

NC 50

CORRIDOR STUDY



NC 50 Today: Existing Conditions Report

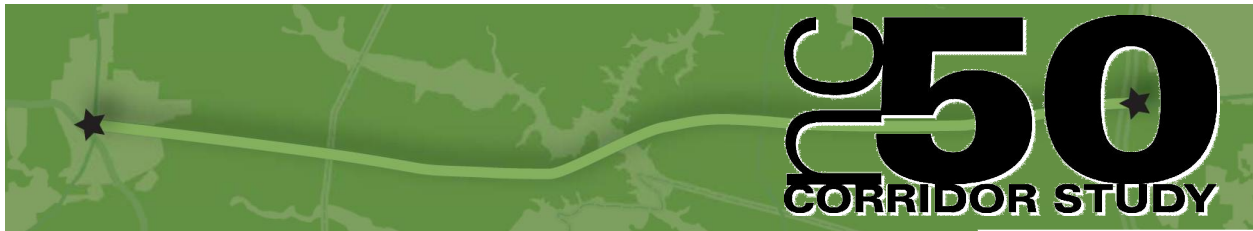


Prepared for:
**Capital Area
Metropolitan
Planning
Organization**

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Introduction

NC 50 is a two-lane, regionally significant corridor that serves growing suburban residential populations around I-540 in North Raleigh and in the southern part of Granville County near the City of Creedmoor. Pressure to improve and widen NC 50 will build with continued growth and increased traffic. Much of this anticipated growth will occur in the environmentally sensitive Falls Lake watershed, the largest water supply reservoir for the Raleigh metropolitan area.

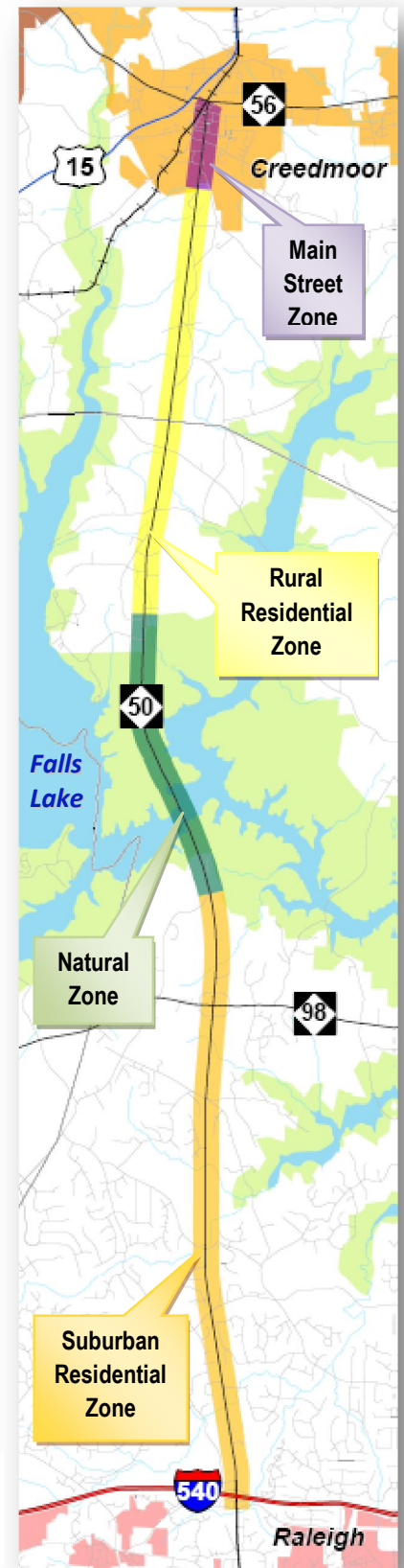
Study Purpose

With the support of the NC Capital Area Metropolitan Planning Organization, NCDOT, and Triangle Transit, this comprehensive study for NC 50 is intended to evaluate potential transportation improvements along NC 50 suitable for implementation at the local and state level with three primary objectives in mind:

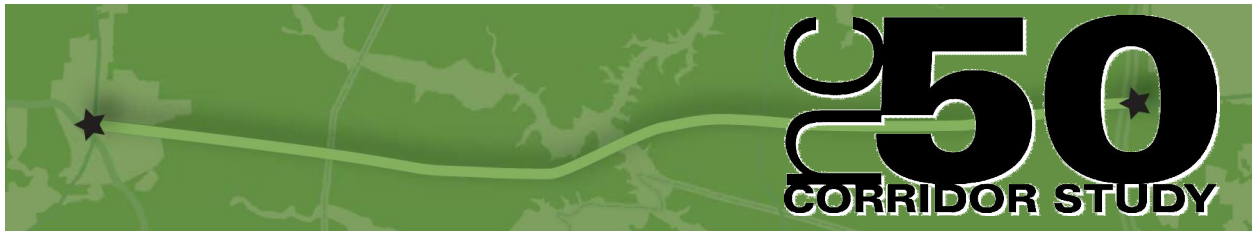
- Improve transportation mobility and traffic safety along the corridor
- Preserve the residential and rural nature of the corridor while supporting regional economic development
- Support activities to protect recreation, water quality, and the environment in the Falls Lake watershed

The primary task is **to evaluate innovative design concepts that balance the competing interests of land use, the environment, and transportation.** As a result, this study must be sensitive to the local character. Careful evaluation of the corridor has revealed four distinct context zones with each likely requiring a unique set of recommendations.

Many have highlighted the fact that *Granville County is the only adjacent county without a divided US highway of four lanes or more connecting to Wake County and Raleigh.* While this statement may be true this study seeks to identify the most appropriate set of interim year improvements as well as a long term strategy for each of the individual corridor segments. The four context areas include: Main Street, Rural Residential, Natural, and Suburban zones.



NC 50's
Context Zones



Existing Conditions

Transportation

NC 50 has remained a two-lane, undivided roadway, connecting area travelers between I-85, the Granville communities of Creedmoor, Oxford, and Butner, as well as northern Wake County.

Traffic volumes within the study area vary significantly based on location:

- 7,000 to 8,000 vehicles per day (vpd) crossing Falls Lake,
- 11,000 vpd on Main Street in Creedmoor,
- 19,000 vpd crossing or accessing the I-540 interchange.

While traffic along the entirety of the corridor may not be approaching the roadway's theoretical capacity (approximately 13,000 vpd), safety and congestion issues are prevalent with lines of motorists delayed behind commercial trucks slowed by the hilly topography or queued behind residents waiting to turn left into one of the numerous driveways or side streets. Passing lanes are present in various locations throughout the corridor, particularly north of Falls Lake, but the ability to pass during period of peak travel is hindered due to steady traffic travelling in both directions and long queues behind slow vehicles. **Table 1** and **2** shows historic, existing and projected future year traffic volumes.



Table 1. Historic Traffic Volumes

Count Location		NCDOT AADT Historic Traffic Counts				Average Annual Growth Rate
		2001	2003	2005	2007	
CREEDMOOR	East of US 15	7,200	6,700	8,300	8,700	3.2%
	Downtown Creedmoor	10,000	11,000	11,000	10,000	--
	Wake/Granville line	6,300	6,500	7,100	7,400	2.7%
	North of NC 98	8,000	8,200	8,000	8,200	0.4%
	South of NC 98	12,000	12,000	12,000	13,000	1.3%
	North of I-540	--	--	21,000	19,000	--
NORTH RALEIGH	South of I-540	17,000	28,000	27,000	29,000	9.3%



Table 2. Existing and Projected Traffic Forecasts

Location		Future AADT Projections		
		2010 ¹	2035 Growth ²	2035 Model ³
CREEDMOOR	East of US 15	9,500	16,000	15,000
	Downtown Creedmoor	11,000	18,000	17,000
	Wake/Granville line	8,100	13,000	26,000
	North of NC 98	9,000	15,000	27,000
	South of NC 98	12,000*	20,000	34,000
	North of I-540	21,000	34,000	42,000
NORTH RALEIGH	South of I-540	32,000	52,000	38,000

¹ Applies 3% annual growth rate from 2007

² Applies 2% annual growth rate from 2010

³ 2035 Triangle Regional Model

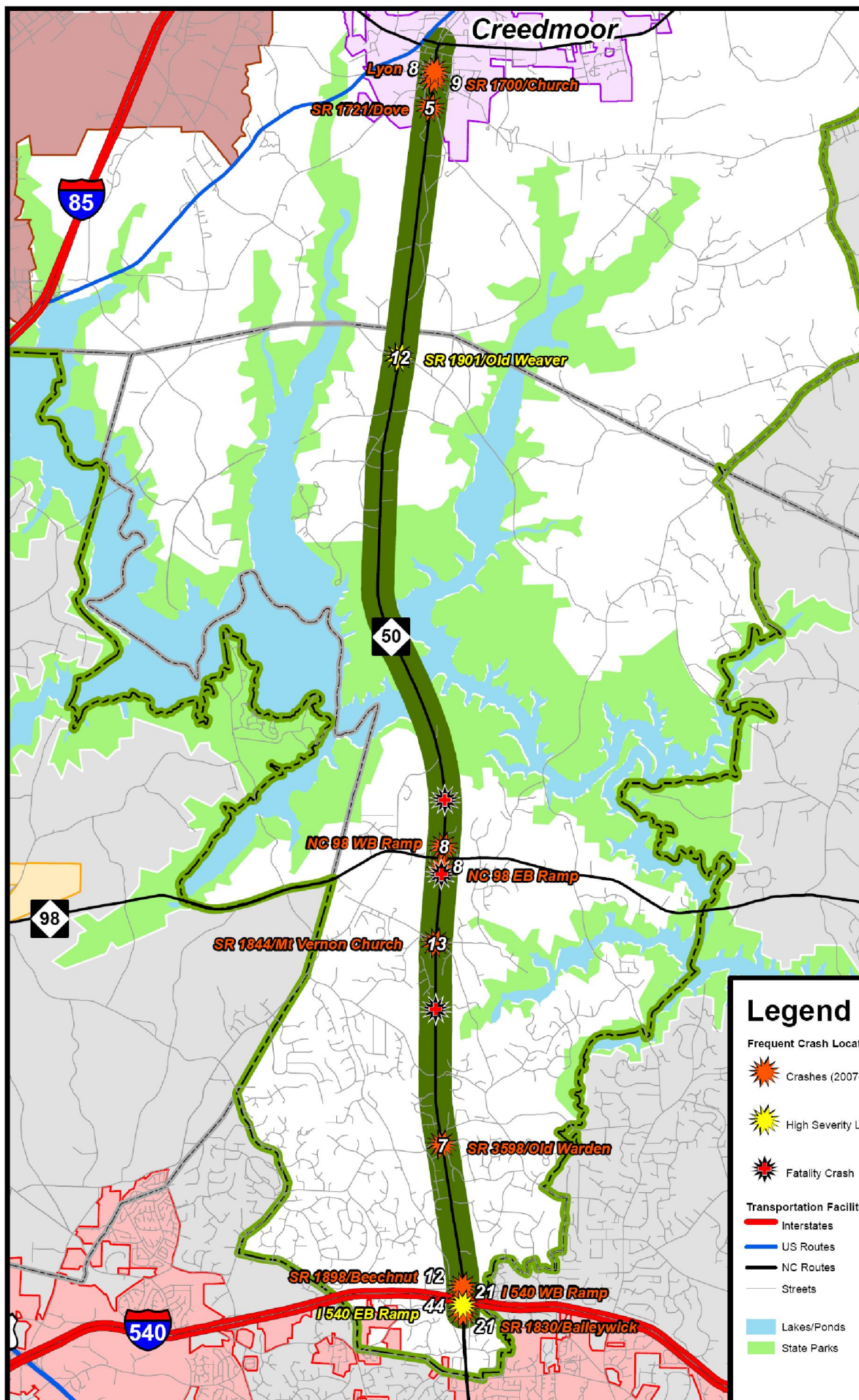
* From 2010 count (3/1/10 – 3/3/10)

Traffic Safety: Frustration with congestion has caused deadly results. Three fatal crashes have occurred along the study corridor in the last three years, all head-on collisions between two vehicles traveling at high speeds. Overall, 456 crashes were reported along NC 50 from December 2006 to November 2009, translating to a crash rate of 213.8 crashes per 100 million vehicle miles traveled, 22% higher than the statewide average (175.4) for a NC route of similar type. Two NC 50 intersections (I-540 eastbound ramp and Old Weaver Trail) and two segments of the corridor (Shooting Club Road to Mt. Vernon Church Road and Aiken Road to Old Weaver Trail) have experienced a considerably higher number of crashes with severe injuries.

Street Connectivity: Despite the traffic congestion and safety concerns, few alternative routes are available to those who use the corridor to due to a lack of connectivity. The geography of Falls Lake and the select few crossings mean limited connections north of the lake. South of the lake, NC 98 Durham Road provides good east-west flow between Wake Forest and Durham, but few other options exist with limited or circuitous roadways connecting the numerous subdivisions prevalent between the axial roads (Leesville and Six Forks Roads) that continue radially from Raleigh and I-540.

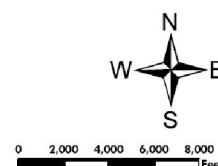
Planned & Committed Improvements: There are no projects programmed in the study area in the NCDOT 2011-2017 Transportation Improvement Program. NCDOT Feasibility Study Unit recently completed functional designs for a Creedmoor Bypass project, including the widening of NC 56 from I-85 east to a proposed bypass alignment beginning at NC 56 east of Lake Rogers and terminating at NC 50 south of Dove Road and the Whitehall subdivision development. Other alignments discussed include a corridor starting west of Lake Rogers as well as a concept for an eastern bypass by extending the east end of the project across NC 50 to Brassfield Road combined with widening Brassfield and Hayes Roads.

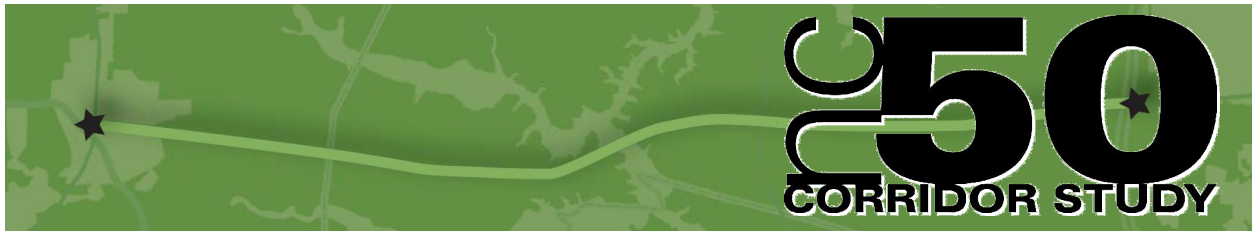
High Crash Locations



Legend

- | | |
|----------------------------------|--------------------------|
| Frequent Crash Locations | NC 50 Study Areas |
| Crashes (2007-9) | Scenario Planning |
| High Severity Location | Transportation |
| Fatality Crash | County Line |
| Transportation Facilities | Municipalities |
| Interstates | Raleigh |
| US Routes | Creedmoor |
| NC Routes | Butner |
| Streets | Durham |
| Lakes/Ponds | Stem |
| State Parks | |





Operations: Current traffic volumes along the corridor operate at acceptable levels-of-service along the roadway segments as well as at intersections. Motorists on side streets, particularly those closer to the southern end of the study corridor, do experience delays when attempting to turn onto NC 50 during the peak hours at unsignalized intersections, but daily volumes at most approaches are too low to warrant signalization. At those few intersections with signals, the only unacceptable delay outside the I-540 interchange was at Norwood Road, with cars queuing on the southbound approach.

Further projections based on the 2035 Triangle Regional model show that the current two-lane cross-section will be fail to handle traffic growth in the corridor. All the segments studied will be operating at LOS E or F, with the major intersections facing over-capacity conditions in some part with improvements or signalization. **Table 3** summarizes the operational performance of critical intersections within the study corridor.

Transit Services: Based on the rural and suburban nature of the corridor and the distance from the centralized hubs of local transit agencies, no fixed route transit service is available along NC 50 corridor.

The Kerr Area Rural Transportation System (KARTS) provides demand-response service for general public or human service agency clients in the rural areas throughout Granville, Vance, Franklin, and Warren counties. These include Medicaid and dialysis trips, but also others coordinated through the Granville County Department of Social Services and Department of Senior Services, which organizes both individual and group trips. KARTS occasionally offers trips to Raleigh, Durham, and Chapel Hill. KARTS does not make connections to Triangle Transit Authority routes or Capital Area Transit routes.

Wake County operates Transportation and Rural Access (TRACS) and Human Services Transportation. TRACS is a service open to the general public residing in non-urbanized areas of Wake County. Wake County transports human service agency clients to medical appointments, employment opportunities, and other destinations on weekdays and Saturdays.



Table 4 lists the demand-responsive services, as well as other local transit routes operating outside but near the study in Wake and Granville counties.

The Triangle Transit Authority is an intercity transit service offering fixed route service between Raleigh, Durham, Chapel Hill, and adjacent towns in Wake, Durham, and Orange counties. Triangle Transit is legally allowed to serve areas up to 10 miles beyond the borders of its member

counties, which would include the entire NC-50 corridor study area. (City of Creedmoor is less than five miles beyond the Wake County border.) Recognizing the rapid residential growth taking place in these outlying areas, Triangle Transit is considering ways to serve these markets even beyond the existing 10-mile provision.

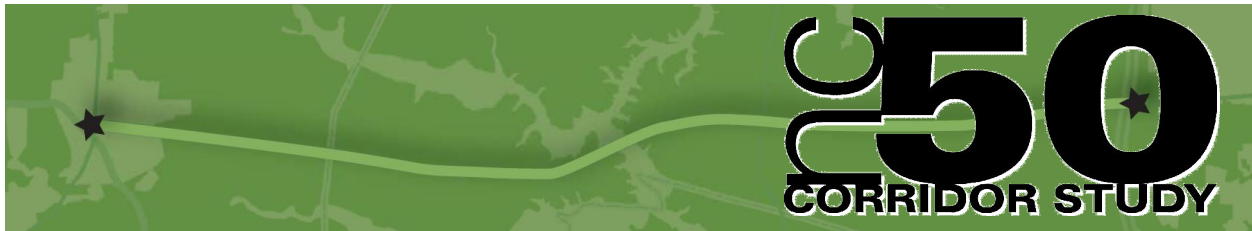


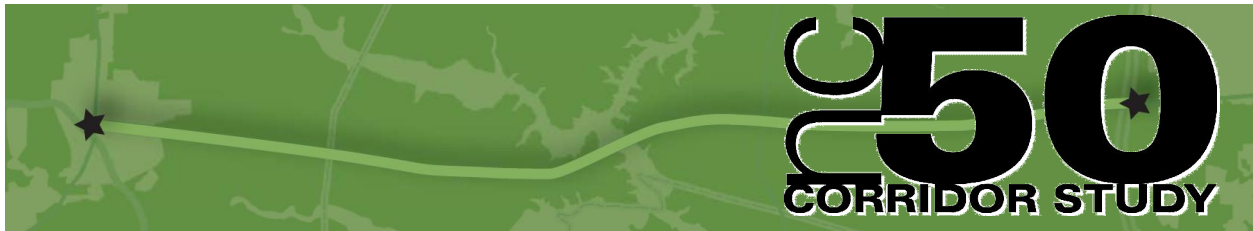
Table 3. Level-of-Service Summary

Location	Mainline Highway Level-of-Service	
	2010	2035 Model ³
Downtown Creedmoor	D	E
NC 98 to Creedmoor	D	F
Interstate 540 to NC 98	D	F
Intersection Scenario	Intersection Level-of-Service (Delay)	
	AM Peak-Hour	PM Peak-Hour
NC 50 at Wilton Avenue <i>Signalized</i>		
Existing (2010)	B (18.5 sec)	C (26.7 sec)
No-Build (2030)	F (85.5 sec) WB – F (130.2 sec)	F (128.0 sec) NB – F (375.2 sec)
NC 50 at Church Street <i>Signalized</i>		
Existing (2010)	C (20.1 sec)	B (17.3 sec)
No-Build (2030)	D (44.0 sec) WB – F (94.5 sec)	C (27.5 sec)
NC 50 at Old Weaver Trail <i>Unsignalized</i>		
Existing (2010)	EB – F (OC)	EB – E (39.6 sec)
No-Build (2030)	EB – F (OC) WB – F (OC)	EB – F (OC) WB – F (OC)
NC 50 at NC 98 Westbound Ramps <i>Unsignalized</i>		
Existing (2010)	EB – E (36.8 sec)	WB – B (11.8 sec)
No-Build (2030)	EB – F (371.4 sec)	WB – C (15.3 sec)
NC 50 at NC 98 Eastbound Ramps <i>Unsignalized</i>		
Existing (2010)	EB – C (21.1 sec)	EB – B (12.8 sec)
No-Build (2030)	EB – F (57.3 sec)	EB – C (19.0 sec)
NC 50 at Norwood Road <i>Signalized</i>		
Existing (2010)	E (60.4 sec) SB – F (91.9 sec)	C (21.5 sec)
No-Build (2030)	F (261.2 sec) SB – F (437.3 sec)	F (142.2 sec) NB – F (241.5 sec)



Table 4. Existing Transit Services in and near Study Area

Transit Service	Transit Provider	Operating Hours	Standard Fare	Description and Notes
Transit Available In Study Area				
KARTS Rural Service	KARTS	Mon-Fri 5 AM to 6 PM	\$4/boarding \$1/additional zone	Demand-responsive paratransit in Granville, Vance, Franklin, and Warren counties; trips booked by reservation with KARTS or Granville Departments of Social Services and of Senior Services
TRACS	Wake County	Mon-Fri 7 AM to 12 PM, 1 PM to 6 PM	\$2 one-way \$4 one-way out of zone	Demand-responsive paratransit in non-urbanized Wake County; trips booked by reservation on 1 st come, 1 st served basis
Human Services Transportation	Wake County	Mon-Fri 5 AM to 8 PM	\$2 one-way	Demand-responsive paratransit in Wake County for medical appointments and employment opportunities; eligibility rules
Transit Near Study Area				
Henderson Shuttle	KARTS	Mon-Sat 7 AM TO 7:45 PM	\$1.00/trip	Fixed route the “Around Town” shuttle in Town of Henderson,
Route 4 Rex Hospital	Capital Area Transit (CAT)	Mon-Fri 4:30 AM TO 8 PM Sat 5 AM TO 8 PM	\$1 one-way	Fixed route between Downtown Raleigh and Brennan Station Shopping Center (less than one mile south of I-540/NC 50 interchange); one of CAT’s 35 routes
Wake Forest-Raleigh Express (WFX)	Triangle Transit	Mon-Fri 5 AM TO 8:15 PM	\$2.50 one-way \$2 one-way (off peak)	Regional express route between park & ride lot in Wake Forest and Downtown Raleigh (Triangle Town Center mall off-peak); Wake Forest Loop feeder service circulates in Downtown Wake Forest



Triangle Transit's 2008 Short Range Transit Plan (S RTP) prioritizes increased and expanded express services. Triangle Transit conducted an investment analysis for potential new express service corridors. The NC-50 corridor to Creedmoor was analyzed, but was found to have a low projected ridership and high investment costs, making it a low-ranked candidate for express service. Demand estimation was based on the Triangle Regional Model, which uses 2005 population data.

Triangle Transit sponsors van pools in the region from as far as 60 miles away, primarily to points south and east of Raleigh and northwest of Durham. Triangle Transit provides the vehicle, gas, insurance, and maintenance, and riders pay a monthly fare (drivers ride for free). A van pool is currently planned for implementation along the Henderson/Youngsville/Wake Forest corridor.



No park and rides exist in the study area. The nearest park and ride is in Wake Forest, 20 miles southeast of Creedmoor, connecting to the Triangle Transit Wake Forest-Raleigh Express route.

Bicycle and Pedestrian Conditions: The NC 50 corridor itself is primarily a two-lane undivided facility with little or no shoulder area and significant topography, uninviting to all but the most experienced cyclists. The portion of the corridor that is bridged over Falls Lake has a wide shoulder section, presumably to accommodate vehicle breakdowns as well as bicycle and pedestrian crossing.

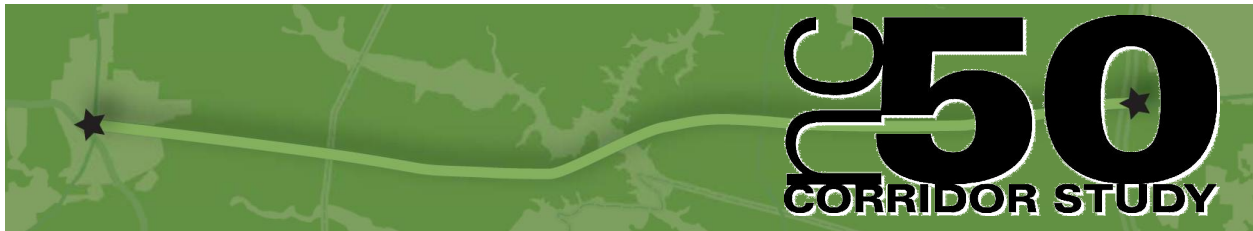


Pedestrian facilities on the NC 50 corridor are also limited. The only sidewalks in the corridor are found within the Creedmoor city limits, beginning at Dogwood Avenue. Within the downtown area, sidewalks are in place on both sides of the street, but are mostly 4-5 feet in width and are set directly on the back of the curb. Complicating the pedestrian realm are several driveway cuts and numerous utility poles. However, some recent investments in the downtown streetscape have included improvements to the street that include improved sidewalks and high visibility crosswalks.



The area surrounding the NC 50 corridor holds a lot of potential for serving non-motorized transportation. The Falls Lake Recreation Area is bisected by the NC 50 corridor. This facility has over 13 miles of mountain biking trails designed to serve all levels of users. There are also several different hiking and walking trails within this facility. Despite the attraction to cyclist and pedestrians there are no external connections from this regional amenity to the City of Creedmoor or surrounding neighborhoods.

At this time, there are no designated bicycle routes or facilities along NC 50. This area is served on a regional scale by the presence of the East Coast Greenway along portions of New Light Road, Six Forks Road,



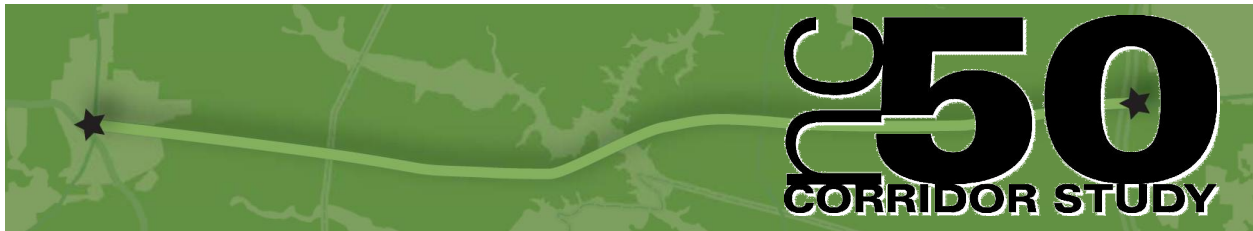
Norwood Road, Bruce Garner Road, Lawrence Road, and State Highway 96. This facility is planned to ultimately be a 2,600-mile off-road facility connecting Calais, Maine with Key West, Florida. However, the entirety of the existing route within the vicinity of the study area is presently designated along existing two-lane roads with limited or no shoulders nor dedicated areas for cyclist.

South of the NC 50 corridor, the East Coast Greenway corridor intersects with the Mountains to Sea Trail. The Mountains to Sea Trail is a statewide route and a major regional bicycle connection. The intersection of these two trails near the NC 50 corridor illustrates the importance of this area for interstate and intrastate bicycle travel.

One interesting aspect of the area surrounding the NC 50 corridor is the presence of horse farms. As a result, there may be a demand for equestrian-friendly facilities in the area. At this time, there are no public equestrian facilities available on the corridor. With proper signage and design, equestrian users can often make use of multi-use paths and greenways alongside bicyclists and pedestrians.



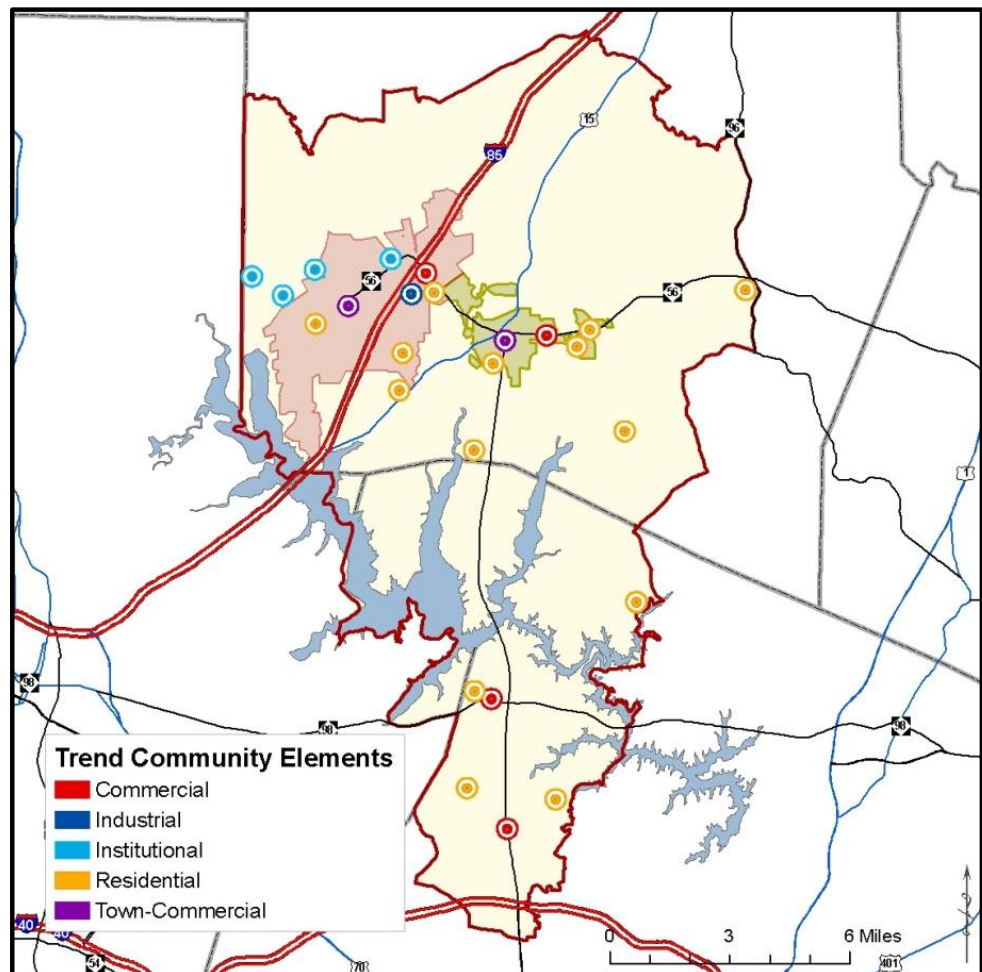
Design Issues: Many of issues facing NC 50 stem from design issues along NC 50. The rolling topography contributes to delays due to truck traffic as well as creating blind intersections near the hillcrests. It also creates segments, especially in the sags of the roadway where steep embankments drop into creeks and valleys just beyond narrow shoulders without any guardrails. The narrow shoulders also contribute to unfavorable conditions for pedestrians and cyclists, and provide little space for emergency crews to respond to crashes along the corridor. These issues combined with the two-lane cross-section and lack of turning lanes at intersections translate to peak-hour congestion despite modest traffic volumes, safety concerns, an unfriendly environment for pedestrians and cycling, and limited transit opportunities.



Existing Land Use

Identifying Patterns

Understanding the characteristics and impacts of different land development patterns is an important step to understanding the relationship between land use, transportation, and environment. Therefore, an analysis of existing development patterns for the study area was conducted. This analysis reveals a handful of dominant, prototypical development patterns for residential, commercial, institutional, industrial, and town-commercial. Given the relative size of the study area, a sample of different community element development types was studied. The map below shows twenty-six “community element” locations surveyed throughout the study area. Each area surveyed includes a summary of land uses within a quarter mile radius (half mile diameter) which represents a five minute walk from the center to edge. Each community element represents a snapshot, or a sampling, of a pattern of development with quantifiable physical characteristics that translate into socioeconomic data – namely households, people, and jobs. The results of this analysis conclude that any developed portion of the study area can generally be classified into one seven land use types. **Table 5** inventories the resulting seven community element types and describes their characteristics.



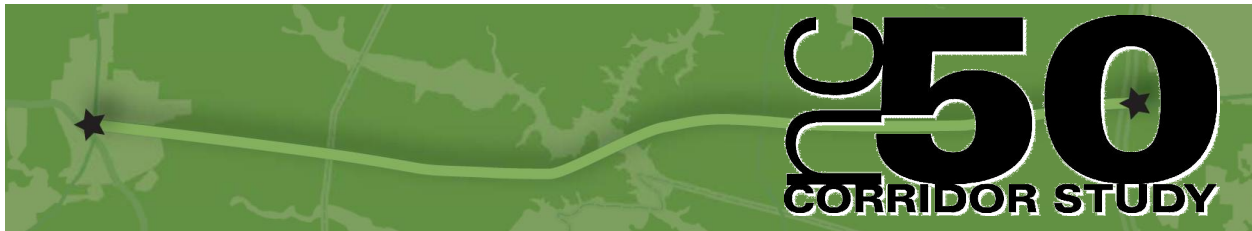
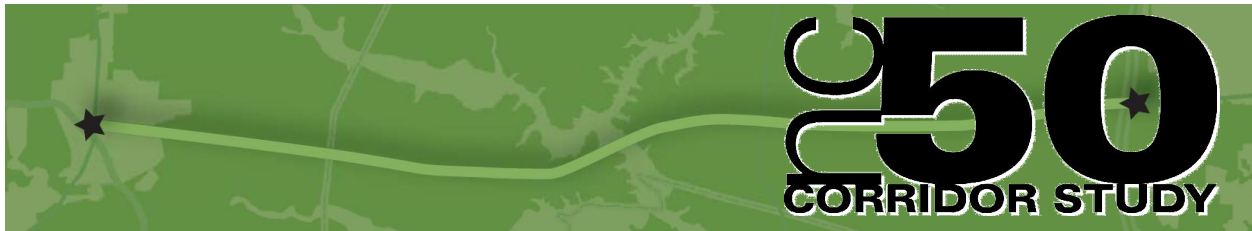


Table 5. Existing Community Elements in NC 50 Study Area

Community Element	General Description	Density/Intensity
Rural Residential	Low density, larger lots generally 5 acres and bigger, along rural roads. Single family residential subdivisions that occur outside more suburban areas.	1-3 stories; larger footprint homes. Lot sizes from 3-7 acres.
Suburban Residential	Typical residential subdivision. An edge community or suburban neighborhood or community where the predominant land use is residential.	1-3 stories; larger footprint homes. Lots sizes from 1-2 acres.
Town Residential	Primarily smaller lot single family with some town house, duplex or MF apartments. Residential in closer proximity to Creedmoor and Butner. Primarily still single family subdivisions but with smaller average lot sizes.	Buildings range from 1-3 stories but generally are 1-2 story residential. Lot sizes from .3-.5 acres
Office/Industrial	Industrial /office parks along I85, outside of Butner. An edge community or outer suburban area where the predominant land use is industrial.	Generally large footprint, single story buildings. Average Floor to Area ratio (FAR) 0.15
Commercial Retail	NC 56 examples, shopping centers, highway commercial. General commercial, business, and office oriented along major roadways. The typical pattern is of highly auto-oriented, separated strip shopping malls.	Buildings are primarily 1 story. Occasionally a 2 story might occur, usually office. Average FAR 0.20
Institutional	Campus style employment centers typically found in or around Butner (Murdoch Center, Hospital, etc)	Can range from 1-3 stories, but typically are in the 1-2 story range. Average FAR is .20
Town Center	Main Street districts are generally mixed use in character, with both residential and commercial, and have the feel of being in a small town/village center. Areas around or along main streets in Butner and Creedmoor. Mixture of residential, schools, civic and commercial.	Buildings range from 1-3 stories. Some retail buildings along the main streets are 2 story. Residential buildings typically are 1-2 stories. Average Lot size: 0.35 Acre Average FAR: 0.35



Land Availability Analysis

The study team also set out to define the potential developable/non-developable lands within the study area for the purposes of assessing future development scenarios associated with the NC 50 corridor. This involved a review of the parcel and tax assessment data for Granville County and Wake County portions of the study area. Every parcel was categorized with a generalized land use and then identified as either already developed or potentially developable. Areas considered already developed, or not likely to develop in the project horizon, were existing residential, commercial, industrial, institutional, public, government and civic (schools, churches, cemeteries, parks etc). Lands considered available for future development were agricultural areas, vacant, larger parcels, or parcels with a low building to land value ratio indicating a low improvement value and therefore development potential in the future. Generally lots larger than 10 acres were considered 'developable' or sub-dividable, because of their larger size.

Table 6 summarizes the approximate land availability for future development within the study area. It should be noted that this analysis does not take into account viability of future development in terms of available water and sewer, environmental constraints or other site-level detail concerns. Rather this is a generalized analysis intended to provide the study team with an order of magnitude assessment of future development potential within the study area. Based on this review, approximately 75% percent of the Granville County portion of the study area is identified as vacant or developable; whereas only 31% of the Wake County portions of the study area were considered available for future development. The functionality and future mobility of the NC 50 will be most heavily influenced by the type, scale, and location of future patterns of development within the Granville County portion of the study area.

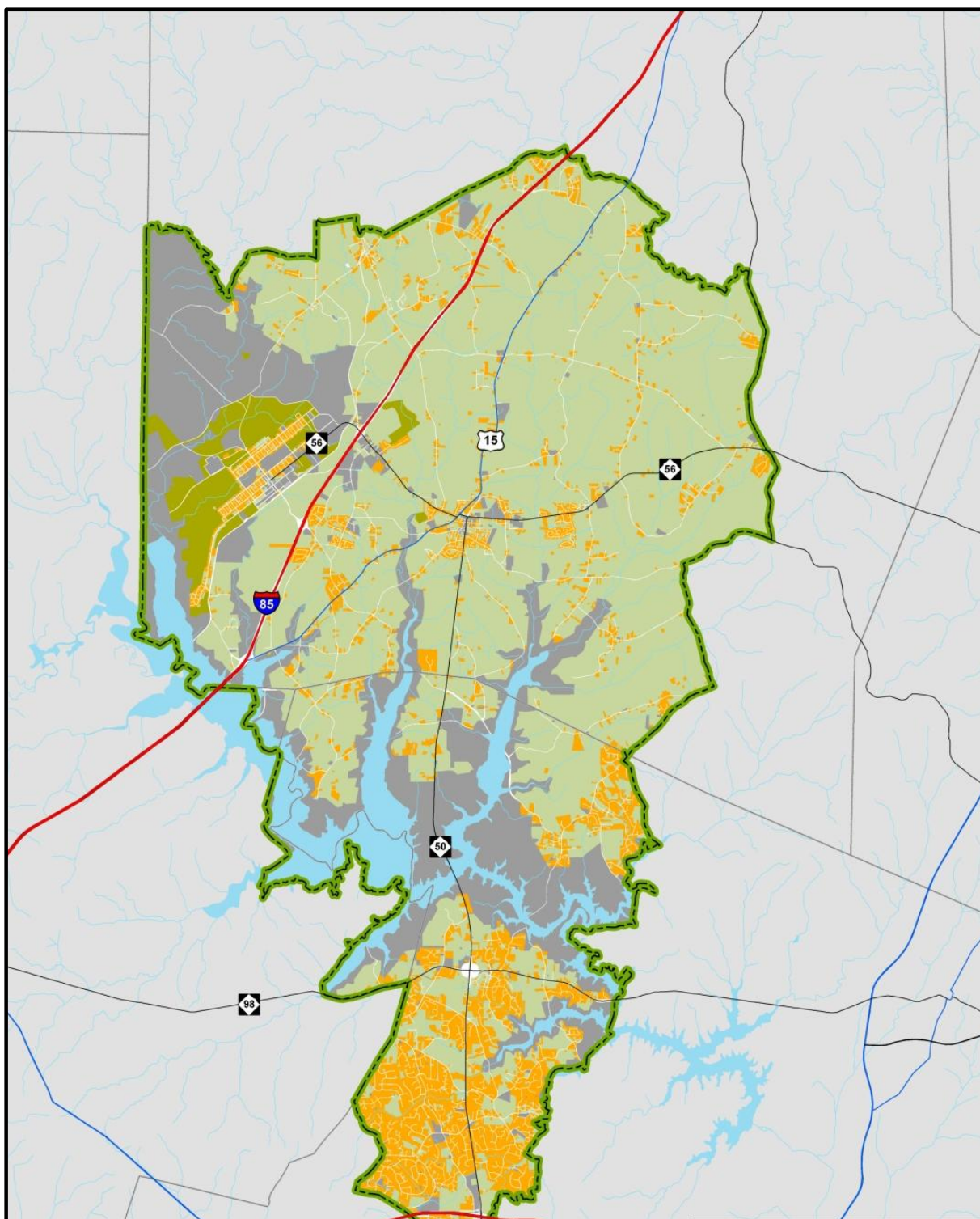
Existing and Future Population and Employment

As part of the regular updates to the CAMPO regional travel demand model, information from the US Census, local jurisdictional staff, and state employment data is used to estimate jobs and housing by traffic analysis zones. **Table 7** summarizes the existing and future population and employment within the study area.

Table 6. *Summary of Land Availability by County*

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

Land Availability Analysis



Legend

Existing Land Assesement

- Developed or Undevelopable
- Residential (Undevelopable)
- Vacant/Under developed (State or Local Govt owned)
- Vacant/Under developed (agricultural, larger lot)

Hydrology

- Lakes/Ponds
- Streams

Transportation Facilities

- Interstates
- US Routes
- NC Routes

- NC50 Study Areas**
- Scenario Planning
 - County Line



0 3,000 6,000 9,000 12,000 Feet

Granville County		
	Acres	Percent of Total
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	Acres	Percent of Total
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Total	32,186	100%



Table 7. CAMPO 2007 & 2035 Triangle Regional Model Data for Study Area

Jurisdiction	Population			Employment		
	2007	2035	Increment	2007	2035	Increment
Granville County	18,213	50,458	32,245	11,258	18,813	7,555
Wake County *	14,457	27,524	13,067	1,080	1,436	356
Totals	32,670	77,982	45,312	12,338	20,249	7,911

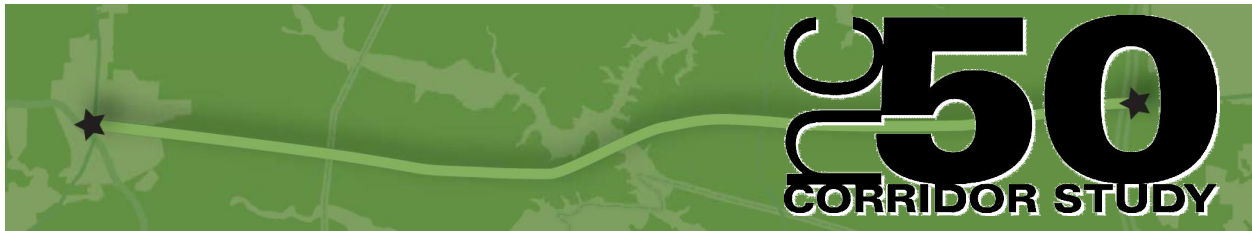
* Includes one TAZ in Durham, south of Falls Lake

Existing Land Use Policy Context

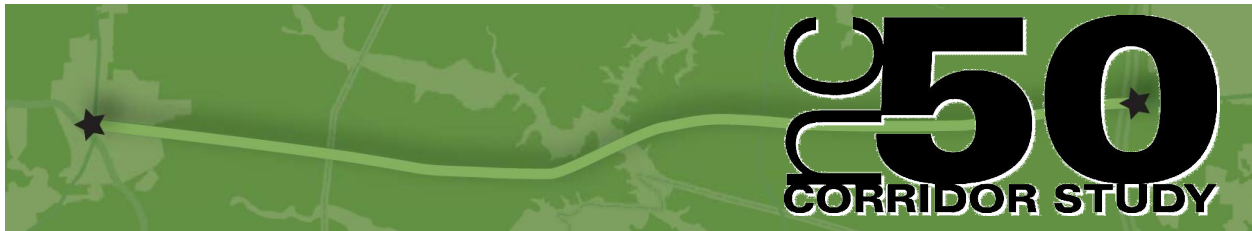
The study team reviewed local land use policies to gain insights into the existing policy context and desired future development conditions. The following documents and plans provide insight into the anticipated development patterns in the study area over the next 25 to 30 years.

- Wake County Comprehensive Plan** – The study area portion of Wake County is located in a Non-Urban Area/Water Supply Watershed, an area in which urbanization is not intended to expand and urban services are not intended to be extended - at least not in the foreseeable future. This designation is characterized by dispersed populations/lower development intensities, and large expanses of open spaces and natural areas. Land within the study area is generally classified as very Low Density Residential (<1 unit/acre), with small areas of Non-Urban Activity Centers that are intended to serve as the focal points for meeting neighborhood-scale shopping, social, educational, cultural, spiritual, and civic needs of the sparsely-developed areas that surround them.
- Wake County Unified Development Ordinance** – Within the study area, all land is zoned either R-40W or R-80W. These residential districts highlight lands within the critical area of water supply watersheds where development intensities should remain low enough to minimize pollution of the water supply source from storm water runoff. The zoning designations allow very-low-density residential development and a limited number of nonresidential uses and incorporate Best Management Practices (BMPs) to minimize stormwater runoff and water quality impacts.
- Granville County Comprehensive Plan** – The existing land development map indicates that the primary uses in the study area include residential, agricultural/open space, commercial, industrial, and office/institutional. The plan acknowledges that the extension of sewer and/or water service will continue to be the force driving the location of the greatest concentrations of residential development. Likewise, sewer services in Butner are nearing capacity, so establishment of new industry in the southern portions of Granville County will not be an option until this issue is addressed. Granville County will need to continue developing its infrastructure to support additional growth.

There is clear policy direction to extend water and sewer to support industrial growth. However, similar policy direction does not exist for residential development, though it can be inferred from the Future Land Development Map that identifies the following land uses:



- industrial and office development in the areas surrounding Butner and I-85
- commercial development concentrated at the I-85/NC 56 interchange
- medium density residential along major transportation corridors with low density residential areas filling the spaces in between
- higher density residential have where water or sewer service is available or planned to be extended
- agricultural and residential in the northern portion of the study area is designated
- ***City of Creedmoor 2021 Plan*** – Highlights from the Plan include the following findings and recommendations:
 - Creedmoor is a prime area for development, but is limited by existing resources, specifically in the area of water/sewer availability.
 - Southern Granville (and Creedmoor) has large level of soil limitations that do not preclude development but would require engineering measures to overcome.
 - There is interest in revitalizing Main Street to improve the downtown area.
 - The plan endorses the 1992 Thoroughfare Plan, which includes the Creedmoor Loop, a two lane bypass circumventing the southern limits of the City.
 - The future land use plan designated nine land use classifications, with little description of the quality or density/intensity, including an expansion of commercial corridors, light industrial areas, a mix of low and higher-density residential uses, and mixed use classifications in heavy traffic corridors.
- ***City of Creedmoor Proposed Strategic Plan*** – The Plan is broad in scope and addresses environmental, economic, and social issues. The Plan is organized around identifiable issues, each with its own goals, objectives, and recommended strategies to achieve the goals. Relevant ordinances and policies that affect NC 50 include:
 - Water and Sewer Allocation Policy and Development Criteria
 - NC 56 Mixed Use District and NC Highway 50 Development Criteria
 - Mixed Use Overlay District
 - Planned Unit Development Overlay Districts
 - Stormwater Management Ordinance
 - Stormwater Design Manual
 - City of Creedmoor Design Manual
- ***Town of Butner 2020 Comprehensive Land Use Plan*** – Butner’s plan sets forth a vision and provides guidance in the form of the future land use map and illustrative examples. To support the future land use plan a number of transportation improvements are also recommended. Including an extended grid street network to support residential development in the north, realignments/safety improvements to Lyon Station and Gate 2 Road, new parallel networks, a new I-85 overpass, and the widening of NC 56.
- ***Camp Butner Joint Land Use Study*** – The Joint Land Use Study resulted in a list of 23 recommendations in the areas of policy, planning and zoning, coordination and communication, and outreach for Camp Butner, most site-specific and none with any major impact to NC 50.



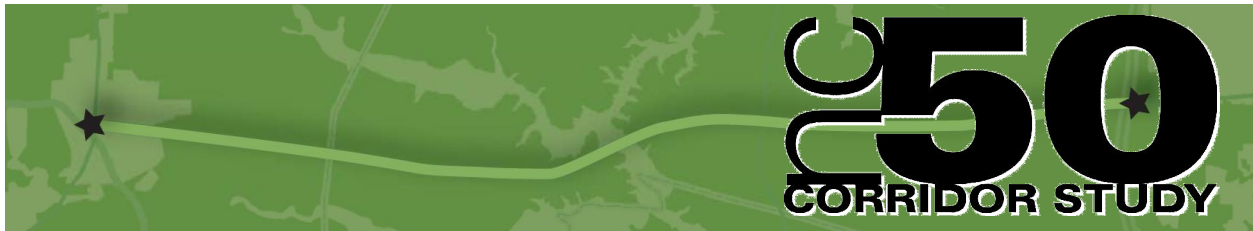
Market Assessment

An independent market study was completed to understand the potential trends and conditions that could influence future growth within the study area. The purpose of this market assessment was to examine the existing and future demographic trends, economic conditions, and development opportunities that could influence the pattern of growth in the corridor. Central to the analysis was an overview of the corridor's market position within the larger regional context of the Raleigh-Durham area. Based on the market position findings, four major elements were addressed: 1) study area characteristics; 2) growth dynamics; 3) study area market position; 4) development opportunities. The following highlights the last section of the market study which identifies future development opportunities. The full study report is available in the appendix.

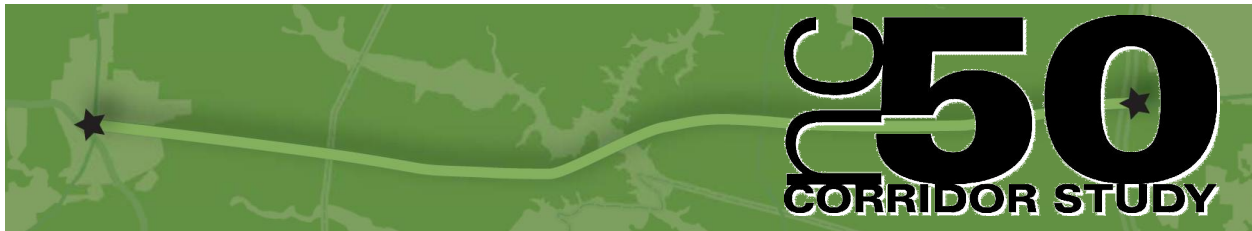
Potential Development Opportunities

Future development opportunities for the NC 50 Corridor study area are based on an evaluation of the study area characteristics, market position, and growth projections. These are intended as high-level, preliminary concepts that will require more detailed analysis to better define the opportunities and to assess their true market, economic, and physical feasibility. These preliminary opportunities are presented here as a starting point for strategic thinking about the NC 50 Corridor's development potential and as input into future scenario planning efforts. Most are longer-term, rather than short-term, opportunities.

- **Government/Institutional "Wild Card"** – The future growth of Butner as a major employment hub may have the greatest potential to alter the development landscape of the study area. Given the amount of available land and highway access, this area has been looked at in the past as a potential location for a major federal facility. Since the likelihood of attracting a new federal facility is difficult to predict, the potential for this should be considered a "wild card" opportunity. For the purposes of this study, a Butner employment center scenario will be explored to understand the potential impacts of this type/scale of future growth could have on the mobility needs and travel demand within the larger study area.
- **Suburban Housing** – Projections of future building permit activity suggest a reasonable chance that a stronger market could potentially lead to approximately 300 residential permits per year in the Butner/Creedmoor area if suitable land with sewer and water services was available. This volume of permit activity suggests potentially six to eight different active subdivisions marketing in any given year, depending on each project's size and sales pace. The locations of these projects would likely be located on or near transportation routes that provide convenient accessibility to I-85 and/or NC 50. The area south of Creedmoor, especially on or near Cash Road, is especially prime due to convenience to both routes.
- **Retail/Services/Professional Office** – While the existing, limited supply of these uses appears to be mostly satisfying the needs of the existing local population, increasing growth in the area and strengthened connections with the greater Raleigh-Durham region would lead to increased demand. Several locations in the study area are potential targets for development:



- **I-85 Interchange Area:** Land around and between the Gate 2 Road and NC 56 interchanges with I-85 in Butner
- **NC 56 into Creedmoor:** Existing clusters of commercial development at the interchange extending eastward toward Creedmoor along NC 56 and the proposed Creedmoor Bypass; careful planning and growth management needed to prevent disconnected and unorganized development
- **NC 50/I-540 Interchange:** Existing commercial development extending north from Strickland Road to I-540, assuming developable land is available; However, this area is within the Falls Lake watershed restriction zone, so the potential for commercial development would have to be evaluated on a site-by-site basis
- **NC 50/Norwood Road.** Additional development near the intersection depending on the availability of suitable land
- **NC 50/NC 98 Interchange.** Parcels outside the interchange area along NC 98 depending on the availability of suitable land and traffic volumes
- ***Senior/Retirement Housing*** – The population projections highlight the 55-74 and 75+ age segments will be the fastest growing segments in Granville County over the next 20 years. This suggests that housing types attractive to empty-nesters and senior/retirement housing could be a potential development opportunity for the study area. This opportunity can be further separated into needs-based housing and choice-based housing.
 - **Needs-based housing,** targeting the needs of the aging population already within the study area and surrounding communities, developed almost anywhere in the study area but optimally in or near Downtown Creedmoor, where residents would have access to some shopping and services without needing to drive
 - **Choice-based housing,** aiming to attract outside retirees and seniors, developed in the area south of Creedmoor along NC 50 due to relatively convenient access to Raleigh, regional activity centers, RDU airport, and Falls Lake
- ***Development Oriented To Falls Lake State Recreation Area*** – With an average of 875,000 visitors to Falls Lake per year, there may be private development opportunities that can capitalize on visitor needs or the potential desire to live near the lake. Given the relative lack of commercial development, the study area could potentially be targeted for services catering to visitors including food and beverages, outfitters and equipment sales/service, and convenience shopping and services. Locations along NC 50 would be prime sites for such development. There is some indication that demand exists for lodging at Falls Lake, with the General Management Master Plan for the recreation area including limited lodging facilities.



Environment

Environmental Screening Issues

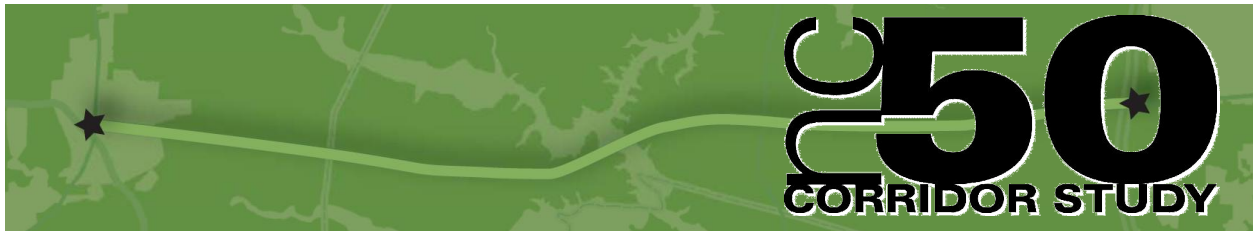
The purpose of an environmental screening is to identify potential environmental issues early in the planning process. A limited field investigation was conducted by environmental engineers and biologists to verify and supplement key information regarding existing corridor conditions.

Jurisdictional Features: Wetlands, streams, and open waters/ponds are regulated by the U.S. Army Corps of Engineers (USACE) pursuant to Section 404 of the Clean Water Act. In North Carolina, the Department of Environment and Natural Resources - Division of Water Quality (NCDWQ) has regulatory authority through Section 401 Water Quality Certification. Permit procedures are available for impacts to both waters of the U.S. and waters of the State associated with development activities, including roadway improvements. Streams, stream buffers, and wetlands that may be subject to these rules were identified using U.S. Geological Survey (USGS) topographic mapping, Natural Resources Conservation Service (NRCS) soils mapping, National Wetland Inventory (NWI) mapping, and limited field assessment to determine their jurisdictional status under the Clean Water Act (CWA) regulated by the USACE. Jurisdictional features identified in the project study corridor are shown in mapping in the technical appendix.

Environmental Permitting: The following permits are anticipated for this project.

- Section 401 General Water Quality Certification – A Section 401 General Water Quality Certification will be required for any activity that may result in a discharge into “Waters of the United States” or for which an issuance of a federal permit is required. The issuance of a required Section 401 certification is a prerequisite to the issuance of a Section 404 permit. If project impacts exceed the Nationwide Permit impact thresholds, an Individual Section 401 Water Quality Certification will be required.
- Section 404 (Impacts to “Waters of the United States”) – Impacts to “Waters of the United States” (including wetlands, streams, and ponds that are hydrologically connected to a navigable water) come under the jurisdiction of the USACE. Discharges of dredge or fill material into jurisdictional wetlands, streams, or open waters associated with the construction of the roadway widening project will require a Section 404 permit from the USACE. The Nationwide Permit 14 (Linear Transportation Projects) may cover the impacts to the jurisdictional wetlands/streams within the project corridor. Final determination of permit applicability lies with the USACE and NCDENR.
- NCDENR Erosion Control Permit from the Division of Land Resources
- FEMA Conditional Letter of Map Revision

Floodplains and Floodways: A review of the Flood Insurance Rate Maps shows the proposed project corridor crosses the floodway, 100-year floodplain (Zone AE), and 500-year floodplain (Zone X) in several locations. Maps with the effective flood hazard areas are included in the appendix.



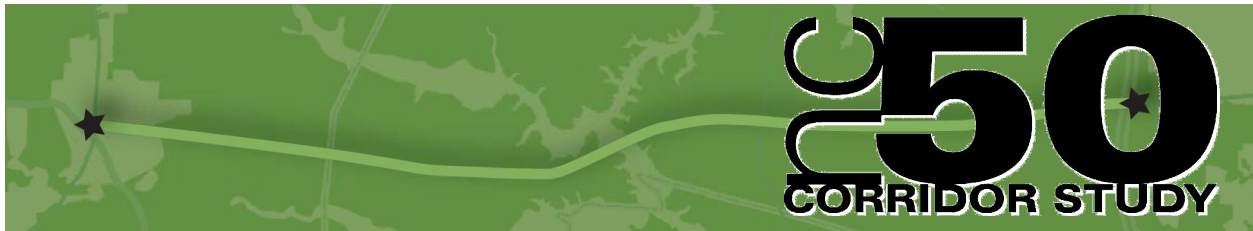
Biotic Resources: Based on a review of the North Carolina Natural Heritage Program (NCNHP) database, there are four element occurrences within the project corridor, which include: 1) rare plant and animal species, sub-species, varieties, and populations; 2) rare and high-quality natural communities; and 3) notable animal assemblages, such as heronries or shorebird nesting areas. The following is a list of the element occurrences within the project corridor:

- **Western rough goldenrod**— a state rare plant known to inhabit dry woodlands over mafic rocks. The location of this occurrence in the southern portion of the project corridor is in the vicinity of the I-540/NC 50 interchange. The occurrence of this species in Wake County is a historic record meaning the element is either extirpated from the county or there have not been any recent surveys to verify its continued existence.
- **Red-cockaded woodpecker**—a state and federally endangered species known to inhabit mature open pine forest primarily comprised of longleaf pine. The location of this occurrence within the project corridor was the forested areas surrounding Falls Lake. The occurrence of this species in Wake County is a historic record meaning the element is either extirpated from the county or there have not been any recent surveys to verify its continued existence.
- **Douglass’s bittercress (*Cardamine douglassii*)** – a state rare plant known to inhabit bottomland forest and rich lower slopes. The location of this occurrence within the project corridor is along the shoreline of Falls Lake. The occurrence of this species in Wake County is current meaning the element has been observed in the county recently.
- **Bald eagle (*Haliaeetus leucocephalus*)** – a state threatened species known to inhabit mature forest near large bodies of water. The location of this occurrence within the project corridor is the forested areas surrounding Falls Lake. The occurrence of this species in Wake County is current meaning the element has been observed in the county recently.



Threatened and Endangered Species: Typically, protected species are only an issue on a project if federal/state funding is utilized for a project or if a federal/state permit is required for a project, or if federally threatened or endangered animals are known to occur or discovered within the project area. Because this project will require a federal 404 permit from the USACE and state 401 Water Quality certification from NCDWQ for stream/wetland impacts, the protected species issue will be relevant.

The U.S. Fish and Wildlife Service (USFWS) lists the dwarf wedge mussel, red-cockaded woodpecker, and Michaux’s sumac, *Harperella*, and smooth coneflower as the only federally-protected species potentially in study area. Potentially suitable habitat for Michaux’s sumac and smooth coneflower exists along the NC 50 roadside. Although the roadside provides potentially suitable habitat, the regular mowing maintenance schedule along the roadside would inhibit the plant’s success. Potentially suitable habitat for harperella exists within the perennial streams in the project corridor. Due to the presence of potentially suitable habitat, the USFWS may request field surveys for Michaux’s sumac, smooth coneflower, and harperella prior to widening NC 50 in conjunction with the Section 404/401 permitting.



Historic Properties: A review of the SHPO database conducted on April 20, 2010 documented the presence of five known historic resources within the project study area, including:

- **National Register (NR) of Historic Places:** former First National Bank Building (Creedmoor)
- **State Historic Properties (SL):** Sandling Complex, Vada Keith Farm, Bill O'Briant Farm, Frank Aiken House, Sion H. Rogers House

In addition, the SHPO database review identified sixteen (16) additional historical properties within the vicinity of the project study area as areas of interest. These properties are under various levels of investigation by SHPO. If roadway improvements are proposed in the vicinity of these properties, additional coordination with SHPO is needed. The location of these properties is shown in the appendix.



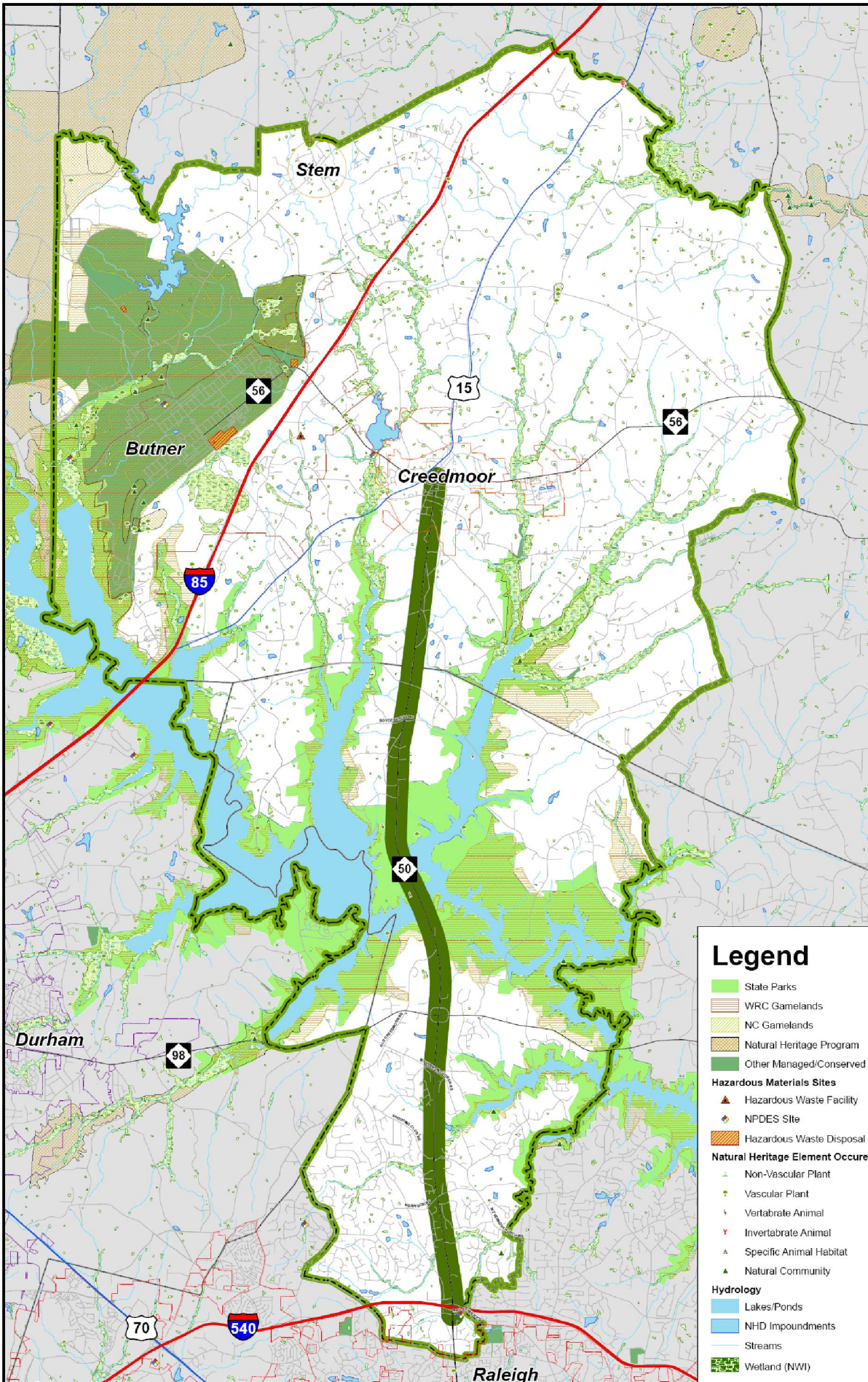
Potential Hazardous Materials: The US Environmental Protection Agency (EPA) National Priorities List (NPL) and Superfund Site Information were searched on April 22, 2010. There were no sites listed on the National Priorities List for any status located within a 1/8th-mile corridor of NC50 from I-540 to the Town of Creedmoor. The EPA Superfund Site Information database search for Wake and Granville Counties produced no sites along the study corridor. Based on the results of these searches, there are no known hazardous waste facilities located along the study corridor.

Water Quality

Actions proposed as part of the study may involve transportation enhancements to encourage mobility, including road widening or other measures. These changes are likely to promote more rapid development in communities served by NC 50. The type and location of road improvements are expected to affect the type and location of development as well. Future growth within the area may have direct and indirect impacts to the quality of water resources in the planning area, which intersects the Neuse and Tar Pamlico river basins.

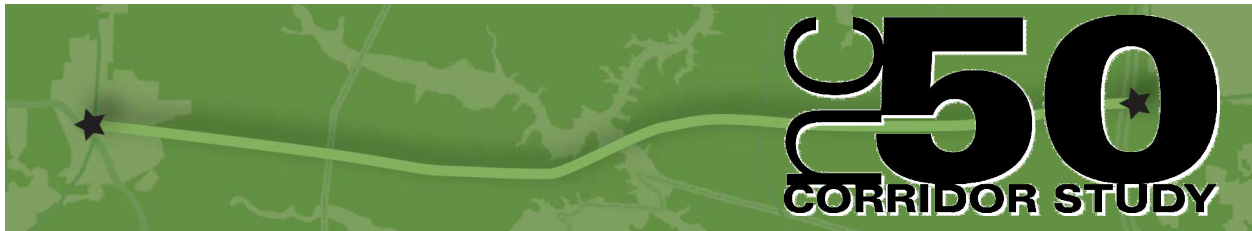
Existing Conditions of Water Resources: The NC 50 corridor improvements are proposed to occur within the Neuse River Basin, draining portions of Durham, Granville, and Wake counties and empty into Falls of the Neuse Reservoir (Falls Lake). The Tar-Pamlico River Basin also intersects with the northern portion of the scenario planning area, and these streams, which include the Tar River, drain an unincorporated portion of northeast Granville County. Falls Lake represents the most significant water resource – in terms of size, drainage area, and value to the community – that would be affected by transportation improvements along the corridor. NC 50 crosses Falls Lake about halfway between Creedmoor and I-540. The City of Raleigh and surrounding towns in Wake County use Falls Lake as their primary source of drinking water. The lake drains a watershed area of approximately 770 square miles (DWQ, 2009a), and nearly 35 percent of the lake's watershed and 70 percent of its surface area intersect with the planning area.

Environmental Constraints



Legend

- State Parks
- WRC Gamelands
- NC Gamelands
- Natural Heritage Program
- Other Managed/Conserved Land/Park
- Hazardous Materials Sites**
 - Hazardous Waste Facility
 - NPDES Site
 - Hazardous Waste Disposal Site
- Natural Heritage Element Occurrences**
 - Non-Vascular Plant
 - Vascular Plant
 - Vertebrate Animal
 - Invertebrate Animal
 - Specific Animal Habitat
 - Natural Community
- Hydrology**
 - Lakes/Ponds
 - NHD Impoundments
 - Streams
 - Wetland (NWI)
- NC 50 Study Areas**
 - Scenario Planning
 - Transportation
- Transportation Facilities**
 - Interstates
 - US Routes
 - NC Routes
 - Streets
- Municipalities**
 - Raleigh
 - Durham
 - Creedmoor
 - Butner
 - Stem
 - County Line



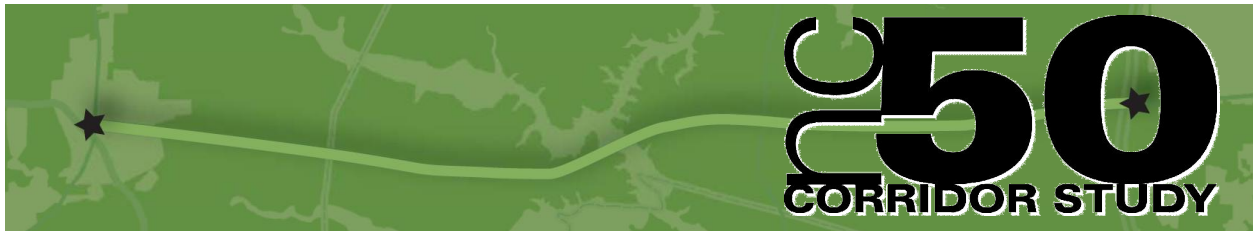
Other notable water resources include two small water supplies in the northwestern portion of the study area: Lake Rogers and Butner Lake. The planning area contains about 900 additional small water bodies which include natural, agricultural, or stormwater ponds. Significant areas of wetlands also exist along streams within the planning area. Overall, the study area contains about 460 miles of streams and 9,700 acres of open water. These water resources provide recreational opportunities, public water supply, and habitat for aquatic life, including several rare aquatic organisms.

While water quality in the Neuse and Tar-Pamlico river basins is reasonably good (due to its relatively undeveloped condition), the waters within the southern portion of the planning area drain the highest and more urban development densities, and as a result, these waters tend to exhibit poor water quality. Poor water quality conditions in the planning area have been caused by a number of stressors, primarily high nutrient and sediment loading which can lead to high chlorophyll-*a* concentrations in lakes and slow moving streams

Management Efforts for Falls Lake: Water quality management efforts have been ongoing in the planning area for decades, and the efforts began when Falls Lake was first categorized by the NC Environmental Management Commission (EMC) as Nutrient Sensitive Waters (NSW) in 1983. After phosphate levels led to eutrophication of the Neuse Estuary and fish kills in the mid 1980s, DWQ classified the entire river basin as NSW in 1988. In 1998, the EMC adopted the Neuse River Basin NSW Management Strategy with a 30 percent total nitrogen reduction goal for the entire basin. By 2004, this goal had been met and exceeded in the basin, but conditions in Falls Lake had not improved (DWQ, 2009b).

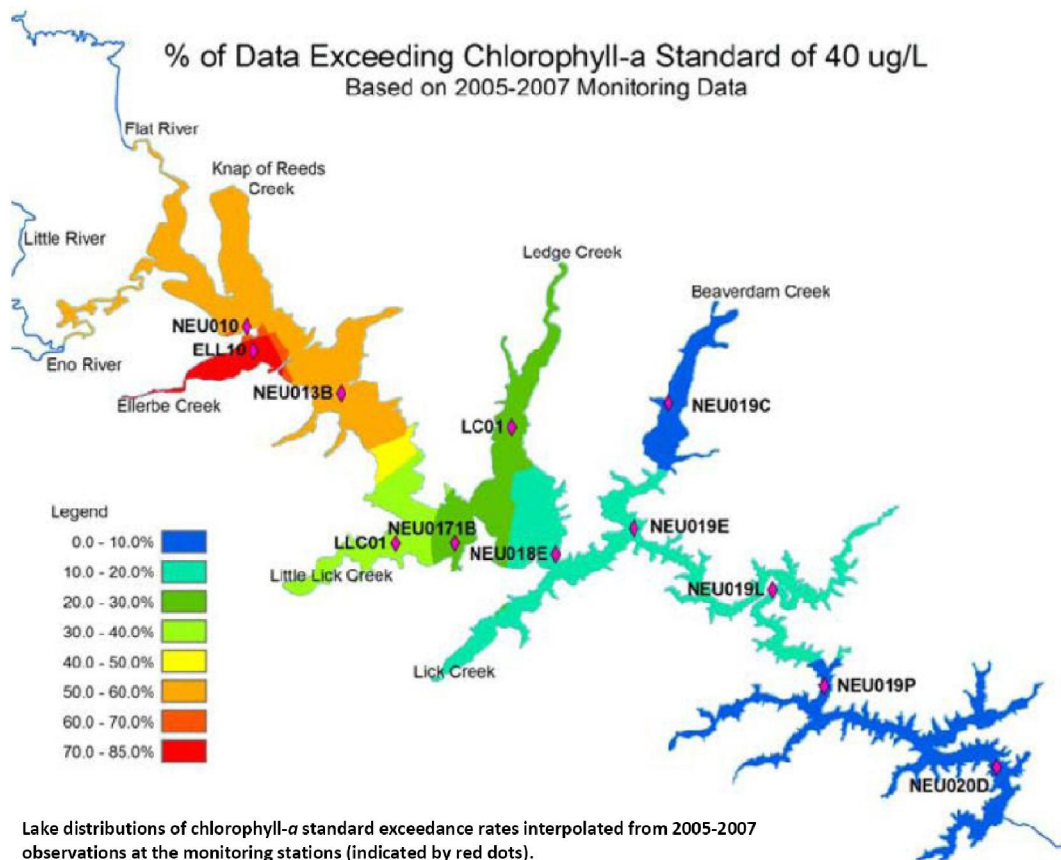
Today, the most stringent regulations in the watershed apply to Neuse River Basin and Falls Lake drainage. The current water quality regulations that apply to new development in the Neuse portion of the planning area are the 1998 Neuse River NSW Management Strategy (Neuse rules), the water supply watershed regulations protecting Falls Lake, and statewide NPDES Phase II stormwater regulations. Although individual jurisdictions may have more stringent requirements or requirements unique to a jurisdiction, these policies represent the minimum requirements for new development that apply to all jurisdictions in the planning area:

- *Neuse and Tar-Pam Rules* require protection of riparian buffers, with vegetation left undisturbed within 30 feet along intermittent and perennial streams, ponds, lakes, and reservoirs and temporary disturbance is allowed in the next 20 feet only if the first zone is not impacted.
- *Neuse Rules* require new development must achieve a nitrogen loading rate no greater than 3.6 pounds/acre/year, but includes in-lieu fee payment provision to offset higher loading rates up to a ceiling based on development type.
- *Creedmoor's zoning ordinance* enforces a 200-foot buffer around Lake Rogers, 100-foot buffers along perennial streams, and 50-foot buffers along intermittent streams.
- *Durham City/County and Raleigh* also require additional buffer protection beyond the minimum 50 feet for some streams and water bodies.
- *Wake County* requires 100-foot buffers and additional 20-foot building setback for reservoirs

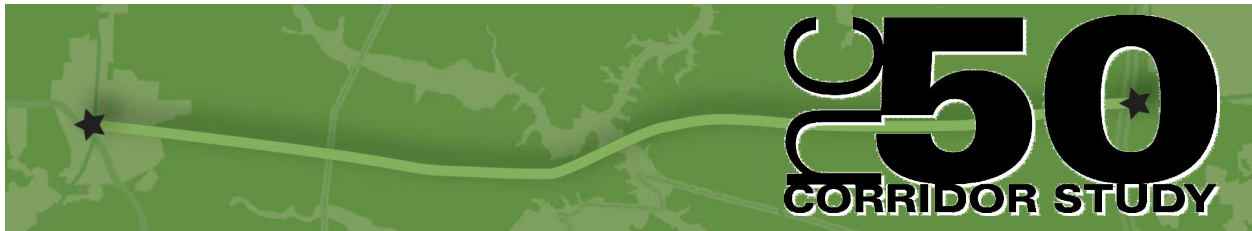


- *Water Supply Watershed Regulations* include stormwater management rules for new development within critical (CA) and protected areas (PA) that vary according to a range for built-upon area allowed.
- *NPDES Phase II Stormwater Rules* dictates development in Durham City/County, Wake County, Raleigh, Butner, and Creedmoor must meet minimum requirements for stormwater management based on acreage disturbed and the percentage built upon area. Some jurisdictions may have more stringent stormwater requirements than the minimum Phase II requirements.

In 2008, DWQ and the Upper Neuse River Basin Association (UNRBA) initiated the development of a Falls Lake Nutrient Management Strategy. The rulemaking process involved extensive stakeholder involvement, a monitoring study, and modeling analysis to assess the lake's capacity to assimilate nutrients and to obtain a better understanding of the impairments. The NC General Assembly has since weighed in through Session Law 2009-486, accelerating and strengthening the rule-making process by process by setting adoption timelines ahead of original dates, enforcing restrictions of new nutrient allocations, and requiring best management practices for erosion control and septic tank design/installation.



Sources: North Carolina Department of Environment and Natural Resources, Division of Water Quality, Modeling & TMDL Unit. *Falls Lake Nutrient Response Model, Final Report*. 11/30/2009. p. 102 (Cited at: <http://h2o.enr.state.nc.us/tmdl/documents/FallsLakeModelReport2.pdf>)



NC Division of Water Quality released the draft rules for public comment in late March 2010. The goal of the Falls Lake Nutrient Management Strategy 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. The draft Falls Lake rules would designate the Falls Lake watershed as a critical water supply watershed, which allows the EMC to establish more stringent requirements than the minimum WS class requirements. The highlights of the draft rules are shown on the following page. Per Session Law 2009-486, the EMC must adopt the final rules by January 15, 2011.

Falls Lake Nutrient Management Strategy: Proposed Rules

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. The rules are organized in stages:

- Stage 1 (10 years from inception): Watershed-wide reductions to meet chlorophyll-*a* standard in lower lake (east of NC 50 Bridge)
- Stage 2 (20 years from end of Stage 1): Additional reductions in upper watershed (above NC 50) to meet standard in the entire lake

New Development Requirements:

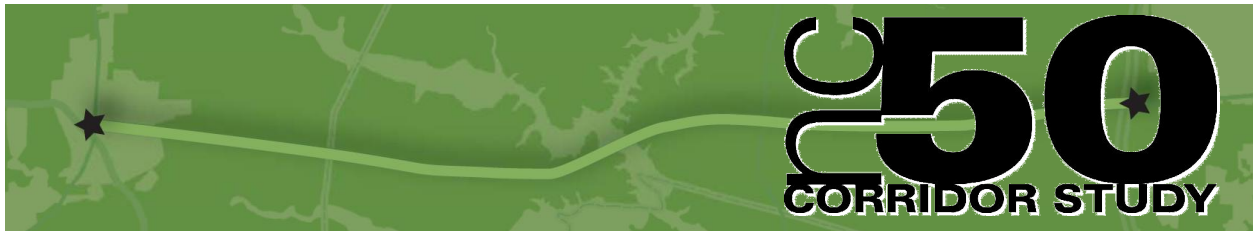
- Achieve nutrient export rates of 2.2 pounds/acre/year total nitrogen and 0.33 pounds/acre/year total phosphorus
- Areal disturbance threshold, above which development must comply (options for public comment): 1) 5,000 square feet, and 2) One-half acre
- Partial off-site mitigation allowed, with specific 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 a mandate to identify and eliminate illegal discharges to its conveyance system in the watershed
- New NCDOT road projects must meet the existing Neuse buffer protection rule
- New non-road 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



Public Involvement

Public outreach efforts are meant to educate and inform, but more importantly, should be used to listen. Input provided by stakeholders is important form of data that must be considered prior to formulating recommendations. With a corridor of this length, there will be fundamental differences in opinion between constituencies living along the corridor. Along with residents in Wake and Granville Counties, other important stakeholders include:

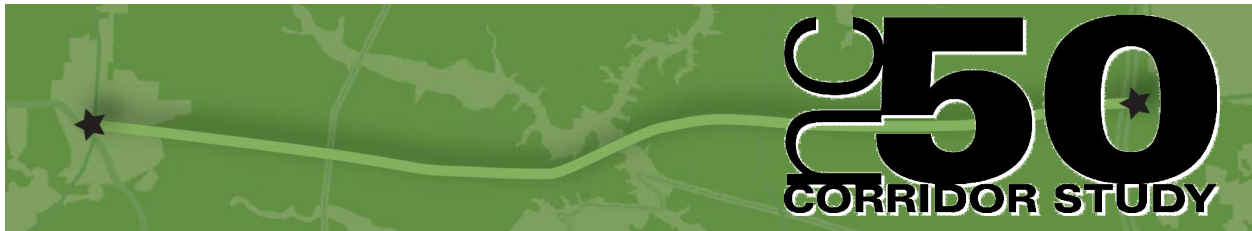
- Local farmers, their heirs, and agricultural extension offices
- Creedmoor area businesses
- Commuters headed to RTP and Raleigh
- Government employees commuting to and from Butner
- Local planners, engineers, and economic development staff
- Environmental interests concerned with Falls Lake watershed and habitat
- US Army Corps of Engineers
- Commercial trucking operators

In order to reach all of these stakeholder groups, a diverse approach to public outreach will take place throughout the project and include a number of meetings and instruments:

- **surveys**, including a web- and paper-based survey for the general public and a phone-based survey targeting commuters that live outside the corridor,
- a **project symposium** aimed at collaboratively discussing major topics with project stakeholders and local officials,
- **public workshops** where planners, residents, and business owners can all sit down at maps and point out concerns, offer ideas, and review recommendations,
- a **design charrette** that provides a forum for open participation and a refinement of the preferred transportation strategy and land use initiatives, and
- **published materials** including newsletters and a project website.

In addition, a core oversight committee consisting of community and public agency representation was established to guide the planning process.





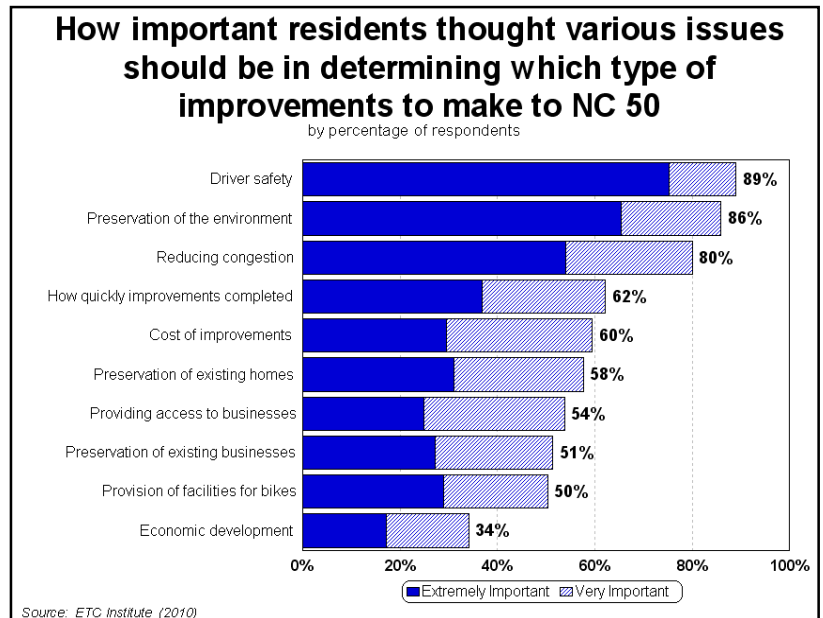
Commuter Phone Survey

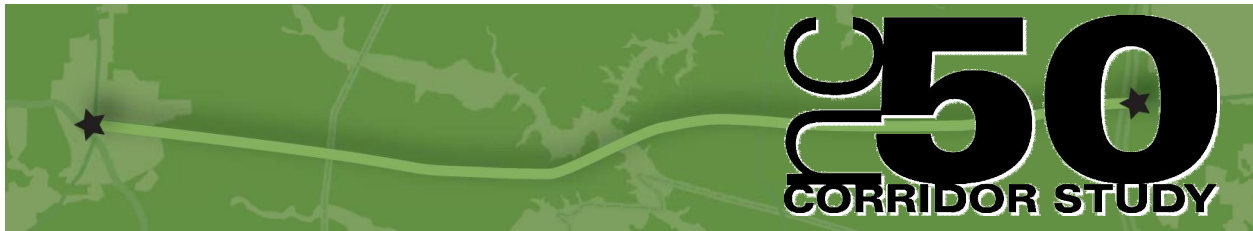
A phone survey was used in an effort to capture the thoughts and opinions of commuters with trip origins or destinations located outside the study area. This means of outreach was selected given the unlikelihood of capturing their participation during locally conducted outreach activities. The survey was conducted during March 2010, targeting commuters who frequently travel NC 50 (Creedmoor Road) between I-540 and the City of Creedmoor, but do not live adjacent to the corridor (within 2 miles). The purpose of the survey was to understand the commuters' perspectives on issues and appropriate improvements for NC 50. 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. The overall results of the survey have a precision of at least +/- 4.9% at the 95% level of confidence.

The major findings uncovered by the commuter survey include:

- The top three reasons people indicated that they travel on NC 50 were: for shopping and/or errands (56%), work and business related travel (51%), and recreation and/or entertainment (36%).
- 46% of those surveyed rated the flow of traffic on NC 50 as "poor" or "very poor" while 21% rated it as "good" or "excellent."
- 44% of those surveyed indicated that they felt "unsafe" or "very unsafe" when driving on NC 50; 27% felt "safe" or "very safe."
- The two issues that residents thought should be most important when planning improvements to NC 50 were: (1) driver safety and (2) preservation of the environment
- Sixty percent (60%) of those surveyed thought there was a "high" need or a "very high" need for improvements to NC 50.
- The top two reasons residents gave for choosing to travel on NC 50 were: 1) faster travel times to destination and 2) use NC 50 out of habit.
- Fifty-eight percent (58%) of those surveyed indicated that an alternate route(s) were available to them when traveling to their destination.
- Twenty-two percent (22%) of those surveyed indicated that they were "very likely" or "somewhat likely" to use a public transportation option for commuter trips to Raleigh and other Triangle destinations if service along the NC 50 corridor were provided.

A full copy of the phone survey results can be found in the appendix.





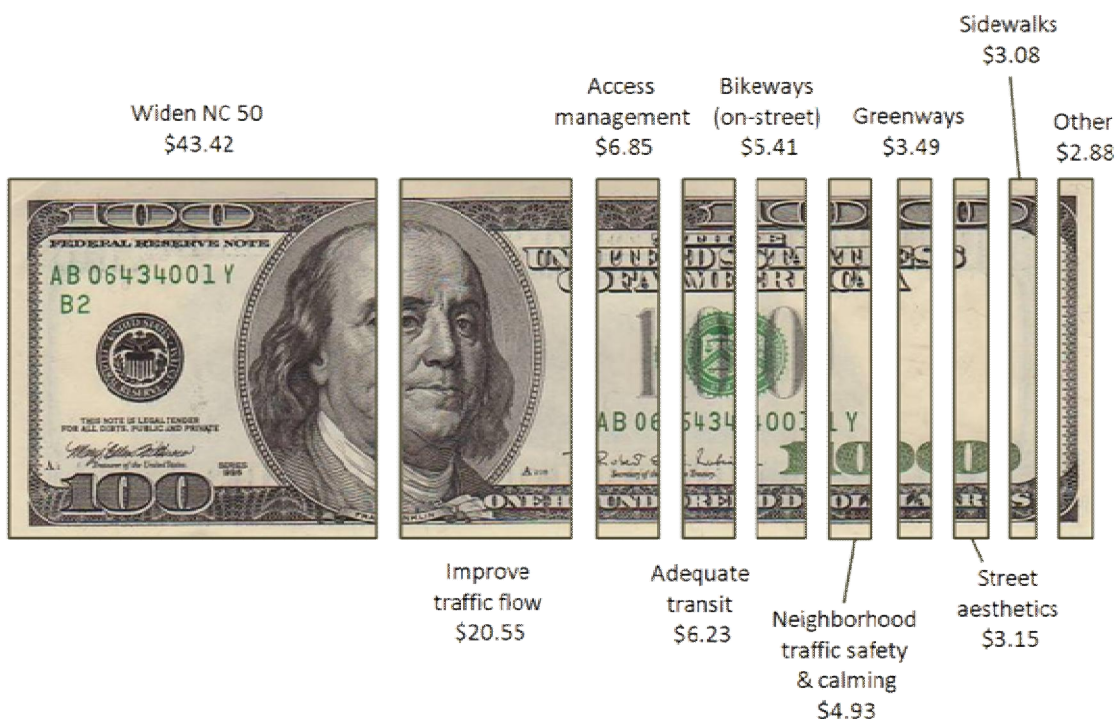
General Public Web Survey

Residents, business owners, local officials, and other stakeholders were surveyed during the first round of public outreach efforts via a brief survey. The survey was also available online for those visiting the project website to take. The survey was conducted during the months of March and April 2010, with approximately 85 respondents.

The major findings of the survey include:

- Nearly half of the respondents were residents of incorporated Wake or Granville Counties, nearly half had lived near the corridor for more than 10 years, and nearly half travel the corridor primarily during one or both of the rush hour periods.
- Only 15% respondents indicated the overall condition of the NC 50 corridor as “good,” with 36% indicating it as “poor.” Issues relating to the condition of the road got more favorable responses, those relating to traffic and operations mixed responses, and the condition of bike and pedestrian facilities drew very negative responses.
- The top five concerns voiced by respondents are: traffic safety (particularly at intersection), traffic volumes/congestion, road design issues including width, shoulders and lack of turn lanes, neighborhood access issues, and slow moving traffic due to the lack of passing lanes.
- When asked to how they would spend \$100 to improve the corridor, respondents spent an average of \$43.42 on widening and another \$27.40 on efforts to improve traffic flow and access management.

Results from the public survey results can be found in the appendix.



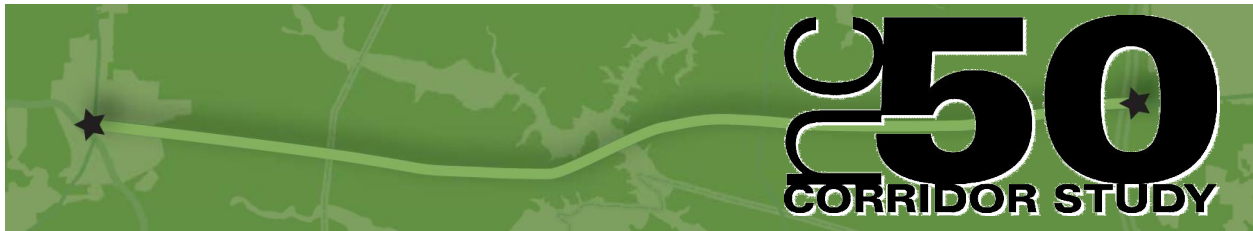


Project Symposium

Stakeholders and project team members joined to together during a Project Symposium conducted March 30th, 2010, to discuss major issues concerning the NC 50 corridor and potential improvements. Project planners presented information on the existing conditions and policies along the corridor and received feedback from those in attendance on key questions as summarized below.

Table 8. Project Symposium Summary

Questions Posed	Main Topics of Discussion
Environment & Water Quality	
How will the Falls Lake Nutrient Rules impact NC 50?	Rules affected on drainage, site development, and illegal discharges
What areas along NC 50 are worth protecting?	Understanding issues/challenges with stormwater/wastewater treatment, capacities
How do we safeguard and protect the natural environment?	Protection of stream buffers will mean more bridging, less culverts
	Options including low-impact design, constructed wetlands, offsite mitigation, and in lieu fees to protect water quality
	Creating a financial/economic balance between Raleigh/Wake water quality and economic impacts to Granville development
Land Use & Development	
What are the existing development patterns?	Creedmoor's focus on residential development per Granville County Master Plan
How will future growth occur within the region?	Need for quality development and better coordination with developers
What type of patterns should be supported?	Consideration of different development patterns for Granville County
	Strength of the rental and starter home markets in the Creedmoor area
	Consideration of impacts of Falls Lake Rules on land costs and new home costs in turn
Transportation	
How do land use decisions impact transportation?	Crash/safety concerns, particularly at single vehicle crashes and Nipper/Shooting Club intersection
What problems do we need to address?	Concerns with no/narrow shoulders, drop-offs, lack of guardrail
How do we approach solutions?	Need to alternative transportation options (bike, transit, park & rides, greenways)
	Any Granville growth stressing NC 50 traffic capacity
	Potential access management (driveway restrictions)
Economic Vitality	
What are today are economic indicators?	Role of Butner in commute patterns and office/non-retail growth
What economic growth opportunities exist?	Commercial development along I-85, including study to look at interchange north of NC 56
What type do we want to encourage/discourage?	Establishment of fees and ordinances to promote quality development, not just quantity
	Capacity and fees related to sewer as major factor in economic development decisions



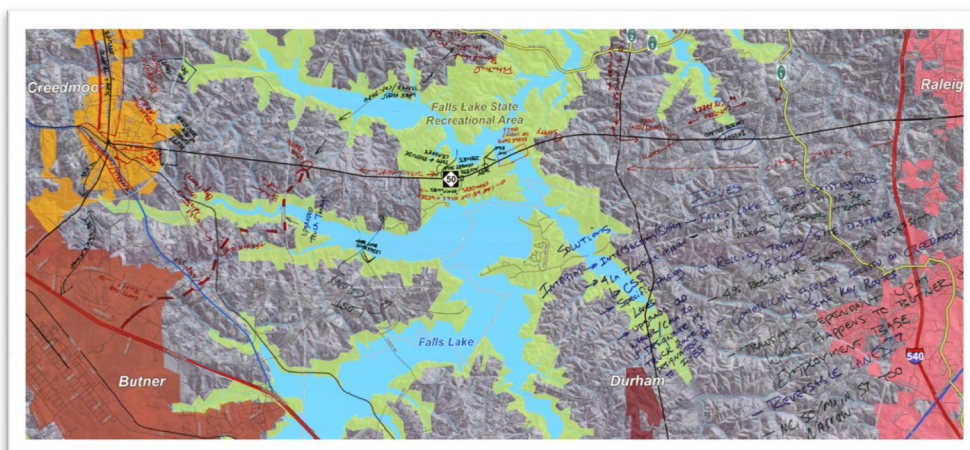
Public Workshops #1

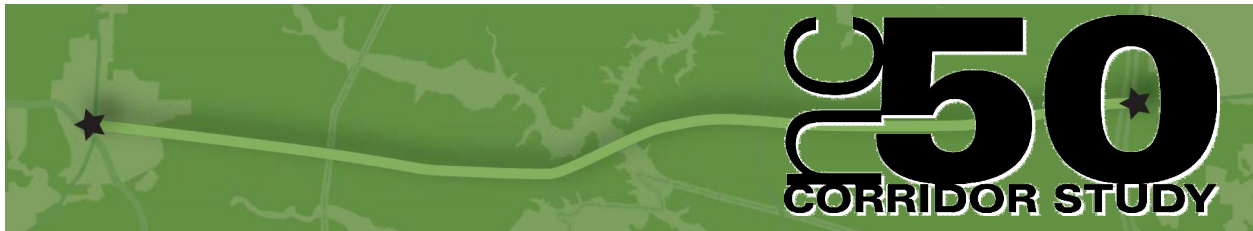
Two public workshops, one in North Raleigh and one in the Creedmoor/Butner area, kicked off the public engagement process. The purpose of these initial workshops was to solicit opinions, thoughts, and ideas from the public in formal and informal brainstorming sessions. The format of the public workshops encouraged citizens, project staff, and business owners to identify particular problem areas, discuss ideas, and brainstorm solutions.



Some of the issues brought up in the meetings included:

- **Safety:** Concerns over the segments near Sandy plains and Falls lake, the Mount Vernon Church Road intersection, blind curves and hillcrests, wildlife crashes, and single vehicle crashes near NC 98
- **Design:** Concerns over transitions between areas, lack of turn lanes, lack of guardrails at sags with drop-offs, offset intersections, lack of bicycle accommodations, and lack of shoulders
- **Mobility:** Concerns over queuing behind slow-moving vehicles, blockages due to crashes, traffic diverting to side streets, Creedmoor Bypass feasibility, truck traffic and routes between I-85, Butner and NC 98, and how the Triangle Connector (Durham) will affect RTP-bound traffic
- **Development:** Concerns about residential growth in NC 56 corridor, and employment growth and commute patterns to Butner
- **Constraints:** Concerns over funding and the Falls Lake Rules
- **Potential solutions:** intersection improvements, sequenced widening from I-540 northward, better bike crossings, access control and management, developer-built capital improvements, new wayfinding signage, passing or bypass lanes, greenway improvements, transit options





Guiding Principles

Residents, business owners, local officials, and other stakeholders have made it clear that the NC 50 corridor is in need of improvement. However, the improvements should not come at the expense of compromising the natural and cultural assets of southern Granville County, or the neighborhoods of northern Wake County, nor should future improvements and growth in the vicinity impair the water quality at Falls Lake.

Community Values

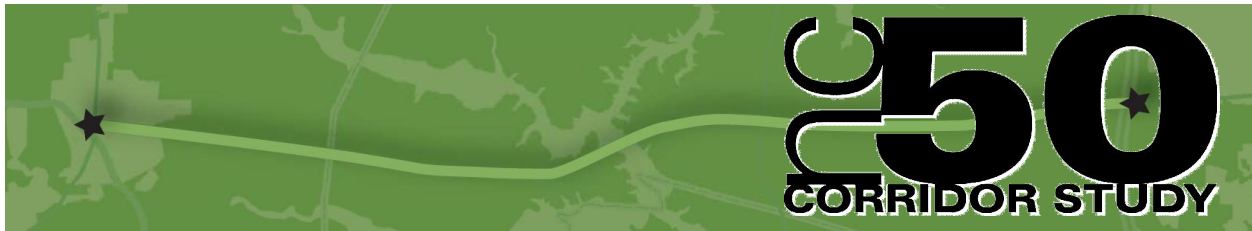
As a part of the corridor study process a series of outreach activities were conducted including stakeholder interviews, public workshops and a project symposium. Discussions that occurred during these activities led to the creation of a set of initial community values for the study including:

- Planning should be conducted in an open and transparent way that includes a framework for considering the full breadth of alternatives and likely outcomes.
- Public outreach should include input from stakeholders within the study area as well as those outside the study area who both impact and benefit from the corridor's connection to the rest of region.
- The local character and context should influence transportation recommendations.
- Falls Lake and the parks that surround it are a regional resource that should be protected and promoted but should also include enhanced connections to local communities.
- Economic vitality and protecting quality of life are important priorities.
- A long-range multimodal vision for the corridor should be established but the vision should be financially viable and implementable, reflecting market potential, constraints, and transportation funding.
- An interim strategy that responds to existing traffic safety and operations should be developed such that it does not preclude implementation of the long-term vision.
- Environmentally sensitive areas and areas of historic or cultural significance are valuable assets to the community.
- New growth should reflect the desire for quality development that is responsive to infrastructure availability, new watershed regulations, and a high quality of life.

Vision Statement

The following statement was crafted in conjunction with the oversight committee as a means to convey the overarching goal of the NC 50 Corridor Study:

"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."



Project Objectives

In an effort to refine the established goals for the project a series of specific objectives were established. These objectives represent statements intended to influence the creation of alternatives and recommendations. Alternatives developed during the study process will be evaluated against these objectives prior to the selection of a preferred set of strategies.

- **Improve transportation mobility and traffic safety along the corridor**
 - Develop a long-term, overall improvement plan that is responsive to projected traffic volumes and documented safety concerns
 - Develop a preferred access strategy that responds to corridor context and traffic operation goals
 - Develop intermediate transportation improvements that seek to mitigate safety concerns and that fit within and minimize reconstruction when long-term improvements are constructed
 - Seek ways to improve connectivity and increase choices for motorist, pedestrians, and bicyclist
 - Identify ways to enhance the pedestrian and bicycle connectivity between places and create a safe environment where these movements can occur
 - Explore ways to enhance transit service and ridership in the area
 - Promote context sensitive roadway designs that are responsive to the character of the surrounding area and local environmental features and include best management practices that comply with NCDOT and Falls Lake Watershed requirements.
 - Determine the appropriate measures for handling truck traffic through downtown Creedmoor travelling between Raleigh, I-85, and Butner, including assessing Creedmoor Bypass options
 - Develop a strategy to best accommodate commuter traffic between Wake County and Butner.
- **Preserve the character of the corridor while supporting regional economic development and local growth initiatives**
 - Identify locations suitable for future growth and areas that should be considered for preservation/protection from the impacts of growth
 - Assess the potential growth and feasibility for residential and commercial development within the study area and develop viable future land use scenarios
 - Demonstrate the use of cluster conservation development patterns as well as the benefits of connectivity and mixture of land uses
 - Identify the locations where the employment based development is most likely to be successful
 - Determine best practices for future growth in the study area using best management practices
 - Promote appropriate urban design and infill development patterns within downtown Creedmoor
 - Establish clear gateways and development patterns to/within the various context areas
- **Support activities to protect recreation, water quality, and the environment in the Falls Lake watershed**
 - Integrate sustainable design, particularly for storm water management, into NC 50 improvements to minimize and mitigate impacts to the environment and water quality.
 - Create a toolbox of land development measures that is responsive to the new Falls Lake Rules
 - Enhance pedestrian, bicycle, and equestrian connections to the parks that surround Falls Lake