

Planning
ZEBULON

NORTH CAROLINA

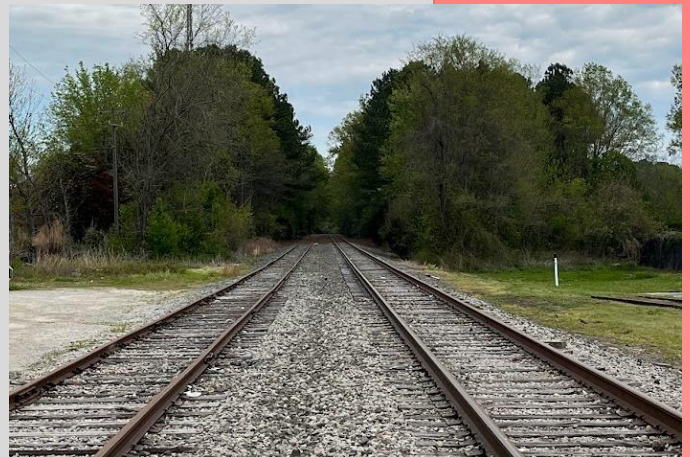


Grow Zebulon

Comprehensive Transportation Plan



Adopted August 2, 2021 by
Town of Zebulon Board of Commissioners



RAMEY KEMP ASSOCIATES

TOGETHER WE ARE LIMITLESS

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September 13, 2021

Mr. Michael J. Clark, AICP, CZO
Planning Director
Town of Zebulon
1003 North Arendell Avenue
Zebulon, North Carolina 27597

Dear Mike:

In combination with our consultant team partner, Kendig Keast Collaborative (KKC), we are pleased to submit this final version of the recently approved Town of Zebulon Comprehensive Transportation Plan (CTP), adopted by the Board of Commissioners on August 2, 2021. The CTP was prepared in accordance with the Professional Services Agreement.

The CTP utilized data from the state Department of Transportation, Wake County, Capital Area Metropolitan Planning Organization (CAMPO) and the Town of Zebulon. Zebulon Town staff, residents, and business owners were engaged to better understand transportation concerns, needs, and desires. A combination of the technical information and the public perception guided the CTP team in the analysis of the data to determine the transportation recommendations that would benefit the challenges specific to Zebulon.

We hope the Zebulon CTP will lead to intentional change to Zebulon's transportation system and will be a highly regarded resource for the Town staff and future developers to utilize to better understand the transportation needs of the Zebulon community.

Respectfully submitted,
RAMEY KEMP ASSOCIATES, INC.



Jessica McClure, PE
State Traffic Engineering Lead (CTP Project Manager)

Acknowledgments

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Thanks also to...

Individual residents, business representatives, property owners, partner agencies, local organizations and others who contributed their insights and ideas to Zebulon's long-range planning process.



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Plan Introduction

Introduction

Any intermodal transportation system should be built to serve public mobility and productivity. Transportation planners undertake a comprehensive analysis and evaluation of the potential impact of transportation plans and programs while addressing the aspirations and concerns of the community served. A Comprehensive Transportation Plan (CTP) can be developed for municipalities, counties, or large metropolitan areas. CTPs are developed to ensure that a progressively developed transportation system will meet the needs of the region for the planning period. The same applies to the transportation systems planned for the Town of Zebulon (Town), North Carolina.

A CTP is a long-range transportation plan that seeks to identify transportation needs and recommendations for the next 20 to 30 years for roadway, pedestrian, bicycle, and transit facilities. The Grow Zebulon CTP serves as an official guide to providing a well-coordinated, efficient, and economical transportation system for the future of the region.

The Zebulon CTP will support the Town's strategic vision of a vibrant, growing community that maintains its small-town charm and heritage by documenting the needs and desires of the community as it relates to the transportation system. CTP recommendations are not fiscally constrained projects; they are aspirational. The CTP should be utilized by officials to ensure that planned transportation facilities reflect the needs of the public, while minimizing the disruption to local residents, businesses, and the environment.

Why Create a CTP?

Having an adopted local transportation plan provides the framework for guiding future transportation system decisions and documenting the Town's commitment to a future transportation network that meets the community's needs. Transportation improvements identified on the CTP have an increased chance to obtaining federal, state, or regional funding. The Town can submit CTP projects into a competitive ranking process conducted by CAMPO to obtain



Downtown Zebulon

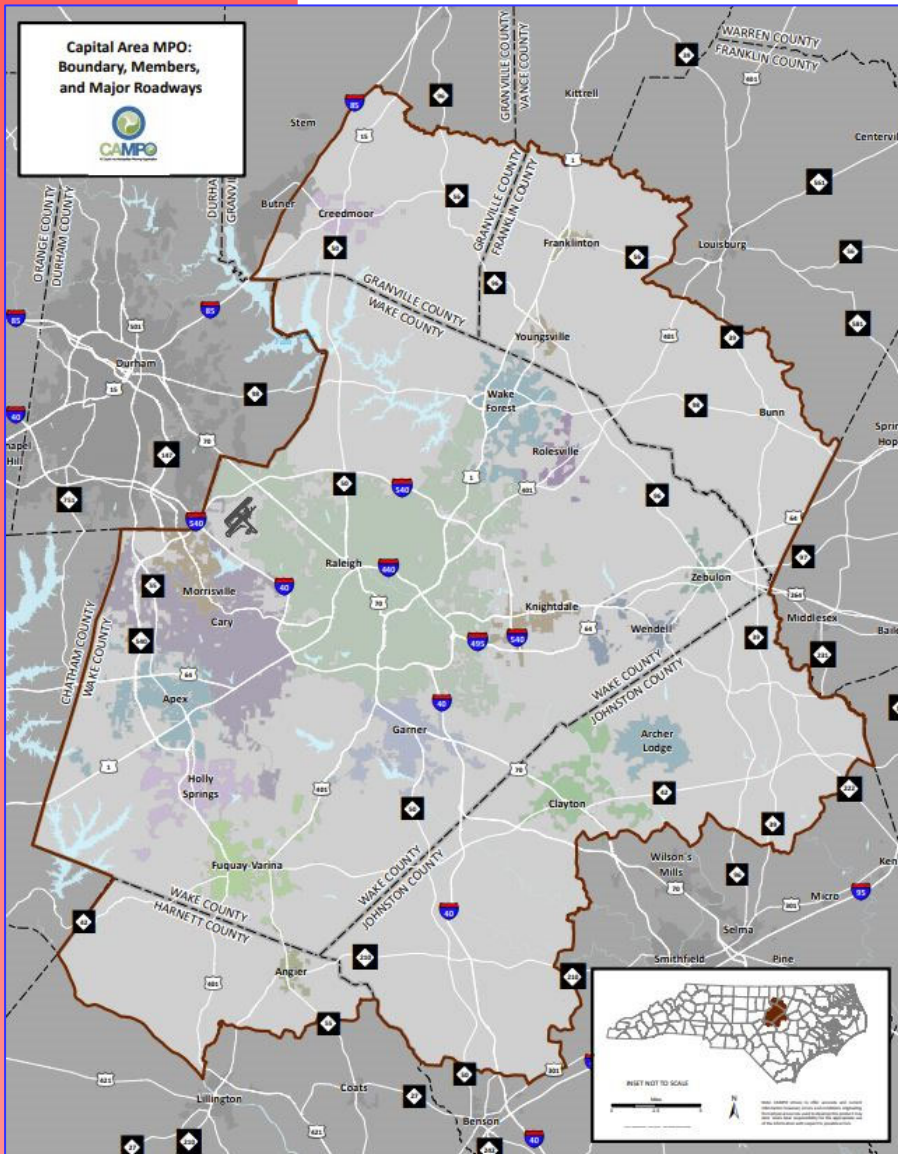
various levels of funding. However, the process is highly competitive, and the Town will compete with several other municipalities in the MPO, including the City of Raleigh, Town of Cary, Town of Wake Forest, and Town of Apex, among others.

Capital Area Metropolitan Planning Organization (CAMPO)

Zebulon is one of nineteen municipalities in the Capital Area Metropolitan Planning Organization (CAMPO). CAMPO covers Wake County in its entirety and parts of Franklin, Granville, Harnett, and Johnston Counties. CAMPO develops a Metropolitan Transportation Plan (MTP) every five years that addresses transportation needs within their jurisdiction. As part of this process, CAMPO receives input from its municipalities regarding their needs for the next several years and projects for which they would like to gain funding. Having a local transportation plan, such as a CTP, shows local support for projects and can help staff organize project requests to the MPO.

The MTP is typically done on a 20-year to 25-year horizon and is fiscally constrained. The most recent CAMPO MTP, 2045 Metropolitan Transportation Plan, was adopted in December 2017. This plan identified how the metropolitan area will manage and operate a multi-modal transportation system to meet the region's economic, transportation, development, and sustainability goals. The CAMPO 2050 MTP is underway at the time of this plan.

Recent revisions in state law have sought to move away from the development of historically used thoroughfare plans because they only reflected the highway element of transportation planning. As the state's needs evolved, so did the need to accurately reflect long range planning goals beyond the highway element, hence the move toward CTPs. CTPs are generally updated every eight to ten years unless circumstances, such as high growth, warrant a faster reevaluation. Studies typically take 18 to 24 months, but this time frame could be longer or shorter depending on the type and complexity of the issues in a region. Minor revisions to any plan based on changing needs can also be made.



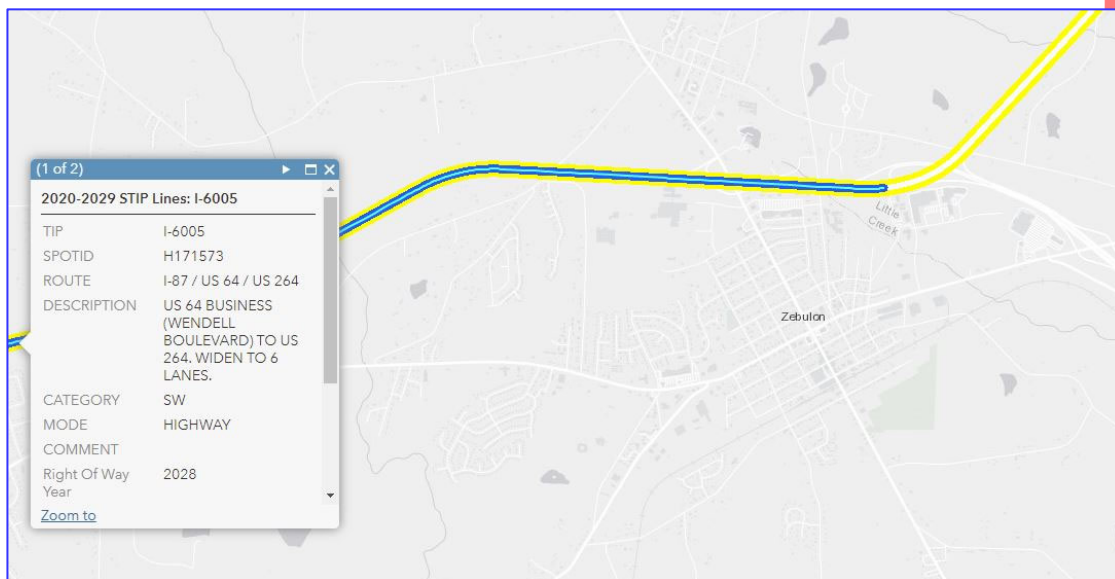
SOURCE: Capital Area Metropolitan Planning Organization

Zebulon Comprehensive Transportation Plan (CTP)

The Zebulon CTP is based not only on the projected growth for the planning area but also guiding principles the Town desires to carry forward to maintain its character. It is possible that actual growth patterns will differ from those logically anticipated. As a result, it may be necessary to accelerate or delay the implementation of some recommendations found within this plan. Some portions of the plan may require revisions to accommodate unexpected changes in development. Prior to implementing projects from the CTP, additional analysis will be necessary to meet the National Environmental Policy Act (NEPA) or the North Carolina (or State) Environmental Policy Act (SEPA). This CTP may be used to provide information in the NEPA/SEPA process.

CTPs can also be used to obtain funding for various projects through several programs including the North Carolina Department of Transportation’s (NCDOT) State Transportation Improvement Program (STIP), NCDOT safety or spot improvement projects, or CAMPO’s Locally Administered Projects Program (LAPP). The current STIP is the 2020-2029 STIP, which identifies the construction funding and scheduling for transportation projects at the state level over this 10-year period. Although federal law requires the plan to be updated every four years, NCDOT proactively updates it every two years to ensure it accurately reflects the state's current financial situation. The data-driven process to update the STIP, which is referred to as strategic prioritization, began in the fall of 2015. There are currently two (2) projects in the 2020-2029 STIP that impact the transportation infrastructure in Zebulon:

- I-6005 – widening of I-87 / US 64/264 to six lanes from Wendell Boulevard to US 264.
- I-6001 – pavement rehabilitation along Future I-87 to Nash County.

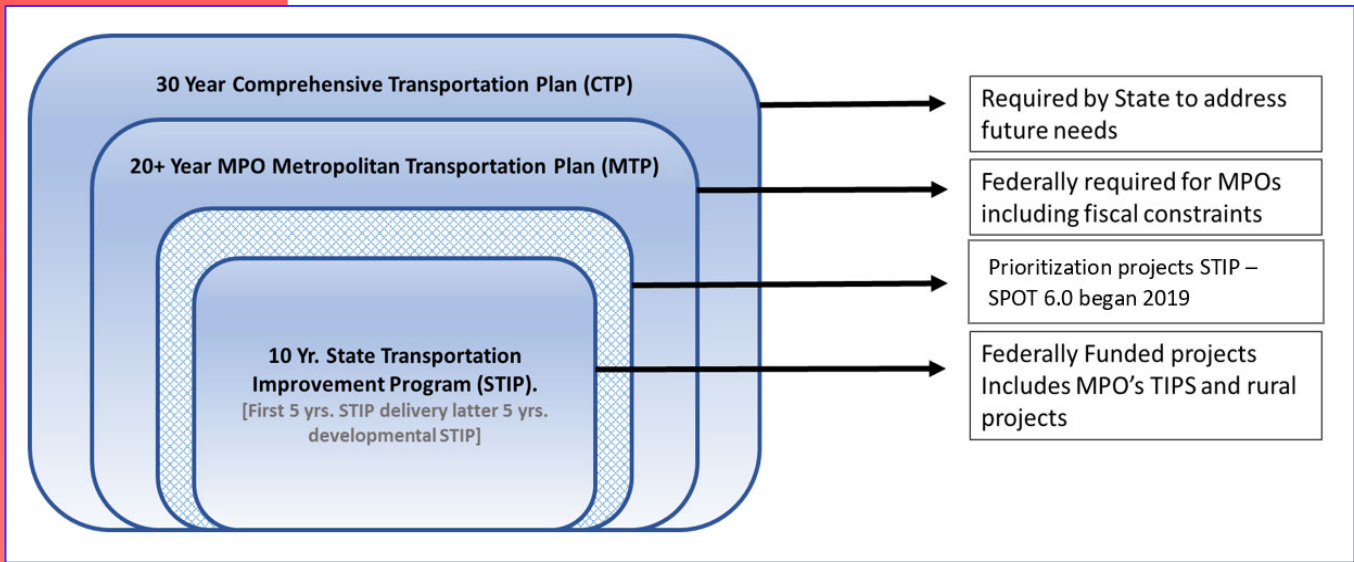


SOURCE: North Carolina Department of Transportation

The Strategic Transportation Prioritization (SPOT) Process is the methodology that NCDOT uses to develop the State Transportation Improvement Program (STIP). The process involves scoring all roadway, public transportation, bicycle, pedestrian, rail, and aviation projects on predetermined criteria. Currently, NCDOT is undertaking Prioritization 6.0 (SPOT 6). NCDOT prioritizes capital



expenditures across all modes in a needs-based format directly tying funding to prioritization results.



Particularly important for Zebulon, this plan will also give the Town flexibility to accommodate transportation network needs as development continues to occur. Knowing that funding from the state and federal government will be highly competitive, Zebulon is in a position to capitalize on the unprecedented rate of development around Town to help fund or construct the identified transportation improvements that align with the expanding needs.

The SPOT process considers five types of projects, each scored separately: 1) Statewide Mobility, 2) Regional Impact Projects, 3) NCDOT Division-Need Projects, 4) Alternate Criteria Projects, and 5) Exempt Programs and Transition Projects. Statewide mobility projects are scored on a purely quantitative basis using the following criteria: congestion, cost benefit analysis, safety, freight, multimodal, and economic components. Regional impact projects have their scores determined by 70 percent quantitative data (congestion, cost benefit, safety, connectivity, freight needs). The remaining 30 percent of the score is determined by NCDOT Division input and MPO/RPO input. Division-Need projects get 50 percent of their scores from quantitative data (congestion, cost benefit, safety, connectivity, freight) and the remaining 50 percent from MPO/RPO input. There are alternate scoring methodologies for the Exempt Programs and Transition Projects.

Zebulon Today



Introduction

In 1903, construction of the Raleigh-Pamlico Sound Railway would eventually move through the small neighboring community of Wakefield. This new Raleigh Pamlico Sound Railroad attracted the attention of many people to the area including Edgar Barbee and Falconer Arendell, who came to the new site to build the Zebulon Company. This company was built to develop land and after attention grew in the Town of Zebulon, Barbee and Arendell began to sell the property for home sites and corporations. On February 16, 1907, the Town of Zebulon was officially incorporated with 297.5 acres. The Town was named after a man known as Zebulon Baird Vance, who was the Governor of North Carolina during the American Civil War.

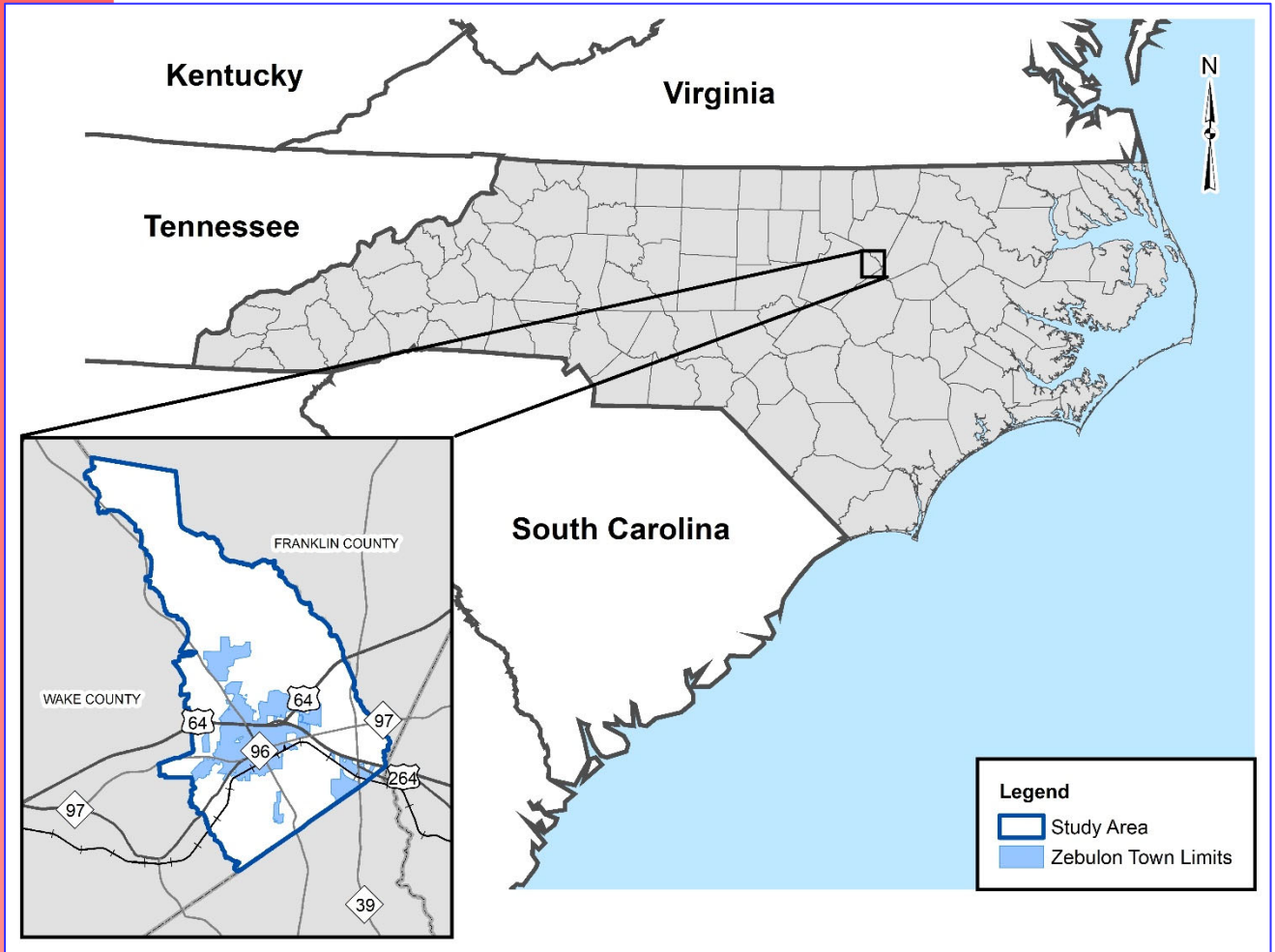


SOURCE: Edythe Tippett Collection. Moore's Mill in Zebulon

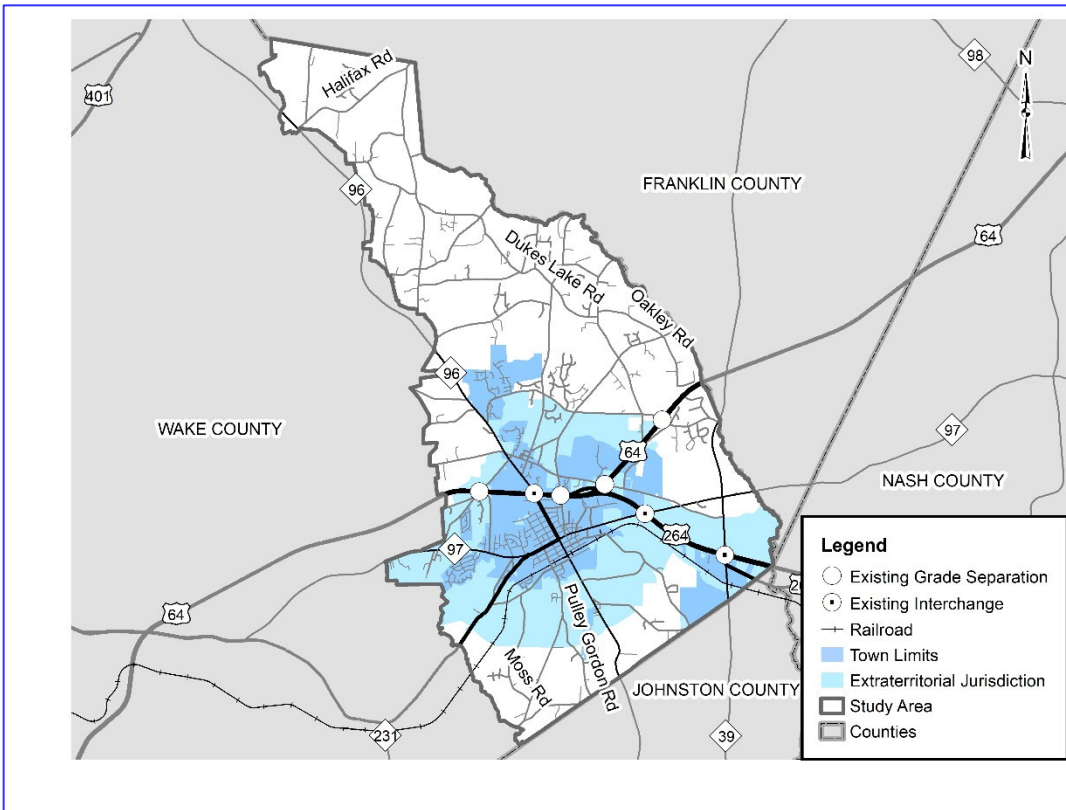
Ninety years later in 1997 Zebulon annexed the neighboring community of Wakefield, increasing the total area inside the corporate limits from 3.0 square miles to 3.3 square miles and the population to 3,908. By 2021, the Town limits encompassed 5.65 square miles and an extraterritorial jurisdiction (ETJ) area of 13.8 square miles and pending the 2020 Census results, the 2019 population estimate is 5,917. This historical growth shows a trend of an increasing population in Zebulon. The Town transportation infrastructure will need to be improved to keep up with this growth to keep citizens, established or new, moving through Town to access all the attractions that Zebulon has to offer.

Study Area

Zebulon is the easternmost town in Wake County, North Carolina, located in the piedmont region of eastern central part of the state. Zebulon is part of the Research Triangle metropolitan region and the Raleigh Metropolitan Statistical Area (MSA), which is a component of the Raleigh-Durham-Cary Combined Statistical Area (CSA). The CTP study area includes the Town of Zebulon, the ETJ, and surrounding land stretching from Johnston County to the south, Nash County to the east, and Franklin County to the north. The Town's relative regional location in North Carolina is shown in Map 1. The CTP study area is shown in Map 2.



Map 1: Regional Location Map

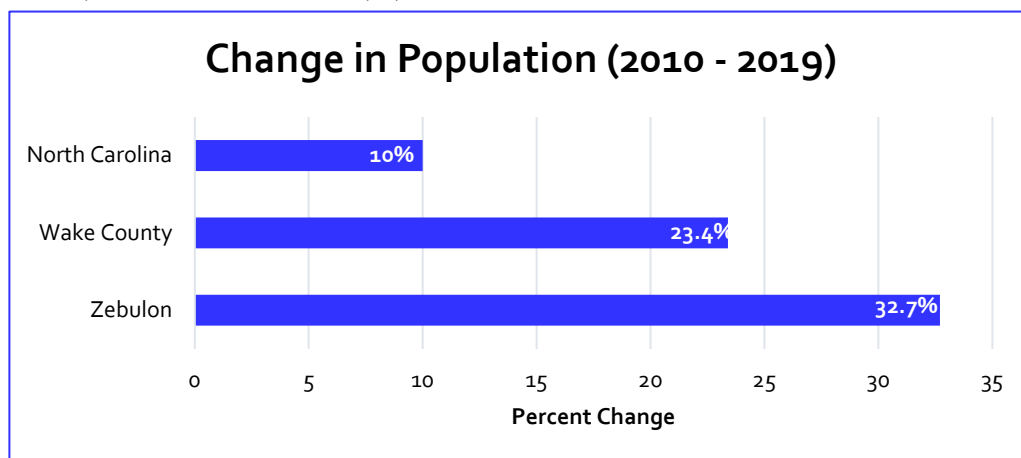


Map 2: Zebulon Comprehensive Transportation Plan (CTP) Study Area

Community Profile

Population

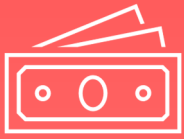
The Town of Zebulon has grown over the past several years and continues to see tremendous growth. Zebulon was reclassified from a small town to a midsize town in 2019 with a population of 5,917 people: a significant increase from 4,433 in 2010. In the years since, thousands of residential building permits and certificates of occupancy have been granted for significant residential developments that increase the population even more.



SOURCE: DP05 ACS DEMOGRAPHIC AND HOUSING ESTIMATES 2015-2019 American Community Survey 5-Year Estimates



Median Household Income



\$51,717

ZEBULON

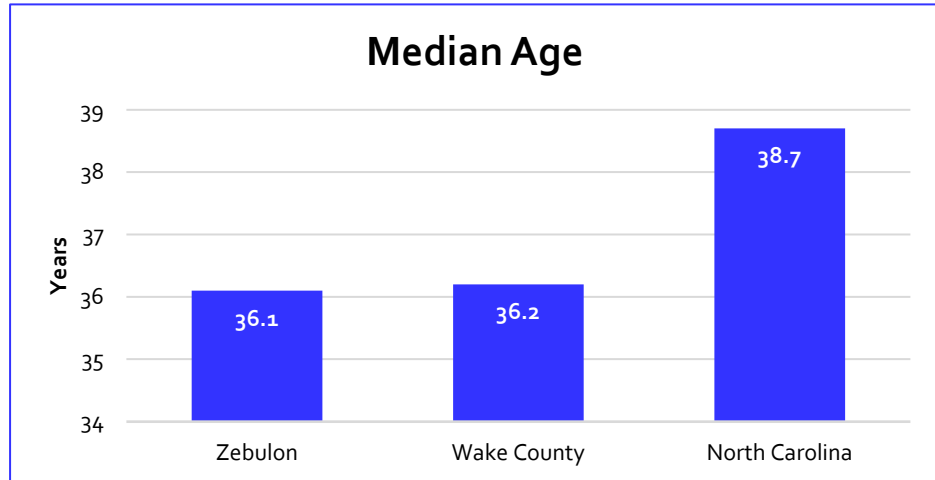
\$67,309

WAKE COUNTY

\$46,868

NORTH CAROLINA

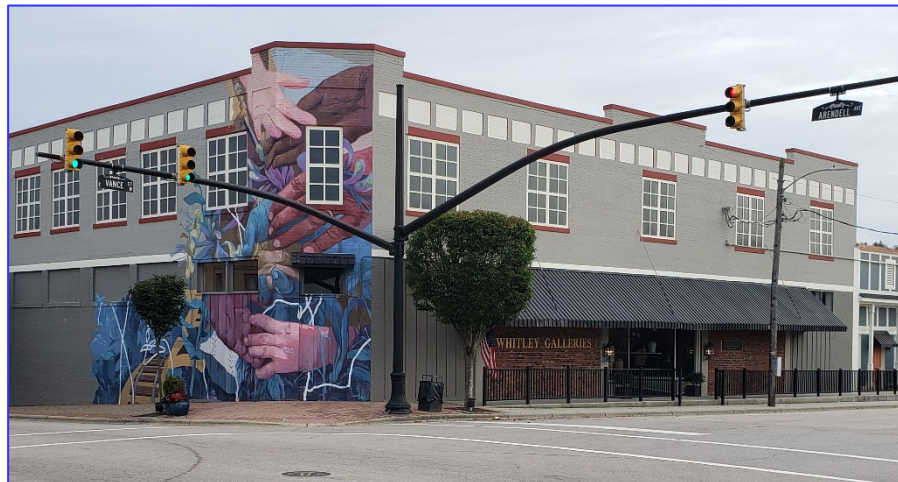
Based on US Census data, the average age in Zebulon is 36.1 years, compared to 36.2 years for Wake County and 38.7 years for North Carolina.



SOURCE: DP05 ACS DEMOGRAPHIC AND HOUSING ESTIMATES 2015-2019 American Community Survey 5-Year Estimates

Income and Employment

In 2015, the median household income in Zebulon was \$51,717 and over 12% of households were in poverty; this is compared to Wake County which saw a median household income of \$67,309 and almost 8% of households were in poverty. In North Carolina overall, the 2015 median household income was \$46,868 and over 12% of households in North Carolina were in poverty. Looking at this comparison, the Town median household income is larger than the state median household income, but smaller compared to the rest of Wake County. The Town has the same percentage of households living in poverty as compared to the state but has a higher percentage than the rest of Wake County.



Mural in Downtown Zebulon



The 2015 commuting patterns indicate that roughly 483,500 persons lived and worked in Wake County. An additional 70,000 people leave the county for employment, but the inflow from neighboring counties outnumbers those that travel out of Wake for employment. Those who leave

account for just under 15 percent of residents. Table 1 below shows primary destinations for most of those leaving and the most popular counties from which workers originate.

Table 1: Traffic Inflow and Outflow from Wake County

Daily Flows To and From Wake County (Major NC Counties ONLY)	Daily Wake Inflow	Daily Wake Outflow
Durham	22,670	53,082
Franklin	11,191	2,498
Granville	4,333	2,032
Johnston	30,119	5,761
Orange	5,244	6,585
TOTAL	73,557	69,955

SOURCE: US Census Bureau, American Community Survey, 2011-2015; County to County Commuting Flows.

As listed in Table 2, employment by sector data within the County is dominated by manufacturing, Healthcare/Social Assistance, and retail trade. The 2019 American Community Survey (ACS) data from the US Census Bureau data show that these jobs account for more than one third of those in the County.

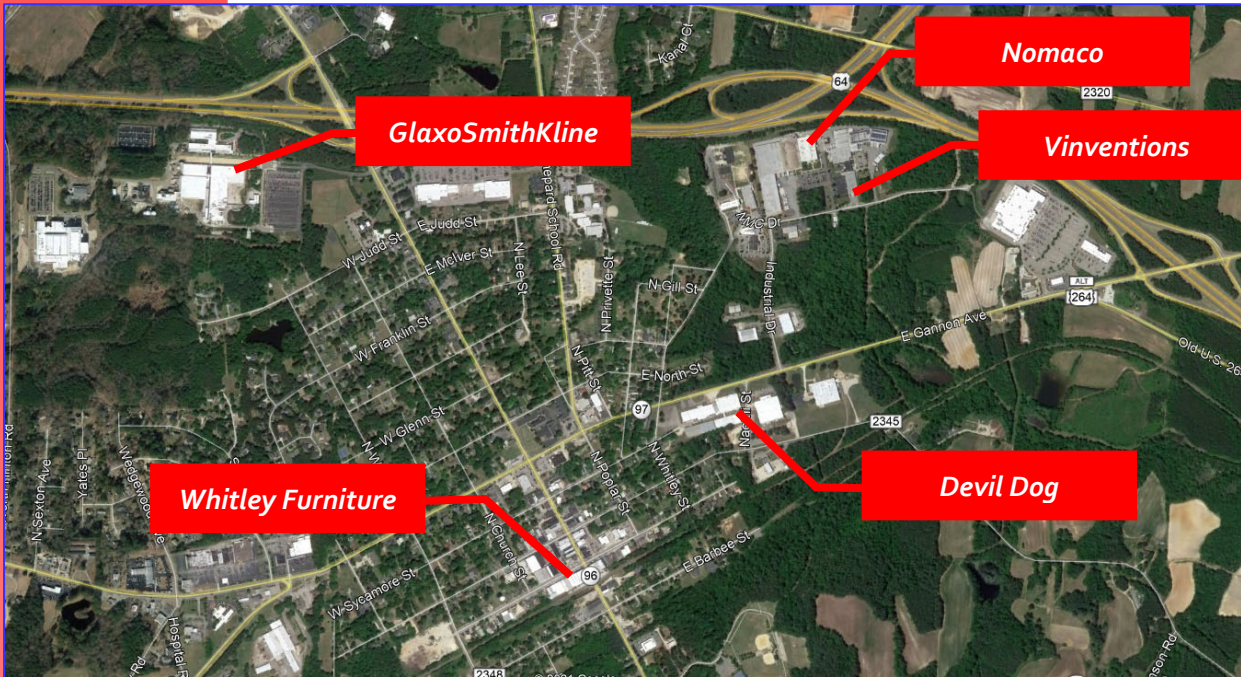
Table 2: Wake County Employment Data

Sector	Employees	Percentage (%) of Total County Employees
Manufacturing	48,773	8.2%
Healthcare/Social Assistance	125,415	21.2%
Retail Trade	55,514	9.4%
TOTAL	229,702	38.8%

Source: 2019: ACS 1-year estimates subject table; table S2045

This is reflective of the Zebulon economy which is dominated by the following employers: GlaxoSmithKline, Nomaco Inc., Vinventions USA LLC., Devil Dog, and Whitley Furniture. Of these five employers, two have their headquarters in Zebulon.

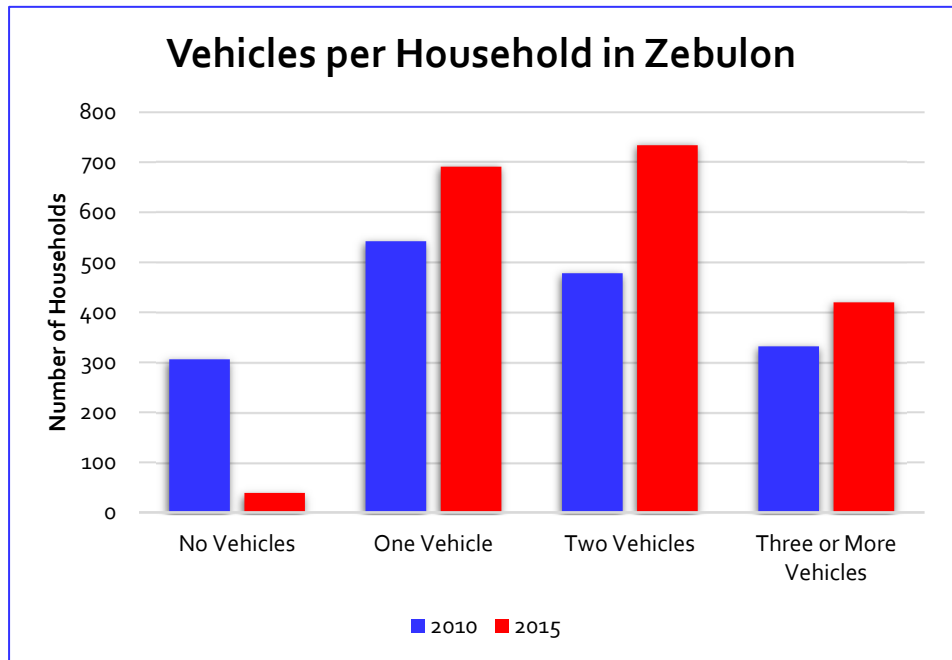




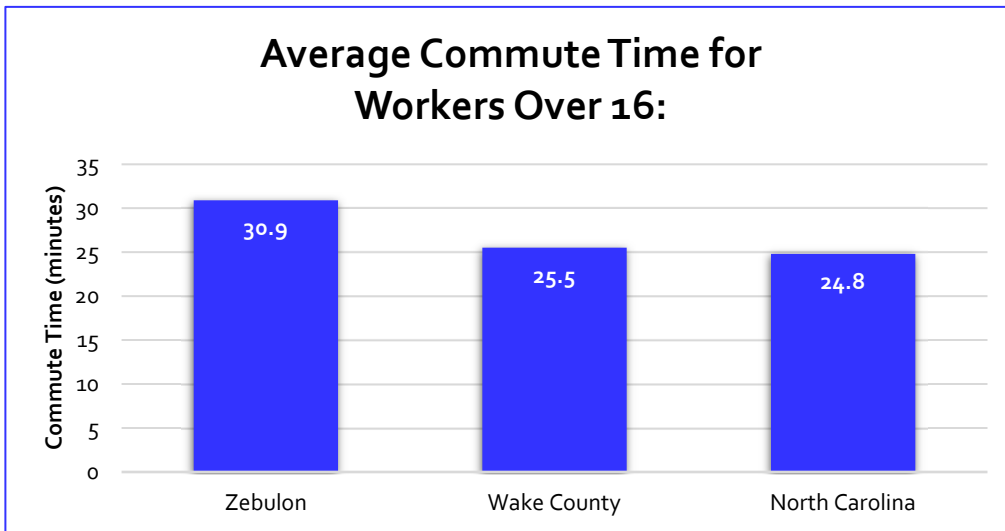
Source: Google Earth

Commuting and Vehicle Ownership

The number of owner-occupied housing units in Zebulon reporting no vehicles decreased dramatically between 2010 and 2019 – from approximately 300 to just under 40. Households with one vehicle saw a 27% increase during this time and households with two vehicles increased by over 50%. Comparatively, the total population of owner-occupied units increased by 13.6% over this period.



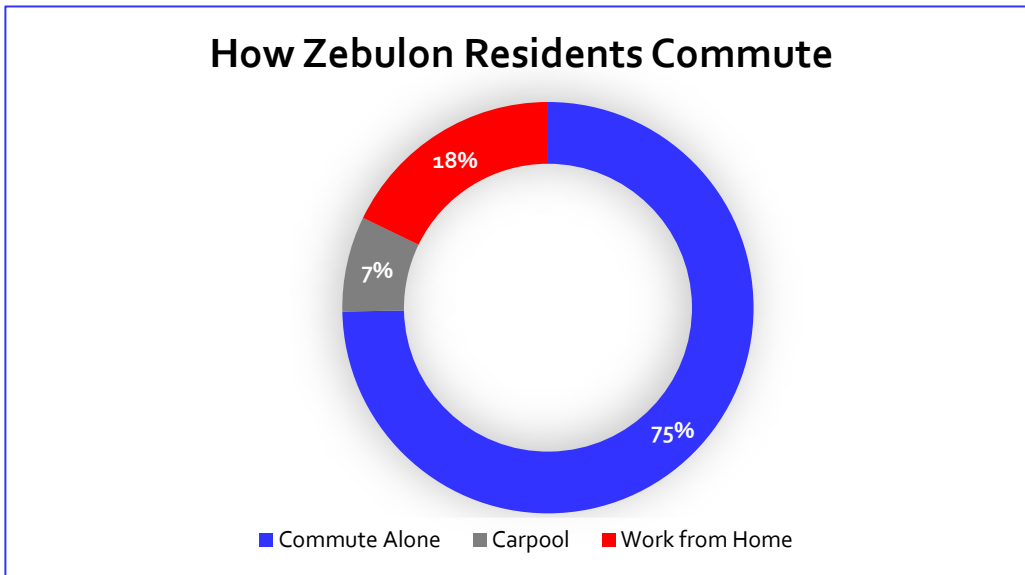
Source: 2019 ACS 5-year estimates data profiles – table DP04



Source: 2019: ACS 5-year estimates subject tables; So801

Commuting

In 2019, the majority of employed Zebulon residents commuted to work in a personal vehicle alone. Approximately 7% carpooled to work and 18% worked from home.



Source: 2019 ACS 5-year estimates subject tables; So801

Existing Transportation Facilities

Roadways

The Town of Zebulon is served by several state and locally managed roadways. The Town is effectively bisected by US 64 (future I-87) / US 264. The Zebulon area is served by three interchanges:

- US 64/264 at NC 96 (Arendell Avenue)
- US 264 at NC 97 (E. Gannon Avenue)
- US 264 at NC 39

Proctor Street, Old Bunn Road, Pippin Road, Debnam Road, and Ferrell Road provide east-west connectivity north of US 64/264. NC 97 (Gannon Avenue) provides east-west connectivity through downtown Zebulon. Currently, there is no continuous east-west connection south of Town. NC 96 (Arendell Avenue), NC 39, Shepard School Road, Pearces Road, Wakefield Street and Horton Road provide north-south connectivity through Zebulon and the study area.

See Map 2 indicating the study area and major roadways within Zebulon.

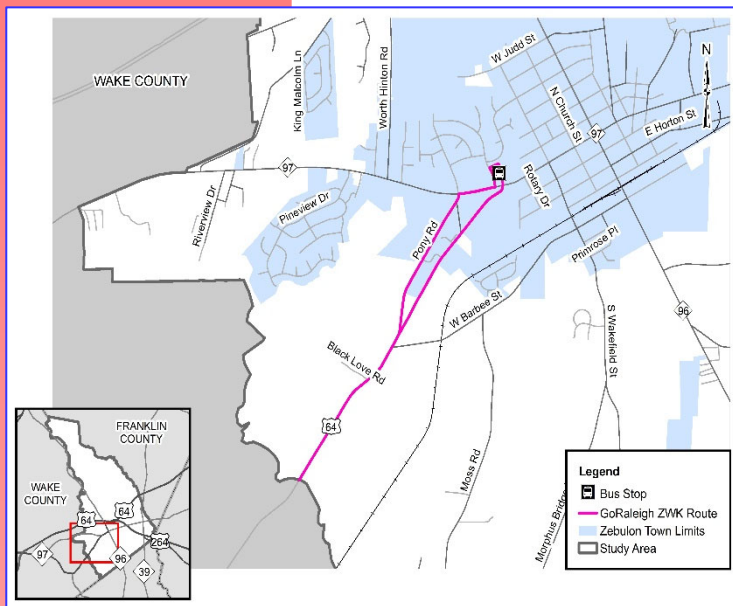
Many major roadways, as well as the traffic signals, in Zebulon are maintained by NCDOT. The Town’s Public Works Department maintains over 25 miles of roadway including many of the new roadways serving the residential growth on the north side of Town.

The most frequent concerns heard from the public during the CTP process for roadways were the increase in traffic overall, the volume of truck traffic along Arendell Avenue through downtown, and future roadway maintenance funding for new roadways due to residential developments.

Transit

GoRaleigh currently operates an express bus service Monday through Friday between Zebulon and the GoRaleigh Station in Raleigh. The Zebulon Park-and-Ride lot is located off Stratford Drive, near its intersection with W. Gannon Avenue. This lot is served by the Zebulon-Wendell-Raleigh Express (ZWK) route which services regional destination points along US 64/264 which includes a stop in the neighboring Town of Wendell. The park-and-ride is served hourly between 6am and 8am and again from 5pm to 7pm. Refer to Map 3 for the ZWK Route in Zebulon.

The long-term desire for a Zebulon circulator transit route was received through input during the CTP process. Additionally, an extension of the existing transit route from the park-and-ride to the Eastern Regional Center was discussed and is also included in the CAMPO Northeast Area Study (NEAS) that is being completed for the area.



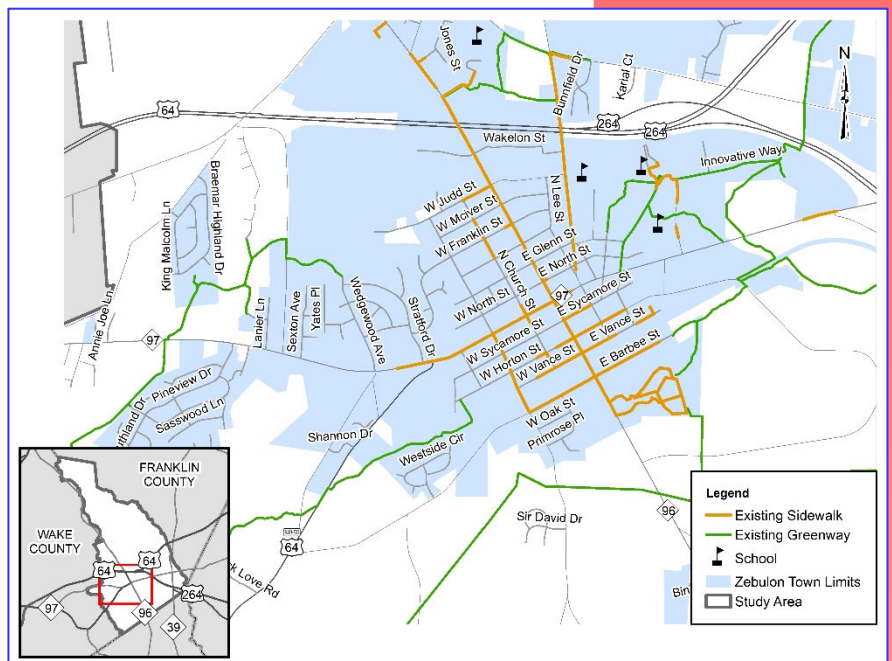
Map 3: Go Raleigh ZKW Route in Zebulon

Pedestrian and Bicycle

There is an existing sidewalk network mainly within the core of Zebulon. Refer to Map 4 to see the existing pedestrian facilities in Zebulon. Sidewalk exists on at least one side of the roadway along Arendell Avenue through downtown, W. Gannon Avenue, Barbee Street, portions of Wakefield Street, and Shepard School Road. However, there are gaps that break down connectivity of the sidewalk network. These gaps range from less than a block to multiple blocks. This makes walking as a main mode of transportation from one site to another a more dangerous and less attractive option. Through this CTP and the Greenway, Bicycle, and Pedestrian Master Plan, the Town intends to improve sidewalk connectivity not only in new developments, but in maturely developed areas of Town that may not see redevelopment as a means of requiring sidewalk installation.

All intersections along Arendell Avenue through downtown do have crosswalks marked, but there are no pedestrian crossing signals incorporated into these intersections. During public input opportunities for the CTP, many people indicated they would feel safer crossing the street if the crosswalks were more visible. It was mentioned that, as a driver, one does not necessarily expect pedestrians at crossings downtown as people may currently avoid walking downtown due to the volume of trucks and traffic in general. Intersection and crosswalk treatments that can encourage pedestrian activity will be discussed in later chapters.

There are currently no dedicated on-street bicycle facilities in Zebulon. The Town is progressing with construction of several greenways identified in the Greenway, Bicycle, and Pedestrian Master Plan. The Greenway Plan identifies more than 20 miles of greenways and shared use trails that can serve Zebulon’s residents using these corridors, connecting them throughout the Town separate from the roads and streets. As will be explored in later chapters, the Town will retain the ability to identify opportunities for on-road and roadside bicycle facilities in a concise and strategic manner using the reserved right-of-way for roadway widenings and new location.



Map 4: Existing Pedestrian Facilities

Aviation

Zebulon is most closely served by the Raleigh-Durham International Airport (RDU), located approximately 35 miles to the west. The airport is easily accessible from US 64/264 (future I-87) via I-540 around north Raleigh or I-40/440 through Raleigh.

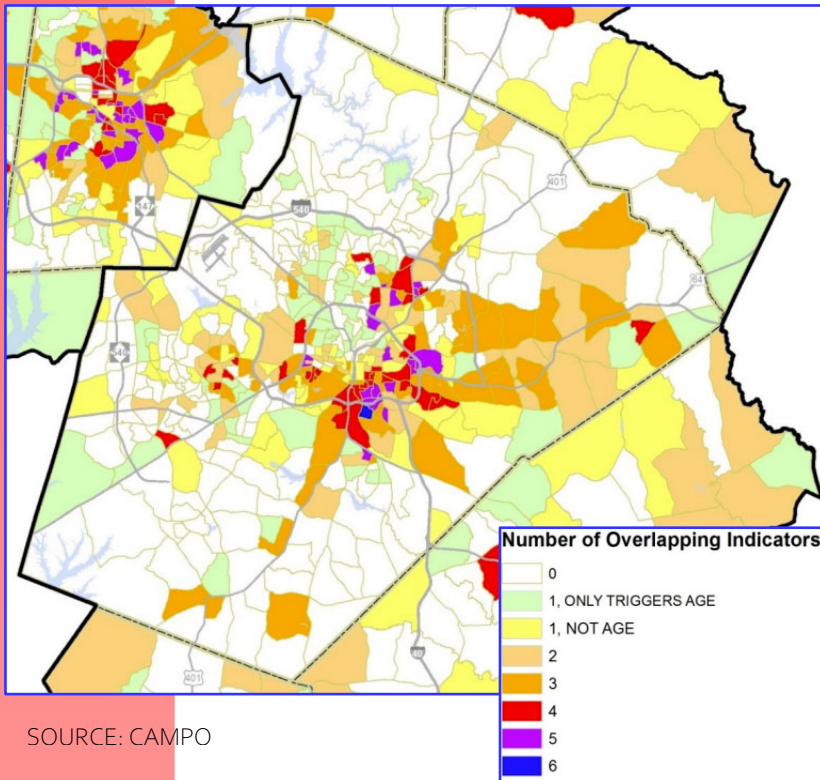


Rail

The Carolina Coastal Railway (CLNA) travels through Zebulon south of NC 97 as a short-line route connecting Raleigh to Wilson and points east. In early 2020, Regional Rail acquired CLNA. This is a freight-only line with no stops in Zebulon and is now mainly used for railcar storage.



Parked rail cars in Zebulon



SOURCE: CAMPO

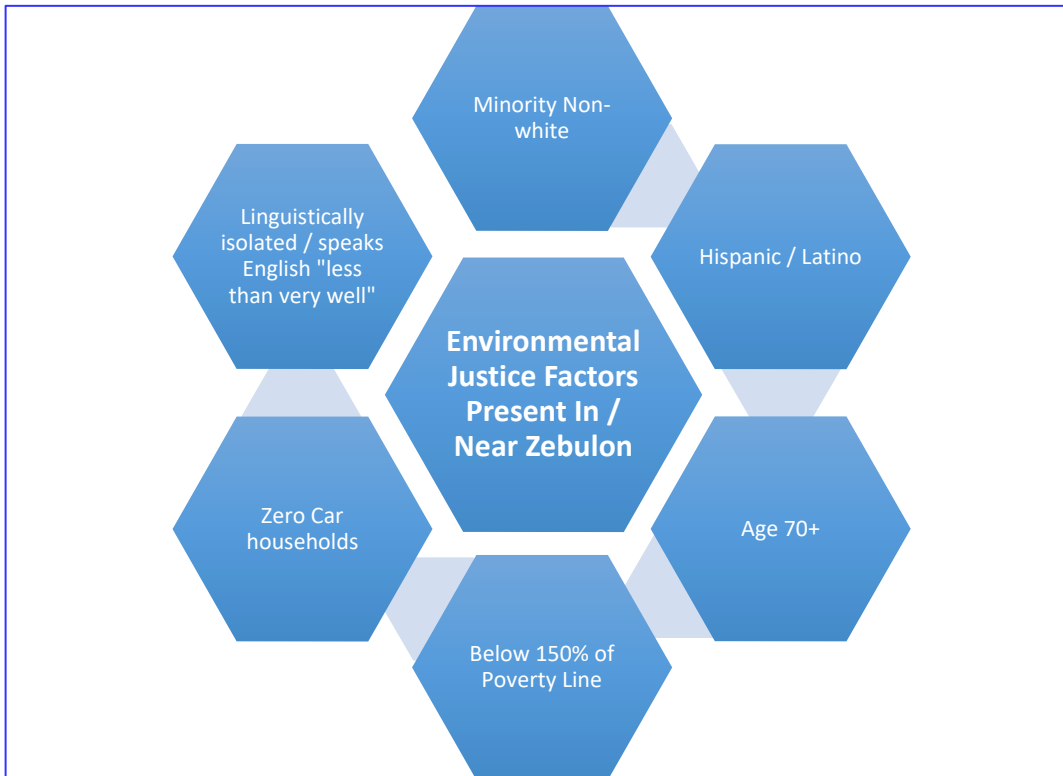
Environmental Justice

Environmental justice is a key consideration in any project receiving federal funding. Environmental justice describes the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. The Title VI, Minority, Limited English Proficiency (LEP), and Low-Income Public Outreach Plan updated in 2018 by CAMPO identifies the location and distribution of populations that represent potential environmental justice issues in the Triangle region.

While the federal definition of environmental justice primarily focuses on minority and low-income populations, the Title VI, Minority, Limited English Proficiency (LEP), and

Low-Income Public Outreach Plan considered the following factors as measures of environmental justice: age, race, sex, color, national origin, LEP, low income, and disability. There were census tracts in Zebulon that exhibited populations above the thresholds for several categories. As shown in the image below from the CAMPO Title VI, Minority, Limited English Proficiency (LEP), and Low-Income Public Outreach Plan, these tracts are mostly located in southern and western Zebulon.

As the Town plans for project execution driven by the recommendations of this CTP, it must seek to ensure that the groups identified do not bear a disproportionate portion of the burdens associated with the project. And they should also proportionally share from the plan benefits.



Previous, Relevant, and Ongoing Planning Efforts

To capture previous planning efforts and develop a robust understanding of the transportation network within Zebulon and the CTP study area, several plans were reviewed and referenced during the development of the CTP. This section summarizes the plans and their relevance to transportation in Zebulon.

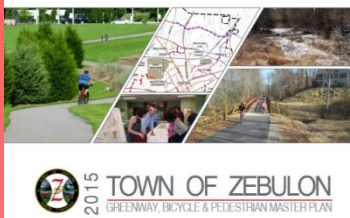
- Zebulon 2030 Strategic Plan (2018)
- Greenway, Bicycle & Pedestrian Master Plan (2015)
- Multimodal Transportation Plan (Revised 2018)
- Comprehensive Master Plan (2008)
- CAMPO 2045 Metropolitan Transportation Plan (2018)
- CAMPO Northeast Area Study (2014, update underway 2020)
- Wake County Transit Plan Update (Draft 2021)
- Zebulon Unified Development Ordinance (2019)

Zebulon 2030 Strategic Plan - (2018)



A strategic plan outlining the future vision and aspirations for the Town and how they will be achieved through the core values of Zebulon and proper goal planning. Completed with the key goals in mind to revitalize downtown Zebulon, enhance community events and places, increase connectedness and walkability within the community, and plan for land uses that meet transportation needs.

Greenway, Bicycle & Pedestrian Master Plan - (2015)



A guide for future greenway trail and other pedestrian improvements throughout the Town. Completed with the goal to improve connectivity, provide an alternate means of transportation, increase recreational opportunities, access to nature, and promote healthy living. The vision illustrated by the master plan is based on the objective of providing the opportunity for all residents and visitors to Zebulon to move around town and reach various destinations in a safe and enjoyable manner without the use of a vehicle.

Multimodal Transportation Plan Update - (2018)

An update to the Town’s existing transportation plan. This update considers recent developments in local and regional patterns of socioeconomic growth. Additional investment in the Town’s transportation system will be needed to accommodate future economic growth. This plan considers the 2014 CAMPO Northeast Area Study which includes Zebulon and the surrounding communities. It also combines elements of the 2001 Zebulon Multimodal Transportation Plan and the Pedestrian and Bicycle Plan into a new single plan.

Comprehensive Master Plan - (2008)

The previously completed CTP for the Town of Zebulon outlining the plan for future growth and land use decisions within the Town’s limits. This plan addresses the need for a coordinated action plan between transportation and land use planning efforts to meet the Town’s growing needs as the population increases in Zebulon. The plan identifies suitable expansion areas and defines characteristics for future growth and development within Zebulon’s planning jurisdiction.

Capital Area Metropolitan Planning Organization’s 2045 Metropolitan Transportation Plan – (2018)

The MTP is a long-range plan for transportation improvements across the region. It includes roadway, transit, rail, bicycle, pedestrian, and other transportation projects to be implemented through the year 2045. This plan serves as a guiding document for future investments in roads, transit services, and other related transportation services and activities to match the growth expected in the Research Triangle Region.

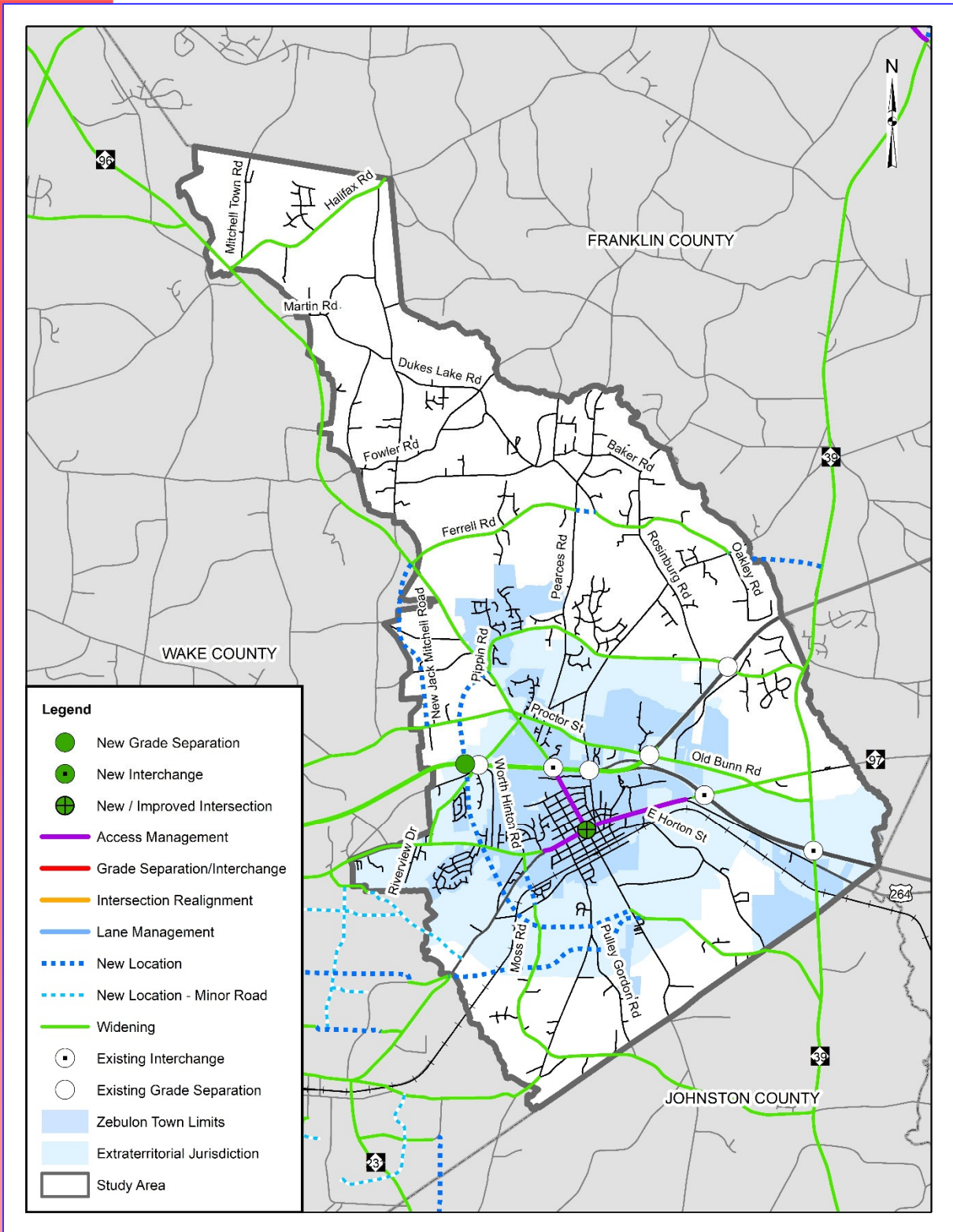
This plan was written jointly by both CAMPO and the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC MPO). The plan had a goal of creating a seamless integration of transportation services between the two planning organization jurisdictions, which are adjacent to each other. The recommended transportation services offer an array of travel choices to support economic development and are compatible with the character and development of the communities.



[CAMPO Northeast Area Study \(NEAS\) - \(2014, 2020 Update\)](#)

A study initiated by CAMPO to identify a sustainable transportation strategy for the growing communities of Wake Forest, Knightdale, Raleigh, Wendell, Zebulon, Rolesville, Bunn, Franklinton, and Youngsville. The 2014 study identified the intersection of NC 96 (Arendell Avenue) and NC 97 (Gannon Avenue) as a potential gateway to Zebulon and included a concept design of a single-lane roundabout at the intersection to address heavy left-turn movements and the relatively high volumes of trucks.

The 2020 NEAS update was underway at the time of this CTP. Preliminary project recommendations include a 2-lane median divided concept design for Proctor Street as well as access management improvements in downtown and improvements to the intersection of Arendell Avenue and Gannon Avenue. Refer to Map 5 on the next page.



Map 5: 2021 NEAS Recommendations

Wake County Transit Plan Update – (Draft 2021)

This plan lays the groundwork for connecting the region and all Wake County municipalities with frequent and reliable urban mobility as well as enhanced access to transit. This plan identifies earmarked funding for increasing transit service in places such as Zebulon that are currently only served with a peak hour fixed route service.

Unified Development Ordinance (UDO) – (2019)

The Town recently updated the UDO to better manage the growth and development requests submitted. The UDO seeks to keep Town residents and visitors safe, encourage compatible land uses and housing options, and protect the environment while maintaining sufficient infrastructure promoting a unique sense of place and diverse local economy.



Zebulon Comprehensive Land Use Plan

The Zebulon Comprehensive Land Use Plan is being developed concurrently with the CTP and addresses the future land use opportunities of the Town.



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ZEBULON TOMORROW

Transportation Vision, Values, and Input



Introduction

In 2018, the Town of Zebulon created a vision of its future and how to approach the physical elements of the vision. During the development of the Zebulon 2030 Strategic Plan, the stakeholders noted that sensitive growth that preserves the Town's uniqueness and small-town character should be encouraged. **Through the CTP, the Town's focus on a vibrant downtown, small town life, and intentional growth are supported and applied to the transportation network to help achieve the goals of increasing the connectedness and walkability in the community and managing transportation needs.**

Stakeholder Engagement and Public Involvement

Input on the CTP from stakeholders and the general public is important to creating a plan that is widely supported and that shares the Vision of the community.

Stakeholder engagement used in the development of the Zebulon CTP took several forms including a primary focus group, small groups sessions, and an online survey. An initial kick-off meeting with Town staff and the primary focus group was held in February of 2020. The project team completed several 'Days in the District' in early March with stakeholders touring the study area and collecting insight on various land use and transportation issues. The COVID-19 pandemic began in March of 2020 and significantly impacted the public input process with stay-in-place orders and strict limits on all types of gatherings from state and local officials. Until September of 2020, the project team suspended in-person public engagement events. During this time, the Town launched an online survey via the Planning Department's website and social media to gain insight from the community at-large.



Zebulon stakeholders at a public engagement event

At the end of September and early October 2020, the project team again engaged the community in small-group, in-person input sessions, limiting the gatherings to 10 people or less. There were 12 small group sessions which were held outside in downtown Zebulon and at the Community Center.

The CTP Primary Focus Group met four times during the CTP development – February 2020, January 2021, February 2021, and April 2021. Discussions ranged from general history of Zebulon

Transportation Challenges in Zebulon as Identified by the Community





1. Increasing traffic volumes and congestion due to explosive new growth north of Town.
2. High volume of truck traffic along NC 96 (Arendell Avenue).
3. Gaps in bike and pedestrian facilities.
4. Aging roadways.
5. Limited access management.
6. Limited parking downtown.

to various transportation topics, such as strengths and weaknesses of Zebulon's transportation network, transportation needs, strategic improvements, and network recommendations.

Survey Results

The project team heard consistent concerns and visions through each avenue of input. The most frequently noted topics are listed below. As downtown Zebulon continues to grow, survey respondents identified the following preferred improvements:

Improvements Survey Respondents Prefer

-  49% of respondents said they would like to see adequate parking
-  40% of respondents said they would like to see street improvements
-  30% of respondents said a safer environment for pedestrian and cyclists downtown
-  16% of respondents said better connections to get downtown without driving

Critical Priorities

Survey respondents identified what they felt were critical priorities to manage for the future of Zebulon:

- 21% of respondents said traffic congestion and safety
- 7% of respondents said infrastructure condition and capacity, including roadways

Downtown Parking

During the development of the CTP, Town staff separately commissioned a parking study for the downtown area based on input from the community. Available parking spaces and utilization were reviewed, as well as input from the community regarding parking perceptions. The study results indicate approximately 450 parking spaces available in the downtown area, with many areas being under-utilized, some simply because potential users are unaware of them. Branded wayfinding was recommended to increase awareness of available parking and time-limited spaces.

CTP Planning Themes

Several planning themes were utilized in the development of this CTP based on stakeholder and public input, as well as previous planning efforts and best practices.

Preserve What Makes Zebulon "Zebulon"

Many Zebulon residents, new and established, appreciate the history and small-town charm of Zebulon; many noted this was a major draw when deciding where to live. Small-town charm can be maintained by physically connecting the community via a robust transportation network. This means provided connections not only by car but also with sidewalks and bicycle friendly routes to connect the community to downtown Zebulon and other Town facilities like parks and open space.



To enhance the small-town feel, alternate routes to “through travelers” should be provided to redirect through trips away from downtown and residential neighborhoods.

Connectivity

Downtown Zebulon is undergoing significant redevelopment as buildings in the downtown area are being rehabilitated with unique shops, services, and restaurants. It is important to create a transportation network that allows residents and visitors can make their way to/from downtown via a variety of modes to provide access to the new development in town. It is also key to focus on connecting other areas of town to each other, not just downtown, to provide a usable network. The CTP will provide guidance and support for creating a multimodal transportation network that creates an inviting and safe destination for pedestrians and cyclists.

Context Sensitive Roadways

There is no ‘one size fits all’ approach for roadways. There are a multitude of factors to be considered when planning, designing, and constructing a new roadway or modifications to existing roadways. This often includes environmental impacts, social and cultural impacts, and constructability feasibility. Community concerns can range from preserving historic places or maintaining existing character in a developed area (such as downtown Zebulon) to avoiding federally protected species or at-risk populations when considering new roadways or widening existing roads.

Complete Streets

NCDOT’s Complete Streets policy requires the consideration and incorporation of multiple modes of transportation when planning new roadways or modifications to existing ones. The policy covers not only motorists anticipated to use the facility, but pedestrians, cyclists, and transit riders in an effort to improve safety, provide travel options, and improve connectivity. A well-balanced transportation system provides support for improved quality of life.

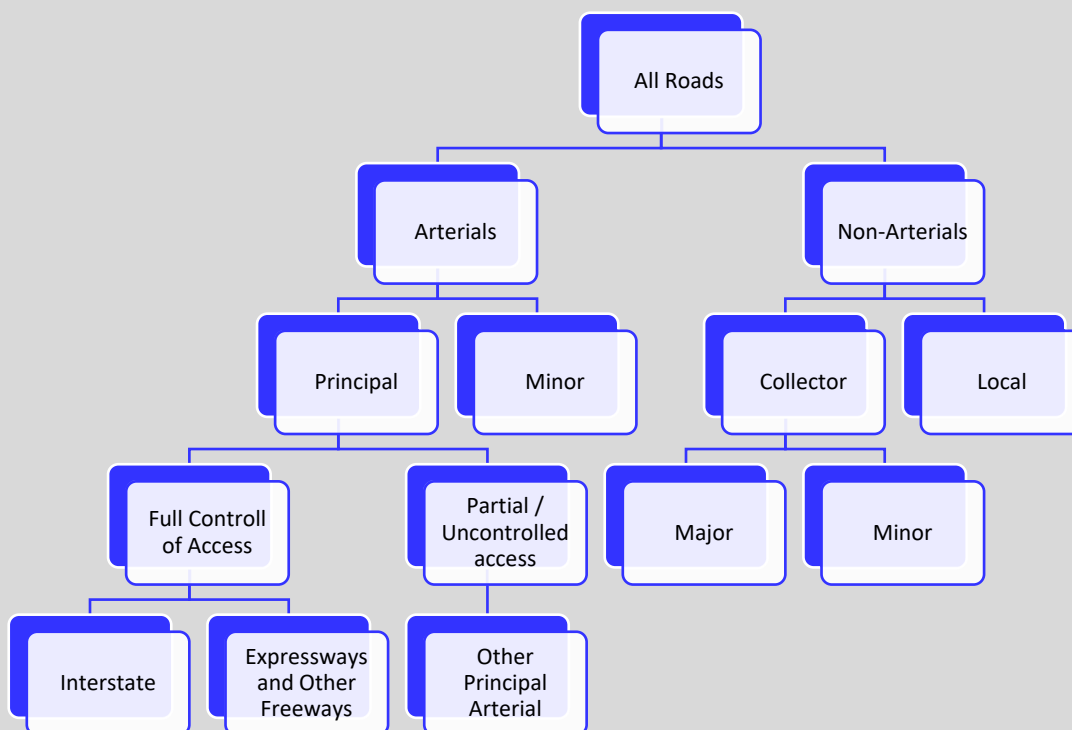
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Roadway Element



Introduction

Roadways are defined by their functional classifications. Functional classification is the process of grouping roadways into classes according to the character of the service they are intended to provide. An illustration of the Federal Highway Association's (FHWA) roadway hierarchy of classification is shown below.



In North Carolina, NCDOT has adopted a Facility Types and Control of Access Definitions document to create a set of understandable and consistent definitions for all roadways in the State. NCDOT worked with the FHWA and several internal departments to create a document that defines the roadway types based on the function of the roadway, mobility and access, the presence of traffic signals, driveways, and medians. These facility types are as follows:

Freeways

These roadways represent a multi-lane divided facility with complete access control (interchanges only and no traffic signals). Design classification: Interstate or Freeway.

Expressways

These roadways represent a multi-lane divided facility with a high level of access control (interchanges, limited at-grade intersections, right-in/right-out access, and no traffic signals). Design Classification: Arterial.

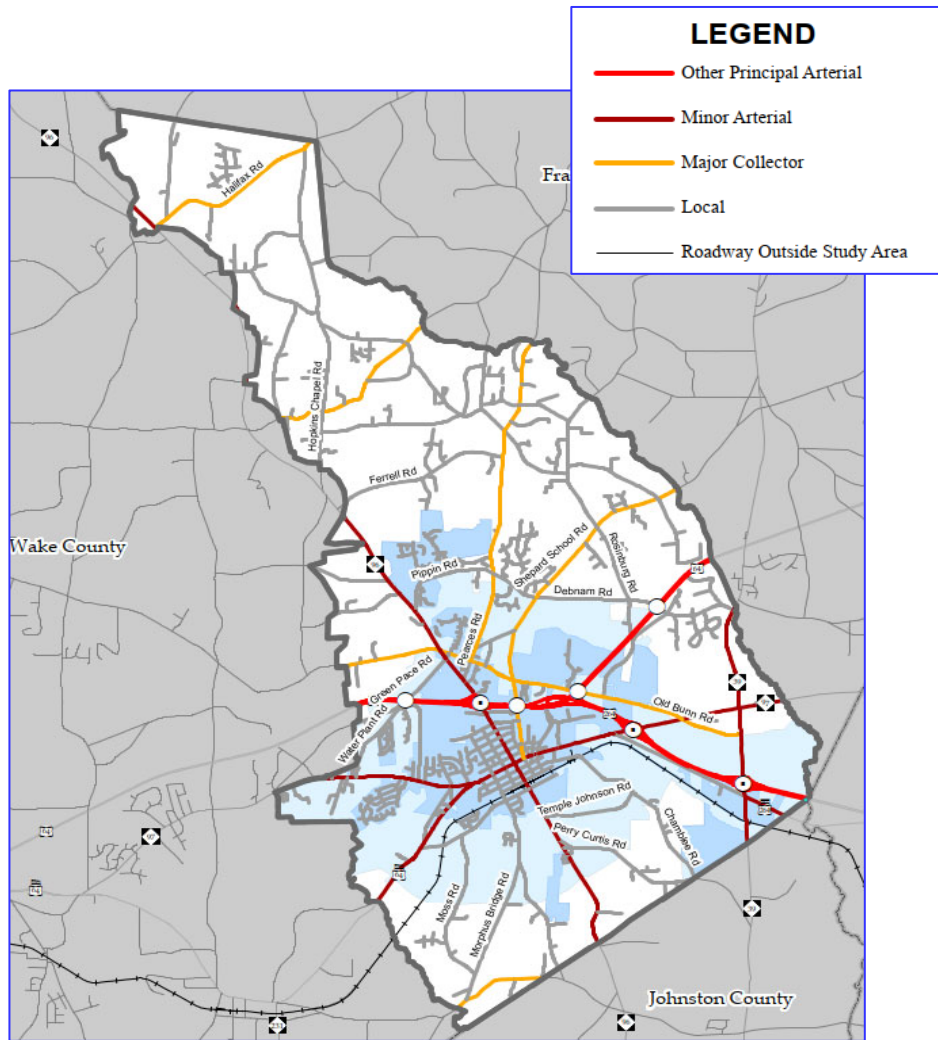
Boulevards

These roadways represent a typically divided facility with moderate access control (at-grade intersections, right-in/right-out access, and traffic signals at major intersections). Design classification: Arterial or Collector.

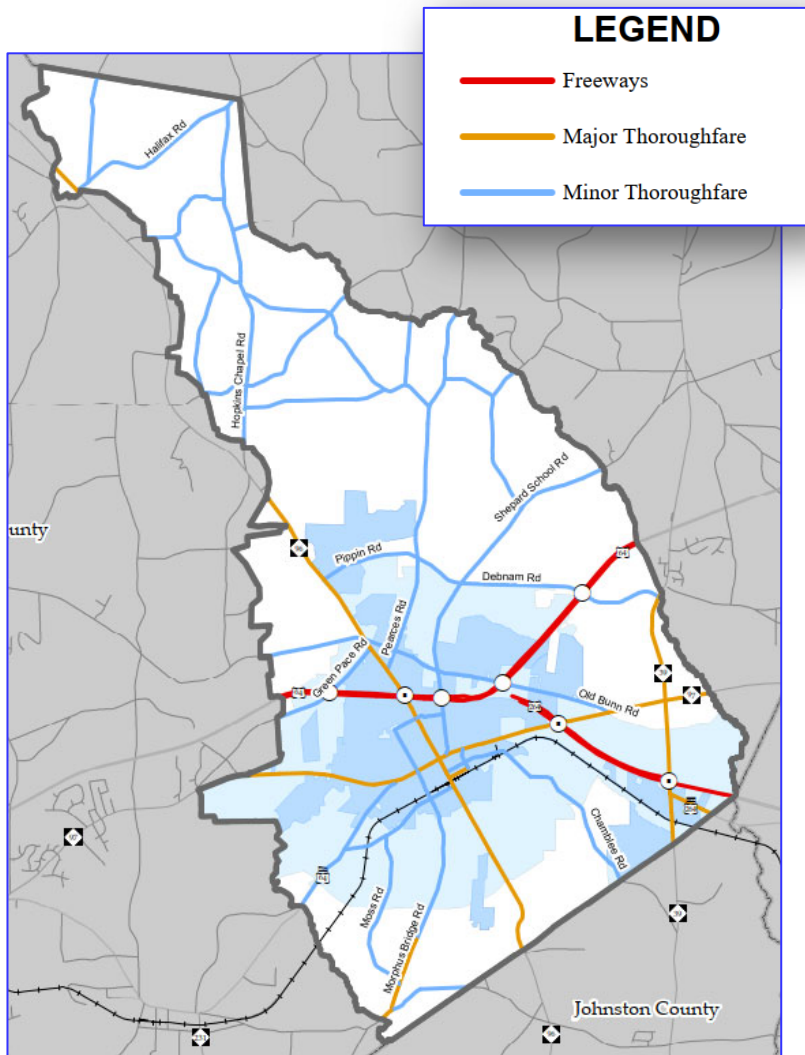
Thoroughfares (Major and Minor)

These roadways are a minimum of 2 lanes and have no medians. This includes all facilities with a two-way left-turn lane. These facilities typically have low access control (at-grade intersections, access to development, and traffic signals at major and some minor intersections). Design Classification: Collector or Local.

Refer to Map 6 for the Federal Functional Classification of roadways within the study. Map 7 depicts the NCDOT CTP facility classifications.



Map 6: Federal Functional Classifications



Map 7: NCDOT CTP Facility Classifications

The Zebulon UDO defines the Street Classifications for Interstate, Principal Arterial, Minor Arterial, Major Collector, Minor Collector, Local, Cul-de-Sac, and Alley in Section 6.10.2.

Existing Conditions

Capacity Analysis

Roadway segments were analyzed using the methodology outlined in the 2010 Highway Capacity Manual (HCM) published by the Transportation Research Board.

The HCM defines capacity as “the maximum hourly rate at which persons or vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time period under prevailing roadway, traffic, and control conditions.” Level of service (LOS) is a term used to represent different driving conditions and is defined as a “qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers.” Level of service varies from Level “A” representing free flow, to Level “F” where breakdown conditions are evident. Refer to Table 3 for HCM levels of service and related average daily traffic (ADT) volume. Although roadway capacity is typically associated with an hourly traffic

volume, this study uses daily traffic volumes for a more robust look at the roadway network. Peak hour congestion is typically handled on a micro-level to determine specific roadway improvements, such as turn lanes and traffic signals, that are needed to address congestion during specific times of day. [This CTP takes a broader look at roadway improvements to identify roads that need widening, areas that need better connectivity or new route options, and identifying any roads that have been over-designed and could see a reduction in number of travel lanes to accommodate pedestrian and bicycle facilities.](#)

The level of service relationship to daily traffic volumes, as shown below, is directly from the HCM.

Table 3: HCM Levels of Service

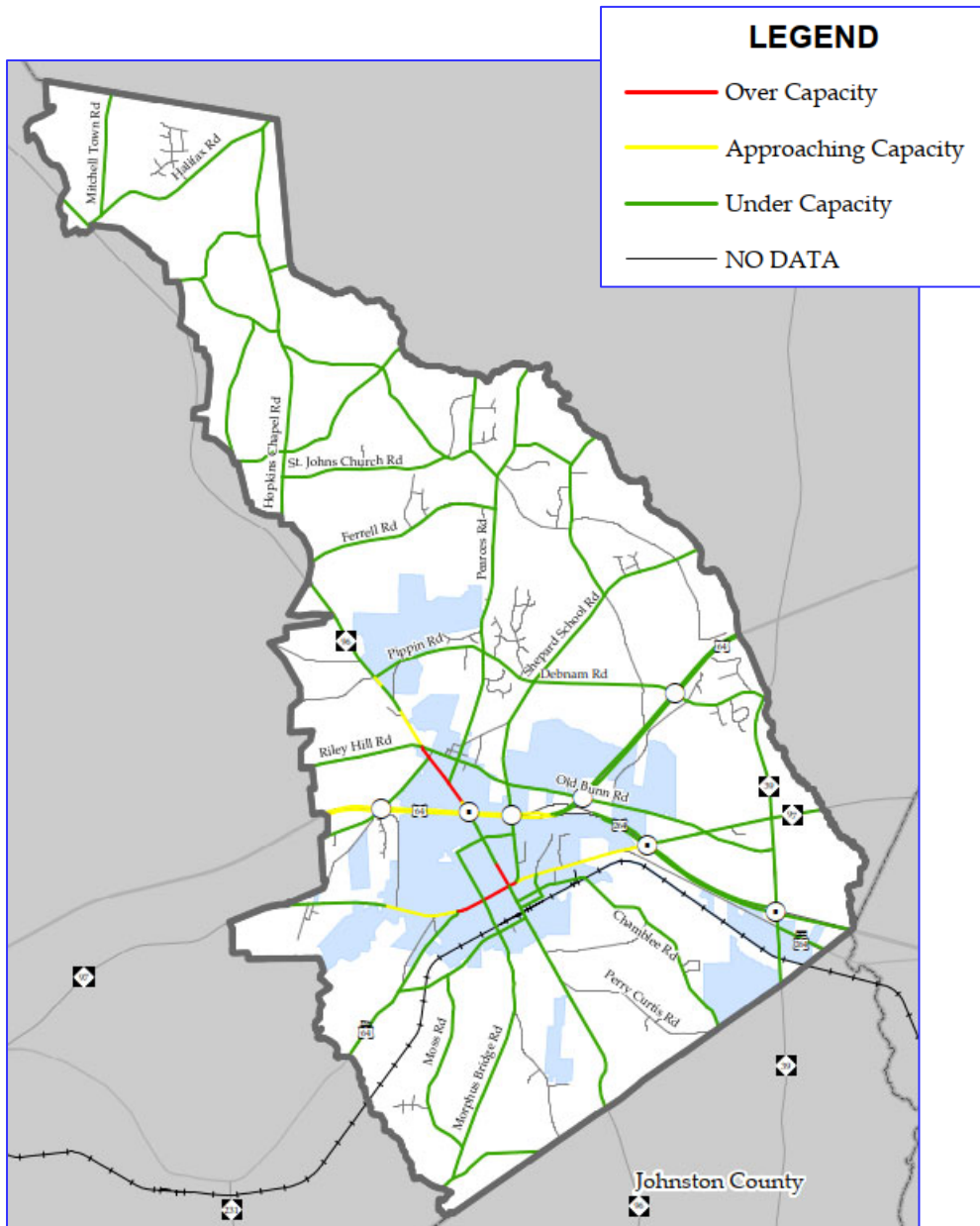
<i>2 Lanes Left-Turn Lanes at Intersections Posted Speed 30 mph</i>		<i>4-Lane Divided Left-Turn Lanes at Intersections Posted Speed 45 mph</i>	
LOS	ADT Range (vpd)	LOS	ADT Range (vpd)
C	0-5,300	C	0-19,300
D	5,301-13,800	D	19,301-33,500
E	13,801-17,900	E	33,501-34,100
F	>17,900	F	>34,100

SOURCE: Transportation Research Board "Highway Capacity Manual 2010" Chapter 16.

The most recent published Average Annual Daily Traffic (AADT) data from NCDOT was used to determine the existing levels of service for major roadways within the study area. Due to the scheduling of annual traffic counts, some AADT are 2018, while others are 2019. [It is important to consider that the traffic volume data available at the time of this study does not capture the intense increase in development and related traffic after 2019.](#)

Generally, most of the major roadways within the study area are operating under capacity daily, with some congestion observed most frequently around the major intersections located along NC 96. NC 96 north of the US 64/264 interchange to Proctor Street is operating over capacity based on the most recent NCDOT AADT data; this was confirmed through public input and focus groups by motorists who often experience significant delays in this area during peak hours. NC 97 experiences capacity issues from NC 96 west to Mack Todd Road. Based on community input, it was described that this portion of roadway is often used as an alternate route to US 64/264 when there is an incident or congestion on the highway. While the count data shows NC 96 overcapacity from NC 97 to the north for several blocks, many in the community agreed that this congestion can extend to the US 64/264 interchange regularly during the afternoon peak hour.

Due to the development in north Zebulon, traffic congestion has increased particularly along Old Bunn Road, Shepard School Road, Proctor Street, and Pearces Road. This increase in traffic will be captured in 2020 and 2021 annual traffic counts collected by NCDOT. A summary of the major existing roadways within the study area, the most recent NCDOT published AADT, the roadway capacity, and the future AADT is available in the Appendix. This data was used to develop the Existing Roadway Deficiency Map, shown on Map 8.



Map 8: Existing (2018-2019) Roadway Deficiencies

Crash Data

Crash statistics are provided by NCDOT for five consecutive years from 2015 through 2019. This data represents reported crash information within the study area. Within the study area, there was a total of 1,078 crashes, 11 of which resulted in fatalities or caused serious injuries. Approximately 834 of the crashes resulted in property damage only.

The majority of the crashes occurred at the intersections of NC 96 and NC 97, NC 96 and Wakelon Street, and at the interchange for US 64/264 and NC 96. Refer to Table 4 for a summary of reported crashes on these roads within the study area.



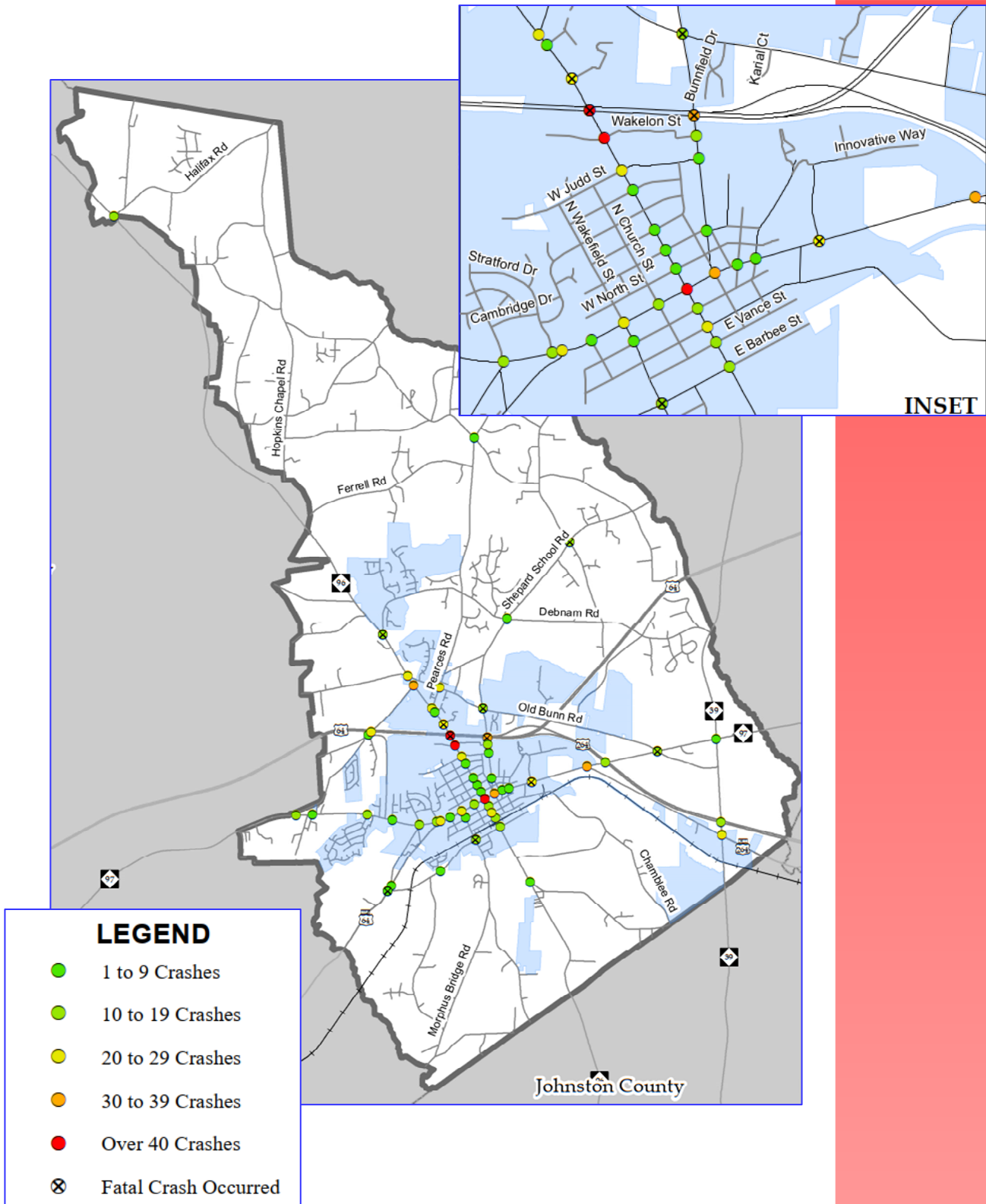
Table 4: Reported Crashes on Major Roads in Zebulon

Intersection	Number of Crashes
US 64 and NC 96 Interchange	114
NC 96 and Wakelon Street	85
NC 96 and NC 97	63
NC 96 and Green Pace Road	36

According to the Department of Motor Vehicles Crash Data and Information published in 2019, the Town of Zebulon had a total of 244 reported crashes in 2017. Of the reported crashes, two of them were fatal and 91 of the crashes included some type of injury. It should also be noted that only two crashes involving pedestrians, and zero crashes involving bicyclists were reported in Zebulon in 2019.

Each year, NCDOT publishes municipality rankings based on reported crash data. The rankings are based on several criteria such as total crashes, crash severity, and crash rates based on population. Municipalities are ranked in one of two groups: population less than 10,000 or population 10,000 or more. Zebulon has a population less than 10,000 and was ranked appropriately within this group. A lower ranking indicates more reported crashes, higher crash severity, and a higher crash rate based on population. Based on 2019 data, Zebulon ranked 9th out of 461 municipalities below 10,000 people. Since 2016, Zebulon has risen up the list of rankings from 40th in 2016, 12th in 2017, and 13th in 2018, indicating an increase in crash rates and severity.

Map 9 shows the crash data information for the study area from 2015 to 2019.



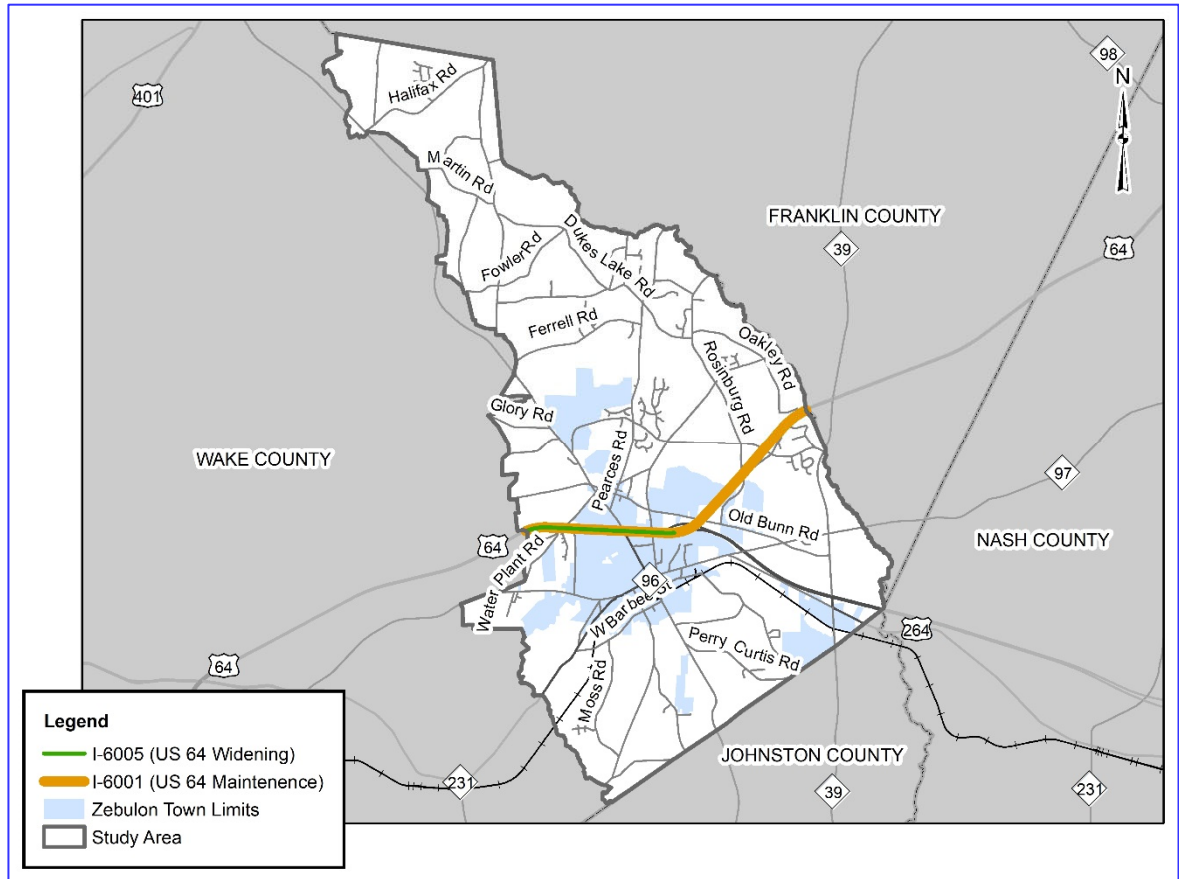
Map 9: High Crash Locations (2015-2019)

Future 2045 Conditions

As part of the future 2045 analysis, the Triangle Regional Model (TRM) version 5 was utilized to determine expected daily traffic flow volumes on major roadways within the study area. This model was created by CAMPO in 2006 and updated in 2011. The updates included calibrating the model to the base year of 2010. Anticipated daily traffic volumes on all modeled roadways were obtained as part of the model analysis results. The 2045 model volumes were compared to the model base (2013) volumes, and growth factors were determined for study area roadways. This growth rate was applied to the existing 2018 and 2019 AADT information from NCDOT.

NCDOT STIP Projects

Map 10 shows the NCDOT funded projects from the current 2020-2029 NCDOT STIP that are within the CTP study area boundary. These are also listed in Table 5.



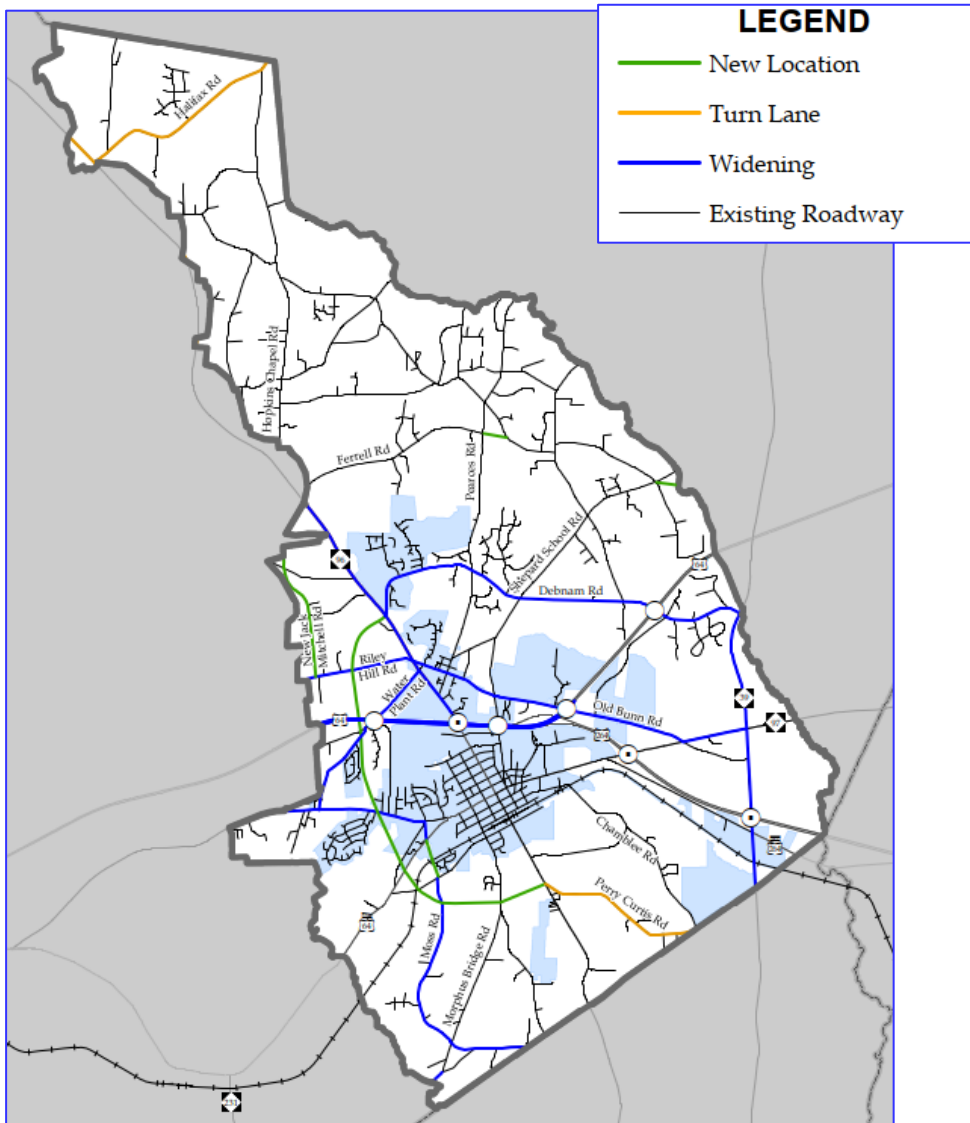
Map 10: Relevant Current TIP Funded Projects

Table 5: NCDOT STIP Projects Within CTP Study Area

STIP Number	Summary
I-6001	US 64 Maintenance
I-6005	US 64 Widening

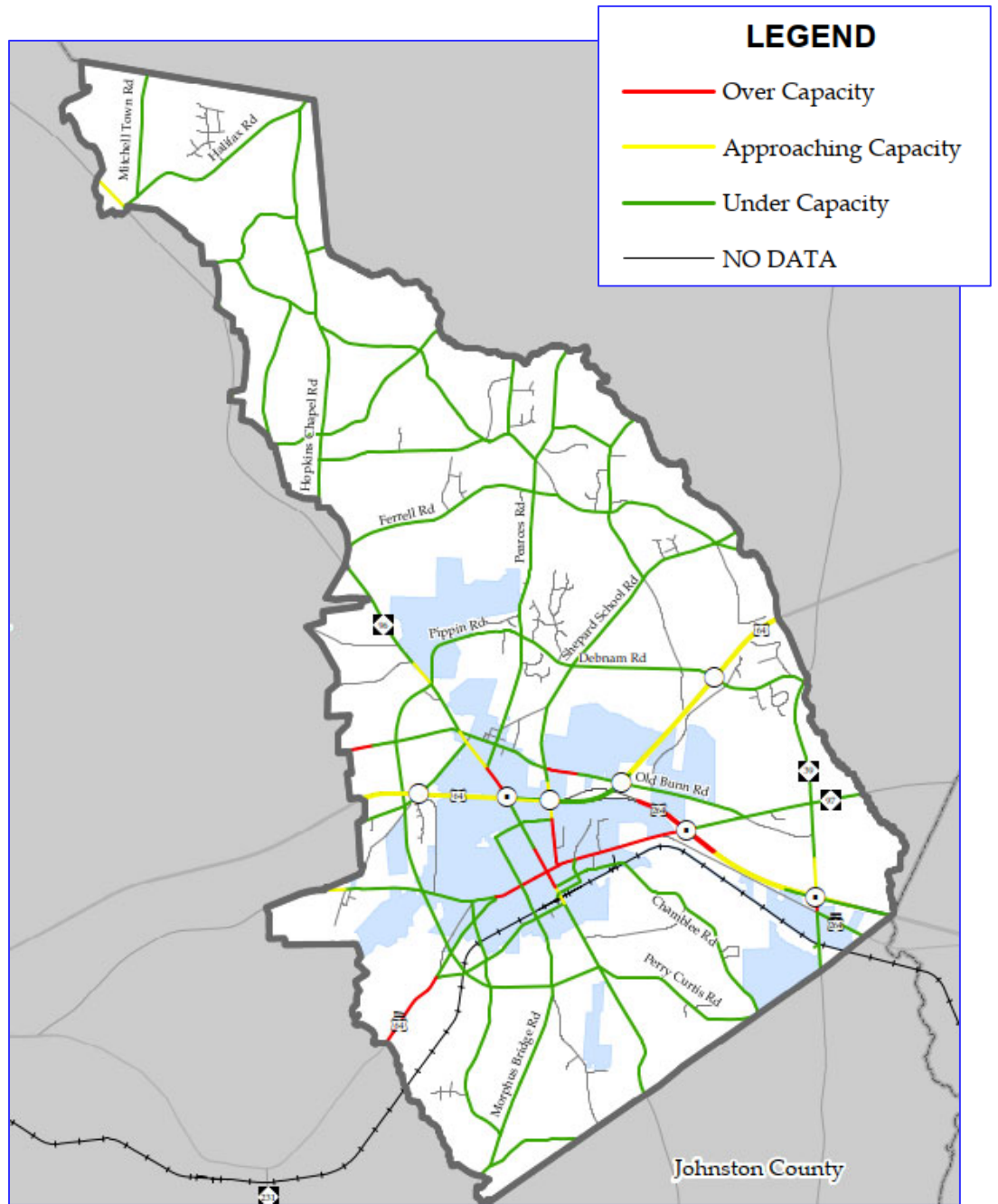
CAMPO MTP Projects

The 2045 TRM also includes projects scheduled out to 2045 in the MTP. Many of these projects do not have funding identified yet. Map 11 shows the CAMPO MTP projects in the study area.



Map 11: Relevant CAMPO MTP Projects Through 2045

The future 2045 daily levels of service are shown in Map 12. Detailed information regarding traffic volumes can be found in the Appendix.



Map 12: Future (2045) Roadway LOS

NC 96 Bypass

It should be noted that a NC 96 Bypass, shown on the west side of town in Maps 11 and 12 from Pippin Road to Perry Curtis Road is a relic of past planning efforts. Through this local CTP process and with extensive discussion and input from the Town Boards and residents, it was decided to remove this project from the Zebulon CTP. Instead of the bypass, a more diverse grid-like network of north-south and east-west connections was identified that minimized impacts to existing development in this area. This decision was discussed with CAMPO staff who advised that the NC 96 bypass project can be removed from CAMPO's plans through an official request by the Commissioners.

CTP Roadway Recommendations

Future 2045 daily LOS was one factor in determining roadway recommendations. The Zebulon CTP also heavily considers the preservation of the Town character and supporting planned land uses with appropriate roadway facilities. Other contributing factors included previous transportation plan recommendations, connectivity enhancements, and public survey responses. The recommendations are meant to indicate where existing facilities may need to be improved or where new facilities should be considered. Roadway facility recommendations are shown in the CTP Maps at the end of this report. **It is critical to note that the paths shown for any 'new location' roadways are purely conceptual to show the intent and desire for connectivity between two locations. Before any roadway is constructed, it will go through an extensive planning and design process analyzing multiple specific alignments and the impacts of each option including property and environmental impacts.**

Methodology

The Zebulon CTP employs a unique methodology for identifying the physical characteristics of the future transportation network. This plan focuses mainly on two categories of right-of-way (ROW) dedication or reservation. The first is referred to as the two-lane divided roadway ROW, the second is the four-lane divided roadway ROW. This approach vastly simplifies and streamlines the CTP mapping itself while allowing Town staff a significant level of flexibility of what is required within each ROW. This allows the Town to adjust for items such as land use, constructability restrictions, continuation of non-vehicular accommodations, and future changes in travel patterns. Both options require pedestrian facilities (mainly sidewalks) and include bicycle facilities where appropriate to enhance connectivity.

As shown in the CTP Maps, the two-lane divided ROW segments are typically concentrated downtown and on routes leading into downtown. This approach transitions network users into a more human-scale focused area, such as downtown Zebulon. On the periphery of Town, the roadways typically transition to four-lane divided ROWs. A four-lane divided ROW provides additional capacity for motorists that are making through trips, with no intentions to stop in Zebulon, and helps remove them from the roadways that serve pedestrian focused development. It should be noted that there is an additional category of ROW shown on the map – the two-lane undivided roadway. This was identified for a few specific areas where existing roadway connections or planned connections did not support a two-lane divided ROW.

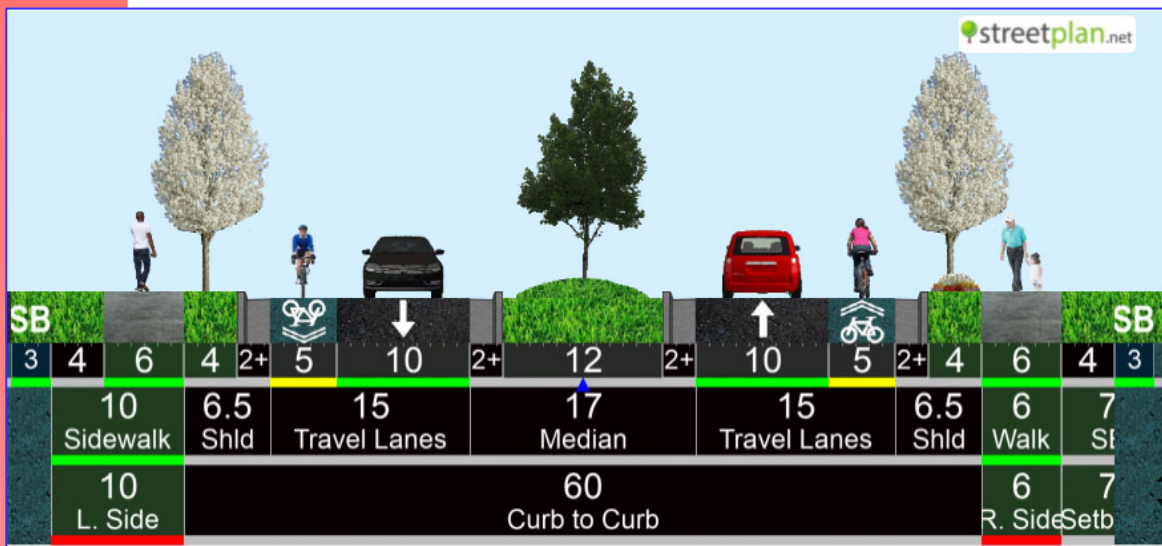
Minimum ROW widths are identified in Section 6.10.3 of the Zebulon UDO and are based on the roadway classification per CAMPO. Refer to Table 6 for the ROW requirements.

Table 6: Minimum ROW Widths

<i>Minimum Street Right-of-Way (ROW) Widths</i>	
Classification	Minimum ROW (feet)
Principal Arterial	80
Minor Arterial	70
Major Collector	60
Minor Collector	60
Local	50

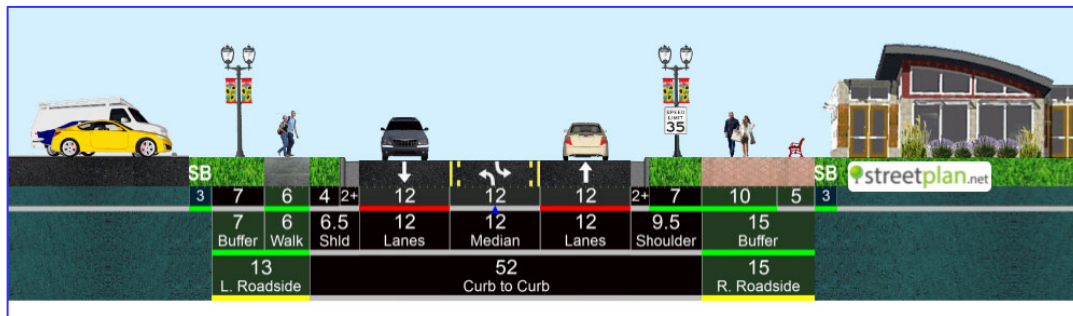
Complete Streets

In keeping with NCDOT’s Complete Streets policy, this approach of reserving ROW widths allows the Town to determine the best fit accommodations for cyclists and pedestrians, as well as transit facilities in the future. For example, the same 80-foot ROW of width can contain varying transportation elements as shown in the two following figures. Each of these examples creates a different character of space and shows how variations in elements can help with ‘place-making’.



SOURCE: Streetplan.net. Example A 80’ ROW Cross-Section

The Example A cross-section shows a travel lane in each direction, a 12-foot landscaped median, bike lanes on both sides as well as sidewalks and additional landscaping. This cross-section would be appropriate for an area with less intense development and lower speeds.



SOURCE: Streetplan.net. Example B 80' ROW Cross-Section

The Example B cross-section depicts a different character and has varying elements from Example A. This cross-section shows a center two-way left-turn lane, a travel lane in each direction, a typical sidewalk on one side, and a wide sidewalk with bench amenities on the other. This would be more appropriate for an area that has frequent access points or driveways. Sharrow markings, which are shared lane markings, could be considered for cyclist accommodations in this scenario if vehicle speeds are acceptable.

These cross-section examples are explored again in Chapter 4 with regard to cyclist and pedestrian facilities.

Priority Intersections

The CTP map also identifies eight intersections as Priority Intersections. These are locations that currently experience issues, whether operationally, geometrically, or otherwise identified as a concern either during the CTP process or from the Northeast Area Study recently completed by CAMPO. Some intersections have improvements planned or underway and others are those that are anticipated to need attention in the future with continued growth in Zebulon. For example, Old Bunn Road at Shepard School Road will have a traffic signal and turn lanes installed. The intention of identifying these intersections in the CTP is that future small area or intersection focused studies can be undertaken to explore specific recommendations such as turn lanes, signalization, roundabout conversions, before solutions become limited due to external factors such as new development.

Traffic Calming

Traffic calming is the combination of mostly physical features that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for pedestrians, joggers, and cyclists. Traffic calming includes physical and visual measures, as well as educational and enforcement activities. Proactive traffic calming techniques are design elements that are built when the street is constructed. They include horizontal curves that slow most motorists and raised-curb islands that narrow the travel way at key locations to ensure motorists slow down. Traffic calming can include intersections where through traffic must turn and the street name changes. Proactive traffic calming includes generous planting strips with street trees that will grow and mature to provide a canopy over the street, lending visual cues to motorists that induce them to drive at reasonable speeds. Traffic calming measures can be reactive; that is, added to existing collector streets that are experiencing speeding problems. The purpose of traffic calming is to reduce the speed and volume of traffic to acceptable levels, reduce crashes, and to provide safe



environments for pedestrians, cyclists, and children. Refer to Chapter 4 for more details on traffic calming measures, especially in downtown.

ZEBULON TOMORROW

Pedestrian and Bicycle Element



Introduction

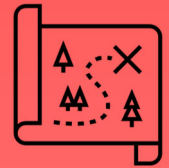
The Zebulon CTP builds on previous extensive planning efforts that culminated in adoption of the Town of Zebulon 2015 Greenway, Bicycle & Pedestrian Master Plan (Greenway Plan). The Greenway Plan provides a broad vision, strategies, and actions for the improvement of the bicycling and walking environments in Zebulon. The Greenway Plan centers around the vision of connectivity that provides a safe and enjoyable way to get around Town by expanding the existing network, filling network gaps, providing greater connectivity, educating and encouraging the public, and maximizing funding sources.

The recommendations of the Greenway Plan are supported by the 2045 CTP. The Greenway Plan identifies 10 primary greenway corridors and more than 20 miles of trails and bicycle and pedestrian improvements throughout Zebulon and the ETJ. Along with these recommended improvements, the plan outlines an implementation strategy, preliminary opinion of construction costs, and identifies possible sources of funding.

The health and economic benefits of walkable and bikeable communities underscore the importance of implementing the Plan. People and businesses choose to live and relocate to communities that provide a high quality of life, including those with greenways, sidewalks, and bikeways. Additionally, national transportation surveys show that almost 50 percent of all trips are three miles or shorter in length. A three-mile trip takes only 15 minutes by bicycle and about one hour by foot. The distance from downtown Zebulon to the Eastern Regional Center is about one mile. Safe and convenient walking and cycling facilities allow mobility for seniors, children, and citizens who are without automobiles.

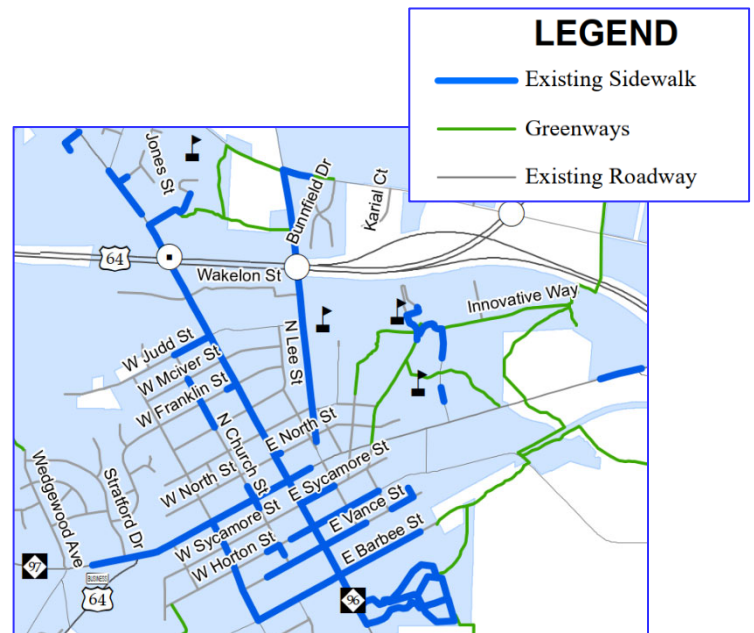
Existing Conditions

There is an existing sidewalk network mainly within the core of Zebulon. Refer to Map 13 for the existing pedestrian facilities in downtown Zebulon. Sidewalk exists on at least one side of the roadway along Arendell Avenue through downtown, W. Gannon Avenue, Barbee Street, portions of Wakefield Street, and Shepard School Road. However, there are gaps that break the connectivity of the sidewalk network. These gaps range from less than a block to multiple blocks and are a major deterrent to walking. This makes walking as a main mode of transportation from one site to another a more dangerous and less attractive option. Additionally, some of the existing sidewalks are in need of maintenance. Through this CTP and the Greenway Plan, the Town intends to improve sidewalk connectivity not only in new developments, but in maturely developed areas of Town that may not see redevelopment as a means of requiring sidewalk installation.



Studies show that homes adjacent to greenways and trails have a higher property value, which was reinforced in a 2002 survey by the National Association of Realtors that showed homebuyers rank trails as the second most important community amenity when they compare homes for purchase.

Intersections along Arendell Avenue through downtown do have crosswalks marked, but there are no pedestrian crossing signals incorporated into the intersections. During the public input opportunities for the CTP, many people indicated they would feel safer crossing the street if the crosswalks were more visible. It was mentioned that, as a driver, one does not necessarily expect pedestrians at crossings downtown as people may currently avoid walking downtown due to the volume of trucks and traffic in general.



Map 13: Existing Pedestrian Facilities Downtown

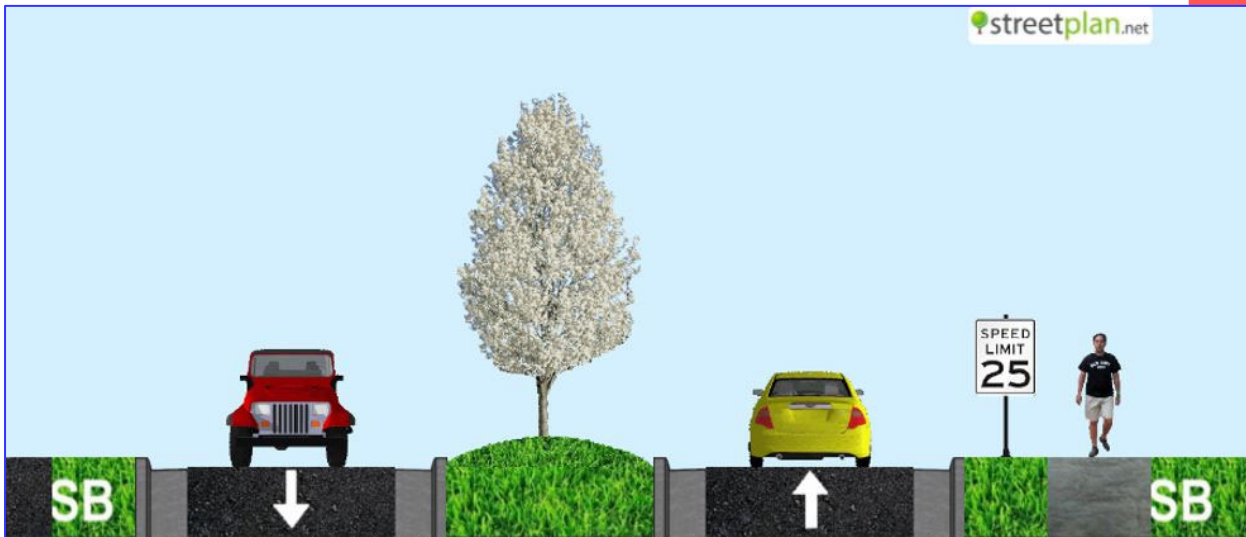
Currently, there are no dedicated on-street bicycle facilities in Zebulon. The Town is progressing with construction of several greenways identified in the Greenway Plan. These greenways and shared use trails can serve Zebulon’s residents by providing bicycle and pedestrian connections throughout the Town that are separate from the roads and streets.

CTP Pedestrian Recommendations

Sidewalks

Section 6.8 of the Grow Zebulon UDO requires sidewalk on both sides of a roadway within several zoning districts, such as residential and mixed-use, as well as along both sides of principal and minor arterial streets regardless of zoning. Some zoning districts, such as industrial uses, may only be required to provide sidewalk along one side of the roadway given it connects to an existing or planned sidewalk facility or, if one does not exist, the sidewalk is to be built on the side least impactful to roadway drainage. The Planning Director may also collect a fee-in-lieu for sidewalks that conflict with other Town, State, or Federal projects.

Pedestrian facilities, such as sidewalks, are captured within the right-of-way designations shown on the CTP map. As discussed in the roadway chapter, by simplifying the identification of improvements to two right-of-way widths, Town staff reserve the capability to determine what infrastructure is the most reasonable and logical for each segment. Best practice would support continuation of immediately adjacent pedestrian facilities to the extent reasonable. By identifying the requirement for pedestrian accommodations but not specific cross-sections, planning staff have the flexibility to adapt to known or unforeseen issues when improving corridors such as restricted right-of-way due to a natural element.



SOURCE: streeplan.net. Example Cross-Section for Restricted 50' ROW Condition



SOURCE: streeplan.net. Example Cross-Section for 80' ROW Condition

Other Pedestrian Infrastructure

To promote and enhance a vibrant downtown that attracts shops, restaurants, and businesses, residents and visitors need to feel safe and comfortable when walking around downtown. The revitalization happening in downtown Zebulon is a prime opportunity to explore and implement supplemental infrastructure to create that safe and comfortable walking environment. Not only can these items help retain 'what makes Zebulon, Zebulon' as was shared frequently in public input sessions, but also many have a practical application that improve pedestrian experiences.

Creating higher visibility crosswalks, either at intersections or mid-block crossings, brings a greater focus to pedestrian activities and movements in a downtown area. Projects such as stamped crosswalks draw attention to the crossings, can be decorative in a manner that supports the local character, and serve as a visual traffic calming device for drivers. High visibility crosswalks are a good choice for downtown Zebulon given the vehicular traffic volumes and that Arendell Avenue is a NC route (NC 96), both of which do not lend themselves to raised crosswalks or intersections. Pedestrian countdown heads at signalized intersections, as well as ADA compliant ramps will improve accessibility.



SOURCE www.patternpaving.com. Stamped and Colored Crosswalk





SOURCE www.fhwa.dot.gov. Bulb-Out Example

Another option for downtown, especially along Arendell Avenue, may be the creation of 'bulb-outs' at pedestrian crossings. Bulb-outs extend the sidewalk facility into the roadway to shorten the crossing that exposes pedestrians to vehicular traffic. This can be especially useful for roadways with on-street parking as pedestrians are less likely to dart out from between parked cars unexpectedly if there is a designated, highly visible crossing available.

Raised crosswalks may work best for pedestrian crossings on the roadways surrounding Arendell Avenue downtown or for new developments and key locations, such as schools. Drivers must slow to traverse the crosswalk and will have a heightened sense of awareness for pedestrian activity due to this change in driving. For locations that are expected to

have high pedestrian volumes across a roadway with a high traffic volume, or where additional safety precautions are desired, a High Intensity Activated Crosswalk (HAWK) beacon can be installed. A HAWK is a traffic signal that stops traffic along a main route, with a red light similar to a typical traffic signal, allowing pedestrians to cross a wide or heavily traveled roadway.

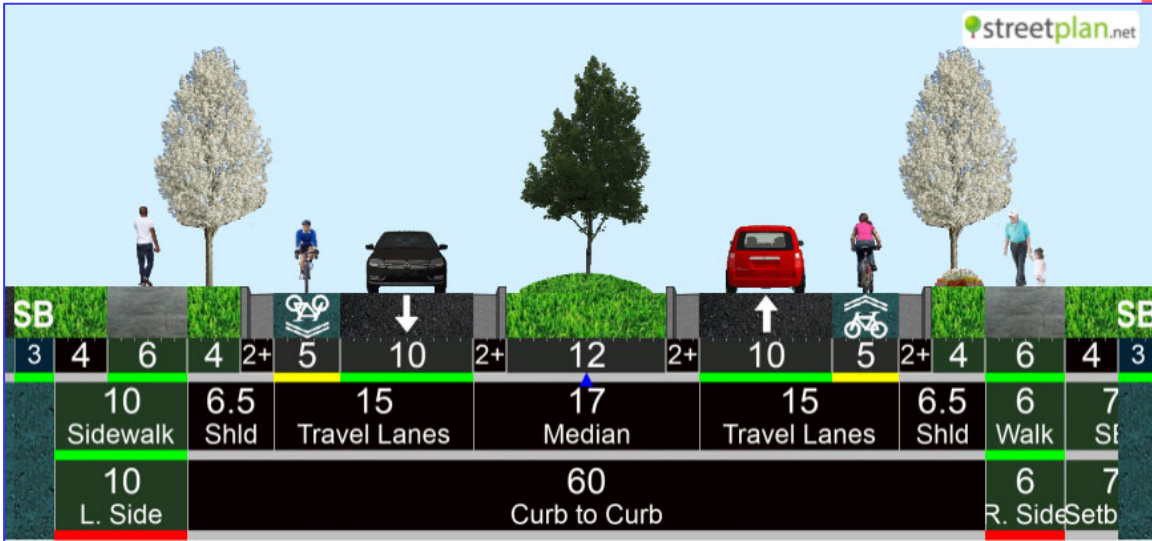
CTP Bicycle Recommendations

There are several options for creating a network of safe and accessible facilities to ride bikes that goes beyond greenways. Infrastructure including bike lanes, paved shoulders, wide outside lanes or shared lane markings known as sharrows, and bicycle route signs. These changes may occur on the street pavement, within the street right-of-way, or along public utility easements (greenways, mentioned in the pedestrian section, are typically built along utility easements).



SOURCE www.craftontull.com. HAWK Beacon

Per Section 5.3.2 Mixed-use Design Standards of the Grown Zebulon UDO, bicycle lanes are required on newly constructed roadways for mixed-use developments. These bike lanes must comply with NCDOT design standards. Beyond the UDO requirements for new roadways, consideration should be given to opportunities for the installation of sharrows along low volume roadways to key destinations and leveraging roadway resurfacing operations, as funding permits, to create wider lanes or a paved shoulder to accommodate bicycle traffic.



SOURCE *streetplan.net*. Cross-Section with dedicated bike lanes and 80' ROW.

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ZEBULON TOMORROW

Transit

Element



Introduction

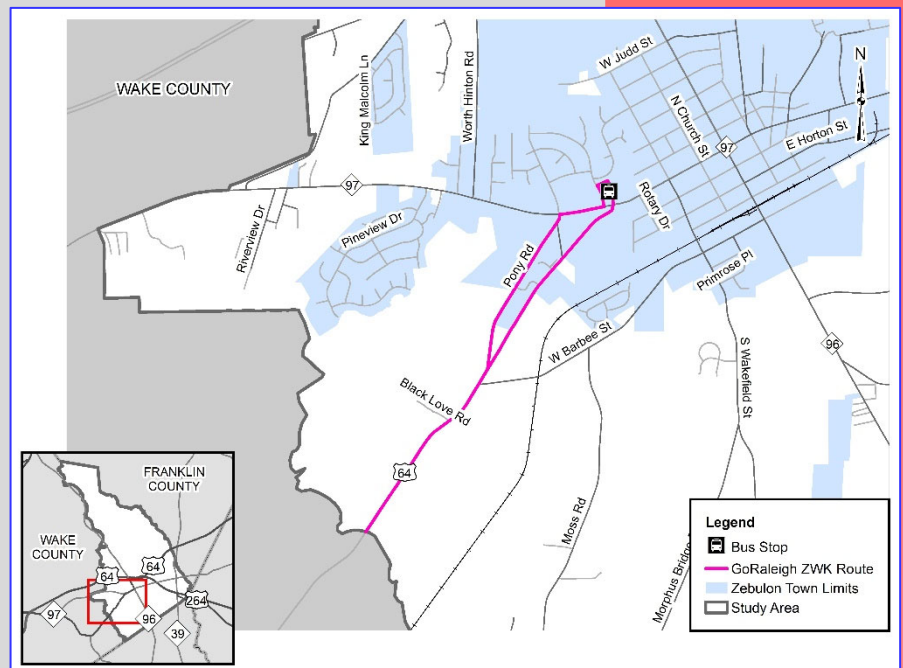
This chapter documents the recommendations and considerations that may be taken when planning a transit program for the Town of Zebulon. Currently, there is not a local public transit option available within the Town of Zebulon. Based on feedback from Town staff and residents, there is a desire to introduce a local public transit route to the Town. Regional transit options are provided to Zebulon, with a GoTriangle park-and-ride bus stop located off Stratford Drive near W. Gannon Avenue, but service is not provided around the Town or to nearby points of interest.

Existing Conditions

As part of the regional GoTriangle transit services, GoRaleigh operates an express bus service from Zebulon to Raleigh Monday through Friday. The Zebulon Park-and-Ride lot is located off Stratford Drive on W. Gannon Avenue. The Park-and-Ride lot is served by the Zebulon-Wendell-Raleigh Express (ZWK) route which services regional destination points along US 64/264, including the neighboring Town of Wendell. The park-and-ride is served hourly between 6 AM and 8 AM and again from 5 PM to 7 PM during a typical weekday. Refer to Map 14 for the GoRaleigh ZWK Route.

The existing transit service is primarily intended to provide transit for riders who are going to and coming from the Raleigh area and provides minimal stops to decrease travel time. The final stop at the GoRaleigh Station on Blount Street, located across from Moore Square in downtown Raleigh, can be used as a transfer point to additional transit routes that reach as far as Wake Forest, Mebane, and Holly Springs.

Additional information can be found on the GoTriangle website, under information for route #ZWK: Zebulon-Wendell-Raleigh Express.



Map 14: Existing GoRaleigh ZWK Route

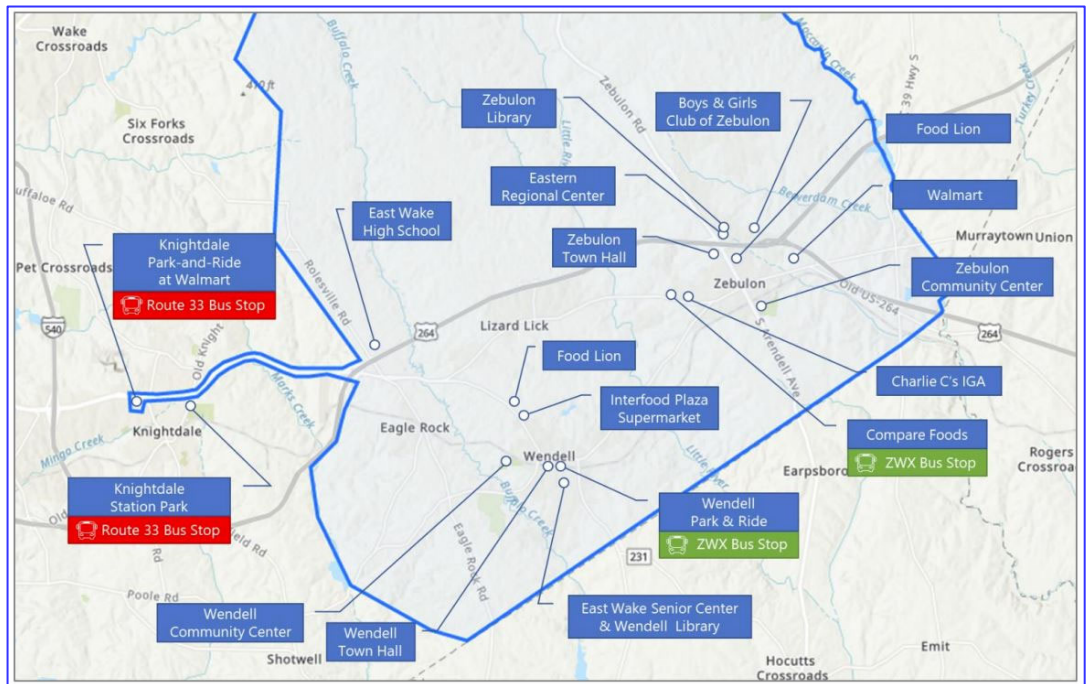
CTP Transit Recommendations

Rural Microtransit Service

GoWake Access is currently in the initial stages of a project to bring microtransit services to the northeastern part of Wake County, including Zebulon, Wendell, and Rolesville. The Northeastern Wake County Rural Microtransit Service Plan was completed in March of 2021 and is now moving into an implementation phase.

Microtransit service is similar to ridesharing services such as Uber and Lyft, in that rides can be scheduled using smartphone applications creating real-time and on-demand service that can go beyond a fixed-route transit service. The plan seeks to provide service within certain georeferenced zones to keep trips and wait times shorter than if servicing larger areas. To improve safety and rider convenience, microtransit service can operate with pick-ups and drop-offs at the nearest corner to destinations. The plan also reflects the desire for local service to operate from approximately 6am or 7am to 7pm or 8pm to provide access for after-school activities (such as at the Boys and Girls Club in Zebulon).

Refer to the figure below from the Northeastern Wake County – NC Rural Microtransit Service Plan to review a portion of the stops that would be anticipated within the Zebulon area with this new service. Microtransit service is slated to begin operating in northeastern Wake County around September of 2021, with a final local decision on continuing the program in March of 2023.



SOURCE: Northeastern Wake County – NC Rural Microtransit Service Plan. Proposed Wake County

Town Circulator Route

The long-term desire for a Zebulon circulator transit route was received through input during the CTP process. Additionally, an extension of the existing transit route from the park-and-ride to the Eastern Regional Center on Arendell Avenue north of US 64/264 was discussed and is also included in the CAMPO Northeast Area Study (NEAS) that is being completed for the area. By providing a local bus route, residents will be able to use public transit to travel from home to several local

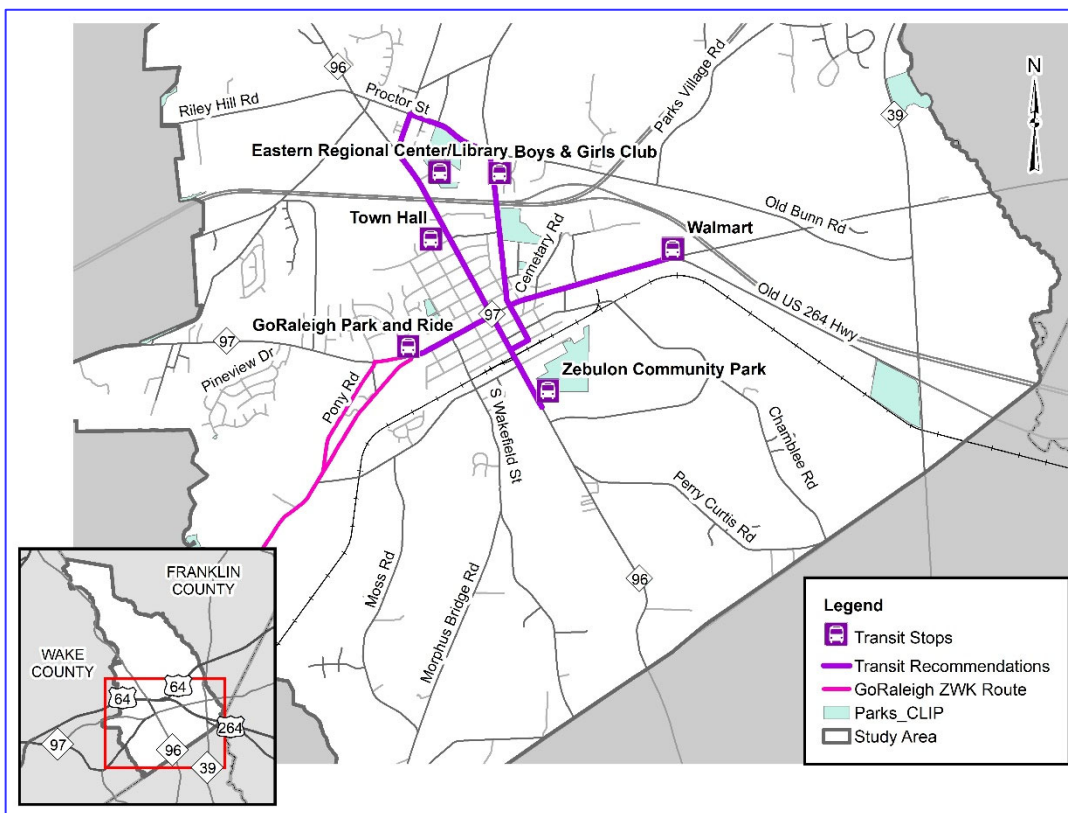
destination points. A local bus route would provide transportation to individuals who rely on transit and may not have another method of traveling around the Town to complete daily tasks.

With the implementation of microtransit service in northeastern Wake County, a Town circulator route may provide overlapping service. This service can be revisited once a decision on the continuation of the microtransit service has been made as anticipated in 2023.

Additional Transit Service

In general, a transit route is recommended to travel along roadways that would have sidewalks to provide a safe space for pedestrians to reach the bus stops. Bus signs should be installed at each location, and consideration for benches, trash cans, and covered shelters should also be taken at the stop locations. Bus stop locations can also have signs installed to inform riders of the bus schedule.

Recommended circulator stops are depicted in Map 15. The stops shown on the map are major points of interest for residents who may not have means of traveling around the Town. These include popular destinations such as Town Hall, the Boys and Girls Club, Walmart, and the Eastern Regional Center. When implementing the future transit program, careful consideration should be given to the safe location of bus stops. Stops should be oriented to provide convenient access to public facilities, but not so frequently that travel times are sacrificed.



Map 15: Recommended Transit Circulator Route

Should the microtransit service continue beyond the final phase of GoWake Access's project, Zebulon could consider a trolley or town circulator that focuses on promoting the small-town charm and sense of community by using a more stylized vehicle(s). This could be done with a vehicle similar to the Raleigh Trolley, which is used for historic tours in the City of Raleigh.



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ZEBULON TOMORROW

Plan Implementation



Implementation

Zebulon is dedicated to creating a robust transportation system that aligns with land uses and supports the safe and efficient movement of people and goods. Zebulon also recognizes that regional and state funding for transportation improvement projects will likely be difficult to obtain in the future due to competing needs with municipalities such as Raleigh, Cary, Wake Forest, and Apex. As a result, the Town has made a conscious effort to capitalize on the significant growth and development interest in and around Zebulon with the development of this CTP. This document gives the Town the ability to require transportation network improvements or other dedications from developers to ensure the network keeps pace to support the Town's needs and wants.

The following methods are several options to implement transportation infrastructure improvements, several of which the Town is currently practicing and should continue to do so:


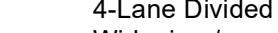

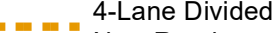

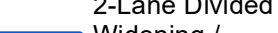



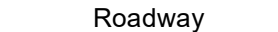

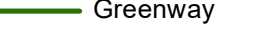

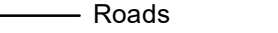

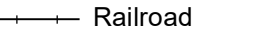

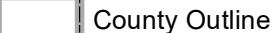
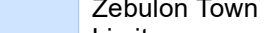


1. Meet with potential developers and review the CTP map to determine the required right-of-way and cross-section requirements for a particular site early in the development process.
2. Require the construction of half of the roadway cross-section, including bicycle and pedestrian facilities, within the road frontage limits of the proposed development.
3. Require a traffic impact analysis (TIA) in accordance with the UDO to identify offsite improvement opportunities that may be caused by development. Attention should be given to the priority intersections identified on the CTP map.
4. Leverage fee-in-lieu payments in accordance with the UDO, if necessary.
5. Have operational and connectivity analyses completed for the priority intersections, or hot spots, to better position the Town for funding that may become available.

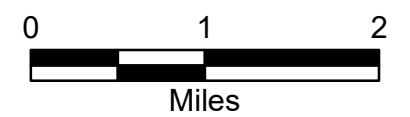
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TOWN OF ZEBULON
2045 COMPREHENSIVE
TRANSPORTATION PLAN

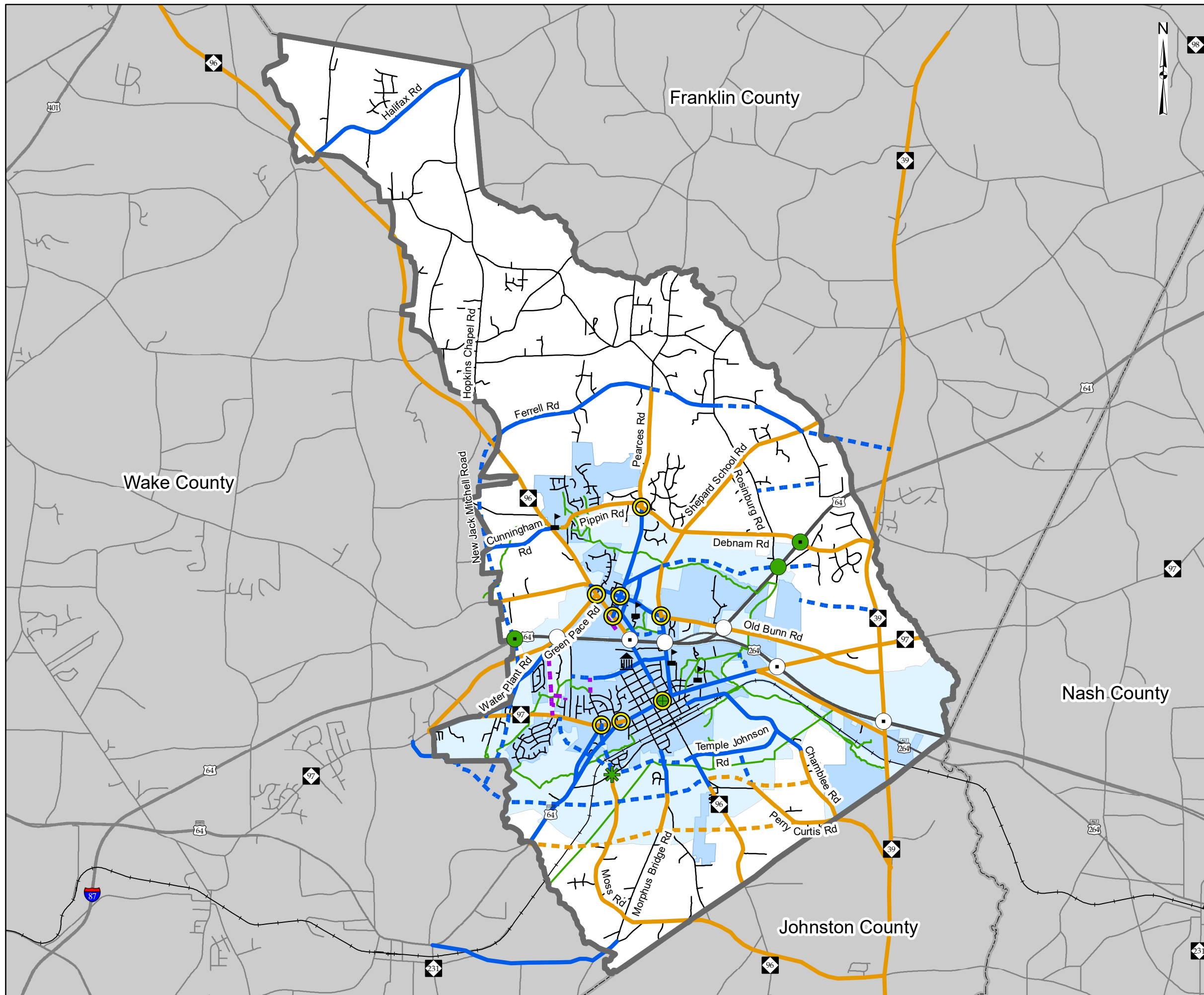
CTP MAP

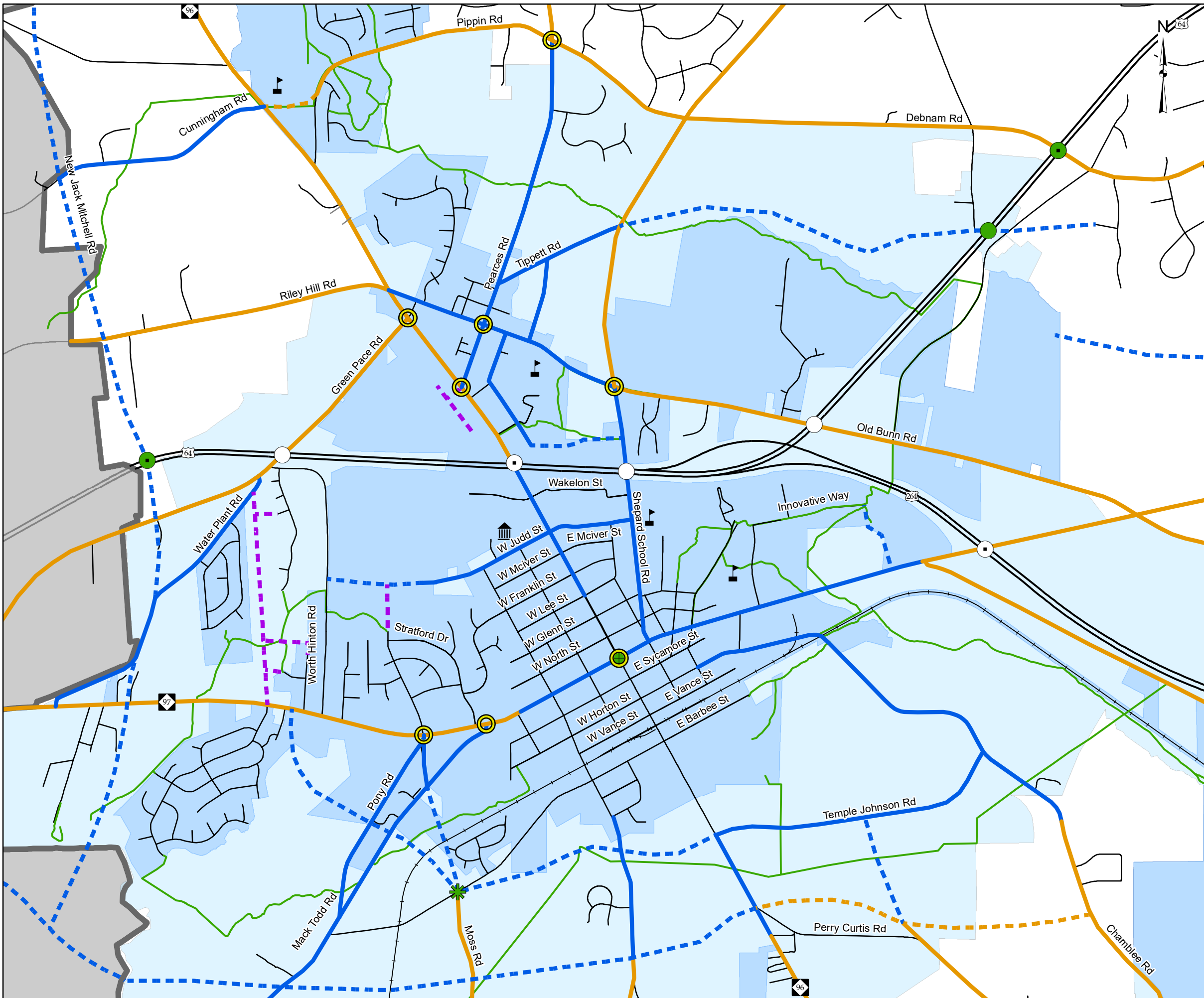
LEGEND

- | | | | |
|---|-------------------------------|---|------------------------------------|
|  | Town Hall |  | 4-Lane Divided Widening / Altering |
|  | School |  | 4-Lane Divided New Roadway |
|  | New Grade Separation |  | 2-Lane Divided Widening / Altering |
|  | New Interchange |  | 2-Lane Divided New Roadway |
|  | New Roundabout |  | 2-Lane Undivided New Roadway |
|  | Intersection Improvements |  | Greenway |
|  | Existing Interchange |  | Roads |
|  | Existing Grade Separation |  | Railroad |
|  | Priority Intersection |  | County Outline |
|  | Zebulon Town Limits |  | CTP Study Area |
|  | Extraterritorial Jurisdiction | | |



Base Map: November 2020





TOWN OF ZEBULON
2045 COMPREHENSIVE
TRANSPORTATION PLAN

CTP MAP - DOWNTOWN DETAIL

LEGEND

	Town Hall		4-Lane Divided Widening / Altering
	School		4-Lane Divided New Roadway
	New Grade Separation		2-Lane Divided Widening / Altering
	New Interchange		2-Lane Divided New Roadway
	New Roundabout		2-Lane Undivided New Roadway
	Intersection Improvements		Greenway
	Existing Interchange		Roads
	Existing Grade Separation		Railroad
	Priority Intersection		County Outline
	Zebulon Town Limits		CTP Study Area
	Extraterritorial Jurisdiction		



Base Map: November 2020



Appendix



Table 7: Volume and Capacity Tables

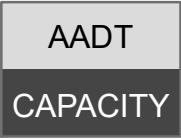






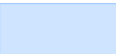
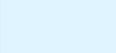


Road Name	Existing Capacity	Existing AADT	Future 2045 AADT
US 264 ALT	14,600	3,000	4,300
Baker Road	14,600	400	800
Barbee Street	12,200	1,900	3,300
Billy Hopkins Road	14,600	n/a	n/a
Chamblee Road	12,200	600	600
Country Club Road	14,600	700	1,900
Denab Road	14,600	1,100	2,300
Dukes Lake Road	14,600	1,300	3,000
Earpsboro Road	12,200	900	1,400
Ferrell Road	12,200	n/a	1,500
Fowler Road	10,200	900	1,700
Gay Road	14,600	n/a	n/a
Green Pace Road	14,600	3,100	6,000
Hopkins Chapel Road	14,600	1,700	4,800
Horton Street	12,200	900	1,000
Hospital Road	n/a	n/a	1,600
Judd Street	10,200	n/a	n/a
Lockleair Road	14,600	n/a	n/a
Mack Todd Road	14,600	7,000	17,100
Martin Road	14,600	600	900
Mitchell Town Road	14,600	500	400
Morphus Bridge Road	12,700	2,900	4,300
Moss Road	14,600	n/a	n/a
NC 39	14,600	8,500	13,800
NC 96	26,000	23,000	40,000
NC 96 Bypass	n/a	n/a	7,400
NC 97	14,600	13,500	34,700
Oakley Road	14,600	n/a	1,600
Old Bunn Road	14,600	6,300	40,700
Old Halifax Road	14,600	1,700	2,200
Pearces Road	12,200	5,400	7,200
Perry Curtis Road	14,600	n/a	900
Pippin Road	14,600	1,400	1,600
Proctor Street	10,200	2,900	6,700

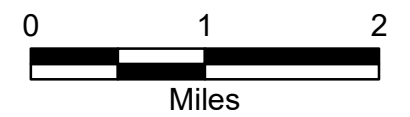
Road Name	Existing Capacity	Existing AADT	Future 2045 AADT
Riley Hill Road	14,600	2,100	38,800
Shepard School Connector	n/a	n/a	2,400
Shepard School Road	14,600	7,400	12,800
St Johns Church Road	14,600	300	800
US 264	119,800	51,000	87,700
US 64 / 264	59,900	59,400	97,600
US 64	58,500	30,000	49,000
Vance Street	11,600	n/a	n/a
Wakefield Street	12,200	4,100	4,000
Whitely Street	10,200	n/a	n/a
Williams White Road	14,600	1,200	1,900

TOWN OF ZEBULON
2045 COMPREHENSIVE
TRANSPORTATION PLAN

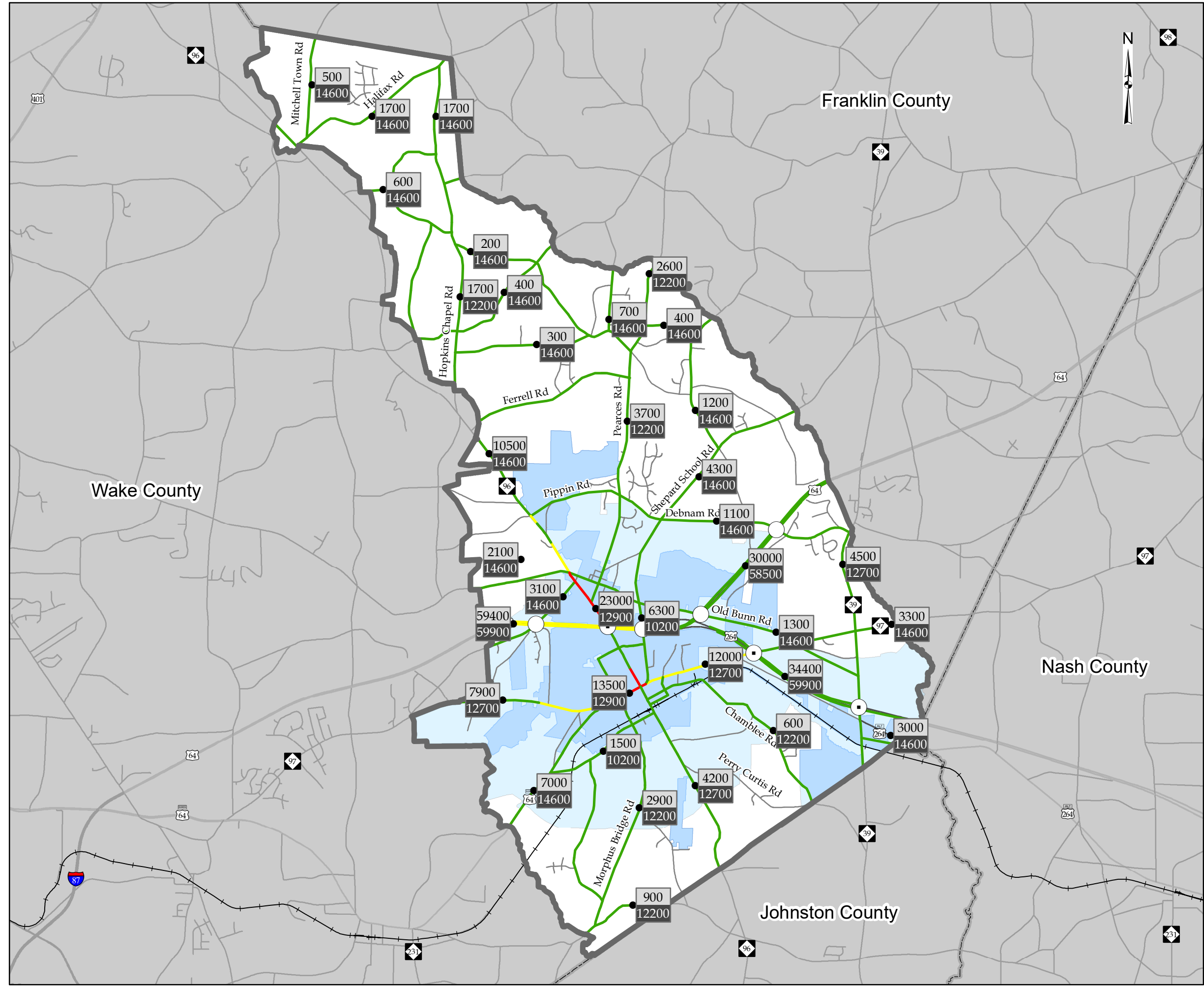
EXISTING (2018-2019)
ROADWAY DEFICIENCY MAP

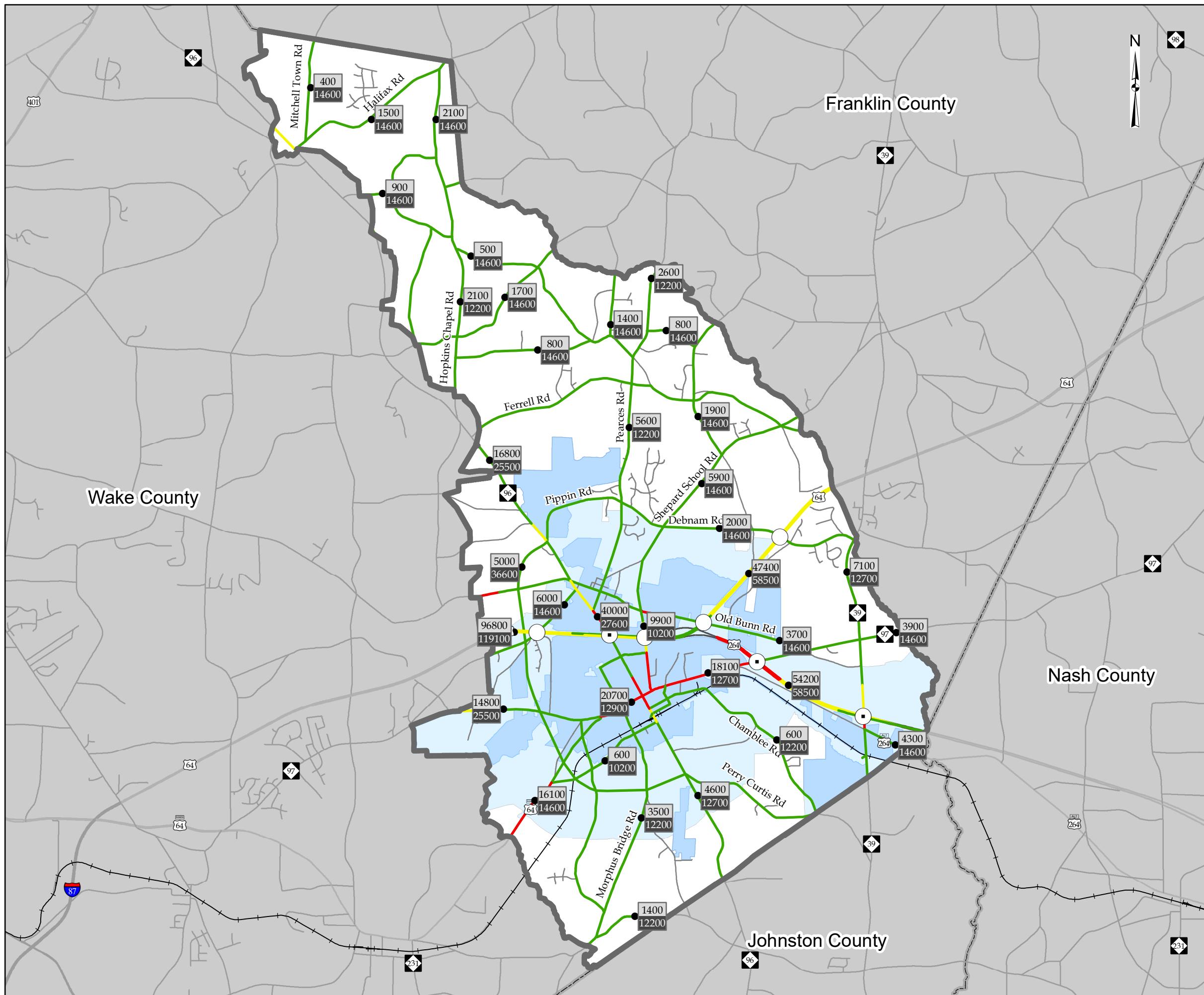
LEGEND

-  AADT
CAPACITY
-  Over Capacity
-  Approaching Capacity
-  Under Capacity
-  NO DATA
-  Existing Interchange
-  Existing Grade Separation
-  Zebulon Town Limits
-  Extraterritorial Jurisdiction
-  County Outline
-  CTP Study Area



Base Map: November 2020





TOWN OF ZEBULON
2045 COMPREHENSIVE
TRANSPORTATION PLAN

FUTURE (2045)
ROADWAY DEFICIENCY MAP

LEGEND

- AADT
- CAPACITY
- Over Capacity
- Approaching Capacity
- Under Capacity
- NO DATA
- Existing Interchange
- Existing Grade Separation
- Zebulon Town Limits
- Extraterritorial Jurisdiction
- County Outline
- CTP Study Area

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Miles

Base Map: November 2020

