NC 50 CORRIDOR STUDY

PROJECT WORKBOOK

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Prepared For:

North Carolina Capital Area Metropolitan Planning Organization

In Coordination With:

Town of Butner, North Carolina

City of Creedmoor, Granville County, North Carolina

The County of Granville, 1746, North Carolina

State of North Carolina, Department of Transportation

Wake County, North Carolina

Acknowledgements

Development of the *NC 50 Corridor Study* was a collaborative process that involved numerous stakeholders, including the Oversight Committee, Town of Butner, City of Creedmoor, Granville County, Wake County and North Carolina Department of Transportation staff, and the Capital Area Metropolitan Planning Organization (CAMPO). The general public also provided input for this plan at various public workshops. All of their efforts are greatly appreciated.

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NC 50 CORRIDOR STUDY

CHAPTER 1 - INTRODUCTION

NC 50 is a two-lane, regionally significant corridor that serves growing suburban residential populations around I-540 in North Raleigh and in southern Granville County near the City of Creedmoor. NC 50 serves as a spine road for regional travel as well as the Main Street for the City of Creedmoor. Plans always have assumed widening NC 50 but without indicating how or when the improvement would occur. Recent growth trends show the area is an emerging growth corridor with increased traffic volumes on the horizon. Yet most of the area lies within the Falls Lake Watershed, the largest water supply reservoir for the Raleigh metropolitan area, and new watershed regulations are pending. Granville County remains the only contiguous county not connected to Wake County and Raleigh by a multi-lane road.

With the support of the NC Capital Area Metropolitan Planning Organization (CAMPO) and the North Carolina Department of Transportation (NCDOT), the comprehensive NC 50 Corridor Study provides an answer to the following questions:

- Does the current NC 50 facility need improvement? If so, what improvements should be made in the short-term and where should these improvements occur?
- What's the long-term vision for the corridor?
- How will the new Falls Lake Watershed requirements impact future growth patterns and roadway design?
- Are other strategies available to reduce reliance on the NC 50 corridor by providing transportation choices?
- How can proposed improvements enhance quality of life and economic vitality?

Generally, this study identifies short-term needs and creates a long-term strategy for all travel modes using the roadway. However, early investigation revealed that an innovative project approach that balances the competing interests of land use, the environment, and transportation would be required. In fact, this study embraces the tenets of Context Sensitive Solutions (CSS) — a process that encourages the roadway design to be responsive to the context through which the roadway passes. When considering the study area using a CSS approach, four distinct context zones appear each requiring unique design treatments. Simply stated, a one size fits all approach is not the right strategy for the approximately 15-mile corridor.

This study does NOT indicate that immediate improvements are pending. In fact, this study represents the first step at developing a strategy for the corridor prior to the creation of any detailed design plans, funding, environmental permitting, or construction. The study provided a forum for collaborative decision making and involvement by all interested stakeholders. Participants were reminded that, "in the absence of a plan, someone else will make decisions for you."

Guiding Principles and Vision Statement

One of the most significant products generated during the early phases of the project were the project's Guiding Principles. The Guiding Principles represent a summary of the core philosophy that will guide the NC 50 Corridor Study irrespective of changes in goals, strategies, type of work, or leadership.

Incorporating all of the cumulative input received throughout study process, the Guiding Principles were refined and adopted by the Core Technical Team and the Project Advisory Committee as the following three statements:

- Improve transportation mobility and traffic safety along the corridor.
- Preserve the residential and rural nature of the corridor while supporting regional economic development.
- Support activities to protect recreation, water quality, and the environment in the Falls Lake watershed.

In addition, the project leadership crafted the NC 50 Vision Statement.

It is our responsibility to:

"Create a Plan that enhances the safety, mobility, and appearance of the NC 50 corridor, in a manner that promotes quality development, connectivity and economic vitality, while seeking to protect the environment and cultural heritage of the region."

-NC 50 Vision Statement

Community Values

Several themes continually emerged during the public outreach for the project. These themes were identified as a result of stakeholder interviews, questionnaires, and workshops as well as the project symposium and public design charrette. Though not formalized, these themes also guided recommendations of the study.

1. *The local character and context should influence transportation recommendations.*
2. *Falls Lake and the parks that surround it are a regional resource that should be protected and promoted but also should include enhanced connections to local communities.*
3. *Economic vitality and protecting quality of life are important priorities.*
4. *A long-range multimodal vision for the corridor should be established, but the recommendations should be grounded in reality (able to be funded and implemented).*
5. *Interim strategies that respond to existing traffic safety and operations are needed (but provide improvements that don't preclude implementation of the long-term vision).*
6. *Environmentally sensitive areas and areas of historic or cultural significance are valuable assets to the community and should be protected.*
7. *New growth should reflect the desire for quality development that is responsive to infrastructure availability, new watershed regulations, and a high quality of life.*

Corridor Limits and Study Area

This study covers the NC 50 corridor from I-540 in Wake County to NC 56 in downtown Creedmoor, a distance of approximately 15 miles. In addition, a broader study area that represents the area of influence was identified and extends west to the Durham County line (including Butner, Stem, and the I-85 corridor); north to the Tar River; east to Falls Lake; and south to I-540. This larger study area can be seen in the resource mapping contained in Chapter 3. In total, more than 105,000 acres are included in the study area with specific boundaries set by the limits of adjacent traffic analysis zones.

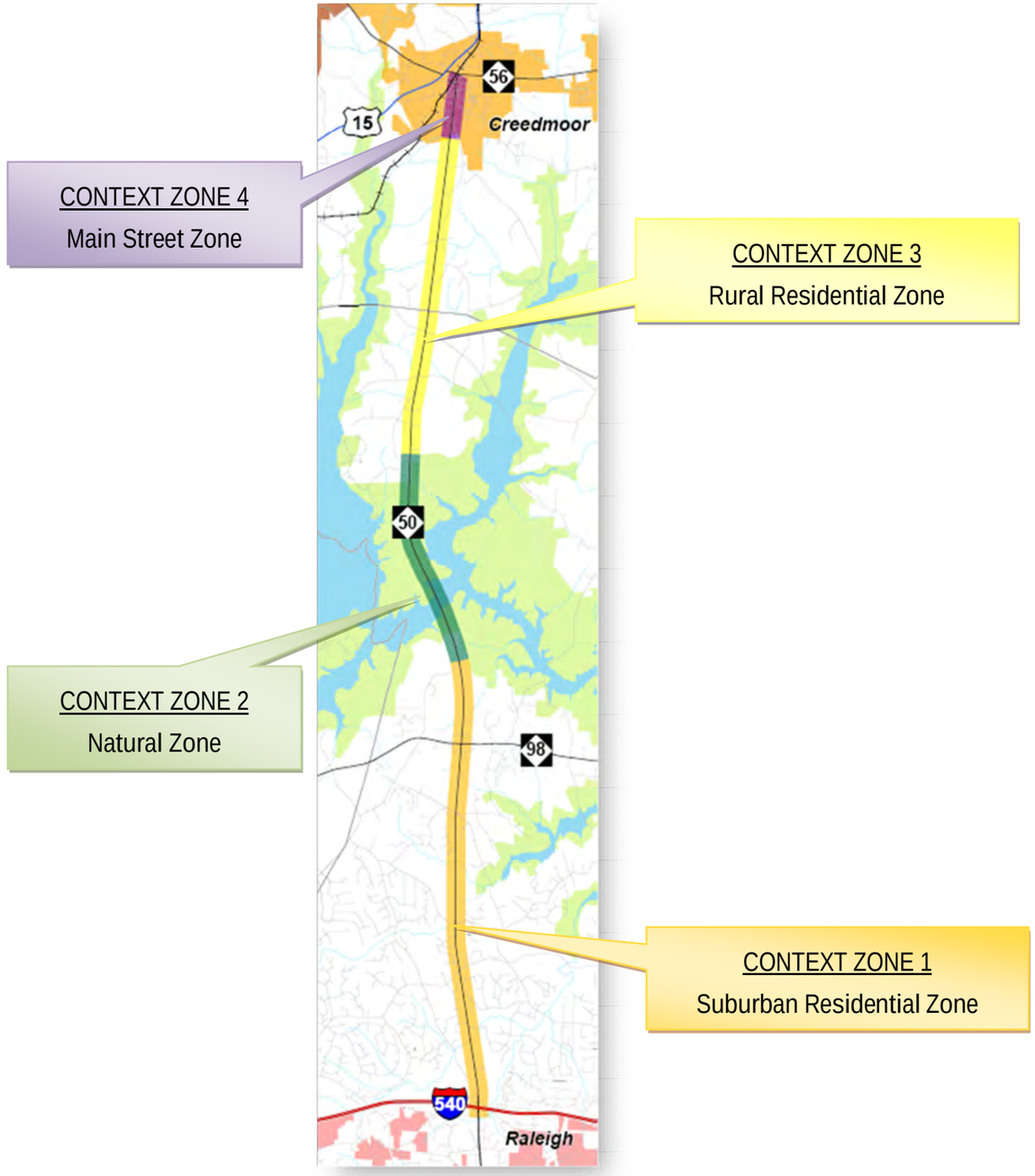
Context Zones

A review of traffic volumes, land use, and general character suggests the 15-mile corridor be considered in four separate zones. This Context Sensitive Solutions (CSS) approach to planning requires each segment be considered for recommendations that respond to the unique character of each zone. From south to north, the four context zones are:

- **Context Zone 1: Suburban Residential Zone**
- **Context Zone 2: Natural Zone**
- **Context Zone 3: Rural Residential Zone**
- **Context Zone 4: Main Street Zone**

Each context zone is described in more detail on the following pages.

"The study process embraces the tenets of Context Sensitive Solutions (CSS) to ensure that the future improvements are responsive to the character of the area through which the roadway passes…"

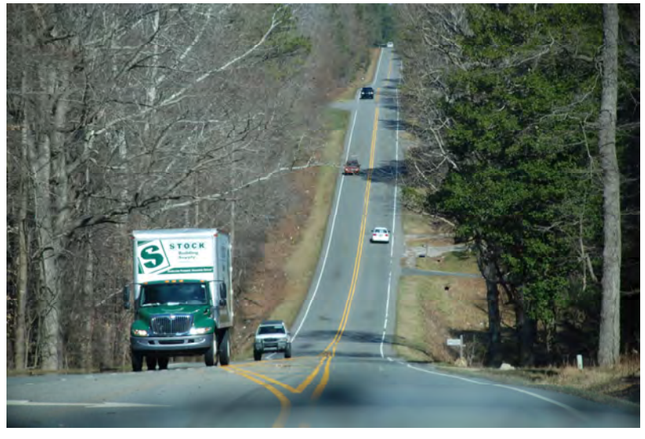


Capital Area MPO

Context Zone 1: Suburban Residential

Context Zone 1 consists of the area from I-540 to Falls Lake State Park (south of the bridge). The area is predominately developed with single family detached subdivisions and suburban scale development all within Wake County's jurisdiction. The majority of this area is developed or has land entitled for development consistent with the surrounding area.

CONTEXT ZONE 1
Suburban Residential Zone



Capital Area MPO

Context Zone 2: Natural Zone

Context Zone 2 spans the entirety of the Fall Lake State Park property frontage including the bridge crossing the lake. The only cross-streets in this location provide access to the state park properties. No future development is foreseen in this area and the land likely will remain in its natural state.

CONTEXT ZONE 2
Natural Zone

Capital Area MPO

Context Zone 3: Rural Residential

Context Zone 3 begins at the northern boundary of Falls Lake State Park and continues north to Creedmoor city limits. This zone spans both unincorporated Wake County and Granville County. Properties in this zone primarily are undeveloped, active agriculture, forested, or developed with large lot single-family dwellings. This area also includes the Granville County Soil and Water Conservation District.

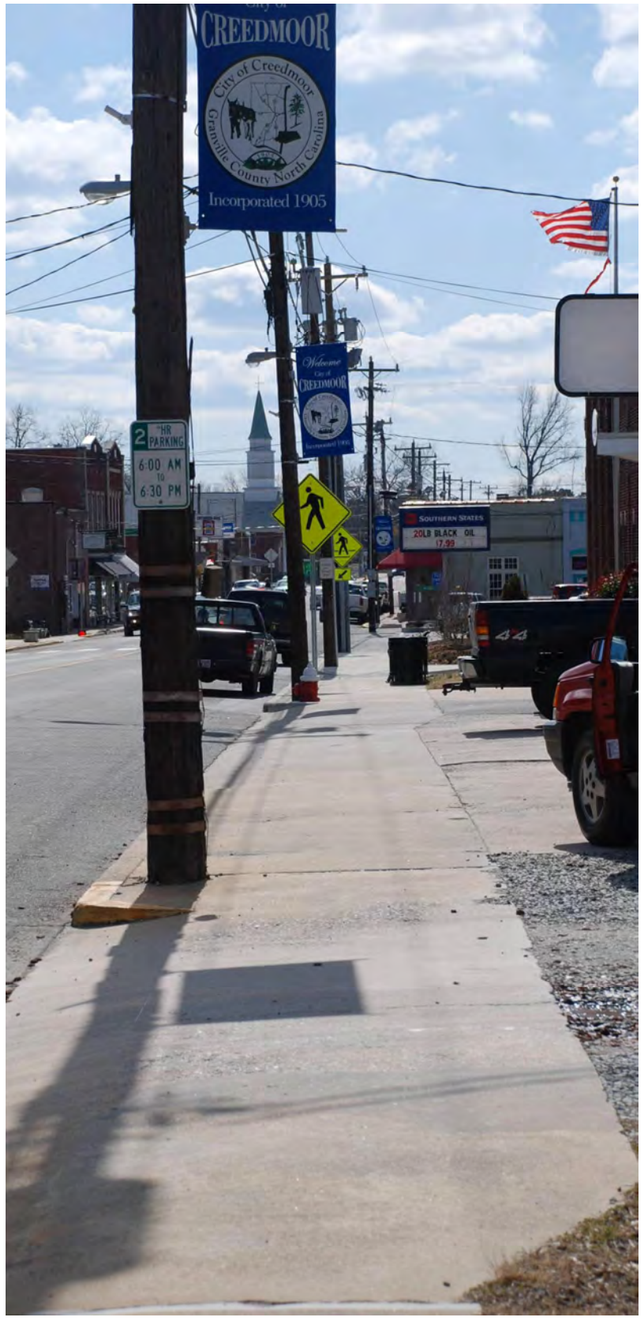
CONTEXT ZONE 3
Rural Residential Zone

Capital Area MPO

Context Zone 4: Main Street

Context Zone 4 begins at Creedmoor city limits and proceeds through downtown, terminating at NC 56. This section includes pedestrian-scale development, sidewalks, and regular block length. This segment of NC 50 is considered Creedmoor's Main Street.

CONTEXT ZONE 4
Main Street Zone



Premises of the Project Workbook

The NC 50 Project Workbook addresses general concerns and specific issues identified during the planning process, especially those issues identified during the project symposium and public design charrette. The Workbook catalogs the planning efforts, outlines the issues, and systematically presents recommendations to achieve the community's vision for the NC 50 corridor. To do this, the workbook evolved based on the following premises.

- The Workbook documents issues and concerns for the study area and provides a series of recommendations based on planning, analysis, and public input.
- The Workbook is not a formal policy document to be presented for adoption.
- The Workbook is organized to provide a visual representation of local issues and specific recommendations to meet the community's needs. The workbook's design takes advantage of sketches, graphics, maps, and diagrams developed during the charrette to effectively convey ideas when text falls short.

Workbook Components

The NC 50 Corridor Study addresses transportation, land use, economic vitality, and water quality within the study area. The components of the workbook are described in the following subsections.

Process and Framework

Following this introductory chapter, the workbook presents a brief overview of the planning process and preliminary study area evaluation that forms the foundation of the issues and recommendations presented later in the workbook.

Planning Process: Intense collaboration provided the essence of a planning process tailored to the unique dynamics of the study area. The planning process is summarized here with a focus on the project symposium and public design charrette.

Resource Maps: The actions and recommendations of the study are rooted in a comprehensive evaluation of the area. An overview of this evaluation is presented here in the form of various resource maps.

Issues and Recommendations

The issues and recommendations are presented according to one of ten interrelated elements. Given the overlap between the elements, some repetition is expected. All issues identified and recommendations developed as part of the NC 50 Corridor Study are assessed in terms of the guiding principles and community values.

Scenario Planning: Represents an evaluation of different development scenarios, the inherent tradeoffs and relative performance of each scenario. A preferred scenario resulting from the collaboration of planning participants is also summarized.

Water Quality: Roadway improvements promote development which will impact water quality both directly through the construction of the roadway improvements themselves and indirectly through increased rates and density of development. This section describes the impacts to water quality as well as current and recommended strategies for protecting water quality along the corridor.

Traffic & Safety: A systematic evaluation of traffic operations, forecasting and safety was developed to assess the current conditions along the corridor as well as 2030 conditions as reflected in the Regional Travel Demand Model. This analysis of system and capacity deficiencies became the cornerstone of corridor recommendations, including spot safety, access management, intersection treatments and capacity improvement priorities.

Bicycles, Pedestrian & Transit: Transportation means more than moving vehicles north-south along the corridor. Effective transportation balances the needs of all users, including bicyclists, pedestrians, and transit users in addition to motorists. This section sets forth strategies for improving multimodal transportation mobility and safety along the corridor.

Roadway Design: The corridor design concepts capsulate the context sensitive solution approach to corridor improvements. Design features were created based on safety and capacity deficiencies while adhering to the environmental issues and challenges through the 15-mile corridor. The treatment of the roadway improvements are based on need and context, while limiting the impacts to water quality, scenic vistas and existing development.

Place-Making: Place-making creates more livable communities, identifiable character, and a higher quality of life by celebrating the uniqueness of a community. Place-making issues and recommendations, such as branding and image, building architecture, site design, billboards, and franchise architecture, are presented here.

Focus Areas: Focus area studies evaluate the relationship between land use, urban design, and transportation using the principles of urban form. Two focus areas provide study-in-detail recommendations for diverse activity centers. Recommendations include market realistic development programs and illustrative master plans that support catalyst projects in the study area.

Inviting Success

The planning process has generated considerable interest in creating a desirable and sustainable future for the NC 50 corridor. This planning process was developed with implementation in mind, and many individuals have shown interest in seeing it through to implementation. Inviting Success sends out a charge for these active citizens as well as key staff members to champion the recommendations of the study.

Workbook Structure

The NC 50 Corridor Study presents a context sensitive approach to transportation, land use, and urban design in northern Wake and southern Granville County. This new approach balances the competing interests of these disciplines with the evolution of the public planning process. The Project Workbook presents not only the approach but also a realistic future envisioned for the surrounding area.

The heart of the workbook is the ten elements for which a series of general issues and specific recommendations are presented. The relationships between issues and recommendations may create repetition, but it is in this repetition that overarching themes emerge. Issues and recommendations are presented in a consistent format throughout these chapters. Each chapter begins with a broad summary of existing conditions and an overview of the element's role in the study area. Following the summary, each issue or recommendation uses the same format:

- **Issue** — States the issue concisely
- **Observation** — Summarizes existing conditions as found and highlights particular problems
- **Discussion** — Expands upon the problem statement by identifying causational factors and expressing the problem's impact on the desired outcome for the study area
- **Recommendations** — Puts forth specific directives to mitigate the problem

Where applicable, photos of existing conditions, sketches, diagrams, and maps are used to illustrate existing conditions and/or recommendations.

CHAPTER 2 - PLANNING PROCESS

Need for the Project

NC 50 is a two-lane regionally significant corridor that serves growing suburban residential populations around I-540 in North Raleigh and areas of southern Granville County near Creedmoor. With land development trends and traffic growth expected to continue, local officials will face growing pressure to widen NC 50. But the corridor is located in an area of critical environmental sensitivity, notably the Falls Lake Watershed that serves as the largest water supply reservoir for the Raleigh metropolitan area.

The NC 50 Corridor Study enables the communities to evaluate innovative design concepts and develop context sensitive design solutions for the corridor that balance the competing interests of land use, the environment, and transportation.

Study Area

This study focuses on approximately 15 miles of NC 50 from I-540 in Wake County to NC 56 in Downtown Creedmoor. The planning area was extended to account for external forces impacting land use and transportation decisions within the study area. This area is known as the "area of influence." The area is bounded to the west by the Durham County line including Butner, Stem, and the I-85 corridor; to the north by the Tar River; to the east by Falls Lake; and to the south by I-540. In total more than 105,000 acres are included in the study area.

Planning Process

Transparency and collaboration provided the core strategies for establishing trust among the participants of the planning process. The project team, including elected officials, the consultant team, and other participants in the planning process, began working together early on and continued to do so as the process moved into the design charrette. This continuity resulted in a shared learning environment and timely communication among participants.

Major elements of the planning process included the following.

Project Oversight Committee

The Project Oversight Committee (POC) was established to assist the Capital Area MPO in guiding the planning process. The primary focus of the POC was to steer the project's next steps and identify key public outreach activities. The POC was comprised of a diverse group of professionals including the following:

Aaron Hair – Capital Area Transit
Alissa Bierma – Neuse Riverkeeper
Barry Baker – Granville County Planning
Bob Mosher – NCDOT Division of Bicycle and Pedestrian Planning
Butch Harris – Granville County landowner/resident
Chip Lamphere – NC Homebuilders Association
Darryl Moss – Creedmoor
Doumit Ishak – NCDOT Congestion Management Unit
Helen Chaney – NCDOT Division of Bicycle and Pedestrian Planning
Hubert Gooch – Granville County
Jay Tilley – Granville County Economic Development
Jessica Robinson – Neuse Riverkeeper
Jill Stark – FHWA
Joey Hopkins – NCDOT Division 5
John Hodges-Copple – TJCOG
Ed Johnson – CAMPO
Jonathan Parker – Triangle Transit
Justin Jorgensen – Granville County Planning
Kerry Brubaker – US Army Corps of Engineers
Chris Lukasina – CAMPO
Mark Massengill – NC Homebuilders Association
Melissa Hodges – Butner Planning
Michael Hosey – US Army Corps of Engineers
Mike Ciriello – Kerr-Tar COG
Paul Black – TJCOG
Reid Elmore – NCDOT Division 5, District 1
James Crawford – NC House of Representatives
Rick Seekins – Kerr-Tar COG
Rob Brink – KARTS
Rupal Desai – NCDOT Transportation Planning Branch
Sarah Bruce – Upper Neuse River Basin Association
Scottie Wilkins – Creedmoor Planning
Shelby Powell - CAMPO
Sherry Johnson – Wake Watershed Protection Council
Thomas Freeman – US Army Corps of Engineers
Tim Gardiner – Wake County Planning
Tim Maloney – Wake County Planning
Tom Lane - Butner
Kenneth Withrow - CAMPO

Project Website

Information prepared in support of the NC 50 Corridor Study was made available on the project website (www.NC50TODAY.com). Information posted to the project website included existing conditions materials, upcoming events, documents/maps, related links, and news and updates.

Stakeholder Interviews

The consultant team, in conjunction with the Capital Area MPO, conducted a series of stakeholder interviews. These interviews provided insight into the social, political, and economic issues throughout the study area. In total, interviews with approximately 75 individuals were conducted which included:

- County and Municipal Planning Directors
- Economic Development Commission
- Developers
- Realtors
- Chamber of Commerce

Project Symposium

The consultant team, in conjunction with the Capital Area MPO, conducted a Project Symposium on March 30, 2010. The four-hour symposium introduced the project to local officials, business owners, and other stakeholders; provided an overview of the NC 50 Corridor Study process; identified a project vision; and allowed open discussion about issues, concerns, and potential improvements.

The Project Symposium also included roundtable discussions about key issues including environment and water quality, land use and planning, transportation, and economic development.

Phone Survey

A phone survey was used to capture the thoughts and opinions of commuters with trip origins or destinations located outside the study area. This means of outreach was selected given the unlikelihood of capturing their participation during locally conducted outreach activities. The survey was administered by phone to a random sample of 400 residents who lived in zip codes 27615, 27522, 27509, 27614, 27613, 27565, 27581, 27525, and 27587. A full copy of the phone survey results can be found in Appendix VIII of the Existing Conditions Report.

Questionnaire

An informal questionnaire was created and filled out by all members of the POC to obtain feedback on specific issues related to quality of life, land use, transportation improvements, and desired needs and improvements along the corridor. This questionnaire also was made available to the general public online and at the public workshop. Approximately 120 questionnaires were completed. Responses were incorporated into the recommendations detailed later in the plan.

Public Workshop

A public workshop was held April 1, 2010 from 6 p.m. to 8 p.m. at the Vance/Granville Community College – Southern Campus. Approximately 40 people attended the workshop to view resource maps and data, complete questionnaires, and participate in break-out sessions.

Design Charrette

The corridor design charrette was held August 10th through 12th, 2010, in the Shriners Club at 11101 Creedmoor Road. A design charrette provides an intensive workshop environment in which planning and design ideas are generated, filtered, and discussed openly by participants. A multi-disciplinary team of community planners, landscape architects, transportation planners, transportation engineers, and environmental engineers was assembled for the event. Locating the charrette design studio on the corridor allowed public access for more than 12 hours a day, infusing public participation and the community's direct involvement into the decision-making process. The on-site location also provided easy access to agencies, stakeholders, and information and allowed the project team to quickly assess existing conditions and changing dynamics along the NC 50 corridor.

The consultant team worked together with citizens and stakeholders to build consensus for a vision that would accommodate future growth in the study area while considering land use and the environment. Over the course of the three-day charrette, more than 100 participants visited the temporary charrette studio to watch the design team in action, take part in focus group meetings, offer feedback, and put forward their vision for the project. Many of the participants joined the project team for multiple sessions.

A pin-up session was held every evening during which the consultant team pinned up the day's drawings and discussion notes to make them available for public feedback and criticism. As a result of these pin-up sessions, the design team received valuable feedback that led to the approval, refinement, or rejection of various concepts being contemplated for the study area. The short feedback loop allowed the team to make changes on the fly to the general themes and specific recommendations.

A final presentation that recapped the week was presented at a Public Open House the evening of August 12th.

US 50 CORRIDOR STUDY

CHAPTER 3 - RESOURCE MAPS

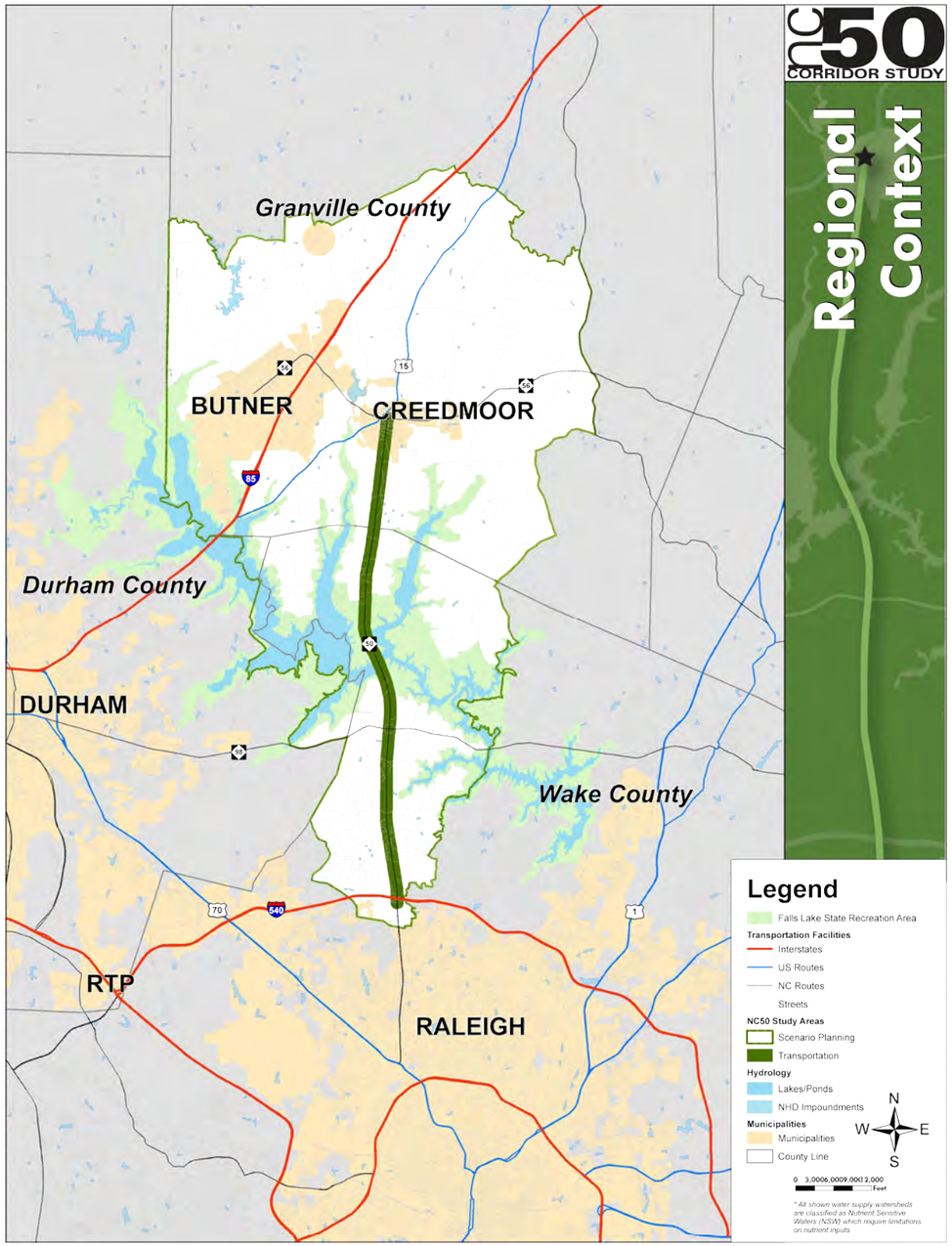
Before the corridor design charrette, the consultant team completed a comprehensive evaluation of the study area. This evaluation included a review of existing plans and policies, interviews with local staff and key stakeholders, and focus group meetings. The collection and review of available data was used to create a series of resource maps to illustrate existing conditions and serve as the foundation for the recommendations described later in this workbook.

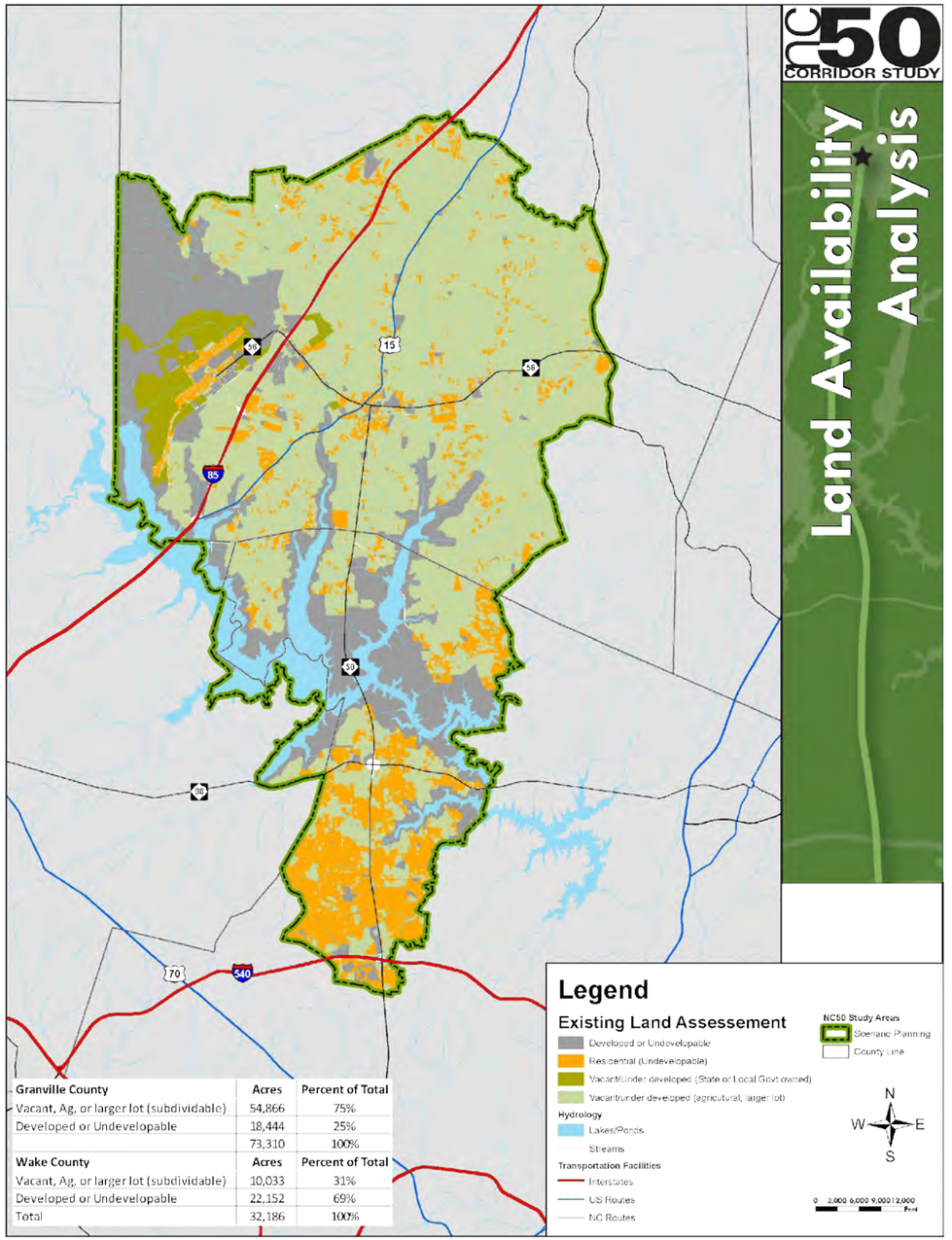
Regional Context

The Regional Context map illustrates the location of the study area within the larger community. The areas surrounding the study area significantly influence land use and transportation decisions within the study area.

Land Availability Analysis

The Land Availability map reveals the land available for development and redevelopment in the study area. In Granville County, 75% of the land is vacant or underdeveloped whereas in Wake County only 31% of land is developable. In total, slightly less than 65,000 acres of land are developable in the study area.





Granville County	Acres	Percent of Total
Vacant, Ag, or larger lot (subdividable)	54,866	75%
Developed or Undevelopable	18,444	25%
	73,310	100%
Wake County	**Acres**	**Percent of Total**
Vacant, Ag, or larger lot (subdividable)	10,033	31%
Developed or Undevelopable	22,152	69%
Total	32,186	100%

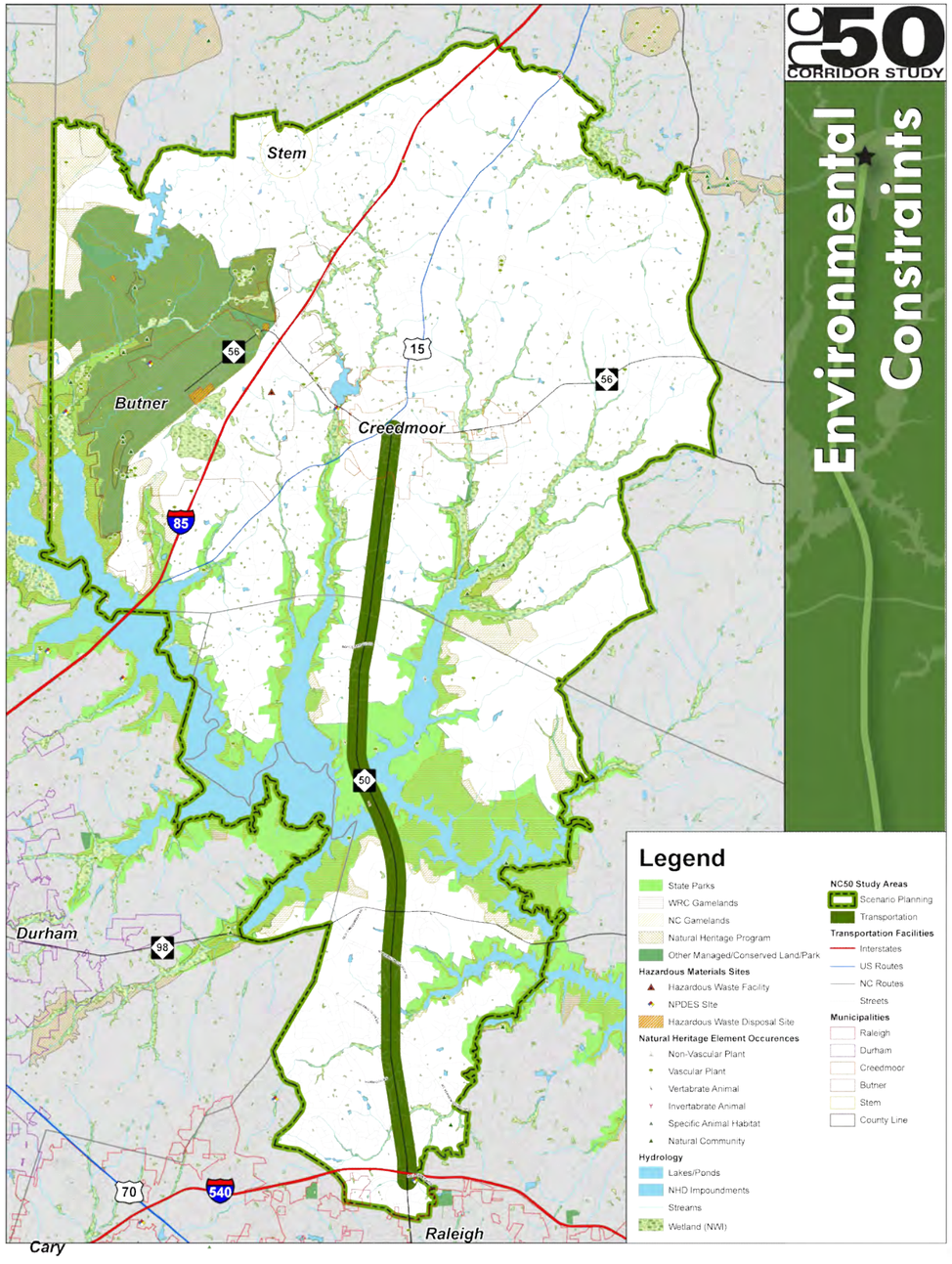
Environmental Constraints

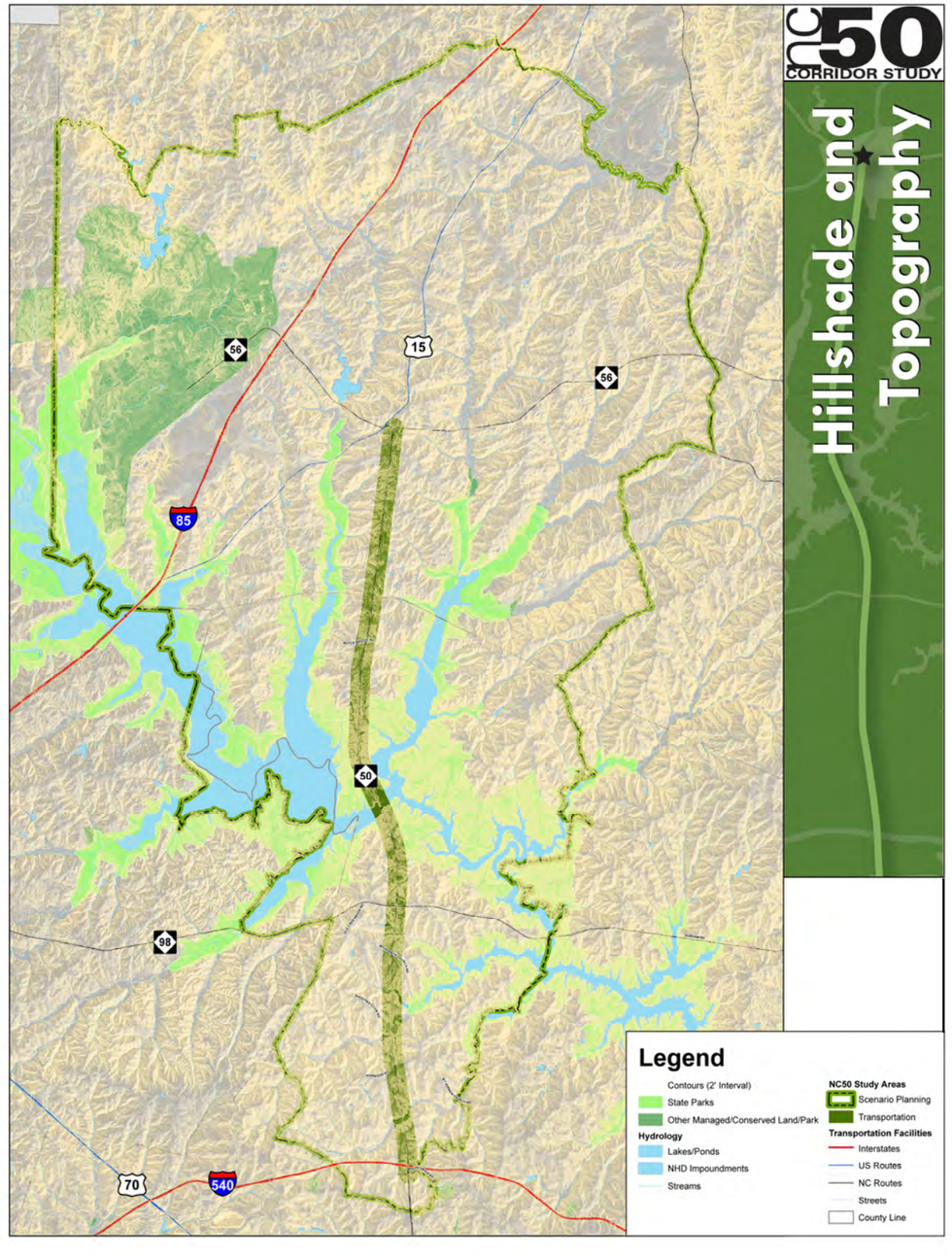
Environmental Constraints includes the interconnected network of blue and green infrastructure that help define the environmental cohesiveness of the community. Environmental features include lakes, streams, parks, gamelands, wetlands, and lands held in permanent conservation.

Conservation of these areas help to naturally manage stormwater, improve water quality, reduce flooding, diversify plant and aquatic life, balance the physical and visual impacts of development, and increase opportunities for recreation in the study area.

Hillshade and Topography

The NC 50 corridor is characterized by rolling topography as shown in the Hillshade and Topography Map. Design plans must account for terrain issues as they relate to cut and fill requirements, blind intersections, and impact on truck traffic. Topography also effects



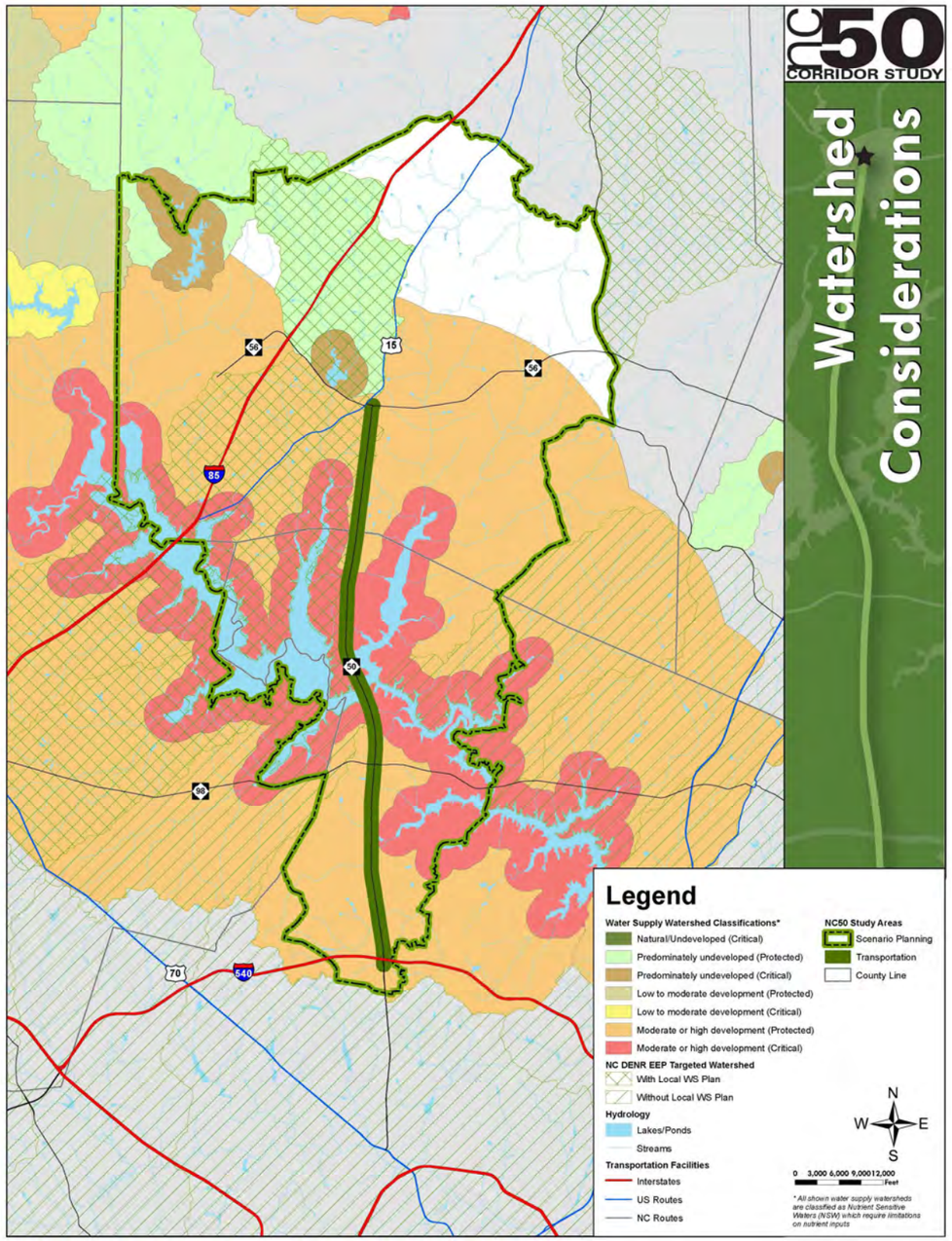


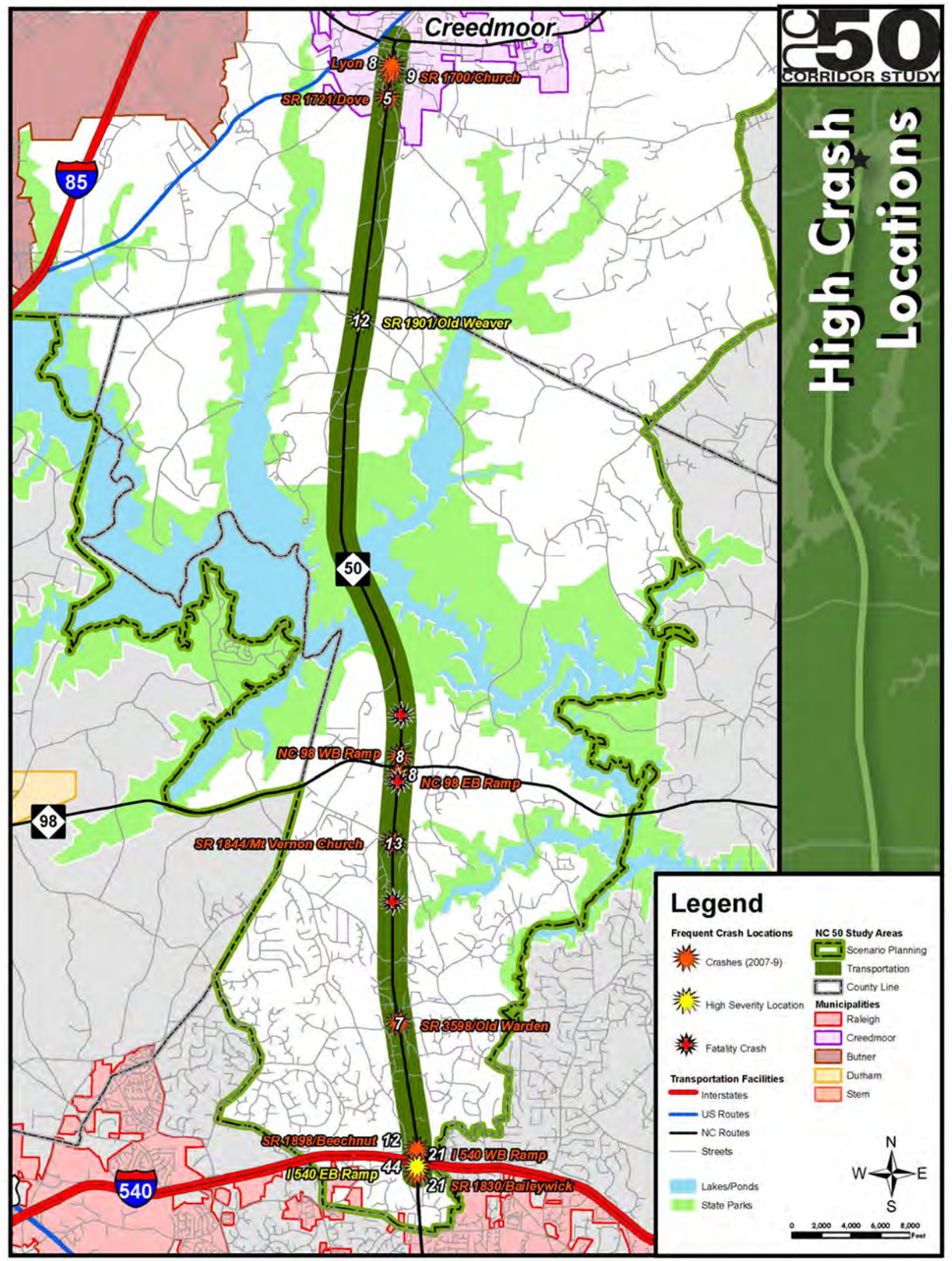
Watershed Considerations

The Watershed map identifies the critical and protected watersheds in the study area as well as the level of development. The map also shows the portions of the study area with local watershed plans in place.

Crash

The High Crash Locations map identifies frequent crash locations in the study area. High severity crash locations include the eastbound I-540 ramp and the intersection of SR 1901 and Old Weaver. Other areas along the corridor with high crash incidences include the eastbound and westbound ramps on NC 98, SR 1898/Beechnut, and SR 1830/Baileywick. Three fatal crashes have also occurred along the corridor since 2007. Please see Chapter 6 for additional information.





Chapter 4 - Scenario Planning

What is Scenario Planning?

Scenario planning is a process commonly used to develop and evaluate alternative futures for how a region might grow and develop over time. The process helps citizens, planners, and elected officials better understand the relative impacts of different policy decisions concerning land use, water quality, and transportation as well as how those decisions can best support various community goals.

As part of the NC 50 Corridor Study, the team engaged the Project Oversight Committee in a scenario planning process to assess possible future growth scenarios within the greater study area before determining the best transportation strategy to support the preferred scenario. The purpose of incorporating this process into the study was two-fold: 1) to help assess and imagine different long-term growth outcomes that may not have been considered and 2) to explore the range of long-term transportation strategies for the corridor that can best support the desired growth vision.

Setting the Stage

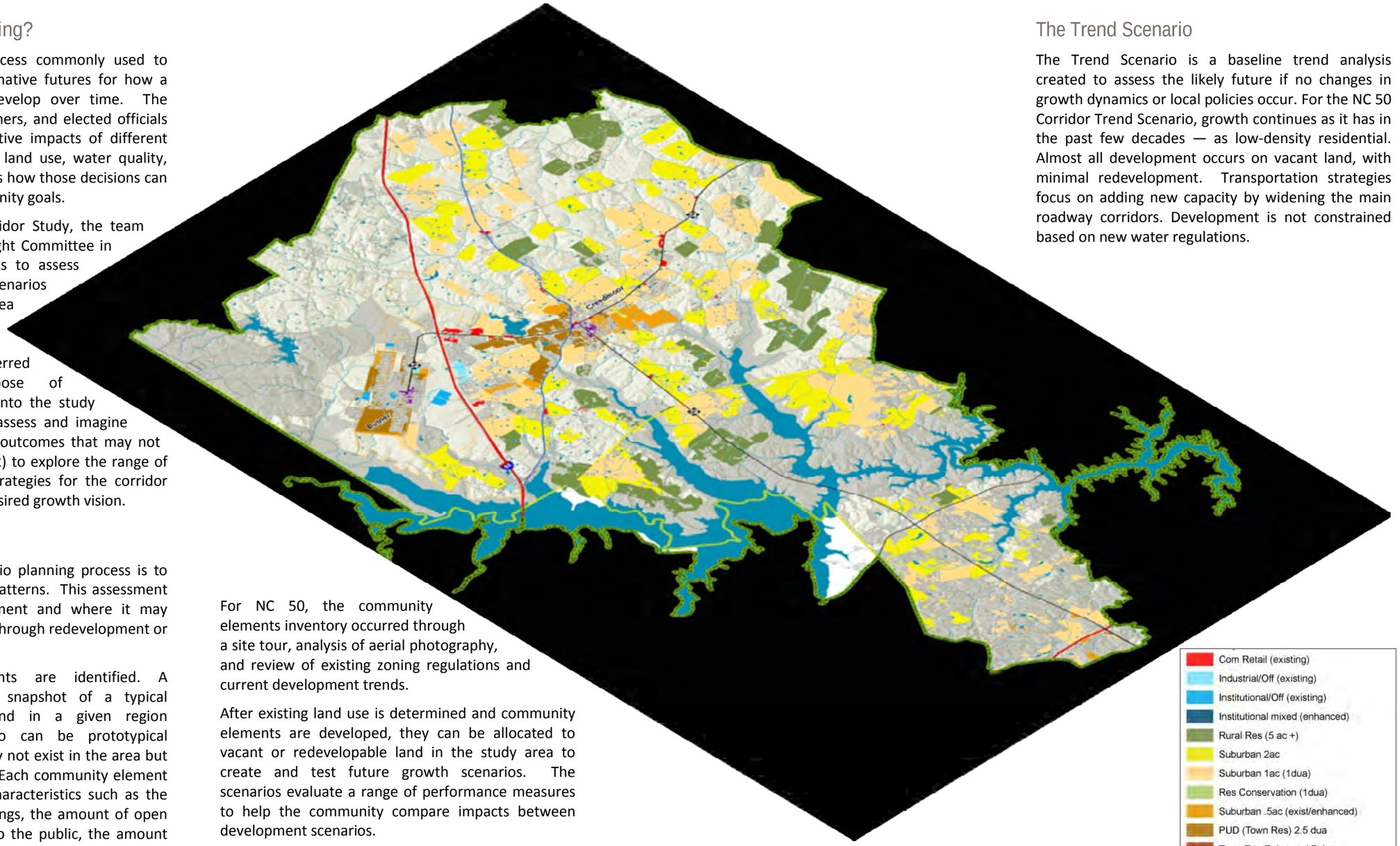
The first step in the scenario planning process is to evaluate existing land use patterns. This assessment identifies existing development and where it may occur in the future – either through redevelopment or greenfield development.

Next, community elements are identified. A community element is a snapshot of a typical development pattern found in a given region (community elements also can be prototypical development types that may not exist in the area but are desired for the future). Each community element is assigned physical data characteristics such as the height and density of buildings, the amount of open space and its accessibility to the public, the amount and type of parking, and the scale, size, and network of streets.

For NC 50, the community elements inventory occurred through a site tour, analysis of aerial photography, and review of existing zoning regulations and current development trends.

After existing land use is determined and community elements are developed, they can be allocated to vacant or redevelopable land in the study area to create and test future growth scenarios. The scenarios evaluate a range of performance measures to help the community compare impacts between development scenarios.

This chapter describes the three scenarios evaluated as part of the NC 50 Corridor Study.



The Trend Scenario

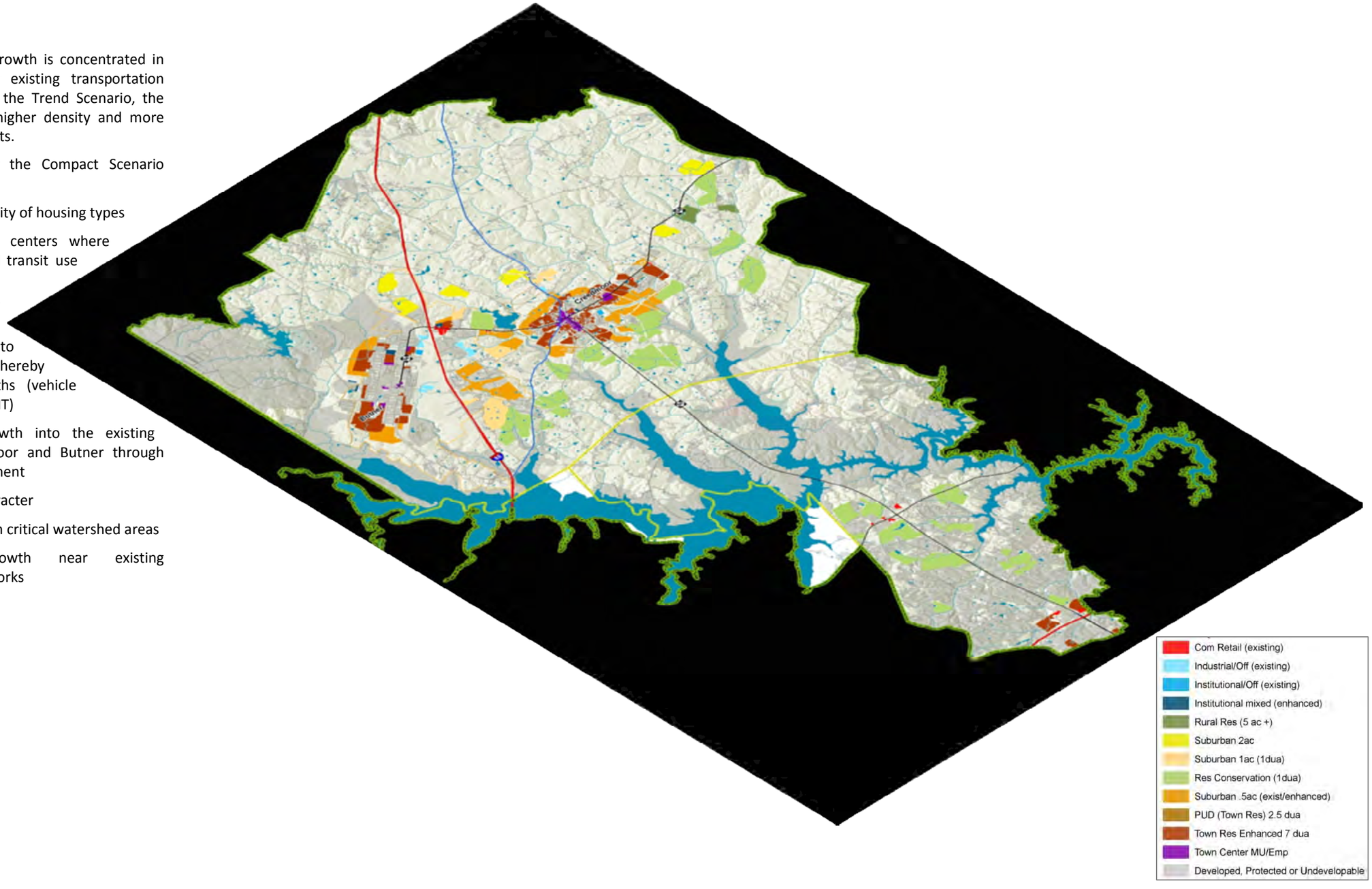
The Trend Scenario is a baseline trend analysis created to assess the likely future if no changes in growth dynamics or local policies occur. For the NC 50 Corridor Trend Scenario, growth continues as it has in the past few decades — as low-density residential. Almost all development occurs on vacant land, with minimal redevelopment. Transportation strategies focus on adding new capacity by widening the main roadway corridors. Development is not constrained based on new water regulations.

The Compact Scenario

In the Compact Scenario, growth is concentrated in existing centers and near existing transportation networks. Compared with the Trend Scenario, the Compact Scenario utilizes higher density and more compact community elements.

The guiding principles for the Compact Scenario included:

- Increasing the diversity of housing types
- Creating mixed-use centers where walking, biking, and transit use may be viable
- Locating a range of destinations within proximity to households, thereby reducing trip lengths (vehicle miles traveled or VMT)
- Investing new growth into the existing centers of Creedmoor and Butner through infill and redevelopment
- Preserving rural character
- Minimizing growth in critical watershed areas
- Concentrating growth near existing transportation networks



The Chip Game

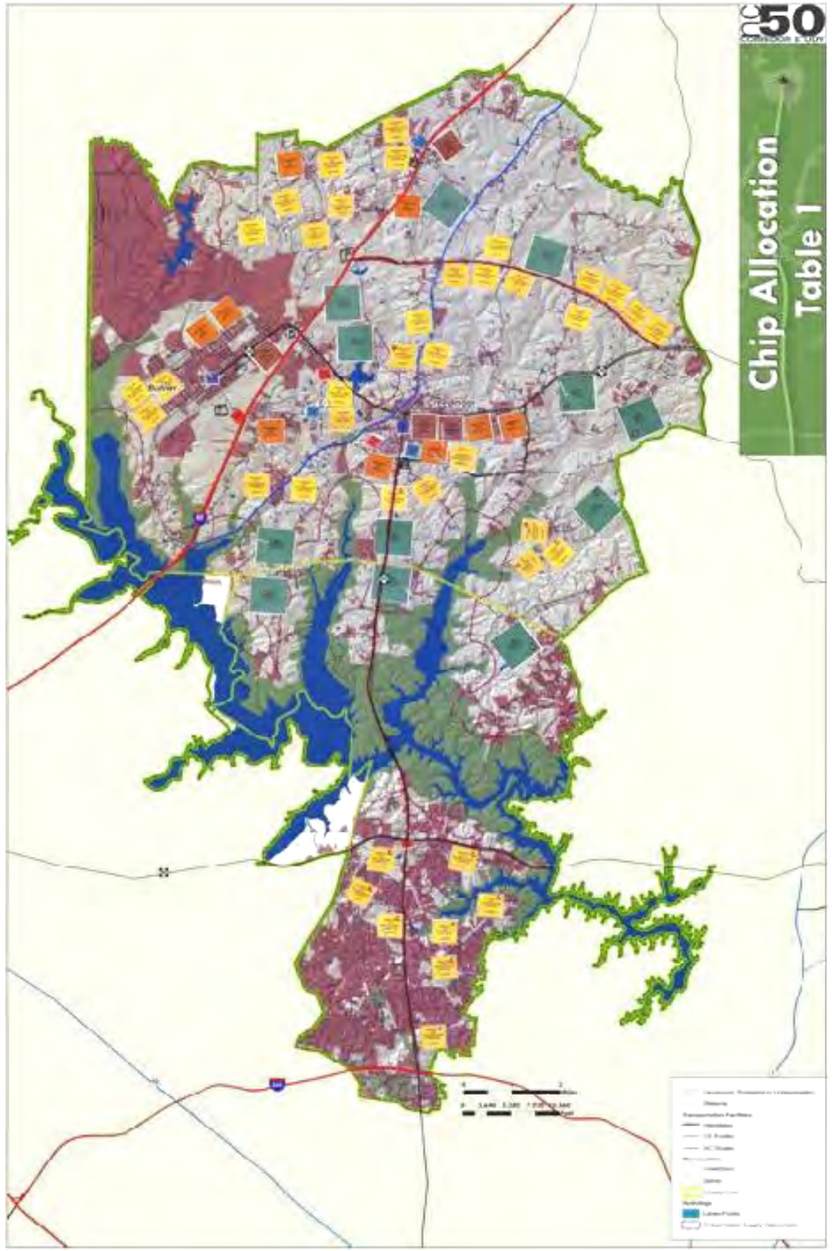
The chip game is a hands-on, interactive public participation strategy designed to increase participants' understanding of land consumption patterns associated with various development scenarios. It allows participants to manipulate key policy components, deal with trade-offs as they would in the real world, and achieve results that lead to more sustainable development patterns.

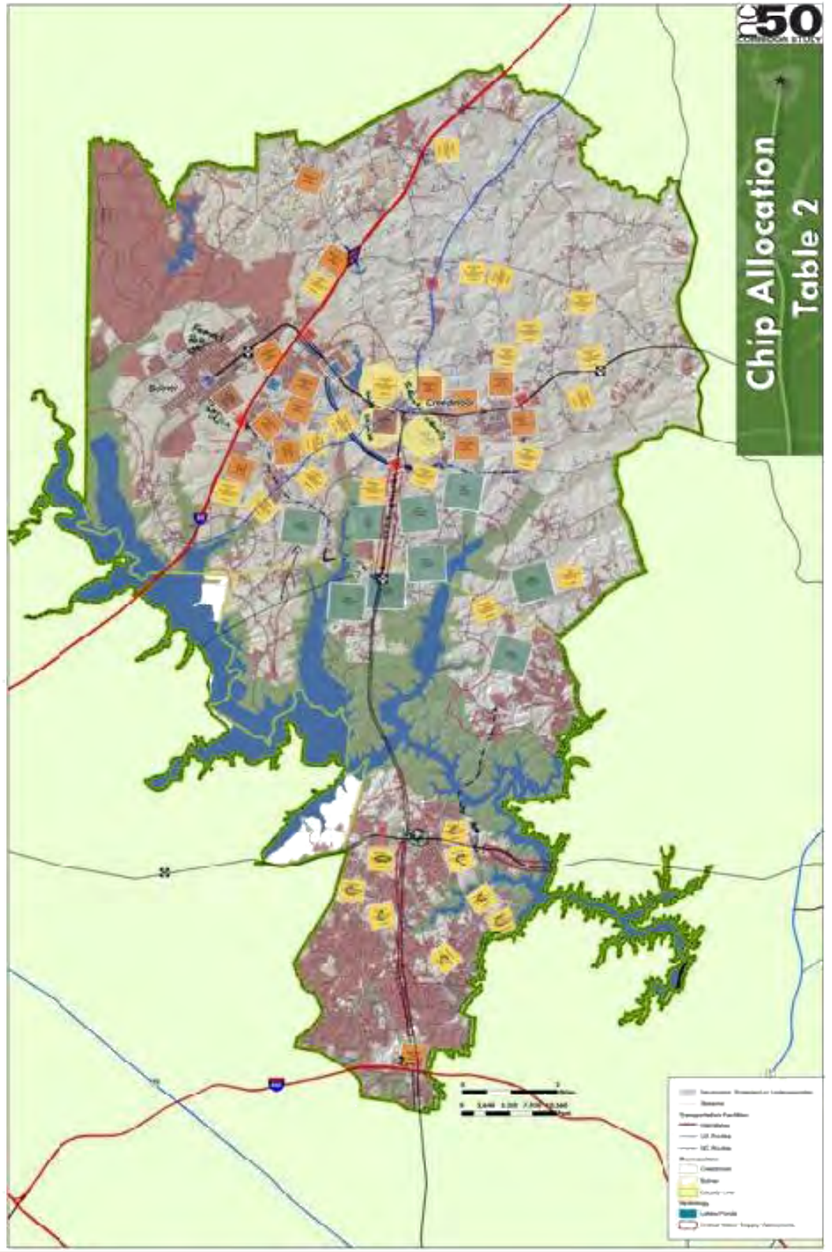
To play the chip game, participants separated into two working groups. The teams were tasked with creating a third development scenario that reflected what they believed to be the best elements of the Trend and Compact scenarios described above. The result — a Blended Scenario — is described in more detail on the following page.

Each team received a set of game chips representing various development types: rural residential, suburban residential-low (conservation subdivision), suburban residential-medium, town residential, commercial/industrial, institutional/office, and town center.

The teams arranged the game pieces on a work map to indicate the desired type and location of growth in the study area. The groups also identified major transportation concepts and strategies to support their respective concepts.

The scenarios created by the two tables are shown to the right.





Blended Scenario

After the chip game the Project Team assembled a final scenario that emulated a balanced approach to development with an emphasis to reinforce the positive characteristics of previous development scenarios. This is the Blended Scenario.

In general, the Blended Scenario aspires to some of the key goals of the Compact Scenario but includes a broader distribution of growth across the entire study area. New growth occurs as infill and redevelopment in both Creedmoor and Butner to create small, walkable mixed-use villages with a small town feel. Additional residential growth outside the towns is located where land is already platted, subdivided or rezoned for development. Conservation subdivisions were proposed in rural areas or locations near critical watershed areas.

Development Scenario Trade-Offs

Summary statistics for comparing impacts between the three development scenarios were created using CorPlan, a GIS-based scenario planning tool. Measures-of-effectiveness used to evaluate the development scenarios were designed around the community values identified as part of the NC 50 Corridor Study. These values included rural character and viewshed protection; reinvestment in existing centers; proximity to jobs; residential densities and mixture of housing types; responsible land consumption; watershed protection; and mobility.

Findings and Recommendations

The Blended Scenario embraces more of a compact, walkable, and livable vision of the future compared to the lower density, business-as-usual Trend scenario. This scenario is not as extreme as the Compact Scenario in terms of the level of density and the focus of locating development within the existing town centers. The Blended Scenario reflects a shift in direction to a pragmatic yet achievable growth vision based on smart growth principles (creating more compact, center-based development patterns) and reflects the key community values identified at public workshops, steering committee meetings, and stakeholder interviews.

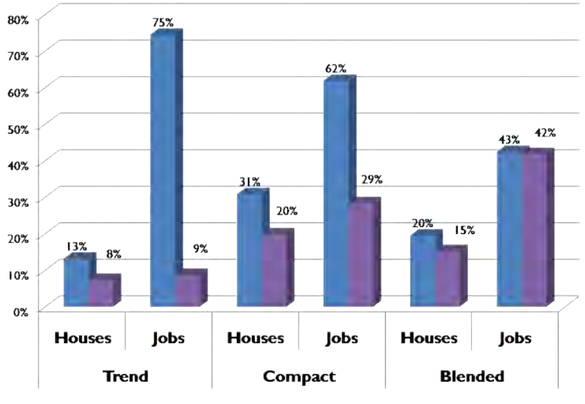
In the Blended Scenario, approximately 40% of new jobs in the future fall within Creedmoor and Butner, creating a stronger jobs and housing balance in the towns. The Blended Scenario reduces the overall development footprint compared to the Trend Scenario, thereby leaving more land undeveloped. A robust mixture of housing types (smaller lot single family, townhomes, and multifamily) occurs through infill in Creedmoor and Butner and as part of new mixed use developments outside the towns. In Wake County this scenario encourages the use of conservation subdivisions instead of the current trend of large-lot developments.

The following tables and charts help to illustrate the relative performance of each scenario on the above noted community issues.

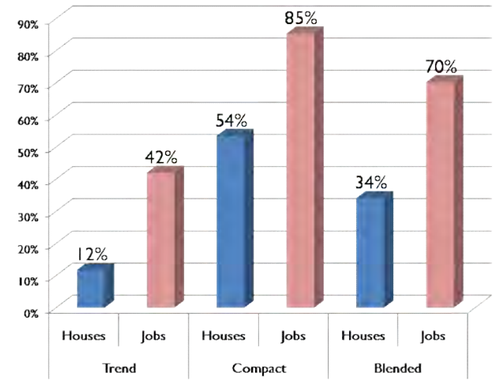
Scenario Comparison

	Trend	Compact	Blended
Residential Dwellings (Percentage by Type)			
Single Family	94%	69%	79%
Townhouse	6%	15%	14%
Multifamily	0%	15%	7%
Jobs (Percentage by Type)			
Commercial/Retail	37%	29%	31%
Service/Office	46%	59%	58%
Industrial/Other	17%	12%	11%
Required Acreage			
New Development	26,373	8,522	13,212
Conservation Subdivision	0	2,668	3,655
Impervious Surface	3,277	2,041	2,349

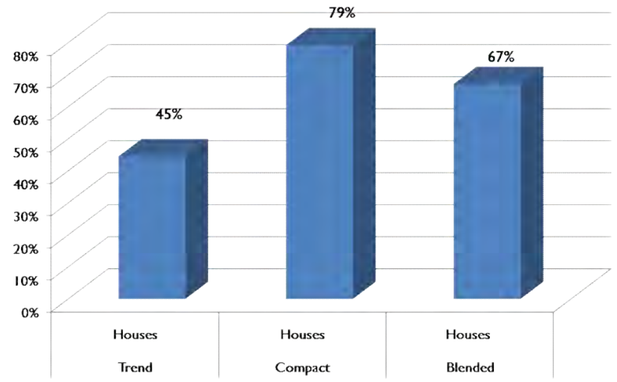
Percent of New Development Located in Existing Town Boundaries



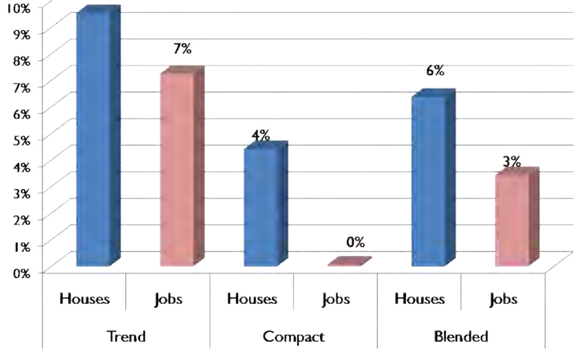
Percent of New Development in Walkable Environments (1/2 mile buffer)



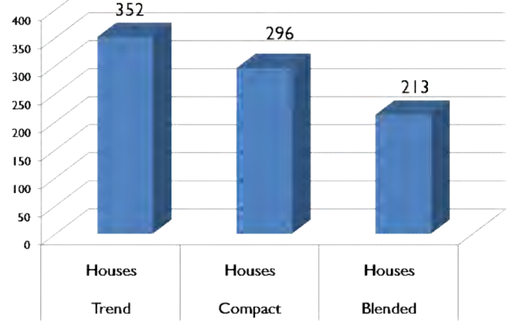
Percent of New Homes Located within 2 Miles of Major Employment Centers



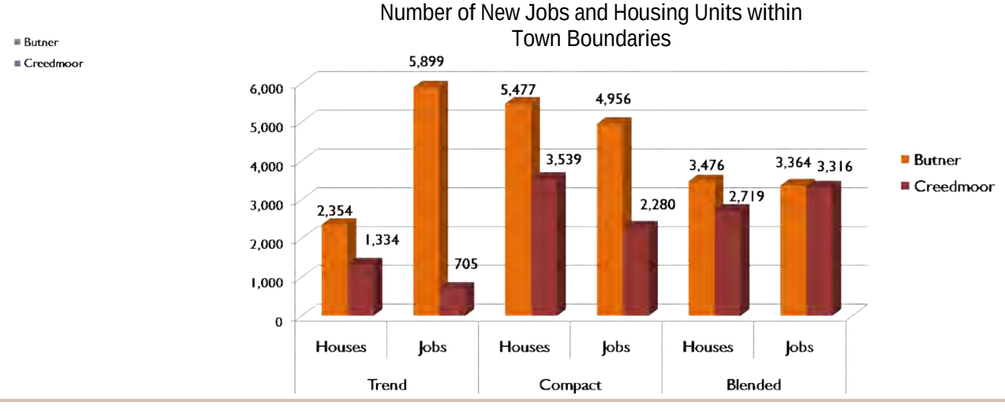
Percent of New Development Located in Critical Water Supply Watersheds



New Homes within a ¼-Mile of Rural NC 50



Number of New Jobs and Housing Units within Town Boundaries



CHAPTER 5 - WATER QUALITY

Roadway improvements recommended for NC 50 are intended to improve safety, reduce congestion, and promote transportation choices. These improvements likely will promote more rapid development in communities served by NC 50, which will impact water quality both during and after construction. Water resources may be directly impacted through the construction of the road improvements themselves and indirectly through increased rates and density of development within the scenario planning area. Impacts to water resources can threaten quality of drinking water supplies, impair aquatic life, cause potential flooding hazards, and hinder recreational use of this important resource.

This chapter discusses how the recommended roadway improvements and associated increase in development can impact water quality. For each key issue relating to water quality, current strategies are discussed and recommendations are outlined to further protect water resources and reduce future impacts. Recommendations are focused on actions for local governments and local or regional planning organizations, but the implementation of these would involve developers, residents, and other parties as noted. Chapter 8 provides additional detail about the application of water quality best management practices along the NC 50 corridor.

Issue: Disturbance of Streambanks and Channels by Roadway Improvements

Observation: Roadway improvements — like those planned for the NC 50 corridor — involve construction activities and changes in land use activity that often disturb streambanks and stream channels.

Discussion: Streambanks and channels are dynamic and sensitive ecosystems that respond to changes in land use activity. Land use changes and construction activities can cause a loss or degradation of natural vegetation along stream banks and force a stream to adjust to changes in discharge, water velocities, and sediment load. These changes accelerate erosion, increase sediment load, and adversely affect the biotic system. Cumulatively, multiple new developments in an area often increase peak flows, which could dramatically alter downstream channels.

Widening a road at stream crossings also can disturb streambanks and alter the natural condition of stream channels. Construction activities expose disturbed soils, increasing sediment loading and turbidity in surface waters.

Water quality regulations have been established to minimize the impact of increased development on water quality. Disturbance of streambanks and channels is less regulated than other impacts such as pollutant loading. Some regulations, like NPDES Phase II stormwater rules, have peak flow requirements that may reduce stream channel instability and degradation. However, only some portions of the study area are subject to these rules.

Recommendation:

- Emphasize proper planning, design, and construction techniques during development and refinement of roadway improvements.
- Involve engineers in the road design who have experience in streambank and channel protection and can best minimize direct disturbance to streams and lakes.
- Select road sections for swales versus curb and gutter (where possible) to achieve water quality treatment at the source while balancing site constraints.
- Implement erosion and sediment Best Management Practices (BMPs) to reduce the discharge of sediment and other pollutants during construction activities.

Issue: Pollutant Loading

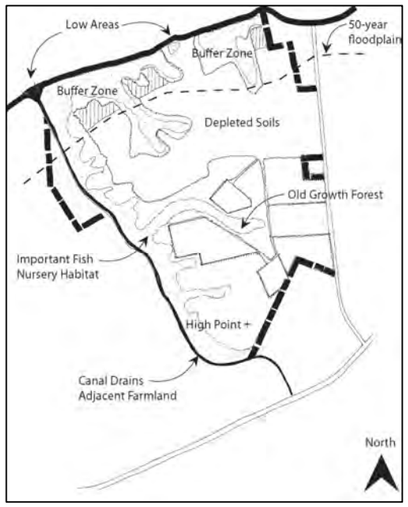
Observation: Watersheds in the scenario planning area have been deemed nutrient-sensitive by the North Carolina Division of Water Quality (DWQ) as a result of high levels of chlorophyll-a, an indicator of excessive algae and often caused by pollutants such as nitrogen and phosphorus. In 1997, DWQ developed a nutrient management strategy for the Neuse River Basin and is developing another management strategy for Falls Lake that imposes additional nitrogen and phosphorus loading standards for new development to reduce the quantity of pollutants entering the watersheds.

Discussion: Pollutant loading is the total quantity of pollutants in stormwater runoff. The quantity of pollutants entering a water body tends to increase as the amount of impervious surface increases, and this quantity varies depending on surrounding land cover, treatment facilities, slopes, and other factors. The combination of road widening and land development will increase the amount of impervious surface in the study area. In turn, runoff volume and flows would likely increase, leading to greater pollutant loading.

Recommendation:

- Endorse the characteristics of the Blended Development Scenario (**Chapter 4**), which is anticipated to result in more natural area, less disturbed/developed land, less impervious surface, and less stream erosion than other scenarios.
- Organize a monitoring consortium to introduce common objectives and protocols and add to the comprehensiveness of data collected in the watershed to better understand the health of the water resources and to facilitate regional policy discussions.
- Incorporate innovative stormwater treatment techniques that provide enhanced pollutant reduction from development sites. These techniques could be incorporated into local development codes or promoted to developers through outreach and training programs. Techniques to consider include Low Impact Development (LID), Water Re-Use, and Disconnection of Impervious Surface and Permeable Pavement. These techniques will be further described in the NC 50 "playbook" under separate cover.

Examples of innovative stormwater management practices (from top to bottom): pervious pavement, parking lot draining to a bioretention cell, and cistern used for rainwater harvesting (Sources: NCSU (2009) and Tetra Tech)



Low Impact Development site planning example showing areas from which development should be restricted

Issue: Stormwater Regulations

Observation: The most widespread regulations implemented in the scenario planning area include the 1998 Neuse River NSW Management Strategy (Neuse Rules), the Tar-Pamlico River Basin rules (Tar-Pam Rules), the water supply watershed regulations applied to areas around Falls Lake, and the statewide NPDES Phase II stormwater regulations (applied to all jurisdictions except for Granville County 1 mile outside of Creedmoor and Butner municipal boundaries). The Falls Lake Nutrient Management Strategy and associated rules were adopted November 19, 2010 (see inset) and implementation of these rules is expected to begin soon. Some jurisdictions also have more stringent regulations or unique regulations in addition to those listed above, including several instances of more protective riparian buffer regulations.

Discussion: Water quality regulations minimize the impact of increased development on water quality. Despite existing and planned regulations, however, proposed roadway improvements likely will cause further impacts to water quality during and after construction.

Existing and proposed water quality regulations do not address all possible impacts and sources of impairment. Streams in the Tar-Pamlico basin, for example, are more vulnerable to impacts because the TarPam rules do not include stormwater control requirements.

Regulations that are focused on protecting large water bodies like Falls Lake tend to be designed well for their main purpose but do not necessarily protect all water bodies within a watershed. A construction project could meet the required pollutant loading rates but still cause localized impacts to streams, particularly from increased stormwater runoff volume and peak flows.

Also, regulations within the study area vary. Impacts may be more pronounced in portions of the study area where more stringent water quality regulations have not yet been implemented.

Recommendation:

- Implement the Falls Lake Nutrient Management Strategy.
- Enforce regulations established by the federal and state government.
- Consider adopting more stringent local regulations that would require future development to implement protection measures (e.g., peak flow control) for local streams. Additional pollutant loading requirements could also be considered for areas where intensive development increases are likely to occur but where stormwater regulations are less stringent than other areas with similar development pressure.

Issue: Regulatory Barriers to Innovative Techniques

Observation: Jurisdictions' land development codes may hinder the use of innovative treatment techniques beyond conventional stormwater strategies. For example, set back requirements may reduce the amount of open space that can be protected through clustering.

Discussion: Existing land development codes both promote undesirable land uses and development types in the study area and hinder the use of innovative treatment techniques beyond conventional facilities. Stakeholders at the NC 50 public design charrette expressed concern about the potential for sprawl into the northern Tar-Pam portion of the study area due to existing regulations. Also, many developers have suggested that current regulations create complexities that do little to encourage Low Impact Development. Therefore, traditional development avoids incorporating innovative treatment techniques. Opportunities exist within these regulations to remove barriers and encourage the use of innovative techniques.

Falls Lake Nutrient Management Strategy: Adopted Rules (November 19, 2010)

General: The goal is to meet the chlorophyll-*a* standard lake-wide by reducing nitrogen and phosphorus loading to surface waters by 30 percent and 70 percent, respectively, which translates into reductions of 40 percent and 77 percent from sources regulated under the rules. The rules are organized into two stages:

- Stage 1 (by 2021): Watershed-wide reductions to meet chlorophyll-*a* standard in lower lake (east of NC 50 Bridge)
- Stage 2 (by 2041): Additional reductions in upper watershed (above NC 50) to meet standard in the entire lake

New Development Requirements:

- Achieve nutrient export rates of 2.2 pounds/acre/year total nitrogen and 0.33 pounds/acre/year total phosphorus
- Areal disturbance thresholds, above which development must comply: one-half acre or more for residential and 12,000 square feet or more for commercial
- Partial off-site mitigation allowed, with specific provisions
- Developers may use low impact development to meet the requirements if the sites meet the hydrologic criteria specified in the North Carolina Low Impact Development Guidebook

NCDOT Requirements:

- Develop a stormwater management program for the Falls Lake watershed, including identification and elimination of illegal discharges to its conveyance system in the watershed
- New NCDOT road projects must meet the existing Neuse buffer protection rule
- New non-road NCDOT development must meet the same rules as private new development
- Implement a nutrient management education program for NCDOT staff and contractors relating to fertilizer application on highway rights-of-way

Other Requirements:

- Local governments required to implement load reduction strategies on existing developed land
- Additional requirements for point sources and agricultural land

Recommendation:

- Consider the development of policies that require the use of or provide incentives for conservation development, innovative stormwater techniques, and additional tree preservation (to mitigate for tree loss in road widening).
- Conduct reviews of local ordinances to identify constraints to innovative stormwater techniques.
- Revise local ordinances to reduce or remove ordinance constraints to innovative stormwater techniques.
- Conduct outreach to developers on the benefits of innovative stormwater techniques, emphasizing cost savings and profitability benefits.
- Amend land development ordinances to guide density where it will best serve multiple community objectives.
- Promote the new stewardship recognition program for development (http://trianglestewardship.org/).
- Work with developers to implement pilot projects demonstrating innovative stormwater design in the study area.

Issue: Public Awareness

Observation: The majority of the public, including landowners and developers, are not aware of what they can do to minimize water quality impacts and protect aquatic resources.

Discussion: There are many things that individual landowners can do to help protect local water resources, such as installing rain barrels and rain gardens, using native plants in landscaping, maintaining buffers along streams on their property, reducing use of fertilizers and pesticides, and picking up litter and pet waste. As part of the public design charrette, a focus group formulated ideas for moving forward and selling innovative stormwater management and other recommended techniques. Their ideas included the following recommendations:

Recommendation:

- Promote educational materials, programs, and workshops on innovative stormwater techniques (e.g., NCSU LID workshops).
- Encourage landowners and developers to seek training on innovative stormwater techniques.
- Identify publically-funded projects that can demonstrate the use innovative stormwater techniques and promote the water quality and cost savings benefits of these practices.
- Use traditional outreach methods (media, websites, etc.) to promote the use of innovative stormwater management and other recommended techniques.
- Educate the community on the values of land conservation and water quality protection (property values, wildlife, etc) and the costs of not protecting water quality (e.g., restoration or retrofit costs).
- Promote available on-line information resources (including nccleanwater.org).

NC 50 CORRIDOR STUDY

Chapter 6 - Traffic & Safety

Traffic and safety are two of the most pressing issues facing NC 50. High traffic volumes along the corridor cause traffic backups and turning movements create queues and erode traffic safety. For NC 50 to serve as an effective link between Granville and Wake Counties, improvements are needed. This chapter discusses the traffic and safety issues facing the corridor and identifies a set of improvements to address these issues. Recommendations not only address the current problems along the corridor but also anticipate future needs.

Issue: Traffic Volumes

Observation: Current traffic volumes along NC 50 fluctuate. Between I-540 and Norwood Road, NC 50 already experiences traffic congestion and backups. The lack of passing zones along much of the corridor also causes slowdowns and traffic delays. Future growth indicates the existing facility will not adequately accommodate future traffic levels.

Discussion: The ***NC 50 Existing Conditions Report*** outlined the current and future traffic volumes along the corridor as well as the projected future corridor congestion levels. An analysis of this information clearly indicates the current two-lane cross-section will have to be improved in the future. Through discussions with the Oversight Committee and data analysis, a four-lane divided cross-section has been identified as the preferred ultimate treatment.

The intent of the NC 50 Corridor Study is to determine the set of improvements that will make this corridor the most effective for current and future traffic needs. Since it's unrealistic to expect a four-lane divided facility in the near term, it is important to consider interim improvements alongside the ultimate vision. These interim improvements should augment the current facility without requiring extensive rework once the ultimate cross-section is implemented.

A ***Preferred Access Plan*** was developed to address the interim and ultimate needs of the NC 50 corridor. Interim improvements address problems at intersections or critical corridor segments, while ultimate improvements focus on the operation of the four-lane divided cross-section as well as interaction with future development.

Recommendation:

Ultimate Preferred Access Plan

The ultimate recommendation for NC 50 is to widen the corridor to a four-lane divided cross-section. This will address future traffic volumes and projected congestion issues in the area.

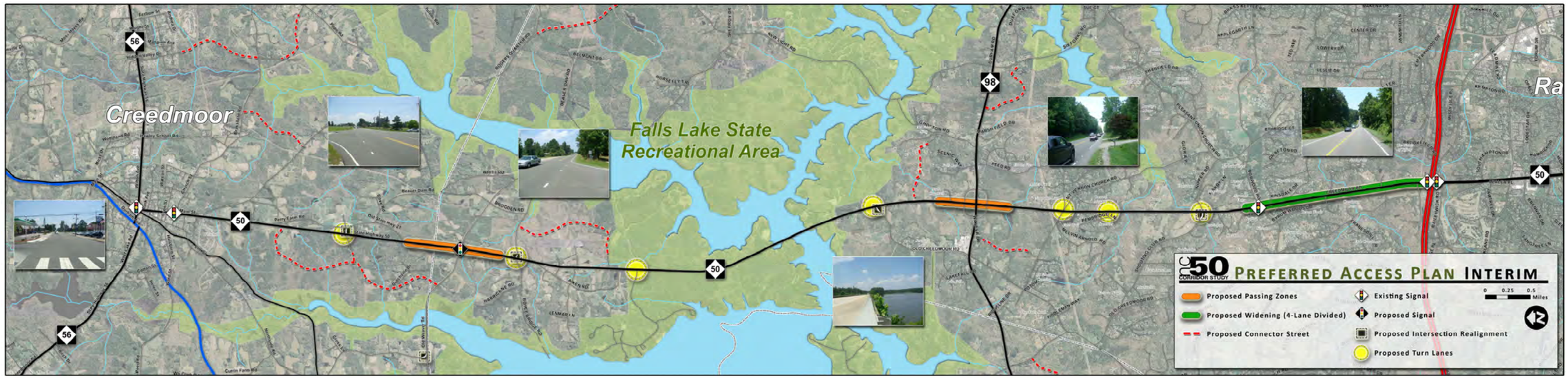
Interim Preferred Access Plan

Several interim solutions will address traffic volume and congestion issues along the corridor:

- **Widen NC 50 to a four-lane divided facility between I-540 and Norwood Road.** This improvement would mitigate most of the existing congestion in the southern portion of the corridor. The improvement would reflect the ultimate plan cross-section, so no modification would be necessary in the long term. Improving the road in this area also will address some of the current roadway's limitations, such as inappropriate design speeds, topographical challenges and outdated hydrologic treatments.
- **Construct a passing zone through the interchange of NC 50 and NC 98.** NC 50 would be widened on either side of the interchange to allow for passing areas. Widening would be offset so vehicles approaching from the north or the south would have time to complete their passing movements before reaching the interchange. Slip ramps, currently in use at the interchange, would be maintained. This would result in a six-lane section between the interchange ramps as shown in the photosimulation to the right.
- **Construct a passing zone around the intersection of NC 50 and Old Weaver Trail.** The road would be widened in an offset manner similar to that at the NC 50 and NC 98 interchange, allowing people to complete their passing movements before going through the intersection.

NC 50 looking southbound


Creedmoor
Falls Lake State
Recreational Area
50
98
56
NC 50 CORRIDOR STUDY
PREFERRED ACCESS PLAN ULTIMATE
Proposed Widening (4-Lane Divided)
Proposed Connector Street
Proposed Creedmoor Connector
Existing Signal
Proposed Signal
Proposed Intersection Realignment
Proposed Median Opening
0 0.25 0.5 Miles


Creedmoor
Falls Lake State
Recreational Area
50
98
56
NC 50 CORRIDOR STUDY
PREFERRED ACCESS PLAN INTERIM
Proposed Passing Zones
Proposed Widening (4-Lane Divided)
Proposed Connector Street
Existing Signal
Proposed Signal
Proposed Intersection Realignment
Proposed Turn Lanes
0 0.25 0.5 Miles

Issue: Safety

Observation: NC 50 experiences a higher crash rate compared to similar facilities throughout North Carolina. Certain intersections and segments of the corridor experience frequent crashes, often resulting in severe injuries as well as property damage.

Discussion: The Existing Conditions Report included information about the crash rates along NC 50. In addition, **Chapter 3** of this Project Workbook (Resource Maps) includes a map that identifies high crash locations. Issues identified in these areas include the intersections of NC 50 and eastbound I-540 as well as NC 50 and Old Weaver Trail. Two segments of the corridor (Shooting Club Road to Mt. Vernon Church Road and Aiken Road to Old Weaver Trail) also have experienced these severe crash issues.

Crashes along NC 50 occur for several reasons. As this roadway and surrounding area have matured, many of the old intersections between NC 50 and the previously smaller service roads have not changed. Often, these intersections experience issues with topography, skews or misalignment never fully addressed. Also, increasing traffic levels along the corridor combined with growth causes many people to stop as other vehicles turn into driveways or side roads. This movement can cause extensive backups and inattentive drivers often crash into slowing or stopped vehicles in front of them.

Recommendation:

Ultimate Preferred Access Plan

The four-lane divided ultimate recommendation for NC 50 will reduce or eliminate many of the conflict points currently causing problems along the corridor. With a median-divided facility, it is important to provide adequate median breaks to allow appropriate access to adjacent land uses. With that in mind, the ultimate cross-section recommends eighteen median breaks over the 15-mile corridor. Locations for these median breaks are determined by neighboring uses as well as optimal spacing guidelines. Two of these breaks would represent future signalized intersections at Old Weaver Trail and at the proposed Creedmoor Connector. The existing signalized intersections in the southern portion of the corridor would also be maintained, as would the interchange at NC 98.

SPACING GUIDELINES

- Signal Spacing: 4,000' to 1 mile
- Median Opening Spacing: 2,600'
- Driveway Spacing: 300' to 500'

Interim Preferred Access Plan

Interim solutions for NC 50 focus on realigning intersections and adding turn lanes at key locations. The following intersections are recommended for realignment of the minor roadway (design concepts included in Ch. 8):

- Shooting Club Road/Nipper Road
- Old Creedmoor Road
- Boyce Bridge Road
- Beaver Dam Road/Old NC 21

Adding turn lanes on the minor leg and/or on NC 50 is recommended for the following intersections:

- Beaver Dam Road/Old NC 21
- Boyce Bridge Road
- Longacre Drive
- Beaverdam Recreation Access/Sandling Beach Access
- Mt. Vernon Church Road
- Shooting Club Road/Nipper Road
- Old Creedmoor Road

In addition to these interim improvements, funding already has been allocated to install a signal at the intersection of NC 50 and Old Weaver Trail.

Issue: Connectivity

Observation: One challenge for the NC 50 corridor is the lack of connectivity within the surrounding roadway network. Getting onto NC 50 often is the only alternative, even for travelers wishing to access adjacent developments or neighborhoods.

Discussion: Enhancing network connectivity often can be achieved as new development occurs. Improved connectivity will relieve congestion along NC 50, reduce intersection conflicts along the corridor, and give users of all travel modes additional options for getting around the area. At the local level, a system of connector streets can be established to improve travel between land uses.

Part of this issue can be addressed through improved regional connections. The route along Old Weaver Trail, Cash Road, and Gate 2 Road has been identified as a possible alternate route for traffic traveling north to Creedmoor and Butner. The proposed Creedmoor Connector also will route traffic away from NC 50 in downtown Creedmoor and will allow quicker access to Butner and I-85.

Old Weaver Trail and NC 50

Recommendation:

Connectivity is an issue that can improve as the area around NC 50 develops. Local connector roads often will be the responsibility of developers as growth occurs. Several connector road connections have been identified on both the Interim and the Ultimate Preferred Access Plan. Specific routes for these connector roads are not set in stone, but providing the connections will enhance area connectivity and will offer alternate travel choices within the area.

To improve regional connectivity, the intersection of Old Weaver Trail and Cash Road should be realigned. Rather than having Cash Road tee into Old Weaver Trail as it does now, the realigned intersection would make the connection from Old Weaver Trail to Cash Road the primary route. The continuation of Old Weaver Trail to the east of this intersection would serve as the minor leg movement.

NC 50 CORRIDOR STUDY

CHAPTER 7 - BICYCLE, PEDESTRIAN & TRANSIT

The needs of the NC 50 corridor go beyond automobile traffic. Bicyclists and pedestrians may desire to travel this area for recreation or may want to commute to area destinations. Transit use in this area may be desired to enhance regional connectivity or to ease commuting frustrations.

In addressing the needs of cyclists, pedestrians, and transit users, we must consider all potential user groups. For instance, the needs of inexperienced bicyclists may be addressed differently than those of frequent on-road travelers. Additionally, the needs of choice users and captive users can differ.

This chapter outlines the issues facing bicycle, pedestrian, and transit travel today. Recommendations address these issues and promote an environment conducive to all users.

Bicycle and Pedestrian

The NC 50 corridor provides limited opportunities for bicycle and pedestrian travel. With Downtown Creedmoor at one end of the corridor and the Falls Lake Recreation Area at the other, the potential exists for bicycle and pedestrian use within the area. Issues such as terrain, distances between destinations, safety, and lack of facilities currently inhibit this travel. Recommendations include a range of facilities and improvements to intersections in the area as well as program and policy measures to encourage future use.

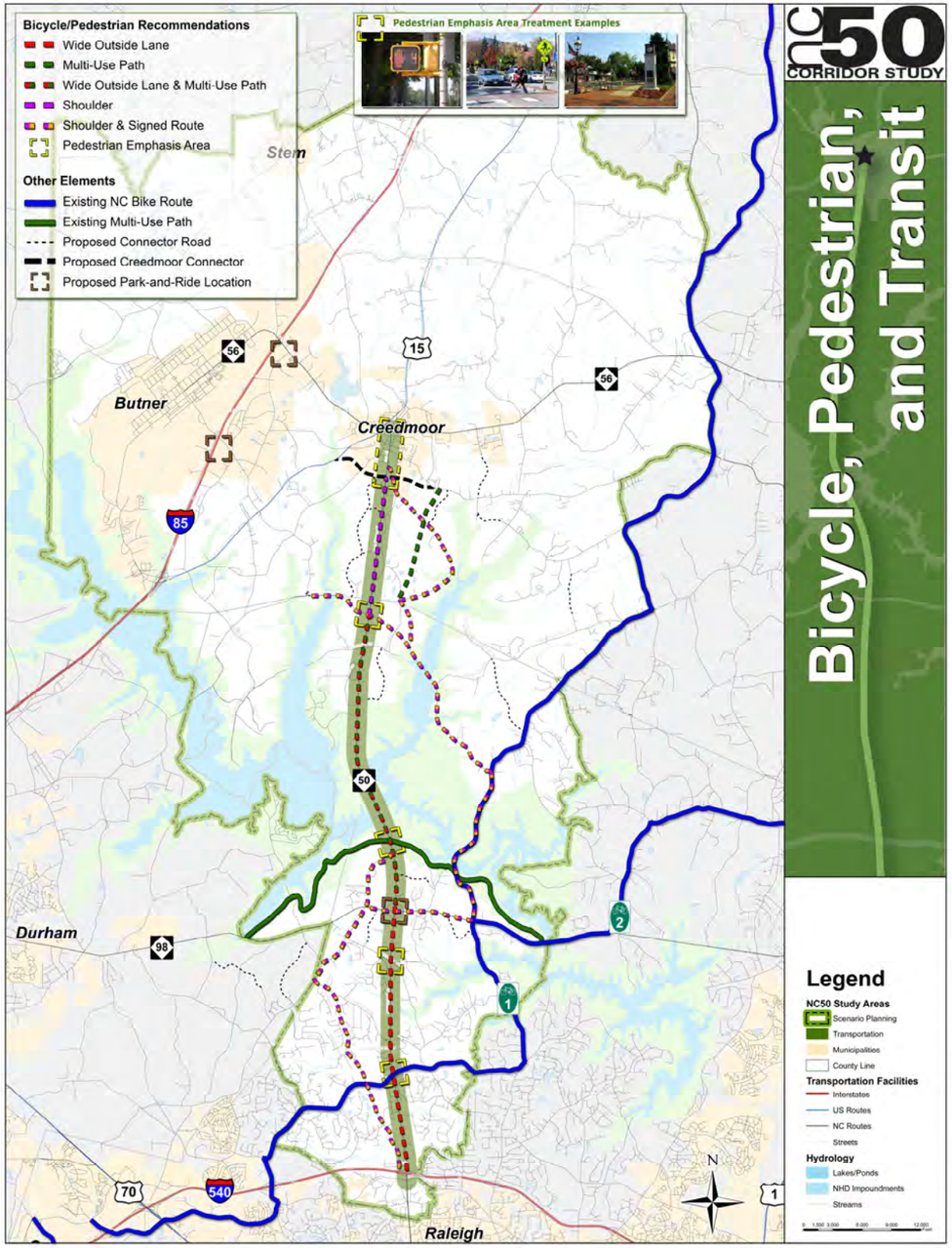
Issue: On-Road Bicycle Facilities

Observation: For the majority of its existing cross-section, NC 50 has narrow shoulders and few refuge areas for bicyclists. While there are state routes in the vicinity, very few of them have significant shoulder space or widened lanes. Terrain, traffic levels, speed differential, and sight distance issues further contribute to the challenges for on-road cycling.

Discussion: Advanced bicyclists typically are more comfortable sharing the travel lane with cars. However, providing additional space on a roadway increases the comfort level (and typically speeds) for motorists. Even with on-street improvements, basic-level bicyclists may not become comfortable riding on a high-speed, high-volume facility such as NC 50. For these cyclists, alternate routes with less traffic and fewer topographical issues often are a better choice. Making improvements to these facilities can give basic-level riders a comfortable option for traveling in the area.

Recommendation:

Recommended on-road bicycle facilities are based on feedback received during the Project Symposium, stakeholder interviews, and Public Design Charrette. They address the needs of the advanced and basic-level cyclists. For cyclists, the idea is to provide wide outside lanes along NC 50 for experienced riders and upgrade existing slower speed facilities adjacent to NC 50 for basic-level riders, a process favored by the majority of public participants.



As shown on the corresponding map, recommended on-road bicycle facilities include:

- **Paved (2'-4') shoulders on supporting roadways — NC 98, New Light Road, and Old Weaver Trail.** These roadways (parts of which also are state bicycle routes) would provide basic-level riders a lower-volume facility that connects the NC 50 corridor between NC 98 and Old Weaver Trail. Since bicyclists may want to use the NC 98 interchange to get between routes, that facility should also be upgraded for easier bicycle use. Basic riders also can connect to the Mountains to Sea Trail from this route.
- **Paved (2'-4') shoulders on supporting roadways — Old Creedmoor Road.** Old Creedmoor Road provides a parallel facility to NC 50 between I-540 to just south of the connection of NC 50 with the Mountains to Sea Trail. This route is lower-volume and would be better suited to basic-level riders.
- **Paved (2'-4') shoulders on supporting roadways — Dove Road and Whitt Road.** These roadways provide a parallel route to the northern part of the NC 50 corridor for basic-level riders, connecting Old Weaver Trail and the future Creedmoor Connector.
- **14' wide outside lanes as a part of the NC 50 widening from I-540 to Old Weaver Trail.** This segment is recommended to have curb and gutter, so a wide outside lane is appropriate. This facility will provide a greater level of comfort for advanced riders traveling along the corridor. The wide shoulders on the current bridge across the lake and the proposed wide shoulders for the future facility can be restriped or left as they are. However, proper maintenance of this facility must be a high priority. These facilities should connect through the I-540 interchange to the existing bicycle amenities in that area.
- **5' wide shoulders on both sides of NC 50 between Old Weaver Trail and the future Creedmoor Connector.** A shoulder section is proposed for this segment of NC 50 as part of the ultimate corridor buildout. Advanced riders also will experience increased travel comfort and will have a refuge area with the installation of this facility.

The series of recommendations along NC 50 will create a more conducive environment for advanced cyclists. The network of recommended parallel facility improvements will give basic cyclists a place to ride with lower traffic speeds and volumes while also giving them a refuge area. These improvements will serve the needs of basic cyclists within this area, from I-540 through downtown Creedmoor.

Issue: Off-Road Bicycle and Pedestrian Facilities

Observation: The Falls Lake Recreation Area includes a series of internal mountain bike and pedestrian trails. However, connections to the park via multiuse trails or on-street paths are limited.

Discussion: Multi-use paths can serve as facilities for both basic-level bicyclists and pedestrians. Natural-surface or crushed stone facilities can also accommodate equestrian users if they are permitted.

Recommendation:

To provide travel alternatives along NC 50, the following off-road bicycle and pedestrian facilities are recommended:

- **10' multi-use path along the eastern side of NC 50 between NC 98 and Old Weaver Trail.** This sidepath would have few intersection conflicts and would allow basic-level users to travel along NC 50 to access the Falls Lake Recreation Area and the Mountains to Sea Trail. The facility's extents would connect to the basic-level cyclist parallel routes.

Issue: On-Road Pedestrian Facilities

Observation: Sidewalks currently exist in the Creedmoor area but not in other locations along the corridor. Some aesthetic enhancements have been put in place for the Creedmoor sidewalk system, but the facilities remain located directly on the back of curb. Challenges limiting pedestrian travel along the NC 50 corridor include the distance between activity nodes and topography.

Discussion: The multi-use path enhancements discussed in the previous section will provide pedestrian facilities near key activity centers along the NC 50 corridor. Additional sidewalks will be most effective around the Creedmoor area due to the city's population density and frequency of destinations.

Recommendation:

On-road pedestrian facilities recommended for improvement include:

- **Sidewalks (new construction) on both sides of the road from the existing sidewalks in downtown Creedmoor to the Creedmoor Connector.** To enhance the pedestrian experience, these sidewalks should be buffered from traffic by a planting strip (i.e., verge area). Sidewalks in this area will heighten the sense of walkability entering into the City.
- **Improved sidewalks along NC 50 in the City of Creedmoor as a part of the downtown streetscape improvements.** Intersection-level improvements, aesthetic enhancements, and sidewalk maintenance will enhance pedestrian travel in this area. Mid-block crossings and treatments should also be considered at appropriate locations.

Issue: Intersection Safety

Observation: The majority of the NC 50 corridor has no intersection-level facilities for pedestrians and bicyclists. Issues such as sight distance, offset intersections, and heavy traffic volumes make it a challenge to cross this corridor safely.

Discussion: A range of different intersection improvements can be employed to assist the movement of bicycles and pedestrians. High-visibility intersection crosswalks, pedestrain countdown signals, pedestrian-scale lighting, and warning flashers are just a sampling of the tools that can be employed. Directional or informational signage can reduce confusion as well as promote the use of available facilities and activity points.

Recommendation:

Several intersections along NC 50 were identified for improvements using the tools listed in the previous discussion. These intersections include:

- NC 50 and Norwood Road
- NC 50 and Mt. Vernon Church Road
- NC 50 and Old Weaver Trail
- NC 50 and the Mountains to Sea Trail

Intersection improvements will allow bicyclists and pedestrians to safely connect to parallel facilities, cross NC 50, and access recreational facilities. These improvements will be complemented by the intersection improvements detailed in the Roadway Design chapter.

In addition to these recommendations, it also is recommended that directional signage and kiosks for bicycle and pedestrian attractions within Falls Lake Recreation Area be installed. These enhancements not only will indicate the best way to access these facilities but also will inform the public of available amenities.

NC 50 at Old Weaver Trail

Transit

Reducing traffic congestion along NC 50 is a particularly challenging issue that, in part, can be accomplished by reducing Single Occupancy Vehicle (SOV) trips. That is, congestion will lessen if more people can be moved using fewer vehicles. The NC 50 Corridor Study examined potential transit options by considering level of demand, the nature of the destinations (dispersed employment centers), and existing and future travel times. Transit recommendations include an iterative process that builds on existing transit agency initiatives and introduces new service as population grows and land use decisions adjust.

Note: This section of the Project Workbook slightly differs from others. The issues facing transit ridership — now and in the future — are best grouped as four interrelated factors. Successful employment of transit in the future will be a dynamic process that must be flexible to adjust to the changing demographics and economics of the study area. As a result, a three-step process is recommended and Transit Support Strategies are presented.

Issue: Four Factors

Observation: Four primary factors characterize the current lack of transit along the corridor. These same factors will influence the success of transit delivery as other improvements to the roadway and surrounding landscape take shape. These factors include:

- **Growing Population** – The number of people living in the study area is rising.
- **Increased Commuting** – With the dominant employment markets located south of the study area and residential growth in Granville County expected to significantly increase, the number of commuters using NC 50 will grow. Also, reverse commuting will likely increase with the growth of employment opportunities in the Butner area.
- **Increased Congestion** – More commuters will equal more congestion on NC 50.
- **Lack of Transit Options** – Residents have few transportation options to lessen delays and reduce congestion.

As the study area population has grown, commuting to the region's primary employment centers has followed suit. This trend is expected to continue through the 2035 planning horizon. For analysis reasons, the project team divided the study area into two sections at the county line — Northern (Granville County) and Southern (Wake County). Based on the market assessment developed as part of the corridor study, the populations in the Northern and Southern sections are expected to grow at 177% and 139%, respectively, through 2035.

While the commuting patterns for future residents may not completely match current residents, it can be assumed that Raleigh, Durham, and RTP will continue to be important employment destinations for study area residents. Having more commuters on the road will give rise to traffic congestion and slower average travel times (an average increase of 10 minutes for the travel time from Creedmoor to Downtown Durham).

Discussion: The area around NC 50 faces several challenges and opportunities regarding transit service.

Challenges

- Demand is comparably low for transit service, even in the plan year of 2035.
- "Last mile" services are a challenge in many rural areas. Most respondents to the telephone survey conducted as a part of this plan live more than two miles from the study corridor, so getting to a transit stop without a car may be very difficult.
- Many commuters' workplaces are dispersed, especially in RTP. Without frequent local service to connect riders to their work sites, fixed-route service along NC 50 likely will not be successful.

- Transferring is a major deterrent to transit riders. A trip that requires riders to drive to a Park and Ride, transfer to transit, and then transfer to another transit service at the destination end may experience low ridership.

Opportunities

- Travel times and average travel speed is increasing along NC 50, increasing demand for alternatives to driving.
- Twenty-two percent (22%) of surveyed residents said they were "very likely" or "somewhat likely" to use transit if available along NC 50 in a resident telephone survey.
- Population in the area is aging, resulting in a new captive or choice rider population that could be served through transit service.
- Triangle Transit's service boundary extends to 10 miles beyond the Wake County border, which includes the study area. Triangle Transit is considering ways to extend services to this boundary and even beyond.
- Both Kerr Area Rural Transportation System (KARTS) (covering Granville, Vance, Franklin, and Warren counties) and Wake County Transportation and Rural Access (TRACS) provide demand-response rural transportation and could benefit from coordination, including accommodating cross-border trips, sharing best practices, and other information-sharing strategies.
- Triangle Transit has a vanpool program that provides a van, gas, and maintenance for a monthly fee. A route can have as few as six participants, plus a willing driver.

Recommendation:

Based on these challenges and opportunities, a three-phased process for integrating transit services into the study area is recommended: vanpool (short-term); Park and Ride facilities (mid-term); and express bus service (long-term). The timing of each step will be predicated by the success of the previous initiative.

Step 1: Vanpool

Seven percent of residents surveyed indicated they would use vanpools if provided. Though this percentage may appear low, vanpool service can be launched with a small number of participants at the outset. For example, Triangle Transit vanpools only require a minimum of six passengers to begin. Existing vanpools to Durham from Henderson and Oxford in neighboring Vance County — both much further from Durham than Creedmoor to Raleigh —have waiting lists.

> According to the survey, 22% of residents were "very likely" or "somewhat likely" to use transit if available along NC 50.

Members of a vanpool decide on a central meeting place in the mornings, such as a member's house or an available parking lot without official Park & Ride designation. Due to the flexibility of vanpooling (operational commitment is based on rider demand) and low-ridership threshold (as low as 7 riders), vanpools are an ideal short-term starting point to introduce transit service in the study area. Vanpools between the corridor and employment destinations can plant the seed of long-term express bus service.

Step 2: Establish Park and Ride Facilities

As the region considers transit service in future scenarios, it also should consider where Park and Ride facilities could be sited. At first, these locations can be meeting sites for vanpools, allowing low-cost steps to test the most popular locations. Three potential park and ride locations were identified to serve this area as a part of this study:

- Food Lion Shopping Center, Creedmoor
- Gate 2 Road/I-85 Interchange
- NC 50 and NC 98 Interchange

These locations are noted on the Bicycle, Pedestrian, and Transit map earlier in the chapter. The first two of these facilities would be located within existing, underutilized parking facilities. This provides the needed parking while limiting capital costs. The third park and ride location would use the area within the NC 50 and NC 98 interchange, where no other land use could easily fit. Park and ride facilities provide areas for vanpool and potential carpool riders to congregate, and are ideal for future express bus service.

Step 3:Express Bus Service

Once vanpool subscriptions to common locations exceed 50 riders per day, express bus service should be implemented. Current estimates (based on the Triangle Regional Demand Model) indicate 2,600 commuters travel from the Northern Study Area to Raleigh, most of which drive alone. By 2035, this number is expected to be approximately 7,300. Nine percent (9%) of telephone survey respondents indicated they would use an express bus service to Raleigh, though in reality this number will likely lower. (If 9% of commuters in 2035 used the service, it would amount to approximately 650 commuters per day.)

> If 9% of commuters in 2035 used an Express Bus Service, it would amount to approximately 650 commuters per day.

Therefore, express bus service is recommended as a long-term solution. In this scenario, two bus runs per day in the peak direction initially could be operated from the Northern Study Area (Butner or Creedmoor) to Raleigh, with potential additional stops in the Southern Study Area (NC 98) and the Towne North Shopping Center. The Northern Study Area to Durham also is expected to generate significant demand (8,200 commuters by 2035), and this route also should be evaluated. Triangle Transit recently implemented express service between Wake Forest and Raleigh, and this process can serve as a guide for planning an express service.

Transit Support Strategies

Support strategies are essential to establishing a successful, transit-friendly environment that includes the services recommended for the NC 50 corridor.

Guaranteed Ride Home Program – Successful transit programs like vanpools and peak-hour express bus service typically include a guaranteed ride home program to ensure riders can return home in the case of an emergency. ***Triangle Transit's Emergency Ride Home*** program offers riders up to six free trips home per year in the event of an emergency or if the rider must work late. Currently, riders must live in Durham, Orange, or Wake counties to participate. To encourage enrollment in vanpool programs from Creedmoor, Triangle Transit should extend this benefit to Granville County residents.

Coordination with KARTS – KARTS provides demand-response service in Granville, Vance, Franklin, and Warren counties for the general public and for human service agency clients. Wake County operates both TRACS for rural general public trips and a service for human service agency clients. As demand for cross-border trips increase, the two systems could benefit from information-sharing and enhanced coordination.

KARTS makes occasional trips into Wake, Durham, and Orange counties. When clients need a more frequent trip or when KARTS is not able to transport riders (as in a medical trip), the two agencies should coordinate a transfer. KARTS also could become part of Triangle Transit's Emergency Ride Home network. KARTS services could be used to establish a fixed-route service between Creedmoor and Butner, similar to the one currently in operation in Henderson.

NC 50 CORRIDOR STUDY

CHAPTER 8 - ROADWAY DESIGN

The Traffic and Safety chapter identified a set of issues facing the NC 50 corridor including congestion, safety, and connectivity. To address these issues, a Preferred Access Plan was developed for a set of ultimate and interim improvements. The improvements recommended for NC 50 are intended to improve safety, reduce congestion, and promote transportation choices. Connector streets are also discussed within that chapter.

Once a set of potential recommendations was determined, the next step was to look at these recommendations from a constructability standpoint. At this time, constraints such as the topography of the area and water quality concerns must be balanced with the transportation needs to arrive at the best solution. This chapter identifies the design characteristics of the proposed interim and ultimate improvements and discusses the provisions in place to address the corridor constraints.

This chapter begins with a brief overview of four critical design elements of the roadway including ***vertical geometry***, ***design speed***, ***context sensitive solutions*** and the ***Preferred Access Plan*** (ultimate and interim). The chapter also includes a summary of interim recommendations along the corridor. These improvements include widening, intersection laneage and realignment, passing zones, and Downtown Creedmoor streetscape enhancements.

Following the discussion of interim roadway design recommendations, the chapter concludes with an investigation of existing and recommended stormwater control methods.

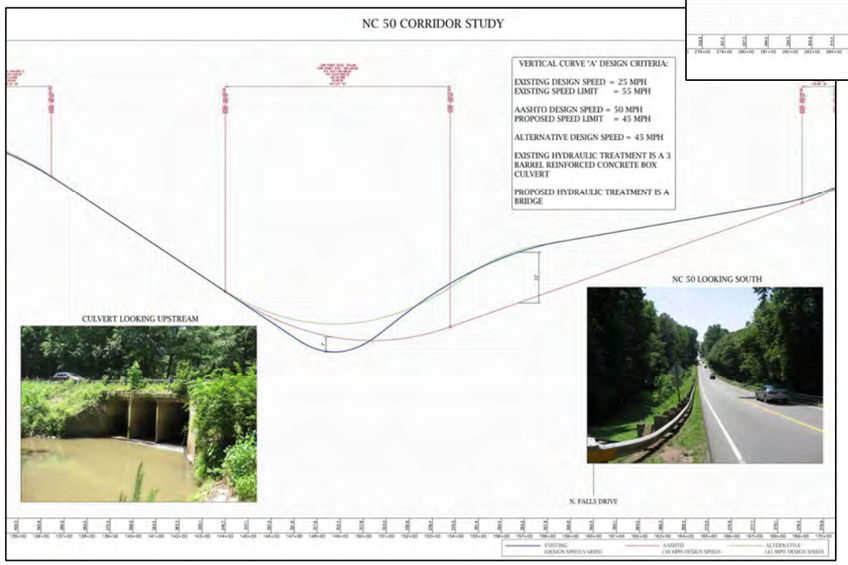
Issue: Vertical Geometry

Observation: There is a disconnect between the existing roadway topography and current operating speeds. As a result, the NC 50 facility does not meet current design standards. If NC 50 were to be re-built today, the design would be significantly different.

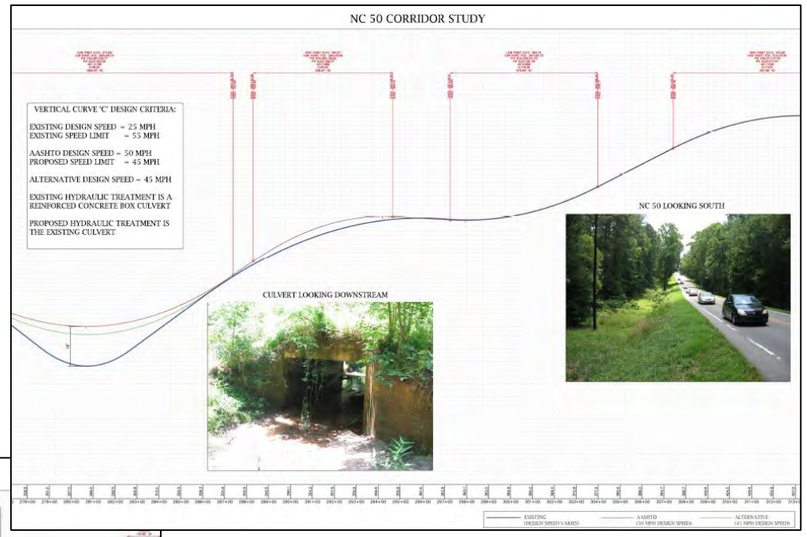
Discussion: Due to the design deficiencies of NC 50, many of the vertical curves are under-designed as noted by the graphics to the right (blue lines indicate current topography; red lines indicate improved vertical curvature). In some locations, the calculated design speed would be close to 25 mph instead of the posted speed limit of 55 mph. This results in safety and operational problems that need to be addressed. Unfortunately, the current vertical geometry will result in constructability issues as well as environmental constraints.

Recommendation:

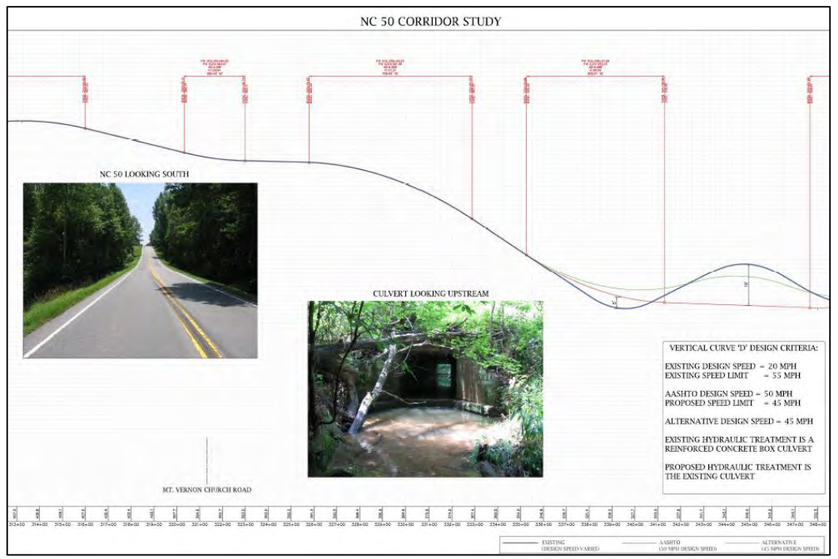
- Use a design speed of 45 mph when designing the vertical geometry in order to minimize impacts to current operations and the surrounding environment (both social and natural). ***This recommendation was endorsed by the Core Team, Oversight Committee and NCDOT participants.***



Location Reference: Near North Falls Drive



Location Reference: Near Nipper Road



Location Reference: Near Mount Vernon Church Road

Issue: Design Speed

Observation: Due in large part to the topographical constraints discussed in the previous section, NC 50 does not meet current standards for design speed.

Discussion: NC 50 has a current posted speed limit of 55 mph, which is not consistent with the design speed of the facility. As a result, NC 50 contains inherent safety and operational problems that cannot be addressed simply by widening the road.

Recommendation:

- Reduce the posted speed limit of NC 50 to a consistent 45 or 50 mph to make it more compatible with the design speed of the facility.
- For the segment of NC 50 between I-540 and the northern edge of Falls Lake, decrease the design speed from what NCDOT would typically use (55 or 60 mph) to 45 mph. This reduction will help limit the impacts (to trees, property and right-of-way) to the area surrounding NC 50. North of the lake, a more rural 55 mph design speed can be employed.

Issue: Context Sensitive Solutions

Observation: NC 50 lies within the Neuse River Basin, with most of the roadway draining directly or indirectly into Falls Lake and the associated watershed area.

Discussion: The portion of NC 50 adjacent to Falls Lake will continue to have a direct impact on water quality of the lake.

Current design practices would require approximately 120' right-of-way to accommodate the widening of NC 50. The NC 50 Corridor Study proposed typical section has a recommended typical ROW width of 94' – 114' that will limit impacts to the homes and the natural environment surrounding NC 50. The proposed cross-sections for the ultimate roadway are shown at right.

Recommendation:

- Use the proposed 94' and 114' ROW typical section through the critical watershed area to limit environmental and property impacts.
- Enhance stormwater design treatments along the entire NC 50 corridor to treat stormwater runoff prior to draining into watershed area.

Issue: Preferred Access Plan

Ultimate Preferred Access Plan

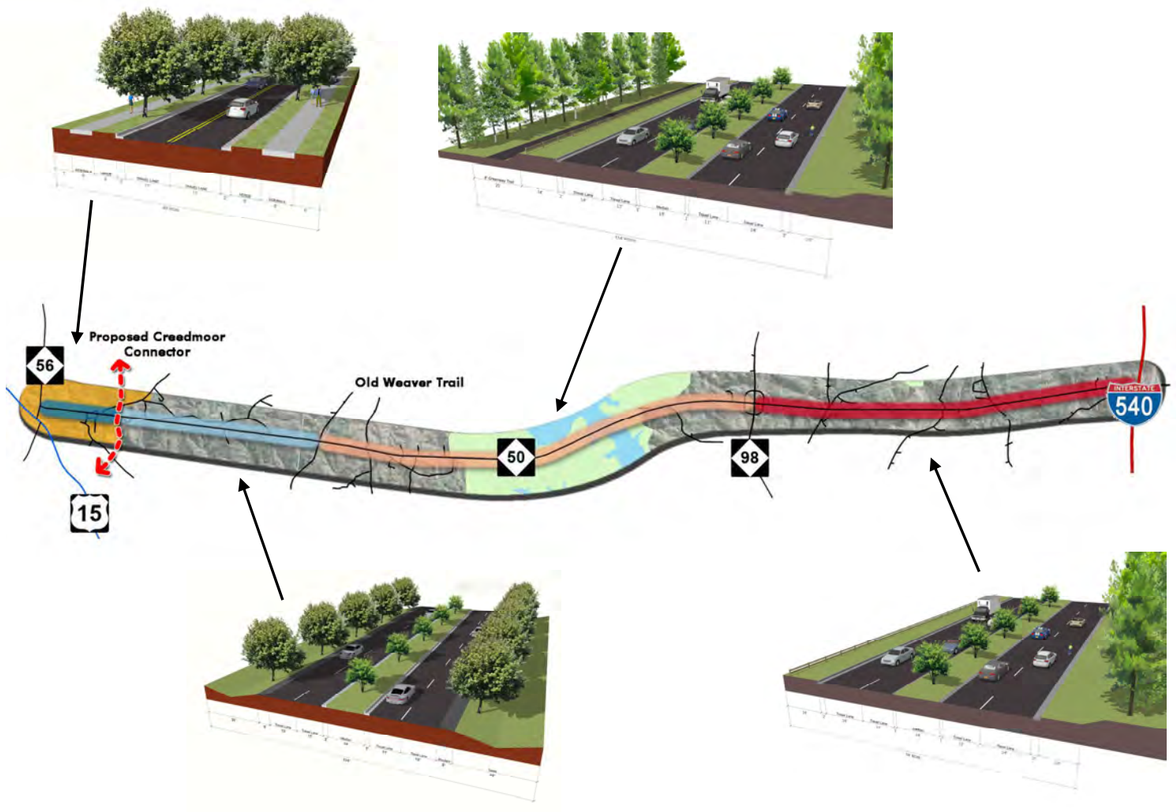
As outlined in the previous chapter, the ultimate recommendation for NC 50 is to widen the corridor to a four-lane cross-section with a plantable median. This will address future traffic volumes, design limitations, and projected congestion in the area.

With this in mind, the map to the right highlights the recommended cross section by corridor zone (see highlights). The corresponding typical right-of-way reflects the best case scenario for limiting environmental impacts and property takings. Ultimately, final ROW impacts will be determined at the time of final construction design plans. Larger versions of these cross-sections can be found later in this chapter.

Interim Preferred Access Plan

The following section describes several recommended interim solutions that will address high priority safety, traffic and congestion issues along the corridor. It is here that a collection of small and medium size and more cost-effective design improvements can be implemented within a shorter timeframe than is typically associated with the Transportation Improvement Program (TIP). Through the implementation of these smaller type projects, the traveling public and business community will be able to realize a higher level of mobility and safety along the NC 50 corridor in the short-term.

Preferred Access Plan - Ultimate



Issue: I-540 to Norwood Road

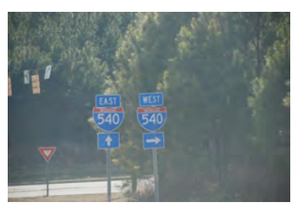
Observation: This section of NC 50 is currently a two lane road with operational and safety concerns.

Discussion: The need to improve this section of NC 50 stems from the increased demand from residents of northern Wake County and southern Granville County. Additionally, NC 50 has design deficiencies which should be addressed in order to improve safety.

The improvements for NC 50 from I-540 to Norwood Road are proposed for the interim condition but also reflect the ultimate improvements proposed for the area. In several places throughout the corridor, interim improvements have been proposed that do not reflect the ultimate build-out condition.

Recommendation:

- Widen NC 50 to a four-lane median divided roadway from I-540 to Norwood Road.



Location Reference: I-540 to south of Goose Pond Road

Issue: I-540 to Norwood Road

Recommendation:

Widen NC 50 to a four-lane median divided roadway from I-540 to Norwood Road.

Location Reference: Goose Pond Road to N. Falls Drive

Issue: I-540 to Norwood Road

Recommendation:

Widen NC 50 to a four-lane median divided roadway from I-540 to Norwood Road.

Location Reference: N. Falls Drive to south of Old Warden Road

Issue: I-540 to Norwood Road

Recommendation:

Widen NC 50 to a four-lane median divided roadway from I-540 to Norwood Road.

Location Reference: Old Warden Road to Bedford Hills Court

Issue: Intersection Improvements

Observation: Various intersections along the NC 50 corridor are in need of operational and safety improvements. The following intersections are being recommended for improvements because they have been identified as high priority intersections by the Oversight Committee participants and members of the public, and were substantiated with crash data. Some of the intersection improvements are recommended to alleviate problems associated with inadequate sight distance, skewed angles, topographical challenges and insufficient laneage.

Discussion: Because NC 50 was developed as a farm to market road, certain segments and intersections are not consistent with current design standards. Additionally, there is a lack of left turn lanes. Left turn lanes prevent turning traffic from blocking through traffic while they wait for gaps to turn. On a two-lane road such as NC 50, the delay caused by left-turning traffic can be significant. This delay results in driver frustration as well as decreased efficiency of the overall roadway network.

These improvements are recommended for the interim scenario. Eventually, NC 50 will be a four-lane median divided roadway from I-540 to Creedmoor. Until that time, interim improvements are needed in order to increase safety and operational efficiency.

Recommendations:

Shooting Club Road and Nipper Road

Currently Shooting Club Road and Nipper Road are offset intersections along NC 50. In order to improve the safety of these two intersections, a realignment of Shooting Club Road is proposed. In addition to the realignment, eastbound and westbound left turn lanes are proposed on Nipper Road and Shooting Club Road respectively. It should be noted that the realignment of Shooting Club Road would require significant environmental mitigation due to the presence of a blue line stream (Upper Barton Creek).

Longacre Drive

The intersection of Longacre Drive and NC 50 is at the entrance to the Somerset neighborhood. In order to improve safety at this intersection, a northbound left turn lane is proposed on NC 50.

Mt. Vernon Church Road

The intersection of Mt. Vernon Church Road and NC 50 has one of the highest crash rates along the NC 50 corridor. Most of these crashes involve turning vehicles. In order to improve safety at this intersection, dedicated left turn lanes on all approaches are proposed. These dedicated left turn lanes are expected to reduce the amount of collisions at the intersection as well as improving the level-of-service.

Old Creedmoor Road

The current intersection of Old Creedmoor Road and NC 50 has an undesirable skew and sight distance problem. In order to improve safety at the intersection, realigning Old Creedmoor Road is recommended. In addition to the realignment of Old Creedmoor Road, a northbound left turn lane on NC 50 and an eastbound left turn lane on Old Creedmoor Road are proposed as well.

Beaverdam Recreation Access/ Sandling Beach Access

The intersection of the Beaverdam Recreation Access/Sandling Beach Access and NC 50 is located just north of Falls Lake. Due to a high number of turning traffic and large vehicles, northbound and southbound left turn lanes are proposed at this intersection to improve safety and operations.

Boyce Bridge Road

The intersection of Boyce Bridge Road and NC 50 currently has an undesirable skew. This skew results in sight distance and safety concerns. Boyce Bridge Road should be realigned to provide a more perpendicular intersection. This project also proposes the addition of a northbound and a southbound left turn lane on NC 50.

Beaver Dam Road and Old NC Highway 21

In response to existing conditions as well as public comments, this study proposes the realignment of Beaver Dam Road where it ties into NC 50. Additionally, the intersection of Beaver Dam Road and Old NC Highway 21/Perry Farm Road is proposed to be realigned. In order to improve the safety and operation of the intersection of Beaver Dam Road and NC 50, a dedicated southbound left turn lane is proposed on NC 50.

Issue: Passing Zones

Observation: NC 50 is a two-lane road without safe passing zones.

Discussion: One of the most common complaints of drivers on NC 50 was the amount of time spent following another vehicle. In fact, level-of-service (LOS) for two-lane roads is defined by the Highway Capacity Manual by the percent time spent following (PTSF) another vehicle.

In order to decrease driver frustration and increase safety, the design of NC 50 should provide safe opportunities for passing vehicles.

Recommendation:

- Create two passing zones – one in the northern section of the study area and one in the southern section. The portions of NC 50 near NC 98 and Old Weaver Trail are recommended passing zones that include full or partial widening of the corridor.
- ***NC 98*** - The existing bridge at NC 98 should accommodate additional passing lanes without the need for major structural changes. Multilane widening should be accommodated through the existing ramp areas, as seen in the plan view. Ultimately, this improvement should not require additional long-term improvements.
- ***Old Weaver Trail*** – The passing zones at Old Weaver Trail are recommended to be offset to limit construction costs and ROW impacts. As seen in the plan view maps, an additional lane widening is recommended for the approach lanes of the intersection. This will allow vehicles to pass safely before and after the Old Weaver Trail intersection.

NC 98 Passing Zone


NC 50
WESTERHAM DRIVE
NC 98 WB OFF RAMP
IMPROVEMENTS
• ADD NORTHBOUND/SOUTHBOUND PASSING LANES
• LANDSCAPING
NC50 CORRIDOR STUDY
PROPOSED DESIGN CONCEPT
NC HIGHWAY 98 INTERCHANGE PASSING ZONE - SHEET 2 OF 2
50' 0' 50' 100' 200'
NORTH
Kimley-Horn and Associates, Inc.
NC HIGHWAY 98


Before


After

Old Weaver Trail Passing Zone


NC 50
NC50 CORRIDOR STUDY
PROPOSED DESIGN CONCEPT
OLD WEAVER TRAIL PASSING ZONE - SHEET 3 OF 3
50' 0' 50' 100' 200'
NORTH
Kimley-Horn and Associates, Inc.


SR 1901 OLD WEAVER TRL 2800
BUTNER
BOATING ACCESS
STOP
Cedar Creek Gallery
UNION BAPTIST

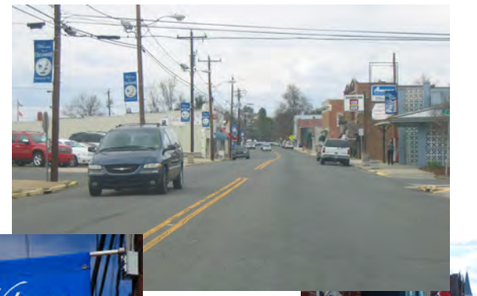
Issue: Downtown Creedmoor Streetscape Improvements

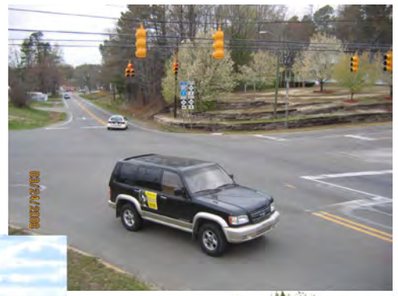
Observation: Downtown Creedmoor contains a section of NC 50 that differs from the rest of the corridor. As such, a unique solution should be applied to this portion of the corridor.

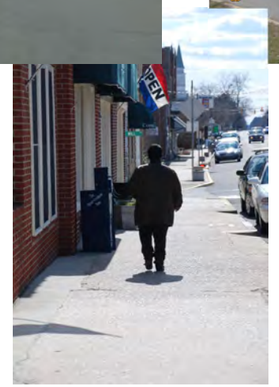
Discussion: Downtown Creedmoor is an urban setting compared to the rural nature of NC 50 to the south. This urban context requires a more pedestrian-friendly environment that includes street trees and pedestrian facilities. These elements combine to create a scaled environment that allows residents to choose whether to walk, bike, or drive between destinations in downtown Creedmoor.

Recommendation:

- Streetscape improvements are proposed for NC 50 in downtown Creedmoor. These improvements include street trees, sidewalk improvements, high-visibility crosswalks, entrance monuments, parking and repaving.








NC 50
CORRIDOR STUDY
PROPOSED DESIGN CONCEPT
DOWNTOWN CREEDMOOR STREETSCAPE - SHEET 2 OF 3
50' 0' 50' 100' 200'
NORTH
Kimley-Horn and Associates, Inc.
SAMBERFORD ROAD
LYON STREET
CHURCH STREET
ROGERS AVENUE
LEGION STREET


NC 50
CORRIDOR STUDY
PROPOSED DESIGN CONCEPT
DOWNTOWN CREEDMOOR STREETSCAPE - SHEET 3 OF 3
50' 0' 50' 100' 200'
NORTH
Kimley-Horn and Associates, Inc.
DOUGLAS DRIVE
PARK AVENUE
CHIEF STREET
MILL STREET
LYON STREET
NC 50
WILTON AVENUE
LAKE ROAD
FLEMING STREET
MASONIC ROAD
SANDERFORD ROAD

Issue: Current Stormwater Control

Observation: NC 50 does not meet current design standards. As such, if NC 50 were to be re-built today, the design would be significantly different.

Discussion: NC 50 has been a two-lane rural road for decades. Once a farm-to-market road, this facility has transitioned to a corridor with high levels of commuter traffic and large trucks as well as a gateway to cheap land and sprawling development. The only aspect of NC 50 that hasn't changed is its stormwater control. In fact, very little stormwater treatment exists along the corridor today other than the existing roadside ditch cross section.

With 75% and 31% available land for development in Granville and Wake counties, respectively, regulatory experts face a dilemma in protecting water quality. While the new NCDENR Falls Lake nutrient strategy rules will help guide development patterns to limit nutrient runoff into the impaired waters, the use of Best Management Practices (BMPs) can further reduce nutrient runoff levels. Using the Upper Neuse Site Evaluation Tool, the effect of BMPs in development was modeled for the study area. As shown in the charts below, BMPs potentially could

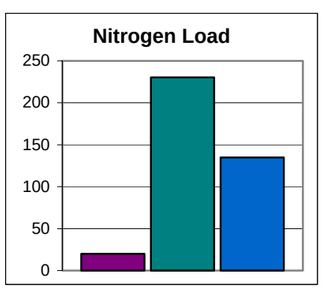
reduce Nitrogen, Phosphorous, and sediment pollutant load by 39%, 51%, and 85%, respectively.

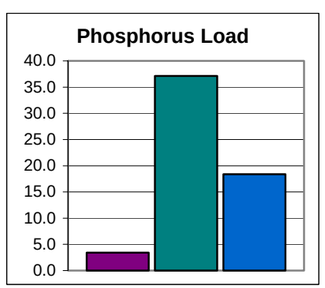
As land is developed, new impervious surfaces increase the amount of runoff during rainfall events, disrupting the natural hydrologic cycle. Without stormwater controls, increased runoff can erode stream channels, increase pollutant loadings, cause downstream flooding, and prevent groundwater recharge. The increased runoff can degrade water quality in all types of waters, including those classified as water supply watersheds such as the Falls Lake reservoir. Stormwater runoff and its treatment was a key consideration of the NC 50 Oversight Committee in the future design of the roadway. Protecting the Falls Lake watershed area will safeguard fish and wildlife habitat, human health, recreation, and drinking water supplies.

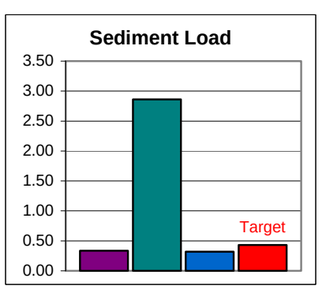
To further this objective, the project team together with CAMPO staff worked to incorporate proven design techniques to filter and treat stormwater runoff as a result of widening NC 50. Today, limited applications along the corridor are dedicated to treating stormwater runoff. The discussion that follows provides a summary of the proposed design techniques for the NC 50 corridor. Much of this information is referenced in ***Stormwater Best Management Practices Toolbox*** (NCDOT, Version 1, March 2008) and ***Stormwater BMP Manual*** (NCDENR, July 2007).

Annual Pollutant Load and Target Summary

Total Site Annual Load	Existing Landuse	Design without BMPs	Design with BMPs	Target	Meets Goal?
Total Nitrogen (lb/yr)	20	230	135		
Total Phosphorus (lb/yr)	3.4	37.1	18.4		
Sediment (ton/yr)	0.34	2.86	0.32	0.43	Yes







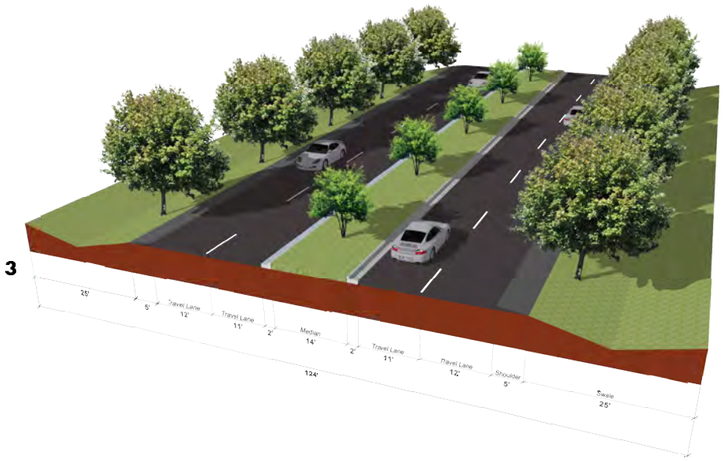
> Most of these programs attempt to ***protect, maintain, and restore water uses*** to the surface waters through the use of narrative based effluent limitations in the form of best management practices. Stormwater BMPs are implemented as a way of treating or limiting pollutants and other damaging effects of stormwater runoff in order ***to meet legislative and North Carolina Administrative Code requirements***. In North Carolina, the management of stormwater runoff through ***non-structural BMPs is the preferred method*** of reducing pollution from developing suburban and rural areas.
>
> -NCDOT BMP Toolbox

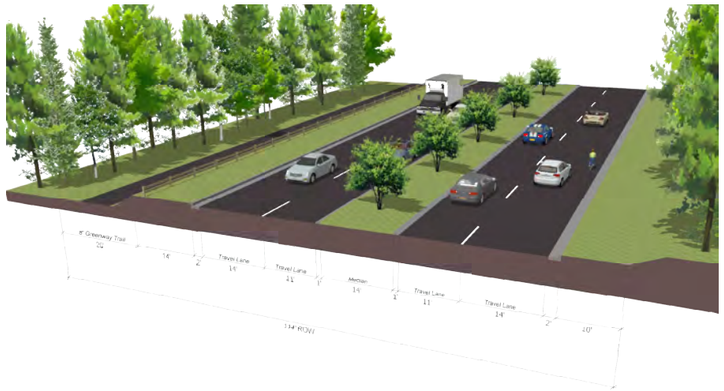
NCDOT has been issued a statewide National Pollutant Discharge Elimination System (NPDES) stormwater permit from the North Carolina Division of Water Quality (NCDWQ), a division of the North Carolina Department of Environment and Natural Resources (NCDENR). This permit authorizes NCDOT to discharge roadway stormwater runoff and borrow pit wastewater into surface waters of the state using appropriate stormwater management. As part of this program, NCDOT developed a BMP toolbox of stormwater treatment structures that can be applied to the roadway improvements associated with the NC 50 corridor.

Recommendation:

BMPs that provide enhanced pollutant reduction depend on numerous factors including topography, water flow characteristics, and proximity to natural water features. Ultimately, stormwater applications should be applied to specific locations along NC 50 during final design. However, the following techniques are recommended for specific context areas along the corridor (i.e., in proximity to and outside of the critical watershed, etc.). The context map on the following page highlights three primary sections of the NC 50 corridor. Depending on the recommended cross section and proximity to the critical watershed area, several stormwater BMP techniques should be applied to each section (as denoted in the following descriptions).

Each technique has been proven successful within the region. However, it should be understood, based on discussions with DWQ and Corps representatives, stormwater runoff will require treatment to reduce nutrient pollutants entering the watershed areas. This resolution applies to both curb and gutter and shoulder typical sections.





Preformed Scour Holes: context sections 1, 2, & 3

Preformed scour holes are riprap depressions constructed at the outlet of a point discharge. A preformed scour hole dissipates energy and diffuses flow for specific applications.

Applications for preformed scour holes should be implemented throughout the NC 50 corridor for small drainage areas and flat outlet areas outside the clear recovery zone. For the purpose of diffusing flow, preformed scour holes can be used downgrade for a maximum of 18" pipes and 10ft^3/sec.

One of the key advantages of using preformed scour holes is that they typically do not require significant right-of-way.

Multiple Outfall Locations: context sections 1 & 3

Based on the topographical challenges along NC 50, it is understood that multiple outfall locations are needed to adequately handle extreme cases of stormwater runoff. For curb and gutter locations, this will necessitate the use of catch basins at specific locations as determined by the hydrology analysis during the roadway design phase of the project.

Level Spreaders: context sections 1, 2 & 3

A level spreader provides a non-erosive outlet for concentrated runoff by diffusing the water uniformly across a stable slope. This treatment should be implemented only where uniform, diffuse flow can be achieved downgrade of the level spreader. Its application is appropriate when concentrated runoff from the roadway is conveyed by a ditch or storm pipe toward the buffer zone of a receiving water body. Benefits of using a level spreader include:

- Mitigation of downgrade erosion and ponding
- Reduction in water velocity, which allows larger particles to settle

Stormwater Wetlands: context sections 1, 2 & 3

Along the NC 50 corridor there are locations of manmade and natural ponds that provide an opportunity for stormwater filtration. Depending on their proximity to the corridor, these impacted ponds can be treated or enhanced into viable stormwater wetlands. Enhanced stormwater wetlands reduce peak discharge to surface waters and recharge groundwater. Stormwater wetlands are constructed systems that mimic the functions of natural wetlands and use physical, chemical, and biological processes to treat stormwater pollution.

A few advantages of stormwater wetlands include: 1) they are one of the best BMP designs for maximum TSS, nitrogen, and phosphorus removal while also providing stormwater volume control; 2) they can provide an excellent habitat for wildlife and waterfowl; and 3) they are aesthetically pleasing when properly maintained and landscaped.

A few of the drawbacks of using stormwater wetlands include: 1) they will likely require easements or right-of-way acquisition outside of the NC 50 corridor right-of-way; 2) they need to meet critical water balance requirements to stay healthy; and 3) poorly maintained stormwater wetlands can be colonized by invasive species that out-compete native wetlands plants.

Bio-Filtration Cells: **context sections 1, 2 & 3**

The use of bio-filtration cells can be an effective BMP for reducing the level of pollutant runoff into the natural system. Bio-filtration (or bio-retention) techniques rely on the use of plants and soils for removal of pollutants (suspended solids, Nitrogen and Phosphorus) from stormwater runoff through absorption, filtration, biological decomposition and sedimentation.

Some advantages of using bio-filtration cells include: 1) they are effective at reducing peak runoff rates for relatively frequent storms, reduce runoff volumes, and recharge groundwater; 2) they are not bounded by size limitation – can be effective as a standalone application or multiple; 3) their flexible adaptation to urban/suburban retrofits; and 4) they are best applied to steep "fill" areas with limited right-of-way.

A few drawbacks include: 1) they require frequent maintenance of plant material and mulch layer; 2) the surface soil layer may clog over time; 3) a single unit can only serve a small drainage area; and 4) they may require the use of guardrail.

Hazardous Spill Basin: context section 2

A Hazardous Spill Basin can be an effective BMP at mitigating the accidental release of hazardous materials from trucks or other toxic materials. This technique is best applied to the Falls Lake Critical Watershed area where the protection of surface water quality will be essential.

Inflow to the hazardous spill basin is trapped by an outlet structure until emergency response activities (i.e., clean-up crews) are complete and the hazardous material is removed. Ideally, the basin should be applied prior to a stream crossing.

Some advantages associated with using hazardous spill basins include: 1) the basins provide a higher level of protection for critical watershed areas; 2) they are applicable in priority linear highway applications.

A few drawbacks to Hazardous spill basins are: 1) under normal operation, basins do not prevent the free-flow of runoff; 2) they require a high degree of maintenance and repair.

(Source: NCDOT)

NC 50 CORRIDOR STUDY

CHAPTER 9 - PLACEMAKING

Place-making embodies the movement to create more livable communities, identifiable character, and a higher quality of life. The process of place-making celebrates the uniqueness of a community and identifies the physical improvements and planning initiatives that can be incorporated in future plans. Place-making not only identifies the character of an area with architecture, streetscapes, and branding but also connects the social fabric of those who live in, work in, and visit an area. Place-making can be used within the context of a municipality or neighborhood, or for an entire corridor seeking a unified identity.

Place-making rarely happens spontaneously. It results from deliberate actions by a community. This generally happens as an outcome of a community planning initiative or through complementary designs by private developers. The most successful communities create great places through a combination of public investments and partnerships with the private sector.

Specific place-making issues identified by design charrette participants, planning staff and municipal leaders include the need for additional public spaces, creation of specific activity centers, defining a sense of place, protecting the rural character of southern Granville County, and gateway enhancement and wayfinding signage opportunities.

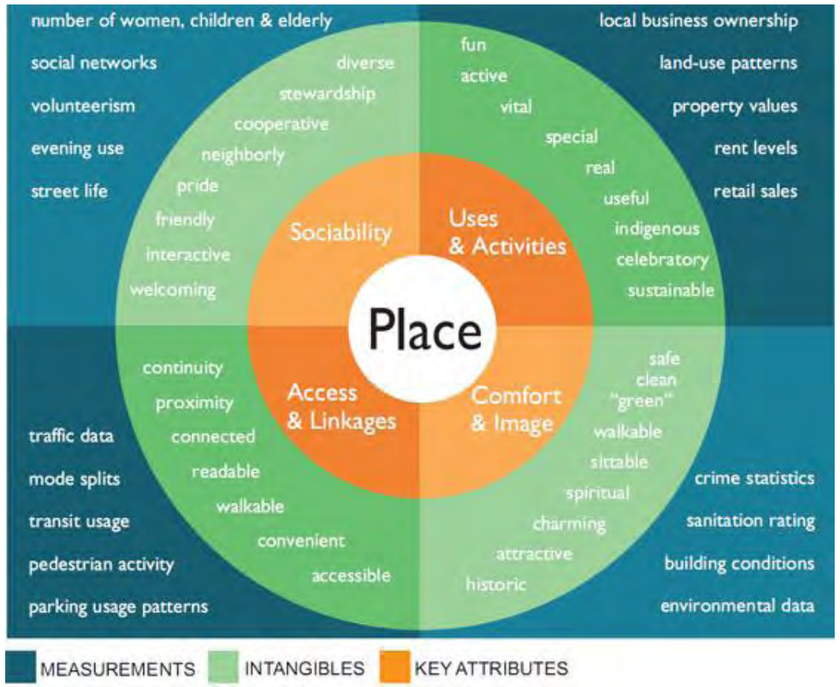
The Project for Public Spaces created the Place Diagram based on their evaluation of thousands of public spaces around the world. The diagram serves as a tool to help judge any place as good or bad.

Issue: Public Spaces

Observation: Few public spaces exist in the study area. Sites are designed to accommodate the automobile and lack human scale. Restaurants don't have outdoor seating and most neighborhoods lack community gathering places or quality open space.

Discussion: Public spaces promote human contact, social activities, and community involvement. The best public spaces are safe, welcoming, and accommodating for a diversity of users; are well maintained; relate well to adjacent uses; reflect local culture or history; and include visually interesting features. Also, in more formal settings, these spaces can be programmed with events and can become opportunities for local retailers and businesses to showcase their products and services. Examples include plazas, squares, parks, marketplaces, and public greens.

What Makes a Great Place? **Project for Public Spaces**



Recommendation:

Several actions may be taken to increase public spaces including:

- Identify strategic locations where neighborhoods/businesses could benefit from the creation of a public space.
- Encourage the creation of public spaces in new development and redevelopment plans. Refer to The Creedmoor Connector/Mixed-Use Village (Site B in **Chapter 13**) for features that could be included in these plans.
- Promote the use of human-proportioned architectural features and site design elements to encourage human activity and scale.

Issue: Activity Center

Observation: The study area lacks a specific activity center or destination. As the roadway user travels along the corridor he or she can see few connections between developments or areas that one would consider walkable. Areas developed or designated for development have been isolated with no connections to anything else.

Discussion: Activity centers typically are a mixture of uses with an emphasis on walkability. Activity Centers encompass several other aspects of what makes a great place. People want a destination that offers them a variety of things, whether dining, entertainment, integrated public open space, outdoor activity, shopping, etc. The idea is to offer many of these things in one location and create a pedestrian-friendly environment for people to walk from place to place.

Recommendation:

Throughout the public involvement process, the intersection of Old Weaver Trail and NC 50 was identified as a location for a potential activity center. Not on the current general development plan, this area was seen as a specific place of interest for a destination based activity center that would attract not only potential business and economic vitality but also home buyers with a focus on a walkable community. With Site B as an example of development that incorporates an activity center, characteristics typically used to identify future locations and features for the activity center include:

- Strategic locations where neighborhoods/ businesses could benefit from the creation of a mixture of uses connected by sidewalks and trails that provide walkability.
- A mixture of residential uses that promotes community togetherness with connections to public open spaces.
- Designated retail and commercial areas within the activity center in proximity to the residential areas to promote community strength and walkability.
- Development that attracts not only residents but also business, entertainment, shopping, and dining.
- Attractive streetscapes with sidewalks and/or multi-use paths with attractive lighting and vegetation.

Issue: Sense of Place

Observation: The study area lacks an identity or "sense of place." Design charrette participants view the corridor as a place to travel through rather than a place with destinations. No gateway signage, directional signage, or community brand exist to distinguish the study area from other areas of the community.

Discussion: When defining a "sense of place" for this study area, there isn't a need to create an identity that wouldn't fit otherwise. The objective is to create an identity using the character and "flavor" that the study area has to offer. For example, architectural styles that are tall, modern, and created from materials in other parts of the country would not be recommended if the area itself is rural and "small town" in nature.

The identity of a community comes from its environment, tradition, and culture. A branding of that identity represents the pride of community members, and a promise made to visitors for what to expect when they arrive. A brand distinguishes a community in the marketplace and should be apparent in every facet of the community.

Absent this reinforced identity, a corridor like NC 50 quickly becomes a forgettable place that lacks investment by the community and property owners. Carefully located gateway signage and identified areas for wayfinding signage placed throughout the corridor and downtown areas not only are functional in terms of identifying where the roadway user is but also help solidify the idea that he or she has entered somewhere special.

Recommendation:

Several actions may be taken to address the lack of identity in the NC50 corridor, including:

- Creating a uniform brand and marketing plan for the study area. This plan should be used consistently to provide the community with an easily recognizable identity. The resulting plan should represent not only the scale of the study area but also projected development. The brand identity and marketing plan should highlight elements of the study area that make it unique, including its rural nature, the farmland and equestrian settings, the National Guard training facility, and the Amran Shriner's Temple.
- Creating recognizable entrances (gateways) to the study area to distinguish it from adjacent areas of the community — including historic downtown Creedmoor — and to communicate to drivers that they have entered a special place.
- Promoting mixed use, compact development with well-designed places for people to gather that encourages them to spend time and money in the corridor.
- Creating a brand consistent with the setting and values of the study area. Do not force a brand or marketing plan that takes away from the nature of the area. Branding, marketing, and gateway/monumentation need to stand out while still fitting in.
- Protecting the recognized rural character of southern Granville County through viewshed protection, appropriate architectural themes, materials, scale, and low impact development strategies.

NC 50 CORRIDOR STUDY

CHAPTER 10 - FOCUS AREAS

Focus areas are small sites within a study area that can demonstrate recommended best development practices in the community. Specific design elements for focus areas are intended to serve as guidelines for future development activity in the study area. Focus areas are a critical tool to visualize how recommendations and improvements will take shape beyond the planning phase of the study.

The consultant team worked with members of the Project Oversight Committee to identify two key focus areas for further study. These focus areas represent influential properties for implementing the community's vision and examining the opportunities associated with thematic challenges along the corridor. These challenges include:

- water quality
- traffic congestion
- preservation of environmentally sensitive and significant areas
- lack of housing variety
- decentralized growth patterns

Criteria considered when selecting the sites included geographical distribution, the diversity of issues/ opportunities, and priority locations according to the community. Themes that emerged during the process to select sites for the focus areas included conservation-based subdivision initiatives, town center and mixed-use developments, access management, and preservation of open space.

The type of land uses or development patterns assumed in the site design studies are for illustrative purposes only and could vary significantly based on future landowner interests, development approvals, or location of available infrastructure. However, property owners with a similar vision, or with sites sharing similar characteristics, should consider the best development practices highlighted in this chapter when developing their own land.

Focus Area Locations

The focus areas are shown on the Focus Area Map to the right.

Site A is located in northern Wake County at the intersection of NC 50 and Old Weaver Trail. This site was selected to demonstrate:

- conservation-based subdivision design
- integrated approach to Wake County's designated activity centers
- open space preservation
- integration of multi-use trail design
- low impact development (LID)
- future signalization at Old Weaver Trail
- integration with nearby Falls Lake State Park

Site B is located in Granville County just south of the existing Creedmoor town limits and generally at the future intersection of NC 50 and the planned Creedmoor Connector. This site was selected to demonstrate:

- village center development pattern
- mixture of uses
- diversity of housing
- walkable community
- open space preservation
- low impact development (LID)

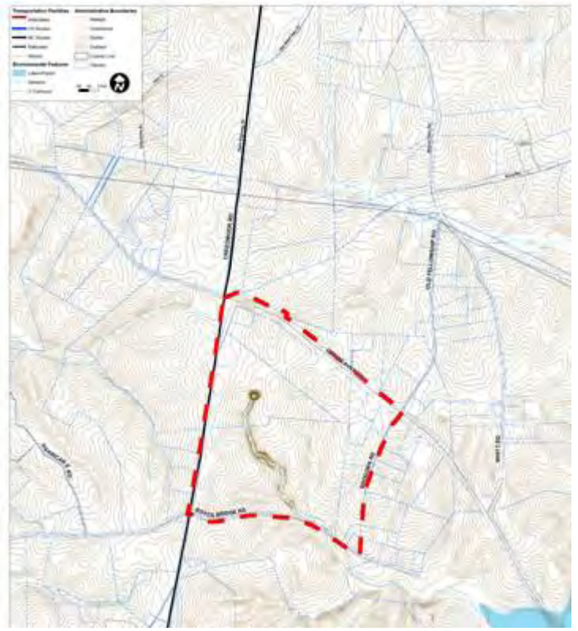
Planning Process

Site design studies for both focus areas represent possible build-out scenarios for undeveloped parcels that promote mobility, development opportunities, and a sense of place. Each site design study included an illustrative master plan concept and a dimensional perspective drawing. Drawings were done over aerial photography with printed property lines, environmental constraints, and street networks. All of the site design studies were prepared with input from participants of the public design charrette.

An inventory of existing conditions was completed for the two focus areas using geographic information systems (GIS) data, aerial photography, field photos, and windshield surveys. This information was used to characterize the study area based on existing land use patterns and development conditions. Particular attention was paid to the surrounding built environment and environmental features.

A review also was conducted of locally adopted plans, programs, and policies prepared by and for Granville and Wake Counties and their municipalities. This information was used to inventory existing development controls and identify potential barriers for implementing development alternatives.

Based on the input provided during the public design charrette, the existing conditions analysis, and the review of locally adopted plans, programs, and policies, site design studies were created for each focus area.



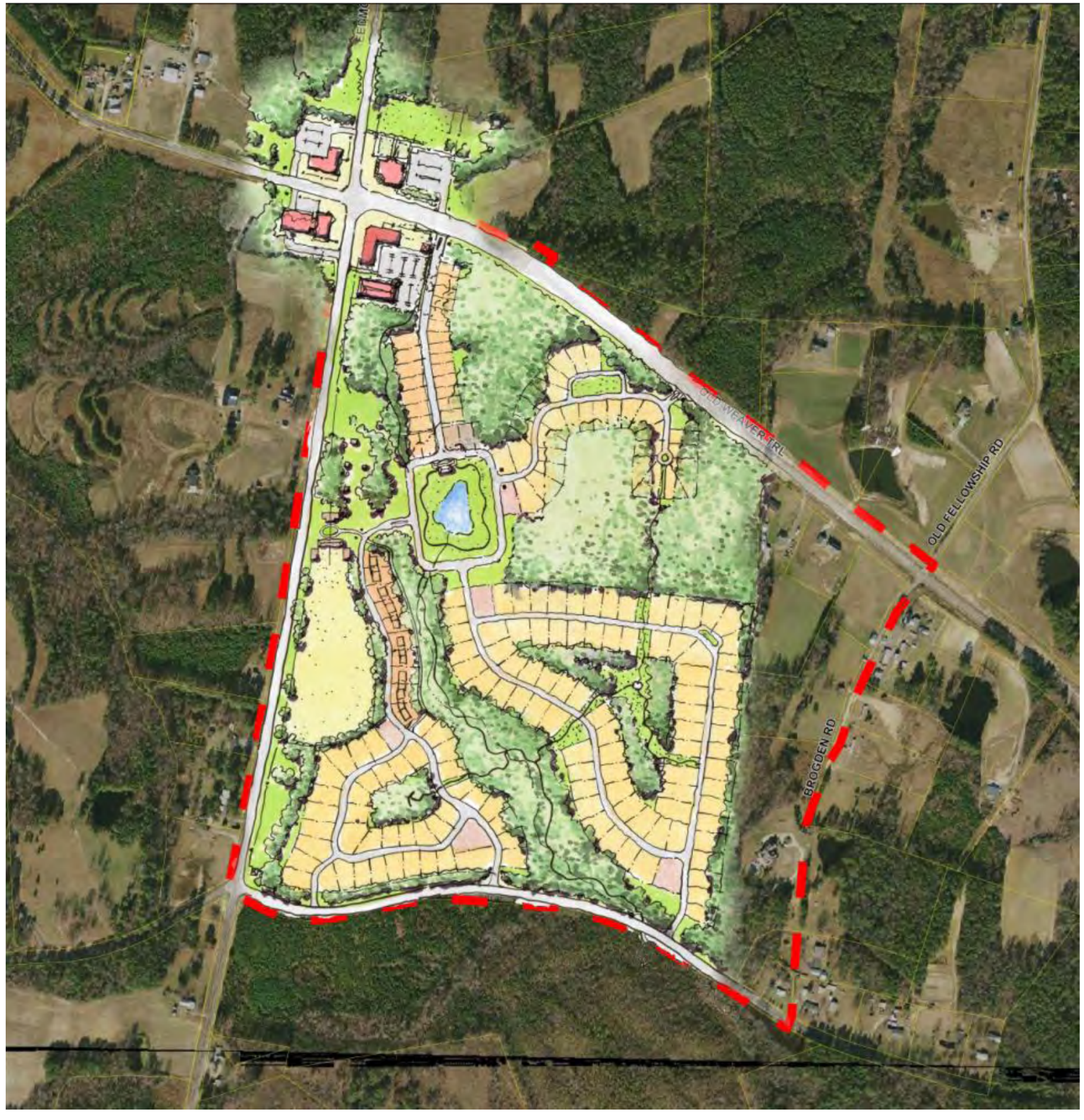
Site A: Old Weaver Trail

The Old Weaver Trail site is approximately 140 acres in unincorporated Wake County just south of the Granville County line. The site generally is located at the southeast quadrant of the intersection of Old Weaver Trail and Creedmoor Road and includes the entirety of the intersection.

This focus area was chosen to illustrate a conservation-based subdivision design. In this example, the development program for this site contains 170 dwelling units as a mixture of single family homes, duplexes, and townhomes. In addition, the development includes an equestrian center, walking trails, and LID design elements to protect water quality. While the design of the site provides more density than the underlying zoning on the site allows, it preserves 50 percent of the site as open space. The current code only requires 35 percent open space. Density bonuses can be tools used to incentivize developers to develop alternatives to traditional subdivisions.

Commercial uses in the study area are concentrated at an intersection activity node to meet the daily needs of neighborhood residents and surrounding neighbors. A library annex anchors the southeast quadrant of the intersection and is integrated with a trailhead for a future greenway as well as a potential farmers market. This intersection was chosen to demonstrate the intent of the activity centers described in the Wake County Comprehensive Plan and to suggest that the existing activity center, identified at Sandy Shoals should be redirected to the intersection at Old Weaver Trail. Arguments for relocation of the activity center designation include:

- Sandy Shoals is in the critical watershed area (Old Weaver Trail is outside).
- A future signal is planned at the NC 50 intersection with Old Weaver Trail.
- The focus area site allows integration of future commercial and residential uses.



This drawing illustrates the activity node at the intersection of Old Weaver Trail and NC 50. Buildings are brought to the street with parking in the rear. Sites are significantly buffered and landscaped and buildings are designed at a neighborhood scale with a rural architectural theme consistent with the character of town. The southeast quadrant includes a potential Wake County Public Library Annex, greenway trailhead, and potential farmers market. Other potential uses include a bank, restaurant, and small scale retail.

Site B: Creedmoor Connector/Mixed-Use Village

The Creedmoor Connector site is approximately 180 acres located on the west side of NC 50 just south of the existing Whitehill neighborhood. This site illustrates a mixed-use village concept with a mix of housing types and retail uses. The site plan is not intended to replicate vertical mixed use. Instead, the plan demonstrates the modest demand for neighborhood-scale retail uses, including an anchor grocer and diverse housing that incorporates senior housing as identified in the market study prepared for this study.

The site plan includes 230 single-family housing units, 100 multi-family units, and 320,000 square feet of senior housing in a multi-family format. In addition to the housing variety, the site includes a village center that contains 185,000 square feet of commercial uses. The site is designed as a walkable community with 40 percent open space, walking trails, and numerous low impact development strategies.

The future Creedmoor Connector provides the northern limit of the site. For this reason, access management standards for the connector as well as NC 50 are demonstrated. Access management in this concept promotes consolidated and coordinated site access, enhanced connectivity (internal and external), and optimum spacing for median breaks and signalization to promote safe and efficient traffic operations. The internal connectivity and appropriately sized streets offer enhanced mobility for pedestrians and cyclists, and the site intensity and concentration of senior housing supports future transit service.

An integrated system of trails and sidewalks helps promotes walkability to the diverse uses (housing, parks, and commercial) as well as enhances the connection to downtown Creedmoor less than a mile away.

This drawing illustrates the northeastern portion of the master plan, including the village center and retail uses with senior housing and single family in the background. The site incorporates smaller-scale retail with buildings that exhibit 4-sided architecture and interior parking.

US 50 CORRIDOR STUDY

CHAPTER 11 - INVITING SUCCESS

Capital Area MPO

The ultimate success of the NC 50 Corridor Study rests on the ability of local officials and leaders to carry out the recommendations of the plan. This effort is made easier by describing a series of defined steps — or action items — to move the process forward. In simple terms, a well-crafted Action Plan provides a framework or "blueprint" for implementation. From the outset of the study, a key objective was to develop cost-effective recommendations (at a variety of scales) that set the stage for additional improvements to NC 50 in the future. With a diminishing return on the dollar, all efforts should focus on creating environment conducive to change along the NC 50 corridor.

Like other corridors throughout the state, NC 50 has crossed the line where commuter-based traffic congestion, unsafe travel conditions, and non-sustainable development patterns no longer are tolerated. The Triangle region has begun to change how it does business by identifying critical issues: Local incentives for the development community are not necessarily protocol. The amount of available land ready for development is immense. The Falls Lake watershed area is at a critical protection state.

Today, a true demarcation exists between residential sprawl encroaching upon rural areas and what once was a scenic two-lane byway. The quality of private investment in both design and community amenities will have a profound impact on the attractiveness of the area, and successful and sustainable development will come only through a cooperative effort between public and private ventures.

Many of the implementation steps identified in this chapter provide conditions under which the plan vision can be achieved through public and private investments and the development of appropriate programs, policies, projects, and other actions. The intent of the Action Plan is twofold: (1) it must provide decision-makers with an implementation blueprint that enables them to track progress and schedule future year improvements and (2) it must provide clearly defined action items that enable CAMPO, NCDOT, Creedmoor, Butner, and Wake and Granville Counties to identify public and private investment opportunities that are healthy, sustainable, and achievable. In short, the investments must surface through well-guided transportation and land use policies that encourage quality design and environmental stewardship.

"Need to reduce speed limit to 45 MPH. Too many accidents from people going too fast. The road has poor line of sight due to rolling hills."

"In the future, I'd like the NC 50 Corridor to be attractive still but better pattern of traffic flow"

"Traffic and safety improvements are overdue for the section of road between I-540 and NC Highway 98"

"In the future, I'd like the NC 50 Corridor to be less congested and safer for passing"

Controlling Factors

The implementation steps identified in this chapter will be executed in phases and will be subject to a variety of factors that will determine their timing. These factors include:

- The degree of control or influence CAMPO, Creedmoor, Granville County, and Wake County has relative to its desire to implement changes. (As specifically shown in the Action Plan Matrix, **Tables 11.1 – 11.8**.)
- The availability of personnel and financial resources necessary to implement specific improvements.
- The degree of which each community and NCDOT proactively can work with the development community to enhance the quality of development and design within the study area while limiting development impacts to the critical watershed.
- Whether an implementation step is an independent project or program, an incidental part of a larger project, or a component of the rational evaluation of a new development project.
- The interdependence of various implementation items, in particular the degree to which implementing one item is dependent on the successful completion of another item (e.g. cross-access improvements made before the implementation of a median treatment).
- The relative severity of the problem that a particular implementation item is designed to remedy.

With this in mind, the following Action Plan Matrix identifies next step items for each category described and summarized in previous chapters. Specific categories include recommendations for General Procedures, Land Use Policy; Interim and Long-term Transportation (Highway, Bicycle, Pedestrian, and Transit), Water Quality, Placemaking, and Funding. Within the context of the land use considerations, specific action items were discussed in **Chapters 4, 9, and 10** of this Project Workbook. Ultimately, these recommendations can be administered concurrently or as priorities and regional initiatives present the opportunity to do so.

Table 11.1 – Action Plan Matrix – Policy & Regulatory Items

	Cost Estimate	Timeframe	Responsible Party
Adopt the NC 50 Corridor Study	N/A	2011	CAMPO
Work cooperatively with the CAMPO and NCDOT during the next update of their Transportation Improvement Program (TIP) and STP-DA program to incorporate the phased recommendations of this study	N/A	2011	CAMPO/ Butner/ Creedmoor/ Wake Co./ Granville Co./ NCDOT
Apply the recommendations of this plan during the development review process. Use this plan as a tool to review proposed development projects as they locate and are implemented within the NC 50 corridor	N/A	2011	CAMPO/ Creedmoor/ Wake Co./ Granville Co./ NCDOT
Create an NC 50 Standing Committee through a mutual agreement (MOU) between all associated jurisdictions to include the Plan, its findings and recommendations into the development review process	N/A	2012	Creedmoor/ Wake Co./ CAMPO/Granville Co.
Consider the creation of an access management overlay ordinance. The ordinance will provide a legal framework for the municipalities and counties to administer and enforce consistent access management standards along the corridor as depicted in this study. The ordinance should contain rules and requirements for the "core" components of the Concept Design Plans, including minimum spacing standards for traffic signals, median openings, and driveways; and provisions for corner clearance. The ordinance also should require cross access between adjacent commercial properties, consolidation/elimination of excessive driveways, and retrofitting site access to the side and rear portions of the site	N/A	2012	Granville Co./ Wake Co.
Continue to require developers to fund roadway improvements that are rational and proportional to the impact created by development	N/A	2012	CAMPO/ Butner/ Creedmoor/ Wake Co./ Granville Co./ NCDOT
Integrate the findings and recommendation of this plan into the CAMPO Long-Range Transportation Plan and County and municipal Comprehensive Plans	N/A	2013	CAMPO/ Creedmoor/ Butner/ Wake Co./ Granville Co.
Update municipal and county ordinances to clarify design guidance for sidewalk, greenways, and multi-use paths	N/A	2013	Butner/ Creedmoor/ Wake Co./ Granville Co.
Consider revising the posted speed limit on NC 50 between I-540 and Beaverdam Recreation Area entrance to 45 mph. Maintain the current speed limit of 55 mph between the Beaverdam Recreation Area entrance and the proposed Creedmoor Connector	N/A	2014	NCDOT
Develop a **wayfinding/signage program** and implement along the entire NC 50 corridor to guide visitors and minimize driver confusion	N/A	2015	NCDOT
Introduce new project selection factors at CAMPO to reinforce the importance of maintaining existing systems through access management, complete street applications, livability factors (FHWA), and economic development potential (e.g., increasing local tax base)	N/A	2015	CAMPO
Update Subdivision Ordinance to allow reduction in trip generation for trips diverted to alternate modes of transportation, provide incentives, reduce parking requirements, strengthen connectivity, and establish sidewalk maintenance policy	N/A	2016	Butner/ Creedmoor/ Wake Co./ Granville Co.

Table 11.2 – Action Plan Matrix – Roadway Items *(See Chapters 2–5, NC 50 Playbook for Best Management Practices)*

Interim (2011-2020)	Cost Estimate[A] (thousands)	Timeframe[B]	Responsible Party	Funding Strategy
Nipper Road/ Shooting Club Road - realignment, laneage, landscaping ** ▪ Preliminary Engineering Cost: $200K (complete by 2012) ▪ Preliminary ROW Cost: $15K (complete by 2012) ▪ Probable Construction Cost: $1.9 million	$2,115	2013	CAMPO/ NCDOT	LAPP, Hazard Elimination, CMAQ, TIP
Revise the collector street portion of the CAMPO Long-Range Transportation Plan (and CTP) with alignment and classification changes outlined in **Chapter 6** to provide guidance to development community on proposed street network	N/A	2013	CAMPO/ NCDOT	N/A
Mt Vernon Church Road intersection – laneage, landscaping ** ▪ Preliminary Engineering Cost: $70K (complete by 2013) ▪ Preliminary ROW Cost: N/A ▪ Probable Construction Cost: $700K	$770	2014	CAMPO/ NCDOT	LAPP, Spot Safety, Hazard Elimination
Main Street/ NC 50 Streetscape from Dove Road to NC 56 in Creedmoor – intersection treatments, streetscape, lighting, crosswalks, bike accommodations, gateways, etc. ▪ Preliminary Engineering Cost: $150K (complete by 2014) ▪ Preliminary ROW Cost: N/A	$1,650	2015	Creedmoor/ NCDOT	LAPP, Grants, Private, TIP
Old Creedmoor Road intersection – realignment, laneage, landscaping ▪ Preliminary Engineering Cost: $75K (complete by 2015) ▪ Preliminary ROW Cost: $5K (complete by 2015) ▪ Probable Construction Cost: $750K	$830	2016	CAMPO/ NCDOT	LAPP, Spot Safety, Hazard Elimination
Falls Lake Access/ Beaverdam Recreation Area intersection – laneage, landscaping ▪ Preliminary Engineering Cost: $50K (complete by 2015) ▪ Preliminary ROW Cost: N/A ▪ Probable Construction Cost: $500K	$550	2016	CAMPO/ NCDOT	LAPP, Spot Safety, Hazard Elimination
Old Weaver Trail/ Cash Road intersection – realignment, laneage ▪ Preliminary Engineering Cost: $50K (complete by 2015) ▪ Preliminary ROW Cost: $17K (complete by 2016) ▪ Probable Construction Cost: $500K	$567	2017	CAMPO/ NCDOT	LAPP, Spot Safety, Hazard Elimination

[A] Cost estimate includes estimated design cost and twenty percent contingency. Probable construction cost estimate is engineer's approximation in current year dollars and is subject to change based on increased construction materials, design, or time of implementation. Right-of-way acquisition costs were estimated based on the CAMPO Cost Estimation spreadsheet. All values are subject to change.

[B] Timeframe (or completion date) for implementation is an estimate based on project need and available funding. Actual timeframe may vary based on externalities. All projects and "Action Items" have been vetted through a collaborative process which included the following agencies: CAMPO, NCDOT, Butner, Creedmoor, Granville County and Wake County.

** Denotes "high priority" project by Oversight Committee representatives.

Table 11.2 – Action Plan Matrix – Roadway Items *(See Chapters 2–5, NC 50 Playbook for Best Management Practices) — Continued*

Interim (2011-2020)	Cost Estimate[A] (thousands)	Timeframe[B]	Responsible Party	Funding Strategy
Boyce Bridge Road intersection – realignment, laneage, landscaping ▪ Preliminary Engineering Cost: $100K (complete by 2015) ▪ Preliminary ROW Cost: $10K (complete by 2016) ▪ Probable Construction Cost: $1 million	$1,110	2017	CAMPO/ NCDOT	LAPP, Spot Safety, Hazard Elimination
Beaver Dam Road / Old NC 21 intersection – Realignment, laneage, landscaping ▪ Preliminary Engineering Cost: $190K (complete by 2015) ▪ Preliminary ROW Cost: $17K (complete by 2016) ▪ Probable Construction Cost: $1.9 million	$2,107	2017	CAMPO/ NCDOT	LAPP, Hazard Elimination, TIP
NC 50 widening at NC 98 to accommodate additional passing lanes ** ▪ Preliminary Engineering Cost: $380K (complete by 2016) ▪ Preliminary ROW Cost: $10K (complete by 2017) ▪ Probable Construction Cost: $3.8 million	$4,190	2018	CAMPO/ Wake Co./NCDOT	LAPP, Hazard Elimination, TIP
NC 50 widening at Old Weaver Road to accommodate additional passing lanes ** ▪ Preliminary Engineering Cost: $360K (complete by 2018) ▪ Preliminary ROW Cost: $15K (complete by 2019) ▪ Probable Construction Cost: $3.6 million	$3,975	2020	CAMPO/ Wake Co./ Granville Co./ NCDOT	LAPP, Hazard Elimination, TIP
NC 50 widening from I-540 to NC 98 – multilane, median, bike provisions, landscaping, etc. (5.4 miles) ** ▪ Preliminary Engineering Cost: $500K (complete by 2017) ▪ Preliminary ROW Cost: $ 850K (complete by 2018) ▪ Probable Construction Cost: $50 million	$51,350	2020	CAMPO/ NCDOT	TIP
Longacre Drive intersection – laneage, landscaping ▪ Preliminary Engineering Cost: $50K (complete by 2019) ▪ Preliminary ROW Cost: N/A ▪ Probable Construction Cost: $500K	$550	2020	CAMPO/ NCDOT	LAPP, Spot Safety, Hazard Elimination

[A] Cost estimate includes estimated design cost and twenty percent contingency. Probable construction cost estimate is engineer's approximation in current year dollars and is subject to change based on increased construction materials, design, or time of implementation. Right-of-way acquisition costs were estimated based on the CAMPO Cost Estimation spreadsheet. All values are subject to change.

[B] Timeframe (or completion date) for implementation is an estimate based on project need and available funding. Actual timeframe may vary based on externalities. All projects and "Action Items" have been vetted through a collaborative process which included the following agencies: CAMPO, NCDOT, Butner, Creedmoor, Granville County and Wake County.

** Denotes "high priority" project by Oversight Committee representatives.

Table 11.3 – Action Plan Matrix – Roadway Items *(See Chapters 2–5, NC 50 Playbook for Best Management Practices)*

Long-Term (2021-2035)	Cost Estimate[A] (thousands)	Timeframe[B]	Responsible Party	Funding Strategy
Complete the connector street network identified in the Preferred Access Plan (**Chapter 6**) to provide slower-speed, lower-volume "Complete Streets" suitable for pedestrians and bicyclists	N/A	(as needed)	CAMPO/ NCDOT/ Developers	Private
NC 50 widening from NC 98 to Beaverdam Recreation Area, including a 2-lane parallel bridge across Falls Lake – multilane, plantable median, bike provisions, landscaping, etc. (3.9 miles) ▪ Preliminary Engineering Cost: $4.1 million (complete by 2027) ▪ Preliminary ROW Cost: $350K (complete by 2028) ▪ Probable Construction Cost: $41 million	$45,450	2030	CAMPO/ NCDOT	TIP
NC 50 widening from Beaverdam Recreation Area to Old Weaver Trail – multilane, plantable median, bike provisions, landscaping, etc. (2.0 miles) ▪ Preliminary Engineering Cost: $1.7 million (complete by 2036) ▪ Preliminary ROW Cost: $200K (complete by 2037) ▪ Probable Construction Cost: $17 million	$18,900	2040	CAMPO/ NCDOT	TIP
NC 50 widening from Old Weaver Trail to Dove Road (future Creedmoor Connector) – multilane, plantable median, bike provisions, landscaping, etc. (2.9 miles) ▪ Preliminary Engineering Cost: $2.5 million (complete by 2037) ▪ Preliminary ROW Cost: $150K (complete by 2038) ▪ Probable Construction Cost: $25 million	$27,650	2040	CAMPO/ NCDOT	TIP

[A] Cost estimate includes estimated design cost and twenty percent contingency. Probable construction cost estimate is engineer's approximation in current year dollars and is subject to change based on increased construction materials, design, or time of implementation. Right-of-way acquisition costs were estimated based on the CAMPO Cost Estimation spreadsheet. All values are subject to change.

[B] Timeframe for implementation is an estimate based on project need and available funding. Actual timeframe may vary based on externalities. All projects and "Action Items" have been vetted through a collaborative process which included the following agencies: CAMPO, NCDOT, Butner, Creedmoor, Granville County and Wake County.

** Denotes "high priority" project by Oversight Committee representatives.

Table 11.4 – Action Plan Matrix – Bicycle, Pedestrian, and Transit Items *(See Chapter 6, NC 50 Playbook for Best Management Practices)*

	Cost Estimate (thousands)	Timeframe	Responsible Party	Funding Strategy
Pursue connectivity for pedestrians and cyclists with pathways in places where street connections are not feasible or acceptable	N/A	2011 (initiate)	CAMPO/ NCDOT	N/A
Install pedestrian treatments (i.e., pedestrian signal, high-visibility crosswalks, ancillary sidewalks, pedestrian lighting, warning flashers, etc.) at the NC 50 intersections of: ▪ Norwood Road: Probable Construction Cost $20K (complete by 2012) ▪ Mt. Vernon Church Road: Probable Construction Cost $20K (complete by 2014) ▪ Old Weaver Trail: Probable Construction Cost $20K (complete by 2014) ▪ Mountains to Sea Trail (south of Falls Lake): Probable Construction Cost $20K (complete by 2014)	$80	(varies)	CAMPO/ NCDOT	LAPP, Grants
Conduct a study to analyze future viability of express bus service	$50	2012	CAMPO	Grants, PL Funds
Use federal and state grants to implement infrastructure-related and non-infrastructure projects and programs associated with walking and bicycling to all public schools located within the NC 50 study area. This should include: in-school training for fourth-grade students about bike and pedestrian safety, Train the Trainers with adult training in bike and pedestrian safety, and a "Walking School Bus", "Bike Rodeo", or "Bicycle Train" with students	N/A	2012	Butner/ Creedmoor/ Granville Co./ Wake Co./ NCDOT	Grants, Private
Construct/coordinate park & ride facilities within NC 50/NC 98 interchange, Creedmoor/Butner area (Gate 2 Road), and/or I-540 interchange	N/A	2013	TT/ CAMPO/ NCDOT	LAPP, CMAQ, Private
Initiate and enhance rideshare program for Creedmoor residents	N/A	2014	TT/ CAMPO/ Creedmoor/ Granville Co./ NCDOT / TJCOG	TT, Grants
Install directional signage and kiosks for bicycle and pedestrian attractions for Park/ Corps property.	$25	2014	CAMPO/ NCDOT/ USACE	Grants, Private
Construct paved (2 – 4') shoulders on supporting roadways – NC 98, New Light Road, and Old Weaver Trail (10.8 miles). ▪ Preliminary Engineering Cost: $450K (complete by 2017) ▪ Probable Construction Cost: $4.5 million	$4,950	2020	CAMPO/ Granville Co./ NCDOT	LAPP, Spot Safety, Hazard Elimination, TIP
Construct multiuse greenway (pervious material) along utility easement between Whitt Road and Brassfield Rd (2.3 miles) ▪ Preliminary Engineering Cost: $70K (complete by 2023) ▪ Probable Construction Cost: $700K	$770	2024	CAMPO/ Granville Co./ NCDOT	LAPP, Spot Safety, Hazard Elimination, Grants
Construct paved (2 – 4') shoulders on supporting roadways – Dove Road and Whitt Road (4.6 miles) ▪ Preliminary Engineering Cost: $190K (complete by 2027) ▪ Probable Construction Cost: $1.9 million	$2,090	2030	CAMPO/ NCDOT	LAPP, Spot Safety, Hazard Elimination, TIP
Construct paved (2 – 4') shoulders on supporting roadways – Old Creedmoor Road (7.4 miles) ▪ Preliminary Engineering Cost: $310K (complete by 2032) ▪ Probable Construction Cost: $3.1 million	$3,410	2035	CAMPO/ NCDOT	LAPP, Spot Safety, Hazard Elimination, TIP

Table 11.5 – Action Plan Matrix – Water Quality Items *(See Chapters 2, 5, & 8, NC 50 Playbook for Best Management Practices)*

	Cost Estimate (thousands)	Timeframe	Responsible Party
Minimize direct disturbance to stream banks and channel protection through the use of retaining walls at critical areas along NC 50 corridor	N/A	2012 (initiate)	CAMPO/ NCDOT
Integrate Low Impact Development (LID) design into all future development within the study area	N/A	2013 (initiate)	Butner/ Creedmoor/ Granville Co./ Wake Co.
Mitigate for tree loss in road widening through incentives to developers for additional tree preservation or community tree-planting events	N/A	2013	Butner/ Creedmoor/ Granville Co./ Wake Co.
Initiate a Water Quality Awareness Program to educate the general public and development community on the benefits of water quality protection, Falls Lake regulations, and innovative stormwater management. (Potential funding strategies include grants, Wake County, and Granville County)	$50	2013	Granville Co./ Wake Co./ NCDENR/ NCDOT
Implement Water Re-Use requirements that integrate stormwater storage facilities within a development and using that water for landscaping irrigation and other uses	N/A	2014 (initiate)	Butner/ Creedmoor/ Granville Co./ Wake Co.
Incentivize the use of permeable pavement in development – parking lots and other impervious surface so that runoff drains to natural or engineered filtration areas	N/A	2014	Butner/ Creedmoor/ Granville Co./ Wake Co.
Conduct a pilot project with at least one developer to protect water quality through cost-effective and innovative design	N/A	2016	Butner/ Creedmoor/ Granville Co./ Wake Co.
Continue to promote existing incentives (stewardship awards program, tax credits, etc.) and provide additional incentives for conservation development and innovative stormwater techniques	N/A	2016	Butner/ Creedmoor/ Granville Co./ Wake Co./TJCOG / UNRBA

Table 11.6 – Action Plan Matrix – Land Use Items *(See Chapters 4, 9, & 10, NC 50 Playbook for Best Management Practices)*

	Cost Estimate (thousands)	Timeframe	Responsible Party
Encourage property owners with a similar vision, or with sites sharing similar characteristics to consider the best development practices highlighted in **Chapters 4, 9, & 10** when developing their own land	N/A	2011	Butner/ Creedmoor/ Granville Co./ Wake Co.
Discourage strip development patterns and encourage the creation of integrated commercial activity centers	N/A	2011	Butner/ Creedmoor/ Granville Co./ Wake Co.
Develop a master plan for downtown Creedmoor that addresses infill and redevelopment, business recruitment and retainage, parking, streetscaping, transportation, historic preservation, and housing. (Potential funding strategies include economic development grants and Creedmoor)	$100	2012 (initiate)	Creedmoor
Establish a setback to accommodate the desired multiuse paths/sidepaths (where designated in the plan)	N/A	2012	Butner/ Creedmoor/ Granville Co./ Wake Co.
Update the Wake County activity centers to encourage a true mixture of uses, compact development and require connectivity to adjacent development	N/A	2014	Wake Co.
Require the use of low-impact development practices (including conservation based design) through local codes and policies	N/A	2015	Butner/ Creedmoor/ Granville Co./ Wake Co.
Adopt new watershed regulations and reflect in local land development codes	N/A	2016	Butner/ Creedmoor/ Granville Co./ Wake Co.
Encourage future development that incorporates an activity center, characteristics typically used to identify future locations and features for the activity center are outlined in **Chapter 9**	N/A	2016	Butner/ Creedmoor/ Granville Co./ Wake Co.
Promote the protection of viewsheds (using zoning and/or overlay requirements)	N/A	2016	CAMPO/ Creedmoor/ Granville Co./ Wake Co.
Consider transfer of development rights as a mechanism for protecting environmentally sensitive and natural and/or heritage sites	N/A	2017	Butner/ Creedmoor/ Granville Co./ Wake Co.

Table 11.7 – Action Plan Matrix – Place-making Items *(See Chapter 9, NC 50 Playbook for Best Management Practices)*

	Cost Estimate (thousands)	Timeframe	Responsible Party
Promote the creation of an activity center near the Old Weaver Trail intersection with NC 50	N/A	Market Driven	Creedmoor/ Granville Co./ Wake Co.
Create a uniform brand and marketing plan for the study area. This plan should be used consistently to provide the community with an easily recognizable identity	$80	2013	Butner/ Creedmoor/ Granville Co./ Wake Co.
Develop branding strategies that expresses preferences of the community for sign type, mass, materials, and overall design	$60	2014	Butner/ Creedmoor/ Granville Co./ Wake Co.
Encourage the creation of public spaces in new development and redevelopment plans. Refer to The Creedmoor Connector/Mixed-Use Village (Site B in **Chapter 10**) for features that could be included in these plans	N/A	2016	Butner/ Creedmoor/ Granville Co./ Wake Co.
Enhance visitor and local's ability to navigate to destinations within the study area with special attention to the creation of a wayfinding and branding strategy for downtown Creedmoor	N/A	2014	Creedmoor/ NCDOT
Protect the recognized rural character of the corridor through viewshed protection (i.e., overlay), appropriate architectural themes, materials, scale, and low impact development strategies	N/A	2016	CAMPO/ Creedmoor/ Granville Co./ Wake Co.
Create a coordinated directional signage system within the study area	N/A	2016	NCDOT
Create recognizable entrances/gateways to the study area to distinguish it from other places, and build on the natural and cultural heritage of the area (including gateway monumentation and signage)	N/A	2017	Creedmoor/ Granville Co./ Wake Co./ NCDOT
Create a uniform brand identity for Granville County and Town of Creedmoor	N/A	2017	Creedmoor/ Granville Co.

Table 11.8 – Action Plan Matrix – Funding Items

	Responsible Party
Lobby NCDOT and members of the State Board of Transportation (BOT) to include partial funding of the design and implementation of recommended improvements in the next Transportation Improvement Program (TIP).	CAMPO/ Creedmoor/ Granville Co./ Wake Co.
Leverage NCDOT District funding allocations for "spot safety" improvement monies to implement safety improvements at key intersections along the NC 50 corridor. See **Table 11.2** – Interim Roadway Improvements for intersection priority list.	CAMPO/ NCDOT
Aggressively pursue CMAQ and STPDA funds - available through LAPP program at CAMPO for interim roadway improvements and bicycle and pedestrian improvements.	CAMPO/ Butner/ Creedmoor/ Granville Co./ Wake Co.
Solicit NCDOT Division Hazard Elimination, Governor's Highway Safety Program (GHSP), Small Construction and Contingency funds improvement monies to implement corridor access and safety improvements at key intersections and segments along the NC 50 corridor. Website: www.ncdot.org/programs/ghsp	CAMPO/ NCDOT
Pursue Enhancement Grants to construct bike, pedestrian and Creedmoor streetscape improvements as outlined in **Chapter 7 & 8** recommendations. State and federal grants can play an important role in implementing strategic elements of the transportation network. Several grants have multiple applications, including Transportation Enhancement Grants as well as State and Federal Transit Grants. The Enhancement Grant program, established by Congress in 1991 through the Intermodal Surface Transportation Efficiency Act (ISTEA), ensures the implementation of projects not typically associated with the road-building mindset. While the construction of roads is not the intent of the grant, the construction of bicycle and pedestrian facilities is one of many enhancements that the grant targets and could play an important role in enhancing the pedestrian safety and connectivity within the NC 50 study area.	CAMPO/ Creedmoor/ NCDOT
Aggressively pursue Safe Routes to School (SRTS) funding to enhance bicycle and pedestrian improvements in proximity to the public schools within the NC 50 study area such as Pleasant Union Elementary, Hawley Middle School, and South Granville High School. SRTS is a program receiving federal funding through the newest SAFETEA-LU legislation. The program provides funding for individual schools to create route plans or develop facilities that create a safer walking and biking environment for their students. North Carolina has a yearly application program for which any school, school district, municipality or other governmental body, or non-profit association may apply. For more information, visit www.saferoutesinfo.org/. Projects funded through the SRTS program receive 100% federal funding.	CAMPO/ Creedmoor/ Granville Co.
Consider providing a tax incentive to existing property owners and developers located along the N. Main Street (Creedmoor) corridor for enhancing their property values through aesthetic design treatments, in accordance with the N. Main Street streetscape recommendations (see **Chapter 8**).	Creedmoor
Active Living by Design (ALbD) is a program that seeks to bring together the health care and transportation communities to create an environment that encourages residents to pursue active forms of transportation such as walking and bicycling. Grants are awarded each year to a selected number of communities, who are then required to produce a local match. These grants can be used to create plans, change land use policies, institute education policies, and develop pilot projects. Website: www.activelivingbydesign.org	CAMPO/ Butner/ Creedmoor/ Granville Co./ Wake Co.
Aggressively pursue City and County matching funds for the Energy Efficiency and Conservation Block Grant (EECBG) Program sponsored by the Department of Energy. This funding program can be used for bike and pedestrian infrastructure improvements within the NC 50 study area, operational and system (signals) improvements and planning activities. Website: www.eecbg.energy.gov	CAMPO/ Granville Co. Wake Co./ Creedmoor
Consider passing a Transportation Bond referendum to potentially fund the N. Main Street (Creedmoor) Streetscape recommendations. Projects that historically have been funded through transportation bonds include sidewalks, road extensions, new road construction, and streetscape enhancements.	Creedmoor
Aggressively pursue Recreational Trails Program to construct the Whitt Road to Brassfield Road greenway (2.3 miles) in accordance with this Study. According to the FHWA, "the Recreational Trails Program (RTP) provides funds to the States to develop and maintain recreational trails and trail-related facilities for both non-motorized and motorized recreational trail uses. The RTP is an assistance program of the Department of Transportation's Federal Highway Administration (FHWA). Federal transportation funds benefitting recreation including hiking, bicycling, in-line skating, equestrian use, cross-country skiing, snowmobiling, off-road motorcycling, all-terrain vehicle riding, four-wheel driving, or using other off-road motorized vehicles."	CAMPO/ Granville Co

Capital Area MPO

Improvements along NC 50 will require careful planning and the collaboration of multiple agencies and entities within a corridor context that changes character and development patterns over the fifteen miles between I-540 and NC 56 in Creedmoor. With this in mind, it is not expected that all of the listed items would be completed over the next five to ten years; however, the process should be initiated to best take advantage of the momentum gained with the development of this plan.

"Many hills create blind turns onto Hwy 50 from side roads. Turning left onto 50 from Old Creedmoor requires quick acceleration to avoid being rear-ended by surprise northbound traffic"

Conclusion

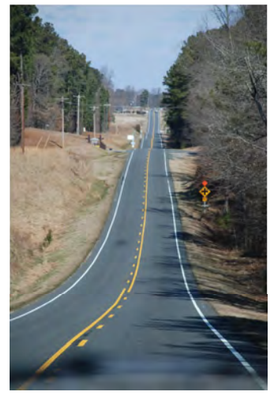
There are a variety of funding strategies to implement the recommended improvements for the ***NC 50 Corridor Study***. These funding strategies include state and local monies, which are often limited or committed well into the future. Grant funding from the state or federal government typically requires a local match, but these monies may be used to cover many of the capital and operating expenses identified in the recommendations for the corridor. Some of the improvements will be made in partnership with the private sector.

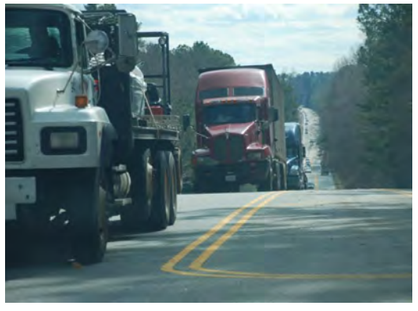
An incremental funding approach would be possible, but is not as attractive because the full benefit of the collective improvements would not be realized for quite some time. Alternative funding sources for expediting construction include special assessments and/or a locally-adopted sales tax or tax incentives.

"Intersection of 50 and Mt Vernon Church is a hazard. Streets don't align, very busy during rush hours, difficult to see as well."

Through the development of this strategic corridor planning initiative, several key stakeholders were collaborated with to establish our guiding principles for the ***NC 50 Corridor Study***. Property owners, elected officials, business owners and civic leaders came together to establish a corridor vision – ***"Create a Plan that enhances the safety, mobility, and appearance of the NC 50 corridor, in a manner that promotes quality development, connectivity and economic vitality, while seeking to protect the environment and cultural heritage of the region."*** It is here that this collective vision will move forward only through the efforts of those engaged with the planning process or "champions" of the Study. In collaboration with state and local officials, their collective efforts will lead to a safe, multimodal corridor that supports sustainable development opportunities and the protection of the Falls Lake Critical Watershed area through the enhancement of this scenic corridor.

"In the future, I'd like the NC 50 Corridor to be the best looking, most efficient, best landscaped country road in North Carolina"



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