

LAKE NORMAN REGIONAL BICYCLE PLAN




Centralina Council of Governments

Division of Bicycle & Pedestrian Transportation
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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The Lake Norman Regional Bicycle Plan could not have been developed without the assistance from a wide range of interested citizens, municipal staff, and NCDOT staff. Their diligent participation and review of the products developed as a part of this Plan was essential in completing the process.

Carolina Thread Trail
Randi Gates, Community Coordinator

Duke Energy
Steadman Sugg

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Mark Stafford, Division 12 Operations Engineer
Scott Cole, Division 10 Traffic Engineer
Bob Mosher, Division of Bicycle and Pedestrian Transportation Planner
Dennis Rash, NCDOT Bicycle Committee

Lake Norman State Park
Jason Gwinn

Catawba County
Mary George, Assistant County Planning Director

Cornelius
Hemal Shah, Transportation Planner
Jason Abernethy, Senior Planner

Davidson
Lauren Blackburn, Planner
John Cock, Planning Board

Huntersville
Zac Gordon, Principal Planner
Scott Treon, Assistant Parks and Recreation Director

Iredell County
Elinor Hiltz, Planner
Ron Smith, Planning Director

Lincoln County
Randy Williams, Principal Planner
Andrew Bryant, Planner

Mecklenburg County
Maya Agarwal, Greenway Planner
Richard Winters, Safe Routes to Schools Coordinator

Mooresville
Neil Burke, Transportation Planner

Troutman
Erika Martin, Planner

Unifour Rural Planning Organization
John Marshall, Transportation Planner

City of Charlotte
Ken Tippette, Bicycle Program Manager

Citizens
Jeff Archer
Don Bartell
Bill Galloway
Geoff Steele
Gene DiMenna

Table of Contents

CHAPTER ONE
Executive Summary

Executive Summary

The Lake Norman Regional Bicycle Plan is the culmination of years of work. The route it describes was first envisioned nearly seven years ago as a means for bicyclists to travel around Lake Norman through Mecklenburg, Iredell, Catawba and Lincoln Counties. NCDOT contracted with Centralina Council of Governments (CCOG) in early 2009 to write a regional bicycle plan for the Lake Norman area. This was to be the first plan of its type in North Carolina. The process used for its development is intended to serve as a model for the creation of similar plans in other portions of the State. Participating communities involved in the Study included:

- Catawba County
- Town of Cornelius
- Town of Davidson
- Town of Huntersville
- Iredell County
- Lincoln County
- Mecklenburg County
- Town of Mooresville
- Town of Troutman

Also deeply involved in the development of the Study were the regional transportation organizations that serve these communities. Those organizations included (1) Unifour Rural Planning Organization (Catawba County); (2) Lake Norman Rural Planning Organization (Iredell and Lincoln Counties, Mooresville and Troutman) and Mecklenburg-Union Metropolitan Planning Organization (Cornelius, Davidson, Huntersville and Mecklenburg County). Carolina Thread Trail staff also served on the Steering Committee. Thread Trail plans were being developed for Lincoln and Mecklenburg Counties at roughly the same time as this Plan was being written and their input was incorporated into the Plan. Finally, NCDOT Divisions 10 and 12 participated in the plan development process.

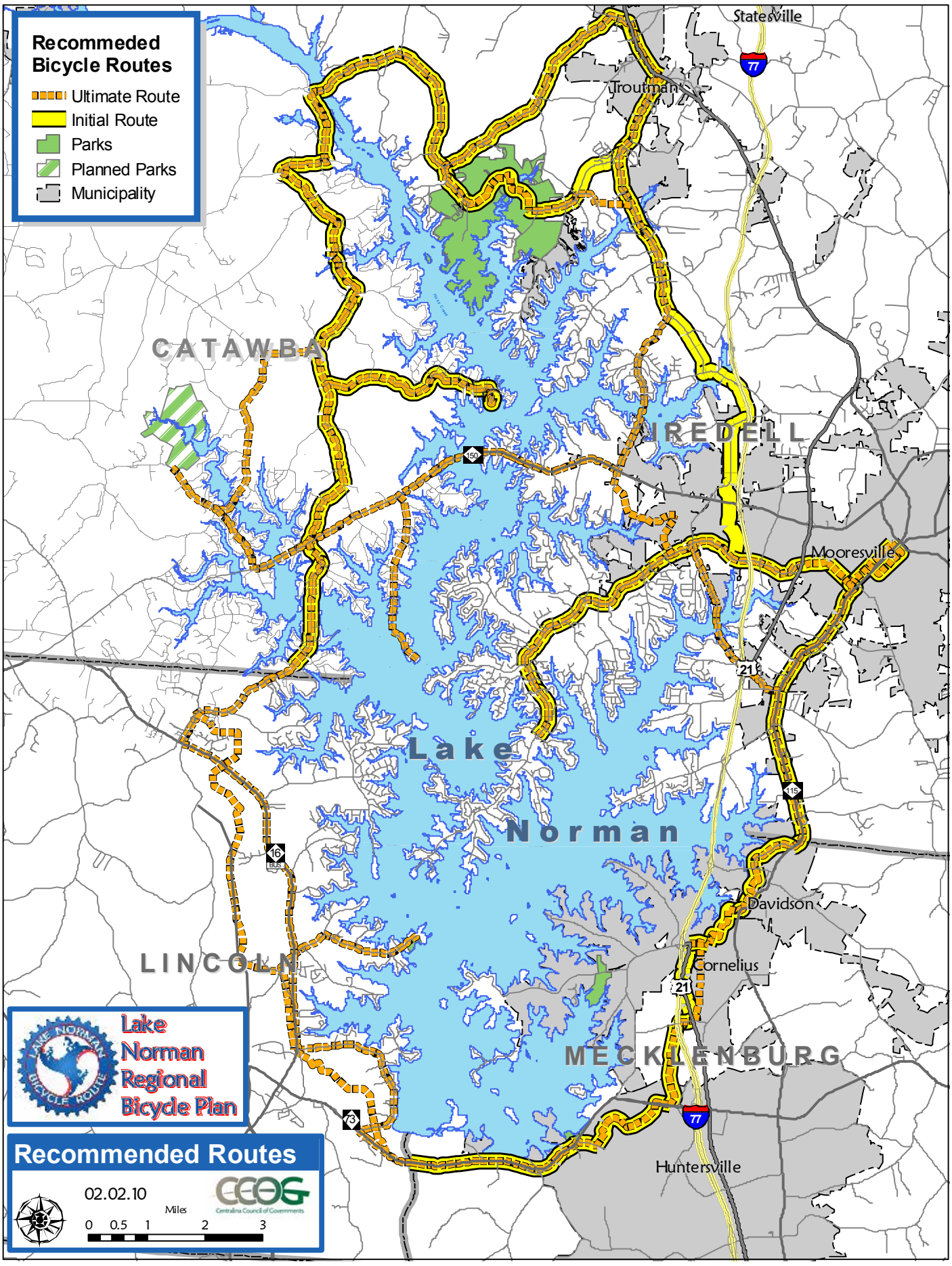
The Plan was written in 2009, with adoption by NCDOT in 2010. Centralina staff assembled a Steering Committee of representatives from transportation, land use, recreation, and environmental perspectives to guide its development. Interested citizens were also invited to attend and participate in Study discussions. Ultimately, 120+ persons showed interest in the Study's development and asked to be included on the distribution list for Steering Committee meetings. The Steering Committee met monthly throughout 2009. They assisted in the development and review of background information, text for the plan, and route recommendations.

The actual route chosen to circumnavigate Lake Norman was split into *Initial* and *Ultimate* routes. The *Initial Route* is primarily comprised of those segments that are already appropriate for bicyclists, or will be with limited improvements. The NCDOT Division of Bicycle and Pedestrian Transportation intends to install signage along the *Initial Route* in 2010. The *Ultimate Route* includes future segments of the Carolina Thread Trail and improved roads, such as NC 150 and Perth Road, that together create the ideal route around the Lake. The two routes are shown on the Recommended Routes map.

The Initial and Ultimate Routes together contain 51 segments that will require many years and millions of dollars to improve or construct. To focus limited resources, the Plan prioritizes these segments and identifies a high priority list that represents moderate cost capital projects for communities to reference when applying for grants. Total cost for implementation of the nine high priority projects is currently estimated to be approximately $15 million. The Plan includes a range of funding strategies to implement the Route. Some of these strategies involve coordination with private development, NCDOT road widenings and resurfacings, grant applications, and local funding.

In recognition of the many years likely to be required to implement the Plan, and the number of local governments and organizations necessarily involved, NCDOT asked that an enduring organization be created to sustain interest and coordinate activities among each of the affected parties. The Lake Norman Regional Bicycle Route Task Force was created to provide a forum for those parties to meet periodically after the Plan's adoption and to coordinate efforts on the Route, including recommending route amendments and sanctioning bicycling events along the route. The Task Force includes each of the organizations and communities directly affected by the Plan.

The Lake Norman Regional Bicycle Plan could not have been developed without the continued participation by each of the communities and organizations involved. Their comments helped to develop an informed and practical bicycle route plan that reflects the needs of those communities while providing specific guidance to all affected entities on how to implement its recommendations.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Ultimate Route
Initial Route
Parks
Planned Parks
Municipality
Statesville
Troutman
77
CATAWBA
IREDELL
150
Mooresville
21
Lake
Norman
16
Davidson
LINCOLN
Cornelius
21
MECKLENBURG
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Huntersville
Lake Norman Regional Bicycle Plan
Recommended Routes
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CCOG
Centralina Council of Governments

CHAPTER TWO
Background

Lake Norman Facts and History

Lake Norman is a man-made lake that covers portions of Catawba, Iredell, Lincoln and Mecklenburg Counties. Although it was technically created in February 1963 when the impoundment of the Catawba River by the Cowans Ford Dam was completed, the Lake was not officially dedicated until September 29, 1964. Partially due to a catastrophic flood that affected the entire Catawba River Basin in 1916, plans for the creation of a lake began in the early 1920s by the Southern Power Company, predecessor of the current Duke Energy Company. The Lake is named for former Duke Power (now Duke Energy) president Norman Atwater Cocke.

The lake is managed by Duke Energy and is home to Cowans Ford hydroelectric station, the coal-fired Marshall Steam Station and McGuire Nuclear Station. The Cowans Ford Development is the fifth of thirteen hydro stations on the Catawba and Wateree Rivers. In addition to being a source of electric power, Lake Norman is also used as a drinking water source by a number of communities including the City of Charlotte and the Town of Mooresville.

Recreational use of the lake is facilitated by eight Duke Energy-owned public boating access areas, public boat launching areas at the Lake Norman State Park in Iredell County, Blythe in Mecklenburg County and several commercial marinas. Most of the remaining lakeshore, particularly in Lincoln, Iredell and Mecklenburg Counties, now exists as residential lots located within increasingly upscale developments. More than 25,000 people reside on or near the Lake.

The creation of Lake Norman significantly altered the lay of the land in the area. Many current peninsulas, such as Brawley School and Unity Church, were previously connected. The current road network, therefore, includes many areas served by one road in and out. The area which has received the most attention due to the formation of the lake is the southern end of the Brawley School Road Peninsula. Until 1997, the southernmost portion of that Peninsula (known as "Meck Neck") was in Mecklenburg County, even though the only access to the area is via Brawley School Road in Iredell County. It was only through a special act of the North Carolina General Assembly that the entire peninsula became a part of Iredell County.

Lake Norman is a part of one of the most managed river systems in the world, with dams both upstream and downstream of the lake. Lake Norman is a part of the Catawba-Wateree Project,

which is operated under a license from the Federal Energy Regulatory Commission (FERC). The original license expired in 2008 and is currently operating under concurrent year-to-year licenses. The Federal Power Act requires non-federal hydroelectric projects to relicense after the original license expires, with the new license being granted for 30-50 years. The original license was issued by FERC in 1958 as Duke Energy was building the 11th and largest lake on the Catawba River - Lake Norman. Duke Energy filed a new license application in 2006 to continue operating the Catawba-Wateree Project. The final agreement was signed in late 2006. This agreement (Comprehensive Relicensing Agreement for the Catawba-Wateree Hydro Project FERC Project No. 2232) included provisions for recreation areas and assistance in planning trails and bicycle route crossings around the Lake. In keeping with this agreement, Duke Energy provided a representative for the Lake Norman Regional Bicycle Plan Steering Committee.

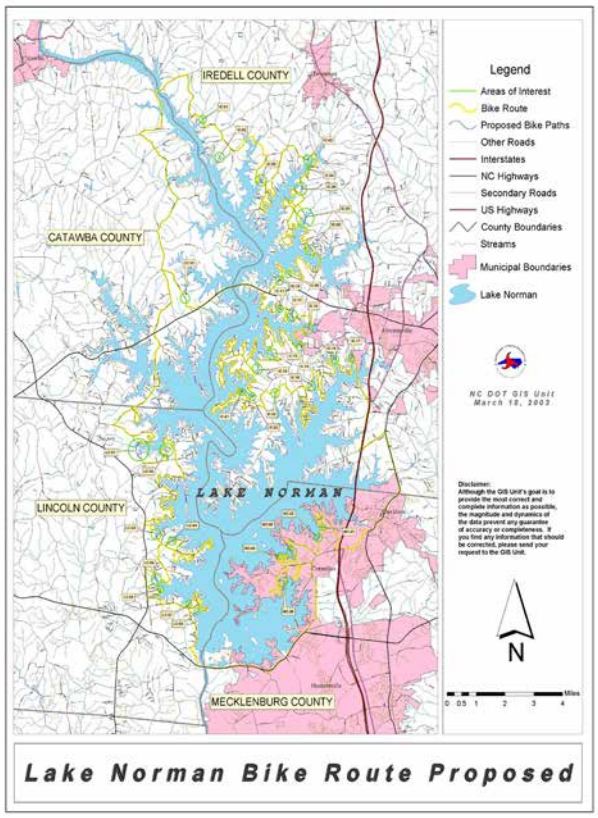
At full pond, the lake has an elevation of 760 feet, a surface acreage of 32,339 acres and a shoreline of 603.9 miles. The maximum depth is 130 feet (at the Cowans Ford Dam). The total drainage area is 1,790 square miles of mountains, foothills and piedmont, which contains a diverse mixture of industrial, commercial, residential and recreational development.

History of the Bicycle Plan

Bicyclists have been organizing rides around Lake Norman for years. The original Lake Norman Bike Route (LNBR) began as a concept of former NCDOT Board of Transportation member Frank Johnson and was envisioned as a scenic ride utilizing low-volume secondary roads around the Lake. Mr. Johnson's original concept map for the Route was completed by NCDOT staff in March 2003 and posted on the NCDOT website. The concept route remained dormant until the Centralina Council of Governments, serving as staff to the Lake Norman Rural Planning Organization, initiated the development of a more detailed on-road route in 2005-2006. This effort was funded in part by Duke Energy

The LNBR developed by Centralina was an on-road bicycle circuit encompassing Lake Norman, with connections to adjacent communities in all four counties that abut the Lake. In addition to providing a continuous "spine" around Lake Norman, the LNBR also comprised a series of bicycling "excursion" segments that were intended to bring bicyclists closer to the

Lake. Centralina staff finalized the route in 2006, and it was endorsed by the Unifour Rural Planning Organization (RPO), Lake Norman RPO, and Mecklenburg-Union Metropolitan Planning Organization (MPO) in late 2006 and early 2007. The plan was then sent to the NCDOT-Division of Bicycle and Pedestrian Transportation (DBPT) for their use.



NCDOT was unable to approve the plan as an official NCDOT route because they had no standards for a regional bicycle route at that time. The NCDOT Transportation Planning Branch did, however, subsequently reference the route in several Comprehensive Transportation Plans (CTP) in the area. The Lincoln County, Iredell County, Mooresville, and Troutman CTPs each referenced the plan in their respective bicycle route maps.

In late 2007, the bicycling community lobbied the North Carolina General Assembly to develop more, and longer, bicycle routes in North Carolina and to develop routes that included segments away from roads. The General Assembly authorized funds for the development of such plans and directed the NCDOT to develop routes that would stimulate tourism and economic development. NCDOT approached Centralina in 2008 to discuss the potential of reexamining the LNBR with the above goals in mind. Centralina subsequently entered into contract in early 2009 to conduct an expanded study, which was completed in early 2010.

CHAPTER THREE
Methodology

Mission

The Lake Norman Regional Bicycle Plan began with a mission to identify and lay out in detail the means of creating the Lake Norman Regional Bicycle Route, each segment at a time. The Plan describes how this regional Route will be developed over time, along with the recommended strategies and prioritizations to implement the Route.

Vision

The vision which guided the development of the Plan was that of a continuous, multi-jurisdictional bicycle route encircling Lake Norman; connecting with neighboring communities, and various destinations of interest. The Route would provide a safer, useful, and attractive transportation and recreation resource for a wide range of users within the surrounding four-county region.

Goals

The Lake Norman Regional Bicycle Route was developed with many goals in mind that would benefit the entire region. They include the following:

1. Create **links for bicyclists** around Lake Norman and its vicinity with facilities that provide connections to and around the Lake, to the surrounding communities, regional multi-modal transportation routes and facilities, and other significant destination points in the Lake area.
2. Provide **supporting facilities** for the bicycle route to identity the route, enhance safety, and improve the overall user experience.
3. Support and accommodate the bicycle as a viable means for **personal transportation**.
4. Permit increased and **equitable accessibility** to the Lake and adjacent destinations for the general populace.
5. Promote growth and **economic prosperity** in the region by attracting visitors and new investment.
6. Help reduce vehicle miles traveled by providing facilities for **alternative modes** of transportation.
7. Encourage **healthy lifestyles**, and social and educational benefits through bicycling.
8. Coordinate with efforts to protect and improve the **natural environment** around the Lake in order to enhance habitat for wildlife and protect water quality for Lake Norman and its successive water bodies which serve as primary drinking water supply for the region's populace.

Key Strategies

In consideration of these goals and the overall mission of the Plan, some initial strategies were embraced as a means of accomplishing the work and realizing the vision.

1. Utilize existing low-volume roads, improve high-volume roads, and develop off-road segments to serve the variety of bicycle users throughout the area.
2. Incorporate the Plan recommendations into relevant transportation, recreation, land use, and economic development plans and programs for the area in order to efficiently implement the recommendations.
3. Promote the route as an opportunity to encourage a healthy lifestyle through exercise to attract users in and around the Lake Norman area, and the greater region.
4. Create a plan that is multi-jurisdictional to serve the entire Lake Norman region.
5. Have the Plan endorsed by participating communities and agencies.

The Design Bicyclist

Bicyclists come in all shapes, sizes and skill levels. While the Lake Norman Regional Bicycle Route is intended to serve a broad range of bicyclists, its facilities have been planned in order to meet the needs of those possessing a particular range of bicycling skills, known as the design bicyclist. The **Design Bicyclist** is someone who is comfortable riding a bicycle along roads with a moderate amount of traffic, either on a wide-outside lane or a bicycle lane. This user's needs are best met through striped bicycle lanes, wide outside lanes, or, where there are lower amounts of traffic, signage. In high volume areas, multi-purpose paths may be necessary.

It is expected that more experienced bicyclists will also benefit from the planned facilities of the Bike Route, though they may not feel the need to rely upon the facilities to the same degree. An **Experienced Bicyclist** feels comfortable riding *with* traffic as opposed to the "design bicyclist', who is comfortable operating *near* traffic. In rural areas these bicyclists value long stretches of road with few curb cuts or turning movements. In urban areas they can easily operate on roads in traffic with prevailing speeds of up to 25 mph. Their needs are often best met by wide outside lanes, paved shoulders, and signage.

Sections of the Lake Norman Regional Bicycle Route are not recommended for bicyclists who are considered novice. The **Novice Bicyclist** is defined as a relatively inexperienced bicyclist who normally travels relatively short distances at a low rate of speed. Such bicyclists typically value scenic views and recreational destinations, such as parks. Their needs are best met by low-volume, low-speed residential roads with signage, and, where necessary, traffic calming. In more urban areas these users' needs are best met with dedicated multi-purpose paths. It is expected

that as the Lake Norman Regional Bicycle Route's *Ultimate Route* is implemented, more multi-purpose paths will be developed which will allow bicyclists to travel separate from motorized vehicular traffic.

Route Identification Process

The approved Route around Lake Norman is the summation of a technically-based, inclusive, and exhaustive process where the Steering Committee identified a wide range of variables to consider when determining where the route should go. These variables included existing plans, environmental features, destinations, and simplicity. The Steering Committee reviewed this information at their monthly meetings to ensure that the Route was both useful and feasible to implement. The key variables considered are described below in greater detail.

Existing Plans
The Lake Norman Regional Bicycle Route development process benefited from a wide range of previous planning work throughout the region. The Route was developed with input from existing transportation, land use, recreation, and greenway plans throughout the four counties. These plans were overlaid on the transportation network within the Study Area to identify linkages and common features. The net result is that over three-quarters of the Lake Norman Regional Bicycle Route and its recommended improvements are already found on existing bicycle, transportation, or greenway plan. This helps provide support for local plans, and focuses scarce construction dollars on improvements that serve multiple purposes.

Environmental Features
The Lake Norman Regional Bicycle Route's Initial and Ultimate routes include approximately 10 percent of their alignment off of an existing road. These new locations are almost always found on a Carolina Thread Trail-designated route. The Lake Norman Regional Bicycle Route planners worked closely with Carolina Thread Trail staff to identify areas where streams, utility corridors, and other opportunities exist to develop a Trail for pedestrians and bicyclists. Where located on-road, the Bicycle Route utilizes roads where a minimum of land disturbance isrequired to implement the recommendations.

Destinations
The Lake Norman Regional Bicycle Route is designed to connect residents and visitors with destinations. Destinations identified as a part of the planning process included schools, historic sites, recreation facilities, downtowns, shopping centers, and other points of interest. The location and type of destinations helped guide the Steering committee and planners in identifying routes to connect relevant destinations to population centers in order to increase the utility of the Route.

Simplicity
In addition to being safe, convenient and attractive, a signed bicycle route should be readily comprehensible to the user. The planners for the Route attempted to minimize the number of directional signs needed, not only to reduce costs and complexity, but to better serve the bicyclist on the street. Bicyclists generally want long stretches of road with a minimum of turns in order to improve safety and travel time and minimize the chances of getting lost or off track.

Prioritization Process

The Steering Committee developed a Segment Evaluation Form that was used to evaluate each of the fifty-one (51) segments studied on a range of issues. A copy of the Segment Evaluation Form is found on the following page. The Steering Committee used these scores to rank and prioritize projects, which are reflected in Map 4 (Appendix B).

Each segment was evaluated in terms of nine different variables listed below. Three of the variables were considered more crucial and therefore given a higher weight than the other six.

WEIGHT = HIGH
- Current Safety
- Linking Residents and Destinations
- Located on a Signature Route

WEIGHT = REGULAR
- Cost-Effectiveness
- Demand
- Scenic Views
- Alternative Travel
- Recreation / Tourism
- Bicycling to School

By scoring each variable for each segment as high, medium or low (i.e., high = 2, medium = 1, or low = 0), and applying the weight assigned to each variable (i.e., high = 2 or regular = 1), the evaluation process permitted each project segment to score anywhere between 0 to 24 points. The actual scores are shown in the Segment Evaluation Form. The segment scores ranged from 4-23 points.

The staff then looked at the range and frequency of scores to identify natural breaks in the scores. There were 12 “High Priority” segments (those with 17 or more points), 22 “Medium Priority” segments (11-16 points), and 17 “Low Priority” segments (10 or fewer points) identified and ranked through this process.

Implementation of the 11 "High Priority" segments will require either signage and possibly some capital improvements. Implementation of the "Medium Priority" segments will require improvements ranging from signage, limited improvements to complete road improvements. "Medium Priority" segments are recommended for implementation once the "High Priority" segments have been implemented. "Low Priority" segments will often require inclusion in future NCDOT road widening projects, and were felt to be beyond the capacity of the communities to implement. These segments were typically found on or near NC 73 and NC 150.

A variety of grant programs will help to implement projects where improvements are recommended. Typically these are in the form of transportation enhancement grants, Safe Routes to Schools, or Congestion Mitigation and Air Quality (CMAQ) funds. Applications for these grants require supporting information and research. The maps in Appendix C depict each of the high-priority projects and include information regarding recommended improvements, distance, estimated costs, signage recommendations, and notable attributes. The available funding sources to implement these projects are listed in Section 6.

Public Input

The Lake Norman Regional Bicycle Plan was written with a significant amount of participation and support from a wide range of citizens, organizations, and community leaders, as well as local, regional, and statewide organizations. Centralina staff actively solicited input throughout the planning process in an effort to raise awareness of the route, take advantage of existing bicycle and greenway plans, and ensure that the plan's recommendations would be supported by the affected communities.

Steering Committee

The Lake Norman Regional Bicycle Plan was developed with substantial input from citizens, interest groups, and area government representatives. The Steering Committee met monthly in Mooresville and was given an opportunity to comment and provide input on all facets of the Study. The Committee included representatives of the following organizations:

- NCDOT Divisions 10 and 12
- Mecklenburg-Union Metropolitan Planning Organization (MUMPO)

- Unifour Rural Planning Organization
- Lake Norman Rural Planning Orangization
- The Towns of Cornelius, Davidson, Huntersville, Mooresville, and Troutman
- Carolina Thread Trail
- Resource agencies including: Duke Energy, Mecklenburg County Health Department, Charlotte DOT Bicycle Program, North Carolina Division of Water Quality (NCDWQ), North Carolina State Parks, Lake Norman State Park Advisory Committee, Mecklenburg County Parks & Recreation Greenway Division, Trips for Kids, the Charlotte-Mecklenburg Bicycle Advisory Committee, and local bicycle shop owners.

In addition, interested citizens from throughout the Study Area were given an opportunity to participate in Steering Committee discussions and provide input. By the time the draft of the Study was completed, a total of 129 persons were on the Steering Committee email list. Updated meeting information was sent to all persons on the email list. In general, however, approximately 20-25 persons attended the Steering Committee meetings. The Steering Committee played an important role in developing the Study. Tasks that they assumed included the following:

- Providing information used in the development of existing conditions maps;
- Identifying routes for study;
- Defining an initial and ultimate route;
- Providing input on the logo for the Study;
- Developing a set of recommended facility improvements; and,
- Reviewing the Plan text.

Public Meetings

The plan process included two rounds of public input meetings. These meetings were well-publicized, with several prominent articles in the Charlotte Observer and on the area National Public Radio station, WFAE 90.7 FM.

The first round of meetings gave attendees opportunity to learn about the plan process and to provide input on :

- Destination points that should be linked;
- Where the Bicycle Route should go on-road and off-road;
- How route segments should be prioritized for implementation;
- The project mission and ultimate vision for the route; and
- Previous related planning efforts in the study area.

A total of 44 citizens attended the May 2009 meetings. They were held at the following locations:

- May 11, 2009 - Lincoln County (Unity Presbyterian Church)
- May 12, 2009 - Mooresville (Charles Mack Citizens Center)
- May 19, 2009 - Davidson (Town Hall)

A summary of the results from these meetings is found in Appendix A.

The second round of public input meetings allowed citizens to view and comment on the results. During an introductory multi-media presentation, citizens learned and asked questions about the process and intentions that led up to the draft Plan. The presentation covered a broad range of topics, including:

- Key distinguishing features of the study area;
- Stakeholders involved;
- Considerations and methodology guiding the selection and prioritization of routes and improvements, both initial and ultimate;
- A description of the proposed route and facilities with an emphasis on the county where the meeting took place;
- "Signature Routes" selected for early implementation; and
- A description of the range of implementation strategies and measures of success.

The presentation was followed by a closer look at key thematic maps of the draft route arranged -- along with other information -- in a format allowing for closer inspection and small group discussion with the presenter, project team, and local staff.

A total of 19 citizens attended the October and November 2009 meetings. They were held at the following locations:

- October 26, 2009 – Cornelius (Town Hall)
- November 2, 2009 – Troutman (Town Hall)
- November 9, 2009 - Lincoln County (Unity Presbyterian Church)

A summary of the results from these meetings is found in Appendix A.

Speakers Bureau
CCOG staff made a number of presentations in the four counties toraise awareness and solicit input. Presentations made and the number of persons in attendance at each of these meetings are shown below:

DATE	GROUP	PERSONS IN ATTENDANCE
May 28, 2009	Tarheel Trailblazers	10
July 16, 2009	Lake Norman Chamber of Commerce Public Policy Committee	8
July 27, 2009	Lake Norman Chamber of Commerce	18
August 4, 2009	Huntersville Bikes and Greenways Committee	7
September 2, 2009	Catawba County Parks Advisory Committee	15
September 23, 2009	Mooresville-S. Iredell Chamber of Commerce	35
November 16, 2009	Cornelius Planning Board and Town Board	18

Personal Interviews
CCOG staff met with experts and key leaders in the local community as the study was being developed to learn more about the study area and to solicit frank input about related issues. Persons interviewed were as follows:

DATE	PERSON(S)	ORGANIZATION
July 10, 2009	Jason Harpe	Director, Lincoln County Historical Society
July 10, 2009	Carroll Gray	Lake Norman Regional Transportation Commission
July 16, 2009	Bill Thunburg	Mayor, Town of Mooresville

DATE	PERSON(S)	ORGANIZATION
August 26, 2009	Greg Biffle	Mooresville property owner
September 14, 2009	Scott Cole and Mike Holder	NCDOT Division 10 and 12 Traffic and Division Engineers

Presentations for Adoption

The Steering Committee formally endorsed the Study on December 17, 2009. Centralina staff then made presentations in early 2010 to all participating municipalities and counties and their respective RPOs and MPO. The list of meetings attended as well as Study adoption dates is shown below:

ORGANIZATION	FINAL PLAN PRESENTATION/ ENDORSEMENT DATE
Catawba County	February 15, 2010
Town of Cornelius	February 1, 2010
Town of Davidson	February 9, 2010
Town of Huntersville	March 15, 2010
Iredell County	March 1, 2010
LNRPO	February 23, 2010
Lincoln County	February 1, 2010
Mecklenburg County	March 2, 2010
Town of Mooresville	February 1, 2010
MUMPO	January 21, 2010
Unifor RPO	January 27, 2010
Catawba Lands Conservancy	
Lake Norman Transportation Commission	February 10, 2010

CHAPTER FOUR
Current Conditions

Lake Norman Transportation Network

The Study Area for the Lake Norman Regional Bicycle Plan completely surrounds Lake Norman and extends approximately one to four miles landward from the Lake shore. This area includes a wide range of transportation facilities, but features only two limited access roads: I-77 and the recently opened new NC 16. Other than I-77, the vast majority of travel in the Study Area occurs on a combination of overburdened and/or rural two-lane roads. NCDOT and affected municipalities have identified and implemented projects in the area to address vehicular safety and congestion issues. But while a variety of road widening, intersection improvement, and interchange construction projects are currently underway, many important projects, such as the widening of NC 73, NC 150 and I-77, are unfunded for construction at this point. As identified transportation needs in the Study Area significantly exceed available resources, road congestion is expected to worsen in the future.

Lake Norman is the dominant feature in the Study Area. Its creation 50 years ago has permanently altered local travel patterns. Many of the Lake's peninsulas include roads that formerly crossed sections of the Lake. Examples of previously connected roads include Langtree Road (SR 1102), Brawley School Road (SR 1100), and Unity Church Road (SR 1479). These peninsulas force traffic to use a ring of NC, US, and Interstate routes to circumnavigate the Lake, and both the Lake and these routes were a key factor in the route determination process for this Plan.

Strategic Highway Corridors

Several highways in the Study Area have been designated by NCDOT as particularly important to North Carolina through the Strategic Highway Corridor (SHC) initiative. The primary purpose of the SHC is to provide a network of high-speed, safe, reliable highways throughout the state. In the Study Area, these designated highways include I-77, NC 73, and NC 150. The SHC designation for NC 73 and NC 150 affects the design for any future improvements, with a focus on high-speed long-distance travel. The Plan process avoided these facilities as much as possible, although the ultimate route does utilize NC 73 and NC 150 to cross Lake Norman due to the lack of alternatives.

Other Major Roads

The major roads in the Study Area are NC 16, NC 73, NC 150, US 21, and NC 115. Around the Lake, these roads carry between 15,000 and 30,000 vehicles per day, and are experiencing

isolated and recurring congestion, which is expected to increase into the future. Segments of each have been identified for future improvements by NCDOT, although the scheduled improvements will require at least 20 years to complete.

Local Roads

Each of the municipalities in the Study Area maintains road networks, although these are typically only secondary and residential streets. Each municipality is committed to developing a network of local streets in their respective jurisdictions to reduce the percentage of local trips utilizing major roads. This will help reduce vehicular congestion and also create a comfortable network for bicyclists and pedestrians to navigate through their communities.

Review of Land Use Regulations and Related Plans

Catawba County

Southeast Catawba County currently offers virtually no formal bicycle or pedestrian facilities. Some scattered subdivisions do have sidewalks; however they are primarily internal and do not connect to the surrounding areas. In 2003, the Catawba County Board of Commissioners adopted the Sherrills Ford Small Area Plan (SAP), which covers the Lake Norman Regional Bicycle Route Plan area. This document describes a number of bike-friendly recommendations. It calls for a request of NCDOT to increase pavement widths on roads identified as bicycle routes, as well as the construction of bicycle lanes on new NCDOT road projects. The Plan also calls for the coordination of bicycle routes with adopted city plans and the connection of sidewalks in urban interface areas. The SAP further recommends greenways along several river corridors, including Lyle Creek, to provide off-road pedestrian and bicycle routes.

The SAP explicitly supports bicycle usage by stating that "all new development [be] designed to accommodate and encourage the pedestrian and bicyclist as equally as the automobile driver". It also calls for the creation of a "pedestrian oriented village center to serve as a focal point of the Sherrills Ford community in Terrell." Interconnection of new developments with existing developments, where practical, is also encouraged. Sidewalks along one side of road frontage in all new subdivisions are also recommended in the SAP.

Examples of new developments approved in the Sherrill Ford area that have pedestrian/bicycle components included on their site plans are:

- Key Harbor – internal sidewalks, road frontage sidewalk network, and a requirement for construction of a bicycle/pedestrian trail along Island Point Road to connect neighborhoods to Sherrills Ford Elementary School
- Village at Slanting Bridge – pedestrian/bicycle trail network within village and connection along NC 150

Catawba County's UDO (Unified Development Ordinance) requires sidewalks within developments and along road frontage for subdivisions based upon density of the development (i.e., subdivisions with lots sizes that are generally less than one-half acre will require sidewalks). Also the Mixed Use Corridor Overlay District requires sidewalk construction along NC 150 or developers can pay a fee-in-lieu which goes to the County's Park Trust Fund for complementing the Parks Master Plan, which can include trails. Connectivity among developments is also encouraged along with conservation subdivision design having a 25 percent open space provision.

Iredell County

There is a sense among Iredell County planning staff that the County is reasonably "bicycle friendly," especially in the areas within and adjacent to this study area. This conclusion is based on the large number of formal bicycle groups in the area. Connectivity between subdivisions within the County's planning jurisdiction is addressed in the Section 405.5 of the Iredell County Subdivision Ordinance by the following: "Where it is deemed necessary and beneficial to the interconnectivity of local land development by the Subdivision Administrator, proposed roads shall be extended by dedication to the boundary of the developing property and a temporary turn around provided within the existing right of way." Thus, the decision on whether connectivity between developments will be required is made on a case-by-case basis. Therefore, connections between origins and destinations cover the range in quality and quantity. Connectivity is hampered by the natural topography of the Lake setting as points and inlets make connections difficult.

There currently are no designated bicycle lanes along public roads in unincorporated portions of the County. Within the study area, publicly accessible bicycle trails include the approximately 14 miles of single track paths within the Lake Norman State Park, with another 4-7 miles expected to be opened in the near future. Local planners estimate that approximately 30 miles of trails will be available to the public at the State Park when all sections are completed. With regard to "developer driven" bicycle improvements, County planners are analyzing possibilities along NC 3 and are including recommendations for a multi-use path south of Rocky River Road to the Cabarrus County line (although NC 3 does not lie within Study Area of this project).

Town of Mooresville

The Town of Mooresville occupies the area in northern Mecklenburg and southern Iredell County that has developed a reputation for bicycle and pedestrian friendliness. The Town's land use regulations call for sidewalks to be placed on both sides of virtually all new streets. Bicycle lanes shall be installed on streets as specified in the Town's 2008 Comprehensive Bicycle Plan. In addition, the Town's Zoning Ordinance requires that all developments that contain 36+ off-street parking spaces provide bicycle storage facilities.

About one mile of designated bicycle lanes, recommended in the Mooresville Comprehensive Bicycle Plan, exists along both sides of Wilson Avenue between Alexander and Academy Streets near downtown Mooresville. These were installed in 2008 by re-striping the existing pavement.

As mentioned with Iredell County, planners are analyzing possibilities along NC 3 and are including recommendations for a multi-use path as the road is improved. Bicycle support facilities are required as part of the Town's off-street parking requirements contained within their development standards.

Town of Troutman

Connectivity is strongly promoted in the Town's Unified Development Ordinance. But while the UDO recognizes that topographic conditions can make connectivity impractical in some locations, the ordinance language does not specify what topographic conditions constitute such an impractical hardship. Varying by zoning district, the Town requires 0 to 30% open space as new development occurs, allowing for greenways and trails as choices among several that developers may use to satisfy this requirement. Within its watershed overlay district, 25-50 foot buffers are required (depending on the use involved); within which greenways are one of only a few allowed activities. The UDO also requires bicycle racks for developments with 50 or more parking spaces.

Lincoln County

Lincoln County adopted a new Unified Development Ordinance in 2009. Much of Eastern Lincoln County east of NC 16, contains single-family, low-density subdivisions. Virtually all of the development here occurred prior to adoption of the UDO. Previous land use regulations did not mandate installation of sidewalks or bicycle paths, nor the dedication of common open space. This changed significantly with the UDO adoption. Its provisions include:

- Prohibiting most development in floodplain areas but allowing for low impact type uses such as bicycle trails in such areas;
- Mandating the placement of sidewalks on one side of all residential subdivision roads (except those with minimum lot sizes of 1+ acres and subdivisions with less than 10 dwelling units);
- Providing for cluster subdivision opportunities in most residential zoning districts, with such subdivisions containing a minimum of 50% common open space, but also with higher density opportunities than conventional subdivisions; and,
- Establishing a road connectivity index threshold in most subdivisions that, among other things, mandates at least two access points for all subdivisions with 20+ lots, and precludes an overabundance of cul-de-sacs.

Mecklenburg County

Mecklenburg County has no planning jurisdiction, and thus no land use authority, within the study area. The responsibilities and activities of the Mecklenburg County Parks and Recreation Department are described later in this document.

Town of Cornelius

Cornelius is rivaled only by Mooresville within this study area as having the greatest number of natural barriers by way of peninsulas along Lake Norman. While this topography challenges connectivity, many of the major arteries accessing these peninsulas (e.g. Jetton Road) are well positioned to accommodate bicycle traffic either now or in the future. Cornelius' land use regulations require the placement of bicycle lanes when new development occurs as well as requiring their placement on certain connecting thoroughfares throughout the Town's planning jurisdiction consistent with the adopted transportation plan. Implementation is required only as parcels develop. Bicycle lanes are currently located in disjointed segments throughout the Town and often span only the length of the property boundaries. Catawba Avenue, however, features bicycle lanes that were installed in conjunction with that corridor's recent redevelopment.

The Town's Land Development Code requires new streets to stub to adjacent properties "unless prohibited by the existing street layout or topography". Again, for properties along Lake Norman, edge conditions prohibit a great degree of connectivity. Aside from this, opportunities to connect bicycle trails/multi-use paths across parcels are considered whenever new development is proposed and as part of the long range planning process. The Town's Land Development Code provides for bicycle support facilities in new development, requires a curb cut design that is both bicycle friendly and which reduces bicycle/vehicle conflict, and encourages a bicycle network (e.g., the "Parkway" street category requires bicycle facilities be physically separated from travel lanes). The Town also requires five-foot wide bicycle lanes on certain designated streets including: East and West Catawba Avenue, Main Street (i.e., NC 115), Washam Potts Road, Torrence Chapel Road, Bethel Church Road, Jetton Road and Nantz Road. The Town allows fees to be paid in lieu of open space dedication, with those fees to be used later for the purposes of acquiring and developing recreation, greenway and open space areas, including bicycle facilities. Where less stringent, the Lake Norman Regional Bicycle Plan's recommendations should defer to higher local requirements.

The Land Development Code also requires the placement of sidewalks on both sides of all streets except alleys and lanes. The Town may modify these requirements on cul-de-sac streets and closes. In areas where no sidewalks exist adjacent to or within reasonable proximity of the development, the Town's Zoning Administrator may allow an improvement guarantee in lieu of sidewalk installation.

Town of Davidson

In terms of accommodating bicyclists, Davidson's planning regulations are quite supportive. The Town requires narrow streets, wide sidewalks and bicycle lanes on most new roads, and does not permit cul-de-sacs. Public outreach programs have been conducted to educate and enforce "sharing the road" with bicyclists. Furthermore, the Town of Davidson has formally endorsed the Carolina Thread Trail.

The Town of Davidson currently features two significant bicycle lanes that connect Davidson-Concord Road with South Street (i.e., the Pines and Davidson Elementary School); The Town also has a number of neighborhood trails on public or utility rights-of-way. Davidson's Southeast Greenway is linked with Mecklenburg County's proposed Southeast Greenway (South Prong) that, when completed, will link Davidson with Cabarrus County.

Town of Huntersville
The Town's land use regulations are generally bicycle friendly. Bicycle lanes have been required by the Town's zoning ordinance since 1996, with any new development required to install bicycle lanes if the development is on a boulevard or commercial town street cross section. Bicycle or multipurpose lanes are required, where they are shown on the Town's 2007 "Greenway and Bikeway Master Plan", in all new subdivisions or multi building developments, per the Town's Subdivision Ordinance. Bicycle support facilities are required in several development scenarios. Greenways and trails are allowed uses or exceptions in natural buffer zones. With few exceptions, connectivity is generally required and limits on new cul-de-sac streets are in place.

Transportation Planning Agencies

Transportation planning in the Lake Norman area is conducted by a number of local, regional, and statewide departments and agencies. Explained below are the roles and responsibilities of the various transportation planning entities in the Study Area.

Municipalities and Counties
Individual municipalities and counties can conduct transportation planning activities within their planning jurisdictions (i.e., corporate limits and, for applicable municipalities, their extraterritorial jurisdictions or "ETJs"). These activities can include reviewing site plans, developing local bicycle and pedestrian plans, implementing projects, and writing grant applications. Each of the participating municipalities and counties included in the Study Area conduct some or all of these activities. Their respective plans were referenced as a part of the plan development process for the Route. The municipalities and counties were asked to endorse the overall plan at the end of the planning process.

In addition to their transportation planning activities, cities and counties can address and implement transportation improvements and projects through their land use regulations. A more detailed overview of this procedure is found in Section 6 (Implementation Plan).

Rural and Metropolitan Planning Organizations
Every county and municipality in North Carolina is represented by either a Rural Planning Organization (RPO) or a Metropolitan Planning Organization (MPO). These two types of transportation planning organizations work with NCDOT to conduct a wide range of

transportation planning activities, including the compiling of demographic, environmental, and transportation data; writing grant applications; identifying, ranking, and reviewing projects; and collecting and coordinating general public input.

Communities within the Study Area are members of either one of the two RPOs or the MPO in the Study Area. The Unifour RPO represents Catawba County, and is staffed by the Western Piedmont Council of Governments in Hickory. Iredell and Lincoln Counties, as well as their respective municipalities (i.e., Mooresville and Troutman), are represented by the Lake Norman RPO. The Lake Norman RPO is staffed by the Centralina Council of Governments. The Mecklenburg-Union MPO (MUMPO) represents Mecklenburg County and its respective municipalities (i.e., Huntersville, Cornelius and Davidson.) It is staffed by the Charlotte-Mecklenburg Planning Commission.

MPOs and RPOs have different levels of responsibilities for the various transportation planning activities within their jurisdictions. The MUMPO maintains and updates a Thoroughfare Plan, now called a Comprehensive Transportation Plan (CTP), for its entire study area, and develops a fiscally-constrained Long Range Transportation Plan (LRTP). The LRTP includes those projects the MPO identifies as being "financially- feasible" in the next 25 years.

RPOs do not maintain a CTP for their entire study area. Individual municipalities and counties approve their own CTPs, although RPOs do review them for consistency with adjacent plans. RPOs do not develop LRTPs. They are responsible for developing project priority lists for the bi-annual Statewide Transportation Improvement Program (STIP) update. These lists are included in the evaluation of candidate projects for funding in the next several years.

North Carolina Department of Transportation

NCDOT has a Transportation Planning Branch that provides multi-modal transportation planning services to municipalities, counties, regions, MPOs and RPOs. The Branch includes two Transportation Planning Units. These provide multi-modal Comprehensive Transportation Planning, travel demand modeling and development assistance to local governments, MPOs, and RPOs. They also perform traffic forecasts for TIP projects and air quality conformity analysis to comply with the Clean Air Act and EPA requirements.

The Division of Bicycle and Pedestrian Transportation (DBPT) of NCDOT is a comprehensive operation, and affects all aspects of bicycling and pedestrian planning in North Carolina. The DBPT is involved in designing facilities, creating safety programs, mapping cross-state bicycle routes, training teachers, sponsoring workshops and conferences, fostering multi-modal planning and integrating bicycling and walking into the ongoing activities of NCDOT. The DBPT also annually awards bicycle and pedestrian planning grants to municipalities and counties throughout the state to increase the planning and implementation of such facilities.

NCDOT is organized into 14 divisions that are responsible for maintenance, operations, design, and construction activities for all transportation modes within their boundaries. The Divisions and their staff play an integral role in implementing the Route. The Lake Norman Regional Bicycle Plan Study Area includes portions of two Divisions. Division 10, based in Albemarle, includes Mecklenburg County. Division 12, based in Shelby, includes Catawba, Iredell, and Lincoln Counties.

Lake Norman Regional Bicycle Plan Study Area Comprehensive Transportation Plans, Greenway, and Bicycle Plans

Charlotte Area Transit System (CATS)

CATS currently operates several express and local bus routes in the Study Area (excluding Catawba County), and is designing a commuter rail line to extend from Charlotte to southern Iredell County. CATS also currently operates, and is expanding, a series of Park and Ride lots for these transit services. These services are explained below in greater detail.

Bus service: CATS operates express bus, local bus, and demand response services throughout most the Study Area. The Mecklenburg County-portion of the Study Area contains the greatest number of bus routes, although East Lincoln County and Mooresville are each served by express bus routes to and from Charlotte. The locations for bus stops in Mecklenburg County are typically in the downtowns of Cornelius, Huntersville, and Davidson, as well as at interchanges with I-77 in Huntersville. Huntersville, Cornelius and Davidson are also served by a "Village Rider" bus that links the downtowns of all three communities with the Catawba Avenue corridor and Birkdale Village.

Park and Ride lots: CATS maintains Park and Ride lots in Cornelius, Davidson, Huntersville, Mooresville and Lincoln County. Lot expansions are planned for Huntersville, Davidson and Mooresville. Currently, CATS does not own facilities outside of Mecklenburg County, so these locations are often established though lease agreements, inter-local agreements and dedications of land (usually through the conditional rezoning or conditional use process) that allow parking during hours of operation.

North Corridor Commuter Rail: The proposed North Corridor Commuter Rail Project will operate along 25 miles of the existing Norfolk Southern rail line (the "O" line) from Center City Charlotte to Mount Mourne in southern Iredell County. The alignment parallels Graham Street and Old Statesville Road (NC-115) in north Charlotte. Sixteen daily round-trip trains are planned and are anticipated to carry between 4,500 and 6,000 passengers daily. According to CATS, a combination of local, state, and private funds will be used to fund operations. The timeframe for implementation has not yet been determined due to recent local revenue constraints.

Mecklenburg-Union Metropolitan Planning Organization
The Mecklenburg-Union Metropolitan Planning Organization (MUMPO) is responsible for transportation planning for the Mecklenburg County portion of the Study Area. The current Thoroughfare Plan (TP) for MUMPO has been continually updated to reflect modifications to new road alignments, and makes references to future rights-of-way and road designs. The TP is referenced by MUMPO member communities when they review new developments and plan transportation improvements, particularly for new right-of-way.

NCDOT is currently updating the Comprehensive Transportation Plan (CTP) for MUMPO. A CTP incorporates non-vehicular modes in its recommendations, and so the Lake Norman Regional Bicycle Plan process will coordinate with the CTP to ensure that the recommendations from the Lake Norman plan are referenced in the CTP. The CTP is used by the NCDOT and affected local governments in the design of future transportation projects, as well as in the land development review process. The recommendations from the CTP are used to preserve right-of-way (ROW), as well as require improvements generated by the new development.

Mecklenburg County

The entire Study Area in Mecklenburg County lies within the planning jurisdictions of Cornelius, Davidson, or Huntersville. The three Towns, as opposed to Mecklenburg County, control land use decisions in this area.

However, the Mecklenburg County Park and Recreation Department has perhaps the greatest influence and level of activity in the study area in terms of recreation improvements and plans. The Park and Recreation Department includes a Greenway Planning and Development Division. The County Park and Recreation Department has been actively involved in greenway development, having constructed over 30 miles of greenways throughout the County. Within the Study Area, a 1.5-mile segment of the McDowell Creek Greenway was opened in 2009, linking Cornelius with the Birkdale area in Huntersville. In addition, the County Park and Recreation Department's "Greenway Plan Update" (2008) calls for trails/greenways/overland connections across northern reaches of the County, with trails specifically called for in the 5-year, 10-year, and future plans in Huntersville, Cornelius and Davidson. Planned greenways inside the Study Area include extensions of McDowell Creek Greenway, South Prong Rocky River Greenway, and North Prong Rocky River Greenway. The planned Caldwell Station Creek Greenway is located just outside the boundary of the Study Area in Cornelius.

The "Charlotte-Mecklenburg Bicycle Transportation Plan" (July 1999) also institutionalizes bicycle activities within the County, including this study area. Major policy statements include:

> "incorporating bicycle facilities in transportation planning activities; seek all potential funding opportunities to implement the bicycle transportation plan; include bicycle improvements in on-going transit and greenway planning, design

and build new and reconstructed roadways to be bicycle-friendly; implement bicycle improvements in conjunction with resurfacing and maintenance activities; implement bicycle-friendly maintenance procedures and maintain bicycle facilities; promote safe bicycle travel; and, encourage increased bicycle transportation ridership."

Huntersville

The Town of Huntersville's approach to transportation emphasizes a multi-modal and traffic dispersion philosophy, emphasizing the connectivity of streets so that travelers may have multiple routes to reach destinations. The Town actively uses and implements MUMPO's TP by requiring improvements to current roads along the frontage of a property to comply with the TP, consistent with the proportional impact of the development upon the transportation network. This requirement usually results in the reservation or dedication of right-of-way for future widening, as well as improvement of roads to include sidewalks, bicycle lanes, turn lanes, or even constructing additional through lanes to accommodate anticipated traffic due to the site.

The Town of Huntersville has an adopted "Greenway and Bikeway Master Plan" (2007). The Plan lists a suite of "tools" for developing future bikeways including zoning regulations and land acquisition methods. The Plan calls for the creation of 25 miles of designated greenway trails and 30 miles of on-road bicycle facilities within the next 10 years. It proposes bicycle connections both within the community, and to external networks under the control of Mecklenburg County, Cornelius, and other neighboring jurisdictions. Existing bicycle accessible public trails are described in the greenway bikeway master plan which can be digitally accessed at: www.huntersville.org/downloads/ParksRec/Green_Way_052008.pdf
The Town of Huntersville has formally endorsed the Carolina Thread Trail.

Davidson

The Town of Davidson's approach to transportation also emphasizes multi-modal considerations, as well as livability. The Town is currently updating its Comprehensive Plan, which will include updating its transportation requirements. This Plan is anticipated to be completed in late 2010, and will include a wide range of transportation recommendations, with particular emphasis on bicycling. The Town adopted a Bicycle Plan in 2008, which made recommendations for bicycle facilities on many roads in the area. The Town requires improvements to the road network consistent with approved transportation plans, including bicycle, pedestrian, and greenway recommendations. The Town is currently conducting the North of Griffith Small Area Plan which crosses into Iredell County. Finally, the Town of Davidson has formally endorsed the Carolina Thread Trail, which complements many of the Town's planning initiatives.

Cornelius

The Town of Cornelius adopted a Centennial Transportation Plan in 2005. This plan addressed all nodes of transportation in the Town, and described ideal road cross-sections for their major

corridors. The Plan called for bicycle lanes to be provided for all developments located along either side of Torrence Chapel Road, Knox Road, Bethel Church Road, Jetton Road, and Nantz Road. Like Huntersville and Davidson, the Town also promotes connectivity in the transportation network. This connectivity can provide alternative routes for bicyclists seeking to avoid busy arterials, such as West Catawba Avenue.

The Town's Park and Recreation Master Plan (2000) calls for several bikeways and greenways along roads that include but are not limited to: Catawba Avenue, Westmoreland Road, Bethel Church Road, Torrence Chapel Road, Jetton Road, and NC 115. Jetton Park and Ramsey Creek Park have already incorporated multi-use trails within their boundaries. The Town of Cornelius has formally endorsed the Carolina Thread Trail.

Lake Norman Rural Planning Organization

The Lake Norman Rural Planning Organization (LNRPO) is the State-designated transportation planning organization serving Iredell, Lincoln, and Cleveland Counties, along with the northwest portion of Gaston County. The LNRPO assists member governments in the development of transportation plans and projects, but does not directly develop or own any transportation plans. However, it does provide review of proposed transportation projects and land development plans for concurrence with approved plans for the area however. The RPO developed the 2009 Lake Norman Coordinated Comprehensive Public Transportation Plan for the Iredell, Lincoln, Gaston, and Cleveland County public transportation systems. This plan made recommendations for several Park and Ride Lots in the Bicycle Plan's Study Area, and these are referenced in the affected community overviews in this document.

Iredell County

Iredell County adopted a Comprehensive Transportation Plan (CTP) in 2008. This CTP includes recommendations for bicycle accommodations, and includes references to the 2007 Lake Norman Bike Route, as well as to NC Bicycle Route 2. The typical-cross sections for new roads include accommodations for bicyclists, as identified in the CTP.

There is a relatively small amount of the Bicycle Plan's Study Area in the CTP Study Area. This is because the Troutman and Mooresville CTP study areas encompass much of Southern Iredell County. Iredell County has committed to linking land use and transportation planning, and will require improvements to area roads consistent with the CTP recommendations. Iredell County also has adopted, by reference, the Mooresville CTP, and is expected to also adopt Troutman's CTP**.** Together these documents will help to clarify the recommendations for improvements on area roads.

The County adopted a Comprehensive Parks and Recreation Master Plan in March 2009. The Plan endorses the concept of bicycle paths, but does not spell out any specific plans for construction or implementation. Iredell County has formally endorsed the Carolina Thread

Trail concept and will be working with Thread Trail personnel and a consultant in developing a county-wide greenway plan designating segments of the Carolina Thread Trail though the County.

Mooresville

The Town of Mooresville adopted a Comprehensive Transportation Plan (CTP) in 2007, and a Bicycle Plan in 2008. These plans identify the need to improve and expand bicycling opportunities in the area, and reference the original 2007 Lake Norman Bicycle Route. The Town is actively requiring improvements to existing roads as a part of the development process, consistent with the recommendations of these Plans. The Town has striped some roads near downtown to include bicycle lanes, and intends to increase the number of lanes with subsequent resurfacings. The Town is developing a Park and Ride lot facility near the Langtree Road interchange with I-77. This facility is adjacent to the future North Corridor commuter rail line. The Mooresville CTP identified several other locations for future Park and Ride lots within the Study Area.

The Town's Bicycle Plan requires that "All new developments and road projects shall include bicycle accommodations in street design and construction related to the project." The Plan also includes a prioritization system that evaluated over 50 projects on the merits of connectivity, safety, and the ability to implement. To date, funding has been secured for one of these projects, the installation of bicycle lanes on NC 115 from Mooresville to Davidson. Other greenway initiatives have been identified through the Mooresville Parks and Recreation Master Plan and the adopted Mooresville Comprehensive Pedestrian Plan.

While the Bicycle Plan notes that Mooresville has no official off-road bicycle facilities, it also points out that "Greenway Plan and the Comprehensive Pedestrian Plan both identify potential multi-use path corridors" and that "Mooresville's downtown core and surrounding areas are reasonably connected and have roadways that are fairly bicycle friendly," although several barriers including heavy or fast traffic and lack of bicycle storage are also mentioned. The Town of Mooresville has formally endorsed the Carolina Thread Trail concept, although the countywide plan has not yet been developed for Iredell County. The Town has approved the Dye Creek Greenway Plan which, when implemented, will run from Downtown Mooresville to Bellingham Park. This facility is located in South Mooresville between Shearers Road and NC 3. To increase connectivity between neighborhoods without relying on the arterial or collector street system, the adopted Mooresville Comprehensive Transportation Plan has also identified a series of feasible roadway connections through its collector street plan. The Plan requires that new residential developments adhere to a standard link-to-node ratio to facilitate greater connectivity both within neighborhoods and to the arterial street system. But like other communities in this study area, topographic constraints created by the Lake frontage pose a significant challenge for good connectivity, despite the requirements in these select development scenarios.

Troutman

The Town of Troutman adopted a Comprehensive Transportation Plan in 2008. This CTP included recommendations for bicycle facility improvements throughout the Study Area, and included the recommendations of the 2007 Lake Norman Bike Route. The CTP also included recommendations for bicycle accommodations in the typical cross-sections for roads, where recommended by the 2007 plan. The roads identified for bicycle lanes include Talley Street, Main Street, Wagner Street, and Perth Road, as well as the access road to the Lake Norman State Park. The CTP also identified several Park and Ride lots for future implementation. The Town actively requires implementation of facilities consistent with the approved transportation plans.

The Troutman Pedestrian Plan, adopted in 2008, describes a number of bicycle opportunities through proposed trails. Initial implementation is currently being discussed, along with considerations of updates for areas that have or are in the process of being developed with greenways/sidewalks. The Town has formally endorsed the Carolina Thread Trail and will be working with Mooresville and Iredell County staff in preparation of a county-wide greenway plan for the County. Once complete, these trails will allow Troutman cyclists safe connections between Statesville and Mooresville. At present, the nearest bicycle accessible trails are at Lake Norman State Park. In the area around Exit 42 (I-77) and along US 21, bicycle accessibility is particularly challenged by narrow travel lanes and little to no shoulder. No formal bicycle lanes currently exist within the Town.

Lincoln County

Lincoln County approved a Comprehensive Transportation Plan in 2006. The CTP included recommended highway and bicycle improvements for all of Lincoln County found in the Study Area. The CTP referenced the recommendations of the 2007 Lake Norman Bike Route. The CTP includes recommendations for bicycle accommodations in the typical cross-sections for roads. Lincoln County has recently updated its development regulations to incorporate the recommendations of the CTP, as well as to incorporate connectivity in its land development process. The RPO's 2009 Lake Norman Coordinated Comprehensive Public Transportation Plan identified Park and Ride lots in Denver along NC 16 and at the intersection of NC 16 and NC 150.

The 2007 Lake Norman Bike Route (LNBR) calls for a network of bicycle routes in Eastern Lincoln County primarily along NC 73, Little Egypt, St. James Church and Campground Roads, as well as along a series of nearby intersecting local roads. The 2007 Lincoln County Land Use Plan endorsed the Plan and its implementation. One of the strategies contained in the LUP was to "create a comprehensive bicycle path network in the County, [and to] require improvements to include bicycle lanes along those roads as subdivisions and development occur."

Lincoln County has also formally endorsed a study to be conducted by the Carolina Thread Trail for the placement of bicycle/pedestrian greenways in the County. As part of the planning

effort study conducted in Lincoln County, a network of proposed trails was developed and was included in an implementation plan. The Plan and network were presented for adoption before the Board of Commissioners in November 2009. The Commissioners adopted the Plan itself, but not the maps associated with the Plan. In addition, the resolution adopting the Plan contained language that states that no County funds will be used to develop, construct or maintain any segment of the Thread Trail.

Unifour Rural Planning Organization (Unifour)
The Unifour RPO is the State-designated transportation planning organization for the rural portions of Catawba, Alexander, Burke, and Caldwell Counties. Like the Lake Norman RPO, the Unifour assists member governments in the development of transportation plans and projects, but does not directly develop or own any transportation plans. It does, however, provide review of proposed transportation projects and land development plans for concurrence with approved plans for the area.

Unifour and NCDOT are in the process of developing a four-county CTP that will include the portion of Catawba County in the Study Area. The CTP will incorporate non-vehicular modes in its recommendations, and so the Lake Norman Regional Bicycle Plan process will coordinate with the CTP to ensure that the recommendations from the Bicycle Plan are referenced in the CTP, which is expected to be ready for adoption in 2010. The CTP will also be used by NCDOT and affected local governments in the design of future transportation projects, as well as in the land development review process. The recommendations from the CTP can be used to preserve right-of-way (ROW), as well as require improvements generated by the new development.

Catawba County
Catawba County was identified by the NCDOT for development of a county-wide bicycle route mapping and signing project. This project, when completed, will enable local bicyclists and tourists to know which highways will be more safely traveled with less conflict between the modes of travel. A committee was established to guide the development of this project and produced a draft map which was completed in 2002 and turned over to NCDOT for their review and implementation. Catawba County still intends to implement the bicycle route mapping and signing project with NCDOT's assistance.

Catawba County has adopted seven small area plans, also referenced in the Land Use Plan section, for the County's planning jurisdiction. Each plan contains bicycle and pedestrian recommendations in the documents' transportation section. The Sherrill's Ford Small Area Plan (SAP) is the adopted plan which covers the Bicycle Plan's study area in Catawba County. Recommendations in the Sherrill's Ford SAP include requesting NCDOT to increase pavement widths on roads identified as bicycle routes, coordination of bicycle routes with adopted city plans and connection of sidewalks in urban interface areas. In addition, the SAP calls for the

construction of bicycle facilities when road projects are constructed by NCDOT. Greenways are also recommended for several river corridors such as Lyle Creek, to provide an off-road pedestrian and bicycle route. A feasibility study of the Lyle Creek greenway is being conducted as part of the County's Master Recreation Plan and the planning process for the Carolina Thread Trail segments in the County.

Some of the specific plan recommendations for the Sherrill's Ford SAP include:

- Pursue funding for the construction of a pedestrian and bicycle connection between Mill Creek Middle School and Bandy's High School.
- Begin to design and construct a lake-oriented pedestrian and bicycle system that links the currently isolated lake-area neighborhoods together.
- When road and highways are resurfaced, provide additional pavement to accommodate the construction of bicycle lanes along Little Mountain Road, Sherrill's Ford Road, the future NC 150, Hudson Chapel Road (from Catawba to the Marina), Slanting Bridge Road (NC 150 to Denver), Buffalo Shoals Road and Monbo Road.

The Catawba County Comprehensive Parks Master Plan, approved in 2007, includes trail and greenway components and references the 2007 LNBR. The feasibility of a greenway along Lyle Creek greenway is being conducted as part of the County's Master Recreation Plan and the planning process for the Carolina Thread Trail segments in the County. Catawba County has formally endorsed the Carolina Thread Trail, selected a consultant to work on the project, and is in the beginning stages of the Thread Trail planning process. The Thread Trail Planning process began in November 2009, and it is estimated that it will take approximately one year to complete. Lyle Creek will be evaluated during this time as a potential greenway trail that could connect several municipalities in the County.

Lake Norman Regional Bicycle Routes and Planned Road Projects

The Lake Norman Regional Bicycle Plan recommendations were made with full awareness of the schedules for various transportation projects in the study area. Some of these projects, such as the widening of Brawley School Road, directly influence the decisions of the overall route, while other projects, such as the construction of the new NC 16 in Lincoln County, indirectly affect locations of route segments. The plan development process included significant consultation with area transportation planners and NCDOT officials concerning the status of the many transportation projects in the study area.

In July of 2009, the NCDOT Board of Transportation approved a Complete Streets policy. This policy directs NCDOT to consider accommodating several modes of transportation when building new projects or making improvements to existing infrastructure and to collaborate with

cities, towns and communities during the design and planning phases of projects. Together, they are to decide if the transportation options available will serve the needs of the people and fit the context of the area. This new policy will require the recommendations of the Lake Norman Regional Bicycle Plan to be considered as a part of road designs, unless exceptional circumstances prevent it. Routine maintenance projects may be excluded from this requirement if an appropriate source of funding is not available.

The following is a list of projects, by county, that are located on the initial or ultimate route around Lake Norman. The following information is provided about each of the projects:

- Project description
- Transportation Improvement Program (TIP) number, if applicable
- Funding Status
- Schedule for implementation
- Implications for the bicycle route

Catawba County

Project: Widening NC 150 from Harvel Road to Catawba River
TIP Number: R-2307C
Funding Status: Funded for ROW acquisition in 2014.
Schedule for Implementation: Right of Way acquisition will not start before 2014. Construction will not occur until after 2020.
Comments: Initial Lake Norman Bicycle Route does not include NC 150 due to the posted speed limit of the road and lack of adequate bicycle facilities on road.

Iredell County

Project: NC 150 from Catawba River to I-77.
TIP Number: R-2307C
Funding Status: Funded for ROW acquisition in 2014.
Schedule for Implementation: Right of Way acquisition will not start before 2014. Construction will not occur until after 2020.
Comments: Initial Lake Norman Bicycle Route does not include NC 150 due to the posted speed limit of the road and lack of adequate bicycle facilities on road.

Project: Williamson Road between I-77 and NC 150
TIP Number: R-5100
Funding Status: Unfunded
Schedule for Implementation: After 2020
Comments: Bicycle facilities are advisable for the design for any future improvements in order

to allow north-south travel west of I-77

Project: Brawley School Road from Chuckwood to I-77
TIP Number: R-3833
Funding Status: Fully funded
Schedule for Implementation: Construction expected to be complete to I-77 by 2013
Comments: Currently under construction with bicycle lanes

Project: Cornelius Road, Replace bridge over Cornelius Creek
TIP Number: B-5142
Funding Status: Scheduled for 2012-2015
Schedule for Implementation: Right-of-Way in 2012. Construction in 2014-2015
Comments: Design will likely include four-foot paved shoulders

Lincoln County

Project: NC 73 from NC 16 to Catawba River
TIP Number: R-2706
Funding Status: Unfunded
Schedule for Implementation: After 2030
Comments: Corridor already included on two separate NCDOT-approved plans for bicycle lanes, including designation as an NC State Bicycle Route Six. Also included in Carolina Thread Trail.

Mecklenburg County

Project: NC 73 from Catawba River to Vance Road Extension
TIP Number: R-2706
Funding Status: Unfunded in TIP and 2035 LRTP
Schedule for Implementation: After 2035
Comments: Corridor already included on two separate NCDOT-approved plans for bicycle lanes, including designation as a NC State Bicycle Route Six

Project: Westmoreland from US 21 to Washam Potts Road
TIP Number: U-5129
Funding Status: Concurrent with Augustalee development
Schedule for Implementation: Concurrent with Augustalee development
Comments: Plans for Augustalee include bicycle lanes

Project: US 21 from Northcross to Eagle Ridge Way
TIP Number: U-5131

Funding Status: Concurrent with Augustalee development
Schedule for Implementation: Concurrent with Augustalee development
Comments: Plans for Augustalee include bicycle lanes

Project: Westmoreland I-77 Interchange
TIP Number: I-5127
Funding Status: Concurrent with Augustalee development
Schedule for Implementation: Concurrent with Augustalee development
Comments: Plans include pedestrian and bicycle refuge islands between travel lanes across Single-Point Urban Interchange (SPUI)

Project: Old Statesville Road (NC 115) from Bailey Road to Iredell County Line
TIP Number: None
Funding Status: MUMPO 2035 LRTP
Schedule for Implementation: To be completed by 2025
Comments: Likely to include bicycle provisions as a part of any improvements

Population

The Study Area spans more than 150,000 acres, or over 200 square miles. It includes portions of four counties, five municipalities and Lake Norman. Its development pattern ranges from high density urban, to suburban neighborhoods, to rural farm land. According to Environmental Systems Research Institute (ESRI), the total population for the Study Area in 2009 was 146,801. This total is displayed on the *Population Distribution* map in Appendix B at the block group level. The Study Area consists of 52 census block groups. The block group population ranges from 494 to 10,869 with the median population of 2,273. The Study Area does not follow census block group boundaries. Therefore, the total population within the actual Study Area is slightly lower as it includes population from outside its boundaries. In addition, six block groups were totally eliminated from the calculation because they only had a small portion within the Study Area.

County	Total 2009 Population
Catawba	10,350
Iredell	62,575
Lincoln	16,739
Mecklenburg	57,137

Employment

According to ESRI, there were 59,232 jobs in the Study Area in 2009. This data is also displayed

at the block group level on the *Employment Distribution* map in Appexdix B. ESRI extracts its business data from a comprehensive list of businesses licensed from infoUSA®. This business list contains data on more than 12 million U.S. businesses—including the business name, location, franchise code, industry classification code, the number of employees, and the sales volume—current as of January 2009. The data was classified using the four-digit Standard Industrial Classification (SIC) system. The service industry, which consists of health and legal services, hotel and auto services, and education, is the largest sector with 19,571 jobs. This is closely followed by retail trade with 17,828 jobs. These two categories alone make up almost two-thirds of the area's total employment. Manufacturing (5,124), wholesale trade (4,538) and finance, insurance and real estate (3,774) sectors are the next three largest categories.

County	Total 2009 Employment
Catawba	2,395
Iredell	25,793
Lincoln	5,891
Mecklenburg	25,153
Total	**59,232**

Growth

The towns of Cornelius, Davidson, Huntersville and Mooresville have seen tremendous growth over the past decade. The eastern half of Lincoln County, which is within 25 miles of downtown Charlotte, has seen similar, but slightly less growth in that same time period. Due to its relative distance from Charlotte, the portion of Catawba County within the Study Area has experienced lower growth than the other three counties. The economic downturn of recent years has dramatically slowed down residential and commercial development. However, with the region's proximity to Charlotte and Lake Norman, the area remains an attractive and desirable location to live, work and play, and is expected to continue growing in the long-term. Improvements to road systems, such as the recently constructed NC 16, will help accommodate new growth.

County	2000 Total Population	2009 Total Population	Nine Year Growth
Catawba	7,823	10,350	32%
Iredell	41,977	62,575	49%
Lincoln	12,157	16,739	38%
Mecklenburg	34,452	57,137	66%
Total	**96,409**	**146,801**	**52%**

Bicycle Crash Data and Safety Considerations

Background

The Lake Norman Regional Bicycle Plan study area includes rural, suburban, and urban development patterns. These development patterns are served by a variety of road types, from multi-lane, grade-separated interstates and US routes to narrow, winding secondary roads. The plan and recommended route interfaces with all of the types of transportation facilities found in the study area. Each of these facility types has its own vehicular and bicyclist characteristics, so understanding the crash statistics and trends for each is useful.

Purpose

This information was collected to guide the Steering Committee and consultants in identifying local and statewide bicycle safety issues that may affect the design and configuration of the route. It is important to understand, however, what analysis resources are available and utilized in North Carolina, as well as the limitations of the data available.

Resources

The North Carolina Department of Transportation receives a copy of all reported traffic accidents in the state and codes these accidents into a database for crash analysis on intersections and roads. The NCDOT Traffic Safety Unit uses a Traffic Engineering Accident Analysis System (TEAAS) to analyze all types of accidents and roads. The NCDOT Division of Bicycle and Pedestrian Transportation utilizes a customized bicycle and pedestrian crash analysis software called the Pedestrian and Bicycle Crash Analysis Tool (PBCAT). The PBCAT is intended to assist state and local pedestrian/bicycle coordinators, planners and engineers with improving walking and bicycling safety. It uses the development and analysis of a database containing details associated with crashes between motor vehicles and pedestrians or bicyclists (www.walkinginfo.org/pbcat). The two programs query the same database for accident data. Centralina Council of Governments collected all crash data from the same database for the period between June and July of 2009.

North Carolina Crash Characteristics

There are approximately 225,000 crashes in North Carolina every year. Bicycle crashes comprise approximately 0.5 percent of these accidents, although it is estimated that up to half of all bicycle crashes go unreported. Bicycle crashes have a much higher chance of injury for the bicyclist when compared to vehicular crashes. Approximately 92 percent of all bicyclists involved in a crash are injured (NCDOT Traffic Safety Unit). Bicyclists have also historically (1997-2006) been cited as at fault in approximately half of all bicycle-related accidents in North Carolina. The percentage of bicyclists at fault has declined from 58 percent to 45 percent over this period, but the percentage of accidents where fault was unknown increased from two percent to sixteen percent. It is possible that the guidance for the law-enforcement community on how to code accidents has changed over time.

Crash Fault	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Totals
Bicyclist at Fault	591	597	573	472	481	451	488	455	475	437	5,020
Both at Fault	108	172	174	158	144	157	130	120	66	120	1,349
Fault cannot be determined	90	67	65	46	22	2	0	0	0	0	292
Motorist at Fault	205	243	279	202	241	190	152	217	269	255	2,253
Neither at Fault	10	4	6	5	4	1	1	5	2	3	41
Unknown	22	29	15	26	54	129	143	162	164	158	902
Totals	**1,026**	**1,112**	**1,112**	**909**	**946**	**930**	**914**	**959**	**976**	**973**	**9,857**

Source: NCDOT-DBPT

Proper design of roadways and designation of the route on *safer* roads and intersections is therefore of primary importance in the plan development process. The table below indicates that the proportion of accidents by road type has remained fairly stable over the five-year period. Despite the wealth of information available at the statewide-level the same issue exists: there is no usage data by which to normalize these results in order to develop crash *rates* instead of crash *totals*. This deficiency will limit recommending "definitive" strategies to make roads and intersections appropriate for bicyclists.

Accidents by Road Type (Classification)	2002	2003	2004	2005	2006	Totals
Interstate Route	0	1	2	3	1	7
United States Route	65	66	50	70	68	319
North Carolina Route	77	48	68	65	67	325
State Secondary Route	184	170	173	169	151	847
Local City Street	537	566	580	605	610	2,898
Public Vehicular Area (e.g. Parking lot)	65	61	82	61	67	336
Private Property	2	2	4	3	9	20
Totals	**930**	**914**	**959**	**976**	**973**	**4,752**

Source: NCDOT-DBPT

Study Area Bicycle Accident Data

Recent bicycle crash data for the study area were analyzed using both the PBCAT and the TEAAS software to determine safety trends and identify specific areas of concern with regard to motorist/bicycle incidents. The PBCAT database only includes accidents up to 2006, while the TEAAS database is current to March 2009. The table below shows the most recent six years' worth of crashes involving bicycles in the study area. These numbers were compared using the two accident analysis software packages described earlier. Over these past six years, the number of bicycle crashes reported per year has remained fairly stable throughout the study area, even if there were some local fluctuations. Almost certainly, some crashes were not reported or recorded.

Community	2003-2008 Bicycle Crashes
Cornelius	1
Davidson	4
Huntersville	14
Mooresville	17
Troutman	3
Catawba County (all)	54
Iredell County (all)	80
Lincoln County (all)	8

Trends are difficult to establish with only a few dozen reported bicycle crashes over six years spread across the five municipalities and four counties, plus the fact that crashes are included from outside the study area. Mecklenburg County crashes were not included here due to the extremely small amount of unincorporated land within the study area. For these reasons this study makes routing, design and operational recommendations based on statewide statistics.

Under normal conditions, high crash totals result from a lack of bicycle facilities, or simply more people bicycling. Eventually a higher frequency of bicyclists on area roads typically reduces the rate of crashes because motorists become accustomed to them. A change in the characteristics of a road can also change crash rates. The upcoming AASHTO Highway Safety Manual states that a 2-4' paved shoulder reduces run-off crashes by 16-29 percent. This means that the recommended improvements for bicyclists will also benefit motor vehicle safety. With continued population growth, as well as the increase in popularity of bicycling, it is reasonable to expect accident rates to remain at their current levels despite improvements in safety due to operational or physical improvements to area roads.

North Carolina Highway Safety Improvement Program

NCDOT periodically updates its county-level lists of potentially hazardous intersections,

bridges, and road sections under the Highway Safety Improvement Program (HSIP). These lists are developed by the Traffic Safety Systems Management Unit within the Traffic Engineering and Safety Systems Branch of the NCDOT. These lists are not based on frequency alone and this program is not an effort to list locations around the state that experience the highest number of crashes. The Unit identifies locations with a targeted pattern of crashes that can be identified, analyzed, investigated and where applicable recommended for appropriate countermeasures. These intersections, bridges, and roads are analyzed for crashes and crash severity. The information is then used to help identify site-specific roadway improvements to address safety issues. Below is the 2007 list of the potentially hazardous areas along the Initial or Ultimate Routes.

It is important to note that the warrants did not consistently identify patterns of bicycle-pedestrian crashes that could be treated effectively with basic engineering countermeasures. Therefore, these warrants have been removed during the 2007 HSIP cycle. The Traffic Safety Unit is researching alternatives to these warrants that will identify clusters of these crash types.

County	Municipality	Location	Facility	Warrant	Comments
Catawba	NONE				
Iredell	NONE				
Lincoln	Unincorporated	NC 16 and Forest Hills Dr.	Intersection	Chronic Pattern	26 total crashes in 2002-2006
	Unincorporated	NC 16 and Campground Rd.	Intersection	Frontal Impact	34 total crashes in 2002-2006
Meck.	Huntersville	Sam Furr and Birkdale Commons	Intersection	Frontal Impact	52 total accidents in 2002-2006

The purpose of this table is to identify intersections where a design strategy may most likely reduce crashes in the future.

Roadway Design and Bicycle Safety

The on-road bicycling experience consists of both riding along roads and riding through intersections. For the most recent year available, 2006, 973 crashes were reported involving a bicycle throughout North Carolina. Nearly half of those (456 out of 973) took place at an intersection (Source: PBCAT).

Riding along all but the most congested or high-designation roads, even roads without bicycle

facilities such as paved shoulders or signage, falls within the ability of the design bicyclist. Conditions which often deter most riders, out of perceived or actual danger, most often involve turning movements, i.e. intersections. This is where vehicles are likely to abruptly turn into the bicyclists' path. For purposes of this topic, high-volume curb cuts, such as gas stations or fast-food restaurants, shall be considered intersections. This plan makes the following recommendations for general roadway and intersection treatments.

Intersections: The American Association of State Highway and Transportation Officials (AASHTO) 1999 Guide for the Development of Bicycle Facilities states that bicycle routes "should be selected so as to minimize the number of crossings, or intersections should be improved to reduce crossing conflicts." A bicycle route should include improvements where a route meets an intersection. These improvements can include striping, prohibited "right turn on red", dedicated bicycle lanes near the intersection, and signage along the road alerting motorists to the presence of bicyclists. In extreme situations this may require the physical separation of the two groups through a bridge or tunnel. The preferable, and lowest-cost, strategy is often to designate routes away from large complex intersections, such as highway interchanges.

On-Road: The AASHTO 1999 Guide for the Development of Bicycle Facilities correctly notes that many factors should be considered in determining the appropriate bicycle facility type and location for route designation. Such factors include, but are not limited to, speed, truck traffic, road width, and frequency of curb cuts. Nearly any road can be made appropriate for the Design Bicyclist so long as the appropriate facilities are added, but the cost of doing so is often prohibitive. The decision on which roads to include in a route, and what improvements to make to the designated roads, requires site-specific analysis of issues and opportunities.

Area Bicycling Clubs

Many area bicyclists have formed or joined both organized and informal bicycle groups to participate in group rides. The Lake Norman area is home to several bicycle clubs that organize rides throughout the area as well as advocate for safety and awareness. The Lake Norman Regional Bicycle Route Task Force should coordinate with these important bicycling community assets to ensure that education, outreach, and implementation of plans such as the Lake Norman Regional Bicycle Plan can occur.

Cannonballs Cycling Club
The Cannonballs Cycling Team is a group of individuals from different facets of the Charlotte community. The team was formed in 1993 by a small group of riders who wanted to participate in the MS 150 Ride to the Beach. Since then, the group has grown to include 50+ members, consisting mainly of road bike riders, with a riding season extending from April through September. For some of the riders, the MS 150 is the season finale. The ATB (All Terrain

Bike) riders enjoy off-road riding from October through March. The Team also participates in promoting bicycling awareness through bicycling safety rodeos for children in the community. (www.cannonballs-cycling.org)

Charlotte Sports Cycling
Charlotte Sports Cycling (CSC) is a premier southeast based sports marketing and event management organization that focuses on promoting the positive health and environmental benefits of cycling channeled through diverse community activities. Their strong community involvement is highlighted through the leadership of their competitive road and mountain bike team and includes event promotions such as charitable rides for people with disabilities, educational and safety clinics for children, and elite racing events. This innovative approach to marketing the sport of cycling allows CSC to attract participants and fans of all ages and abilities while providing a substantial platform to market their sponsor's brands and products. (www.charlottesportscycling.com)

Crossroads Cycling Club
The CCC was founded in 1995 to support road and mountain bike race teams. In 2000, the Club shifted its focus primarily to bicycling advocacy. The CCC, in conjunction with the Tarheel TrailBlazers, is responsible for the Itusi Trail at Lake Norman State Park. This trail has 18 miles of single-track mountain bike trail with more under construction. Club members have also taken active roles in the Lake Norman Bike Route, the Statesville Greenway, the Signal Hill Mountain Bike Trail and the Carolina Thread Trail. Each year since 2000, the Club has been responsible for the Cackalacky Cup bike festival at Lake Norman State Park. Weekly club-sponsored road and mountain bikes rides leave from the First Flight Bicycles shop in historic downtown Statesville.

Dirt Divas
The Dirt Divas is a mountain biking club for women of all ages and skill levels who share an enthusiasm for mountain biking and cycling. They make it easier to find compatible women riders by scheduling group rides and events. With fun and fitness in mind, Dirt Diva rides encourage a safe and supportive environment for women who ride the trails. They also strive to protect the environment by participating in regular trail maintenance and involvement in the community with bicycling advocacy. (www.dirtdivas.net)

Piedmont Area Singletrack Alliance
PASA was founded in 2005 by a small core of avid cyclists in the Charlotte region. Since its inception, PASA has focused on promoting land access and trail preservation, securing land for new trail development, and helping to manage and maintain both new and existing trail systems in the Central Piedmont region of the Carolinas. This is more important than ever as the population of Charlotte and Mecklenburg County overflow into the surrounding counties. Land will only become scarcer as time passes. The group includes a variety of riding styles such as:

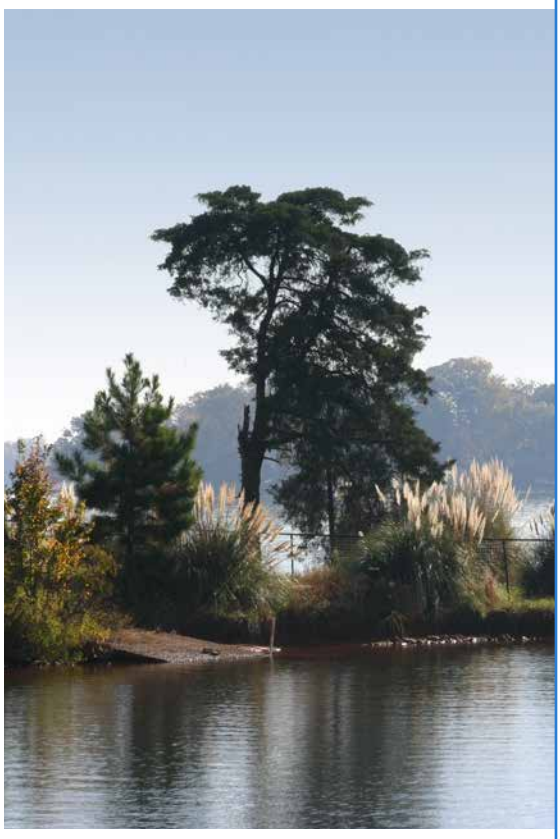
cross-country, free-riding, XC-racing, BMX, mountain unicycling, etc**.** (www.bikepasa.com/index.php)

Rocky River Road Club
The Rocky River Road Club is a United States Cycling Federation-sanctioned club based in northern Mecklenburg County. The club consists of racing and social riders whose primary goal is to promote the sport of cycling by encouraging safe and responsible cycling. The club sponsors the Annual Polar Bear Metric Century bicycle ride. (www.rockyriverroadclub.org)

Tailwind Tandem Club
The TailWind Tandem Club (TWTC) was formed in 2001 with the purpose of bringing together people with a mutual interest in cycling, promoting fellowship, organizing year-round cycling activities, and developing a better understanding of safe and proper cycling in the Charlotte area. The mission of TWTC is to promote and encourage cycling for fun and health, as well as for transportation. (www.tailwindtandemclub.com)

Tarheel Trailblazers
The Tarheel Trailblazers were founded in 1990 by a handful of local mountain bike enthusiasts. Over the years the club has grown to over 300, resourceful, energetic and active men and women of all ages. The volunteers work directly with local land managers, building and assisting in the maintenance of what will soon approach 75 miles of carefully constructed, sustainable mountain bike trails in the Charlotte region. They are a voice of advocacy for mountain bikers and their goal is to build and maintain trails for all mountain bikers to enjoy. (www.tarheeltrailblazers.com/index.cfm)

CHAPTER FIVE
Initial and Ultimate Route



Route Descriptions

Lincoln County

The Lake Norman Regional Bicycle Route does not include Lincoln County in its initial route, but it included both on-road and off-road facilities in its Ultimate alignment. Belowis a brief description of the Ultimate Route.

Ultimate Route

A variety of improvements are recommended to upgrade existing roads in Lincoln County to meet the needs of the Design Cyclist. There are a total of 26.7 miles of Ultimate Route in the County. A direct ride from the northern to southern end is 13 miles long. This direct route includes segments along Slanting Bridge Road from Catawba County, Campground Road, Old NC 16, Hagers Ferry Road, Club Drive, and NC 73 into Mecklenburg County. Approximately ten miles of the Carolina Thread Trail is identified for future on-road segments.

Conditions along Old NC 16 were evaluated as preferable for the major north-south segment compared to the alternative of St. James Church Road and Little Egypt Road. The presence of "superstreet" design of St. James Church Road at new NC 16 makes this road less hospitable for bicycle use.

A description of each of the segments on the Initial Route through Lincoln County is provided below, complete with a description of current conditions, recommended improvements, and recommended funding sources.

Project	Location	Existing Condition	Recommended Improvement	Length (miles)	Eligible Funding Sources	Priority
L1	Slanting Bridge Rd. (SR 1844)/ Campground Rd. (SR 1373), and St. James Church Rd. (SR 1380) from Catawba Co. to Old NC 16	Two lane road with little to no paved shoulder, narrow graded shoulder	Paved shoulders	2.1	Resurfacing, enhancement, CMAQ or via development	Low

Project	Location	Existing Condition	Recommended Improvement	Length (miles)	Eligible Funding Sources	Priority
L2	Old NC 16 from St. James Church Rd. to Webbs Rd. (SR 1379)	Two lane road with no paved shoulders	Bicycle lanes	1.7	Resurfacing, enhancement, CMAQ or via development	Medium
L3	Old NC 16 from Webbs Rd. to Unity Church Rd. (SR 1479)	Two lane road with 1' paved shoulder	Bicycle lanes	1.1	Resurfacing, enhancement, CMAQ or via development	Medium
L4	Old NC 16 from Unity Church Rd. to Hagers Ferry Rd. (SR 1393)	Typically three lane road with 1-2' paved shoulders	Bicycle lanes	1.7	Resurfacing, enhancement, CMAQ or via development	Low
L5	Hagers Ferry Rd. & Club Dr. (SR 1395) from Old NC 16 to NC 73	Narrow lanes, some eroded shoulders	Paved shoulders	3.2	Resurfacing, enhancement, or CMAQ	Low
L6	Unity Church Rd. from Old NC 16 to Park	Narrow lanes	Paved shoulders	2.3	CMAQ or as part of TIP project	Medium
L7	Carolina Thread Trail from Campground Rd. (SR 1373) to Old NC 16	Undeveloped	Multi-purpose path	1.6	CMAQ, PARTF, or via development	Medium
L8	Carolina Thread Trail from Old NC 16 to Optimist Club Rd. (SR 1380)	Undeveloped	Multi-purpose path	3.8	CMAQ, PARTF, or via development	Medium
L9	Carolina Thread Trail from Optimist Club Rd. to Hagers Ferry Rd.	Undeveloped	Multi-purpose path	2.2	CMAQ, PARTF, or via development	Low
L10	Carolina Thread Trail from Hagers Ferry Rd. to NC 73	Undeveloped	Multi-purpose path	2.8	CMAQ, PARTF, or via development	Low

Project	Location	Existing Condition	Recommended Improvement	Length (miles)	Eligible Funding Sources	Priority
M1	NC 73 from Club Dr. (SR 1395) to Catawba River	Two-lane road with segments of 2' paved shoulder, and high traffic	Bicycle lanes, with possible separate path on Catawba River bridge	1.1 (Lincoln)	TIP	Low

The Ultimate Route in Lincoln County employs a combination of existing roads and future sections of the Carolina Thread Trail. While an additional 10.4 miles of off-road trail will be incorporated to give the Ultimate Route in Lincoln County a total length of 26 miles. The Ultimate Route will include sections to allow cyclists to visit county parks, including Beatty's Ford Park and the planned Rock Springs Park.

The Ultimate Route will cross the Catawba River along NC 73, but those improvements will likely need to wait until the NC 73 bridge is replaced, which is not expected until after 2030. There is potential for modifications to the existing bridge to accommodate bicyclists and pedestrians, but these would be expensive. The primary off-road corridor of the Ultimate Route will run through largely undeveloped areas between northern and southern Lincoln County, roughly parallel to NC 16. Off-road sections are intended to be multi-purpose paths, but some may be unpaved facilities. A description of each of these projects, including the current condition, recommended improvements, and recommended funding sources is provided below.

Catawba County

For its length in Catawba County, the Lake Norman Regional Bicycle Route is planned for primarily on-road facilities, in both its initial and ultimate configurations. However, it is expected that as the County begins its Carolina Thread Trail planning process, a trail network will be identified which will result in some multi-purpose trail sections suitable for later inclusion in the Ultimate Route. Below is a brief description of the Initial and Ultimate Routes in Catawba County.

Initial Route

The Initial Route in Catawba County stretches 15.6 miles, and is located exclusively on two-lane, NCDOT-maintained facilities, with the potential exception of a planned multi-purpose path on Island Point Road. The Study Area within Catawba County includes many scenic low-volume rural roads. Some of these roads, such as Sherrills Ford, were recently improved to

include paved shoulders, but the remaining rural roads lack paved shoulders. The feasibility for installing them is hindered by the presence of slopes and ditches. Several large developments are proposed for this part of the County which is expected to create an influx of population and commercial destinations in the area. Such development may present opportunities to improve the shoulders of these roads along the new development frontages.

The Initial Route enters from the south from Lincoln County along Slanting Bridge Road, crossing NC 150 to Sherrills Ford Road. This point is the southern end of the Catawba Run signature route, which continues north into Iredell County. The Route joins Sherrills Ford Roads for approximately 2 ½ miles to Mollys Backbone, which then connects to Monbo Road. These two rural two-lane roads both lack paved shoulders, but they have relatively low traffic volumes. Further on, the Route utilizes Long Island and Kale Roads to connect to Hudson Chapel Road at Lake Norman. Kale Road enjoys long stretches of scenic overlooks of the Lake to the east. Finally, the Route crosses over Lake Norman and into Iredell County. Additionally, the County also includes an Initial Route branch along the complete 3.6 mile length of Island Point Road beginning at Sherrills Ford Road.

A description of each of the segments included in the Initial Route for Catawba County is provided below, complete with a description of current conditions, recommended improvements, recommended funding sources, and prioritization.

Project	Location	Existing Condition	Recommended Improvement	Length (miles)	Eligible Funding Sources	Priority
C1	Sherrills Ford Road	Two-lane road with paved shoulder	Signage	4.2	Division signage	Medium
C2	Island Point Road	Two-lane road without shoulder	Multi-purpose path and signage	1.3	By developer and Division signage	Medium
C3	Mollys Backbone and Monbo	Two-lane road without shoulder	Paved shoulders	1.0	Resurfacing, enhancement, or CMAQ	Medium
C4	Long Island Road and Kale Road	Narrow two-lane road without shoulder	Paved shoulders	1.3	Resurfacing, enhancement, or CMAQ	Medium
C11	Slanting Bridge Road	Two-lane road without shoulder	Paved shoulders	12	Resurfacing, enhancement, or CMAQ	Low

Ultimate Route

The Ultimate Route in Catawba County includes all segments already identified in the Initial Route, and adds a loop near the future Mountain Creek Park west of Mt. Pleasant Road along Sherrills Ford and Mt. Pleasant Roads. The Ultimate Route also includes NC 150 from Little Mountain Road east across Lake Norman to complete this loop and connect to Iredell County. These sections would be added to the route as the Park is developed and NC 150 is widened and the bridge across NC 150 is replaced, which is not expected until after 2020. Kiser Island Road does need to be improved to be added to the Ultimate Route, but is not included in the Initial Route because it is otherwise isolated due to inadequate connections along NC 150.

All 15.6 miles of the Initial Route in Catawba County will remain in the Ultimate Route, and 16.7 additional miles are identified for the Ultimate Route, for a total of 32.3 miles. These totals are expected to change should any sections of the Carolina Thread Trail be recommended for inclusion in the Ultimate Route.

Project	Location	Existing Condition	Recommended Improvement	Length (miles)	Eligible Funding Sources	Priority
C5	NC 150 from Little Mountain to Harvel	Two-lane high-volume road without shoulder	Bicycle lanes	3.4	TIP	Low
C6	NC 150 from Harvel to Perth (includes bridge) in Iredell County	Two-lane high-volume road without shoulder	Bicycle lanes	0.7 in Catawba County	TIP	Low
C7	Kiser Island Road	Narrow two-lane road without shoulder	Signage	3	Division signage	Low
C8	Little Mountain Road	Narrow two-lane road without shoulder	Paved shoulders	2.8	Resurfacing, enhancement, or CMAQ	Low
C9	Mt. Pleasant Road	Narrow two-lane road without shoulder	Paved shoulders	3.1	Resurfacing, enhancement, or CMAQ	Low
C10	Sherrills Ford Road between Mollys Backbone and Mt. Pleasant Road	Narrow two-lane road without shoulder	Paved shoulders	1	Resurfacing, enhancement, or CMAQ	Low
C12	Slanting Bridge south of NC150	Two-lane road without shoulder	Paved Shoulder	2.9	Resurfacing, enhancement or CMAQ	Low

Iredell County

A ride through Iredell County on the Lake Norman Regional Bicycle Route includes historic small town downtowns and neighborhoods, rolling countryside, and miles of state park land. The park connection is important because it is home to miles of mountain biking paths. Iredell County includes many existing and potential bicycle-friendly areas that address the needs of a wide range of users. Below are brief descriptions of the County's Initial and Ultimate Routes.

Initial Route

The Initial Route in Iredell County will be located exclusively on existing roads. A variety of improvements are recommended to upgrade the roads to meet the needs of the Design Cyclist. The Route includes sections within Lake Norman State Park as well as many opportunities to view Lake Norman. A total of 38.5 miles are planned for the Iredell County portion of the Initial Route; the most mileage of any of the four counties. The most direct route through Iredell from Catawba to Mecklenburg Counties measures roughly 24 miles. Beginning at Buffalo Shoals bridge over Lake Norman, this trip would involve riding along Buffalo Shoals Road to Pineville Road to St. Johns Road into Lake Norman State Park. Emerging from the eastern side of the Park on State Park Road, the Route then turns south on Perth Road, turns onto Judas Road, then Cornelius Road. Just before I-77, the Route turns south and runs directly adjacent to the Interstate on Bluefield Road. It then connects to Regency Center Drive by way of a short jog on Midnight Lane, and a 200 yard, currently unpaved path preserved by easement for a future road. The Route crosses NC 150 and continues south on Rolling Hill Road. When Rolling Hill terminates at Brawley School Road, the Route heads east, crosses I-77, and follows Wilson Avenue, and then utilizes Lowrance Avenue to South Academy Street just blocks from Downtown Mooresville. The Route turns right on Academy with a short jog on West Gray Avenue which terminates at Broad Street (NC 115). It then continues south on NC 115 into Mecklenburg County.

The Iredell Route also visits Downtown Mooresville in a short loop that follows Main Street north, turning right on East Moore Avenue, followed by another right onto Church Street, and then back to Main Street on Wilson Avenue. This circuit forms the beginning of two signature routes: the Peninsula Pedal, and the Main Street Ride. The **Peninsula Pedal** follows the Route out from Mooresville heading west, and continuing along Brawley School Road until the large traffic circle by Point Lake & Golf Club, for a 10-mile one-way ride from downtown. The **Main Street Ride** visits three Lake Norman municipalities. From Downtown Mooresville, it follows

NC 115 south into Davidson, and continues into Cornelius before terminating at Birkdale Village in Huntersville.

The Iredell County portion of the Route includes a third signature route. The **Troutman Loop** features opportunities to access mountain bike trails in Lake Norman State Park, visit a working Vineyard, or stop in at destinations in the Town of Troutman. This 11.5-mile circuit follows East Monbo Road, Old Mountain Road, Main Street (US 21) and Eastway Drive through Downtown Troutman, Wagner Street, and then State Park Road and St. Johns Road through the State Park. During times when the State Park is closed, the Troutman Loop provides an alternate way to continue on the Route through Iredell County.

A description of each of the segments on the Initial Route through Iredell County is provided below, complete with a description of current conditions, recommended improvements, and recommended funding sources.

Segment	Location	Existing Condition	Recommended Improvement	Length (miles)	Eligible Funding Sources	Priority
I1	Buffalo Shoals Rd. (SR 1004) & Pineville Rd. (SR 1332) from Catawba Co. to East Monbo Rd. (SR 1328)	Two-lane road with no paved shoulder, narrow graded shoulder	Paved shoulders	4.0	Resurfacing	Medium
I2	East Monbo Rd. & Old Mountain Rd. (SR 1005) from Pineville Rd. to US 21/ NC 115	Two-lane road with no paved shoulders	Paved shoulders	4.3	Resurfacing	Medium
I3	US 21/ NC 115, Old Murdock Rd., & Eastway Dr. from Old Mountain Rd. (SR 1005) to Wagner St. (SR 1303)	Two- lane high-volume open ditch road with varying paved shoulders	Bicycle lanes on NC 115/ US 21 & signage on Old Murdock & Eastway	1.0	Resurfacing, with development, enhancement or via road widening	High

Project	Location	Existing Condition	Recommended Improvement	Length (miles)	Eligible Funding Sources	Priority
I4	Wagner St. (SR 1303) from W. Church St. to State Park Rd. (SR 1321)	Combination two-lane curb and gutter road with wide-outside lanes and open ditch with no paved shoulder	Paved shoulders and signage	1.5	Resurfacing via Powell Bill, or enhancement	Medium
I5	East Monbo Rd. (SR 1328), St. Johns Rd., & State Park Rd. (SR 1321) from Pineville Rd. (SR 1332) to Wagner St. (SR 1303)	Two-lane road with narrow lanes and intermittent eroded shoulders	Signage	4.5	State park signage	High
I7	Perth Rd. (SR 1303) from State Park Rd. (SR 1321) to Judas Road (SR 1378)	Two-lane road with no paved shoulders and narrow lanes	Paved shoulders	3.0	Resurfacing or enhancement	Low
I8	Judas Rd., Bluefield Rd., Cornelius Rd. (SR 1302), & Bluefield Rd. (SR 1395) from State Park Rd. (SR 1321) to Regency Center Dr.	Two-lane roads with open ditches and no paved shoulders,	Paved shoulders	3.7	Resurfacing, with development, or via road widening	Low
I9	Regency Center Drive & Rolling Hill Rd. from Bluefield Rd. (SR 1395) to Brawley School Rd. (SR 1100)	Two-lane suburban curb and gutter roads with intermittent wide lanes and low traffic	Signage	1.3	Mooresville signage	Medium
I10	Brawley School Rd. (SR 1100) from Williamson Rd. (SR 1109) to The Point Dr.	Future multi-lane road with bicycle lanes	Signage	5.2	Division signage	High

Project	Location	Existing Condition	Recommended Improvement	Length (miles)	Eligible Funding Sources	Priority
I13	Brawley School Rd. (SR 1100) & Wilson Ave. (SR 1117) from Williamson Rd. to S. Academy St.	Combination of future multi-lane road with bicycle lanes and two-lane open ditch roads with no paved shoulders, and urban two-lane curb and gutter roads with wide outside lanes	Bicycle Lanes and Signage	3.2	Division signage, Enhancement or CMAQ	High
I14	S. Academy & Church St. from Wilson Ave. (SR 1117) to NC 115	Two-lane urban roads with wide lanes, low speed traffic and moderate volumes.	Signage	2.0	Mooresville signage	High
I15	NC 115 from Wilson Ave. (SR 1117) to Fairview Rd. (SR 1246)	Two-lane road with intermittent paved shoulders and high traffic volumes.	Bicycle lanes	2.2	Resurfacing, enhancement, or CMAQ	Medium
I17	Perth Rd. (SR 1303) from State Park Rd. (SR 1321) to Judas Rd. (SR 1378)	Two-lane rural road with segments of 2' paved shoulder and high traffic volumes.	Paved shoulders	2.6	Resurfacing or enhancement	High

Ultimate Route

The Ultimate Route in Iredell County utilizes a combination of existing roads and proposed off-road multi-purpose paths. Approximately 33.5 miles of the County's 38.5 mile Initial Route will remain designated in the Ultimate Route. In addition, 12.4 miles of new Route (listed below) will be incorporated to give the Ultimate Route in Iredell County a total length of close to 46 miles, or approximately 40 percent of the Ultimate Route. The most critical new connections to be established with the Ultimate Route in Iredell County will be the opportunity to cross the Lake on NC 150 and connection to Doolie Road from Morrison Plantation.

The Ultimate Route is currently planned to feature a mile of off-road trail (see Project I-6 in table

below). However, as the County is just beginning a greenway master planning process with the Carolina Thread Trail, more off-road opportunities will likely arise. As new multi-purpose paths are planned and constructed, connections to these trails from the Lake Norman Regional Bicycle Route will provide additional miles of off-road trail bicycling.

A description of each of the additional projects for the Ultimate Route is provided below.

Project	Location	Existing Condition	Recommended Improvement	Length (miles)	Eligible Funding Sources	Priority
I6	State Park to Perth Connector from State Park Road (SR 1321) to Perth Road (SR 1303)	Narrow lanes	Multi-purpose path	1.0	Enhancement or through development	Low
I11	Morrison Plantation & Plantation Ridge from Brawley School Rd. (SR 1100) to Doolie Rd.	Undeveloped	Signage, restriping and multi-purpose path	2.2	Division signage, and CMAQ, enhancement, or via development	Medium
I12	Perth Road (SR 1303) from NC 150 to Judas Rd. (SR 1378)	Undeveloped	Paved shoulders	3.0	Resurfacing	Low
I16	Fairview Rd. (SR 1246) from NC 115 to Williamson Rd. (SR 1109)	Undeveloped	Bicycle lanes or signage	0.8	Division signage	Medium
I18	Doolie Rd. (SR 1180) from Plantation Ridge extension to NC 150	Undeveloped	Paved shoulders	0.3	Resurfacing, with development, enhancement, or CMAQ	Medium
I19	Williamson Rd. (SR 1109) from Fairview Rd. (SR 1246) to Brawley School Rd. (SR 1100)	Undeveloped	Paved shoulders	2.4	Resurfacing, CMAQ, with development, enhancement, or via road widening	Medium
C6	NC 150 from Harvel Rd. (SR 1902) to Perth Rd. (SR 1303)	Bicycle lanes	Bicycle lanes	2.7 (in Iredell County)	Resurfacing, CMAQ, with development, or via road widening	Low

Mecklenburg County

The portion of the Lake Norman Regional Bicycle Route in Mecklenburg County includes a variety of on- and off-road facilities, in both its initial and ultimate configurations. Mecklenburg County and its municipalities have nearly completed the Carolina Thread Trail process, which helped identify an off-road segment in Cornelius. Below is a brief description of the Initial and Ultimate Routes in Mecklenburg County.

Initial Route

The Initial Route in Mecklenburg County follows existing roads, and the recently opened McDowell Creek Greenway, which runs from Birkdale Village in Huntersville, to Westmoreland Road in Cornelius. From the west, the Route starts at Blythe Landing Park. Bicyclists then cross NC73 to Babe Stillwell Farm Road, which connects to a series of subdivision roads, ultimately leading to Birkdale Crossing at Sam Furr Road. The Route then crosses Sam Furr (NC 73) and connects to the McDowell Creek Greenway just east of the main entrance to Birkdale Village.

The McDowell Creek Greenway provides an important connection between Sam Furr and Westmoreland as an alternative to the congested Sam Furr and I-77 interchange area. The Route follows Westmoreland to US 21 north to Catawba Avenue, where bicyclists can travel east into Cornelius. The Route then follows existing neighborhood streets to connect to NC 115 near the YMCA. A short section of NC 115 (less than 200 yards) is used before the Route again turns to neighborhood roads in order to connect to Beaty Street at Griffith. Beaty Street is then designated to NC 115 north of downtown Davidson, where the Route continues on to Mooresville. NC 115 through Davidson is avoided due to its high frequency of turning movements and on-street parking.

While the Initial Route offers limited opportunities to view Lake Norman, it allows cyclists to visit attractive downtowns and other commercial areas. The **Main Street Ride** signature route highlights these destinations as it follows NC 115 from Downtown Mooresville in Iredell County south into Davidson, and continues into Cornelius before crossing through Birkdale Village in Huntersville and terminates at Blythe Landing Park.

Huntersville has done a commendable job of requiring connectivity between neighborhoods south of Sam Furr, which has allowed the route to deviate from NC 73 for over a mile. The older, grid-patterned neighborhoods in Cornelius and Davidson offer similar benefits, with only limited sections of NC 115 and Catawba Avenue required for the Initial Route. Conditions

along recently widened West Catawba Avenue are considered less safe and attractive compared to the alternative of the McDowell Creek Greenway and Westmoreland Road. Anticipated future improvements to area roads from the proposed Augustalee development will facilitate recommended improvements for the Route, particularly on Westmoreland and a portion of US 21.

There are a total of 12.7 miles of the Initial Route in Mecklenburg County. A variety of improvements are recommended for the identified roads to meet the needs of the Design Cyclist (see Chapter 3 for a definition). A description of each of the segments included is provided below, complete with a description of current conditions, recommended improvements, recommended funding sources, and prioritization. The methodology for prioritization is described in Chapter 3.

Project	Location	Existing Condition	Recommended Improvement	Length (miles)	Eligible Funding Sources	Priority
M2	Babe Stillwell (SR 2143), Sandowne, and Devonshire	Two-lane road and low volume residential roads	Signage	1.3	Division and Huntersville signage	Medium
M3	Birkdale Commons Parkway and Sam Furr	Two-lane roads with paved shoulder and bicycle lane	Signage	1.0	Huntersville and Division signage	Medium
M4	McDowell Creek Greenway	Existing multi-purpose path	Bicycle lanes	1.5	Signage	High
M5	Westmoreland Road (SR 2147)	Two-lane road with limited paved shoulder	Paved shoulders	0.4	Via developer, enhancement, or CMAQ	High
M6	US 21	Two-lane road with paved shoulder	Bicycle lanes	1.4	Via developer, enhancement, or CMAQ	Medium
M7	Washam Street, Church Street, and Catawba Avenue	Two-lane residential roads	Signage	1.1	Cornelius signage	High
M8	NC 115	Two-lane high-volume road with limited paved shoulder and sidewalk	Wide sidewalk and signage	0.1	CMAQ, enhancement, Davidson and Cornelius signage	Medium
M9	Potts Street, Jetton Street, Gamble Street, and Sloan Street	Two-lane residential roads	Signage	0.8	Davidson signage	High

Project	Location	Existing Condition	Recommended Improvement	Length (miles)	Eligible Funding Sources	Priority
M10	Beaty Street	Two-lane road with limited paved shoulder	Bicycle lanes	1.0	CMAQ, enhancement, resurfacing or via developer	Medium
M11	NC 115	Two-lane high volume road with paved shoulder	Bicycle lanes	0.2	CMAQ, enhancement, or resurfacing	Medium

Ultimate Route

Approximately 6.8 miles (or about two-thirds) of the Initial Route in Mecklenburg County will remain as the Ultimate Route. The Ultimate Route's two addition in Mecklenburg County is one future section of the Carolina Thread Trail identified between Westmoreland and Catawba Avenue east of US 21. Once this section is constructed, the Ultimate Route will bypass US 21 and directly connect with Cornelius. The other section is NC 73 from Lincoln County to Babe Stillwell. When an additional 1.4 miles of off-road multi-purpose path is included the County's Ultimate Route will have a total length of 12.7 miles.

The Ultimate Route will still cross the Catawba River along NC 73, but it will utilize a bicycle lane or multi-purpose path, ideally separated from motor vehicle traffic. This facility is unfortunately not expected to be in place until at least 2030 when the NC 73 bridge is replaced.

Project	Location	Existing Condition	Recommended Improvement	Length (miles)	Eligible Funding Sources	Priority
M1	NC 73	Two-lane high-volume road with limited paved shoulder	Bicycle Lanes, with possible separate path along Catawba River bridge	4.2	Via widening, enhancement, or CMAQ	Low
M12	Between Westmoreland and Catawba east of US 21	Does not exist	Multi-purpose path	1.4	CMAQ or PARTF	Medium

CHAPTER SIX
Implementation Plan

Policies and Land Use Regulations

An organization or community cannot effectively implement plans to achieve a vision without guiding principles in place. These principles are codified into a body of policy, which gives direction to the community as it determines the most effective and appropriate strategies for implementing projects. Policy guides the identification of alternative programs or spending priorities.. NCDOT and the affected counties and municipalities within the Plan's Study Area have various levels of policies and regulations regarding bicycling. Some communities have plans that specifically identify the location of future bicycle lanes, multi-purpose paths and greenways. Other communities go a step further and consistently reference locally adopted plans when making larger transportation and land use decisions. Communities may also have land use regulations that specify where bicycle lanes are to be placed, how wide they are to be, or when and where bicycle racks are to be installed. This section of the Lake Norman Regional Bicycle Plan describes strategies for NCDOT, the counties, and municipalities as they reference this Plan in the future.

Implementation by NCDOT

NCDOT has well-established policies and regulations regarding the implementation of bicycle plans. In 2009, the NCDOT Board of Transportation approved a "Complete Streets" policy that, among other things, incorporates multimodal alternatives in the design and improvement of all appropriate transportation projects within a municipality or county unless exceptional circumstances exist, and should be referenced by municipalities and counties when conducting site plan reviews and making other land use decisions. This policy will work very well for traditional capital improvement projects, but it is unclear how it will be applird regarding maintenance projects.

It is recommended that NCDOT evaluate every resurfacing project for the potential of adding paved shoulders or bicycle lanes, and alert the affected county or municipality where the adding of such facilities is feasible and within the scope of a resurfacing project. The county or municipality should br made aware of the resurfacing plans with sufficient time to consider the opportunity to contribute to the cost of the project in order to provide paved shoulders or bicycle lanes consistent with an approved plan.

Implementation at the Local Level

A. Guiding Principles

The most cost efficient and rational method for implementing bicycle facilities on a consistent basis is to do so as part of the land development process. Depending on the individual situation and what the local land use regulations call for, right-of-way can be preserved, or a greenway, multi-purpose path or bicycle lane can be constructed. In general, required improvements or land reservation should be proportional to the impact the development will have on the transportation system.

The following guiding principles are suggested for consideration by each of the communities within the Study Area:

1. Make bicycling a viable transportation option by providing bicycling facilities that connect important destinations to neighborhood and regional bicycle routes, bicycle lanes, greenways and multiple-purpose paths.
2. Adopt land use practices that support mixed residential/non-residential zoning, connectivity between adjacent land use and neighborhoods, and infill development to give bicyclists of all skill levels a realistic opportunity to use their bicycles as a viable means of transportation.
3. Encourage the addition of amenities that make biking pleasurable and practical such as landscaping, traffic calming, public restrooms and showers, lockers, bicycle racks, and recreational facilities.
4. Create an atmosphere where motorists are familiar with driving near bicyclists, where bicyclists are comfortable riding near motorists, and where the many physical and operational obstacles that bicyclists currently face are corrected.
5. Promote awareness of the wide-ranging benefits of bicycling throughout the community.
6. Designate, design and modify appropriate streets to accommodate automobiles and bicyclists. Collector roads may require bicycle lanes and other design modifications, whereas lower speed and volume roads may not require any modifications.
7. Consider the provision of bicycle facilities as a legitimate element on all new streets before street widening or construction projects are undertaken.
8. Revise local ordinance to reflect the above principles in the manner appropriate for the community.

B. Land Use Regulations

Local governments can promote the construction of bicycle facilities through a variety of methods involving land use regulations. A summary of suggested implementation tools follows (many of which are already in place in the communities involved in this Study):

1. Citing Adopted Plans When Making Land Use Decisions

   North Carolina's general statutes do not mandate strict adherence by local governments to their adopted land use and transportation plans. The general statutes were amended, however, in 2005 to require that all local governments consider these plans when making their land use decisions and to include "a statement of consistency" with all zoning changes. Thus, this Study upon adoption by NCDOT should be given the same weight and attention as any other locally adopted comprehensive plan, land use plan, transportation plan or small area plan. Local governments should incorporate the Plan's recommendations in all future site plan approvals.

   The approved Regional Bicycle Plan and Route should also be cited and considered in communities that issue "conditional use" or "special use" permits. Most communities that issue these permits have a finding of fact in their land use regulations that states something akin to "the proposed use must be in harmony with the land use plan and any other adopted plan for the physical development of the community."

2. Infill Zoning

   Older parts of a community (i.e., those built prior to the 1950s) were often developed with the pedestrian (and bicyclist) in mind. Blocks were relatively short in length and laid out in a grid or modified grid pattern. Lot sizes tended to be small, with a mix of uses in closer proximity to each other, easier to reach by foot or bicycle. Modern forms of development stand in stark contrast to these practical conventions. In place of a grid of local and interconnected streets, wide and heavily traveled collector roads designed primarily for the automobile, as opposed to the bicyclist or pedestrian, serve as the only means of connection.
   The land development regulations of many communities make it difficult to develop in these older areas, mandating larger lot sizes or developments with relatively large lot setbacks. In recent years, communities have realized the great economic development potential that exists with redevelopment of older areas. Allowing and accommodating development in these "infill" areas through appropriate land use regulations is not only a plus for the community as a whole, but a benefit to the pedestrian and bicyclist.

3. Mixed-Use Zoning

   For decades, the norm in the United States has been zoning districts where uses were strictly segregated. Most land use codes have outlawed the "neighborhood corner store" as they relegate such establishments and most other non-residential to designated non-residentially zoned areas. Such an arrangement increases the necessity for travelling

by automobile as opposed to foot or bicycle for basic everyday needs. In recent years, however, this trend has been reversed as local governments become more willing to allow for a mixture of uses where persons could theoretically live, shop and work all within a relatively small geographic area, thereby making bicycling and walking more feasible modes of transportation. Such mixed zoning arrangements can take many forms:

(1) mixed-use developments on a large scale such as Birkdale and Vermillion in Huntersville, or on a small scale with storefronts on the ground floor of buildings and residential units on upper stories (i.e., the live/work units in Downtown Cornelius); or,

(2) zoning districts that allow and encourage residential uses and non-residential uses to locate near each other (such as along Catawba Avenue between I-77 and downtown Cornelius.)

The end result of either of these arrangements is increased opportunity for getting around by means other than the automobile. This is of particular importance where the Route travels through downtowns and commercial areas. Encouraging or requiring such development supports non-vehicular travel and creates an environment where bicycling is a preferable mode of travel.

4. Required Green Space, Priority for Trails and Bicycle Lanes

   North Carolina's General Statutes (NCGS 160A-372 for cities and NCGA 153A-331 for counties) allow local governments to mandate the dedication of open space in subdivisions. In lieu of open space dedication, local governments can mandate that a fee be paid. Those fees may be used by that local government for recreation and open space purposes only. Most local governments have adopted and enforce such provisions.

   Local governments are now starting to give more emphasis to bicycle and greenway plans by stating that if such an adopted plan shows a trail crossing the property to be subdivided, land for such trail must be set aside (as opposed to allowing a fee to be paid or substituting other lands to be dedicated for recreational purposes). Such language gives lands for greenways, bicycle or multi-purpose trails higher consideration than other types of land to be set aside or constructed.

5. Identification and construction of bicycle lanes within subdivisions where such lanes have been designated.

   As mentioned earlier, one of the best means of ensuring the installation of bicycle facilities is to incorporate the recommendations from this Plan into local land use documents. The Plan calls for the creation of bicycle facilities on certain roads. To ensure that those road segments will NOT be overlooked in the future, each participating

jurisdiction should reference the adopted plans and require their construction when adjoining properties are subdivided or developed in the future. In certain instances this can necessitate additional right-of-way, which can be required by the local jurisdiction or NCDOT.

6. Bicycle Amenities

   A growing trend in land use regulations is the requirement for the installation of facilities for bicyclists (e.g., bicycle racks) for new or expanded civic land uses (e.g., libraries, city/town halls, community centers, schools, etc.) as well as uses that attract large numbers of persons (e.g., shopping centers). Only a few of the communities within the Study Area have such requirements in their land use regulations.

7. Public Transportation

   Not all communities within the Study Area have fixed-route public transportation systems. And for those that do, not all portions of the community are now or likely will be effectively served by transit in the foreseeable future. But for those communities with transit systems, making concerted efforts to locate civic uses along or near transit lines will certainly increase their utilization by bicyclists and others who might not otherwise have access to vehicular transportation. This can be accomplished by amending local land use regulations to give preference to such uses along transit lines (i.e., making them uses by right as opposed to conditional uses, by relaxing off-street parking requirements, lowering development fees, etc.)

8. Street and Neighborhood Connectivity
   Standard development practice for years in this region consisted of neighborhoods and subdivisions replete with dead end cul-de-sac streets. In addition, subdivisions were often built as individual “islands of development” that did not connect to each other. This lack of internal or external connectivity resulted in the reliance on the automobile as the only viable means of transportation both within and between these neighborhoods.

   A growing trend in recent years has been to limit (or in some cases, eliminate) the use of cul-de-sacs and to mandate (unless physical factors dictated otherwise) that new subdivisions connect or have stubs for future connection with adjacent properties. Fewer cul-de-sacs and more interconnections give pedestrians, bicyclists, and drivers, more options for completing a trip. The projected increase in connectivity is expected to provide greater opportunities for the Route as the Plan is reviewed in the future by the Task Force to take advantage of future low-volume residential and commercial connections that allow bicyclists to avoid major roads.

Grant and Project Participation Funding

Counties and municipalities are often unable to apply for grants or cost-sharing with NCDOT on projects because of the short advance notice. But communities that budget a set-aside amount each fiscal year for the local match are thereby able to rapidly and more successfully respond to grant announcements. All counties and municipalities are encouraged to regularly set-aside funds to use as local match for relevant recreation, transportation and safety related grants and cost-sharing for enhancements to NCDOT projects. This strategy will minimize the opportunities lost for lack of a local match.

Wayfinding, Signage, and Logo

Way-finding signs are essential to any bicycle system. NCDOT does not currently allow wayfinding for bicyclists along NCDOT-maintained facilities. According to the NCDOT guidance for motorists, "wayfinding signs are destination guide signs that assist motorists to find destinations that generate substantial traffic from tourists or other unfamiliar motorists such as cultural, historic, art, sport attractions, or other destinations such as visitor centers, courthouses, or civic centers. These signs are generally located in downtown areas of municipalities where stacking destinations on signs and consolidating signs will benefit the motoring public." (Source: NCDOT Wayfinding Guidelines approved 4-17-07). The NCDOT is governed by § G.S. 136-30, which covers signage on the state highway system.

Despite these limitations, recommended signage for the Initial Route provides sufficient guidance to prevent bicyclists from having to guess if he or she is on the designated bicycle route. Signs need to be clear, easy to find and read, aesthetically pleasing and have a uniform set of words/ symbols on them to easily let the bicyclist (as well as motorists and pedestrians) know that they are on a bicycle route. Any level of bicyclist will feel more comfortable on a trip if they have a good idea of where they are at various points, and when they must turn.

The Federal Highway Administration's (FHWA) Manual of Uniform Traffic Control Devices (MUTCD) defines nationwide standards used by road managers to install and maintain traffic control devices on all streets and highways. The FHWA recently updated the MUTCD. These updates enhanced flexibility, allowing way-finding signage for bicycle routes that show bike route delineation and logo through an all in one sign as compared to the previous standard that did not allow logos. Whichever sign standards are used for the Bicycle Route, they must be consistent, whether the roads are maintained by NCDOT, or by a municipality.

Directional "wayfinding" signs that describe area attractions, such as downtowns or shopping areas are not allowed on NCDOT-maintained roads. However, bicyclists can refer to the brochure developed as a part of this plan to identify points of interest apart from those historic sites and related resources already signed on area roads.

The recommended locations for signing the route are limited to intersections where the route turns or travels through a large intersection. The other locations for signage would be at the end of a peninsula where the bicyclist must turn around (two locations in the Initial Route).

The required signs and installation locations along the Initial Route, primarily at intersections for both directions of travel, is described in a supplemental report for NCDOT for use in installing signage.

The Logo

The official Lake Norman Regional Bicycle Route logo is known as the "Sprocket". It is intended for use as a permanent identifier for the Route. This image will serve as the foundational element for all branding and promotional efforts for the Lake Norman Regional Bicycle Route. The intention is to include it on all official Bicycle Route signs along highways, pending approval by the NCDOT Division 10 and 12 Traffic Engineers. This will be explained in further detail in the supplemental sin report.

The Sprocket logo features elements intended to communicate various aspects of the Route and its experience:

- The sprocket shape plainly mimics the chain sprocket of a bicycle.
- The "Lake Norman Bicycle Route" name is clearly included.
- The primary blue color in the design recalls the Route's connection to water.
- Cyclists of various skill levels and riding interests, and of both genders, depict the breadth of intended users.
- The cyclists are shown each riding on paths that represent the various routes within the system.
- The "paths" merge to form the characteristic "triskelion" shape utilized by NCDOT, as well as the FHWA, in their logos.

Flexibility within the logo design allows for various applications that will require specialized or simplified versions.

When necessary for printing on signs or various product media, simplified "flat" or monochrome versions of the logo can be used.

As the logo is easily recognizable in monochrome (as well as black and white), the Sprocket can be depicted in various colors to indicate secondary routes to be featured in the route. Variations can also be incorporated into the design for special events or causes. All variations must be approved by Route management body and NCDOT, as well as being in keeping with FHWAs guidelines.

Linkage with the Carolina Thread Trail

From its earliest notion, the Lake Norman Regional Bicycle Route was envisioned as utilizing both roads and off-road trails. The original Frank Johnson plan depicts many off-road connections to complete its circuit around the Lake. As the process began for formulating the Lake Norman Regional Bicycle Plan, NCDOT expressed its goal of maximizing the percentage of the bicycle route found off roads. This goal was one deciding factor in NCDOT's selection of the Lake Norman area for a regional bicycle route, as work was already underway in the area with the planning of the Carolina Thread Trail (CTT).

The Carolina Thread Trail is a regional network of greenways and trails currently being designed and developed in the Charlotte region, including Lake Norman. It is intended to ultimately reach 15 counties and over two million people, linking cities, towns and attractions. Its multi-purpose paths are intended to be primarily off-road facilities that will also serve to help preserve natural areas and provide opportunities for exploration of nature, culture, science and history.

The Catawba Lands Conservancy is the lead organization for the CTT. The Conservancy is a regional land trust that has worked closely with regional stakeholders to protect natural areas, water quality, working farms and other special places in the region.

All four counties in the Lake Norman Regional Bicycle Plan Study Area are participating in the CTT by developing county-wide greenway plans. The CTT and Centralina staff have worked together closely since the Bicycle Plan was initiated to ensure that any off-road segments were

consistent. There are segments of roads designated as part of both the CTT and the Regional Bicycle Route. While in certain situations the CTT may recommend multi-purpose paths, the Plan may recommend only paved shoulders or bicycle lanes. However, should the multi-purpose paths be constructed, the Task Force would consider utilizing the CTT facilities as a part of the signed Route. This coordination paid dividends in Mecklenburg and Lincoln Counties, where extensive planning and consultation efforts resulted in trail routes that are identified for both processes. While the locations of the on-road segments of the Lake Norman Regional Bicycle Route are precisely known, the Carolina Thread Trail segments are defined as ¼-mile wide "opportunity corridors." The trail itself will be narrower, in recognition that communities will determine the exact location of their segments upon trail design and development, depending upon existing conditions, including the availability of land, rights-of-way, landowner interest and future opportunities.

By the time the Bicycle Plan had been completed, Catawba and Iredell Counties had not yet completed their CTT planning processes. Planning staff of both counties were heavily involved in the development of the Bicycle Plan, as was the CTT staff. The plan development processes for both counties will consider the route recommendations of the Bicycle Plan and make greenway recommendations that will support alternative routes off of existing roads. The Task Force responsible for sustaining the Plan and facilitating implementation will review and recommend modifications to the route, with NCDOT remaining the ultimate approving body for any modifications.

Project Costs

In order to build bicycle facilities, a number of different associated costs must be considered. They include: material, labor, mobilization, right-of-way purchase or easement costs, design, and project management expenses. Installation of paved shoulders and bicycle lanes may also include changes to existing grades and necessitate alterations to drainage structures. Together these items are considered "project costs." Multi-purpose paths are often co-located on water or sewer easements, which eliminate right-of-way costs. Multi-purpose paths are literally small roads, with all the costs associated with roads construction, so eliminating the right-of-way costs is often essential to the financial viability of a project.

The cost estimates are provided below only as a guide and are approximate. Prices are current as of 2009. Materials, labor and other project costs will vary with fluctuating interest rates and inflation, as well as on the complexity of the project.

Signage

The cost for manufacturing a sign is relatively low, sometimes only $25 when many simple signs are produced. Installing a sign raises the cost significantly, to approximately $300 per sign installation. With the assumption that every major intersection and all intersections on

designated bicycle route where the route makes a turn will require bicycle route signage and a directional arrow for each approaching direction. Signage is also recommended for the two dead-end segments along Island Point Road and Brawley School Road. "Share the Road" signage is recommended on a case by case basis as the NCDOT desires to limit the installation of further signs due to visibility, maintenance, and driver perception issues. The total signage cost is therefore estimated at $40,000-$50,000.

The resulting signage requirements are shown in the table below.

Sign Type	Quantity
Bicycle Route	150
Logo (if a separate sign)	135
Arrow	150
Turn Around	2

Paved Shoulders and Bicycle Lanes

Adding asphalt to an existing paved road can oftentimes appear as a straightforward endeavor, but there are often comlications from installing such improvements that increase costs. Paved shoulders and bicycle lanes can be installed as a part of a resurfacing or widening project, or can be completed as a stand-alone project. The information below describes the variables, and costs, that must be considered as a part of any project.

Cost Assumptions (includes design, construction, drainage, and management):

- Two-foot paved shoulder on both sides of road: $700,000 per mile
- Four-foot striped bicycle lane on both sides of road: $1,000,000 per mile
- Utility relocation: $400,000 per mile
- Drainage and shoulder modification: $750,000 per mile
- New two-lane bridge replacement/upgrade: $1,500,000 per bridge

The above 2009 costs were calculated from an NCDOT project calculation spreadsheet that included, design, utility relocation, and contingency costs. The results are costs that reflect those expenses for stand alone projects, which must be designed, bid, and managed as independent projects. These costs may be lower for bicycle facilities that are constructed as a part of a larger road improvement project.

The cost for slope (shoulder) modification is difficult to predict. The cost is minimal on projects where dirt simply has to be moved to create an appropriate slope. The cost increases dramatically when creating an appropriate slope requires right-of-way or easement acquisition, drainage modification, or retaining structures.

The cost to add bicycle lanes to the design and construction of a traditional road widening or construction project is reflected in all of the costs associated with a project, and so their costs can best be estimated as a percent of the project cost. According to NCDOT, the rule of thumb for adding bicycle or pedestrian facilities to a project is five to ten percent. The percentage will be higher on a straightforward two-lane road project, and less on a complex multi-lane project.

Typical bicycle lane cross-sections are found Appendix A.

Multi-Purpose Paths
Multi-purpose paths are typically 10-foot wide paved facilities, on 20-foot wide corridors designated for bicycle and pedestrian use only. Such paths can be built on specific easements, dedicated rights-of way, or along utility corridors, such as electricity, water or sewer lines. There must be sufficient room available to accommodate the 20-foot corridor, which includes 10 feet of travel surface, and five-foot shoulders on either side. According to Mecklenburg County Department of Parks and Recreation, a general, conservative estimate for installing a multi-purpose path on an existing easement of right-of-way is $1 million per mile. This figure assumes that the path will not cross any bridges. The cost to build a multi-purpose path includes many of the variables considered when constructing a new road: materials, bridging, drainage, signage, earth moving, and overall design and management.

Implementation Strategies

The Lake Norman Regional Bicycle Plan identifies routes on a variety of facilities, and recommends a various improvements to make the route ideal for the design user.

Many sources are available for funding the planning and construction of bicycle improvements. Using the right source and getting the best return requires strategy. The most successful strategy for a jurisdiction to develop and improve its bicycle system will involve an appropriate combination of all possible funding sources, both public and private. Local, state, federal, and private funding is available to support the planning, construction, right-of-way acquisition and maintenance of bicycle facilities. Available funding sources are related to a variety of purposes including transportation, water quality, hazard mitigation, recreation, air quality, wildlife protection, community health, and economic development. This section identifies a list of some of the bicycle facility funding opportunities available through federal, state, nonprofit, corporate and private sources. An important key to obtaining any of this funding is for local governments to reference an adopted plan for bicycle and multi-purpose trail systems in place prior to making an application or otherwise securing funding.

State Funding Strategies

North Carolina Department of Transportation

1. **Transportation Improvement Program (TIP):** This is the formal, multi-year funding process for transportation projects in North Carolina. Segments of the Route could be included in the TIP for implementation. Local RPOs and MPOs prioritize projects for inclusion in the TIP, which is then updated on a two-year schedule.

2. **Bicycle and Pedestrian TIP:** The NCDOT has been allocating $6 million per year for independent bicycle and pedestrian improvements in the state, and are commonly called Enhancement projects. These projects are awarded on a competitive basis. Funds are eligible for shared-use paths off of NCDOT right-of-way where they serve a transportation purpose.

3. **Incidental Projects:** The NCDOT Board of Transportation approved in 2009 a "Complete Streets" policy to consider and incorporate multimodal alternatives in the design and improvement of all appropriate transportation projects within a growth area of a municipality unless exceptional circumstances exist. Routine maintenance projects may be excluded from this requirement. As NCDOT designs or develops individual highway or bridge projects along the proposed route; recommended bicycle improvements should be included in the design. These accommodations may increase the cost of the project. Local governments typically are asked to participate in funding such improvements, with implementation by the NCDOT.

   The NCDOT may require local financial participation in the construction of such facilities, but the cost to include as a part of a larger project is always less than as a stand-alone one. The affects RPOs and MPO, and their member governments, should reference the Plan's recommendations when reviewing projects throughout the development process.

4. **Congestion Mitigation and Air Quality (CMAQ):** CMAQ is a federal program that currently allocates approximately $20 million annually to North Carolina to fund programs in "non-attainment areas" (i.e., areas that do not meet federal air quality standards) and projects designed to improve air quality and reduce congestion, without adding single-occupant vehicle capacity to the transportation system. The funds originate from the Federal Highway Administration but are passed through to transportation planning organizations by NCDOT. All of the road improvements recommended for the Bicycle Route are eligible CMAQ projects, although the portion of the Route roughly north of NC 150 in Iredell County is currently outside of the non-attainment boundary and therefore not eligible for CMAQ funding. The three transportation planning organizations in the Lake Norman area currently receive CMAQ funds. They are listed below with their approximate annual allocations as of 2009.

1. Mecklenburg-Union Metropolitan Planning Organization (MUMPO): $3,500,000
2. Lake Norman Rural Planning Organization (LNRPO): $750,000
3. Unifour Rural Planning Organization: $75,000

Please contact the appropriate staff of the RPOs or MPO for more information on this program.

5. **Road Resurfacing:** NCDOT should evaluate all road repaving projects to determine if a two-foot paved shoulder, or a four-foot bicycle lane can be installed without significant drainage, Right-of-Way, or grading work required. Where such work is feasible, NCDOT can then inform the affected community of the upcoming work and offer them the opportunity to financially contribute for the marginal cost associated with these improvements.

6. **Signage:** Bicycle route signage is installed by either the local NCDOT District Office or, when on municipal roads or multi-purpose paths, the affected municipality. NCDOTs Bicycle and Pedestrian Transportation Division will purchase signage and hardware.

   All signage on NCDOT-owned facilities must meet the Federal Highway Administration's Manual on Uniform Traffic Control Devices (MUTCD) guidelines, which were recently updated to provide flexibility for route numbering and designation.

7. **Safe Routes To School (SRTS):** The SRTS program is funded under SAFETEA-LU and administered by NCDOT. The program provides approximately $15 million in North Carolina over five years for improvements within two miles of elementary and middle schools. No local match is required, and individual grant awards are limited to approximately $200,000. These grants can pay for pedestrian and bicycle facilities and intersection improvements. The funds can also be used for education and enforcement efforts. The target population for these activities must be K-8 students.

North Carolina Division of Parks and Recreation

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. Funds are subject to the overall Federal-aid highway obligation limitation. While the Federal RTP authorization ended in FY 2009, the North Carolina Division of Parks and Recreation is still encouraging applications for grant money, contingent upon the program's reauthorization in FY 2011. The grants are intended for the development, construction, maintenance, and rehabilitation of multi-purpose trails and trail facilities.

Eligible activities include:

- Maintenance and restoration of trails;
- Development and rehabilitation of trailside and trailhead facilities;

- Purchase and lease of trail construction and maintenance equipment;
- Construction of new trails (with some limits on Federal lands);
- Acquisition of easements and fee simple title to property;
- Assessment of trail conditions for accessibility and maintenance;
- Development and distribution of related publications;
- Operation of trail safety and trail environmental protection programs;
- Assessment of trail conditions for accessibility and maintenance; and,
- Other related uses.

RTP funds may be used to match other Federal program funds for projects that otherwise would be eligible for RTP funding.

North Carolina Department of Environment and Natural Resources (NCDENR)
NCDENR administers two grant programs designed to fund planning and implementation of recreation projects, such as multi-purpose trails. These programs are the Parks and Recreation Trust Fund (PARTF) and the Land and Water Conservation Fund (LWCF). LWCF applicants may receive a maximum of $250,000 per project from NCDENR, and PARTF applicants may receive a maximum of $500,000, per project, from NCDENR. Both LWCF and PARTF grants require a dollar-for-dollar match, or 50 percent.

Municipal and County Strategies

Land Use Regulation
The most cost-effective method of installing bicycle facilities is when construction is already occurring as a part of another project. Several communities affected by the route recommendations already require the installation of bicycle lanes or paved shoulders as a part of the development approval process, which obviously has a cost to the developer, but results in a facility constructed for less cost, and far less difficulty, than as an independent project. The traditional zoning language used for this strategy requires construction along the frontage of the development. For multi-purpose paths the community may work with the developer to set aside the land for construction of the facility, with either an easement or dedication of the property to the community.

Another strategy that communities use in securing infrastructural improvements is to make such improvements a “fair and reasonable” condition in association with the approval of a conditional zoning district or conditional use permit. Any such conditions must be tied to a development project (i.e., it would not reasonable to ask a developer to install bicycle lanes on a stretch of road two miles from the edge of his/her project), must be mutually agreed upon by both the approving entity and the applicant, and should be directly associated with an approved planning document. In other words, if an approved plan called for an off-road bicycle path or greenway on a piece of property, a “fair and reasonable” condition associated with conditional approval

would be for either the property associated with the path or greenway be dedicated to the local government, or the path segment be built on that piece of property (or funds in lieu be paid to the local government).

Local governments should use this tool ONLY when referencing adopted plans that clearly show proposed improvements (i.e., plan or greenway development) on a specific piece of property. The term "fair and reasonable" should also be used appropriately by the local government. Asking a property owner to make a $500,000 improvement or donation for a development that is valued at only $25,000 would not be deemed by most persons to be "fair and reasonable."

In order for these two tools to be used, they must be specifically allowed in a local government's land use regulations. In addition, approval of a conditional use permit necessitates a quasi-judicial public hearing to be held by the local government.

Powell Bill Funds

Annually, State street-aid (Powell Bill) allocations are made to incorporated municipalities which establish their eligibility and qualify as provided by G.S. 136-41.1 through 136-41.4. Powell Bill funds shall be expended only for the purposes of maintaining, repairing, constructing, reconstructing or widening of local streets that are the responsibility of the municipalities or for planning, construction, and maintenance of bikeways or sidewalks along public streets and highways. Communities are able to use Powell Bill funds to build and maintain bicycle lanes on roads that they maintain. All municipalities within the Study Area receive Powell Bill funding.

General Funds

Municipalities and counties are always eligible to utilize their own revenues for trail improvement and installation projects. Historically, there has been little interest in County-level participation in transportation, as public roads in North Carolina have been owned and maintained by either NCDOT or by municipalities (although in recent years the North Carolina General Statutes have been changed to allow counties to fund road projects). Municipalities have been more involved in funding and executing transportation projects. Both counties and municipalities are encouraged to fund strategic projects that the Study calls for that will not be funded by NCDOT in the foreseeable future, are ineligible for other grants, or cannot be improved or funded as a part of the development process. All improvements on NCDOT facilities must be coordinated with NCDOT to ensure their requirements are met.

Partnerships

Due to the linear and connective nature of bicycle facilities, off-road improvements may involve numerous landowners. Greenway projects, for example, can present complex challenges of working with multiple property owners and jurisdictions. Creating partnerships may be the only way to solve the complex problems that ensue, as well as deal with the inevitable web of utility lines (and providers) and transportation corridors. Though these partners may have some

conflicting interests at times, opportunities for funding, support and publicity may arise and broaden by involving partners with diverse interests.

Multiple uses of utility corridors provide one example of effective partnership. Most utilities use a linear corridor but occupy only a small portion of the ground surface. Rather than being solely dedicated to that one isolated use, these valuable corridors can often include a complementary public transportation and recreation use along with the utility functions. Utilities benefit from sharing corridors with trails through maintenance savings.

Partnerships engender a spirit of cooperation, civic pride and community participation. The key to the involvement of private partners is to make a compelling argument for their participation. Major employers and developers should be identified. Very specific routes that make critical connections to places of business would be targeted for private partners' monetary support following a successful master planning effort. Potential partners include major employers that are located along or accessible to bicycle facilities such as multi-use paths or greenways. Name recognition for corporate partnerships would be accomplished through signage trailheads or interpretive signage along greenway systems. It is important to have a lawyer review the legal agreement and verify ownership of the subsurface, surface or air rights in order to enter into an agreement.

Local Trail Sponsors
A sponsorship program for multi-purpose trail amenities allows smaller donations to be received from both individuals and businesses. Cash donations could be placed into a trust fund to be accessed for certain construction or acquisition projects associated with a greenway system. Some recognition of the donors is appropriate and can be accomplished through the placement of a plaque, the naming of a trail segment, and/or special recognition at an opening ceremony. Types of gifts other than cash could include donations of services, equipment, labor, or reduced costs for supplies.

Initial Projects

Staff considered each of the 52 segments included in the Initial and Ultimate Routes and ranked them based on a range of variables (see Prioritization Plan in the Appendix for methodology). Staff then developed a one-page information sheet for each of the top projects that required capital improvements (bicycle lanes or paved shoulders). Each information sheet depicts the project on an aerial map to show the surrounding environment, and includes pertinent information, such as anticipated project costs, traffic counts and Right-of-Way information. These projects range from less than $50,000 to more than $3 million, and are eligible for a range of grants, such as enhancement, CMAQ, Safe Routes to Schools, and Spot Safety.

The recommended improvements are typically limited to those necessary for bicyclists. Some

roads, such as NC 115 in Davidson or Williamson Road in Mooresville, will be improved in the future to address motor vehicle safety and capacity issues. The Plan's recommended improvements are consistent with the road projects scheduled within the next five years. However, when improvements to roads are planned but not yet funded, a significant degree of uncertainty and flexibility can exist. The projects detailed on the following maps are recommended in any first round of grant applications by the affected communities.

The information shown on the following maps can be used as a stand-alone document to use in support of a grant application to implement the recommended improvements. Any grant application and project on an NCDOT-maintained facility must be coordinated with NCDOT for Right-of-Way and other issues.

On-Going Coordination

NCDOT understands that implementing the Route will require continued support over a period of years, and will include significant coordination. NCDOT therefore required "Implementation and Sustainment" as a specific part of the overall Lake Norman Regional Bicycle Plan (LNRBP) plan development process. The Steering Committee and Plan authors felt this is best described as a standing "task force" that represents stakeholders in the plan and coordinates/ guides plan implementation. This group will be key to future implementation due to the large number of stakeholders and limited resources available for implementing such projects.

The Lake Norman Bicycle Route Task Force concept has the following attributes:

Structure and Representation
A group assigned the responsibility for guiding implementation and sustainment of the Plan requires legitimacy and responsibility. The group will need to have the ability to recommend which segments are implemented first when competitive funding is made available, and reviews transportation plans and projects to ensure the Plan's recommendations are upheld. All affected communities and transportation planning organizations will have a seat at the table, with established bylaws. A copy of the bylaws recommended by the Steering Committee is included in the Appendix.

Meeting Schedule
The task force shall meet twice a year for staff, and annually for elected officials and community leaders. These meetings will typically be ad hoc and called based on immediate issues, such as route amendment and grant application coordination. Additional meetings can be called as needed.

Organization and Leadership
The Task Force would have a chairman and vice-chairman, who are elected annually. All

affected communities and government agencies (NCDOT Divisions) would be allowed one representative (and alternate). The Task Force would have a MOU (Appendix A) and bylaws, with each participating community and organization being a signatory to the documents. The chairman would have the authority to speak for the Task Force in those instances where there is not enough time to call a meeting for full deliberation on a particular issue.

Budget

Centralina COG would administer the Task Force under the auspices of COG membership services. Centralina can also utilize NC state planning funds and COG membership funds for paying for the remainder of staff time. Western Piedmont COG would be responsible for assisting Catawba County with project development, but overall administration of the Task Force would be under Centralina COG.

Roles and Responsibilities

Project Funding: The Task Force would endorse grant applications for bicycle route-related projects requesting funds competitive at the statewide level. The RPOs and MPO would be responsible for prioritizing projects utilizing funds under their respective control.

Route Amendment: The Task Force would consider amendments to the route and recommended improvements based on changes proposed by affected communities. These amendments may require significant text and mapping changes that may exceed available resources and require membership financial contribution.

Marketing and Outreach: The Task Force staff and members would be available for presentations, and the Task Force would approve all requests for use of the Route logo in events.

CHAPTER SEVEN
Conclusion

Conclusion

The Lake Norman Regional Bicycle Plan is the culmination of a year's worth of data collection, analysis, public input, refinement and approval of a detailed bicycle route around Lake Norman. Selecting the eventual Route involved working with a very diverse set of stakeholders, among them NCDOT. NCDOT maintains the vast majority of roads found on the Route, and they bear a responsibility to approve plans and projects that are mutually supportive to the overall transportation system. Their participation in the development of this Plan and identification of a Route ranged from traffic engineering, maintenance, general transportation planning, to bicycle planning. The wide range of experience and perspectives offered from within the NCDOT organization, as well as the other Steering Committee members, helped create a better end-product.

Portions of the Route around Lake Norman already exist, as do independent plans for bicycle routes that can meet to extend the Route around much of the Lake, particularly in Southern Iredell and Mecklenburg Counties. The Plan referenced these existing documents and facilities wherever possible, with the net result being that the significant majority of the *Initial* and *Ultimate* Routes are already found "on the ground" or in previously adopted planning documents. This aided the approval process with each of the communities affected by the Plan, as it demonstrated the regional potential of their local decisions.

Implementing the Route will require years of dedicated and coordinated efforts from a wide range of entities. In 2009 NCDOT approved a "Complete Streets" policy to consider and incorporate multimodal alternatives in the design and improvement of all appropriate transportation projects within a growth area of a town or city unless exceptional circumstances exist. This policy is a sound foundation for implementing the routes called for in this study, but the limiting factor is feasibility, particularly costs. Adding bicycle lanes or even paved shoulders to a road can be expensive, and NCDOT has limited resources. Local communities can help reduce costs by coordinating utility placement and site plan approvals to ensure that adequate land exists to install such facilities. The participating communities should expect to be asked to participate in the funding of some improvements.

Developing this route would not have been possible without the consistent attendance and participation by interested citizens, planning staff, and NCDOT staff at the Steering Committee and public input meetings. Continuous, informed dialogue between the Plan's authors and its audience proved critical. Several important issues regarding the alignment and recommended improvements to the Route were identified and addressed early in the process rather than at the end. The resulting document shows a recognition of the challenges of implementing a regional bicycle route, and proposes strategies to address them.

APPENDIX A

Rules of Procedure
Lake Norman Regional Bicycle Route Task Force
_____, 2010

ARTICLE I-NAME

The name of this body shall be the Lake Norman Regional Bicycle Route Task Force, hereinafter referred to as the Task Force.

ARTICLE II-PURPOSE

The purpose and goals of the Task Force shall be to:

1. To meet on a regular basis to discuss land use and transportation issues along the Lake Norman Regional Bicycle Plan's Initial and Ultimate Routes.
2. To disseminate information regarding grants and other funding programs available to assist in implementation of the Route.
4. To coordinate and prioritize grant applications for implementation of the Route.
   To approve requests for use of the Route logo for relevant events.
5. To consider and make recommendations to the NCDOT for amendments to the Route.
6. To undertake other mutually agreed upon tasks to enhance transportation system development and land use coordination along the Route.

ARTICLE III-MEMBERS

Section 1-Membership:

The Task Force shall consist of one or more officials from local governments along the Corridor, and invited persons from affected and interested agencies or organizations, and NCDOT. The initial membership shall include representatives from the following agencies

REGULAR MEMBERS

- Catawba County
- Iredell County
- Lincoln County
- Mecklenburg County
- Town of Cornelius
- Town of Davidson
- Town of Huntersville
- Town of Mooresville
- Town of Troutman
- NCDOT-Division of Bicycle and Pedestrian Transportation
- Unifour Rural Planning Organization
- Lake Norman Rural Planning Organization
- Mecklenburg-Union Metropolitan Planning Organization

INVITED AGENCIES

- NCDOT Transportation Planning Branch
- NCDOT- Division 10 Office
- NCDOT- Division 12 Office

Each member present shall have been appointed by his/her respective local government, agency, or organization to sit on the Task Force. Voting privileges shall be extended to regular member agencies only. Each regular member agency shall be able to cast one (1) vote on all matters for which voting is called for, irrespective of the number of persons present at that meeting representing that agency.

Section 3-Term of Membership:
Term of office for all seats on the Task Force shall be for two (2) years. Re-appointments to the same position shall be allowed.

Section 4- Administration
The Centralina Council of Governments (CCOG) shall serve as the administrative staff to the Task Force. The CCOG shall appoint a Secretary for the Task Force.

ARTICLE IV-OFFICERS

Section 1-Officers Defined:

The officers of the Task Force will consist of a Chairman and a Vice-Chairman serving annual terms, but shall be limited to two consecutive terms. The Chair and Vice-Chair shall each be a representative from one of the communities or agencies on the Task Force.

Section 2-Duties of Officers:

Duties of the Chairman include, but shall not be limited, to:

- Preside at all meetings of the Task Force.
- Decide all points of order or procedure.
- Work with CCOG to draft meeting agendas.
- Call special meetings of the Task Force, as needed.

The Vice-Chairman shall conduct the duties of the Chairman in the event of the Chairman's absence.

Should neither the Chairman nor Vice-Chairman be able to preside at a meeting, regular members present shall elect a person to serve as a Chairman for that meeting. Such person elected shall have all the powers, duties and responsibilities of the Chairman for that meeting.

A representative from CCOG shall serve as the Secretary.

ARTICLE V-MEETINGS

Section 1-Regular Meetings:

Meetings will be held on an ad hoc basis. Dates, times and locations to be determined by the Task Force

membership, with approval by the Chairman. Meeting notices and agendas are to be mailed in sufficient time for them to have been received by each Task Force member, but not later than seven (7) days prior to the meeting date. Notices will be submitted to local newspapers at least seven (7) days prior to the meeting date.

Section 2-Special Meetings:

Special meetings may be called by the Chairman, or at the request of any regular member petitioning the Chairman. Whenever possible, at least seven (7) days notice shall be given. In no event shall a special meeting be called with less than forty-eight (48) hours notice.

Section 3-Workshops:

The Task Force may choose to hold workshops from time to time. Notice for all workshops shall be provided in the manner as regular meetings of the Task Force.

Section 4-Attendance:

Each member shall be expected to attend each regular meeting and each special meeting provided at least seven (7) days notice is given of the latter.

Section 5-Agenda:

The agenda is a list of considerations for discussion at a meeting. Any member of the Task Force can place items on the agenda prior to its distribution, so long as they are presented to the Secretary prior to distribution of the agenda to the Task Force membership. Additional items may be placed on the regular agenda following discussion of the last item on the regular agenda, as long as a majority concurrence of the present and eligible regular voting membership is received.

Section 6- Quorum:

A quorum of the Task Force shall be required to hold a meeting. Any regular or special meeting will be cancelled without a quorum present. A quorum shall consist of one (1) or more members being present from a majority of the regular membership agencies, as depicted in Article III, Section 1 herein. Electronic participation (teleconference) will be allowed to count in determining quorum.

Section 7-Voting Procedures:

Each regular member agency shall be given one (1) vote on all matters for which a vote is called for. The Chair may vote on any matter as the representative from his/her community.

The Chairman may call for a vote on any issue, provided that a motion has been made and seconded and such motion is generally within the purposes of the Task Force as set forth in Article II herein and provided the issue is on the agenda as outlined in Article V, Section 5. A majority vote of the regular membership communities present at the meeting vote shall be sufficient for approval of matters coming before the Task Force. By approval of a majority of the remaining regular membership communities present, one or more voting members may withdraw from voting on an issue due to a conflict of interest. If all members present representing a regular committee abstain from voting, such community shall be considered to have voted

in the affirmative on the matter at hand, unless such community shall have been previously excused from voting on said matter. In the absence of any direction from these rules or other duly adopted voting procedures pursuant to certain approval actions, Robert's Rules of Order will designate procedures governing voting. Any vote or resolution will be non-binding for any affected agency, and a statement indicating such will be included on any resolution.

The Task Force will generally not vote on matters of local or NCDOT land use or transportation decisions on the Route. However, the Task Force reserves the right to make a communal recommendation when those decisions have the potential to significantly affect (positively or negatively) the Route.

ARTICLE VI- APPROVAL/AMENDMENTS TO RULES OF PROCEDURE

Initial adoption and any subsequent amendment to these rules of procedure shall require the affirmative vote of at least a majority of the Task Force's regular members, at a regular Task Force meeting, provided that written notice of the proposed amendment has been received by each member at least thirty (30) days prior to the meeting at which the amendment is to be considered and provided that such amendment does not conflict with the Lake Norman Regional Bicycle Plan Memorandum of Understanding adopted by each regular member, any locally adopted regulation, or any State statute.

The Lake Norman Regional Bicycle Route Task Force approved these rules of procedure on _____.

_____
Chairman
Lake Norman Regional Bicycle Route
Task Force

_____
Secretary
Lake Norman Regional Bicycle Route
Task Force

A RESOLUTION FOR ENDORSEMENT OF THE LAKE NORMAN REGIONAL BICYCLE PLAN

WHEREAS, the Lake Norman Regional Bicycle Plan is the first plan of its kind in North Carolina, and was initiated by the NCDOT; and

WHEREAS, the NCDOT chose the Lake Norman area for its first regional bicycle plan due to its history of coordination and collaboration on land use, transportation, and economic development issues; and

WHEREAS, the _____ recognizes a need to promote alternative modes of travel to reduce congestion, improve air quality, increase tourism, promote recreation, improve health, and increase safety for existing bicyclists and motorists; and

WHEREAS, the Lake Norman Regional Bicycle Plan and its supporting text were developed with input from a wide range of constituents and public input to reflect local conditions and preferences; and

WHEREAS, _____ will consider implementation of the Lake Norman Regional Bicycle Plan through the recommended implementation strategies as listed in the plan; and

WHEREAS, _____ will participate in the Lake Norman Regional Bicycle Route Task Force upon Plan approval by the NCDOT Board of Transportation. The Task Force was identified as the enduring organization to ensure visibility and implementation of the Route.

NOW, THEREFORE BE IT RESOLVED that _____ endorses the Lake Norman Regional Bicycle Plan on this, the_____ day of _____, 2010.

A motion was made by _____and seconded by _____for adoption of the resolution, and upon being put to a vote was duly adopted, on this, the _____ day of _____, 2010.

_____ Chairman

_____ Clerk to Council

Lake Norman Regional Bicycle Plan

~ PUBLIC INPUT MEETINGS ~

IREDELL COUNTY

WHAT DO YOU THINK?

The North Carolina Department of Transportation has asked Centralina Council of Governments to work with local jurisdictions to plan and implement the first regional bicycle route in the State, encompassing Catawba, Lincoln, Iredell & Mecklenburg Counties! The route will feature bike paths and on-road bike lanes.

WE NEED YOUR HELP!

Please attend one of these upcoming public input workshops:

LINCOLN COUNTY

MONDAY **May 11** 7:00 PM	TUESDAY **May 12** 7:00 PM	TUESDAY **May 19** 7:00 PM
Unity Presbyterian Church	Charles Mack Citizen Center	Davidson Town Hall
8210 Unity Church Rd.	215 N. Main Street	216 S. Main Street
Denver, NC	**Mooresville**, NC	**Davidson**, NC

- **Learn about the planning process.**
- **Help decide where the route should go.**
- **Identify local attractions & destinations.**
- **Verify information about the area.**

MECKLENBURG COUNTY

CCOG Centralina Council of Governments

If you have questions before the meeting, please contact Bjorn Hansen:
bhansen@centralina.org
Phone: 704-688-6501, Fax: 704-347-4710
http://www.lakenormanrpo.org/Lake%20Norman%20RBP.htm
www.centralina.org

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Lake Norman Regional Bicycle Plan

~ PUBLIC COMMENT MEETINGS ~

IREDELL COUNTY

HOW DID WE DO?

The North Carolina Department of Transportation has asked Centralina Council of Governments to work with local jurisdictions to plan and implement the first regional bicycle route in the State, encompassing Catawba, Lincoln, Iredell & Mecklenburg Counties! The route will feature bicycle paths, signage, and on-road bicycle lanes.

WE WANT YOUR COMMENTS!

Please attend one of these upcoming public comment workshops:

LINCOLN COUNTY

MONDAY **October 26** 7:00 PM	MONDAY **November 2** 7:00 PM	MONDAY **November 9** 7:00 PM
Cornelius Town Hall 21445 Catawba Ave. Cornelius, NC	Troutman Town Hall 400 North Eastway Troutman, NC	Unity Presbyterian Church 8210 Unity Church Rd. Denver, NC

- **Learn about the planning process.**
- **Comment on the recommendations.**
- **Confirm local attractions & destinations.**
- **Verify information about the area.**

MECKLENBURG COUNTY

If you have questions before the meeting, please contact Bjorn Hansen:
bhansen@centralina.org
Phone: 704-688-6501, Fax: 704-347-4710
http://www.lakenormanrpo.org Click on LNRBP.
www.centralina.org

Centralina Council of Governments

Lake Norman Regional Bicycle Plan Segment Data

Map ID	Segment Name	From	To	Recommended Improvements	Part of a Plan?	On an Existing TIP Project?	Affected Communities	Potential Funding Source	Comments	Initial Route	Ultimate Route	Current Safety	Cost Effectiveness	Demand	Linking Residents and Destinations	Scenic Views	Alternative Travel	Recreation/ Tourism	Bicycling to School	On Signature Route	Total Score	Priority	Segment Length
Catawba County																							
C1	Sherrills Ford Road (SR 1848)	Slanting Bridge Road	Mollys Backbone (SR 1837)	Signage	Yes	No	Catawba County	Division signage		Yes	Yes	2	0	2	0	1	1	1	1	4	12	Medium	2.4
C4	Long Island Road (SR 1833) and Kale Road (SR 1832)	Monbo Road (SR 1885)	Hudson Chapel Road	Paved shoulders	Yes	No	Catawba County	Resurfacing, enhancement, or CMAQ		Yes	Yes	2	1	2	0	2	0	1	0	4	12	Medium	2.1
C2	Island Point Road	Sherrills Ford Road	End of pennisula	Multi-purpose path	Yes	No	Catawba County	By developer	Already permitted	Yes	Yes	2	1	2	0	1	1	2	2	0	11	Medium	3
C3	Mollys Backbone (SR 1837) and Monbo (SR 1885)	Sherrills Ford Road	Long Island Road (SR 1833)	Paved shoulders	Yes	No	Catawba County	Resurfacing, enhancement, or CMAQ		Yes	Yes	2	1	2	0	1	0	1	0	4	11	Medium	4
C11	Slanting Bridge Road	NC 150	Sherrills Ford Road (SR 1848)	Paved shoulders	Yes	No	Catawba County	Resurfacing, enhancement, or CMAQ		Yes	Yes	2	0	2	2	2	1	1	0	0	10	Low	1.2
C7	Kiser Island Road	NC 150	End of pennisula	Signage	No	No	Catawba County	Division signage		No	Yes	2	1	2	0	2	1	1	0	0	9	Low	3
C8	Little Mountain Road (SR 1815)	NC 150	Future park entrance	Paved shoulders	No	No	Catawba County	Resurfacing, enhancement, or CMAQ		No	Yes	2	1	1	0	1	0	2	0	0	7	Low	2.8
C9	Mt. Pleasant Road (SR 1849)	Little Mountain Road (SR 1815)	Sherrills Ford Road (SR 1848)	Paved shoulders	No	No	Catawba County	Resurfacing, enhancement, or CMAQ		No	Yes	2	1	2	0	1	0	1	0	0	7	Low	3.1
C10	Sherrills Ford Road (SR 1848)	Mollys Backbone (SR 1837)	Mt. Pleasant Road (SR 1849)	Paved shoulders	No	No	Catawba County	Resurfacing, enhancement, or CMAQ		No	Yes	2	1	1	2	0	0	1	0	0	7	Low	1
C6	NC 150	Harvel Road (SR 1902)	Perth Road (SR 1303)	Bicycle lanes	Yes	Yes	Catawba County, Mooresville, and Iredell County	Resurfacing, CMAQ, with development, or via road widening		No	Yes	0	0	1	0	2	1	1	0	0	5	Low	3.4
C5	NC 150	Little Mountain Road (SR 1815)	Harvel Road (SR 1902)	Bicycle lanes	Yes	Yes	Catawba County	TIP		No	Yes	0	0	1	0	1	1	1	0	0	4	Low	3.4
Iredell County																							
I14	S. Academy and Church Street	Wilson Avenue (SR 1117)	NC 115	Signage	Yes	No	Mooresville	Mooresville signage		Yes	Yes	4	2	2	4	2	2	2	1	4	23	High	2
I5	East Monbo Road (SR 1328), St. Johns Road, State Park Road (SR 1321)	Pineville Road (SR 1332)	Wagner Street (SR 1303)	Signage	Yes	No	Lake Norman State Park and Iredell County	State park signage		Yes	Yes	4	2	2	4	2	0	2	0	4	20	High	4.5
I10	Brawley School Road (SR 1100)	Williamson Road (SR 1109)	The Point Drive	Signage	Yes	Yes	Mooresville and Iredell County	Division signage		Yes	Yes	4	2	2	2	0	2	1	2	4	19	High	5.2
I3	US 21/ NC 115, Old Murdock Road, and Eastway Drive	Old Mountain Road (SR 1005)	Wagner Street (SR 1303)	Bicycle lanes on NC 115/US 21 and signage on Old Murdock and Eastway	No	Partial	Troutman	Resurfacing, with development, or via road widening		Yes	Yes	2	0	1	4	1	2	2	2	4	18	High	1
I13	Brawley School Road (SR 1100), Wilson Avenue (SR 1117), Golf Club, and Lowrance	Williamson Road (SR 1109)	S. Academy Street	Bicycle Lanes and Signage	Yes	Yes	Mooresville	Division signage, Enhancement or CMAQ		Yes	Yes	2	1	2	4	0	2	1	1	4	17	High	3.2
I17	NC 115	Fairview Road (SR 1246)	Mecklenburg County Line	Bicycle lanes	Yes	No	Mooresville	Resurfacing, enhancement, or CMAQ	LN RPO CMAQ project list for 11-17 TIP	Yes	Yes	4	2	2	2	1	0	0	2	4	17	High	2.6
I11	Morrison Plantation and Plantation Ridge	Brawley School Road (SR 1100)	Doolie Road	Signage, restriping and multi-purpose path	Yes	No	Mooresville	Division signage, CMAQ, enhancement, or via development	Extension of Plantation Ridge to Doolie	No	Yes	2	2	2	4	1	2	1	2	0	16	Medium	2.2
I1	Buffalo Shoals Road (SR 1004) and Pineville Road (SR 1332)	Catawba River	East Monbo Road (SR 1328)	Paved shoulders	No	No	Iredell County	Resurfacing		Yes	Yes	4	1	2	2	1	0	1	0	4	15	Medium	4
I2	East Monbo Road (SR 1328) and Old Mountain Road (SR 1005)	Pineville Road (SR 1332)	US 21/ NC 115	Paved shoulders	Partial	No	Troutman	Resurfacing		Yes	Yes	4	0	2	2	1	0	1	1	4	15	Medium	4.3
I4	Wagner Street (SR 1303)	W. Church Street	State Park Road (SR 1321)	Paved shoulders and signage	Yes	No	Troutman	Resurfacing via Powell Bill, enhancement, or CMAQ		Yes	Yes	2	1	2	2	0	1	1	2	4	15	Medium	1.5
I15	NC 115	Wilson Avenue (SR 1117)	Fairview Road (SR 1246)	Bicycle lanes	Yes	No	Mooresville	Resurfacing, enhancement, or CMAQ		Yes	Yes	2	1	2	4	0	1	1	0	4	15	Medium	2.2
I16	Fairview Road (SR 1246)	NC 115	Williamson Road (SR 1109)	Bicycle lanes or signage	Yes	No	Mooresville	Division signage, Enhancement or CMAQ		No	Yes	4	2	2	4	0	2	0	1	0	15	Medium	0.8
I9	Regency Center Drive and Rolling Hill Road	Bluefield Road (SR 1395)	Brawley School Road (SR 1100)	Signage	Yes	No	Mooresville	Mooresville signage		Yes	No	2	2	2	4	0	2	0	1	0	13	Medium	1.3
I18	Doolie Road (SR 1180)	Plantation Ridge extension	NC 150	Paved Shoulders	Yes	No	Iredell County	Resurfacing, with development, enhancement, or CMAQ		No	Yes	2	1	1	4	0	1	2	1	0	12	Medium	0.3
I19	Williamson Road (SR 1109)	Fairview Road (SR 1246)	Brawley School Road (SR 1100)	Paved Shoulders	No	Yes	Iredell County and Mooresville	Resurfacing, CMAQ, with development, enhancement, or via road widening		No	Yes	0	1	1	4	2	2	1	1	0	12	Medium	2.4

Lake Norman Regional Bicycle Plan Segment Data

Map ID	Segment Name	From	To	Recommended Improvements	Part of a Plan?	On an Existing TIP Project?	Affected Communities	Potential Funding Source	Comments	Initial Route	Ultimate Route	Current Safety	Cost Effectiveness	Demand	Linking Residents and Destinations	Scenic Views	Alternative Travel	Recreation/ Tourism	Bicycling to School	On Signature Route	Total Score	Priority	Segment Length
I6	State Park to Perth Connector and Honeycutt Road	State Park Road (SR 1321)	Perth Road (SR 1303)	Paved shoulder and Multi-purpose path	No	No	Iredell County	Enhancement or through development	Partially through private property	No	Yes	4	0	2	2	1	0	1	0	0	10	Low	1
I7	Perth Road (SR 1303)	State Park Road (SR 1321)	Judas Road (SR 1378)	Paved shoulders	Yes	No	Iredell County	Resurfacing		Yes	Yes	2	1	1	0	2	0	1	0	0	7	Low	3
I8	Judas Road (SR 1378), Bluefield Road, Cornelius Road (SR 1302), and Bluefield Road (SR 1395)	Perth Road (SR 1303)	Regency Center Drive	Paved shoulders		Yes	Iredell County	Resurfacing, with development, or via road widening		Yes	No	2	1	2	0	1	1	0	0	0	7	Low	3.7
I12	Perth Road (SR 1303)	NC 150	Judas Road (SR 1378)	Paved shoulders	Yes	No	Mooresville and Iredell County	Resurfacing		No	Yes	2	0	1	0	2	1	1	0	0	7	Low	3
C6	NC 150	Harvel Road (SR 1902)	Perth Road (SR 1303)	Bicycle Lanes	No	Yes	Catawba County, Mooresville, and Iredell County	Resurfacing, CMAQ, with development, or via road widening		No	Yes	0	0	1	0	2	1	1	0	0	5	Low	3.4
Lincoln County																							
L3	Old NC 16	Webbs Road (SR 1379)	Unity Church Road (SR 1479)	Bicycle lanes	No	No	Lincoln County	Resurfacing, CMAQ or with development		No	Yes	2	1	1	4	0	2	0	2	4	16	Medium	1.1
L2	Old NC 16	St. James Church Road (SR 1380)	Webbs Road (SR 1379)	Bicycle lanes	No	No	Lincoln County	Resurfacing, enhancement, CMAQ or with development		No	Yes	2	1	1	2	0	2	0	2	4	14	Medium	1.7
L7	Carolina Thread Trail	Campground Road (SR 1373)	Old NC 16	Multi-purpose path	Yes	No	Lincoln County	CMAQ, PARTF, or via development		No	Yes	0	0	2	4	2	1	2	1	0	12	Medium	1.6
L6	Unity Church Road (SR 1479)	Old NC 16	Park entrance	Paved shoulders	Yes	No	Lincoln County	CMAQ or as a part of TIP project		No	Yes	2	1	2	2	2	0	2	0	0	11	Medium	2.3
L8	Carolina Thread Trail	Old NC 16	Optimist Club Road (SR 1380)	Multi-purpose path	Yes	No	Lincoln County	CMAQ, PARTF, or via development		No	Yes	2	0	2	2	2	0	2	1	0	11	Medium	3.8
L9	Carolina Thread Trail	Optimist Club Road (SR 1380)	Hagers Ferry Road (SR 1393)	Multi-purpose path	Yes	No	Lincoln County	CMAQ, PARTF, or via development		No	Yes	0	0	2	2	2	1	2	0	0	9	Low	2.2
L5	Hagers Ferry Road (SR 1393) and Club Drive (SR 1395)	Old NC 16	NC 73	Paved shoulders	Yes	No	Lincoln County	Resurfacing, enhancement, or CMAQ		No	Yes	4	1	1	0	2	0	1	0	0	9	Low	3.2
L10	Carolina Thread Trail	Hagers Ferry Road (SR 1393)	NC 73	Multi-purpose path	Yes	No	Lincoln County	CMAQ, PARTF, or via development		No	Yes	0	0	2	2	2	0	2	0	0	8	Low	2.8
L1	Slanting Bridge Road (SR 1844)/ Campground Road (SR 1373), and St. James Church Road (SR 1380)	Catawba County Line	Old NC 16	Paved shoulders	Yes	No	Lincoln County	Resurfacing, CMAQ or with development		No	Yes	2	0	1	2	1	0	1	0	0	7	Low	2.1
L4	Old NC 16	Unity Church Road (SR 1439)	Hagers Ferry Road (SR 1393)	Bicycle lanes	No	No	Lincoln County	Resurfacing, CMAQ or with development		No	Yes	2	1	1	2	0	1	0	0	0	7	Low	1.7
M1	NC 73	Club Drive (SR 1395)	Babe Stillwell (SR 2143)	Bicycle lanes	Yes	Yes	Lincoln County and Huntersville	Via widening or CMAQ		No	Yes	0	0	1	2	1	0	0	0	0	4	Low	4.2
Mecklenburg County																							
M2	Babe Stillwell (SR 2143), Sandowne, and Devonshire	NC 73	Birkdale Commons Parkway	Signage	No	No	Huntersville	Division and Huntersville signage		Yes	Yes	4	2	2	2	0	2	1	0	4	17	High	1.3
M4	McDowell Creek Greenway	Sam Furr	Westmoreland Road (SR 2147)	Signage	Yes	No	Huntersville/ Cornelius	Division signage	Already open	Yes	Yes	4	2	2	4	1	2	2	1	4	22	High	1.3
M7	Washam Street, Church Street, and Catawba Avenue	Catawba Avenue	NC 115	Signage	Yes	No	Cornelius	Cornelius signage		Yes	Yes	4	2	2	4	1	2	1	2	4	22	High	1.1
M9	Potts Street, Jetton Street, Gamble Street, and Sloan Street	NC 115	Griffith Street	Signage	Yes	No	Davidson	Davidson signage		Yes	Yes	4	2	2	4	0	2	1	2	4	21	High	0.8
M5	Westmoreland Road (SR 2147)	McDowell Creek Greenway	US 21	Bicycle lanes	Yes	Yes	Cornelius	Via developer, enhancement, or CMAQ	Part of Augustalee	Yes	Yes	2	1	2	4	0	1	1	2	4	17	High	0.3
M10	Beaty Street	Griffith Street	NC 115	Bicycle lanes	Yes	No	Davidson	CMAQ, resurfacing or via developer		Yes	Yes	2	1	2	2	1	2	1	2	4	17	High	1
M8	NC 115	Cornelius Street	Potts Street	Wide sidewalk and signage	Yes	No	Cornelius and Davidson	CMAQ, Enhancement, Davidson signage		Yes	Yes	2	1	2	2	0	2	1	1	4	15	Medium	0.1
M6	US 21	Westmoreland Road (SR 2147)	Catawba Avenue	Bicycle lanes	Yes	Yes	Cornelius	Via developer	Part of Augustalee	Yes	No	2	1	1	4	0	1	0	1	4	14	Medium	1.4
M12	Carolina Thread Trail	Westmoreland Road (SR 2147)	Catawba Avenue	Multi-purpose path	Yes	No	Cornelius	CMAQ, PARTF, or via development		No	Yes	0	1	2	4	1	2	2	1	0	13	Medium	1.4
M3	Birkdale Commons Parkway and Sam Furr	Devonshire	McDowell Creek Greekway	Signage	Partial	No	Huntersville	Division signage		Yes	Yes	4	2	2	2	0	2	1	0	0	13	Medium	1
M11	NC 115	Beaty Street	Iredell County Line	Bicycle lanes	Yes	No	Davidson	CMAQ, enhancement, or resurfacing		Yes	Yes	2	1	2	2	1	0	1	0	4	13	Medium	0.2

Lake Norman Regional Bicycle Plan
Segment Evaluation Form
Segment: _____
Date Completed:_____

Variable	Explanation	Metric	Weighting (High=2, Regular=1)	Score (High=2, Medium=1, Low=0)	Weighted Score
Current Safety	Is the road currently attractive for bicyclists?	High: Does the road only require signage and limited improvements to make it appropriate for inclusion in the route? Low: Is there high truck traffic, traffic volumes, frequent curb cuts, or a lack of shoulders?	2		
Cost Effectiveness	Will constructing the appropriate bicycle facility (excluding signage) require ROW acquisition, drainage modification, or curb and gutter modification?	Low cost effectiveness: Large intersections, lack of shoulders on high traffic roads, high percent truck traffic, existing curb and gutter, or bridge construction or renovation. High cost effectiveness: shoulders already graded for paving, adequate right-of-way, or excess pavement available for restriping.	1		
Demand	Is this segment already known as a "bicycling" road, or is it reasonable to assume it will be with improvements?	Existing bicycle traffic or identified bicycling populations nearby currently not using facility	1		
Linking Residents and Destinations	With recommended improvments, will this segment allow residents to bicycle to identified destinations?	Identified origins and destinations near each other	2		
Scenic Views	Are there attractive views of Lake Norman or other natural or built areas?	Identified scenic views for extended lengths (at least several hundred feet)	1		
Alternative Travel	Will residents be able to complete routine tasks (running errands or getting to work) on this segment?	Identified residential areas and shopping, employment, or transit stops	1		
Recreation/ Tourism	Will residents and visitors want to ride this segment for exercise and tourism?	Combination of safety, scenic views, and leisure oriented destinations	1		
Bicycling to School	Will this segment allow students to safely travel to a nearby school (if one is nearby)?	Identified residential areas and schools	1		
On a Signature Route	The initial route includes many segments that only require signage or limited improvements to be a designated "ride" of approximately 10 miles.	Yes: The segment is on a Signature Route. No: The segment is not on a Signature Route.	2		
Draft Date: October 14, 2009			**Composite Score**		

Facility Types

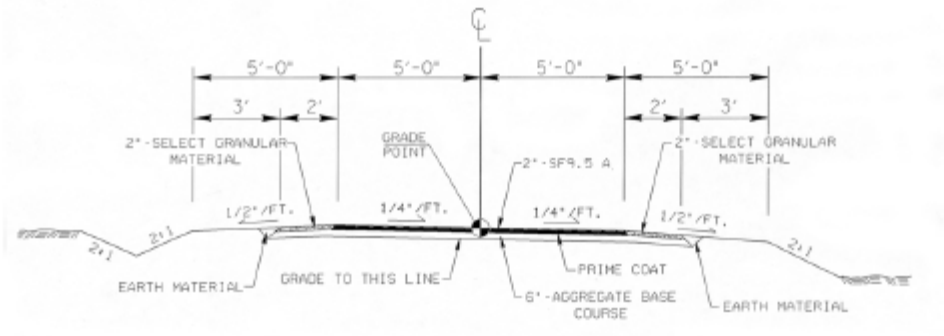
Note: All images and drawings are from NCDOT Division of Pedestrian and Bicycle Transportation

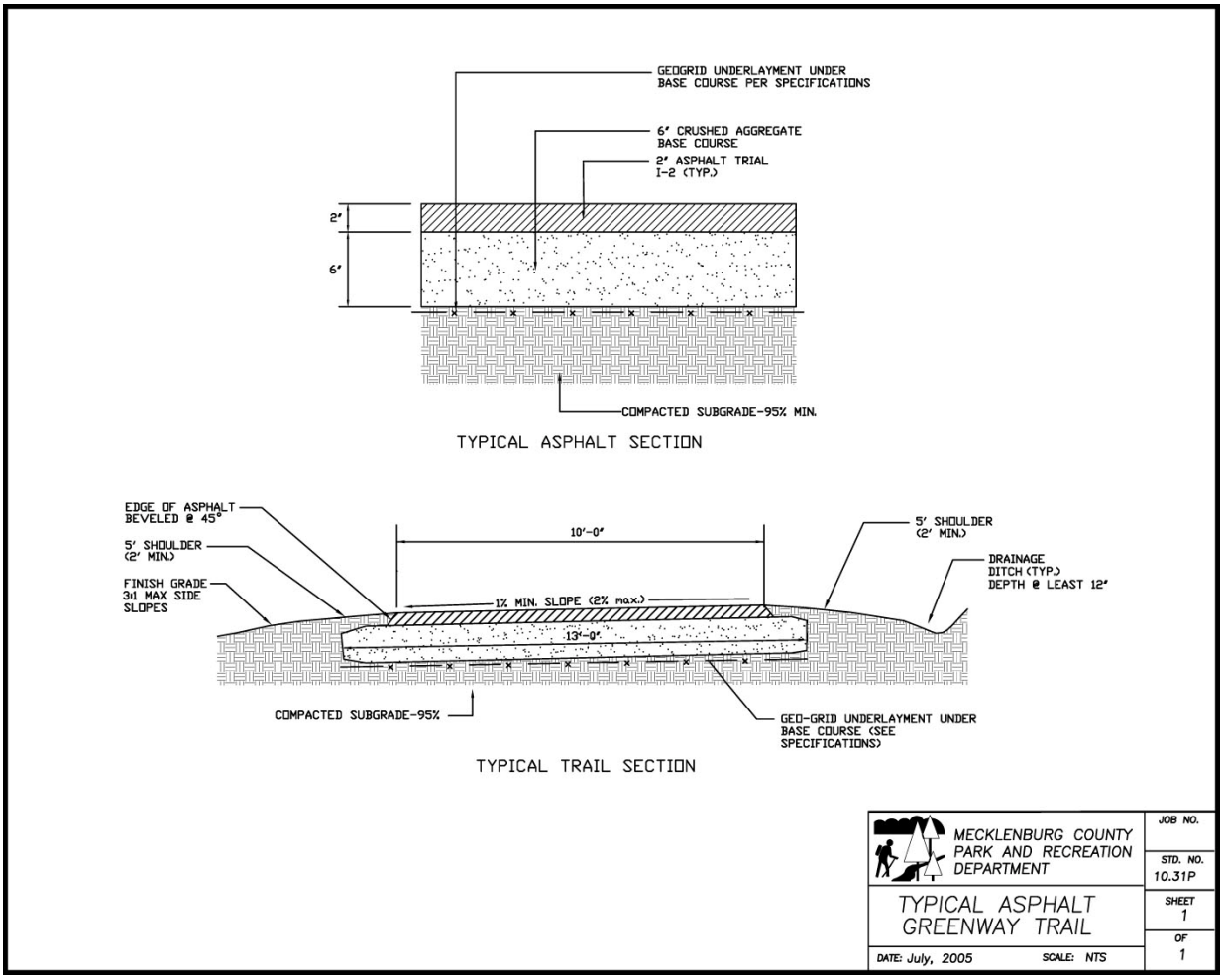
Shared-Use Path

A shared-use path, also known as a multi-use or multi-purpose path, is a paved pathway physically separated from motor vehicle traffic, located either within the highway right-of-way or within an independent right-of-way and easements. Multi-use pathways include bicycle paths, rail to trails or other facilities built for bicycle and pedestrian traffic. These travel surfaces are ten feet wide, with five-foot shoulders on either side. The total facility width is typically 30 feet wide (20 feet minimum). (Source: http://www.ncdot.org/transit/bicycle/projects/project_types/Multi_Use_Pathways2.pdf)

RECOMMENDED TYPICAL SECTION OF 10-FT ASPHALT PATHWAY

With 2-Ft Select Material Shoulder



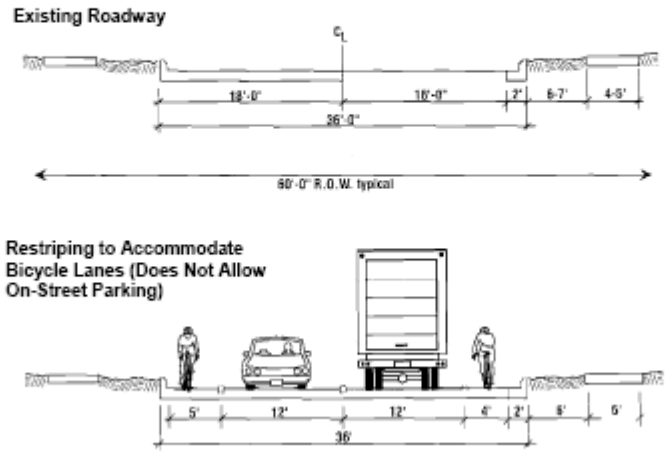

GEOGRID UNDERLAYMENT UNDER
BASE COURSE PER SPECIFICATIONS
6" CRUSHED AGGREGATE
BASE COURSE
2" ASPHALT TRIAL
I-2 (TYP.)
2"
6"
COMPACTED SUBGRADE-95% MIN.
TYPICAL ASPHALT SECTION
EDGE OF ASPHALT
BEVELED @ 45°
5' SHOULDER
(2' MIN.)
FINISH GRADE
3:1 MAX SIDE
SLOPES
10'-0"
1% MIN. SLOPE (2% max.)
13'-0"
5' SHOULDER
(2' MIN.)
DRAINAGE
DITCH (TYP.)
DEPTH @ LEAST 12"
COMPACTED SUBGRADE-95%
GEO-GRID UNDERLAYMENT UNDER
BASE COURSE (SEE
SPECIFICATIONS)
TYPICAL TRAIL SECTION
MECKLENBURG COUNTY
PARK AND RECREATION
DEPARTMENT
TYPICAL ASPHALT
GREENWAY TRAIL
DATE: July, 2005
SCALE: NTS
JOB NO.
STD. NO.
10.31P
SHEET
1
OF
1

Bicycle Route

A bicycle route is composed of a system of routes designated along roads and by signage. These routes are designated by the agency having authority over the roadways included in the route. Along the majority of the Lake Norman Regional Bicycle Route, this organization is NCDOT. (Source: http://www.ncdot.org/transit/bicycle/projects/project_types/Signed_Bike_Routes.pdf)

Striped Bicycle Lane
Striped bicycle lanes are a portion of a roadway reserved for preferential or exclusive use by bicycles through striping, signing, and pavement markings. These lanes are at least four feet wide, not including concrete gutter pan. (Source: http://www.ncdot.org/transit/bicycle/projects/project_types/Bike_Lanes.pdf)

BICYCLE LANES ON COLLECTOR STREETS



Wide Outside Lane

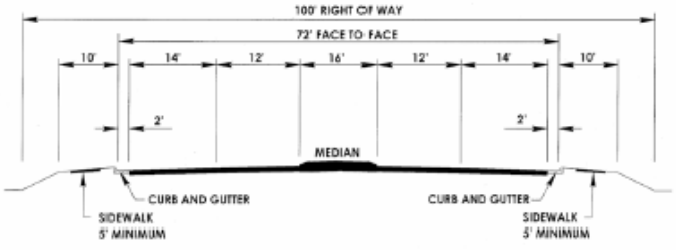
Wide outside lanes are through lanes located closest to the curb and gutter of a roadway. These do not include dedicated right turn only lanes. Wide outside lanes are intended to allow motorists to move safely past slower moving bicyclists without changing lanes. They are effective on both four-lane median divided and four-lane with a center turn lane roadways.

(Source: http://www.ncdot.org/transit/bicycle/projects/project_types/Wide_Outside_Lanes.pdf)

WIDE CURB LANES

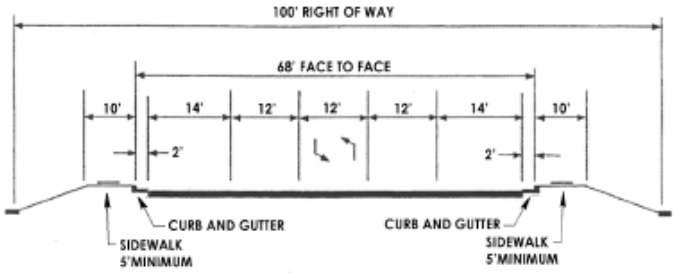
4-LANE MEDIAN DIVIDED TYPICAL SECTION

With Wide Outside Lanes



5-LANE TYPICAL SECTION

With Wide Outside Lanes



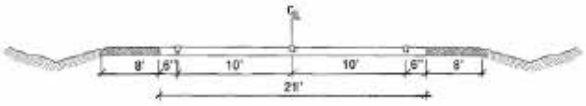
Paved Shoulder

A paved shoulder refers to the part of the highway that is adjacent to the regularly traveled portion of the highway and is on the same level as the highway. A wide paved shoulder refers to the pavement width of at least two feet that has been added to an existing roadway in order to accommodate bicycles more safely. At a minimum, a two-foot paved shoulder should be included in the construction of new highways and the upgrade of existing highways. The shoulder must be at least four-feet wide to be classified as a striped bike lane with a bicycle logo installed on the lane.

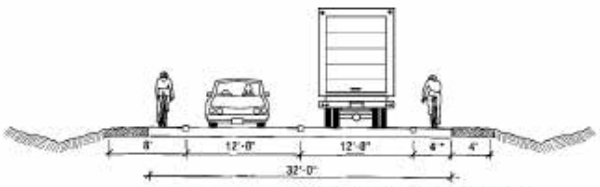
(Source: http://www.ncdot.org/transit/bicycle/projects/project_types/Wide_Paved_Shoulders.pdf)

WIDE PAVED SHOULDERS

Existing Roadway

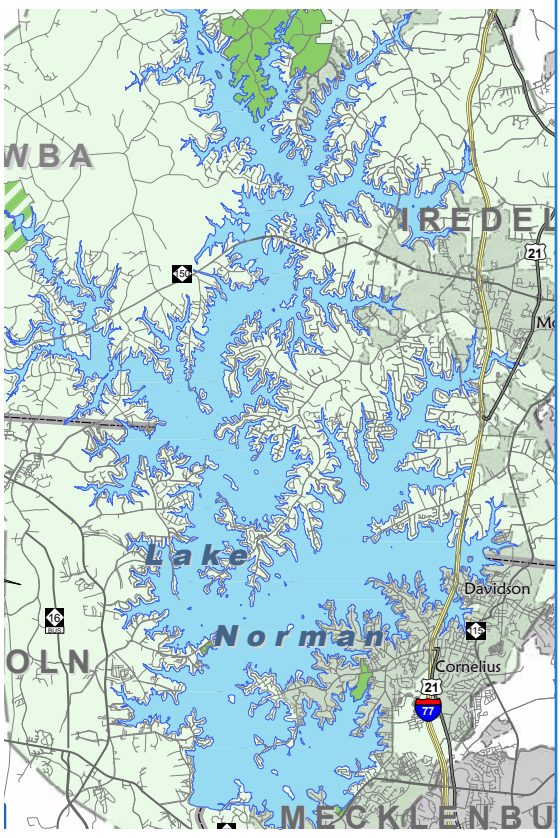


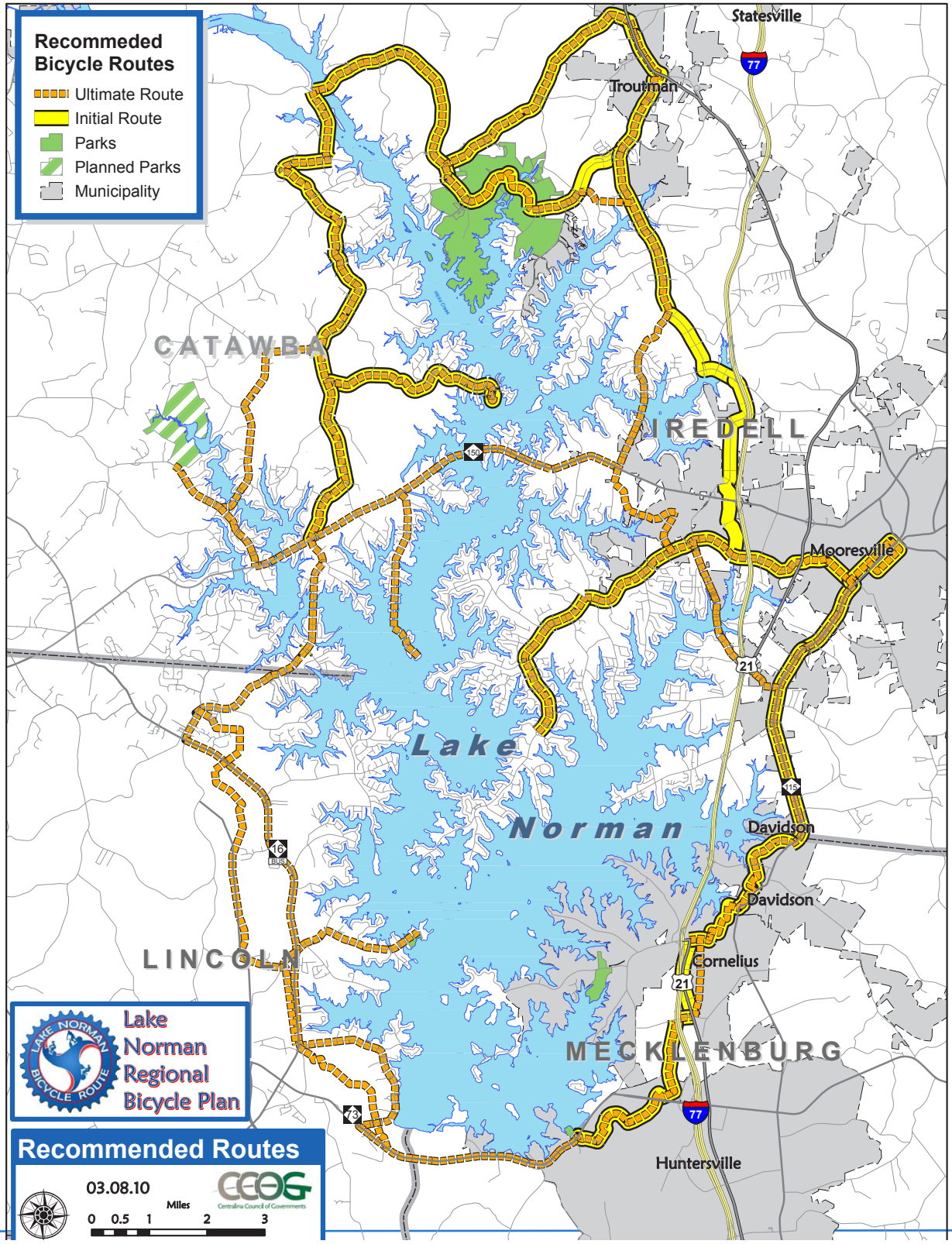
Roadway Retrofitted with 4-Ft Paved Shoulders

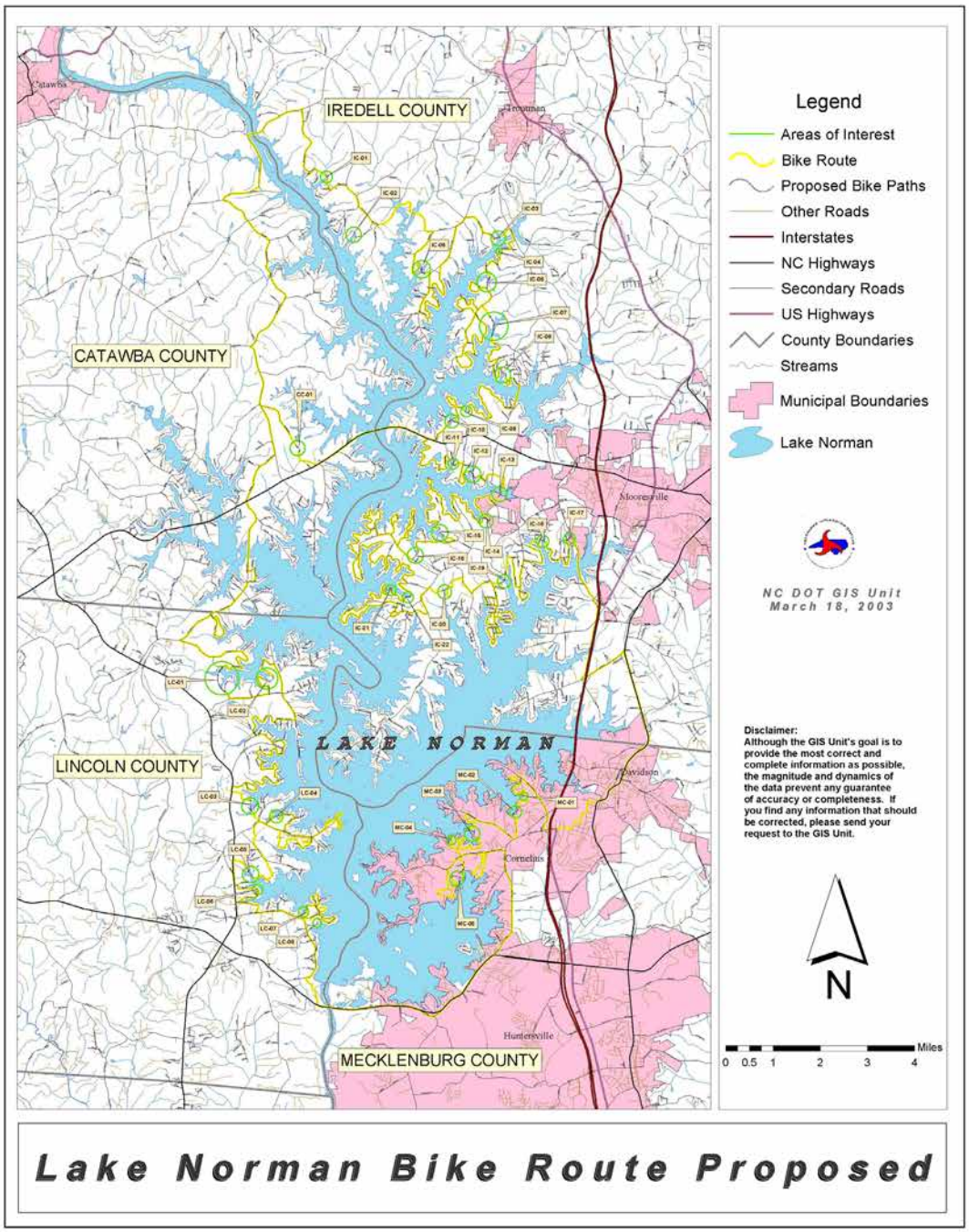


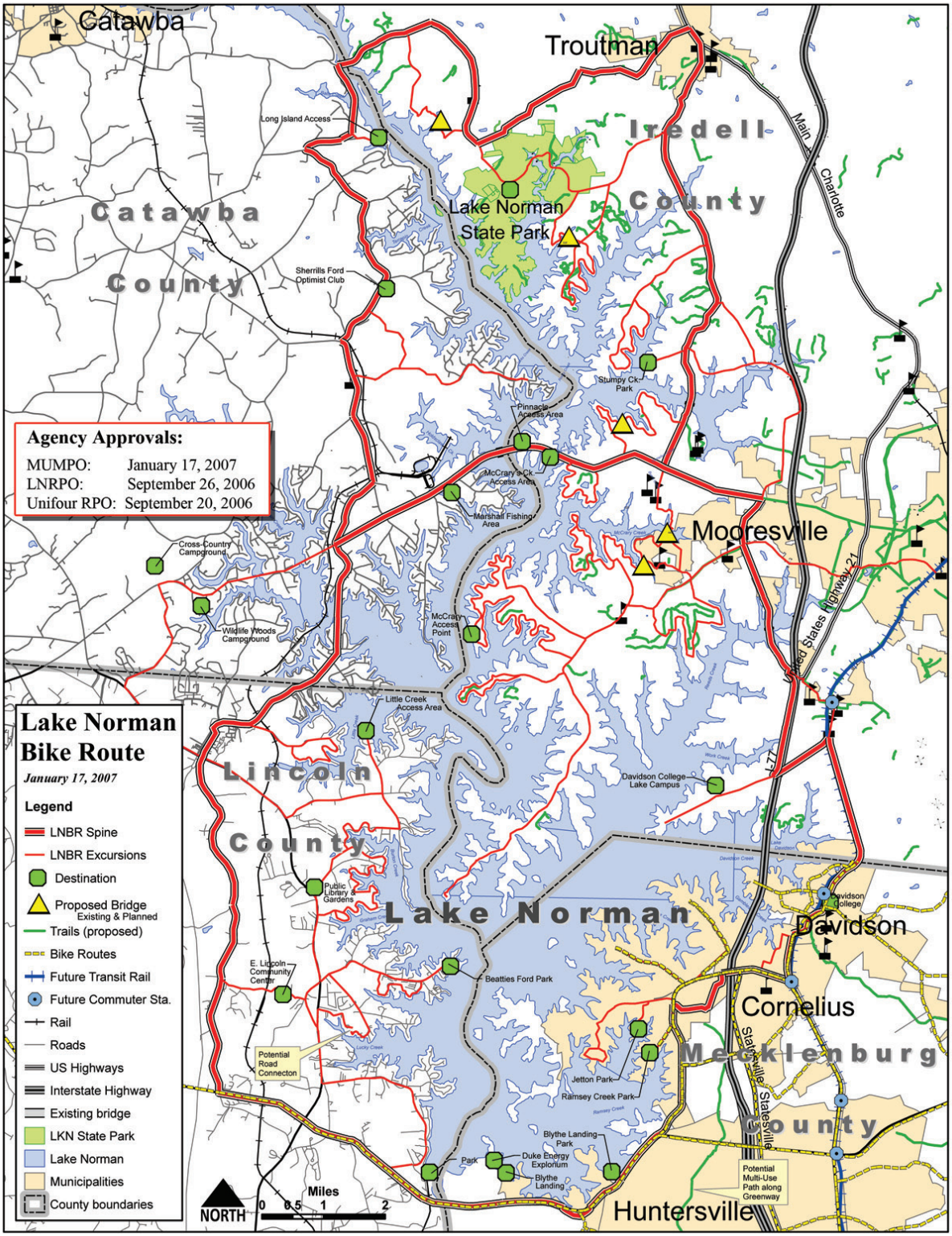
* If speeds are higher than 40 mph, shoulder widths greater than 4' are recommended.

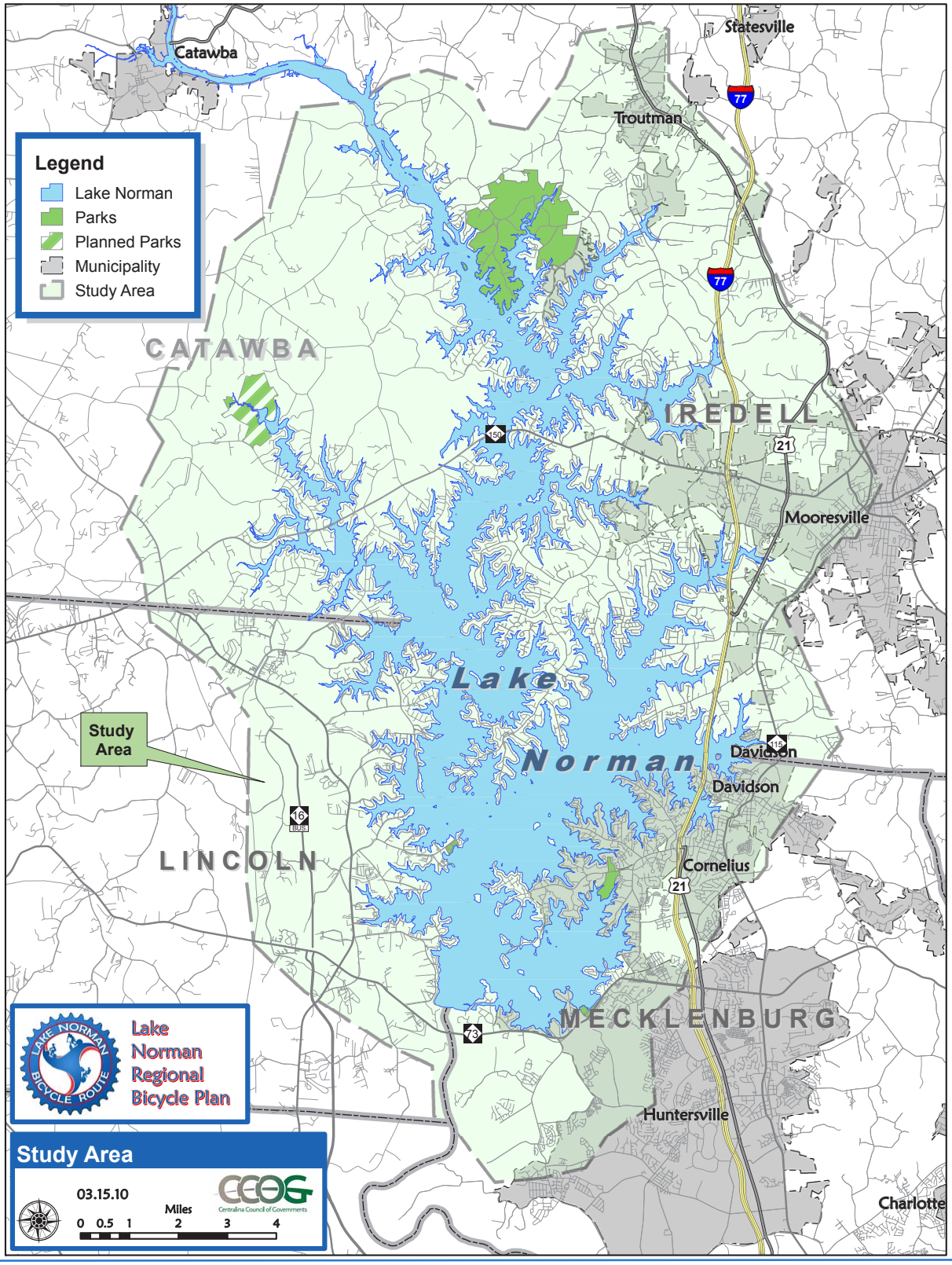
APPENDIX B
Maps

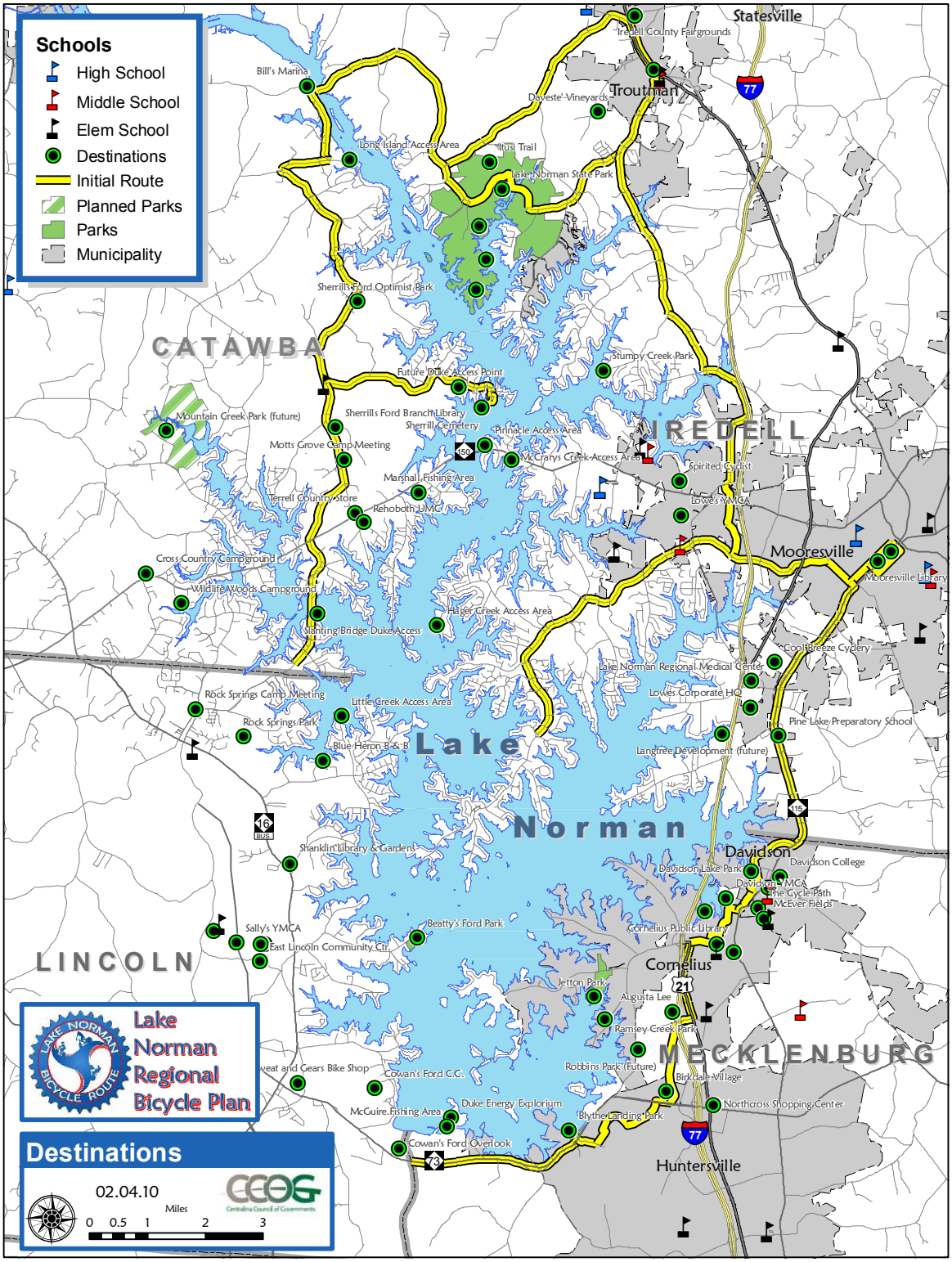


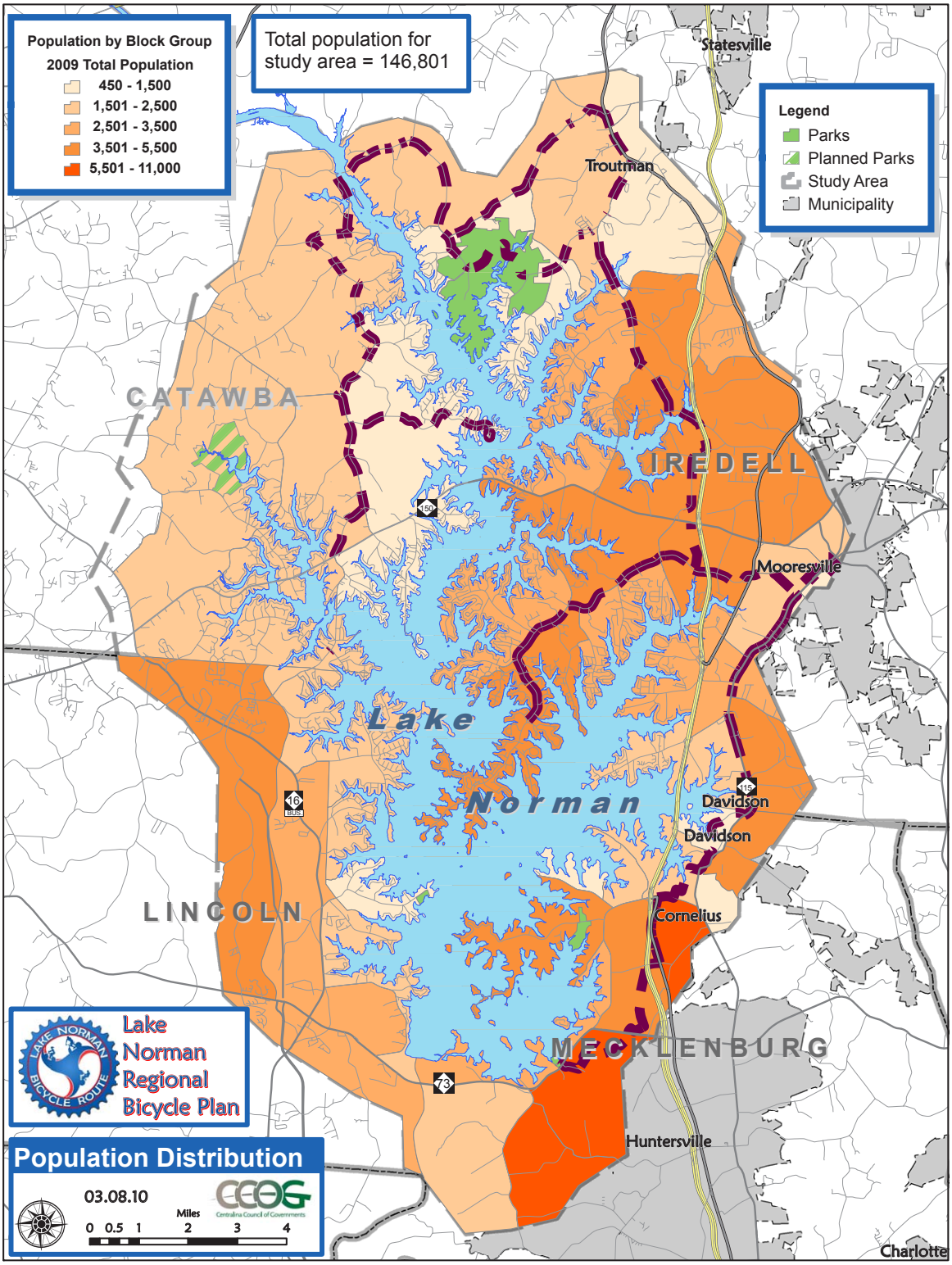

Recommeded Bicycle Routes
Ultimate Route
Initial Route
Parks
Planned Parks
Municipality
Statesville
Troutman
CATAWBA
IREDELL
Mooresville
Lake
Norman
Davidson
Davidson
LINCOLN
Cornelius
MECKLENBURG
Huntersville
Lake Norman Regional Bicycle Plan
Recommended Routes
03.08.10
Miles
0 0.5 1 2 3
CCOG
Centralina Council of Governments

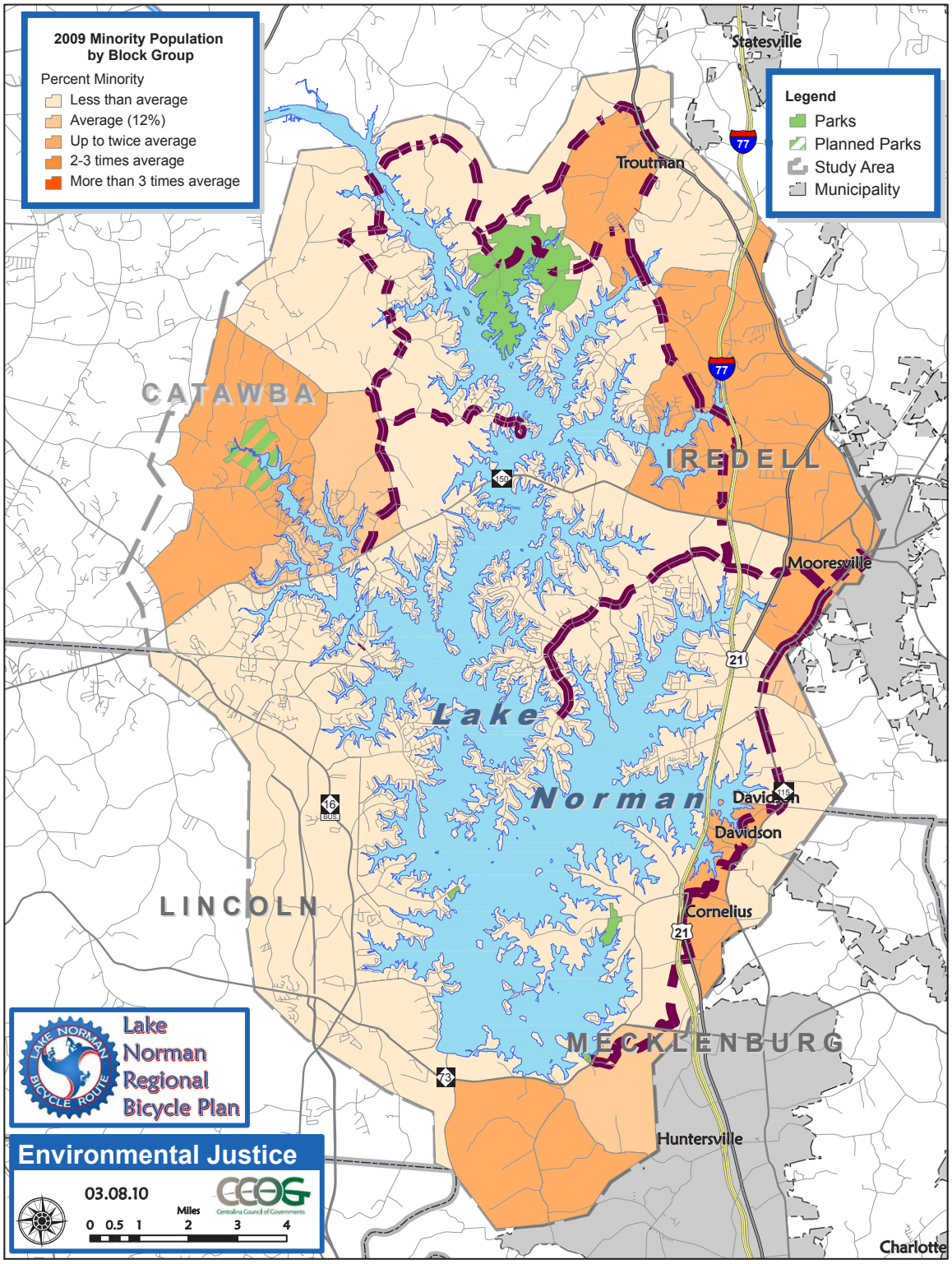

IREDELL COUNTY
CATAWBA COUNTY
LINCOLN COUNTY
MECKLENBURG COUNTY
LAKE NORMAN
Mooresville
Davidson
Cornelius
Huntersville
Legend
Areas of Interest
Bike Route
Proposed Bike Paths
Other Roads
Interstates
NC Highways
Secondary Roads
US Highways
County Boundaries
Streams
Municipal Boundaries
Lake Norman
NC DOT GIS Unit
March 18, 2003
Disclaimer:
Although the GIS Unit's goal is to provide the most correct and complete information as possible, the magnitude and dynamics of the data prevent any guarantee of accuracy or completeness. If you find any information that should be corrected, please send your request to the GIS Unit.
N
0 0.5 1 2 3 4 Miles
Lake Norman Bike Route Proposed

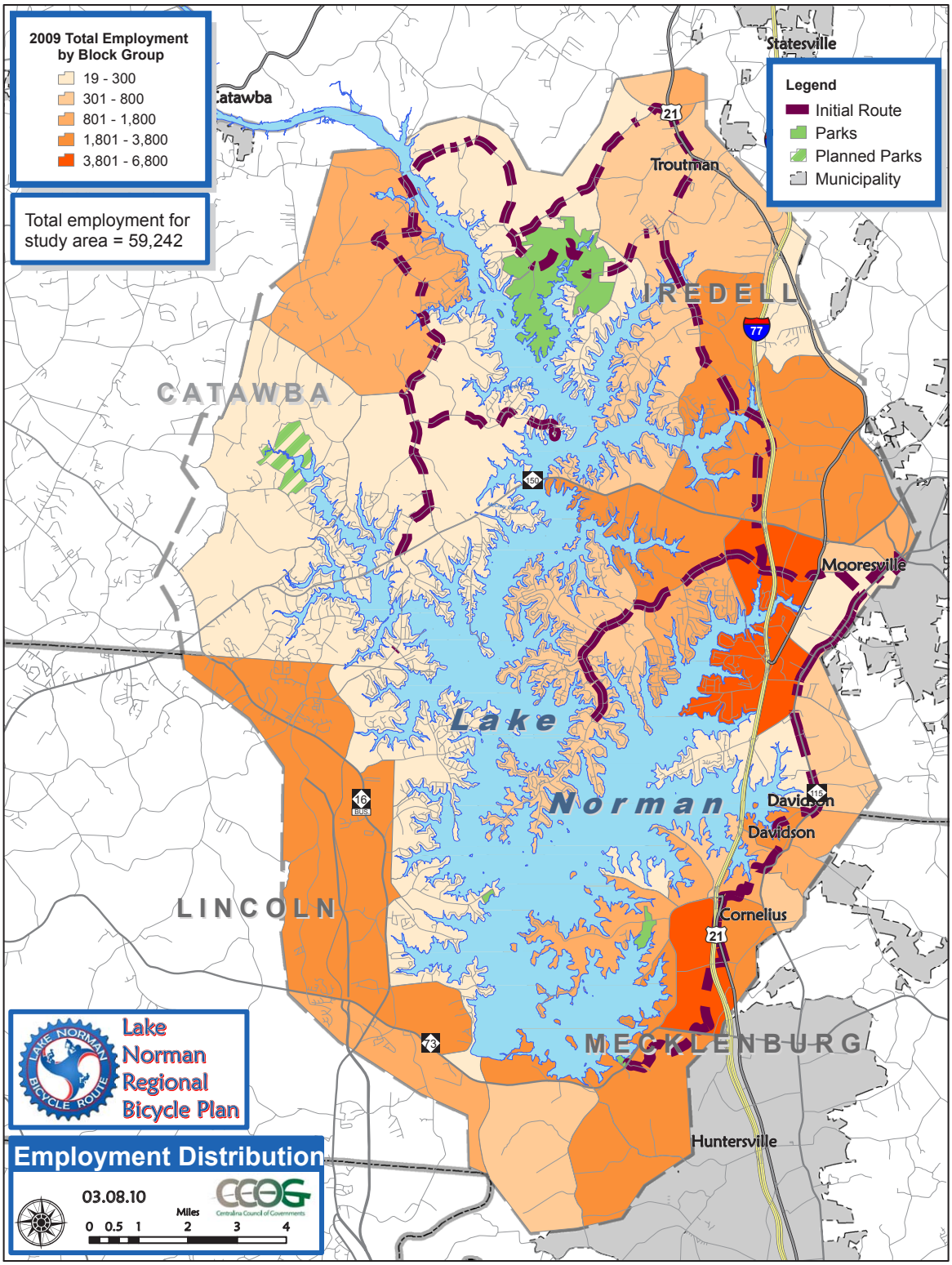

Catawba
Troutman
Iredell
County
Catawba
County
Lincoln
County
Lake Norman
Mecklenburg
County
Long Island Access
Lake Norman
State Park
Sherrills Ford
Optimist Club
Stumpy Ck
Park
Pinnacle
Access Area
McCrary Ck
Access Area
Marshall Fishing
Area
Mooresville
Cross-Country
Campground
Wildlife Woods
Campground
McCrary
Access
Point
Little Creek
Access Area
Davidson College
Lake Campus
Public
Library
Gardens
E. Lincoln
Community
Center
Beatties Ford Park
Potential
Road
Connecton
Jetton Park
Ramsey Creek Park
Blythe Landing
Park
Duke Energy
Explorium
Blythe
Landing
Potential
Multi-Use
Path along
Greenway
Huntersville
Cornelius
Davidson
Davidson
College
Main
Charlotte
United States Highway 21
Statesville
Statesville
77
Agency Approvals:
MUMPO: January 17, 2007
LNRPO: September 26, 2006
Unifour RPO: September 20, 2006
Lake Norman
Bike Route
January 17, 2007
Legend
LNBR Spine
LNBR Excursions
Destination
Proposed Bridge
Existing & Planned
Trails (proposed)
Bike Routes
Future Transit Rail
Future Commuter Sta.
Rail
Roads
US Highways
Interstate Highway
Existing bridge
LKN State Park
Lake Norman
Municipalities
County boundaries
NORTH
0 0.5 1 2
Miles

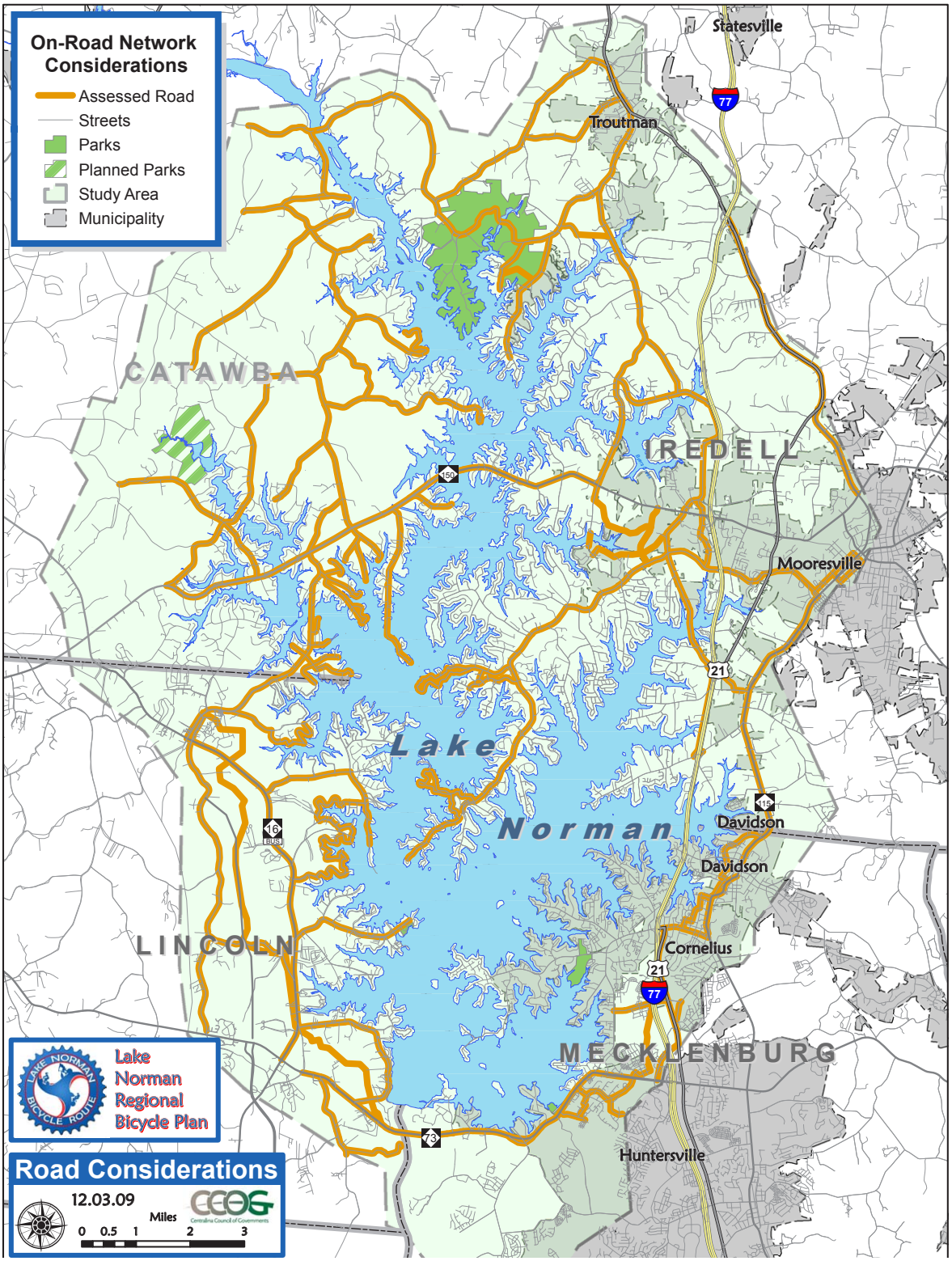

Legend
Lake Norman
Parks
Planned Parks
Municipality
Study Area
Catawba
Statesville
Troutman
77
CATAWBA
IREDELL
150
21
Mooresville
Lake
Norman
Study Area
Davidson
16
BUS
LINCOLN
Cornelius
21
MECKLENBURG
73
Huntersville
Charlotte
Lake Norman Regional Bicycle Plan
Study Area
03.15.10
Miles
0 0.5 1 2 3 4
CCOG
Centralina Council of Governments

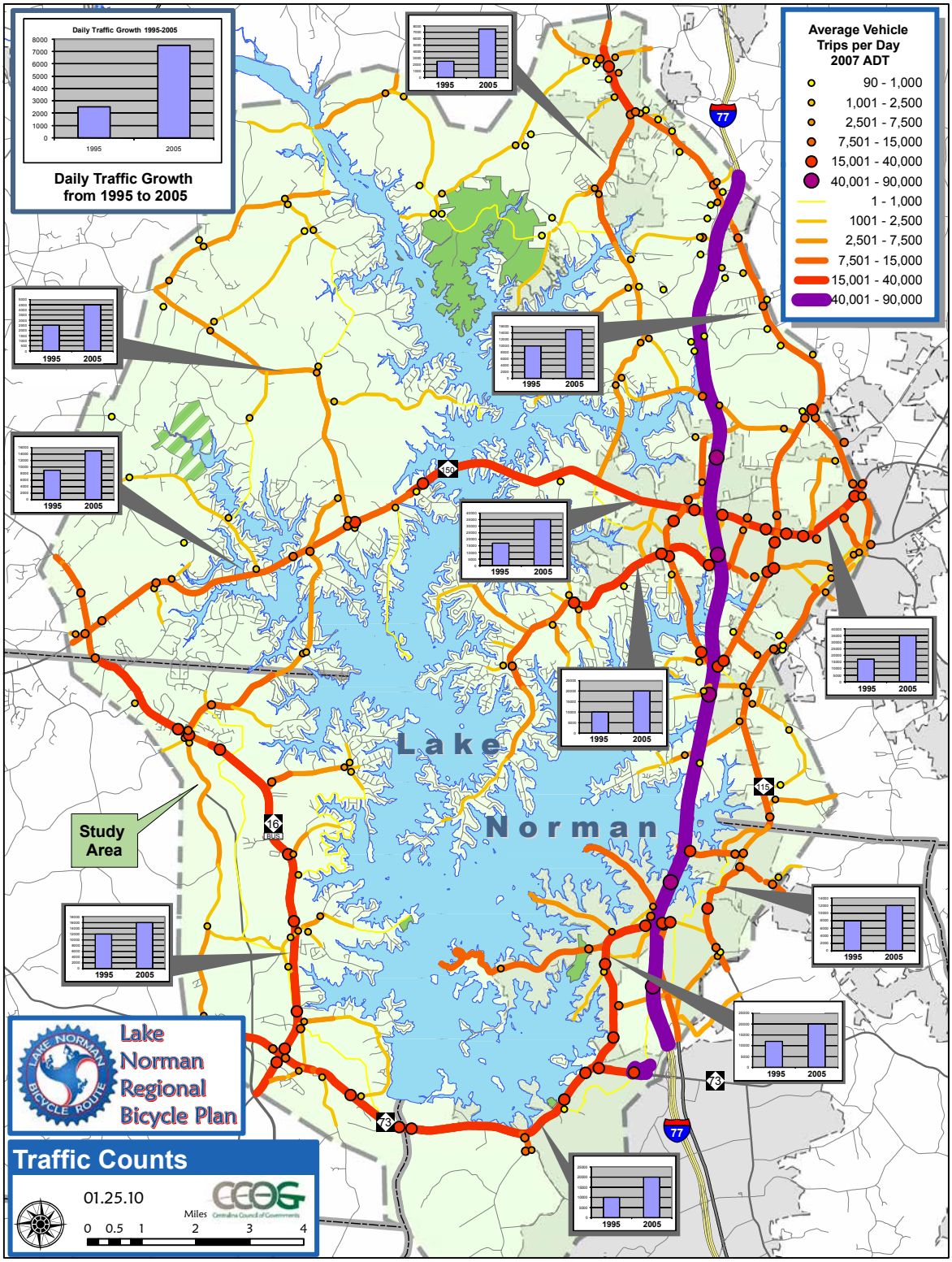

Schools
High School
Middle School
Elem School
Destinations
Initial Route
Planned Parks
Parks
Municipality
Statesville
Iredell County Fairgrounds
Troutman
Bill's Marina
Daveste Vineyards
Long Island Access Area
Ilusi Trail
Lake Norman State Park
Sherrills Ford Optimist Park
CATAWBA
Stumpy Creek Park
Future Duke Access Point
Mountain Creek Park (future)
Sherrills Ford Branch Library
Sherrill Cemetery
Pinnacle Access Area
IREDELL
Motts Grove Camp Meeting
McCrarys Creek Access Area
Spirited Cyclist
Marshall Fishing Area
Terrell Country Store
Rehoboth UMC
Lowes YMCA
Mooresville
Cross Country Campground
Mooresville Library
Wildlife Woods Campground
Hager Creek Access Area
Stanting Bridge Duke Access
Cool Breeze Cyclery
Lake Norman Regional Medical Center
Rock Springs Camp Meeting
Little Creek Access Area
Lowes Corporate HQ
Rock Springs Park
Pine Lake Preparatory School
Blue Heron B & B
Lake
Langtree Development (future)
Norman
Shanklin Library & Garden
Davidson
Davidson College
Davidson Lake Park
Davidson YMCA
The Cycle Path
McEver Fields
Sally's YMCA
Beatty's Ford Park
Cornelius Public Library
East Lincoln Community Ctr.
LINCOLN
Cornelius
Jetton Park
Augusta Lee
Ramsey Creek Park
MECKLENBURG
Cowan's Ford C.C.
Robbins Park (future)
Birkdale Village
Duke Energy Explorium
Northcross Shopping Center
McGuire Fishing Area
Blythe Landing Park
Cowan's Ford Overlook
Huntersville
Lake Norman Regional Bicycle Plan
Destinations
02.04.10
Miles
0 0.5 1 2 3

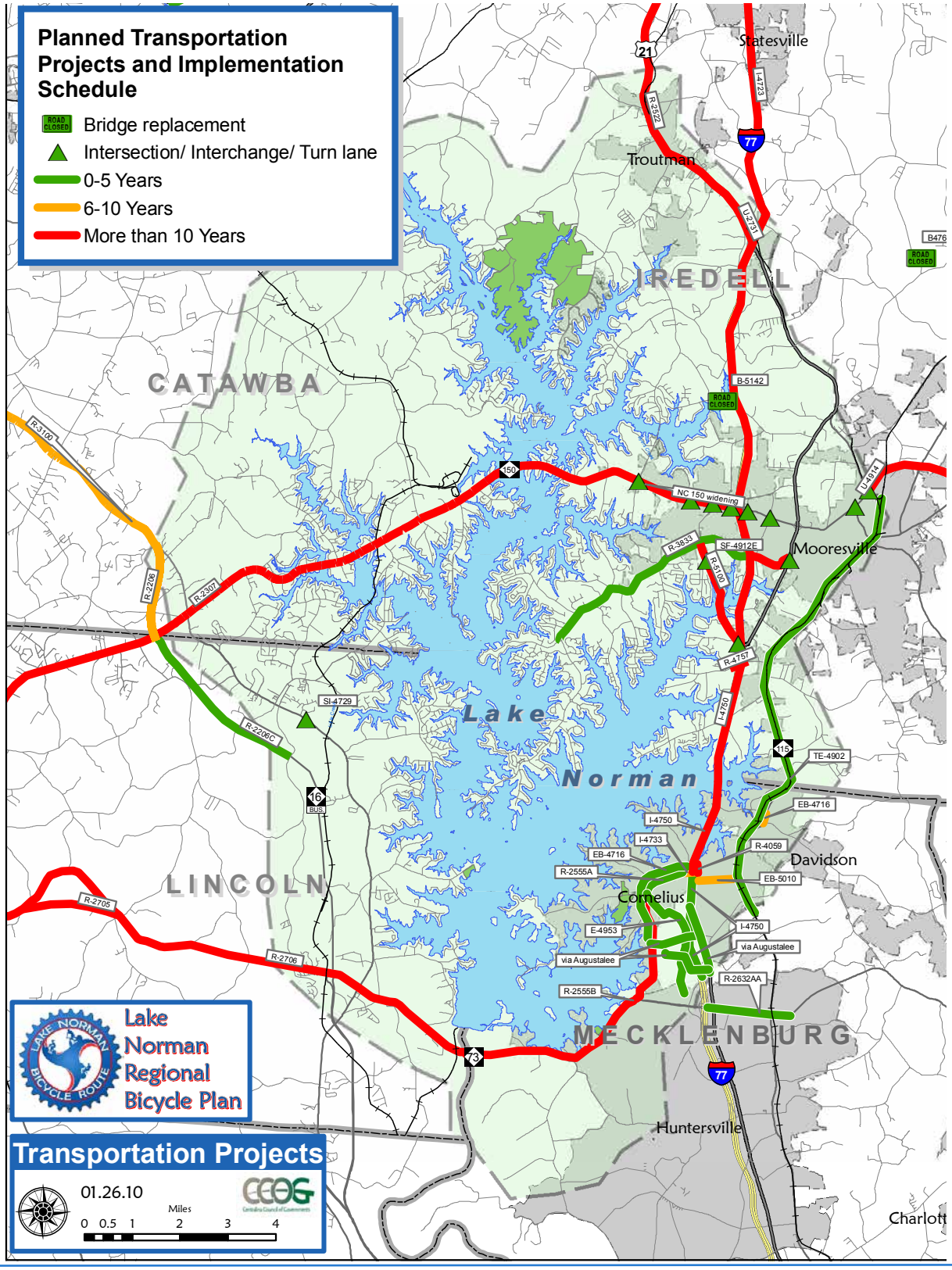

Population by Block Group
2009 Total Population
450 - 1,500
1,501 - 2,500
2,501 - 3,500
3,501 - 5,500
5,501 - 11,000
Total population for study area = 146,801
Legend
Parks
Planned Parks
Study Area
Municipality
Statesville
Troutman
CATAWBA
IREDELL
Mooresville
Lake
Norman
Davidson
Davidson
LINCOLN
Cornelius
MECKLENBURG
Huntersville
Charlotte
Lake Norman Regional Bicycle Plan
Population Distribution
03.08.10
Miles
0 0.5 1 2 3 4

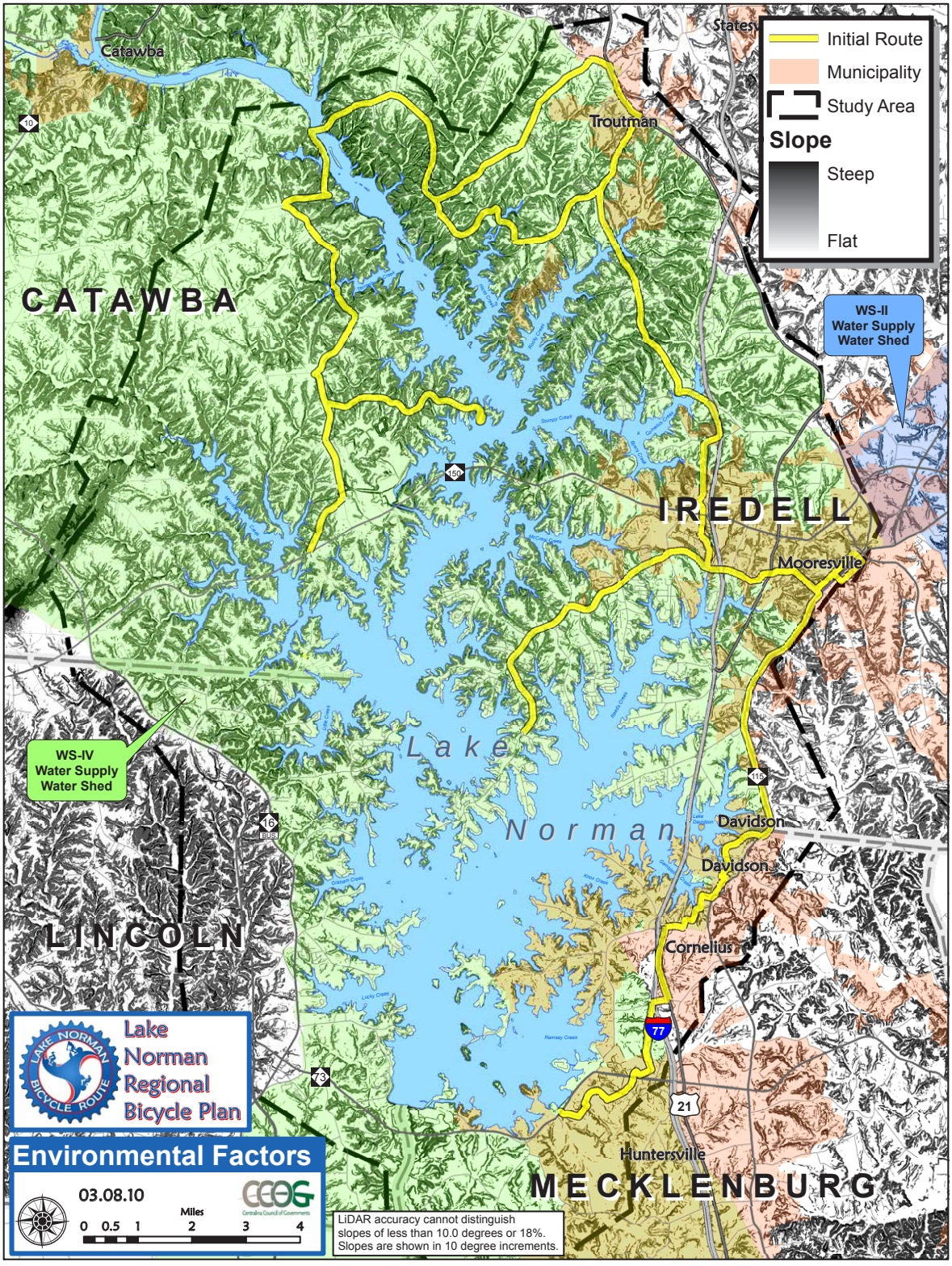

2009 Minority Population by Block Group
Percent Minority
Less than average
Average (12%)
Up to twice average
2-3 times average
More than 3 times average
Legend
Parks
Planned Parks
Study Area
Municipality
Statesville
Troutman
77
CATAWBA
IREDELL
Mooresville
21
Lake Norman
16
BUS
Davidson
Davidson
LINCOLN
Cornelius
21
MECKLENBURG
73
Huntersville
Charlotte
Lake Norman Regional Bicycle Plan
Environmental Justice
03.08.10
Miles
0 0.5 1 2 3 4
Centralina Council of Governments

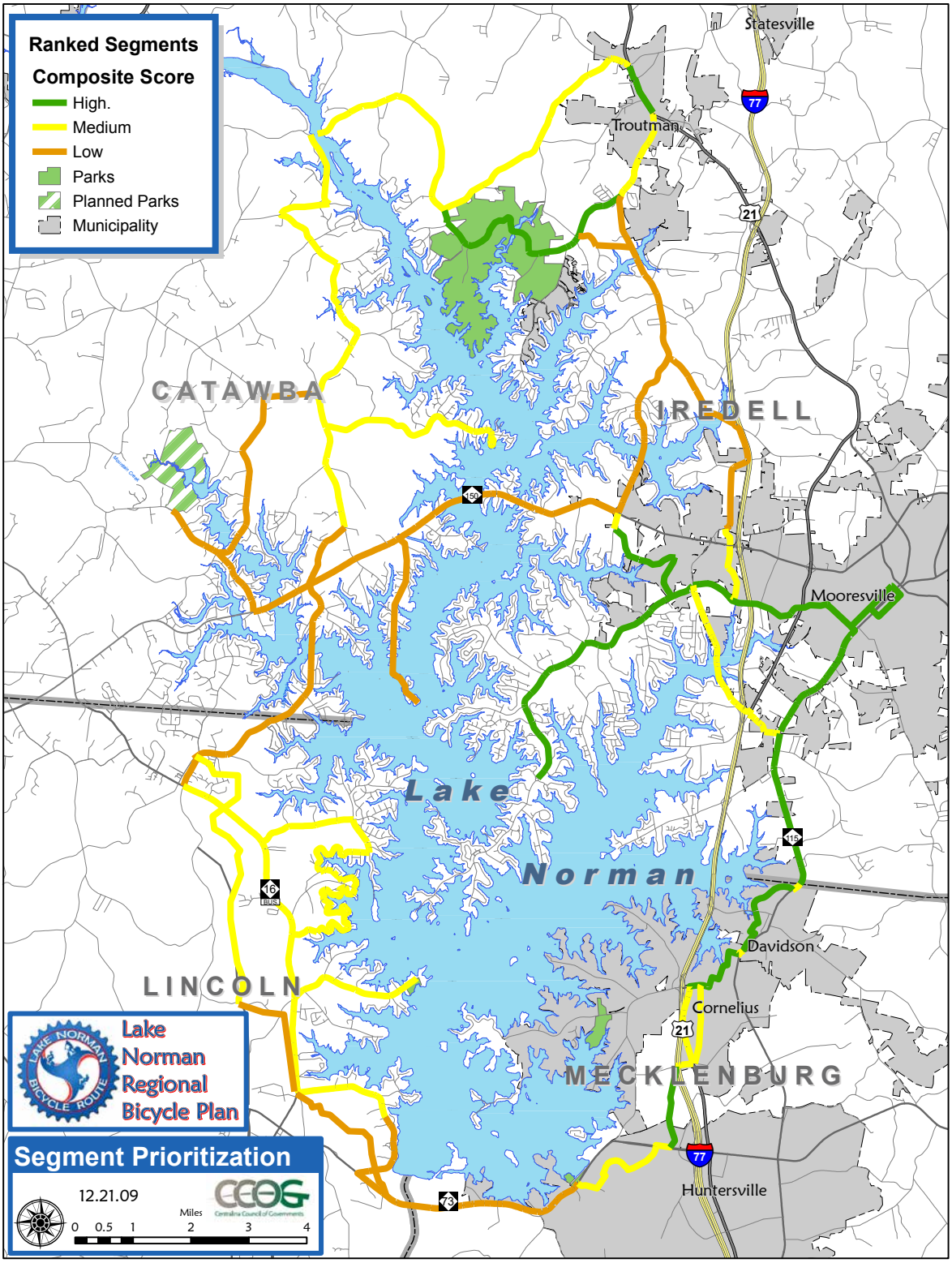

2009 Total Employment by Block Group
19 - 300
301 - 800
801 - 1,800
1,801 - 3,800
3,801 - 6,800
Total employment for study area = 59,242
Legend
Initial Route
Parks
Planned Parks
Municipality
Statesville
Troutman
IREDELL
CATAWBA
Mooresville
Lake
Norman
Davidson
LINCOLN
Cornelius
MECKLENBURG
Huntersville
Lake Norman Regional Bicycle Plan
Employment Distribution
03.08.10
Miles
0 0.5 1 2 3 4

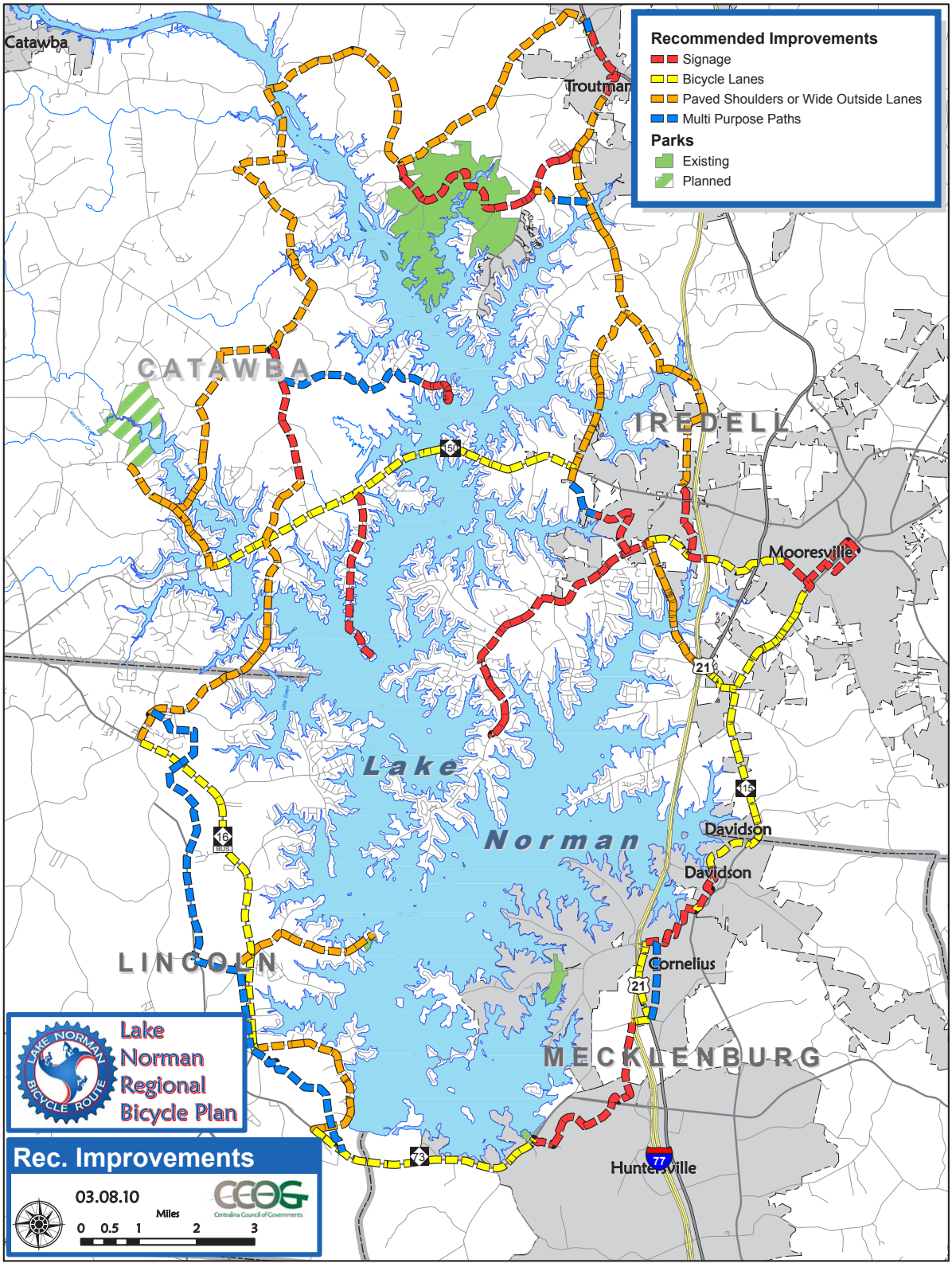

On-Road Network Considerations
Assessed Road
Streets
Parks
Planned Parks
Study Area
Municipality
Statesville
Troutman
77
CATAWBA
IREDELL
160
Mooresville
21
Lake
Norman
16
BUS
16
Davidson
Davidson
LINCOLN
Cornelius
21
77
MECKLENBURG
73
Huntersville
Lake Norman Regional Bicycle Plan
Road Considerations
12.03.09
Miles
0 0.5 1 2 3

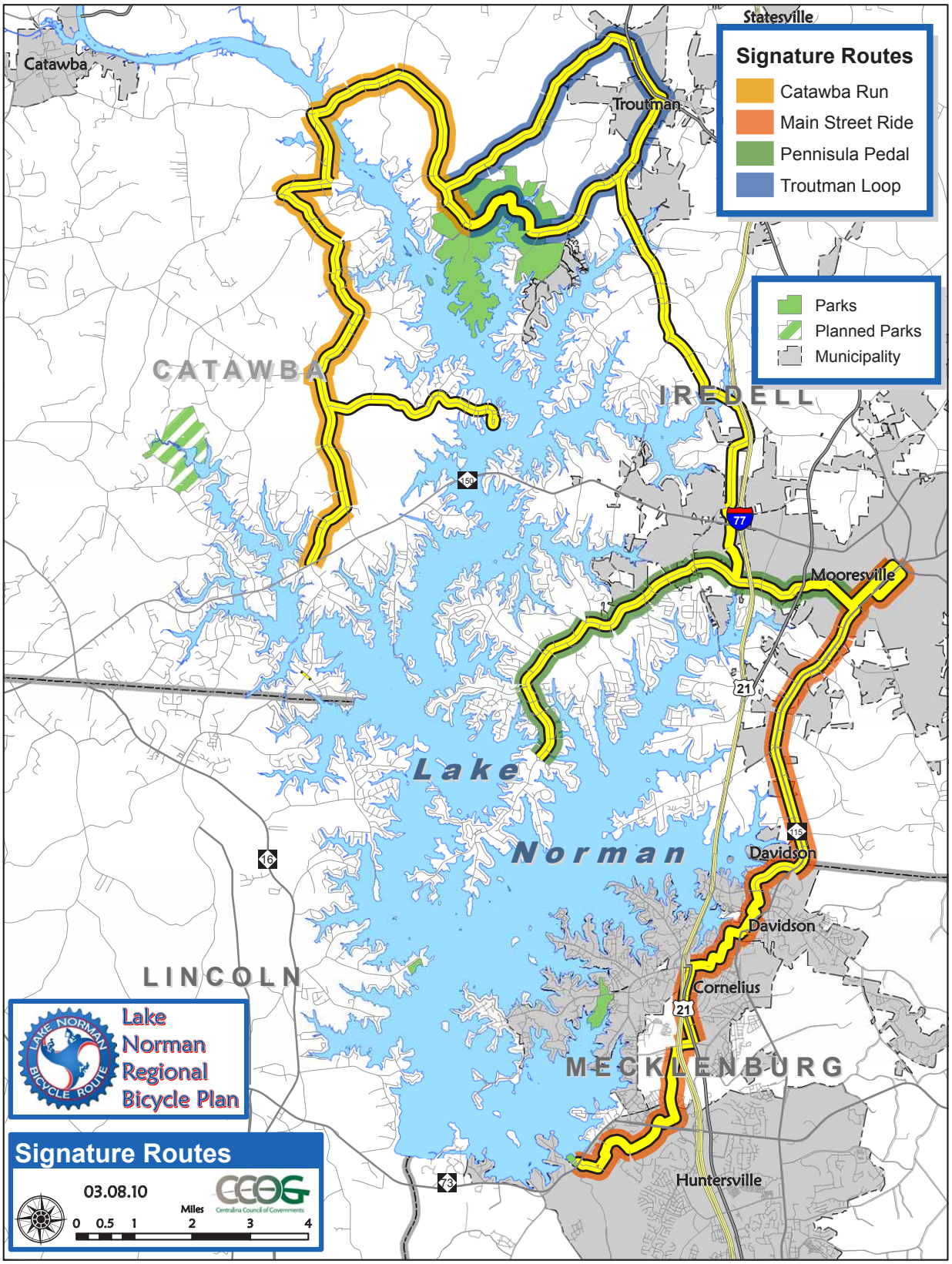

Daily Traffic Growth 1995-2005
Daily Traffic Growth from 1995 to 2005
Average Vehicle Trips per Day 2007 ADT
90 - 1,000
1,001 - 2,500
2,501 - 7,500
7,501 - 15,000
15,001 - 40,000
40,001 - 90,000
1 - 1,000
1001 - 2,500
2,501 - 7,500
7,501 - 15,000
15,001 - 40,000
40,001 - 90,000
Lake
Norman
Study Area
Lake Norman Regional Bicycle Plan
Traffic Counts
01.25.10
Miles
0 0.5 1 2 3 4
1995
2005


Planned Transportation Projects and Implementation Schedule
Bridge replacement
Intersection/ Interchange/ Turn lane
0-5 Years
6-10 Years
More than 10 Years
Statesville
Troutman
IREDELL
CATAWBA
LINCOLN
MECKLENBURG
Lake Norman
Mooresville
Davidson
Cornelius
Huntersville
Charlotte
NC 150 widening
Lake Norman Regional Bicycle Plan
Transportation Projects
01.26.10
Miles
0 0.5 1 2 3 4

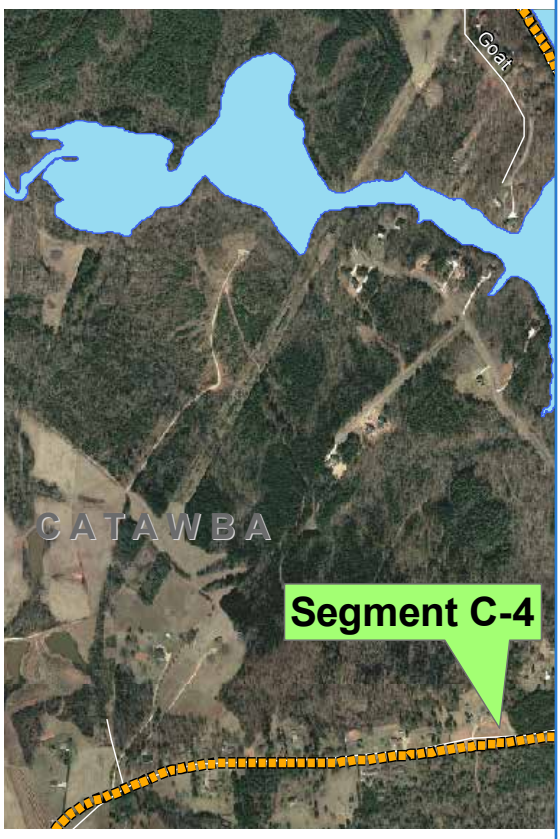

Initial Route
Municipality
Study Area
Slope
Steep
Flat
Statesville
Catawba
Troutman
CATAWBA
WS-II
Water Supply
Water Shed
IREDELL
Mooresville
WS-IV
Water Supply
Water Shed
Lake
Norman
Davidson
Davidson
LINCOLN
Cornelius
Huntersville
MECKLENBURG
Lake
Norman
Regional
Bicycle Plan
Environmental Factors
03.08.10
Miles
0 0.5 1 2 3 4
LiDAR accuracy cannot distinguish
slopes of less than 10.0 degrees or 18%.
Slopes are shown in 10 degree increments.

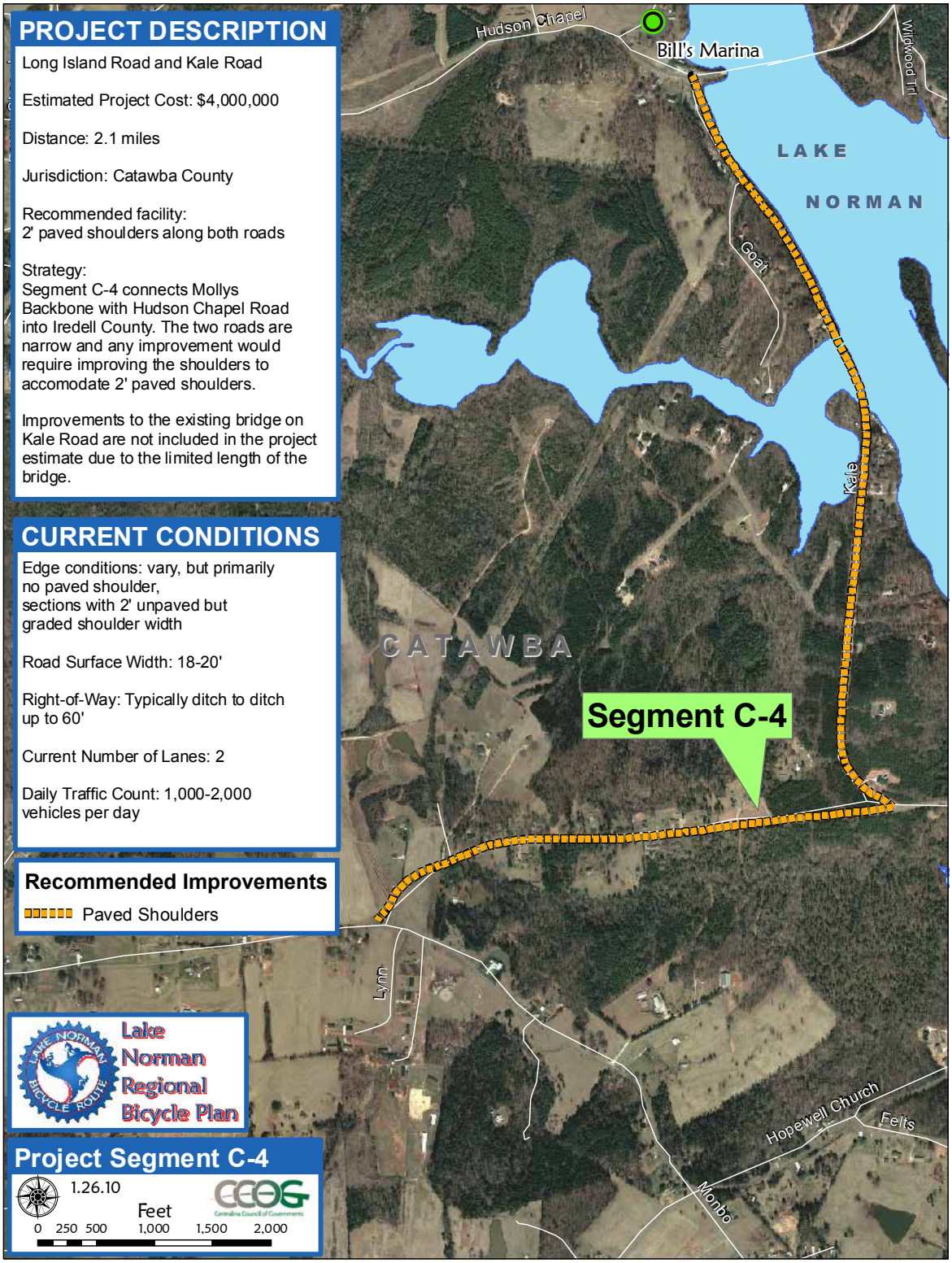

Ranked Segments
Composite Score
High.
Medium
Low
Parks
Planned Parks
Municipality
Statesville
Troutman
77
21
CATAWBA
IREDELL
150
Mooresville
Lake
Norman
16
BUS
115
Davidson
LINCOLN
Cornelius
21
MECKLENBURG
77
Huntersville
73
Lake Norman Regional Bicycle Plan
Segment Prioritization
12.21.09
Miles
0 0.5 1 2 3 4

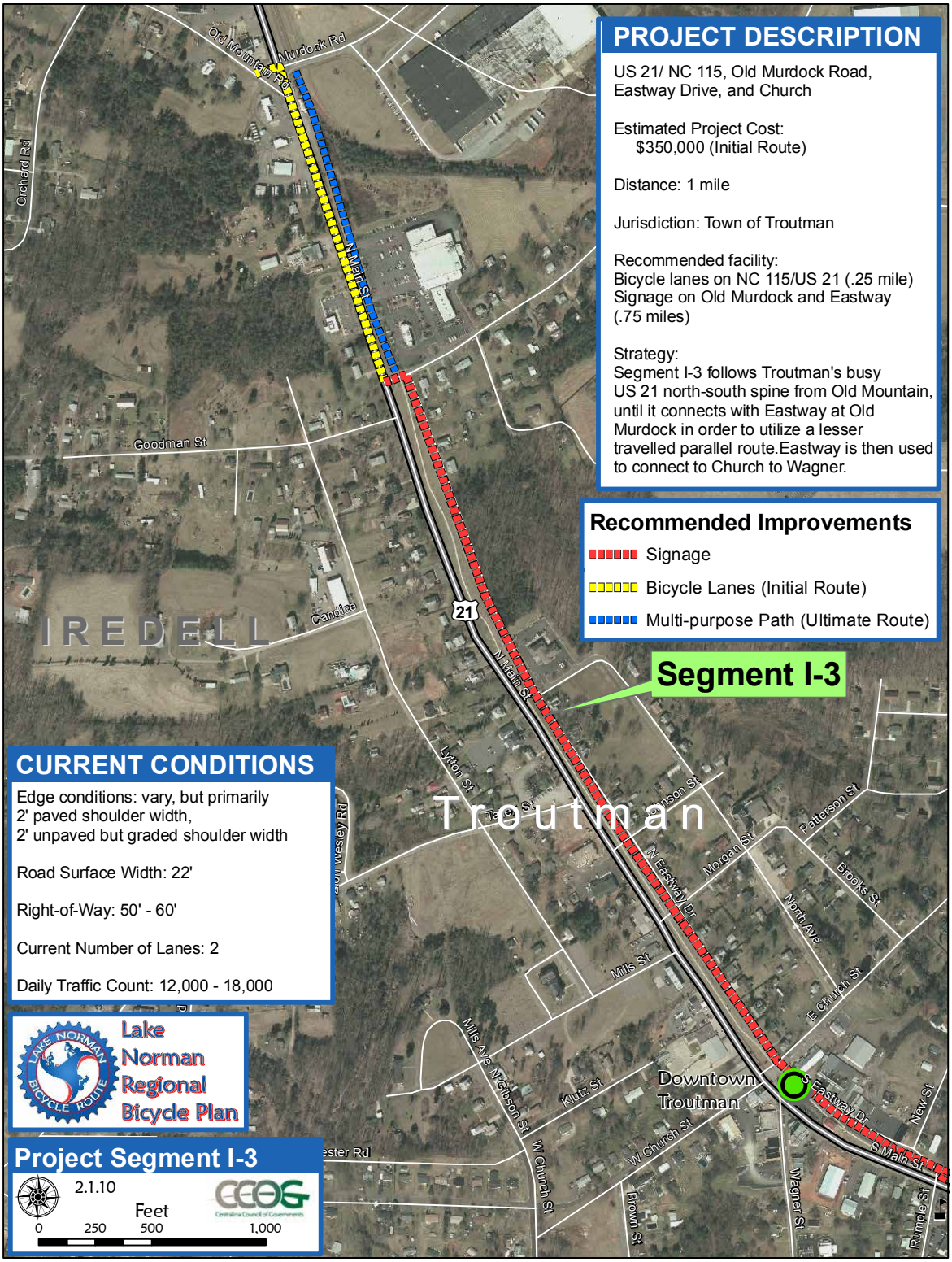

Recommended Improvements
Signage
Bicycle Lanes
Paved Shoulders or Wide Outside Lanes
Multi Purpose Paths
Parks
Existing
Planned
Catawba
Troutman
CATAWBA
IREDELL
Mooresville
Lake
Norman
Davidson
Davidson
LINCOLN
Cornelius
MECKLENBURG
Huntersville
Lake Norman Regional Bicycle Plan
Rec. Improvements
03.08.10
Miles
0 0.5 1 2 3
CCOG
Centralina Council of Governments

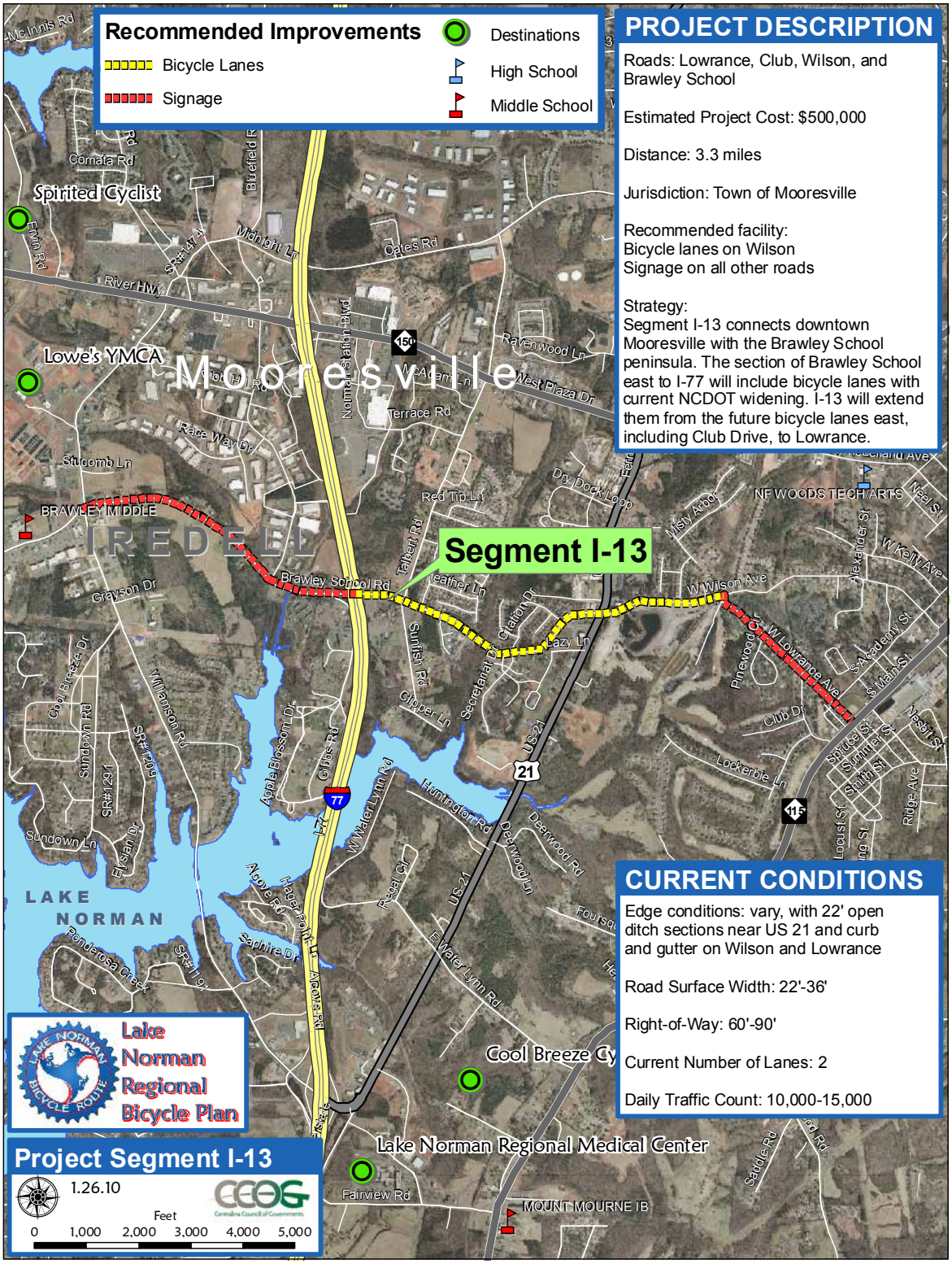

Statesville
Catawba
Troutman
Signature Routes
Catawba Run
Main Street Ride
Pennisula Pedal
Troutman Loop
Parks
Planned Parks
Municipality
CATAWBA
IREDELL
150
77
Mooresville
21
Lake
Norman
16
115
Davidson
Davidson
LINCOLN
Cornelius
21
MECKLENBURG
Huntersville
73
Lake Norman Regional Bicycle Plan
Signature Routes
03.08.10
Miles
0 0.5 1 2 3 4

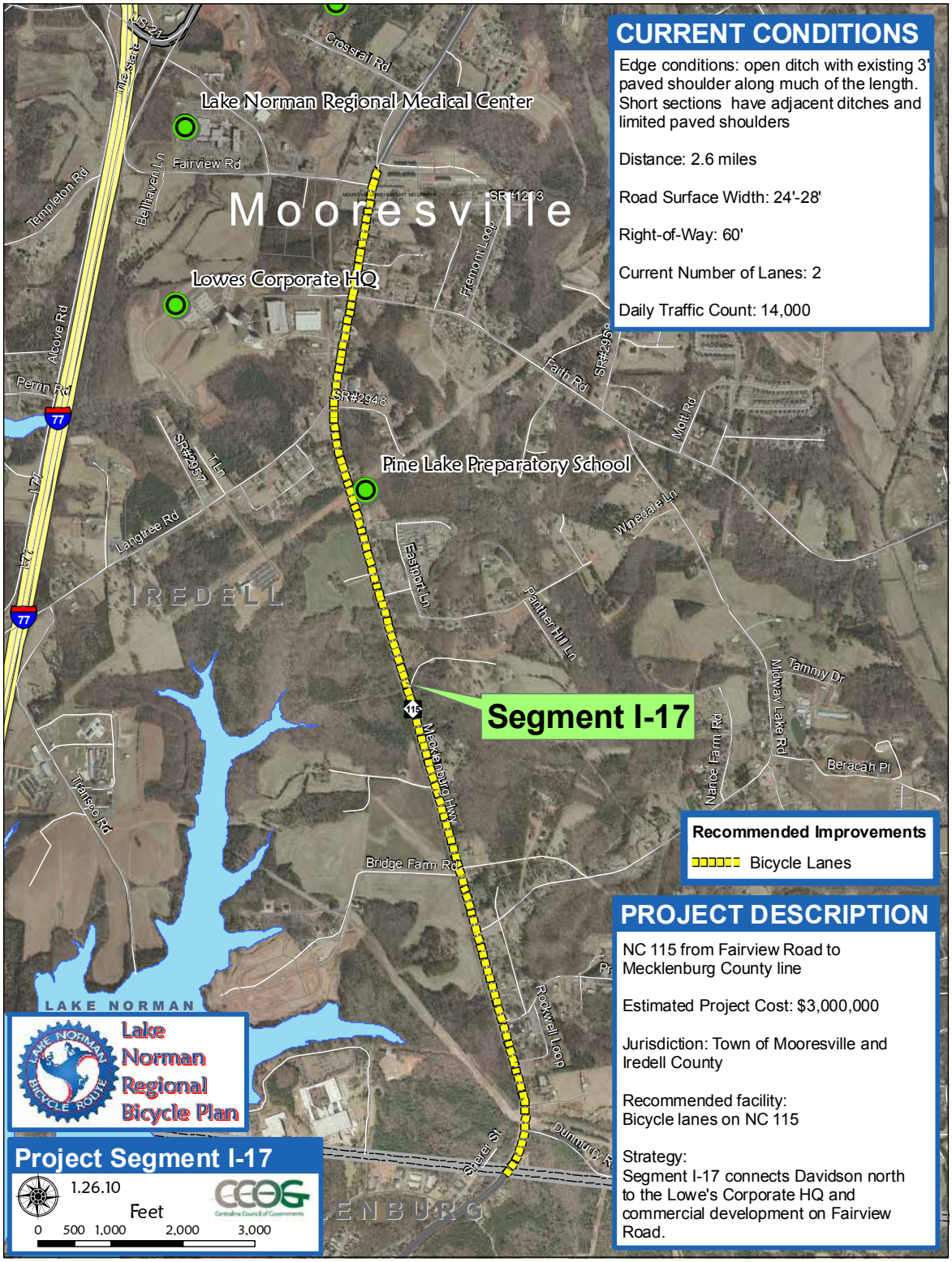
APPENDIX C

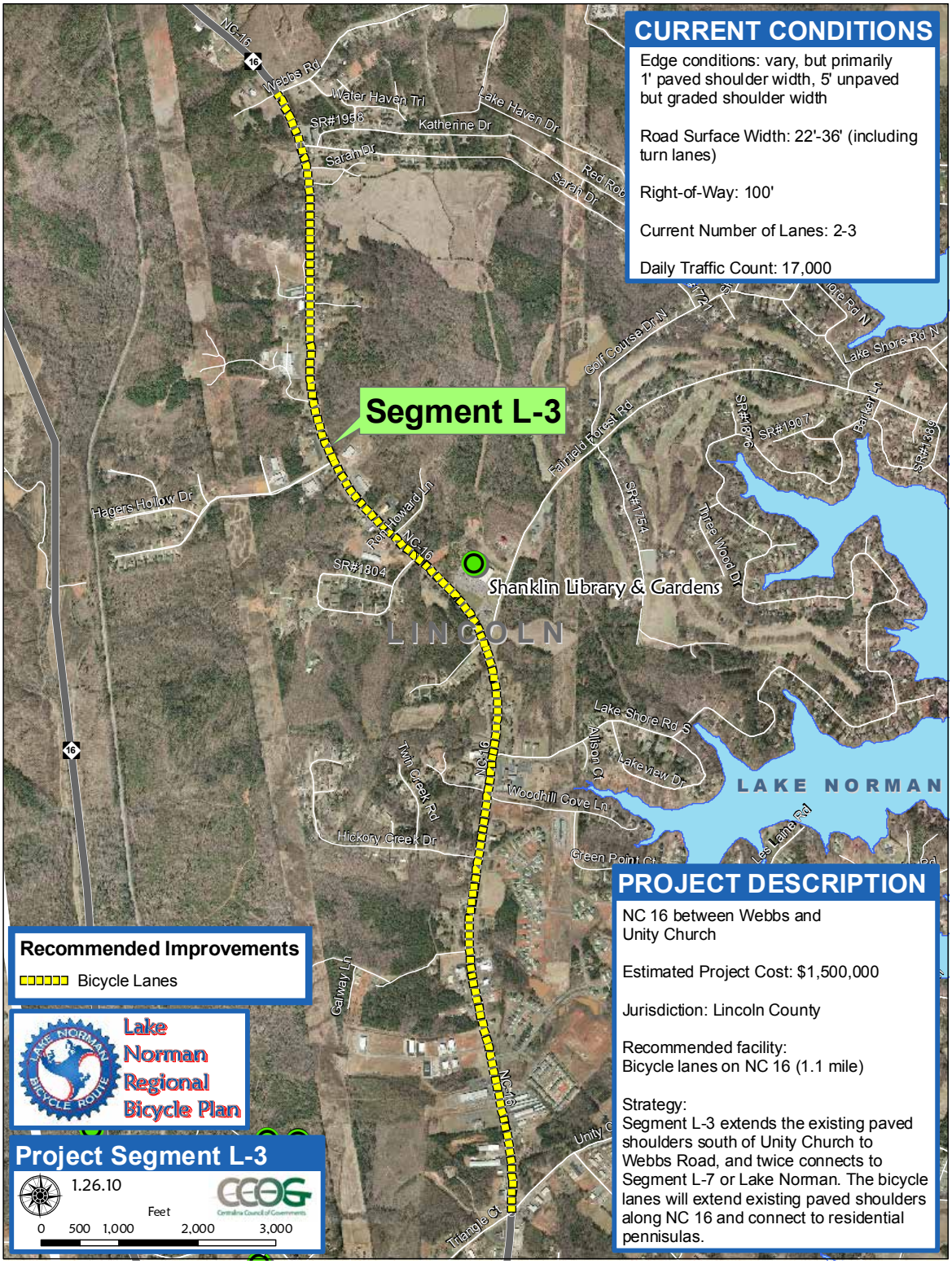


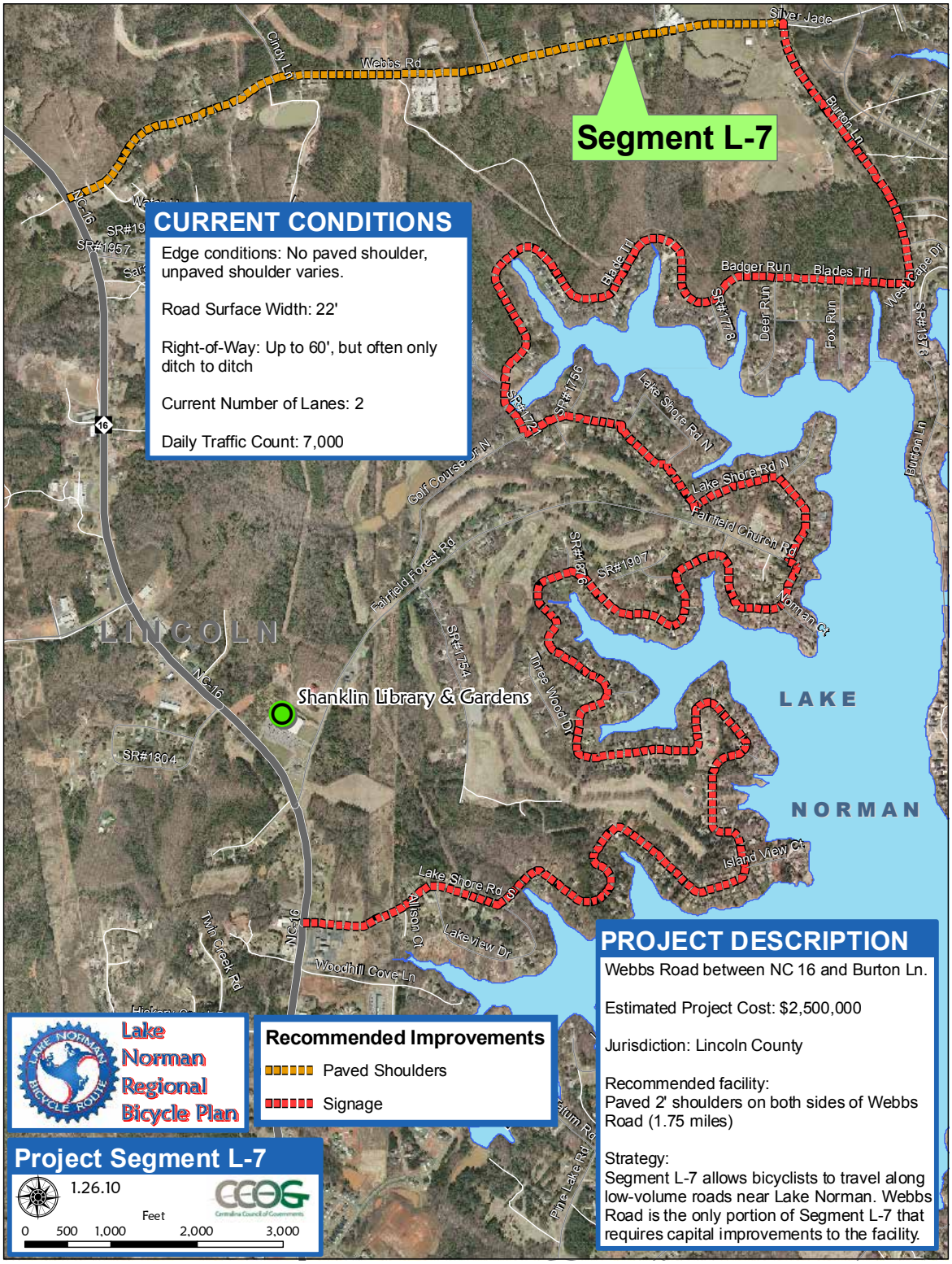

PROJECT DESCRIPTION
Long Island Road and Kale Road
Estimated Project Cost: $4,000,000
Distance: 2.1 miles
Jurisdiction: Catawba County
Recommended facility:
2' paved shoulders along both roads
Strategy:
Segment C-4 connects Mollys Backbone with Hudson Chapel Road into Iredell County. The two roads are narrow and any improvement would require improving the shoulders to accomodate 2' paved shoulders.
Improvements to the existing bridge on Kale Road are not included in the project estimate due to the limited length of the bridge.
CURRENT CONDITIONS
Edge conditions: vary, but primarily no paved shoulder, sections with 2' unpaved but graded shoulder width
Road Surface Width: 18-20'
Right-of-Way: Typically ditch to ditch up to 60'
Current Number of Lanes: 2
Daily Traffic Count: 1,000-2,000 vehicles per day
Recommended Improvements
Paved Shoulders
Lake Norman Regional Bicycle Plan
Project Segment C-4
1.26.10
Feet
0 250 500 1,000 1,500 2,000
Hudson Chapel
Bill's Marina
Wildwood Trl
LAKE
NORMAN
Goat
Kale
CATAWBA
Segment C-4
Lynn
Hopewell Church
Felts
Monbo


PROJECT DESCRIPTION
US 21/ NC 115, Old Murdock Road, Eastway Drive, and Church
Estimated Project Cost:
$350,000 (Initial Route)
Distance: 1 mile
Jurisdiction: Town of Troutman
Recommended facility:
Bicycle lanes on NC 115/US 21 (.25 mile)
Signage on Old Murdock and Eastway (.75 miles)
Strategy:
Segment I-3 follows Troutman's busy US 21 north-south spine from Old Mountain, until it connects with Eastway at Old Murdock in order to utilize a lesser travelled parallel route.Eastway is then used to connect to Church to Wagner.
Recommended Improvements
Signage
Bicycle Lanes (Initial Route)
Multi-purpose Path (Ultimate Route)
Segment I-3
CURRENT CONDITIONS
Edge conditions: vary, but primarily
2' paved shoulder width,
2' unpaved but graded shoulder width
Road Surface Width: 22'
Right-of-Way: 50' - 60'
Current Number of Lanes: 2
Daily Traffic Count: 12,000 - 18,000
Lake Norman Regional Bicycle Plan
Project Segment I-3
2.1.10
Feet
0 250 500 1,000
IREDELL
Troutman
Downtown Troutman
Murdock Rd
Old Mountain Rd
Orchard Rd
N Main St
Goodman St
Candice
21
Lyton St
Mills St
Kluz St
W Church St
E Church St
N Eastway Dr
S Eastway Dr
S Main St
Morgan St
Patterson St
Brooks St
North Ave
New St
Wagner St
Brown St
Rumple St
Mills Ave
N Gibson St

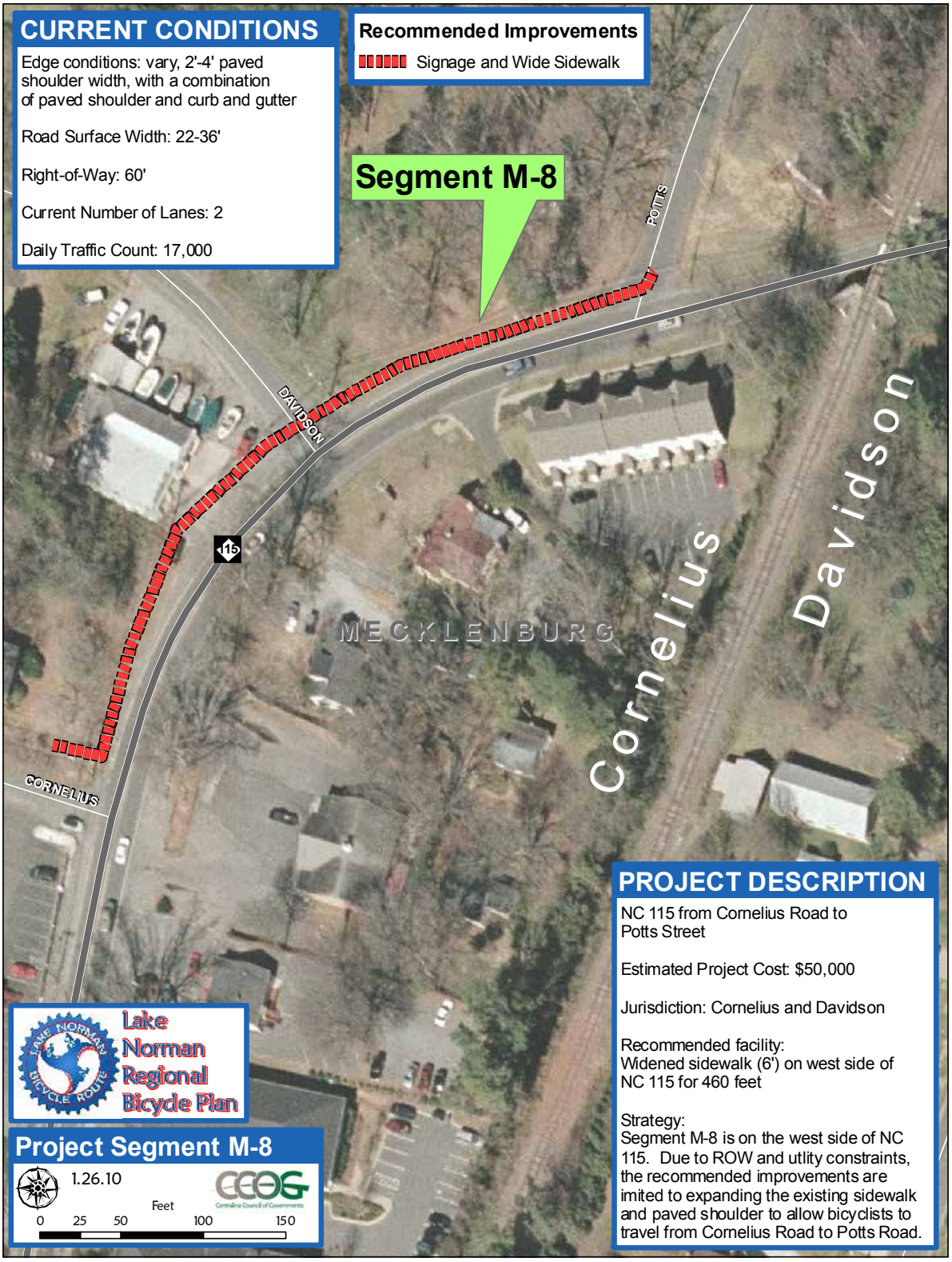

Recommended Improvements
Bicycle Lanes
Signage
Destinations
High School
Middle School
PROJECT DESCRIPTION
Roads: Lowrance, Club, Wilson, and Brawley School
Estimated Project Cost: $500,000
Distance: 3.3 miles
Jurisdiction: Town of Mooresville
Recommended facility:
Bicycle lanes on Wilson
Signage on all other roads
Strategy:
Segment I-13 connects downtown Mooresville with the Brawley School peninsula. The section of Brawley School east to I-77 will include bicycle lanes with current NCDOT widening. I-13 will extend them from the future bicycle lanes east, including Club Drive, to Lowrance.
Segment I-13
CURRENT CONDITIONS
Edge conditions: vary, with 22' open ditch sections near US 21 and curb and gutter on Wilson and Lowrance
Road Surface Width: 22'-36'
Right-of-Way: 60'-90'
Current Number of Lanes: 2
Daily Traffic Count: 10,000-15,000
Mooresville
IREDELL
LAKE NORMAN
Spirited Cyclist
Lowe's YMCA
BRAWLEY MIDDLE
NF WOODS TECH/ARTS
Cool Breeze Cy
Lake Norman Regional Medical Center
MOUNT MOURNE IB
Brawley School Rd
W Wilson Ave
W Lowrance Ave
Club Dr
Lockerbie Ln
Lake Norman Regional Bicycle Plan
Project Segment I-13
1.26.10
Feet
0 1,000 2,000 3,000 4,000 5,000

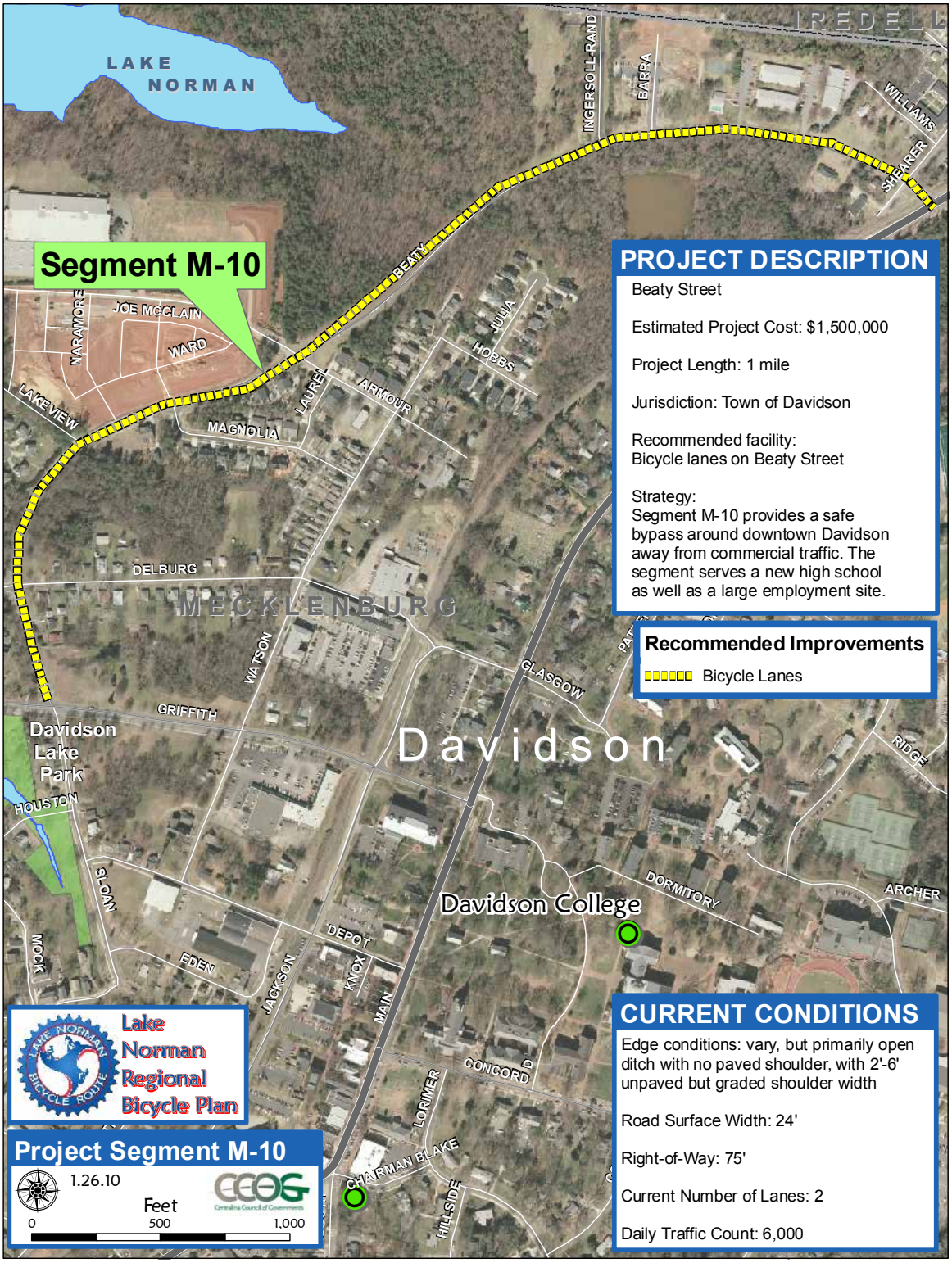

CURRENT CONDITIONS
Edge conditions: open ditch with existing 3' paved shoulder along much of the length. Short sections have adjacent ditches and limited paved shoulders
Distance: 2.6 miles
Road Surface Width: 24'-28'
Right-of-Way: 60'
Current Number of Lanes: 2
Daily Traffic Count: 14,000
Lake Norman Regional Medical Center
Mooresville
Lowes Corporate HQ
Pine Lake Preparatory School
Segment I-17
IREDELL
LAKE NORMAN
Recommended Improvements
Bicycle Lanes
PROJECT DESCRIPTION
NC 115 from Fairview Road to Mecklenburg County line
Estimated Project Cost: $3,000,000
Jurisdiction: Town of Mooresville and Iredell County
Recommended facility:
Bicycle lanes on NC 115
Strategy:
Segment I-17 connects Davidson north to the Lowe's Corporate HQ and commercial development on Fairview Road.
Lake Norman Regional Bicycle Plan
Project Segment I-17
1.26.10
Feet
0 500 1,000 2,000 3,000
Crossrail Rd
Fairview Rd
Templeton Rd
Bellhaven Ln
Fremont Loop
Alcove Rd
Perrin Rd
Faith Rd
Mott Rd
Langtree Rd
Eastport Ln
Panther Hill Ln
Wynedale Ln
Tammy Dr
Midway Lake Rd
Nance Farm Rd
Beracah Pl
Mecklenburg Hwy
Bridge Farm Rd
Rockwell Loop
Shearer St


CURRENT CONDITIONS
Edge conditions: vary, but primarily 1' paved shoulder width, 5' unpaved but graded shoulder width
Road Surface Width: 22'-36' (including turn lanes)
Right-of-Way: 100'
Current Number of Lanes: 2-3
Daily Traffic Count: 17,000
Segment L-3
Webbs Rd
Water Haven Trl
Lake Haven Dr
Katherine Dr
SR#1958
Sarah Dr
Red Robin Rd
Golf Course Dr N
Lake Shore Rd N
Fairfield Forest Rd
SR#1876
SR#1907
Barker Ln
SR#1754
Three Wood Dr
Hagers Hollow Dr
Rob Howard Ln
SR#1804
Shanklin Library & Gardens
LINCOLN
Lake Shore Rd S
Allison Ct
Lakeview Dr
LAKE NORMAN
Twin Creek Rd
Woodhill Cove Ln
Hickory Creek Dr
Green Point Ct
Les Lane Rd
Galway Ln
Triangle Ct
Unity Ch
Recommended Improvements
Bicycle Lanes
Lake Norman Regional Bicycle Plan
Project Segment L-3
1.26.10
Feet
0 500 1,000 2,000 3,000
PROJECT DESCRIPTION
NC 16 between Webbs and Unity Church
Estimated Project Cost: $1,500,000
Jurisdiction: Lincoln County
Recommended facility:
Bicycle lanes on NC 16 (1.1 mile)
Strategy:
Segment L-3 extends the existing paved shoulders south of Unity Church to Webbs Road, and twice connects to Segment L-7 or Lake Norman. The bicycle lanes will extend existing paved shoulders along NC 16 and connect to residential pennisulas.


Segment L-7
CURRENT CONDITIONS
Edge conditions: No paved shoulder, unpaved shoulder varies.
Road Surface Width: 22'
Right-of-Way: Up to 60', but often only ditch to ditch
Current Number of Lanes: 2
Daily Traffic Count: 7,000
PROJECT DESCRIPTION
Webbs Road between NC 16 and Burton Ln.
Estimated Project Cost: $2,500,000
Jurisdiction: Lincoln County
Recommended facility:
Paved 2' shoulders on both sides of Webbs Road (1.75 miles)
Strategy:
Segment L-7 allows bicyclists to travel along low-volume roads near Lake Norman. Webbs Road is the only portion of Segment L-7 that requires capital improvements to the facility.
Recommended Improvements
Paved Shoulders
Signage
Lake Norman Regional Bicycle Plan
Project Segment L-7
1.26.10
Feet
0 500 1,000 2,000 3,000
Shanklin Library & Gardens
LINCOLN
LAKE
NORMAN
Webbs Rd
Silver Jade
Burton Ln
Badger Run
Blades Trl
Deer Run
Fox Run
Lake Shore Rd N
Fairfield Church Rd
Fairfield Forest Rd
Golf Course Dr N
Three Wood Dr
Norman Ct
Island View Ct
Lake Shore Rd
Lakeview Dr
Allison Ct
Woodhill Cove Ln
Twin Creek Rd
Pine Lake Rd
NC 16
SR#1804
SR#1957


CURRENT CONDITIONS
Edge conditions: vary, with 0-4' paved shoulder and 2'-6' graded but unpaved shoulder
Road Surface Width: 22'-24'
Right-of-Way: 90'
Current Number of Lanes: 2
Daily Traffic Count: 10,000
McDOWELL CREEK GREENWAY
PORTAGE
I-77
77
21
STATESVILLE
Cornelius
MECKLENBURG
Existing bridge accomodates bicyclists
WESTMORELAND
Segment M-5
Recommended Improvements
Bicycle Lanes
Improvements end at greenway entrance
DOE VALLEY
DEER VALLEY
PROJECT DESCRIPTION
Road: Westmoreland Road
Estimated Project Cost: $400,000
Distance: 2,100 feet
Jurisdiction: Town of Cornelius
Recommended facility:
Bicycle lanes
Strategy:
Segment M-5 connects the McDowell Creek Greenway to US-21. It may be improved through the Augustalee development, with an SPUI interchange at I-77.
The recommended improvements would connect the greenway to US 21 and Cornelius
Lake Norman Regional Bicycle Plan
Project Segment M-5
1.26.10
Feet
0
250
500


CURRENT CONDITIONS
Edge conditions: vary, 2'-4' paved shoulder width, with a combination of paved shoulder and curb and gutter
Road Surface Width: 22-36'
Right-of-Way: 60'
Current Number of Lanes: 2
Daily Traffic Count: 17,000
Recommended Improvements
Signage and Wide Sidewalk
Segment M-8
POTTS
DAVIDSON
CORNELIUS
MECKLENBURG
Cornelius
Davidson
115
Lake Norman Regional Bicycle Plan
Project Segment M-8
1.26.10
Feet
0 25 50 100 150
PROJECT DESCRIPTION
NC 115 from Cornelius Road to Potts Street
Estimated Project Cost: $50,000
Jurisdiction: Cornelius and Davidson
Recommended facility:
Widened sidewalk (6') on west side of NC 115 for 460 feet
Strategy:
Segment M-8 is on the west side of NC 115. Due to ROW and utlity constraints, the recommended improvements are imited to expanding the existing sidewalk and paved shoulder to allow bicyclists to travel from Cornelius Road to Potts Road.


LAKE NORMAN
IREDELL
INGERSOLL-RAND
BARRA
WILLIAMS
SHARER
Segment M-10
BEATY
NARAMORE
JOE MCCLAIN
WARD
LAKEVIEW
MAGNOLIA
LAUREL
ARMOUR
JUNA
HOBBS
DELBURG
MECKLENBURG
WATSON
GLASGOW
GRIFFITH
Davidson Lake Park
HOUSTON
Davidson
RIDGE
DORMITORY
ARCHER
Davidson College
SLOAN
MOCK
EDEN
DEPOT
JACKSON
KNOX
MAIN
CONCORD
LORIMER
CHARMAN BLAKE
HILLSIDE
PROJECT DESCRIPTION
Beaty Street
Estimated Project Cost: $1,500,000
Project Length: 1 mile
Jurisdiction: Town of Davidson
Recommended facility:
Bicycle lanes on Beaty Street
Strategy:
Segment M-10 provides a safe bypass around downtown Davidson away from commercial traffic. The segment serves a new high school as well as a large employment site.
Recommended Improvements
Bicycle Lanes
CURRENT CONDITIONS
Edge conditions: vary, but primarily open ditch with no paved shoulder, with 2'-6' unpaved but graded shoulder width
Road Surface Width: 24'
Right-of-Way: 75'
Current Number of Lanes: 2
Daily Traffic Count: 6,000
Lake Norman Regional Bicycle Plan
Project Segment M-10
1.26.10
Feet
0
500
1,000

APPENDIX D

UNIFOUR
RURAL PLANNING ORGANIZATION (RPO)
736 4th Street SW, PO Box 9026
Hickory, NC 28603
(828) 322-9191
http://trans.wpcog.org

A RESOLUTION FOR ENDORSEMENT OF THE LAKE NORMAN REGIONAL BICYCLE PLAN

WHEREAS, the Lake Norman Regional Bicycle Plan is the first plan of its kind in North Carolina, and was initiated by the NCDOT; and

WHEREAS, the NCDOT chose the Lake Norman area for its first regional bicycle plan due to its history of coordination and collaboration on land use, transportation, and economic development issues; and

WHEREAS, the Unifour RPO recognizes a need to promote alternative modes of travel to reduce congestion, improve air quality, increase tourism, promote recreation, improve health, and increase safety for existing bicyclists and motorists; and

WHEREAS, the Lake Norman Regional Bicycle Plan and its supporting text were developed with input from a wide range of constituents and public input to reflect local conditions and preferences; and

WHEREAS, Unifour RPO will consider implementation of the Lake Norman Regional Bicycle Plan through the recommended implementation strategies as listed in the plan; and

WHEREAS, Unifour RPO will participate in the Lake Norman Regional Bicycle Route Task Force upon Plan approval by the NCDOT Board of Transportation. The Task Force was identified as the enduring organization to ensure visibility and implementation of the Route.

NOW, THEREFORE BE IT RESOLVED that Unifour RPO endorses the Lake Norman Regional Bicycle Plan on this, the 27th day of January, 2010.

A motion was made by Barbara Beatty and seconded by Bruce Hawkins for adoption of the resolution, and upon being put to a vote was duly adopted, on this, the 27th day of January, 2010.

Barbara Beatty, Chair
Unifour RPO TAC

John Marshall, Secretary
Unifour RPO TAC

A RESOLUTION FOR ENDORSEMENT OF THE LAKE NORMAN REGIONAL BICYCLE PLAN

WHEREAS, the Lake Norman Regional Bicycle Plan is the first plan of its kind in North Carolina, and was initiated by the NCDOT; and

WHEREAS, the NCDOT chose the Lake Norman area for its first regional bicycle plan due to its history of coordination and collaboration on land use, transportation, and economic development issues; and

WHEREAS, the Town of Mooresville recognizes a need to promote alternative modes of travel to reduce congestion, improve air quality, increase tourism, promote recreation, improve health, and increase safety for existing bicyclists and motorists; and

WHEREAS, the Lake Norman Regional Bicycle Plan and its supporting text were developed with input from a wide range of constituents and public input to reflect local conditions and preferences; and

WHEREAS, the Town of Mooresville will consider implementation of the Lake Norman Regional Bicycle Plan through the recommended implementation strategies as listed in the plan; and

WHEREAS, the Town of Mooresville will participate in the Lake Norman Regional Bicycle Route Task Force upon Plan approval by the NCDOT Board of Transportation. The Task Force was identified as the enduring organization to ensure visibility and implementation of the Route.

NOW, THEREFORE BE IT RESOLVED that Town of Mooresville endorses the Lake Norman Regional Bicycle Plan

Endorsed this 1st day of February, 2010.

C M
Chris Montgomery, Mayor

Attest:

Janet Pope
Janet Pope, Town Clerk

MOORESVILLE INCORPORATED 1873 NORTH CAROLINA

Resolution 07-10

RESOLUTION OF ENDORSEMENT FOR
THE LAKE NORMAN REGIONAL BICYCLE PLAN

WHEREAS, the Lake Norman Regional Bicycle Plan is the first plan of its kind in North Carolina, and was initiated by the NCDOT; and

WHEREAS, the NCDOT chose the Lake Norman area for its first regional bicycle plan due to its history of coordination and collaboration on land use, transportation, and economic development issues; and

WHEREAS, the Town of Troutman recognizes a need to promote alternative modes of travel to reduce congestion, improve air quality, increase tourism, promote recreation, improve health, and increase safety for existing bicyclists and motorists; and

WHEREAS, the Lake Norman Regional Bicycle Plan and its supporting text were developed with input from a wide range of constituents and public input to reflect local conditions and preferences; and

WHEREAS, the Town of Troutman will consider implementation of the Lake Norman Regional Bicycle Plan through the recommended implementation strategies as listed in the plan; and

WHEREAS, the Town of Troutman will participate in the Lake Norman Regional Bicycle Route Task Force upon Plan approval by the NCDOT Board of Transportation. The Task Force was identified as the enduring organization to ensure visibility and implementation of the Route.

NOW, THEREFORE BE IT RESOLVED that the Town of Troutman endorses the Lake Norman Regional Bicycle Plan on this, the 11th day of February, 2010.

A motion was made by Alderman Mike Spath and seconded by Alderman Betty Jean Troutman for adoption of the resolution, and upon being put to a vote was duly adopted, on this, the 11th day of February, 2010.

Elbert H. Richardson, Mayor

Kimberly H. Davis, Town Clerk

316

LAKE NORMAN RPO

1300 Baxter Street,
Suite 450
P. O. Box 35008
Charlotte, NC 28235

(704) 372-2416
FAX (704) 347-4710
www.lakenormanrpo.org
www.centralina.org

A RESOLUTION FOR ENDORSEMENT OF THE LAKE NORMAN REGIONAL BICYCLE PLAN

WHEREAS, the Lake Norman Regional Bicycle Plan is the first plan of its kind in North Carolina, and was initiated by the NCDOT; and

WHEREAS, the NCDOT chose the Lake Norman area for its first regional bicycle plan due to its history of coordination and collaboration on land use, transportation, and economic development issues; and

WHEREAS, the Lake Norman Rural Planning Organization recognizes a need to promote alternative modes of travel to reduce congestion, improve air quality, increase tourism, promote recreation, improve health, and increase safety for existing bicyclists and motorists; and

WHEREAS, the Lake Norman Regional Bicycle Plan and its supporting text were developed with input from a wide range of constituents and public input to reflect local conditions and preferences; and

WHEREAS, the Lake Norman RPO will consider implementation of the Lake Norman Regional Bicycle Plan through the recommended implementation strategies as listed in the plan; and

WHEREAS, the Lake Norman RPO will participate in the Lake Norman Regional Bicycle Route Task Force upon Plan approval by the NCDOT Board of Transportation. The Task Force was identified as the enduring organization to ensure visibility and implementation of the Route.

NOW, THEREFORE BE IT RESOLVED that the Lake Norman RPO endorses the Lake Norman Regional Bicycle Plan on this, the 23rd day of February, 2010.

A motion was made by George Arena and seconded by M. Abraham for adoption of the resolution, and upon being put to a vote was duly adopted, on this, the 23rd day of February, 2010.

Robert Austell
Chairman - Vice

Secretary

Town of Huntersville
NORTH CAROLINA

CERTIFICATION

STATE OF NORTH CAROLINA
COUNTY OF MECKLENBURG

I, Janet Pierson, Town Clerk of the Town of Huntersville, North Carolina, do hereby certify that the following motion was made by Commissioner Jeter, seconded by Commissioner McAulay and unanimously approved in a meeting of the Huntersville Board of Commissioners on March 15, 2010.

Motion for the Town of Huntersville to officially endorse the Lake Norman Regional Bicycle Plan.

WITNESS my hand and seal this the 5th day of April, 2010.

Janet Pierson, Town Clerk

Post Office Box 664 • 101 Huntersville-Concord Road • Huntersville, NC 28070
Phone: (704) 875-6541 • Fax: (704) 875-6546 • Website: www.huntersville.org

Post Office Box 788
Statesville, North Carolina 28687
Phone (704) 878-3058
Fax (704) 878-3053
www.co.iredell.nc.us

IREDELL COUNTY BOARD OF COMMISSIONERS

RESOLUTION
FOR ENDORSEMENT OF
THE LAKE NORMAN REGIONAL BICYCLE PLAN

WHEREAS, the Lake Norman Regional Bicycle Plan is the first plan of its kind in North Carolina and was initiated by the NCDOT; and

WHEREAS, the NCDOT chose the Lake Norman area for its first regional bicycle plan due to its history of coordination and collaboration on land use, transportation, and economic development issues; and

WHEREAS, the Iredell County Board of Commissioners recognizes a need to promote alternative modes of travel to reduce congestion, improve air quality, increase tourism, promote recreation, improve health, and increase safety for existing bicyclists and motorists; and

WHEREAS, the Lake Norman Regional Bicycle Plan and its supporting text were developed with input from a wide range of constituents and public input to reflect local conditions and preferences; and

WHEREAS, Iredell County Board of Commissioners will consider implementation of the Lake Norman Regional Bicycle Plan through the recommended implementation strategies as listed in the plan; and

WHEREAS, public confidence in the equitable and timely funding of highway projects has been seriously damaged, the Iredell County Board of Commissioners respectfully requests that no revenues be diverted from any existing Iredell County Transportation Improvement Plans towards the construction of this bicycle plan; and

WHEREAS, the Iredell County Board of Commissioners has an abiding concern for personal property, the use of personal property for the construction shall result in the just compensation of the owner; and

WHEREAS, Iredell County Board of Commissioners will participate in the Lake Norman Regional Bicycle Route Task Force upon Plan approval by the NCDOT Board of Transportation. The Task Force was identified as the enduring organization to ensure visibility and implementation of the Route.

NOW, THEREFORE BE IT RESOLVED that the Iredell County Board of Commissioners endorses the Lake Norman Regional Bicycle Plan on this, the 16th day of March, 2010.

* * * * *

A motion was made by Commissioner Steve Johnson for adoption of the resolution, and upon being put to a vote was duly adopted, on this, the 16th day of March, 2010.

Marvin Norman
Vice Chairman

COPY

Resolution No: 2010 - 00601

A RESOLUTION FOR ENDORSEMENT OF THE LAKE NORMAN REGIONAL BICYCLE PLAN

WHEREAS, the Lake Norman Regional Bicycle Plan is the first plan of its kind in North Carolina, and was initiated by the NCDOT; and

WHEREAS, the NCDOT chose the Lake Norman area for its first regional bicycle plan due to its history of coordination and collaboration on land use, transportation, and economic development issues; and

WHEREAS, the Town of Cornelius recognizes a need to promote alternative modes of travel to reduce congestion, improve air quality, increase tourism, promote recreation, improve health, and increase safety for existing bicyclists and motorists; and

WHEREAS, the Lake Norman Regional Bicycle Plan and its supporting text were developed with input from a wide range of constituents and public input to reflect local conditions and preferences; and

WHEREAS, the Town of Cornelius will consider implementation of the Lake Norman Regional Bicycle Plan through the recommended implementation strategies as listed in the plan; and

WHEREAS, the Town of Cornelius will participate in the Lake Norman Regional Bicycle Route Task Force upon Plan approval by the NCDOT Board of Transportation. The Task Force was identified as the enduring organization to ensure visibility and implementation of the Route.

NOW, THEREFORE BE IT RESOLVED that the Town of Cornelius endorses the Lake Norman Regional Bicycle Plan on this, the 1st day of February, 2010.

This resolution is effective upon its adoption this 1st day of February, 2010

SEAL

ATTEST:

Lori A. Pearson
Town Clerk

Jeffery P. Tarte
Mayor

APPROVED AS TO FORM:

William L. Brown
Town Attorney

Exhibit VII (c)

A RESOLUTION FOR ENDORSEMENT OF THE LAKE NORMAN REGIONAL BICYCLE PLAN

WHEREAS, the Lake Norman Regional Bicycle Plan is the first plan of its kind in North Carolina, and was initiated by the NCDOT; and

WHEREAS, the NCDOT chose the Lake Norman area for its first regional bicycle plan due to its history of coordination and collaboration on land use, transportation, and economic development issues; and

WHEREAS, the Town of Davidson recognizes a need to promote alternative modes of travel to reduce congestion, improve air quality, increase tourism, promote recreation, improve health, and increase safety for existing bicyclists and motorists; and

WHEREAS, the Lake Norman Regional Bicycle Plan and its supporting text were developed with input from a wide range of constituents and public input to reflect local conditions and preferences; and

WHEREAS, the Town of Davidson will consider implementation of the Lake Norman Regional Bicycle Plan through the recommended implementation strategies as listed in the plan; and

WHEREAS, the Town of davidson will participate in the Lake Norman Regional Bicycle Route Task Force upon Plan approval by the NCDOT Board of Transportation. The Task Force was identified as the enduring organization to ensure visibility and implementation of the Route.

NOW, THEREFORE BE IT RESOLVED that the Town of Davidson endorses the Lake Norman Regional Bicycle Plan on this, the 9th day of February, 2010.

A motion was made by Laurie Venzon for adoption of the Resolution, and upon being put to a vote was duly adopted, on this, the 9th day of February, 2010.

John M. Woods, Mayor

ATTEST:

Town Clerk

Resolutions/Endorsing LNR Bicycle Plan-February 9, 2010

Lake Norman Regional Bicycle Plan Consideration for Endorsement – Bjorn Hansen/Andrew Bryant: Bjorn Hansen and Andrew Bryant presented the following information on the Lake Norman Regional Bicycle Plan Consideration for Endorsement.

The Planning Board voted last month to recommend endorsement to the Board of Commissioners. They recommended traffic calming devices be included on Lakeshore, Blades, and back to 16. The recommendation for Webbs remained as paved strollers. Unity Church Road is still off the initial route because of the recommendation for wholesale improvements to that road in light of the relatively high volumes and high development pressure on that road. The improvements recommended are a paved shoulder on Webbs, signage, bicycle lanes on 16 and thread trail segments.

Commissioner Arena stated that he has received emails from bicyclists and automobile users on Lakeshore Road South and from the Westport Homeowner's Association and none of them want traffic calming devices on that road.

Commissioner Mitchem stated that he does not feel this would be good for residents. He said he feels Lincoln County should not participate in this.

Commissioner Carlton stated that he has talked to a lot of people on the "wiggle road" and has not found one in favor of it. He said these roads are dangerous as they are now and to invite these people to ride on these roads is an inconvenience to residents. He said he is not in favor of this plan. He expressed concerns that

Chairman Patton asked who would be liable if someone gets hurt on a bicycle after these signs go up. Jeff Taylor said it depends on whose signs they are, if they are state signs there would not be.

A MOTION by Commissioner Mitchem to not endorse the Bicycle Plan.

Vote: 2-3 AYES: Mitchem, Carlton
NOES: Patton, Klein, Arena

A MOTION by Commissioner Arena to endorse the plan subject to the following conditions:

1. Lakeshore Road South was to be removed from the Plan.
2. All routes in the Plan would be improved to have either bicycle lanes or paved shoulders.
3. No signs would be erected until the improvements were made on the designated roads.
4. No county money would be used to make the improvements needed.

VOTE: 3 – 2 AYES: Arena, Patton, Carlton
NOES: Klein, Mitchem

February 1, 2010
BOC Public Hearing - Zoning

A RESOLUTION FOR ENDORSEMENT OF
THE LAKE NORMAN REGIONAL BICYCLE PLAN

WHEREAS, the Lake Norman Regional Bicycle Plan is the first plan of its kind in North Carolina, and was initiated by the NCDOT; and

WHEREAS, the NCDOT chose the Lake Norman area for its first regional bicycle plan due to its history of coordination and collaboration on land use, transportation, and economic development issues; and

WHEREAS, Mecklenburg County recognizes a need to promote alternative modes of travel to reduce congestion, improve air quality, increase tourism, promote recreation, improve health, and increase safety for existing bicyclists and motorists; and

WHEREAS, the Lake Norman Regional Bicycle Plan and its supporting text were developed with input from a wide range of constituents and public input to reflect local conditions and preferences; and

WHEREAS, Mecklenburg County will consider implementation of the Lake Norman Regional Bicycle Plan through the recommended implementation strategies as listed in the plan; and

WHEREAS, the Mecklenburg County Board of County Commissioners will participate in the Lake Norman Regional Bicycle Route Task Force upon Plan approval by the NCDOT Board of Transportation. The Task Force was identified as the enduring organization to ensure visibility and implementation of the Route.

NOW, THEREFORE, BE IT RESOLVED that Mecklenburg County endorses the Lake Norman Regional Bicycle Plan on this, the 16th day of March, 2010.

A motion was made by Commissioner Dumont Clarke and seconded by Commissioner Karen Bentley for adoption of the resolution, and upon being put to a vote was duly adopted, on this, the 16th day of March, 2010.

Chairman, Mecklenburg Board
Of County Commissioners

Clerk to the Board

A RESOLUTION FOR ENDORSEMENT OF THE LAKE NORMAN REGIONAL BICYCLE PLAN

WHEREAS, the Lake Norman Regional Bicycle Plan is the first plan of its kind in North Carolina, and was initiated by the NCDOT; and

WHEREAS, the North Carolina Department of Transportation chose the Lake Norman area for its first regional bicycle plan due to its history of coordination and collaboration on land use, transportation, and economic development issues; and

WHEREAS, the Mecklenburg-Union Metropolitan Planning Organization (MUMPO) recognizes a need to promote alternative modes of travel to reduce congestion, improve air quality, increase tourism, promote recreation, improve health, and increase safety for existing bicyclists and motorists; and

WHEREAS, the Lake Norman Regional Bicycle Plan and its supporting text were developed with input from a wide range of constituents and public input to reflect local conditions and preferences; and

WHEREAS, MUMPO will consider implementation of the Lake Norman Regional Bicycle Plan through the recommended implementation strategies as listed in the plan; and

WHEREAS, MUMPO will participate in the Lake Norman Regional Bicycle Route Task Force upon Plan approval by the NCDOT Board of Transportation. The Task Force was identified as the enduring organization to ensure visibility and implementation of the Route.

NOW THEREFORE BE IT RESOLVED by the Mecklenburg-Union Metropolitan Planning Organization that it endorses the Lake Norman Regional Bicycle Plan on this the 20th day of January, 2010.

I, TED BIGGERS, Chairman of the Mecklenburg-Union Metropolitan Planning Organization, do hereby certify that the above is a true and correct copy of an excerpt from the minutes of a meeting of the Mecklenburg-Union Metropolitan Planning Organization, duly held on January 20, 2010.

Ted Biggers, Chairman

Robert W. Cook, Secretary

RESOLUTION #2010-02

A RESOLUTION FOR ENDORSEMENT OF THE LAKE NORMAN REGIONAL BICYCLE PLAN

WHEREAS, the Lake Norman Regional Bicycle Plan is the first plan of its kind in North Carolina, and was initiated by the NCDOT; and

WHEREAS, the NCDOT chose the Lake Norman area for its first regional bicycle plan due to its history of coordination and collaboration on land use, transportation, and economic development issues; and

WHEREAS, Catawba County recognizes a need to promote alternative modes of travel to reduce congestion, improve air quality, increase tourism, promote recreation, improve health, and increase safety for existing bicyclists and motorists; and

WHEREAS, the Lake Norman Regional Bicycle Plan and its supporting text were developed with input from a wide range of constituents and public input to reflect local conditions and preferences; and

WHEREAS, Catawba County will consider implementation of the Lake Norman Regional Bicycle Plan through the recommended implementation strategies as listed in the plan; and

WHEREAS, Catawba County will participate in the Lake Norman Regional Bicycle Route Task Force upon Plan approval by the NCDOT Board of Transportation. The Task Force was identified as the enduring organization to ensure visibility and implementation of the Route.

NOW, THEREFORE BE IT RESOLVED that Catawba County endorses the Lake Norman Regional Bicycle Plan.

This the 15th day of February, 2010.

Kitty W. Barnes

Kitty W. Barnes, Chair
Catawba County Board of Commissioners

ATTEST:

Barbara E. Morris

Barbara Morris
County Clerk

COUNTY OF CATAWBA CHARTERED SEAL 1842 NORTH CAROLINA