shelters, and facilities for fire protection, police protection, EMS, and solid waste management.

3. COMPLIANCE WITH SUBDIVISION STANDARDS

Planned developments that include the division of land into two or more lots shall be subject to the subdivision standards in Article 6: Subdivisions, and shall be subject to the requirements of Section 2.2.14, Preliminary Plat, and Section 2.2.10, Final Plat, prior to the issuance of a building permit.

4. SITE PLAN REVIEW

a. The planned development master plan may take the form of a generalized concept plan for development that provides a general indication of building and site feature location, or may it may be configured to the level of detail associated with site plans and construction drawings depicting exact building placement, location and profile of public infrastructure, and configuration of site features like parking, landscaping, and similar elements.

b. In cases where the master plan is more general or conceptual in nature, the development proposed in the planned development designation shall also undergo site plan review in accordance with Section 2.2.17, Site Plan.

c. In cases where the master plan is detailed and meets the minimum requirements for a site plan in the opinion of the Board of Commissioners, the applicant shall request, and the Board of Commissioners may grant an exemption from subsequent site plan review.

d. If a site plan review exemption is granted by the Board of Commissioners, the proposed development shall fully comply with the development configuration depicted in the planned development master plan. Failure to comply with the approved master plan configuration shall require an amendment of the planned development application in accordance with Section 2.2.17.I, Amendment.

5. DENSITIES/INTENSITIES

The densities for residential development and the intensities for nonresidential development applicable in each development area of a PD district shall be as established in the master plan, and shall be consistent with adopted policy guidance.

6. DIMENSIONAL STANDARDS

The dimensional standards applicable in each development area of a PD district shall be as established in the master plan. The master plan shall include at least the following types of dimensional standards:

a. Minimum lot area;
b. Minimum lot width;
c. Minimum and maximum setbacks;
d. Maximum lot coverage;
e. Maximum building height;
f. Maximum individual building size;
g. Floor area ratio; and
h. Minimum setbacks from adjoining residential development or residential zoning districts.

7. DEVELOPMENT STANDARDS

a. All development in a PD district shall comply with the development standards of Article 5: Development Standards, and the subdivision and infrastructure design standards of Article 6: Subdivisions, unless modified in accordance with this section.

b. In no instance shall a planned development district seek to modify, waive, or reduce any of the following standards:

i. Section 3.8, Overlay Zoning Districts; or
ii. Section 6.5, Owners' Associations.

c. In cases where a planned development district is proposed as part of redevelopment of an existing site and the existing site does not comply with the standards in subsection (b) above, the development contemplated in the planned development shall not be required to achieve full

compliance, but shall not increase the degree to which the development fails to comply with the standards in subsection (b) above.

8. CONSISTENCY WITH ADOPTED POLICY GUIDANCE

The PD zoning district designation, the master plan, and the terms and conditions document should be consistent with the Comprehensive Plan, and any applicable functional plans and small area plans adopted by the Town.

9. COMPATIBILITY WITH SURROUNDING AREAS

Development along the perimeter of a PD district shall be compatible with adjacent existing or proposed development. Where there are issues of compatibility, the master plan shall provide for transition areas at the edges of the PD district that provide for appropriate buffering and/or ensure a complementary character of uses. Determination of complementary character shall be based on densities/intensities, lot size and dimensions, building height, building mass and scale, hours of operation, exterior lighting, siting of service areas, or other aspects identified by the Board of Commissioners.

10. DEVELOPMENT PHASING PLAN

If development in the PD district is proposed to be phased, the master plan shall include a development phasing plan that identifies the general sequence or phases in which the district is proposed to be developed, including how residential and nonresidential development will be timed, how infrastructure (public and private) and open space will be provided and timed, and how development will be coordinated with the Town's capital improvements program.

11. CONVERSION SCHEDULE

a. The planned development application may include a conversion schedule that identifies the extent to which one type of residential use may be converted to another type of residential use or one type of nonresidential use may be converted to another type of nonresidential use (i.e., residential to residential, or nonresidential to nonresidential). These conversions may occur within development areas and between development areas, as long as they occur within the same development phase, as identified by the approved development phasing plan, and are consistent with established extents of conversion set down in the conversion schedule.

b. In the event an applicant seeks to revise the development in accordance with an approved conversion schedule, the applicant shall provide a revised site plan depicting the proposed conversions to the TRC for review and approval prior to commencing any conversions.

12. ON-SITE PUBLIC FACILITIES

a. DESIGN AND CONSTRUCTION

The master plan shall establish the responsibility of the developer/landowner to design and construct or install required and proposed on-site public facilities in compliance with applicable Town, state, and federal regulations.

b. DEDICATION

The master plan shall establish the responsibility of the developer/landowner to dedicate to the public the right-of-way and easements necessary for the construction or installation of required and proposed on-site public facilities in compliance with applicable Town, state, and federal regulations.

c. MODIFICATIONS TO STREET STANDARDS

In approving a master plan, the Board of Commissioners may approve modifications or reductions of street design standards—including those for right-of-way widths, pavement widths, required materials, provision of public transit amenities, and turning radii, with NCDOT approval, on finding that:

i. The master plan provides for adequate separation/integration of vehicular, pedestrian, and bicycle traffic;

ii. Access for emergency service vehicles is not substantially impaired;

iii. Adequate parking is provided for the uses proposed; and

iv. Adequate space for public utilities is provided within the street right-of-way.

13. USES

The uses allowed in a PD district are identified in Table 4.2.3, Principal Use Table, as allowed subject to a master plan. Allowed uses shall be established in the master plan. Allowed uses shall be consistent with adopted policy guidance, the purpose of the particular PD district, and subject to any additional limitations or requirements set forth in Section 4.3, Use-Specific Standards, for the PD district. Nothing shall limit an applicant from seeking to modify an otherwise applicable use-specific standard in accordance with the standards in Section 3.5.5.B.2, Master Plan Required.

C. PLANNED DEVELOPMENT TERMS AND CONDITIONS

The terms and conditions document shall incorporate by reference or include, but not be limited to:

1. Conditions related to approval of the application for the PD zoning district classification;
2. The master plan, including any density/intensity standards, dimensional standards, and development standards established in the master plan;
3. Conditions related to the approval of the master plan, including any conditions related to the form and design of development shown in the master plan;
4. Provisions addressing how transportation, potable water, wastewater, stormwater management, and other infrastructure will be provided to accommodate the proposed development;
5. Provisions related to environmental protection and monitoring; and
6. Any other provisions the Board of Commissioners determines are relevant and necessary to the development of the PD in accordance with applicable standards and regulations.

D. AMENDMENTS TO APPROVED MASTER PLAN

Amendments or modifications to a master plan shall be considered in accordance with the standards in Section 2.2.13, Planned Development.

Suburban Residential

This designation is for residential areas where suburban character is established and preserved by achieving a balance between buildings and other site improvements relative to the degree of open space maintained within the neighborhood. The openness may be found in relatively large yard areas on individual lots and between homes and/or in common green spaces or water features. This distinguishes suburban character areas from more auto-oriented areas where site coverage in the form of dwellings, driveways and other paved surfaces predominates over open space.

Primary Land Use Types

- Detached residential dwellings.
- Planned developments that integrate other housing types (e.g., attached residential such as patio homes or townhomes), with increased open space to preserve an overall suburban character.
- Golf course subdivisions.

Subdivisions around Pippin Road in north Zebulon.

Characteristics

- Less noticeable accommodation of the automobile compared to more intensive auto-oriented areas, especially where driveways are on the side of homes rather than occupying a portion of the front yard and where garages are situated to the side or rear of the dwelling.
- A larger baseline minimum lot size in a Suburban Residential zoning district allows for deeper front yards and building setbacks and greater side separation between homes.
- Character-based zoning and development standards can also discourage overly standardized subdivision designs and promote conservation design by allowing for smaller lot sizes than the baseline in exchange for greater open space set-aside. This approach enables some viable use of sites partially constrained by topography or other factors. It also provides flexibility for additional housing forms that blend with the area's suburban residential character through additional on-site open space and perimeter buffering where differing housing types and densities are adjacent.
- More opportunity for natural and/or swale drainage (and storm water retention/absorption) relative to concentrated storm water conveyance in auto-oriented areas.

Where on the Map

Extensive coverage on the map, surrounding much of the core area of Zebulon in most directions, and all the way to the edge of the larger planning area in some locations.

General Residential

This designation covers areas of primarily single-family detached residential use where accommodation of the automobile is more visually dominant relative to more prominent green space in Suburban Residential character areas. This is typically due to relatively smaller and narrower lots, and often with limited open space set-asides or amenities for residents.

Primary Land Use Types

- Detached residential dwellings.
- Other attached residential forms (e.g., duplexes and multiplexes, patio homes, townhomes, multi-family, etc.) as permitted by zoning.
- Planned developments, potentially with a mix of housing types and varying densities, subject to compatibility and open space standards.

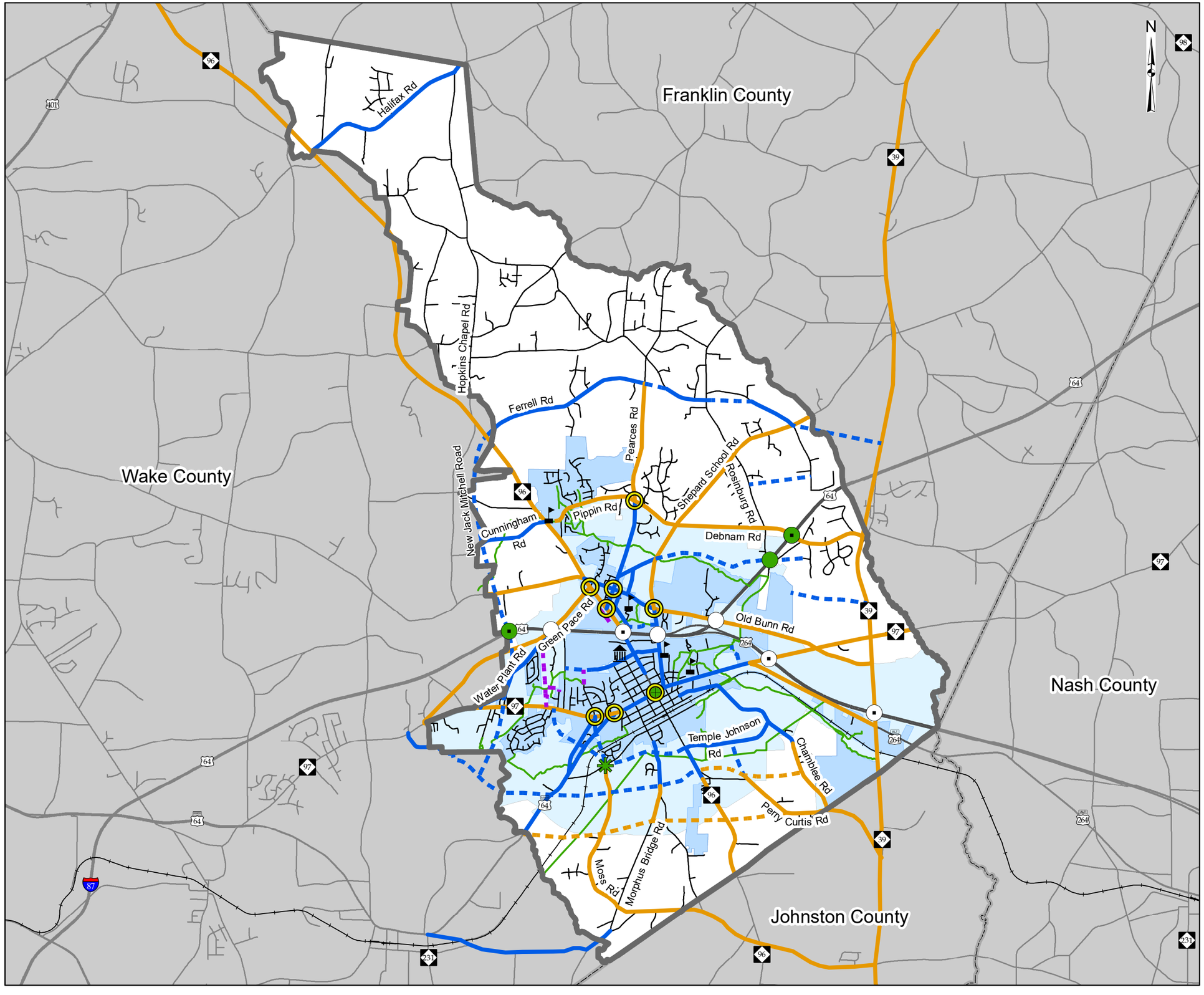
Shepard's Point subdivision along Old Bunn Road, adjacent to the Hamilton Acres subdivision to the east.

Characteristics

- Residential neighborhoods with less openness and separation between dwellings compared to Suburban Residential areas.
- Auto Urban character, especially where driveways and front-loading garages dominate the front yards and front facades of homes. This can be offset by landscaping, "anti-monotony" architectural standards, and limitations on "cookie cutter" subdivision layouts characterized by straight streets and uniform lot sizes and arrangement.
- Neighborhood-oriented commercial uses may emerge over time and should be encouraged on corner sites or other locations at the edge of predominantly residential areas, at a scale and with a site design that is compatible with nearby residential uses.

Where on the Map

In some central areas of Zebulon, such as west of N.C. 96 and north of West. Gannon Avenue. Also provides a transition to Suburban Residential areas in other locations, such as north of U.S. 64/ 264 and southwest of town.



grow Zebulon
TRANSPORTATION PLAN

TOWN OF ZEBULON
2045 COMPREHENSIVE TRANSPORTATION PLAN

CTP MAP

LEGEND

- Town Hall
- School
- New Grade Separation
- New Interchange
- New Roundabout
- Intersection Improvements
- Existing Interchange
- Existing Grade Separation
- Priority Intersection
- Zebulon Town Limits
- Extraterritorial Jurisdiction
- 4-Lane Divided Widening / Altering
- 4-Lane Divided New Roadway
- 2-Lane Divided Widening / Altering
- 2-Lane Divided New Roadway
- 2-Lane Undivided New Roadway
- Greenway
- Roads
- Railroad
- County Outline
- CTP Study Area

0 1 2
Miles

Base Map: November 2020

Moving forward.
RKA
RAMEY KEMP ASSOCIATES