



CH2M HILL
3120 Highwoods Blvd
Suite 214
Raleigh, NC
27604
Tel 919.875.4311
Fax 919.875.8491

December 10, 2014

Lyn Hardison
Environmental Review Coordinator
NCDENR
1639 Mail Service Center
Raleigh, NC 27699-1601

Subject: Final 2015 Secondary and Cumulative Impacts Master Management Plan (SCIMMP) for
the Town of Morrisville

Dear Ms. Hardison:

Per our discussion on November 13, 2014, no comments were received from the State Environmental Review Clearinghouse and Appendix A has been updated to include related correspondence. The final version is dated December 2014.

Per your request, I have enclosed 1 hard copy and 1 digital copy of the final 2015 Secondary and Cumulative Impacts (SCI) Master Management Plan for the Town of Morrisville. As required by the Memorandum of Agreement (MOA), electronic versions of the document will also be available to the public on the Town's website:

Town of Morrisville: <http://www.ci.morrisville.nc.us/>

This completes the SCI Master Management Plan Update process for the Town. At this time the Town has met all of the conditions of the MOA until the biennial report is due on September 30, 2017. Thank you for all your effort and support on developing this Plan. If you have any questions, please contact me at (919-607-4347)

Sincerely,

CH2M HILL

Kathryn Benson, PE
Project Manager

c: Tim Gauss, AICP, Town of Morrisville

Secondary and Cumulative Impacts Master Management Plan

Morrisville, North Carolina

Tim Gauss, AICP
Director of Development Services
260 Town Hall Drive
Morrisville, NC 27560
(919) 463-6980

Prepared by:

CH2MHILL

3120 Highwoods Boulevard
Suite 214
Raleigh, NC 27604

December 2014

Contents

Acronyms and Abbreviations	v
Executive Summary	ES-1
Section 1 - Introduction	1-1
1.1 Background.....	1-1
1.2 SCI Master Management Plan Process.....	1-3
1.3 Project Study Area	1-3
1.4 Organization of Document	1-7
Section 2 -Background and Description of Infrastructure Master Plans.....	2-1
2.1 Wastewater	2-1
2.1.1 Existing Wastewater System.....	2-1
2.1.2 Future Wastewater System	2-1
2.1.3 Reclaimed Water.....	2-2
2.2 Water.....	2-3
2.2.1 Existing Water System	2-3
2.2.2 Future Water System.....	2-3
2.3 Transportation.....	2-4
Section 3 - Purpose of and Need for Proposed Infrastructure.....	3-1
Section 4 - Description of Existing Environment in Planning Area	4-1
4.1 Topography and Floodplains.....	4-1
4.2 Soils	4-1
4.3 Land Use	4-1
4.4 Wetlands.....	4-7
4.5 Prime or Unique Agricultural Lands	4-8
4.6 Public Lands and Scenic, Recreational, and State Natural Areas	4-11
4.7 Areas of Archaeological or Historical Value.....	4-11
4.8 Air Quality	4-12
4.9 Noise Levels.....	4-13
4.10 Water Resources.....	4-13
4.10.1 Surface Water	4-13
4.10.2 Groundwater.....	4-19
4.11 Forest Resources.....	4-19
4.12 Shellfish or Fish and their Habitats	4-20
4.13 Wildlife and Natural Vegetation	4-20
4.13.1 Rare, Threatened, or Endangered Species	4-20
4.13.2 Natural Vegetation.....	4-23
4.14 Introduction of Toxic Substances.....	4-23
Section 5 - Secondary and Cumulative Impacts Related to Projected Growth In the Planning Area.....	5-1
5.1 Topography and Floodplains.....	5-1
5.2 Soils.....	5-2

5.3	Land Use	5-2
5.4	Wetlands	5-6
5.5	Prime or Unique Agricultural Land	5-7
5.6	Public Lands and Scenic, Recreational, and State Natural Areas	5-7
5.7	Areas of Archaeological or Historical Value	5-7
5.8	Air Quality	5-8
5.9	Noise Levels	5-8
5.10	Water Resources	5-8
5.10.1	Surface Water	5-8
5.10.2	Groundwater	5-10
5.11	Forest Resources	5-10
5.12	Shellfish or Fish and their Habitats	5-10
5.13	Wildlife and Natural Vegetation	5-11
5.13.1	Rare, Threatened, or Endangered Species	5-12
5.13.2	Natural Vegetation	5-13
5.14	Introduction of Toxic Substances	5-14
5.15	Summary of Secondary and Cumulative Impacts	5-14
Section 6 – Mitigation for Secondary and Cumulative Impacts		6-1
6.1	Summary of Federal and State Regulations and Programs	6-1
6.1.1	Endangered Species Act	6-4
6.1.2	Fish and Wildlife Coordination Act	6-4
6.1.3	Clean Water Act	6-4
6.1.4	Protection of Wetlands, Executive Order 11990	6-7
6.1.5	Isolated Wetland Protection	6-7
6.1.6	Safe Drinking Water Act	6-7
6.1.7	Clean Air Act	6-8
6.1.8	Floodplain Management, Executive Order 11988	6-9
6.1.9	National Flood Insurance Program	6-9
6.1.10	Wild and Scenic Rivers Act	6-9
6.1.11	Archaeological Protection	6-10
6.1.12	Farmland Protection Policy Act	6-11
6.1.13	Sediment and Erosion Control	6-11
6.1.14	North Carolina Clean Water Management Trust Fund	6-11
6.1.15	State Revolving Fund	6-11
6.1.16	North Carolina Ecosystem Enhancement Program	6-12
6.1.17	Groundwater Protection	6-12
6.1.18	Neuse River Basin Nutrient Sensitive Waters (NSW) Rules	6-12
6.1.19	Jordan Lake Nutrient Management Strategy	6-13
6.1.20	Water Supply Watershed Protection Program	6-14
6.1.21	Conservation Reserve Enhancement Program	6-15
6.1.22	Miscellaneous Land Conservation Incentive Programs	6-16
6.2	Local Regulations and Programs	6-16
6.2.1	Managing Growth in the Town of Morrisville	6-18
6.2.2	Open Space Preservation	6-20
6.2.3	Riparian Buffers and Floodplain Protection	6-24
6.2.4	Erosion and Sediment Control	6-27

6.2.5	Stormwater Programs	6-28
6.2.6	Sanitary Sewer Installation and Maintenance and Road Crossings.....	6-32
6.2.6	Water Conservation	6-32
6.2.7	Solid Waste Disposal and Recycling.....	6-35
6.2.8	Air Quality Protection.....	6-35
6.2.9	Tree Protection	6-37
Section 7 – Summary of Mitigation to Address Secondary and Cumulative Impacts		7-1
7.1	Topography and Floodplains.....	7-1
7.2	Soils	7-1
7.3	Land Use	7-1
7.4	Wetlands.....	7-2
7.5	Prime or Unique Agricultural Land.....	7-2
7.6	Public Lands and Scenic, Recreational, and State Natural Areas	7-2
7.7	Areas of Archaeological or Historical Value.....	7-2
7.8	Air Quality	7-3
7.9	Noise Levels.....	7-3
7.10	Water Resources.....	7-4
	7.10.1 Surface Water	7-4
	7.10.2 Groundwater	7-5
7.11	Forest Resources.....	7-5
7.12	Shellfish or Fish and their Habitats	7-5
7.13	Wildlife and Natural Vegetation	7-6
7.14	Introduction of Toxic Substances.....	7-6
Section 8 - References		8-1

Appendices

A	Agency Involvement
B	Wake County Mitigation
C	Capital Improvement Plans
D	Land Use Definitions and Maps
E	Endangered Species Information
F	Ordinances
G	Master Plan Excerpts

Tables

ES-1	Areas of Potential Impacts to be Addressed by Permitting and Mitigation Programs.....	ES-5
3-1	Projected Population for the Town of Morrisville.....	3-1
4-1	Planning Area Existing Land Use.....	4-2
4-2	Planning Area Detailed Existing Land Use.....	4-7
4-3	National Wetlands Inventory within the Planning Area.....	4-8
4-4	Parks and Gamelands within the Planning Area.....	4-11
4-5	Planning Area Watersheds.....	4-17
4-6	Wake County Watershed Assessment Summary.....	4-18
4-7	Federally Listed Species within Wake County.....	4-22
5-1	Planning Area Future Land Use.....	5-2
5-2	Planning Area Detailed Future Land Use.....	5-5
5-3	Likelihood of SCI to Federally Listed Species within Wake County.....	5-12
5-4	Areas of Potential Impacts to be Addressed by Permitting and Mitigation Programs.....	5-15
6-1	Summary of Existing State and Federal Programs and the Environmental Resources They Protect.....	6-2
6-2	Summary of Existing Local Programs.....	6-16
6-3	Summary of Existing Local Programs and the Environmental Resources They Protect.....	6-18
6-4	Town of Morrisville Use Districts Defined by UDO Article 3.....	6-20
6-5	Open Space within the Planning Area.....	6-23
6-6	2014 Single-Family Residential: Customers Inside Cary or Morrisville Corporate Limits (charge per 1,000 gallons).....	6-35
7-1	Areas of Potential Impacts to be Addressed by Permitting and Mitigation Programs.....	7-7

Figures

1-1	Town of Morrisville – Planning Area.....	1-5
2-1	Town of Morrisville – Proposed Wastewater Infrastructure.....	2-5
2-2	Town of Morrisville – Proposed Reclaimed Water Infrastructure.....	2-7
2-3	Town of Morrisville – Proposed Water Infrastructure.....	2-9
2-4	Town of Morrisville – Proposed Transportation Infrastructure.....	2-11
4-1	Town of Morrisville – Environmental Features.....	4-3
4-2	Town of Morrisville – Existing Land Use.....	4-5
4-3	Town of Morrisville – National Wetlands Inventory.....	4-9
4-4	Town of Morrisville – Water Resources.....	4-15
5-1	Town of Morrisville – Future Land Use.....	5-3
6-1	Annual Average Overall Water Use in Gallons per Capita per Day, 1995 through 2011.....	6-33

Abbreviations and Acronyms

AQI	Air Quality Index
ATT	American Tobacco Trail
BGPA	Bald and Golden Eagle Protection Act
BMP	best management practice
CAMPO	Capital Area Metropolitan Planning Organization
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIP	Capital Improvement Plan
CLG	Certified Local Government
CO	Certificate of Occupancy
CWA	Clean Water Act
CWEP	Clear Water Education Partnership
CWMTF	Clean Water Management Trust Fund
DDT	dichlorodiphenyltrichloroethane
DO	dissolved oxygen
EA	environmental assessment
EEP	Ecosystem Enhancement Program
EIS	environmental impact statement
EMC	Environmental Management Commission
EPT	ephemeroptera, plecoptera, and trichoptera
ESA	Endangered Species Act of 1973
ETJ	extraterritorial jurisdiction
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FSC	Federal species of concern
GAP	Gap Analysis Project
GIS	geographic information system
LI	limited impact
LID	Low Impact Development
LMP	Land Management Plan
LRUSA	Long Range Urban Service Area
MG	million gallons

MGD	million gallons per day
MOA	Memorandum of Agreement
MPO	Metropolitan Planning Organization
MS4	Municipal Separate Storm Sewer System
MTP	Metropolitan Transportation Plan
NAAQS	National Ambient Air Quality Standards
NCAC	North Carolina Administrative Code
NCCGIA	North Carolina Center for Geographic Information and Analysis
NCDAQ	North Carolina Division of Air Quality
NCDCR	North Carolina Department of Cultural Resources
NCDWR	North Carolina Division of Water Resources
NCDLR	North Carolina Division of Land Resources
NCDENR	North Carolina Department of Environment and Natural Resources
NCDOT	North Carolina Department of Transportation
NCWRC	North Carolina Wildlife Resources Commission
NCNHP	North Carolina Natural Heritage Program
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NHEO	Natural Heritage Element Occurrence
NOV	Notice of Violation
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resources Conservation Service
NRHP	National Register of Historic Places
NSW	Nutrient Sensitive Waters
NWI	National Wetlands Inventory
PI	potential impact
PUD	planned unit development
RCRA	Resource Conservation and Recovery Act
RTA	Regional Transportation Alliance
RTP	Research Triangle Park
SAESH	Significant Aquatic Endangered Species Habitat
SCI	secondary and cumulative impacts
SCIMMP	Secondary and Cumulative Impacts Master Management Plan
SDWA	Safe Drinking Water Act
SEPA	State (North Carolina) Environmental Policy Act

SNHA	Significant Natural Heritage Area
SR	state route
TDM	transportation demand management
TJCOG	Triangle J Council of Governments
TMDL	total maximum daily load
Town	Town of Apex
TSS	total suspended solids
UDO	Unified Development Ordinance
USA	urban service area
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VMT	vehicle miles traveled
WRF	water reclamation facility
WSW	water supply watershed
WTP	water treatment plant
WWRWRF	Western Wake Regional Water Reclamation Facility

Executive Summary

The North Carolina (State) Environmental Policy Act (SEPA) requires preparation of an environmental documents (environmental assessment [EA] or environmental impact statement [EIS]) for projects that involve public funding and that exceeds certain minimum criteria. These environmental documents must outline the direct, indirect (or secondary), and cumulative impacts to natural, cultural, and historical resources.

Typically, EAs or EISs are developed for a given infrastructure project. Each individual EA or EIS includes summaries of the direct, secondary, and cumulative impacts. Inefficiencies from developing documents in this manner include the following:

- **Project Area** – Frequently the project area for a given infrastructure project includes a small portion of a given municipality. Thus, a holistic view of the growth-related impacts throughout the jurisdiction may not be included in the document.
- **Documentation Inefficiencies** – Often the secondary and cumulative impacts (SCI) of various infrastructure projects are similar. Thus, multiple environmental documents contain SCI sections that are largely redundant.
- **Review Inefficiencies** – Regulatory agencies review similar information on SCI and the local programs in place to mitigate them for various infrastructure projects for a given municipality. Those agencies and local government officials therefore often have to devote considerable time to similar comments and negotiations on a number of projects.
- **Governing Board and Capital Planning** – Typically, Town departments develop environmental documents to support permitting decisions, and the permitting agency may include conditions in the permit to address project impacts. Conditions related to SCI sometimes require ordinance changes or jurisdiction-wide policy changes. The Town department typically does not have authority to implement such requirements; they require governing board action. Reviewing SCI in one holistic document helps streamline this process.

These inefficiencies result in frustration for both the regulatory agencies and the regulated community. The Town of Morrisville (Town) developed an SCI Master Management Plan (SCIMMP) to address the SCI for all planned infrastructure. Evaluation of the SCI from all infrastructure plans in one document, the SCIMMP, provides a holistic review of the Town’s growth projections and infrastructure being designed to support that growth. While EAs or EISs are developed for individual projects to examine the direct

SCI Master Management Plan Process

- *EAs or EISs for individual infrastructure projects will be developed to address direct impacts.*
- *SCI will not be addressed in each individual EA or EIS; these documents will reference the SCIMMP.*
- *The Memorandum of Agreement (MOA) with the North Carolina Department of Environment and Natural Resources (NCDENR) addresses how the SCIMMP document should be used, its period of standing, and circumstances under which it must be updated more frequently.*

impacts of the projects, these documents will reference the SCIMMP for SCI, avoiding redundancy.

The Town entered into an MOA in 2005 with NCDENR that outlines how the SCIMMP document will be used, the time period during which it can be cited in individual EAs and EISs, and under what circumstances it must be updated more frequently. An amendment to the MOA clarified the reporting dates. Per the MOA, the period of applicability is 30 years with a SCIMMP update required every 10 years. For this reason, this updated SCIMMP has been developed to take effect in 2015.

The study area for the SCIMMP document consists of the Town's Planning Area. The Town is bounded by Research Triangle Park (RTP), the Town of Cary, and the Raleigh-Durham International Airport (RDU); and these boundaries form the Planning Area, which is approximately 10 square miles in size.

Infrastructure – In 2006, the Town of Cary obtained the ownership and operation of the Town's water and wastewater infrastructure. The Town developed long-range plans for providing services to its residents in a manner that will protect water quality, air quality, open space, and wildlife habitat. The Town promotes orderly growth through development and implementation of its Unified Development Ordinance (UDO) and zoning. The Town's water is supplied via the Cary/Apex Water Treatment Plant (WTP) and its wastewater is treated at the North Cary Water Reclamation Facility (WRF) and the Western Wake Regional Water Reclamation Facility (WWRWRF).

The Town integrates its infrastructure plans with its other planning processes, and understands that infrastructure planning strategies must be formulated and implemented in a manner to balance the competing goals of growth and the environment. The Town is also working with the Town of Cary to improve efficiency of the combined water distribution and wastewater collection systems. By integrating its land use planning strategies and infrastructure plans, the Town preserves important ecological areas in the form of open space; ensures that its residents have adequate recreational resources; and meets water, wastewater, and transportation demands.

Existing Conditions – Within the Planning Area, existing environmental conditions were assessed to facilitate the identification of potential SCI impacts to the natural environment as growth occurs. Of particular concern is the potential for impacts to Federally listed threatened or endangered species.

The SCIMMP addresses the presence of potential habitat for protected species within the Planning Area. Within Wake County, Federally listed species include the bald eagle (*Haliaeetus leucocephalus*), dwarf wedgemussel (*Alasmidonta heterodon*), and Michaux's sumac (*Rhus michaux*). The bald eagle (*Haliaeetus leucocephalus*) is present near the Planning Area at Jordan Lake and Lake Crabtree, and is protected by the Bald and Golden Eagle Protection Act (BGPA). According to the North Carolina Natural Heritage Program (NHP), no rare freshwater mussel species are present upstream of Lake Crabtree. Therefore, it is thought that these mussels are not present within the Planning Area. The other Federally listed species, Michaux's sumac (*Rhus michaux*) and Northern long-eared bat (*Myotis septentrionalis*), are known to occur in other parts of Wake County and not in the Planning Area. No current records for any of these species exist within the Planning Area.

Secondary and Cumulative Impacts – Table ES-1 summarizes potential SCI to the Planning Area, the likelihood of impacts, and the mitigation measures in place to address them. These mitigation measures will offset environmental impacts associated with growth that are likely to occur with or without planned infrastructure projects. The Town is taking progressive steps to protect its environmental heritage by developing many programs to balance the competing goals of growth and environmental protection.

Main SCI concerns include the loss of open space (including forests) and the potential for impacts to water resources, aquatic habitats, and associated aquatic species. Agricultural land uses are not currently present in the Town.

Mitigation – Many measures are currently in place to limit SCI as growth occurs in the Town. Planning processes will guide development in appropriate areas. The UDO protects open space, stream buffers, floodplains, and wetlands; and requires stormwater controls to limit water resources impacts. These efforts protect the Town’s natural resources and quality of life for its residents. Table ES-1 presents a summary of these mitigation efforts and their applicability to each of the natural and cultural resources analyzed under SEPA guidelines.

This page intentionally left blank.

TABLE ES-1
 Areas of Potential Impacts to be Addressed by Permitting and Mitigation Programs

Environmental Resource	Potential for SCI	Types of SCIs	Mitigation
Topography and Floodplains	LI	Loss of floodplain water storage could occur in areas outside riparian buffers Isolation of floodplain from stream by channel entrenchment; loss of nutrient exchange capabilities; increased sedimentation	Unified Development Ordinance (UDO) <ul style="list-style-type: none"> - Open Space Preservation and Land Use Plans often preserve additional corridors along required riparian buffers - Floodplain Protection - no development or fill in floodway; development in floodplain must obtain special use permit which limits development in floodplain; Hazard Mitigation Plan - Stormwater Programs and Impervious Surface Limitations - Sanitary Sewer Installation – avoids laying sewer lines in riparian buffers - Floodplain Overlay District - prohibits development without a floodplain development permit Erosion and Sediment Control Program administered by Wake County
Soils	PI	Soil erosion and compaction from new development	Land Use Plans – encourages more intense development in Town Center, activity centers, and growth corridors to limit areas of disturbance Parks and Recreation Master Plan Erosion and Sediment Control Program administered by Wake County UDO <ul style="list-style-type: none"> - Riparian Buffers and Floodplain Protection - Stormwater Programs and Impervious Surface Limitations - Open Space Preservation

TABLE ES-1
 Areas of Potential Impacts to be Addressed by Permitting and Mitigation Programs

Environmental Resource	Potential for SCI	Types of SCIs	Mitigation
Land Use	PI	Conversion of agricultural and forested land uses to other developed land uses Redevelopment to higher density land uses	UDO - Open Space Preservation - Riparian Buffers and Floodplain Protection – restricts development in riparian buffer zones and prohibits nearly all floodplain encroachment - Stormwater Programs Land Use Plans to encourage development around Town Center and Activity Center Districts Parks and Recreation Master Plan
Wetlands	LI	Loss through development; subsequent loss of habitat and habitat fragmentation, reduction in genetic diversity, and loss of attenuation of flow Loss of wetland function through pollutant loading	Wetland Protection through CWA Section 404 and Section 401 UDO - Open Space Preservation - Stormwater Programs to reduce pollutant loads and limit stormwater impacts to wetlands - Riparian Buffers and Floodplain Protection Land Use Plans to set aside natural open space and encourages development around Town Center, selected corridors, and mixed-use developments Parks and Recreation Master Plan Erosion and Sediment Control Program, administered by Wake County
Prime or Unique Agricultural Land	LI	Conversion to other uses	Land use planning – Note no agriculture activity at this time Supports regional farms by encouraging demand for products through the Western Wake Farmers Market.

TABLE ES-1
Areas of Potential Impacts to be Addressed by Permitting and Mitigation Programs

Environmental Resource	Potential for SCI	Types of SCIs	Mitigation
Public Lands and Scenic, Recreational, and State Natural Areas	LI	Possibility of conversion of adjacent land uses	UDO <ul style="list-style-type: none"> - Open Space Preservation - Conservation Zoning District - protects environmentally important areas Land use planning Parks and Recreation Master Plan
Areas of Archaeological or Historical Value	LI	Possibility of conversion of adjacent land uses Structural damage from acid rain and vibrations from construction or adjacent transportation	Land use planning to control uses allowed UDO <ul style="list-style-type: none"> - Open space preservation - Town Center Districts, including Historic Crossroads Village and Conservation/Buffer zones
Air Quality	PI	Reduction in air quality from increased vehicular traffic Negative impacts to human health (e.g., asthma); acid rain; reduced visibility	Transportation Plan elements of bicycle and pedestrian planning, road reconnections to alleviate congestion and enhancements for decreasing idle time Wake County Sustainability Task Force Planning for regional connectivity, including a future regional light rail system UDO <ul style="list-style-type: none"> - Connectivity requirement - Open space preservation - Riparian Buffers Protection - Tree Protection Land Use Plan - Activity Center Districts and Town Center Districts Parks and Recreation Master Plan

TABLE ES-1
 Areas of Potential Impacts to be Addressed by Permitting and Mitigation Programs

Environmental Resource	Potential for SCI	Types of SCIs	Mitigation
Noise Levels	PI	Increase in overall noise level in Planning Area Negative impacts to human health	Land use planning UDO <ul style="list-style-type: none"> - Airport overlay district - Open Space Preservation - Riparian Buffers Protection – development buffers - Tree Protection Parks and Recreation Master Plan Increase in grade separation projects for transportation corridors (reduce train whistle noises) NCDOT Traffic Noise Abatement Policy
Surface Water Resources	PI	Water quality degradation; increase in stormwater runoff and sedimentation Alteration of natural hydrograph (e.g., magnitude, timing, frequency, duration, rate of change); lower and more frequent low-flow conditions; alteration of channel morphology	UDO <ul style="list-style-type: none"> - Stormwater Programs - Sanitary Sewer Installation – stream crossings with directional borings - Water Conservation - Riparian Buffers and Floodplain Protection – no residential development or fill in floodplain Land Use Plans and open space preservation Parks and Recreation Master Plan Erosion and Sediment Control Program administered by Wake County
Groundwater Resources	LI	Possible reduction in groundwater inflow that provides baseflow in streams and supports aquatic life during droughts Reduction in use for private drinking water; potential to become contaminated	Land use planning UDO <ul style="list-style-type: none"> - Open Space Preservation - Riparian Buffers and Floodplain Protection – allow for natural infiltration - Stormwater Programs, including promotion of LID - Water Conservation Programs

TABLE ES-1
Areas of Potential Impacts to be Addressed by Permitting and Mitigation Programs

Environmental Resource	Potential for SCI	Types of SCIs	Mitigation
Forest Resources	PI	Conversion to other uses Reduction in air quality; increase in near-surface air temperature; habitat fragmentation	Land Use Planning - encourage development in Town Center and growth corridors, as well as tree and urban forest preservation Parks and Recreation Master Plan UDO - Conservation/Buffer District – promotes preservation of forest resources - Open Space Preservation - Riparian Buffers and Floodplain Protection
Shellfish or Fish and their Habitats	PI	Possible aquatic habitat degradation Disruption of food chain; reduction in aquatic insect number and diversity through loss of riffle habitat by increased siltation and increased low-flow conditions; reduction in potential for long-term population sustainability	Wetland Protection through CWA Section 404 and Section 401 Endangered Species Act Land Use Planning Parks and Recreation Master Plan Erosion and Sediment Control Program– plan view and pre-construction process; monitoring UDO - Conservation/Buffer District – protect environmentally important areas - and open space preservation - Riparian Buffers and Floodplain Protection - Stormwater Programs - Phase II requires runoff volume be controlled - Sanitary Sewer Installation – stream crossings with directional borings

TABLE ES-1
 Areas of Potential Impacts to be Addressed by Permitting and Mitigation Programs

Environmental Resource	Potential for SCI	Types of SCIs	Mitigation
Wildlife and Natural Vegetation	PI	Reduction in available habitat; no impact to federally listed species Habitat fragmentation; reduction in genetic diversity; reduction in species tolerance; increased dispersal distance to suitable habitat; reduction in potential for long-term population sustainability	Endangered Species Act Parks and Recreation Master Plan - important habitat areas prioritized for protection Land Use Plan– encourage development in Town Center, tree protection Erosion and Sediment Control Program administered by Wake County UDO <ul style="list-style-type: none"> - Open Space Preservation - Conservation/Buffer District - Riparian Buffers and Floodplain Protection -- Habitat protection and maintenance of habitat corridors - Stormwater Programs
Introduction of Toxic Substances	LI	Increase in likelihood of contamination particularly in rail transportation corridors Negative impacts to human health	Land use planning to control uses and likely exposure Stormwater Programs including education programs Sanitary Sewer Installation – design standards to limit spills Grade separation programs to reduce rail and vehicular traffic interaction

PI = Areas of Potential Impact (major relevance in SEPA documents and permitting applications)

LI = Areas of Limited Impact (minor relevance in SEPA documents and permitting applications)

SECTION 1

Introduction

The purpose of this document is to present the Secondary and Cumulative Impact Master Management Plan (SCIMMP) for the Town of Morrisville (Town). This plan is an update of a Plan approved by the North Carolina Department of Environment and Natural Resources (NCDENR) in 2005 for use as part of the North Carolina (State) Environmental Policy Act (SEPA) review process. The following sections provide information regarding the background, previous plan, and use of this document.

1.1 Background

For projects that involve public funding and that exceed certain minimum criteria, SEPA requires that they include the preparation of an environmental document (environmental assessment [EA] or environmental impact statement [EIS]). These environmental documents must outline the direct, indirect (or secondary), and cumulative impacts to the following resources:

- Topography and floodplains
- Soils
- Land use
- Wetlands
- Agricultural land
- Public lands and scenic and recreational areas
- Cultural/historical resources
- Air quality
- Noise
- Surface and groundwater resources
- Forest resources
- Shellfish and fish
- Wildlife and natural vegetation
- Toxic substances (if applicable)

Direct impacts are those impacts that are caused by the construction and operation of the given project. Indirect or secondary impacts are “caused by and result from the proposed activity although they are later in time or further removed in distance, but they are still reasonably foreseeable” (15A North Carolina Administrative Code [NCAC] 1C. 0101(d)(4)). Thus, secondary impacts include the impacts of growth that a given project may help support.

Cumulative effects or impacts are defined as “resulting from the incremental impact of the proposed activity when added to other past, present, and reasonably foreseeable future activities regardless of what entities undertake such other activities” (15A NCAC 1C. 0101(d)(2)). Cumulative impacts include the direct and secondary impacts that occur when examined in conjunction with other proposed infrastructure projects. This document focuses

on secondary impacts and cumulative indirect impacts. Cumulative direct impacts will be addressed in individual EAs or EISs.

Typically, EAs or EISs are developed for a given infrastructure project. Each individual EA or EIS includes summaries of the direct, secondary, and cumulative impacts. Developing documents in this manner has several inefficiencies, including the following:

- **Project area** – Often the project area for a given infrastructure project includes a small portion of a given municipality. Thus, a holistic view of the growth-related impacts throughout the jurisdiction may not be included in the document.
- **Documentation inefficiencies** – Often the secondary and cumulative impacts (SCI) of various infrastructure projects are similar. As a result, multiple environmental documents contain SCI sections that are very similar.
- **Review inefficiencies** – Regulatory agencies review similar information on SCI and the local programs in place to mitigate them for various infrastructure projects for a given municipality. Those agencies and local government officials, therefore, often have to devote considerable time to similar comments and negotiations on a number of projects.
- **Governing Board and Capital Planning** – Typically, Town departments develop environmental documents to support permitting decisions. If the permitting agency includes specific permit conditions to address impacts from a given project, the utility department may not be able to address those conditions. For example, if requirements for ordinance changes are included in the permit conditions, these must be approved by the town’s Governing Board. Reviewing SCI in one holistic document helps streamline this process.

These inefficiencies result in frustration for both the regulatory agencies and regulated community. **The Town, therefore, worked with NCDENR to develop an SCIMMP process to address the SCI for its planned infrastructure.** Evaluation of the SCI from all planned infrastructure in one document provides a holistic review of the Town’s growth projections and infrastructure being designed to support that growth. While EAs or EISs are developed for individual projects to examine the direct impacts of the projects, these documents will reference the SCIMMP for SCI, avoiding redundancy.

The Town entered into a Memorandum of Agreement (MOA) in 2005 with NCDENR that outlines how the SCIMMP will be used, for what time period it can be cited in individual EAs and EISs, reporting requirements, and under what circumstances it must be updated on a more frequent basis. An amendment to the MOA clarified the reporting dates. In accordance with the MOA, the period of standing is 30 years with a SCIMMP update required every 10 years. For this reason, this updated SCIMMP has been developed to take effect in 2015.

SCI Master Management Plan Process

- *EAs or EISs will be developed for individual infrastructure projects that address direct impacts.*
- *Secondary and cumulative impacts will not be addressed in each individual EA or EIS; these documents will reference this SCIMMP.*
- *The MOA with NCDENR addresses how the SCIMMP should be used, its period of standing, and circumstances under which it must be updated more frequently.*

1.2 SCI Master Management Plan Process

The 2005 Plan was developed following an approach similar to an EIS. A scoping document was developed and submitted to the State Clearinghouse for review and comment. During the scoping process, a meeting was also held with state and federal agencies that are typically involved with review of SEPA documents to explain the purpose of this process and plan and receive preliminary comments, which were then incorporated into the 2005 SCIMMP. This document, the 2015 SCIMMP, reflects an update to the 2005 document. A draft 2015 SCIMMP was prepared and submitted to NCDENR, the lead agency for review and comment. All agency comments are included in Appendix A. Summaries of the meetings held in preparation for the 2015 SCIMMP are also included in Appendix A.

An EIS does not require a determination of whether impacts are significant. Thus, this document uses qualitative analyses of available data and literature to determine whether impacts to a given resource have the potential to occur. This document also outlines the mitigation strategies in place to address those impacts. However, no quantitative analysis was performed to determine the level of significance of the impacts.

It should also be noted that for a given infrastructure project, NCDENR may determine that the mitigation strategies described in this document are insufficient to address the impacts of that given project. In that case, this document would still be used to meet SEPA requirements, but additional requirements could be placed in the permit.

1.3 Project Study Area

The Study Area for the SCIMMP consists of the Town's Planning Area (Figure 1-1). The Town is bounded by Research Triangle Park (RTP), the Town of Cary, and the Raleigh-Durham (RDU) International Airport. These boundaries form the Planning Area, which is approximately 9.8 square miles. The Town's Planning Area is equivalent to its extra-territorial jurisdiction (ETJ). The Planning Area is located entirely within Wake County.

The ETJ represents the area beyond the Town limits where the Town has zoning and regulatory authority. State law authorizes municipalities to have an ETJ to allow control of development in areas that are expected to come within their corporate limits in the near future. This enables municipalities to ensure that development patterns and associated infrastructure will allow for the efficient provision of urban services.

The Wake County Board of Commissioners evaluates the following criteria when they consider expansions of a Town's ETJ:

- Location of land within the municipality's long-range urban service area (USA)
- Demonstration of a commitment to comprehensive planning through official action of a governing body
- Adoption of any required special regulations (such as water supply watershed or special transportation corridors)

- Provision of water and sewer service within 5 years (evidence that the system is designed with adequate treatment capacity and required improvements are included in the capital improvements plan [CIP])
- Evidence of feasibility for urban density development
- Anticipation of annexation within 10 years
- Demonstration of progress in annexing and supplying municipal services throughout the entirety of its existing ETJ

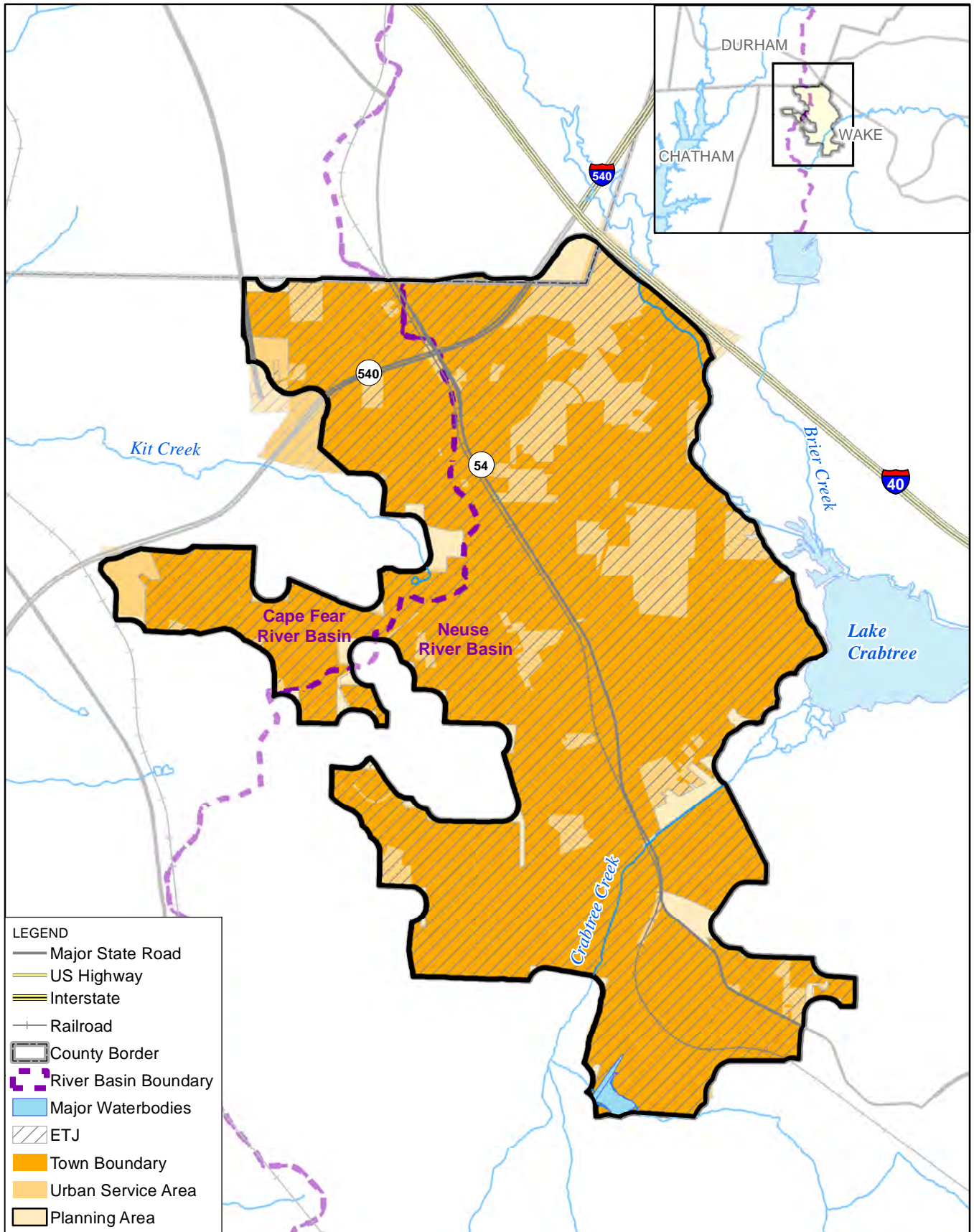
The long-range USA represents areas where the Town will ultimately provide utility service. The Town does not have zoning authority outside the ETJ, even in areas within the USA. Wake County determines the USA and a town does not have the authority to make modifications to the boundaries. New development within the USA is to occur according to Town standards, if annexation is requested, and to Wake County standards, if annexation is not requested. For the Town to provide utility services to new development, it typically requires annexation or provides utility service at rates significantly higher than the typical rates. Because of these policies, the Town rarely provides utility service to areas outside their ETJs.

Annexation is a governing board decision. Recent changes in State annexation laws no longer make Town-initiated annexation an effective tool to provide an orderly and predictable extension of Town boundaries. Areas outside of a Town's ETJ may still request annexation, which often occurs when these areas desire utility service. For areas previously developed under Wake County development standards, a situation (such as septic failures) may occur that could cause areas currently outside the Town limits to come into compliance with Town standards when requesting utility services or annexation. If annexation by the Town does not occur, Wake County policies described in Appendix B will apply.

Wake County was an active participant in the process to develop this document. Wake County does not provide utility services; therefore, it has decided not to prepare its own SCIMMP. Within Wake County, the North Carolina Department of Transportation (NCDOT) provides major transportation infrastructure, and the municipalities provide water and sewer infrastructure. Wake County does have riparian buffer, stormwater, and other mitigation programs in place; these are described in Appendix B.

Land use planning serves as a basis for the SCIMMP. Land use plans indicate how a town would like development to occur if a landowner chooses to develop their property. A land use plan cannot limit property owners' decisions to develop their land. Zoning, which is based on the land use plan, can limit the type of development a property owner can execute.

In 2006, the Town completed a utility merger with the Town of Cary. As a result of the utility merger, the Town of Cary owns and operates all of the Town's water and wastewater infrastructure, and bills the Town of Morrisville's residents directly for water and wastewater services. The Town works with the Town of Cary in implementing a sustainable, long-range vision for utility service in the region.



0 0.25 0.5 1 Miles



FIGURE 1-1
Planning Area
 2015 Secondary and Cumulative Impacts
 Master Management Plan - Town of Morrisville

The page intentionally left blank.

The land use planning and infrastructure planning process is a dynamic process. A future land use plan and proposed infrastructure plan are linked to population projections and reassessed as elements change over time. As a future land use plan is modified, the proposed infrastructure plan is modified to ensure adequate infrastructure for projected populations. Zoning, which is guided by the land use plan, may be modified. Future land use plans typically coincide with planned infrastructure.

1.4 Organization of Document

This document is the Town's SCIMMP document. The following sections include:

Section	Description
2.	Background and Description of Infrastructure Master Plans
3.	Purpose of and Need for Proposed Infrastructure
4.	Description of Existing Environment in Planning Area
5.	Description of Secondary and Cumulative Impacts Related to Projected Growth in the Planning Area
6.	Mitigation for Secondary and Cumulative Impacts
7.	Summary of Mitigation to Address Secondary and Cumulative Impacts
8.	References

Appendices

A	Agency Involvement
B	Wake County Mitigation
C	Capital Improvement Plans
D	Land Use Definitions and Maps
E	Endangered Species Information
F	Ordinances
G	Master Plan Excerpts

This page intentionally left blank.

SECTION 2

Background and Description of Infrastructure Master Plans

As of April 3, 2006, the Town of Cary owns and operates the water and wastewater infrastructure assets within the Town of Morrisville's jurisdiction. As such, the Town of Morrisville has adopted the Town of Cary's water and sanitary sewer standards. This section reviews the capital improvements planned within the Town's jurisdiction. Appendix C includes the Town of Cary's Capital Improvements Plan (CIP) regarding water and wastewater infrastructure planned for the Town of Morrisville. The Town has a CIP for roadways, also included in Appendix C; this CIP is based on the Town's Transportation Plan, which identifies future transportation corridors and roadway improvements.

2.1 Wastewater

2.1.1 Existing Wastewater System

The wastewater collection and treatment system for the Town consists of gravity lines, pumping stations, and force mains conveying flows to the North Cary Water Reclamation Facility (WRF), which discharges to Crabtree Creek; and the Western Wake Regional WRF (WWRWRF), which discharges to the Cape Fear River.

The system serves residential, commercial, industrial, and institutional customers. The Town's industrial community includes several major employers, including Lenovo, Tekalec, and other business and manufacturing uses in Perimeter Park and Southpark business parks. There are also several shopping centers. Institutional customers include several schools (two public elementary schools, private elementary schools, vocational schools) and the Town of Morrisville municipal facilities located at several sites. A major campus of Wake Technical Community College is scheduled to begin construction in 2015.

Numerous drainage basins exist within the Town. Sewer lines generally flow by gravity, following the natural drainage, until they reach the North Cary WRF or a point where they are pumped out of the basin toward the North Cary WRF or to the WWRWRF. There are 21 subbasins served by gravity or pump stations. The collection system within the Town of Morrisville Planning Area consists of more than 86 miles of gravity sewer and 4 miles of force mains, as well as 12 pumping stations. Figure 2-1 illustrates the location of existing wastewater infrastructure (Town of Cary, 2013).

2.1.2 Future Wastewater System

The Town of Cary's Wastewater Collection Master Plan was updated in 2013 with a focus on addressing challenges posed by the merged collection system. The Plan recommended increasing the delivery capacity in the York Interceptor and at the Aviation Parkway Pump Station, as well as making other recommendations for outside of the Town of Morrisville to ultimately improve system efficiency (Hazen and Sawyer, 2013). Several projects are being pursued by the Town of Cary, in the service area previously owned by the Town of

Morrisville, to unify, streamline, and optimize collection system operations by abandoning surplus lift stations and merging or redirecting wastewater flows to the Town of Cary's system, thereby enhancing system reliability and minimizing operational costs. The Town of Cary will also build sewer lines and pump stations to convey additional wastewater to the North Cary WRF and WWRWRF, as population growth and development occur.

Exact locations of lines and supporting infrastructure are not known at this time; however, knowledge of the general location of the main sewer lines and population projections that are consistent with planned infrastructure and land use planning will enable SCI to be examined. Exact locations will be determined during development of the environmental documents that examine alternatives and direct environmental impacts of the alternatives. Figure 2-1 illustrates the location of existing and proposed wastewater infrastructure within the Town's Planning Area.

As part of this collaborative effort associated with the WWRWRF, the Towns of Cary, Apex, and Morrisville are also addressing a mandate regarding their interbasin transfer (IBT) certificate, which requires the towns to return water to the Haw River or Cape Fear River basins after 2010. The operation of the WWRWRF meets this condition. The current IBT certificate, issued in 2001, allows transfers of up to 24 million gallons per day (MGD), on a maximum day basis, from the Haw River subbasin (for which Jordan Lake is the water supply source) to the Neuse River subbasin. In 2013, the maximum daily IBT amount for the Towns of Cary, Apex, Morrisville, and RTP South was 19.2 MGD, while the annual average IBT amount was 13.8 MGD (Town of Cary, 2014a). On September 20, 2013, the Towns of Cary, Apex, and Morrisville, and Wake County notified the Environmental Management Commission (EMC) that they are requesting a modification of the IBT certificate to address water needs through 2045. One objective that would be accomplished by this modification is a shift from a maximum-day IBT calculation to IBT calculated as the daily average of a calendar month, according to the changes to NCGS 143-215.22L (regulation of surface water transfers) based on Session Law 2013-388.

2.1.3 Reclaimed Water

The Town of Morrisville will continue to work with the Town of Cary to identify potential reclaimed water opportunities. The Town of Cary is in the process of designing a connector pipeline that will bring reclaimed water from the North Cary WRF to the West Service Area. This line will pass directly through the Town, providing the opportunity for reclaimed water service in its jurisdiction (Figure 2-2). The Town of Cary's Effective Utilization of Reclaimed Water System policy states that residents and businesses use the Town's reclaimed water system for secondary plumbing to the maximum extent possible, and that new development within the designated service areas connect to the reclaimed water system. More specific details regarding service areas and proposed infrastructure is found in the Town of Cary's Reclaimed Water Master Plan Update (CDM, 2013).

Water conservation is a benefit to the environment and community which can be achieved, in part, through water reclamation. Locations of proposed reclaimed water infrastructure will be determined during environmental studies that examine direct impacts of the proposed infrastructure. In general, unlike other types of infrastructure, water reclamation does not support additional growth, and therefore does not have SCI associated with it. For direct growth, using reclaimed water will help extend the viability of the water supply

source, reduce withdrawals from the source, and reduce the amount of treated effluent to the receiving stream, which is a goal of the Clean Water Act under the National Pollutant Discharge Elimination System (NPDES) program.

2.2 Water

2.2.1 Existing Water System

The Town obtains its drinking water from Jordan Lake. The water is treated at the Cary/Apex Water Treatment Plant (WTP), which is located in the Town of Apex's jurisdiction. Raw water from Jordan Lake is conveyed approximately 4 miles to the WTP, which is located on Wimberly Road (State Route [SR] 1603). The WTP has a current capacity of 40 MGD. To distribute water, the Town of Cary maintains approximately 103 miles of transmission lines, with diameters ranging from 2 to 42 inches within the Town of Morrisville. No pump stations or storage tanks are present in the Town (CH2M HILL, 2009). Figure 2-3 illustrates the existing water infrastructure in the Town of Morrisville.

2.2.2 Future Water System

The Town of Cary developed its Water Distribution System Master Plan (Water Plan) in June 2009 (CH2M HILL, 2009). This effort involved creating a new water distribution system model, including the Town of Morrisville's system. The Water Plan recommends improvements outside of the Town to improve service to the Town's existing and future residents. Additionally, the plan recommends further demand studies and potential modification of pressure zone boundaries and storage to improve system efficiency.

Future water lines are shown on Figure 2-3. Any future construction would occur under the direction of the Town of Cary. A detailed explanation of proposed capital improvements is presented in Appendix C. Exact locations of the proposed infrastructure will be determined during development of the environmental documents, which will examine the direct impacts of the infrastructure. However, general locations for the infrastructure are known and supported by land use planning and population projections; therefore, SCI are identifiable at this time.

The Cary/Apex WTP is being expanded to 56 MGD and a portion of the generated potable water will serve Town of Morrisville's residents. Construction is expected to be completed in 2016 (Town of Cary, 2014b).

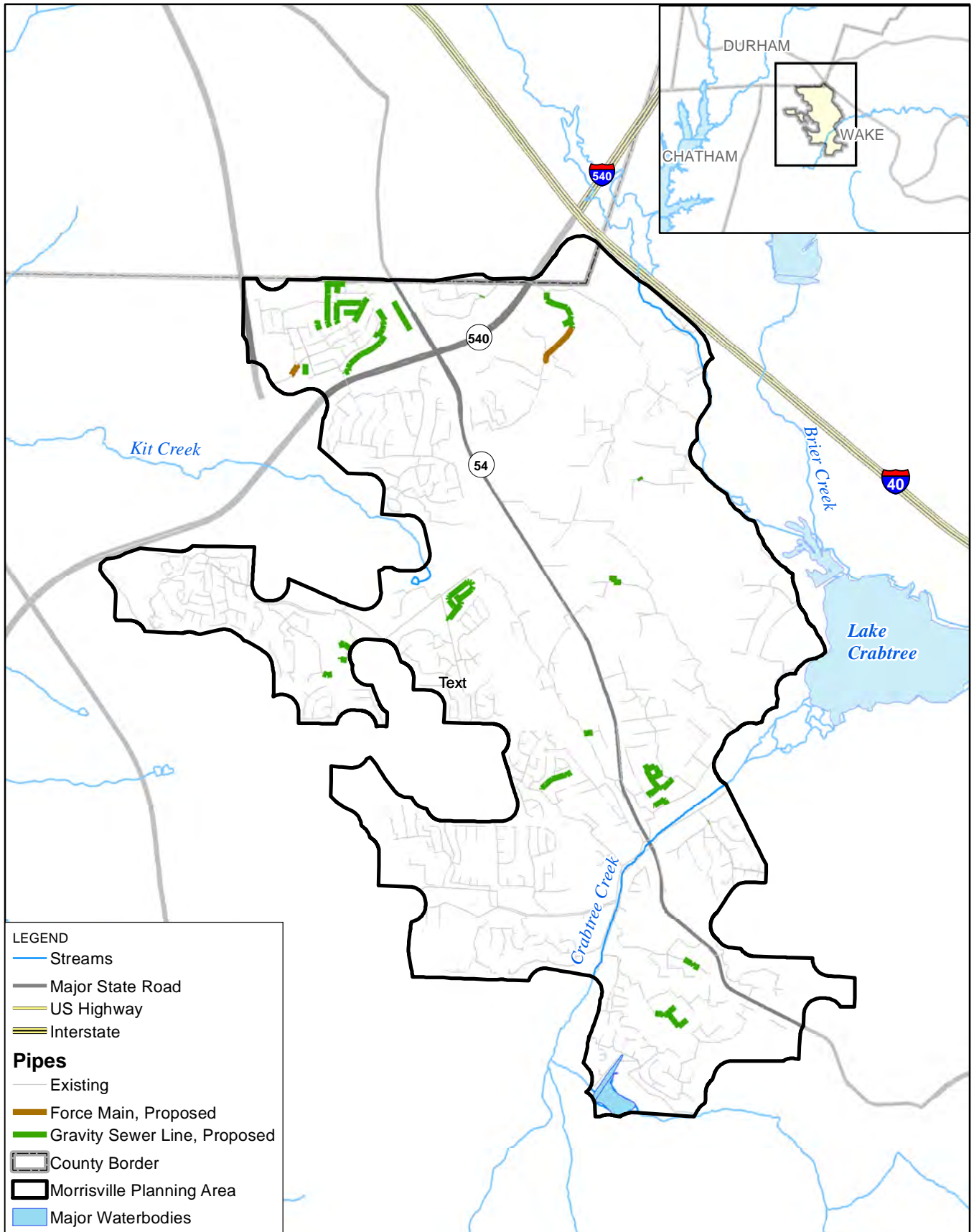
In 2013, the Town of Cary developed a Long-Range Water Resources Plan (LRWRP), which will guide the development of water supply and resource management solutions that are financially responsible and maintain a high quality of service for the Town of Cary's customers, which include the Town of Morrisville. The LRWRP takes a strategic long view, through 2060, to meet the Town's water resources challenges in a dynamic and holistic way, through development of a Water Resources Portfolio. The Portfolio provides a mix of practical strategies that the Town can apply to meet its water resources responsibilities by implementing the right actions at the right time (CH2M HILL and Brown and Caldwell, 2013). The LRWRP identifies water supply and resource management options for implementation.

2.3 Transportation

The Town of Morrisville 2009 Transportation Plan identifies areas in need of additional infrastructure (The Louis Berger Group, 2009). The Plan discusses future non-vehicular transportation system options. Also, a regional rail system is proposed in the Wake County's Draft Transit Plan (Wake County, 2012). The Town's transportation plan shows how the Town can begin to anticipate enhanced regional bus service and a future regional rail system. The Town also has developed a network of sidewalks, greenways, and bikeways.

In 2012, the Town approved a \$14.3 million street improvement bond, to be used to construct the NC 54 Bypass, a new roadway extending McCrimmon Parkway at NC 54 to Aviation Parkway. Additionally, the Town continues to pursue plans to complete the Town Center walking trail with funding from the Capital Area Metropolitan Planning Organization (CAMPO). Town roadway projects that are identified in the Plan include the extension of International Drive, Southport Drive, and the Morrisville East Connector. Several roads within the Town limits are maintained by the North Carolina Department of Transportation (NCDOT). Projects that have been identified by NCDOT's State Transportation Improvement Program include widening of NC 54 and extensions of Airport Boulevard, Louis Stephens Drive, and Little Drive. More information on these projects can be found in the Town's CIP in Appendix C.

Figure 2-4 summarizes thoroughfares recommended in the Transportation Plan. Exact locations of the proposed infrastructure will be determined during the development of environmental documents, which will examine the direct impacts of infrastructure. However, general locations are known and supported by land use planning and population projections; therefore, SCI can be identified at this time. More information on these plans can be found in the Town's CIP in Appendix C.



Note: Infrastructure owned by the Town of Cary

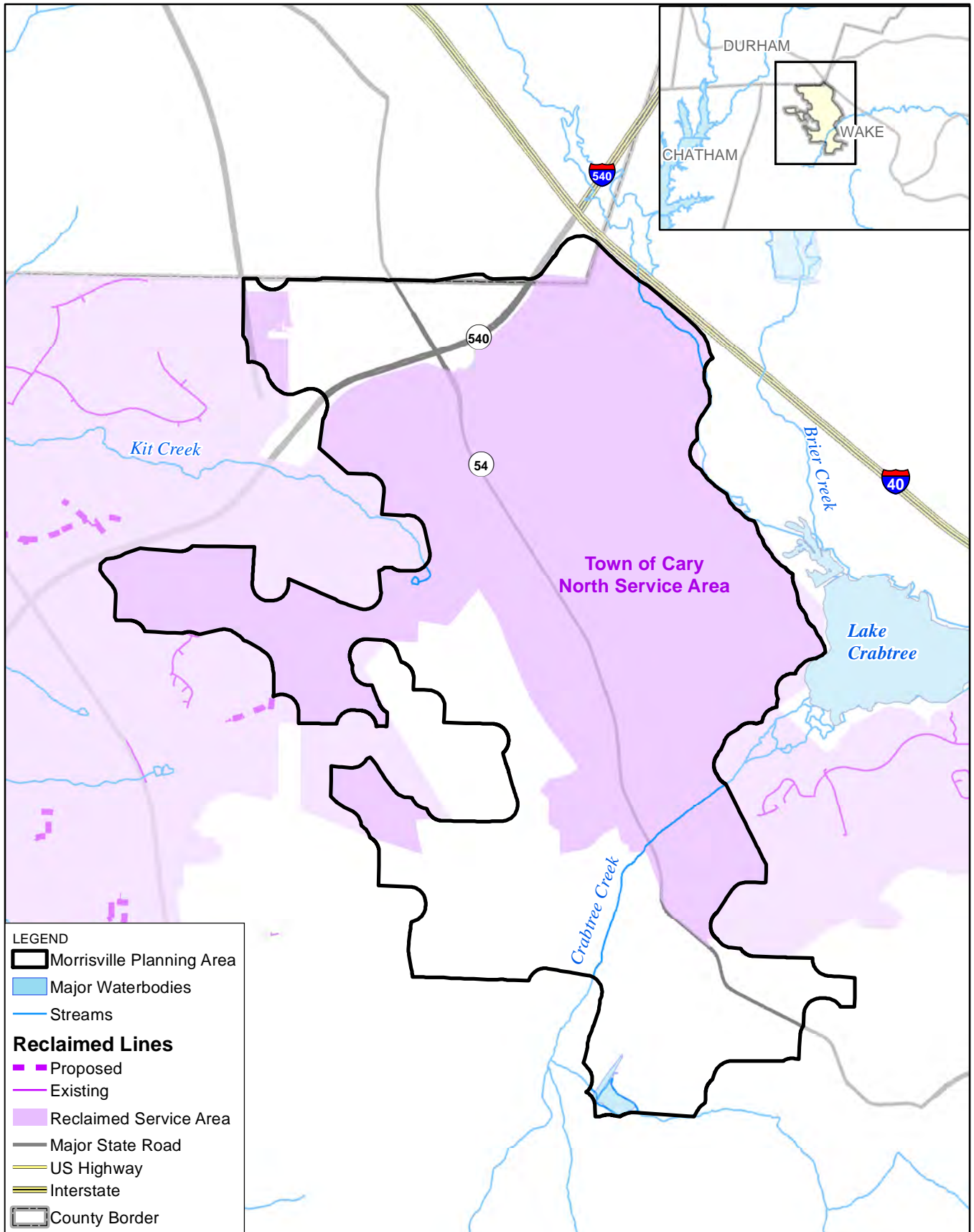


0 0.25 0.5 1 Miles



FIGURE 2-1
Proposed Wastewater Infrastructure
 2015 Secondary and Cumulative Impacts
 Master Management Plan - Town of Morrisville

This page intentionally left blank.

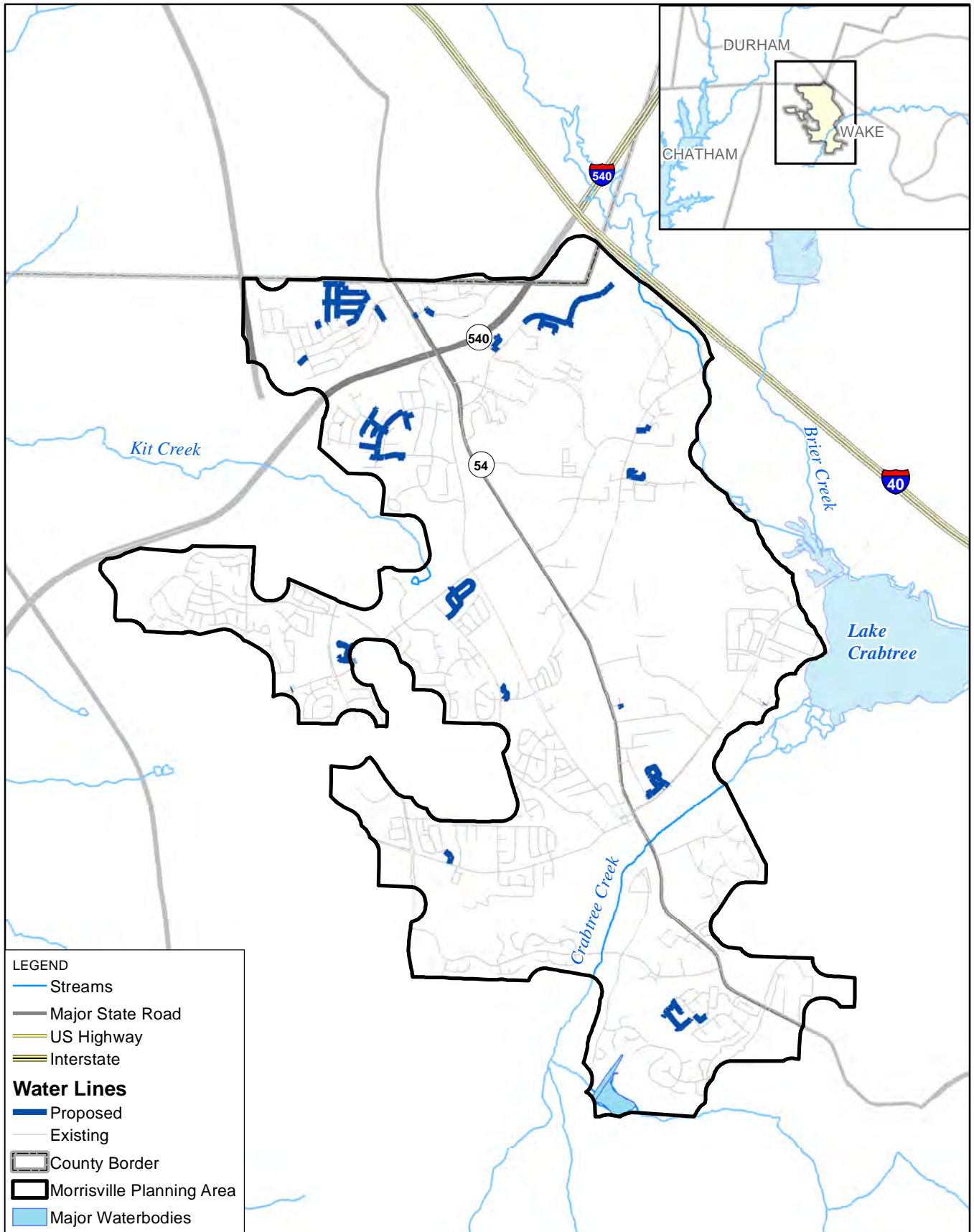


Note: Infrastructure owned by the Town of Cary



FIGURE 2-2
Proposed Reclaimed Water Infrastructure
 2015 Secondary and Cumulative Impacts
 Master Management Plan - Town of Morrisville

This page intentionally left blank.



Note: Infrastructure owned by the Town of Cary



0 0.25 0.5 1 Miles



FIGURE 2-3
Proposed Water Infrastructure
 2015 Secondary and Cumulative Impacts
 Master Management Plan - Town of Morrisville

This page intentionally left blank.

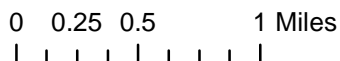
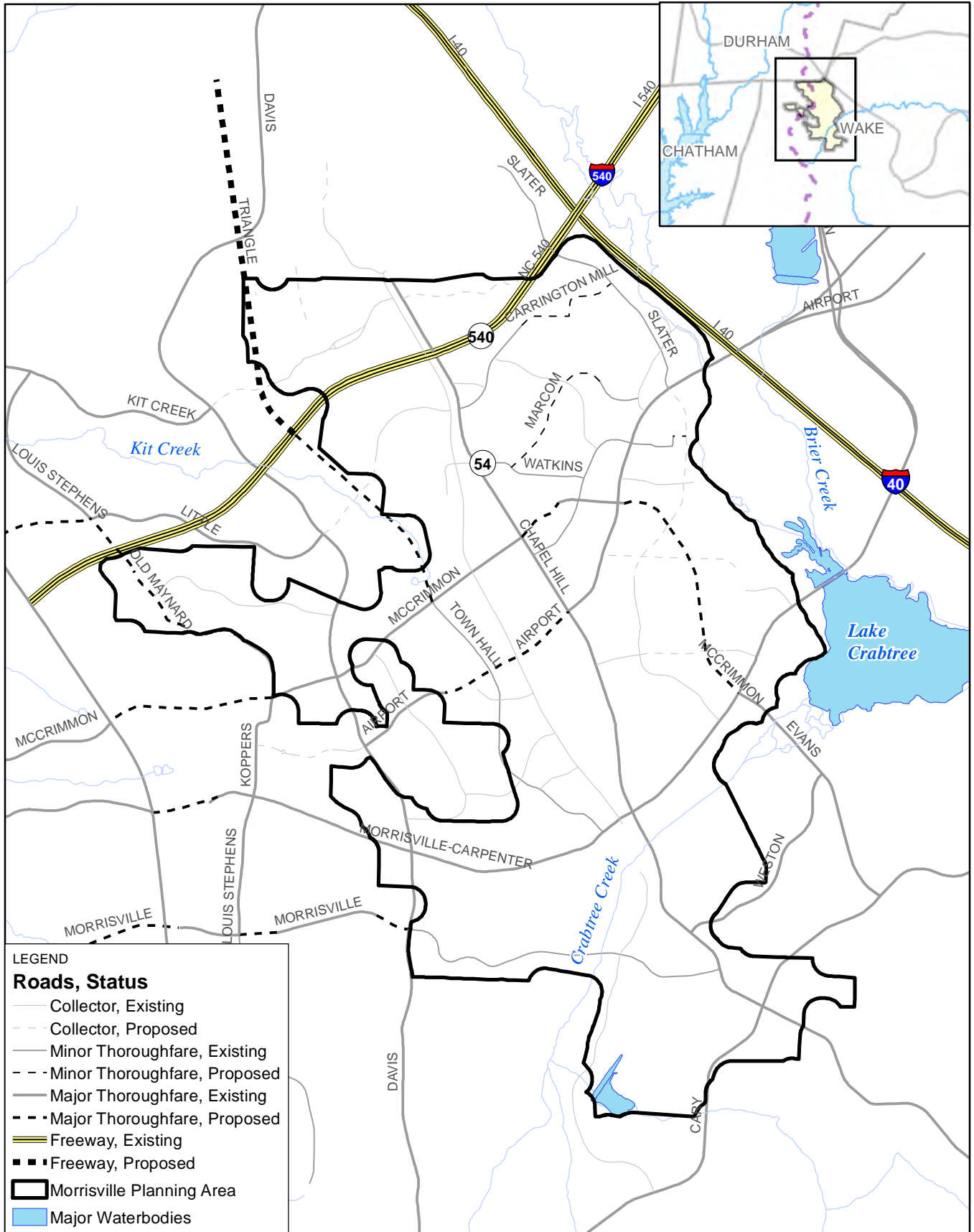


FIGURE 2-4
Proposed Transportation Infrastructure
 2015 Secondary and Cumulative Impacts
 Master Management Plan - Town of Morrisville

This page intentionally left blank.

SECTION 3

Purpose of and Need for Proposed Infrastructure

The purpose of and need for proposed infrastructure is a function of the Town of Morrisville’s commitment to its residents. The Town wants to ensure that its infrastructure plans are commensurate with the projected population of given sections within the Planning Area. The three main infrastructure elements are wastewater, water, and transportation. The projects in each area are evaluated against the goals of the Town.

In 2006, the Town completed a water and wastewater system utility merger with the Town of Cary. To ensure an orderly expansion of the utility system, the Town will follow the Town of Cary’s Standard Specifications and Details Manual for water and wastewater infrastructure. The Town of Morrisville has developed an Engineering Design Construction Manual to guide expansion of the Town’s stormwater infrastructure and development process. To ensure that adequate future capacity exists at the proper locations, the Town has developed a Land Use Plan that serves as the basis for infrastructure planning (Louis Berger Group, 2009a). The Town’s land use planning is described in Sections 5 and 6.

The Town grew rapidly in the 1980s, 1990s and 2000s, but growth has slowed in recent years. The population was estimated to be 251 in 1980, 5,208 in 2000, and 18,576 in 2010 (U.S. Census Bureau, 2010). Population projections shown in Table 3-1 include about 34,580 residents by the year 2045. The population projections presented in Table 3-1 are for the Planning Area and correspond with the Town’s land use plan and the Planning Department projections which are based on State Demographers Certified Estimates (Town of Morrisville, 2012).

To best meet the needs of residents, protect the environment, and conduct these efforts in a cost-effective way, the Town of Morrisville is working with the Town of Cary in implementing a long-range vision for the region. This effort will give the Town a measure with which to guide development and infrastructure improvements in coordination with its land use planning, described in Sections 5 and 6.

The Town integrates its transportation and land use plan with its other planning processes. By integrating its growth management strategies, land use planning strategies, and transportation plans, and coordinating infrastructure planning with the Town of Cary, the Town is able to preserve important ecological areas in the form of open space; ensure that its residents have adequate recreational resources; and meet water, wastewater, and transportation demands. In addition, proper planning helps ensure that Jordan Lake drinking water quality is protected.

TABLE 3-1
Town of Morrisville Population Projections

Year	Population
2012	20,164 ¹
2014	22,260 ²
2020	25,540 ¹
2025	28,200 ¹
2030	30,530 ¹
2035	32,100 ¹
2040	33,560 ¹
2045	34,580 ¹

¹ State Demographer Certified Estimate as of July 1, 2012

² Town of Morrisville Planning Department

The environmental documents that are developed for specific infrastructure projects will contain thorough justifications of why the project is needed to support the Town's growing demands. The balance of growth and environmental protection is of critical importance to the Town.

The Town's Engineering Department is responsible for planning, design, and construction of the capital improvements, including street improvements, right-of-way acquisition, stormwater improvements, thoroughfare planning, and management of development contract and easement releases. Under the 2006 utility merger agreement, the Town of Cary is responsible for improvements to the water and wastewater systems, including those needed for new development.

SECTION 4

Description of Existing Environment in Planning Area

This section describes the existing environment in order to facilitate the identification of potential SCI to the natural environment as growth occurs in the Planning Area. The data for this section were gathered through literature reviews, geographic information system (GIS) analysis; and phone conversations, letters, and meetings with various agency personnel.

4.1 Topography and Floodplains

The Town is located in the central piedmont physiographic region with gently sloping to moderately steep terrain. Floodplains function as storage areas for surface water during large rainfall events. Within floodplains, micro-topographical variations often create pockets of riparian wetlands. These riparian areas provide multiple functions, including: flood storage, wildlife habitat, corridors for wildlife movement, and water quality functions, such as infiltration zones and surface water filtering.

Approximately 0.7 square mile of Federal Emergency Management Agency (FEMA) regulated floodplains are located inside the Planning Area (FEMA, 2006). These floodplains represent 7 percent of the total Planning Area.

A majority of the regulated floodplain area is within the Town's stream buffer zone. Floodplains within watersheds greater than 1 square mile are regulated by FEMA. Flood Insurance Rate Maps (FIRMs) for the area are dated May 2, 2006 (FEMA, 2006). FIRMs for the Neuse River basin and Cape Fear River basin in Wake County are in the process of being updated and are expected to be available for public review in 2014. These updates will likely increase the floodplain information available to the Town. The floodplains may change in the future based on the revisions reflected in the updated FIRMs.

4.2 Soils

The major soil types are White Shore and Creedmoor. These upland soils are usually gently sloping to hilly, and moderately well drained. Triassic soils are found throughout much of the Town, resulting in a very firm clay subsoil type. These soils are derived from sandstone, shale, and mudstone. Soil types within floodplains and adjacent to streams include Chewacla, Mayodan, Creedmoor, and Congaree. These soils are silty or sandy loams.

4.3 Land Use

Figure 4-2 illustrates the general land use categories within the Planning Area. The map shows land available for development, developed land, and open space. The developed land is divided into residential and non-residential uses. The open space category includes protected open space, parks, and privately held open space.

Table 4-1 provides detail on the area (square miles) within each general land use category. As shown in the table, approximately 71 percent of the Planning Area is developed, 10 percent is open space, and another 19 percent is currently undeveloped and represents forested or vacant land (no building on the parcel). This category also includes parcels that are 10 acres or greater and have a single residence on them; these lands could be subdivided in the future.

Figure 4-1 illustrates the riparian buffers within the Town's Planning Area; these buffers account for 1.8 square miles or 18 percent of the Planning Area. The Wake County hydrology coverage, which includes perennial and intermittent streams, was used as the basis for determining the riparian buffer area. Floodplains inside the Planning Area are 0.7 square mile (or 7 percent of the Planning Area). Because of the manner in which the data were developed and analyzed, the riparian buffer and floodplain areas can occur in various land use categories. Other areas within developed categories, such as perimeter buffers, are actually open space. Additionally, the non-residential developed land use category is assumed to be over-estimated because of the inclusion of areas identified in the Town's GIS data as mixed use.

The actual percentage of open space within the Planning Area is likely greater than the amount indicated in Tables 4-1 and 4-2, and on Figures 4-1 and 4-2 because of the following factors: 1) large portions of the areas classified as residential are open space because of the large amount of low-density development; 2) the Town requires open space in residential and commercial developments; and 3) the Town requires the protection of 50-foot-wide undisturbed riparian buffers. In addition, as land is developed, the Town requires open space to be provided with the new developments. Therefore, many areas are undeveloped open space within the various general land use categories.

Table 4-2 provides a detailed breakdown of the Town's general land use categories. Non-residential use (41 percent) is predominant, while residential use (30 percent) is the second-most predominant land use within the Planning Area.

The majority of residential use (14 percent of total land use) is classified as low density.

TABLE 4-1
Planning Area Existing Land Use

General Land Use Type	Square Miles	Percent of Planning Area
Residential Developed	2.9	30%
Non-residential Developed ¹	4.0	41%
Undeveloped/Vacant ²	1.9	19%
Open Space ³	1.0	10%
Total	9.8	100%

Source: Town of Morrisville, 2013.

¹ Transportation and mixed use are included within the Non-Residential Developed category.

² Undeveloped land is any undeveloped land that has the potential for development. Undeveloped land may be forested or vacant. The Town does not have any active farms,

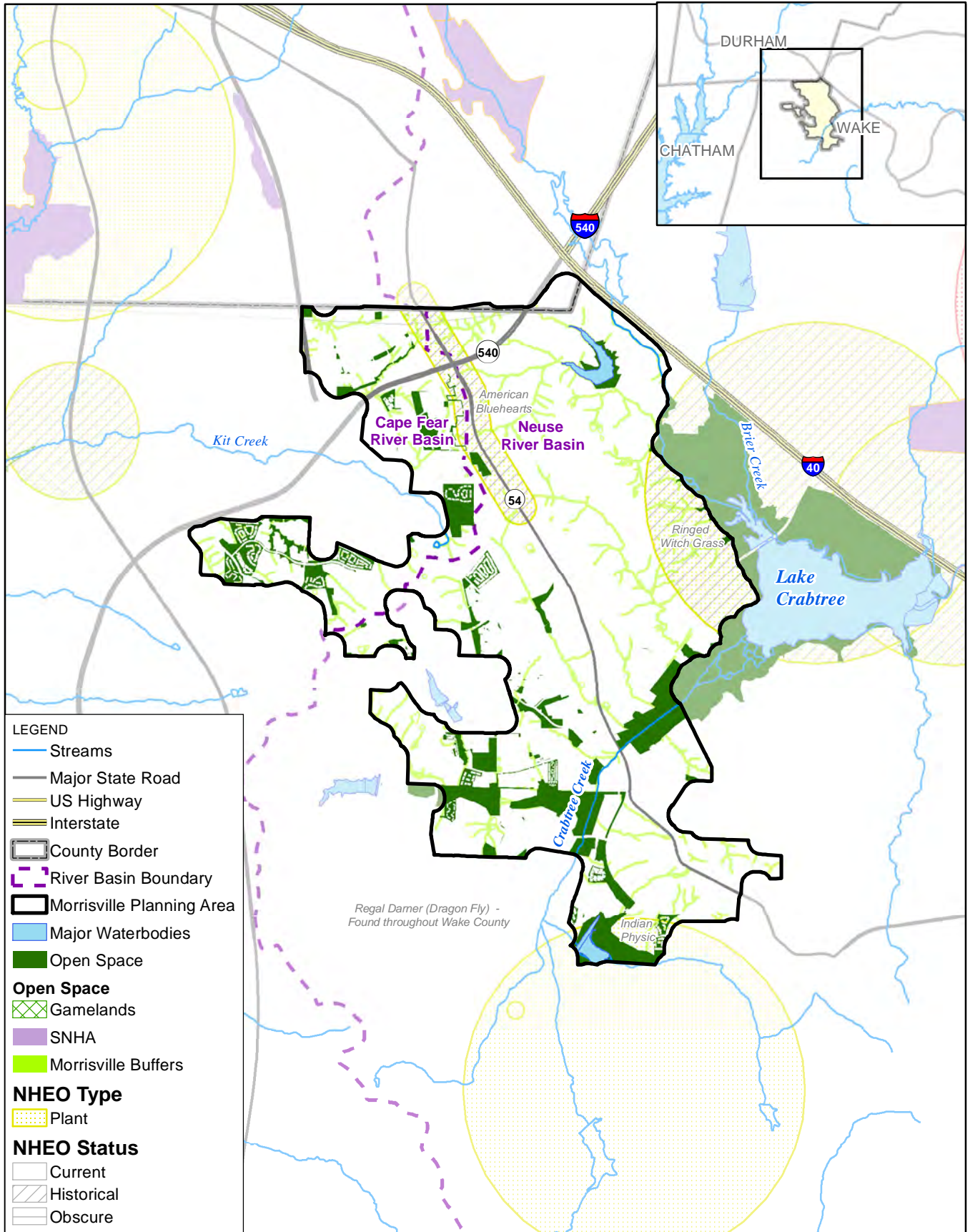


FIGURE 4-1
Environmental Features
 2015 Secondary and Cumulative Impacts
 Master Management Plan - Town of Morrisville

This page intentionally left blank.

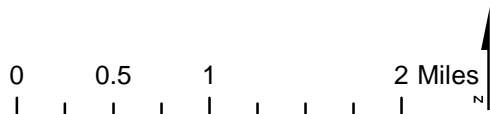
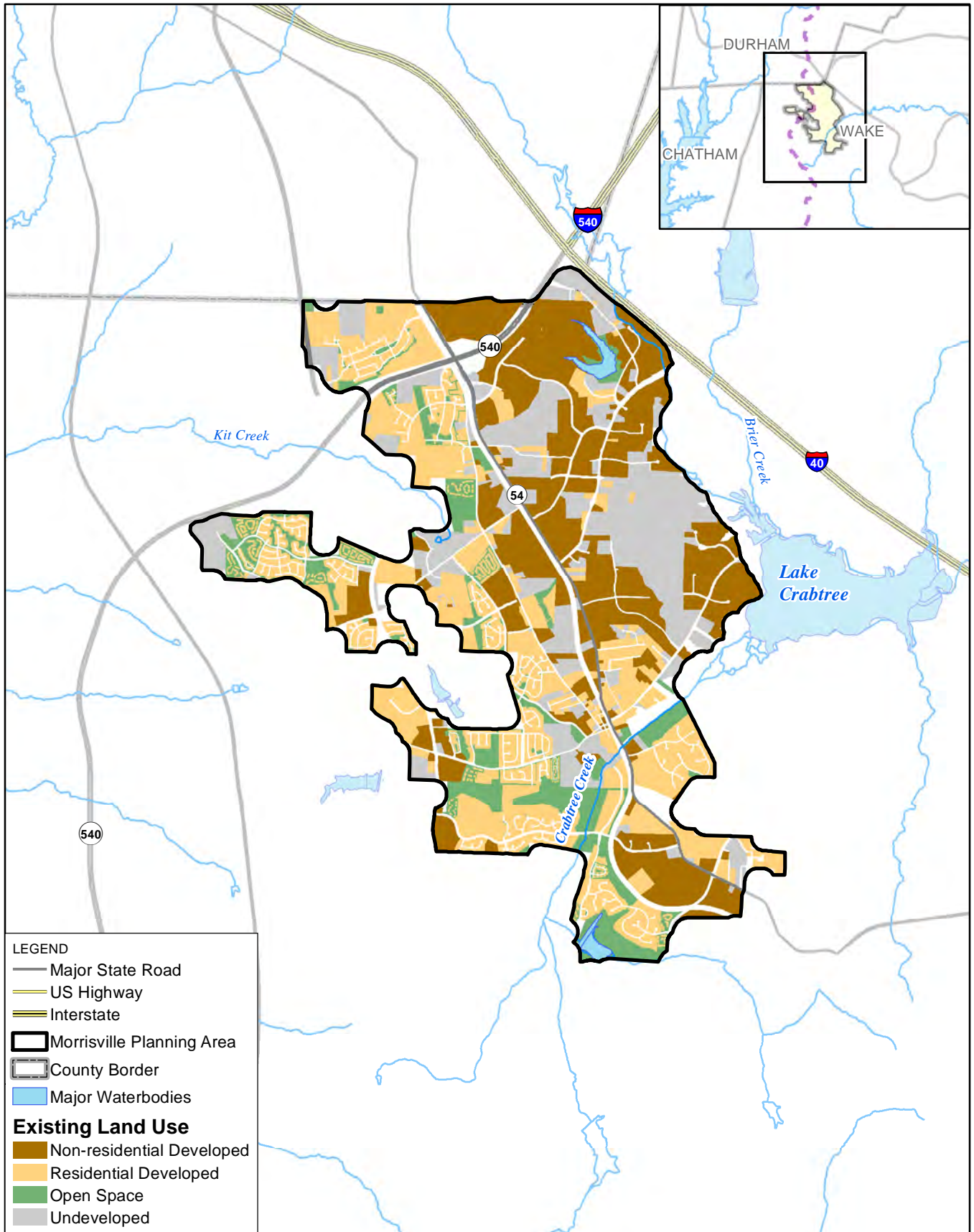


FIGURE 4-2
Existing Land Use
 2015 Secondary and Cumulative Impacts
 Master Management Plan - Town of Morrisville

This page intentionally left blank.

TABLE 4-2
Planning Area Detailed Existing Land Use

Land Use Type	Square Miles	Percent of Planning Area	Estimated Percent Impervious ⁴	Estimated Impervious Square Miles
Commercial	0.6	6%	82%	0.5
Industrial	1.0	10%	82%	0.8
Office and Institutional	1.0	10%	72%	0.7
Mixed Use ¹	0.2	2%	72%	1.1
Transportation ²	1.2	13%	87%	0.6
High-density Residential	0.8	8%	72%	0.3
Medium-density Residential	0.7	8%	44%	0.3
Low-density Residential	1.4	14%	21%	0.1
Undeveloped/Vacant ³	1.9	19%	4%	<0.1
Golf Course	0.3	3%	4%	<0.1
Park/Greenway/Open Space	0.7	7%	4%	0.5
Total	9.8	100%		4.5

Sources: Town of Morrisville, 2013

Note: The Town's land use categories are described in Appendix D

¹ Mixed use was categorized within the non-residential developed category in Table 4-1.

² Transportation is not included in the land use coverages. The area used for transportation was estimated by subtracting the land use area from the transportation area.

³ Undeveloped land is forested or vacant lots. The Town does not have any active farms.

⁴ Percent imperviousness estimates are based on a modeling analysis done for the Town of Cary (CH2M HILL, 2002a). Imperviousness values most likely over-estimate the percent imperviousness because reference categories contained slightly higher densities for residential classes than the Town of Morrisville designates.

Table 4-2 also includes estimates of percent imperviousness; the estimated values shown in the table were used in modeling analyses performed for the Town of Cary in its Northwest Area (CH2M HILL, 2002a). These values are based on literature values. The percentage impervious per land class was used to estimate the impervious area for the 2013 land use data. These were then summed and divided by the total land area to estimate the overall impervious value for existing land use conditions. The total estimated percent impervious is approximately 45 percent.

4.4 Wetlands

For regulatory purposes under the Clean Water Act (CWA), the term wetlands means "those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." In general, wetlands share three key characteristics: wetland hydrology, hydric soils, and hydrophytic vegetation. Wetlands and vegetated riparian areas are valuable because they are among the

most biologically productive natural ecosystems in the world. They also protect wildlife, provide natural open spaces, protect water quality, control erosion, and limit flood damage.

Wetlands, as classified in the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI), within the Planning Area are primarily riparian or bottomland forest associated with streams and their floodplains (Figure 4-3) (NCCGIA, 2013, which is based on the 1982 USFWS NWI). The majority of the NWI wetlands are forested or scrub-shrub and are part of bottomland communities adjacent to larger streams within the Planning Area (Table 4-3). Analysis of the Wake County Soil Survey (USDA, 1970) also shows hydric soils, primarily along stream channels, concurring with NWI data indicating that wetlands within the Planning Area are primarily located within riparian and floodplain areas. Small areas of emergent wetlands are present along ponds. Open water ponds occur along many of the streams within the Planning Area. While the NWI does not map all jurisdictional wetlands, it is useful in terms of classifying types of wetlands and their approximate locations within the Planning Area. It is important to note that many changes have taken place within the Planning Area since these data were compiled.

TABLE 4-3
National Wetlands Inventory

NWI Type	Acres
Emergent	8
Forested/Shrub	156
Lakes/Ponds	73
Total	237

Source: NCCGIA, 2013

4.5 Prime or Unique Agricultural Lands

North Carolina Executive Order 96 charges all State agencies to minimize the loss of prime agricultural and forested lands as defined in the Federal Farmland Protection Policy Act. The United States Department of Agriculture (USDA) Natural Resources Conservation Service has classified lands into three categories based on suitability for agricultural uses. These classifications incorporate soil type, slope, and water capacity. Prime farmlands are those soils with slopes between zero and eight percent in capability classes I and II, and some in capability class III. Unique farmlands are recognized for having a certain set of parameters necessary to produce certain high-value crops. The third category, farmland of statewide importance, includes those soils that do not quite qualify as prime farmland. Factors include steepness of slope, susceptibility to erosion, and permeability (USDA, 1998).

Soils being defined as prime farmland are present within the Planning Area. The major soil types in the Planning Area are White Shore and Creedmoor. These upland soils are sandy loams. Soil types within floodplains and adjacent to streams include Chewacla, Mayodan, Creedmoor, and Congaree. These soils are silty or sandy loams. Of the major soil types within the Planning Area, Congaree, Creedmoor, and Chewacla are listed as prime farmlands (USDA, 1998). Chewacla soils must be drained to be of use for agricultural purposes. Other soil types considered of statewide importance include Mayodan and White Shore. While soils may be classified as prime farmland, such classification does not mean that these areas are currently under tillage because many of these soils have been affected by previous development and other soil disturbances. Town staff has indicated that there are no farms within the Planning Area, with the exception of a community garden on Town-owned land; the property is leased to a local community group for a nominal fee.

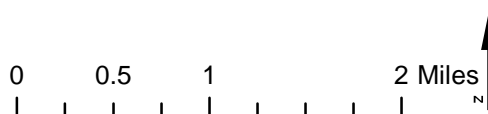
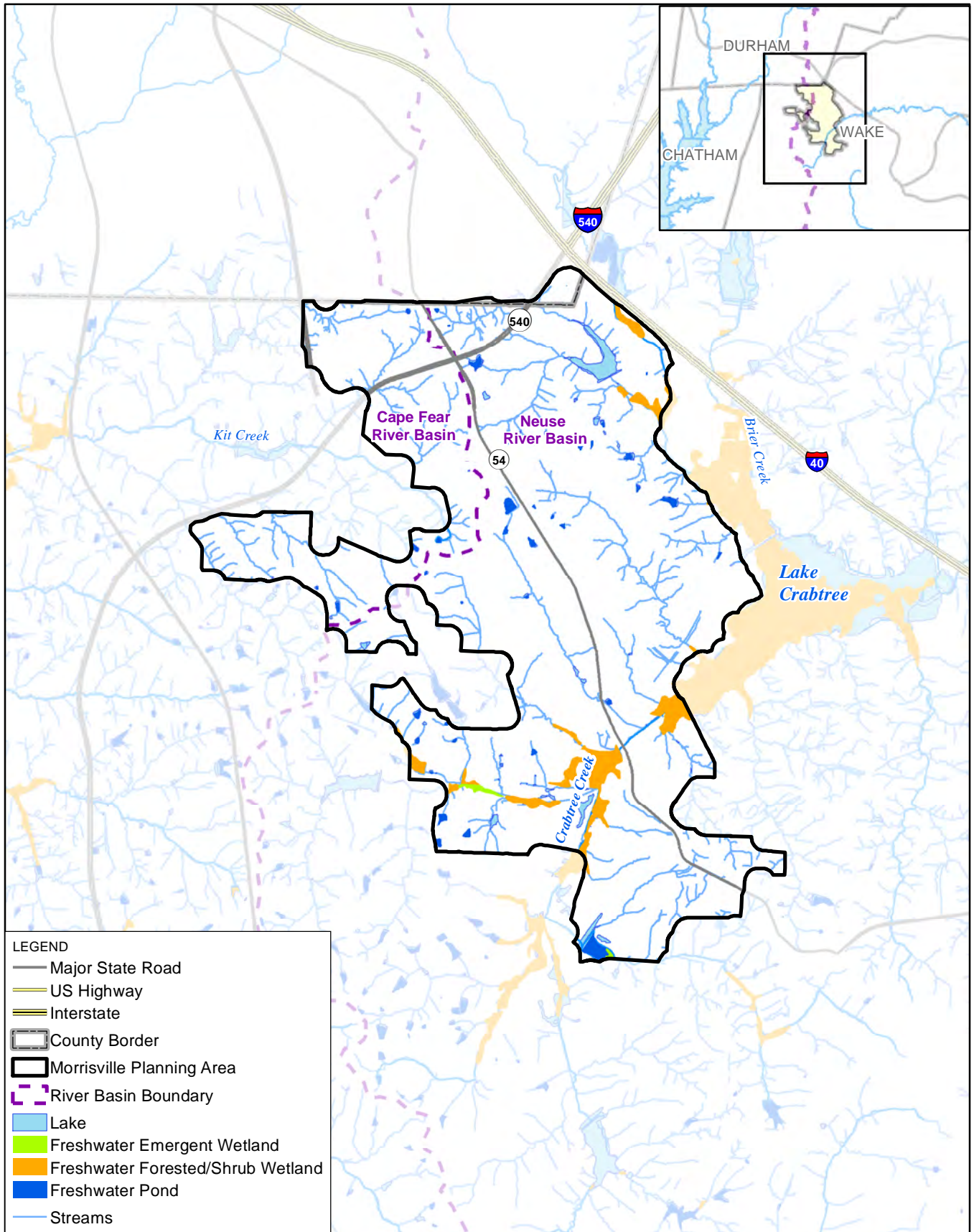


FIGURE 4-3
National Wetlands Inventory (NWI)
 2015 Secondary and Cumulative Impacts
 Master Management Plan - Town of Morrisville

This page intentionally left blank.

4.6 Public Lands and Scenic, Recreational, and State Natural Areas

This category includes Federal, State, and local parks, and other scenic and recreational areas. Some major parks present within the Planning Area are Morrisville Community Park, Shiloh Park and Cedar Fork District Park (Table 4-4), the latter of which stretches across the Planning Area boundary into Cary. Figures 4-1 and 4-2 show the parks as open space. Morrisville Community Park offers sports facilities and a half-mile trail. Crabtree Park, which is just outside the Planning Area, surrounds Lake Crabtree, is used extensively for recreation, and is maintained by Wake County. These open spaces provide both scenic and recreational opportunities for residents. A major new park funded by Bonds approved in 2004 is the RTP Park, with completion of construction scheduled for fall 2014. This park will feature tournament quality Cricket facilities.

The Town has a total of 157 acres of dedicated land for parks and open space, with 90 acres developed, 44 acres undeveloped, and 23 acres dedicated for open space. The undeveloped park space includes a 37 acre Crabtree Creek Nature Center, which is adjacent to the Cedar Fork District Park and is planned for 2040. A detailed inventory of the parks and greenway system is found in the Town’s 2011 Parks and Recreation Master Plan. Privately held recreational open space totals 585 acres, primarily including the Prestonwood Golf Course (Town of Morrisville, 2011). There are no gamelands within the Planning Area (NCWRC, 2013a)

TABLE 4-4
Open Space within the Planning Area

Park	Total Acres	Acres within Planning Area	Owner
Morrisville Community Park	35	35	Town of Morrisville
Cedar Fork District Park	31	4	Wake County/Town of Morrisville
Shiloh Park	8	8	Town of Morrisville
Indian Trailhead and Open Space	18	18	Town of Morrisville
RTP Park	25	25	Town of Morrisville
Undeveloped ¹	44	44	Town of Morrisville
Dedicated Open Space	23	23	Town of Morrisville
Total	184	157	

Source: Town of Morrisville, 2011

¹ Includes the 37-acre Crabtree Creek Nature Center

4.7 Areas of Archaeological or Historical Value

SEPA requires the conservation and protection of the State’s natural resources and preservation of “the important historic and cultural elements of our common inheritance.” The National Register of Historic Places (NRHP) is the formal repository of information pertaining to historic structures and districts; it is maintained by the National Park Service

(NPS). Places considered for listing include historic structures and districts, cemeteries, and archaeological sites. The Town has three structures identified in the NRHP: the Morrisville Christian Church, the Williamson Page house, and the James M. Pugh House (NPS, 2014).

The Town has actively worked to preserve history as development has occurred. The Town created a History Center, located in Town Hall to educate residents of the various phases of the Town's history and encourage appreciation of the Town's historically significant sites. The Morrisville Christian Church was renovated as a Town project in 2011 and approved for listing on the NRHP in 2012. The James M. Pugh House was added to the Register in 2003. Because of the improvements at the intersection of NC 54 and Morrisville-Carpenter Road, the Pugh House was relocated to a nearby site that is visually prominent in the Town Center area. The house relocation was coordinated with the State Historic Preservation Office (SHPO). Town-funded renovation of the exterior of the of the Pugh House occurred in 2012, and Wake County Landmark designation was obtained in 2013.

Town staff also worked with the developer of a shopping center site to relocate, before construction took place, two tobacco barns that would have threatened the structures. One of the barns was relocated to a Town-owned property for future site enhancement.

As of 2014, there have been almost 1,900 archaeological sites identified, ranging from Paleo-Indian (10,000 BC) to 19th century industrial sites (NCDCCR, 2014a) To support federal efforts to protect historic places, the Town became a Certified Local Government (CLG). The responsibilities of a CLG are:

- Enforcement of appropriate State or local legislation for the designation and protection of historic properties
- Establishment of a historic preservation review commission
- Maintenance of a system for the survey and inventory of historic properties that is compatible with the statewide survey
- Providing opportunities for public participation in the local program

As a CLG, the Town is eligible for grant money and can provide local expertise during the nomination process for the NRHP. The Wake County Historic Preservation Commission has jurisdiction over Morrisville (NCDCCR, 2014b).

Looking to the future, the Town Center Plan creates a vision for the original center of Morrisville, identifies historic neighborhoods to preserve and enhance, and proposes preparation of Historic Preservation Guidelines for the area. The plan also identifies significant open space areas, including a historic civil war battlefield.

4.8 Air Quality

The U.S. Environmental Protection Agency (USEPA) uses the Air Quality Index (AQI) to report ambient air quality conditions. The AQI range includes good, moderate, unhealthy for sensitive groups, unhealthy, and hazardous. In 2012, the median AQI in Wake County was 42, or "good." No days were considered unhealthy and 4 days were considered unhealthy for sensitive populations (USEPA, 2012a).

A new, more stringent National Ambient Air Quality Standard for ozone was established by USEPA in 1997. As of June 2005, Wake County, which was identified as a maintenance area, was no longer subject to the 1-hour standard. In March 2008, USEPA further strengthened the national standards for 8-hour ozone levels. Since 2006, the County has been listed as a maintenance area for the 8-hour ozone standard. Ozone is not directly emitted, but is formed when sunlight reacts with volatile organic compounds and nitrogen oxides, and is a component of smog. The largest source of the precursors to the formation of ozone in the Planning Area is exhaust from motor vehicles. The Raleigh/Durham area is listed as a maintenance area for carbon monoxide, which is primarily emitted from transportation and industrial sources (USEPA, 2013).

In 2013, North Carolina had its lowest ozone levels on record since air monitoring began in the early 1970s. The declining ozone levels paralleled lower emissions from the State's power plants. A recent report by the NC Division of Air Quality (NCDAQ) shows that the State's coal-fired power plants have cut their nitrogen oxides emissions, a primary industrial contributor to ozone pollution, by more than 80 percent since the General Assembly enacted the Clean Smokestacks Act in 2002 (NCDENR, 2013a).

4.9 Noise Levels

Within the Planning Area, noise is primarily created by transportation sources: RDU Airport, North Carolina Railroad (NCR), and vehicular traffic. Typical flight patterns for the airport cross the northern edge of the Planning Area. The NCR rail lines run approximately two miles through town in a north-south direction (roughly paralleling NC 54) through both residential and non-residential areas. Train traffic occurs throughout the day on an intermittent basis. Noise is generated by the movement of engines and cars over the track, as well as train whistles near at-grade rail crossings. Noise levels are highest near the airport and along traffic corridors, with lower noise levels in residential areas. Typical residential noises include lawn mowers, leaf blowers, and barking dogs. This noise is generally concentrated during daylight hours. Construction activities, which occur with development, are also present within the Planning Area and are temporary. Noise is also associated with industrial activities, and with 10 percent of land use consisting of industrial land uses; this land use is a likely contributor to noise in the Planning Area.

4.10 Water Resources

4.10.1 Surface Water

The Town lies on the ridge between the Neuse and Cape Fear River basins. Approximately 81 percent of the study area lies in the Neuse River basin (HU 03020201) and 19 percent lies in the Cape Fear River basin (HU 03030002) (Figure 4-4). Within the Planning Area, many ponds are present along the smaller tributaries. The major tributary to the Neuse River basin within the Planning Area is Crabtree Creek (Table 4-5). Its tributaries include Coles Branch, Stirrup Iron Creek, and many unnamed streams. The Environmental Management Commission (EMC) classifies all water bodies within the State based on best usage, and each classification represents certain designated uses. All of the streams in the Planning Area are classified as Class C (NCDENR, 2004, 2012a). (Note: The EMC has not classified many of the unnamed tributaries shown on Figure 4-4; stream classifications of unnamed tributaries are

equivalent to the stream into which they drain). The designated uses of Class C waters are aquatic life support, swimming, and fishing. In addition to the assigned classifications, all waters within the Planning Area are classified as Nutrient Sensitive Waters (NSW) in response to excessive growths of macroscopic and/or microscopic vegetation.

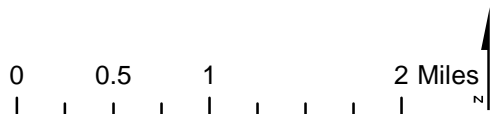
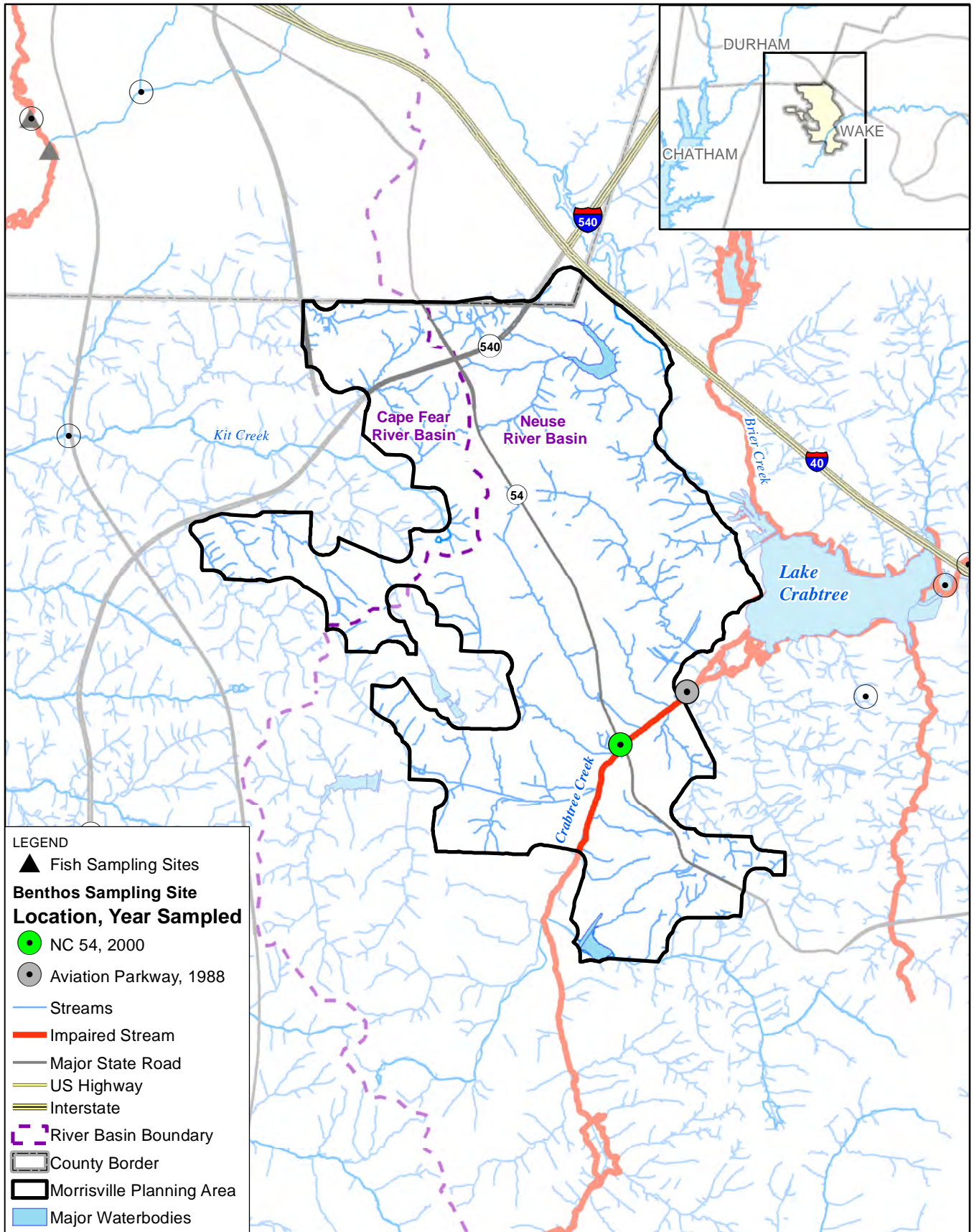


FIGURE 4-4
Water Resources
 2015 Secondary and Cumulative Impacts
 Master Management Plan - Town of Morrisville

This page intentionally left blank.

Within the Cape Fear River basin, the major tributary is Kit Creek (Table 4-5 and Figure 4-1). Kit Creek drains to Northeast Creek before it enters Jordan Lake, which is the Town's water supply and a highly used recreational area. The headwaters of Kit Creek are just within the Planning Area, and are classified as Class C waters. Outside the Planning Area, near NC 55 the stream changes to WS-IV (water supply) classification. WS-IV designated areas have development density limits, mandates related to best management practices (BMPs), and landfill construction limitations. Approximately one percent of the Town's Planning Area lies within a water supply watershed (WSW) (NCDENR, 2012a).

In 2013, the Town had an assessment performed for Kit Creek watershed. Streams, buffers, and outfalls were evaluated, in order to determine potential mitigation opportunities. The stream assessment found that in general streams were in stable condition with low bank erosion, but some reaches are incised with indications of sediment deposition and poor water quality and aquatic habitat. The buffer assessment indicated that a majority of the buffers were 50 feet wide. In general, invasive species were observed in upland utility line right of ways. Twelve of the 38 outfalls evaluated were classified as being in poor condition due to active erosion, unstable channel conditions, headcutting and undercut outlet structures (Stantec, 2013).

TABLE 4-5
Planning Area Watersheds

River Basin	Watershed	EMC Subbasin	EMC Water Quality Classification	Watershed Description
Neuse River	Crabtree Creek	03-04-02	C NSW	Tributaries include Coles Branch and Stirrup Iron Creek.
Cape Fear River	Kit Creek	03-06-05	C NSW; WS-IV NSW	Kit Creek discharges to Northeast Creek before it enters Jordan Lake.

Source: NCDENR, 2012a; Secondary Recreation

Within the Neuse River Basin, benthic macroinvertebrate communities are sampled to analyze water quality and habitat conditions at one site within the Planning Area. Crabtree Creek is sampled at NC 54 near the border of the Planning Area with Cary. At this site, the benthic macroinvertebrate community rating was "Poor" in 1995, 2000, and 2005. The low rating resulted from many factors affecting habitat, including sediment loading and siltation, low dissolved oxygen (DO) levels, and high conductivity (NCDENR, 2012b). In addition, the North Carolina Department of Water Resources (NCDWR) may perform biological monitoring at other locations periodically, within the Town's Planning Area on the basin rotation schedule.

No benthic macroinvertebrate community sampling locations are present within the Cape Fear River basin in Wake County (NCDENR, 2004). Also, there are no fish community sampling sites in the Planning Area (NCDENR, 2005 and 2012b).

4.10.1.1 303 (d) Listed Streams

Section 303(d) of the CWA requires that states develop a list of waters not meeting water quality standards or that have impaired uses. The State must prioritize these water bodies and prepare a management strategy or total maximum daily load (TMDL).

Within the Planning Area, Crabtree Creek is the only stream listed on the 303(d) list. With impaired biological integrity, this stream has been listed since 1998. Potential issues also include chlorophyll *a* and turbidity levels. Identified potential sources of impairment include urban runoff and storm sewers (NCDENR, 2012a).

Limited data exist to determine whether water quality in Crabtree Creek is improving, degrading, or stable. Data collected in Crabtree Creek downstream of the North Cary WRF indicate that the stream is stable. Benthic data collected in 2005 showed decreases from previous years in scores for ephemeroptera, plecoptera, and tricoptera (EPT), but the scores increased in 2010 (NCDENR, 2012b).

4.10.1.2 Wake County Watershed Assessment Summary

In an effort to characterize the health of its streams and watersheds, Wake County completed a watershed assessment in 2001 to assess the overall effects of land use changes on stream physical structure and aquatic communities. An update to this watershed assessment has not been undertaken since 2001.

In summary, three types of assessments were conducted in streams and watersheds county-wide:

- **Biological assessment** – Benthic organisms were collected and identified, providing an estimate of long-term effects of water quality on the aquatic community.
- **Habitat assessment** – The effects of land use changes on streams were assessed to help differentiate the impacts of water quality pollutants versus habitat degradation on the stream environment.
- **Stream geomorphology** – Characteristics, such as channel shape, channel slope, sediment load, and sediment size, were assessed to help determine stream bank erodibility and other potential areas of stream degradation.

This evaluation concluded that many of the streams within the County were degraded. Influencing factors include agricultural practices and urbanization, with the effects of urbanization on the biotic community structure more pronounced than agricultural effects. Within the Planning Area, three sites were evaluated (Table 4-6). In general, these sites upstream of Crabtree Lake exhibit moderate to severe entrenchment. Crabtree Creek had a Fair bioclassification, while Stirrup Iron Creek had a Poor bioclassification based on very low macroinvertebrate diversity. Watershed classifications are in line with the majority of streams in the County.

TABLE 4-6
Wake County Watershed Assessment Summary

Stream Name	Nearest Road Crossing	Habitat Condition	Bioclass	Watershed Classification	Entrenchment
Crabtree Creek	Morrisville Square	Marginal	Fair	Fair	Entrenched
Crabtree Creek	NC 54	Sub-optimal	Poor	Good	Moderate
Stirrup Iron Creek	Sorrels Grove Church Rd.	Marginal	Poor	Fair	Moderate

Source: CH2M HILL, 2002b

4.10.2 Groundwater

The Planning Area is within the Triassic Basin of the Piedmont region of North Carolina and is characterized by a thin regolith layer, which limits groundwater storage capacity. As a result, well yields tend to be low (around 5 to 25 gallons per minute[gpm]). Within the western portion of Wake County, where the Planning Area is located, approximately 6 percent of precipitation reaches the groundwater for recharge, contributing approximately 35 to 55 percent of stream baseflow during normal precipitation years (CDM, 2003).

Groundwater within the Planning Area is generally free of contaminants and is used as a source of drinking water by individuals and community well systems (CDM, 2003). Because of the prevalence of Triassic soils in the area, septic systems may not percolate well, and could provide a public health hazard if not properly designed, installed, and maintained.

Some residents within the Planning Area currently obtain their water from wells and discharge waste to septic systems. These residents could request that the Town provide service when municipal water and sewer are available to them. New development will be served by current treatment facilities.

4.11 Forest Resources

This section further describes those lands within the vacant and open space land use categories that are forested. In addition to land use data provided by the Town, land cover data from by the North Carolina Gap Analysis Program (NCGAP) were also analyzed and are described below (NCGAP, 2006). The NCGAP land cover data are based on a land use analysis performed by U.S. Geological Survey (USGS), using 1992 satellite imagery. These data provide a better understanding of the types of forest resources present within the Planning Area. Much of the land classified as vacant by the Town is currently forested.

The most dominant forest type within the Planning Area is Piedmont/Mountains Dry-Mesic Oak and Hardwood Forest. These forests are primarily oak dominated forests with white oak (*Quercus alba*) often dominant. Habitats with drier conditions are dominated by southern red (*Q. falcata*), post (*Q. stella*), and chestnut oaks (*Q. prinus*). Sweetgum (*Liquidambar styraciflua*) and yellow poplar (*Liriodendron tulipifera*) are the other main canopy species. Sites with basic soils may also provide habitat for eastern red cedar (*Juniperus virginiana*).

Other natural communities in the Planning Area include the Piedmont Dry-Mesic Pine Forests, which are dominated by loblolly pine (*Pinus taeda*), especially those that previously were cleared. Communities with drier xeric habitats tend to be dominated by Virginia pine (*P. virginiana*) or shortleaf pine (*P. echinata*). Also present in the Planning Area are Dry-Mesic Oak and Pine Forests, which include loblolly pine with several oak species, such as white, post, and southern red oak.

Another common forest type includes the Coniferous Cultivated Pine Plantations (natural and planted), with dominant pine species including loblolly, slash (*P. elliottii*), and longleaf (*P. palustris*).

Because of the fragmented nature of forested parcels of land in the Planning Area, smaller areas of forest are not suitable for continued silviculture use. However, forested areas being converted to other land uses do provide a one-time source of wood products.

4.12 Shellfish or Fish and their Habitats

Water resources within the Planning Area provide aquatic habitat for various species of fishes and other aquatic organisms. These streams provide free-flowing, warm-water habitats with moderate gradient, generally alternating pools and riffle-runs, and substrates consisting mainly of rocks, gravel, sand, and mud. Many ponds also provide warm-water habitat within the Planning Area. Recreational fishing opportunities are available. Typical fishes caught within the streams and ponds include catfish, suckers, bass, crappie, and sunfish.

No fish community sampling sites are maintained by NCDENR within in the Planning Area (NCDENR, 2005 and 2012b).

4.13 Wildlife and Natural Vegetation

Upland wildlife communities are home to Virginia opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), eastern cottontail (*Sylvilagus floridanus*), gray squirrel (*Sciurus carolinensis*), red (*Vulpes vulpes*) and gray foxes (*Urocyon cinereoargenteus*), and white-tailed deer (*Odocoileus virginianus*), eastern mole (*Scalopus aquaticus*), and several species of shrews and mice. Amphibians and reptiles are abundant and diverse. Frogs, turtles, and water snakes inhabit wetlands and the perimeters of ponds and streams.

Bird life in the Planning Area is typical of the Carolina Piedmont. The Northern cardinal (*Cardinalis cardinalis*), American robin (*Turdus migratorius*), Carolina chickadee (*Poecile carolinensis*), Eastern bluebird (*Sialia sialis*), Eastern towhee (*Pipilo erythrophthalmus*), various sparrow and warbler species, and other songbirds make their homes in the backyard habitats and forests of the area. Hawks, such as the red-tailed hawk (*Buteo jamaicensis*), owls, and vultures, are predator and scavenger species known to inhabit the area. The open waters of Harris Lake and the many ponds in the Planning Area attract the Bald eagle (*Haliaeetus leucocephalus*) and a variety of waterfowl, including migratory species. Mallards, wood ducks, teal, and other ducks, as well as geese, may be seen during certain seasons. Wading birds, including great blue heron (*Ardea herodias*) and green heron (*Butorides virescens*), may be encountered along lake shallows.

Following is a discussion of the rare wildlife and wildlife habitats found within the Planning Area. Forested areas and habitats were discussed in Section 4.11.

4.13.1 Rare, Threatened, or Endangered Species

Specific regulations exist at the State and Federal levels to protect endangered and threatened species and their habitats from impacts resulting from to public or private projects and land-disturbing activities. The primary law that protects sensitive wildlife species is the Federal Endangered Species Act (ESA) of 1973.

The USFWS identifies species that are federally listed as endangered, threatened, or species of concern and may have suitable habitat present or known occurrences in Wake County, as listed in Table 4-9 (USFWS, 2014a). Information obtained from the North Carolina Natural Heritage Program's (NCNHP) Natural Heritage Element Occurrence (NHEO) and SNHA databases, updated in January 2014, were analyzed to identify occurrences of both state and federally listed species. There were no documented reports of individuals or populations of federally listed endangered or threatened species within the Planning Area (NCNHP, 2014).

The USFWS identifies species within Wake County that are Federally listed as endangered, threatened, or species of concern and may have suitable habitat present or known occurrences in Wake County, shown in Table 4-7 (USFWS, 2014a). A complete list of state-listed species within Wake County is provided in Appendix E, as well as state-listed species within the Planning Area.

The USFWS identified 20 federally listed species as having the potential to occur within Wake County as presented following Table 4-9. Of these, 16 are listed as Federal Species of Concern (FSC), 3 are endangered and 1 is proposed. Species listed as endangered includes the red-cockaded woodpecker (*Picoides borealis*), the dwarf wedgemussel (*Alasmidonta heterodon*), and Michaux's sumac (*Rhus michauxii*). The Northern long-eared bat (*Nyctophilus arnhemensis*), has been proposed for listing as federally endangered or threatened. The bald eagle (*Haliaeetus leucocephalus*) was removed from the Federal List of Threatened and Endangered Species in 2007, but remains federally protected (USFWS, 2014a). There were no documented reports of individuals or populations of federally listed species within the Planning Area (NCNHP, 2014). A brief discussion of these species is included following Table 4-9.

The bald eagle (*Haliaeetus leucocephalus*) was removed from the Federal List of Threatened and Endangered Species in 2007. The species is now protected by the Bald and Golden Eagle Protection Act (BGPA), which prohibits disturbing the eagle or its nests, which are often constructed near water and reused by the same pair year after year. The recovery of this species is largely a result of banning harmful pesticides, including dichlorodiphenyltrichloroethane (DDT) (USFWS, 2014a). An inactive nest is located north of Lake Crabtree and a population exists near Jordan Lake (NCNHP, 2014). These areas are near, but not within, the Planning Area.

The northern long-eared bat (*Myotis septentrionalis*) is proposed for listing as an endangered species. It is 3 to 4 inches in length, with a wingspan of 9 to 10 inches and is distinguished by its long ears. They roost individually or in colonies under tree bark or in crevices of both live and dead trees. They typically hibernate in caves and mines, usually large with large entrances, stable temperatures, and high humidity with limited air flow. White-nose syndrome, a fungal disease known to affect bats, is currently the predominant threat to this bat. White-nose syndrome is currently found in at least 22 of 39 states, including North Carolina, and continues to spread across much of the northern and eastern US (USFWS, 2014b). In 2013, NCWRC adopted a surveillance and response plan to outline steps to protect the species (NCWRC, 2013b). The northern long-eared bat has not been observed within the Planning Area (NCNHP, 2014).

The dwarf wedgemussel (*Alasmidonta heterodon*), a freshwater mussel species, is federally listed as endangered. This small mussel is less than 1.5 inches in length and can be identified by its dentition pattern; the right valve possesses two lateral teeth, while the left valve has one tooth. Habitat preferences include a slow to moderate current and a sand, gravel, or muddy stream or river bottom. As with other freshwater mussel species, glochidia are released into the water by females after reproduction. These glochidia then attach to host fishes for further development. The success of the species also depends on the success of specific host fishes. The tessellated darter (*Etheostoma olmstedii*), johnny darter (*Etheostoma nigrum*), and mottled sulphin (*Cottus bairdi*) have been identified as hosts for the dwarf wedgemussel (USFWS, 2014a). The original range of this species stretched from New

Brunswick, Canada to North Carolina. This species has been found in Swift Creek, Little River, and Buffalo Creek; but, according to the most recent version of the NHEO database provided by NCNHP, no individuals of dwarf wedgemussel have been recorded within the Planning Area (NCNHP, 2014).

TABLE 4-7
Federally Listed Species within Wake County

Scientific Name	Common Name	Federal Status	County Status
Animals			
<i>Aimophila aestivalis</i>	Bachman's Sparrow	FSC	Historic
<i>Ambloplites cavifrons</i>	Roanoke bass	FSC	Current
<i>Anguilla rostrata</i>	American eel	FSC	Current
<i>Etheostoma collis lepidinion</i>	Carolina darter	FSC	Probable/potential
<i>Haliaeetus leucocephalus</i>	Bald eagle	BGPA	Current
<i>Heterodon simus</i>	Southern hognose snake	FSC	Obscure
<i>Lythrurus matutinus</i>	Pinewoods shiner	FSC	Current
<i>Myotis austroriparius</i>	Southeastern myotis	FSC	Historic
<i>Myotis septentrionalis</i>	Northern long-eared bat	P	Current
<i>Noturus furiosus</i>	Carolina madtom	FSC	Current
<i>Picoides borealis</i>	Red-cockaded woodpecker	E	Historic
Invertebrates			
<i>Alasmidonta heterodon</i>	Dwarf wedgemussel	E	Current
<i>Elliptio lanceolata</i>	Yellow lance	FSC	Current
<i>Fusconaia masoni</i>	Atlantic pigtoe	FSC	Current
<i>Lasmigona subviridis</i>	Green floater	FSC	Current
Insects			
<i>Speyeria diana</i>	Diana fritillary	FSC	Current
Plants			
<i>Trillium pusillum</i> var. <i>virginianum</i>	Virginia least trillium	FSC	Current

Source: USFWS, 2014a, updated January 22, 2014

Note: Additional state-listed species can be found in Appendix E.

Federal Status:

T = Threatened

E = Endangered

P = Proposed listing

FSC = Federal Species of Concern

BGPA= Bald and Golden Eagle Protection Act

Michaux's sumac (*Rhus michaux*) is an upland terrestrial vascular plant that is also considered endangered. This shrub grows to between 1 and 3 feet, and flowers between June and July. Most plants are unisexual, which may partly explain the plant's rarity. Reproductive capacity is low. Typical habitat includes sandy or rocky open woods with

basic soils. Repeated disturbance is necessary to provide open areas for this plant to be successful. Remaining populations are found along maintained roadway rights-of-way and areas managed with frequent fires. Threats to remaining populations include habitat loss resulting from development and fire suppression. The species has been located elsewhere in the county; no NHEO sites have been recorded within the Planning Area (NCNHP, 2014).

The NHEO database includes both state and federally listed species and populations, as well as natural communities. The SNHA database identifies exemplary or unique natural ecosystems (terrestrial and aquatic). There are no SNHAs within the Town's Planning Area (NCNHP, 2014). Figure 4-1 illustrates the distribution of NHEO occurrences within the Planning Area. Appendix E includes a complete list of species occurrences from the NHEO database within Wake County as well as within the Planning Area. Other sources of information regarding the presence of species or habitat include special surveys and the NCWRC.

According to NCWRC, the Crabtree Creek watershed provides suitable habitat for many State-listed mussel species, including the creeper (*Strophitus undulatus*), triangle floater (*Aslasmidonta undulata*), and notched rainbow (*Villosa constricta*) mussel species (NCWRC, 2014). Based on data received in 2014 from the NCNHP, there are no rare mussel species in the Planning Area (NCNHP, 2014).

4.13.2 Natural Vegetation

Within the Planning Area, natural vegetation is typical of piedmont upland and bottomland communities. The NCGAP data, provided by North Carolina State University, were used to analyze land cover within the Planning Area (NCGAP, 2006). These data depict the various types of natural vegetation and agriculture present within the Planning Area. Further descriptions are included in Section 4.11. According to data received from NCNHP, there are no SNHAs, aquatic habitat, or natural communities identified within the Planning Area (NCNHP, 2014).

4.14 Introduction of Toxic Substances

Toxic substances and their cleanup are regulated by the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The goals of these programs are to eliminate or reduce toxic waste; clean up waste that has been leaked, spilled, or improperly disposed; and protect people from harmful waste.

One cleanup site is present within the Planning Area. Koppers Company, Inc., operated a wood treatment process that ceased operation in 1975 (USEPA, 2014). Pentachlorophenol and isopropyl ether were used in the process. Wastewater lagoons were present at the site, leading to groundwater, surface water, and soil contamination. A groundwater treatment system is currently operating and will continue to do so until cleanup standards are met. Surface water and soil cleanup has been completed. This site is important because groundwater in the area was a source of drinking water for approximately 2,200 residents. In 1989, public water supply lines were installed in the area and use of groundwater as a public drinking water supply was halted. A third 5-year review was completed in 2012; it recommends continued monitoring because of a recent, more stringent standard for pentachlorophenol (USEPA 2012b).

A potential transportation-related source of toxic substances is industrial freight and/or chemicals carried on the NCRRL lines through town.

Other potential sources of toxic substances present in the Planning Area are common landscape applications, such as fertilizers, herbicides, and pesticides. Other common toxic substances, such as glues, solvents, and paints are employed in the construction of homes and commercial buildings. Typical household hazardous wastes include oils, cleaners, solvents, paints, herbicides, and fertilizers.

SECTION 5

Secondary and Cumulative Impacts Related to Projected Growth in the Planning Area

This section outlines the SCI associated with the infrastructure needed to accommodate the growth in the Town. The area's transportation and utility infrastructure is being expanded and strengthened in response to its economic growth. In addition, the EMC included a condition in the Town's IBT certificate that requires them to return wastewater to the Cape Fear River Basin by January 1, 2011. The newly constructed WWRWRF became operational in 2014 and discharges into the Cape Fear River, meeting this condition.

Analysis of impacts includes all proposed water, wastewater, and local transportation infrastructure planned for full build-out. These proposed plans are based on the Town of Morrisville's 2035 Land Use Plan and the Town of Cary's developed master plans for providing water and sewer services to its residents in a manner that will protect the environment. Overall, the Town of Morrisville plans to manage growth in a sustainable way.

Growth in the Town will be facilitated by transportation facilities, including the NCDOT development of NC 540, which improves access to RTP and other communities within Wake County. The section of this roadway that extends from I-40 to NC Highway 55 in the Town was completed in 2012. NCDOT has addressed direct and secondary and cumulative impacts of this roadway project.

In general, the environmental documents indicate that the roadway and associated interchanges will not induce growth, but may change the location of growth. More intensive development is anticipated around the interchanges, but local governments already anticipate higher rates of growth in the project area of NC 540 (Arcadis, 2003; HNTB, 2003). NCDOT is widening other roads to help accommodate future growth.

The discussion provided in the following sections reflects a general analysis of the potential for development to affect specific resources in the Planning Area, given current trends, literature records, and input from state agencies. Agency correspondence is included in Appendix A. Mitigation efforts to limit possible SCI are discussed in Section 6. As described in Section 1, direct impacts will be addressed in separate environmental documents that are prepared for individual infrastructure projects.

5.1 Topography and Floodplains

Clearing and grading of undeveloped sites will change the site's topography. The County reviews erosion and sediment control plans for the Town and works with developers to minimize grading in areas with steep slopes.

If development within a floodplain occurs, the function of that floodplain is reduced. Water storage capacity is lessened by any structure constructed in a floodplain. Floodplains, if left undisturbed, provide other functions, including wildlife habitat, surface water filtration,

infiltration, and corridors for wildlife movement. Impacts to floodplains will be limited, because of the Town’s Unified Development Ordinance (UDO), and floodplain overlay zoning district, as described in Section 6.

5.2 Soils

As land is developed, clearing and grading will result in soil disturbance. By using heavy equipment on development sites, soils will be compacted. During grading, soil will be moved; in some areas, it will be removed, while in other areas it will be replaced. The Triassic soils found throughout the Planning Area require particular construction considerations. Thus, the location of soil types may change. During clearing and grading, some soils will be eroded, but the impacts from this will be minimized by following an approved site plan in accordance with the County’s erosion and sediment control program described in Appendix B.

5.3 Land Use

The Town’s 2035 Land Use Plan was used to estimate future build-out land use conditions (Louis Berger Group, 2009a). A land use plan is a guidance document that illustrates the land use the Town would like to see in a given area if development occurs. This does not mean that all land in a given area will be developed. Figure 5-1 illustrates general land use categories within the Planning Area. Table

5-1 provides details on the area (square miles) within each general land use category. Given the proximity of the area to RTP and a strong local economy, it is very unlikely that the existing land use characterization would remain. The pattern and rate of growth without infrastructure will be different; growth without infrastructure may be less dense than growth supported by infrastructure and the Town’s 2035 Land Use Plan, but it may be spread over a larger area.

Currently, 19 percent of the Planning Area is undeveloped, which is defined by the Town as land that has potential for development.

Even without the proposed infrastructure, conversion of this vacant land to low-density residential land is likely to occur in the Planning Area. Undeveloped land may be forested or cleared. The most heavily urbanized areas lie along the NC 54 corridor. Commercial and industrial growth is planned for the area between NC 54 and I-40, while low- and medium-density residential growth is planned for the western portion of the Planning Area closer to RTP, as described in the Town’s 2035 Land Use Plan. This will also include growth facilitated by NC 540.

As development occurs and land uses change, open space will be preserved by a number of measures. A public open space requirement is part of the Town’s UDO and is described in Section 6.

TABLE 5-1
Planning Area Future Land Use

General Land Use Type	Square Miles	Percent of Planning Area
Residential Developed	3.3	34%
Non-residential Developed ¹	5.4	55%
Open Space	1.1	11%
Total	9.8	100%

Town of Morrisville, 2014

¹ Transportation and mixed use are included within the Non-Residential category.

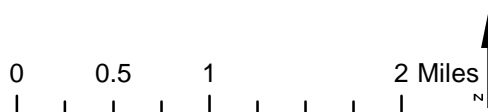
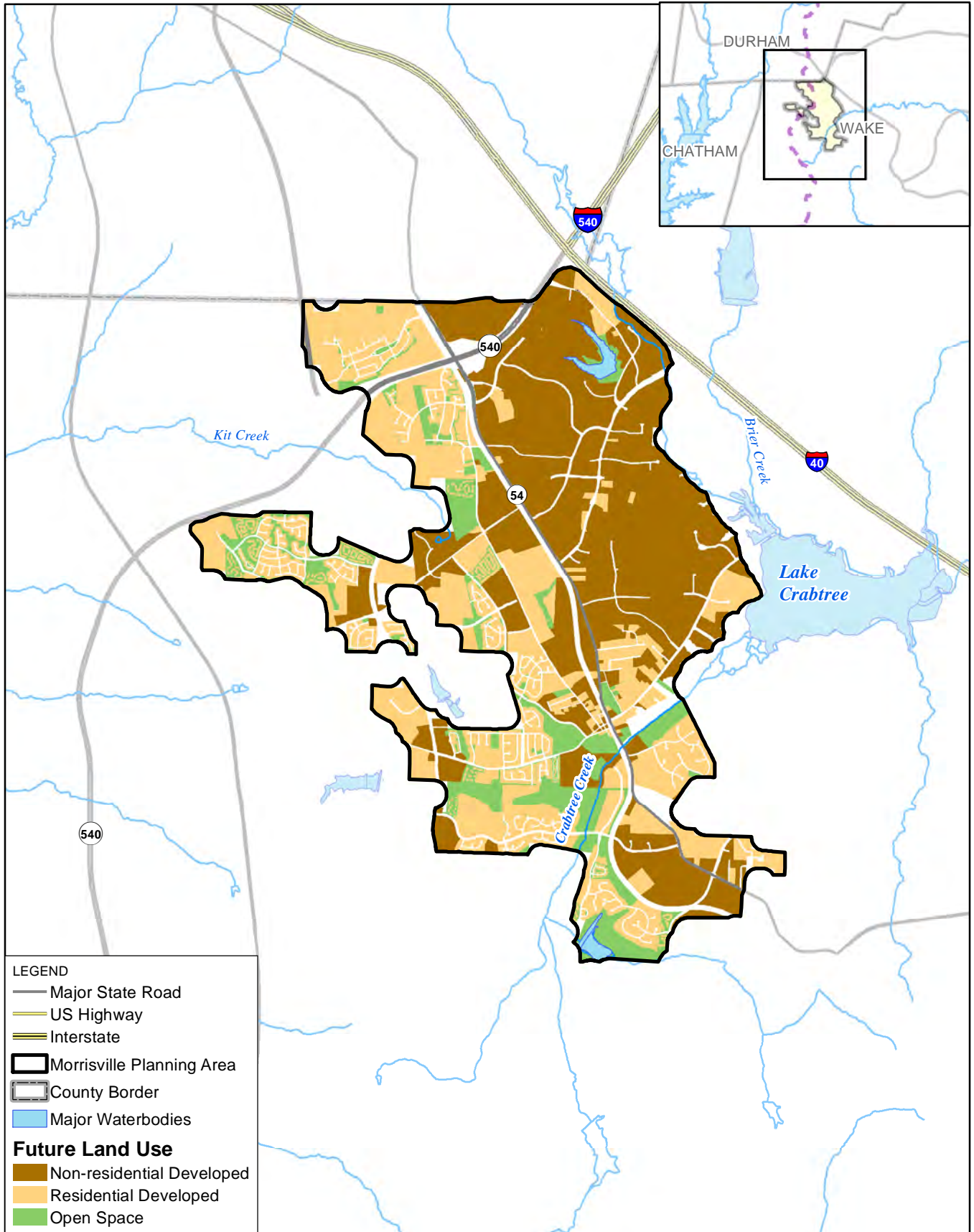


FIGURE 5-1
Future Land Use
 2015 Secondary and Cumulative Impacts
 Master Management Plan - Town of Morrisville

This page intentionally left blank.

Open spaces, such as forests, will potentially be lost to development; these impacts will be minimized by the development requirements in the UDO. Open spaces still may become fragmented, except along stream channels where riparian buffers and floodplains will serve as habitat corridors.

Currently, non-residential use (41 percent) is the predominant land use, while residential use (30 percent) is the second most predominant land use within the Planning Area. This relationship is maintained in the 2035 Land Use Plan, with non-residential and residential composing 55 percent and 34 percent of total land use, respectively (Louis Berger Group, 2009a). The majority of residential land uses both currently and in the 2035 Land Use Plan is classified as low density (14 and 17 percent of total land use, respectively). Small amounts of clustered high- and medium-density residential developments exist. Residential development is primarily clustered around the Town Center and along the NC 54 corridor. The Town Center Plan, developed in 2007, further defines the proposed land uses and historic preservation for that area (Town of Morrisville, 2007). The most heavily urbanized areas lie along NC 54 and to the east in proximity to the airport. The largest changes between existing and future land use will be in the reduction of undeveloped land and growth in mixed use, medium-density, and high-density residential uses. Table 5-2 provides a more detailed breakdown of future land use within the Planning Area.

TABLE 5-2
Planning Area Detailed Future Land Use

Land Use Type	Area (square miles)	Percent of Planning Area	Estimated Percent Impervious	Estimated Impervious Area (square miles)
Commercial	0.6	6%	82%	0.5
Industrial	1.0	10%	82%	0.8
Office and Institutional	1.3	13%	72%	0.9
Mixed Use	1.2	13%	72%	1.1
Transportation	1.3	13%	87%	0.6
High-density Residential	0.8	8%	72%	0.4
Medium-density Residential	0.9	9%	44%	0.4
Low-density Residential	1.6	17%	21%	0.5
Golf Course	0.3	3%	4%	< 0.1
Park/Open Space	0.8	8%	4%	< 0.1
Total	9.8	100%	-	5.6

Source: Town of Morrisville, 2013

Note: The Town's land use categories are described in Appendix D

- ¹ Mixed use was categorized within the non-residential developed category in Table 5-1.
- ² Transportation is not included in the land use coverages. The area used for transportation was estimated by subtracting the land use area from the transportation area.
- ⁴ Percent impervious values come from estimates from a modeling analysis (CH2M HILL, 2002a). Percent impervious values are capped in water supply watersheds. Thus, actual percent imperviousness for a given high-density development may not be as high as presented in the table.

As the land use within the Planning Area changes, the amount of impervious surface will increase, which not only changes the viewshed, but also affects surface and groundwater flow, as described in Section 5.10. Table 5-2 includes percentage imperviousness; the values listed were used in modeling analyses performed for the Town of Cary in its Northwest Area (CH2M HILL, 2002a). These values are based on literature values. Based on these impervious values, an impervious area for each land use was estimated. These were then summed and divided by the total land area to estimate the overall impervious value for future land use conditions. It is estimated that in the future just over one half of the Planning Area could be developed into impervious surfaces.

The 2035 Land Use Plan does not include categories for forested and agricultural land. As described above, the 2035 Land Use Plan is a guidance document that indicates the land use the Town prefers, if land is developed. Agricultural land is allowed as a land use within the very low density residential zoning category, but there are no active farms within the Town. Similarly, currently forested land may remain as forest.

The largest changes between the existing and future land use will be the reductions in forested land and the increases in industrial and office, and institutional development. Forested and agricultural land will continue to decrease as low- and medium-density development replace it. Even without the proposed infrastructure, growth is likely to occur in the Planning Area, given the Town's proximity to RTP and the strong local economy; however, the pattern and rate of growth will be different between these two scenarios.

The Town has mechanisms in place to protect open space through the development process, as presented in Section 6. Stream buffers, required open space in subdivisions along with clustered development, landscape buffers between different land uses, park lands, and greenways will limit the impacts to open space. For these reasons, Table 5-1 underestimates the amount of open space under future conditions.

Approximately 10.8 percent of the future land within the Planning Area is expected to be protected as open space. This number is likely underestimated as the riparian buffer, floodplain, and open space are often included in the other land use categories. Figure 4-1 illustrates the riparian buffers within the Town's Planning Area, and these buffers account for 1.8 square miles (or 18 percent of Planning Area). The floodplain area inside the Planning Area is 0.7 square mile (or 7 percent of the Planning Area). These areas are not separated from the land use categories listed in Table 5-2. Other areas within development areas, such as perimeter buffers, are actually open space. Finally, some planned parks are categorized as undeveloped and not open space.

5.4 Wetlands

Wetlands in the Planning Area are located primarily within the riparian zones or floodplains of streams and lakes. Wetland losses may occur as land use changes occur and population density increases in the Planning Area. Wetland loss can result in habitat loss, habitat fragmentation, and reduction in species diversity. As discussed in Sections 4 and 6, the majority of wetlands will be protected by existing floodplain regulations. Other programs that protect wetlands are described in Section 6.

Wetland functions also may be decreased if pollutant impacts occur. For example, sediment loading from stormwater runoff may affect hydrology and vegetation within a wetland. Nutrient enrichment and other surface water pollutants may affect amphibians and aquatic organisms inhabiting a wetland. In the long term, overall quality and total acreage of wetlands may be decreased by SCI in upland portions of the Planning Area. However, these impacts will be minimized by stream buffers, floodplain protection, and other development controls.

5.5 Prime or Unique Agricultural Land

As land is developed, prime farmland soils will be disturbed. However, recent growth has already converted many acres of agriculture and prime farmland soils within the Planning Area to other land uses, and no active agriculture lands are present in the Planning Area. This conversion and disturbance of soils would likely continue, even without the proposed infrastructure, because of the proximity to RTP and other development in the area, while the pattern of growth may be different than predicted and the density may be lower, prime farmland soils would still likely be converted and/or disturbed.

5.6 Public Lands and Scenic, Recreational, and State Natural Areas

Growth in the Planning Area should have limited impacts on scenic and recreational areas that are currently part of the park systems. These areas may become more valued by the community as forested areas are converted to other land uses. The Town recognizes the value of these spaces and has a plan of action to protect natural resources and open space, documented in the UDO and Parks and Recreation Master Plan. These plans are further discussed in Section 6. With the continued implementation of the Town's plans, scenic areas, open space, and parks will be a high priority for the Town and will provide mitigation for losses of open space as the Town grows.

5.7 Areas of Archaeological or Historical Value

Historical areas may be impacted directly by future projects, but indirect impacts are unlikely. Direct impacts to historic resources will be assessed individually during project planning processes. Assessing historical properties is beyond the scope of this document, because this document focuses on SCI.

Some loss of historic resources could inadvertently occur with development. For example, an unknown cemetery could be destroyed. Where historic resources are known, they should be protected over time. The Town has three properties on the NRHP: the Morrisville Christian Church, the Williamson Page house, and the James M. Pugh House. Some structural damage could occur to historical structures, if they exist near future developments, as a result of vibrations from increased traffic or acid rain that may occur from increased emissions to the atmosphere. The Town has proactively relocated the James M. Pugh House, as well as two historic tobacco barns to prevent potential impact. The Town's Historic Crossroads Village zoning district as well as the Town Center Plan encourage preservation of historic resources. It is likely that few SCI will occur to cultural and historical resources.

5.8 Air Quality

The cumulative impacts of a growing population may impact air quality in the Planning Area. As more vehicles travel within the Planning Area, levels of emitted air pollution may increase. Even without the proposed infrastructure, population within the Planning Area is likely to increase and contribute to higher levels of air pollution. While industrial emissions also may increase in the Planning Area, vehicles are likely to remain the primary source of air pollution. Without improved roadways, traffic problems are likely to increase, which would exacerbate existing air quality problems. Smog, ozone, and carbon monoxide are the pollutants of concern within the Planning Area, and they are monitored.

As a result of air pollution, the area may see an increase in the number of Ozone Action Days, which are tracked as a measure of air quality by the USEPA. Increased ozone levels can impact human health; on Ozone Action Days, outdoor activity should be limited for health reasons and at-risk populations should remain inside. Smog can decrease visibility, and increased nitrogen and sulfur emissions can lead to acid rain.

To address the impacts of growth on air quality, the Town is actively pursuing alternative modes of transportation and has developed a Transportation Plan and Transit-Oriented Development zoning district, as described in Section 6. A regional light rail system is planned for the Triangle area (Wake County, 2012). Several regional planning efforts aim to reduce vehicle miles traveled and appropriately size roads according to air quality modeling analyses (Triangle J Council of Governments [TJCOG], 2013 and 2014). These programs are further described in Section 6 and Appendix B. Despite regional efforts, SCI to air quality have the potential to occur because of increased amount of traffic.

5.9 Noise Levels

The predicted growth in the Planning Area will produce greater amounts of noise from a greater density of land uses, more people living in the study area, more businesses and industries operating in the area, and a large increase in the number of vehicles using local roadways. The continued growth and development of the Planning Area will impact the community noise levels through the introduction of additional domestic and commercial traffic and intensification of industry. High noise levels can also impact human health. Urbanization also increases the base level of noise, potentially impacting wildlife behavior.

Efforts taken to improve air quality by promoting alternative forms of transportation will limit SCI to noise levels in the Planning Area, as described in Section 6.

5.10 Water Resources

5.10.1 Surface Water

SCI to surface water resources have the potential to occur in both the Neuse and Cape Fear River basins. With the addition of planned infrastructure improvements, population density will rise. Even without the planned infrastructure, population would increase in the Planning Area because of its proximity to RTP and the strong local economy.

As a result of the increase in population and associated development, the impervious area will increase, which will result in an increase in stormwater runoff during rain events from an increase in impervious areas. Damage, such as increased pollution and scouring, will increase without practices to control runoff rates. Without adequate controls, typical urban stormwater pollutants include sediment, nutrients (nitrogen, phosphorus), bacteria (fecal coliform as indicators), and potential toxicants (metals, oil and grease, hydrocarbons, and pesticides). Modifications to the runoff rate also may impact stream channel stability and, thus, aquatic habitat. The increase in runoff may cause an increased pollutant load, which will lead to a decline in water quality and stream channel stability, and create subsequent impacts on aquatic habitat, wetlands, and sensitive aquatic and amphibian species in the area.

Increases in impervious surface will increase the rate of runoff, which also may impact fluvial system stability, stream channel sinuosity, streambank slopes, floodplain dynamics, and hydrologic flow rates, and, thus, aquatic and riverine habitats. For example, during storms, a larger volume of rainfall will run directly to streams, causing higher storm event flows, which may cause streambank erosion and a degraded aquatic habitat. Less rainfall will percolate to groundwater, which can reduce baseflow during dry weather. It should also be noted that the impact on storm event and baseflow conditions are smaller in western Wake County than in other areas of the County because of the soil types found within the Planning Area. A groundwater study completed by Wake County in 2003 identifies the presence of a high percentage of hydrologic soils groups C and D (low infiltration capacity) in the Jordan Lake watersheds. Low-flow recharge rates in streams were the lowest in western Wake County watersheds, at 0 gallons per acre per day in the Jordan Lake watershed (CDM, 2003). An update to this comprehensive groundwater study has not occurred since 2003.

Most waters within the Planning Area are classified as NSW in response to excessive growths of macroscopic and/or microscopic vegetation in both the Jordan Lake watershed and the Neuse River basin. Current strategies to limit nutrient loading will help protect water quality; however, as runoff volumes increase, nutrient loading could continue to impact water quality. As agricultural land uses decrease in the Planning Area, impacts from this land use type may decrease in the watershed.

The construction of sewer lines, water lines, and roads may also impact water quality, particularly where they cross streams. There are sediment impacts from construction, although the use of proper erosion and sediment controls help minimize this impact. In general, these impacts are direct, but there is also a cumulative direct impact from previous crossings and other future crossings. The Town will review stream crossings as a cumulative direct impact in future EAs and EISs.

NCDENR monitoring of both benthic macroinvertebrate and fish communities within the Planning Area will indicate if any water quality declines are impacting aquatic communities. The composition of these aquatic communities provide insight into the effects of sediment loading, nutrient enrichment, and stream temperature changes, among others.

5.10.1.1 303(d)-Listed Streams

As previously discussed, land use changes may impact both water quality and quantity in the Planning Area. These impacts may limit or impede the ability of the State to prepare and

effectively implement management strategies to improve water quality in Section 303(d)-listed water bodies. Crabtree Creek is the only 303(d)-listed body of water in the Planning Area. This stream currently suffers from water quality or aquatic habitat stresses, primarily from stormwater and urban runoff. Because this stream is located in an area that is already urbanized, attaining a healthy aquatic community in it will likely be difficult, even with no future development. Increases in runoff may further degrade this section of Crabtree Creek within the Town's Planning Area (NCDENR, 2012a).

5.10.2 Groundwater

A limited number of residents within the Planning Area do not currently have public water and sewer services. These residents may request service from the Town of Cary when services are available. New development must tie on to public utilities. As water and sewer services are expanded, fewer residents will rely on groundwater as a public water supply source. Also, a number of septic tank/ground absorption systems that are serving residences may be eliminated. These are positive secondary impacts to the groundwater resources of the Planning Area, reducing the demand for groundwater as a source for drinking water and the public health risk of groundwater contamination in the Planning Area from leaking or failing septic tanks.

Future development may degrade groundwater quality if contaminants common to urban activities reach the groundwater. These contaminants include fertilizers, petroleum products, metals, and nutrients from stormwater runoff; and volatile organic compounds.

A general increase in impervious surfaces also may affect groundwater recharge and groundwater's ability to maintain baseflow during drought conditions. However, Wake County's groundwater study illustrates the lowest recharge rates in the western part of the County. In the Town's Planning Area, groundwater recharge is approximately 2 to 3 inches per year, as compared to central and eastern portions of the County, which have recharge rates of 7 to 9 inches per year (CDM, 2003).

5.11 Forest Resources

According to Town land use planning data, much of the undeveloped land, including forests, within the Planning Area will be converted to other uses. Even without the proposed infrastructure, forested lands will likely be converted to low-density residential lots. The majority of the forested lands within the Planning Area are currently coniferous cultivated pines.

Forested communities are likely to remain along stream channels. Overall, forested wildlife habitat will be reduced within the Planning Area and may become more fragmented.

Trees also filter air and their shade can cool air temperatures. Loss of forest resources may also impact air quality and temperature.

5.12 Shellfish or Fish and their Habitats

Degradation of water quality and aquatic habitats may, in turn, impact aquatic resources and fish communities. Sources of degradation include increasing erosion of stream channels, sedimentation from construction activities, changed hydrology from increased impervious

surfaces, and increased stormwater runoff containing high levels of nonpoint source pollutants. These changes may affect fish communities by altering species diversity and/or the number of individuals within a community, which decreases the potential for a long-term sustainable healthy fish community. Those fish species that are less tolerant of habitat stress and pollutants may disappear from a community, causing a decrease in species diversity. This may occur without the overall quantity of fish present changing, or a community may lose both diversity and population.

Changes that may impact the community include sedimentation of channel substrate. Insectivorous fish species dependent on healthy benthic macroinvertebrate communities may be impacted by a loss or change in their food source. Darters and other fish species that are dependent on riffle habitats may disappear with habitat impacts. Other factors that may change a fish community include the replacement of sensitive fish species by pollutant-tolerant exotic species.

The construction of sewer lines, water lines, and roads may also impact water quality and aquatic habitat, particularly where they cross streams. There are sediment impacts from construction, although the use of proper erosion and sediment controls help minimize this impact. In addition, where culverts are used for road crossings and not sufficiently buried, a natural substrate will no longer exist to provide aquatic habitat. In general, these impacts are direct, but there is also a cumulative direct impact from previous crossings and other future crossings. The Town will review crossings as a cumulative direct impact in future EAs and EISs.

5.13 Wildlife and Natural Vegetation

Wildlife resources are primarily impacted by habitat changes. Further urbanization of the region may impact wildlife resources through the continued:

- Loss, fragmentation, or degradation of sensitive and non-sensitive aquatic and terrestrial species and their habitats through conversion of land and wetland areas, and filling or piping of streams for residential, business, or public facility uses. (The loss of habitat may also increase distances between suitable habitat for a given species.)
- Degradation of air resources through increased automobile usage and traffic congestion.
- Loss of species diversity through the combined impacts listed above.

Terrestrial species are impacted by loss of habitat as land use changes occur. Cumulatively, land use changes fragment the landscape. Habitat fragmentation makes wildlife movement more difficult. Over time, a loss in the general number of wildlife individuals may occur as fewer and fewer acres of suitable habitat remain. This habitat loss impacts the sustainability of a given species and may decrease species and genetic diversity. To offset SCI, the Town created a park/greenway/open space and a floodplain overlay zoning district, which guides development away from sensitive areas largely along Crabtree Creek. This protects both terrestrial and aquatic habitats and associated wildlife.

Aquatic species may be more affected by habitat changes and losses without proper protective measures in place. Changes in land use may lead to increased sedimentation and

can deliver more stormwater pollutants to the system, reduce the stability of stream banks, and cause other channel modifications.

Fish communities are discussed in Section 5.12. Forested areas and habitats are discussed in Section 5.11.

5.13.1 Rare, Threatened, or Endangered Species

While the ESA protects threatened and endangered species from takings, SCI to a species' habitat may, over the long term, reduce the number of individuals of a species. Table 5-3 presents a list of potentially present Federally listed species within the Planning Area and possible SCI to these species. This list is based on the presence of habitat and observations of the species at some time in Wake County (USFWS, 2014a).

Based on information gathered from NCNHP (2014) no Federally listed endangered or threatened species is known to occur within or near the Planning Area. A bald eagle nesting site is present just north of Lake Crabtree and a population resides nearby at Jordan Lake. It is unlikely that the bald eagle will be impacted by SCI associated growth in the Planning Area. The food source for this bird is primarily the fish from the plentiful amount of open water near the Planning Area. Crabtree Lake should be marginally impacted because of the Town's stormwater, erosion and sediment control, and riparian buffer ordinances.

It is unlikely that another Federally listed species, including the dwarf wedgemussel, will be impacted by SCI within the Planning Area. This mussel is not thought to inhabit streams within the Planning Area. Methods to address and mitigate SCI that may impact water quality and aquatic habitats of this species are presented in Section 6, and include riparian buffer protection, erosion and sediment control, and stormwater runoff control. Based on data received from NCNHP in 2014, no rare mussel species exist upstream of Lake Crabtree. The lake should mitigate any potential impacts to rare mussel species downstream. Again, riparian buffers, erosion and sediment control, and stormwater programs will help minimize any impacts to habitat in Lake Crabtree.

The federally listed species Michaux's sumac is not known to occur within the Planning Area. Therefore, it is unlikely that this plant will be affected by SCI in the Planning Area. However, because the species is located in the County, the potential for direct impacts from all future infrastructure projects will be evaluated. The plant prefers habitat that is disturbed periodically, such as is found along utility lines. Thus, the Town will evaluate the potential for impacts to this species in all future environmental documents.

TABLE 5-3
Likelihood of SCI to Federally Listed Species within Wake County

Scientific Name	Common Name	Federal Status	County Status	Likelihood of SCI within Planning Area*
Animals				
<i>Aimophila aestivalis</i>	Bachman's sparrow	FSC	Historic	Not likely to be impacted
<i>Ambloplites cavifrons</i>	Roanoke bass	FSC	Current	Not likely to be impacted
<i>Anguilla rostrata</i>	American eel	FSC	Current	Not likely to be impacted
<i>Etheostoma collis lepidinion</i>	Carolina darter	FSC	Probable/ potential	Not likely to be impacted

TABLE 5-3
Likelihood of SCI to Federally Listed Species within Wake County

Scientific Name	Common Name	Federal Status	County Status	Likelihood of SCI within Planning Area*
<i>Haliaeetus leucocephalus</i>	Bald eagle	BGPA	Current	Not likely to be impacted
<i>Heterodon simus</i>	Southern hognose snake	FSC	Obscure	Not likely to be impacted
<i>Lythrurus matutinus</i>	Pinewoods shiner	FSC	Current	Not likely to be impacted
<i>Myotis austroriparius</i>	Southeastern myotis	FSC	Historic	Not likely to be impacted
<i>Myotis septentrionalis</i>	Northern long-eared bat	P	Current	Not likely to be impacted
<i>Picoides borealis</i>	Red-cockaded woodpecker	E	Historic	Not likely to be impacted
Invertebrates				
<i>Alasmidonta heterodon</i>	Dwarf wedgemussel	E	Current	Not likely to be impacted
<i>Elliptio lanceolata</i>	Yellow lance	FSC	Current	Not likely to be impacted
<i>Fusconaia masoni</i>	Atlantic pigtoe	FSC	Current	Not likely to be impacted
<i>Lasmigona subviridis</i>	Green floater	FSC	Current	Not likely to be impacted
Insects				
<i>Speyeria diana</i>	Diana fritillary	FSC	Obscure	Not likely to be impacted
Plants				
<i>Lindera subcoriacea</i>	Bog spicebush	FSC	Current	Possible impact
<i>Monotropsis odorata</i>	Sweet pinesap	FSC	Historic	Not likely to be impacted
<i>Rhus michauxii</i>	Michaux's sumac	E	Current	Not likely to be impacted
<i>Trillium pusillum</i> var. <i>pusillum</i>	Carolina least trillium	FSC	Current	Possible impact

* A probable impact indicates that without proper mitigation policies and ordinances, an impact to the species is likely. With the mitigation programs summarized in Section 6, the likelihood of impacts will be reduced. A possible impact has a lower probability of impact than a probable impact without proper mitigation policies and ordinances in place.

5.13.2 Natural Vegetation

Within the Planning Area, natural vegetation is typical of Piedmont upland and bottomland communities. However, smaller unique ecosystems are also present. These communities have the potential to be impacted by SCI resulting from growth in the Planning Area. As forested lands are converted to other uses, natural communities will decrease in size. Rare communities may run the risk of being lost if adequate protection is not afforded them.

Loss of natural vegetation also occurs in disturbed areas, as non-native exotic species may begin to out-compete native vegetation and alter community structure. As naturally vegetated areas are converted to other uses, wildlife habitat is lost and/or fragmented. SCI may limit the locations of major tracts of natural vegetation to locations along stream channels currently protected by undisturbed buffer zones. Even without the proposed infrastructure, forested land may be converted to low-density residential land. This conversion would likely result in many of the same impacts to natural vegetation and habitat described above.

5.14 Introduction of Toxic Substances

As urbanization continues in the Planning Area, the potential for release of toxic substances from residential and commercial sources increases. The improper disposal of these substances could have adverse impacts on the environment by entering the groundwater system through landfill leachate or by entering the sewer system and reaching the WWTPs. Improper disposal could impact groundwater and surface water quality and potentially impact human health through drinking water supplies, fish consumption, and other means.

As the amount of traffic and urban uses in the receiving basin increases, stormwater runoff will contain increasing levels of water pollutants, some of them toxic. Typical urban stormwater pollutants include sediment and silt, nitrogen and phosphorus from lawn fertilizers, oils and greases, rubber deposits, toxic chemicals, pesticides and herbicides, and road salts. Unless contained and treated before entering surface waters, this urban stormwater could impact the water quality and sensitive species living within the receiving basin.

The expected increase in rail traffic in the future may increase the likelihood of spills of industrial chemicals associated with accidents.

There have been no physical changes at the Koppers Company, Inc., superfund site, so introduction of new toxic substances is not anticipated (USEPA, 2012b).

The long-term impact of new toxic discharges to the surface water and groundwater from urban stormwater, and accidental and/or intentional spill of household and industrial chemicals in the receiving basin could lead to declines in water quality without proper protective measures in place. This could contribute to the potential loss of wildlife and their habitats.

5.15 Summary of Secondary and Cumulative Impacts

Table 5-4 presents a summary of possible and anticipated SCI to natural resources as a result of current and future growth in the Planning Area. This table is meant as a summary and does not determine the level of significance of impacts to each of the natural resource categories. Mitigation efforts to limit environmental resource impacts are detailed in Section 6.

TABLE 5-4
Areas of Potential Impacts to be Addressed by Permitting and Mitigation

Environmental Resource	Potential for SCI	Types of SCIs
Topography and Floodplains	LI	Potential minimal loss of floodplain water storage in areas outside riparian buffers, which could result in reduction in water storage capacity, habitat, surface water filtration, and infiltration Isolation of floodplain from stream by channel entrenchment; increased sedimentation
Soils	PI	Soil erosion and compaction from new development
Land Use	PI	Conversion of forested or vacant land uses to other developed land uses Redevelopment to higher density land uses
Wetlands	LI	Wetland loss resulting in loss of habitat, habitat fragmentation, reduction in genetic diversity, and loss of attenuation of flood flows Loss of wetland function through pollutant loading
Prime or Unique Agriculture Land	LI	Conversion to other uses
Public Lands and Scenic, Recreational, and State Natural Areas	LI	Possibility of conversion of adjacent land uses
Areas of Archaeological or Historical Value	LI	Possibility of conversion of adjacent land uses Structural damage resulting from acid rain and vibrations from construction or adjacent transportation
Air Quality	PI	Reduction in air quality resulting from increased vehicular traffic Negative impacts to human health (such as asthma) Reduction in air quality benefits of trees Acid rain Reduced visibility
Noise Level	PI	Increase in overall noise level in Planning Area Negative impacts to human health
Surface Water Resources	PI	Water quality degradation; increase in stormwater runoff and sedimentation Alteration of natural hydrograph (e.g., magnitude, timing, frequency, duration, rate of change); lower and more frequent low-flow conditions; alteration of channel morphology
Groundwater Resources	LI	Possible reduction in groundwater inflow that provides baseflow in streams and supports aquatic life during droughts Reduction in use for private drinking water; potential to become contaminated
Forest Resources	PI	Conversion to other uses Reduction in air quality; increase in near-surface air temperature; habitat fragmentation
Shellfish or Fish and their Habitat	PI	Possible aquatic habitat degradation Disruption of food chain; reduction in aquatic insect number and diversity through loss of riffle habitat by increased siltation and increased low-flow conditions; reduction in potential for long-term population sustainability
Wildlife Resources	PI	Reduction in available habitat; no impact to Federally listed species Habitat fragmentation; reduction in genetic diversity; reduction in species tolerance; increased dispersal distance to suitable habitat; reduction in potential for long-term population sustainability
Introduction of Toxic Substances	LI	Increase in likelihood of contamination particularly in rail transportation corridors Negative impacts to human health

Notes: PI = Areas of Potential Impact (major relevance in SEPA documents and permitting applications)

LI = Areas of Limited Impact (minor relevance in SEPA documents and permitting applications)

This page intentionally left blank.

SECTION 6

Mitigation for Secondary and Cumulative Impacts

The Town of Morrisville is an emerging community in western Wake County adjacent to RDU International Airport and RTP. The Town of Cary is its immediate neighbor to the south and west. This area repeatedly has ranked among the top regions in the country to live, work, find a home, start a business, raise a family, and retire. The Town is convenient to schools, parks, shopping, and entertainment. It embraces the best of city life and small town environment and boasts that the Town provides everything needed to live, work, and play in the “Heart of the Triangle.” Because of Morrisville’s proximity to RTP and the center of the region, growth is expected to continue.

As the Town continues to grow, to ensure the quality of life for its residents and continue to make it an attractive place to live and raise a family, Town leaders are taking a proactive approach to protecting the environment, preserving open space, and protecting habitat. This is being accomplished by the use of innovative planning approaches and techniques. As part of this program, the Town is working to address environmental concerns related to open space, water and wastewater infrastructure, transportation, and stormwater. The Town has implemented programs to direct growth to a planned central core village, preserve open space, protect riparian buffers, and maintain water quality through zoning ordinances and stormwater programs.

This section identifies and discusses the Federal, State, and local programs; these programs mitigate the potential SCI discussed in Section 5.

6.1 Summary of Federal and State Regulations and Programs

There are several Federal and State regulations and programs that will mitigate the impacts related to growth. These include: the ESA, the CWA, the Clean Air Act (CAA), the National Flood Insurance Program (NFIP), stormwater regulations, programs to reduce nutrient loading in the Neuse River basin and Jordan Lake watershed, archaeological protection through various laws and programs, the Sedimentation and Pollution Control Act, the Water Supply Watershed Program Clean Water Management Trust Fund (CWMTF), the State Revolving Fund (SRF), and the Ecosystem Enhancement Program (EEP). Table 6-1 summarizes these programs and indicates whether local involvement is needed to implement them fully. Where local programs are needed to implement the State and Federal regulations and programs, the program description is provided under the Town regulations and programs discussion in Section 6.2.

TABLE 6-1
Summary of Existing State and Federal Programs and the Environmental Resources They Protect

Program or Regulation	Local Govt. Program Required	Wetlands	Land Use	Fish and Wildlife	Sensitive Species	Water Quality and/or Quantity	Air Quality	Ground-water	Noise	Toxics
Endangered Species Act		X	X	X	X	X				
Fish and Wildlife Coordination Act				X	X					
Clean Water Act - Section 303(d)		X		X		X	X			X
Clean Water Act - Section 404		X	X	X	X	X				
Clean Water Act - Section 401		X	X	X	X	X				
Clean Water Act - Sanitary Sewer Overflow Regulations		X	X	X	X	X		X		X
Clean Water Act - NPDES Stormwater Regulations	X	X		X	X	X				X
Protection of Wetlands		X	X	X	X	X				
Isolated Wetland Protection		X	X	X	X	X				
Safe Drinking Water Act		X	X			X		X		X
Clean Air Act							X			
Floodplain Management		X	X			X				
National Flood Insurance Program		X	X	X	X	X				X
Wild and Scenic Rivers Act			X	X	X	X				
Archaeological Protection			X							
Archaeological and Historic Preservation Act			X							
National Historic Preservation Act			X							
Protection and Enhancement of			X							

TABLE 6-1
Summary of Existing State and Federal Programs and the Environmental Resources They Protect

Program or Regulation	Local Govt. Program Required	Wetlands	Land Use	Fish and Wildlife	Sensitive Species	Water Quality and/or Quantity	Air Quality	Ground-water	Noise	Toxics
the Cultural Environment										
Farmland Protection Policy Act			X							
Sediment and Erosion Control	X	X	X	X	X	X				
CWMTF/State Revolving Fund (SRF)		(X)	(X)	(X)	(X)	(X)				
NC Ecosystem Enhancement Program (EEP)		X		X	X	X				
Groundwater			X					X		X
Neuse Nutrient Sensitive Water (NSW)	X	X		X	X	X				
Jordan Lake Nutrient Management Strategy	X	X		X	X	X				
Water Supply Watershed (WSW)	X	X	X	X	X	X				
Land Conservation Incentives		(X)	(X)	(X)	(X)	(X)				

X = Demonstrates clear environmental benefits

(X) = Shows potential for environmental benefits (policy only, program not mandatory, or regulation not yet adopted)

6.1.1 Endangered Species Act

The ESA, enacted in 1973, conserves ecosystems upon which threatened and endangered species of fish, wildlife, and plants depend, through Federal action and State programs (16 U.S.C. 1531-1544, 87 Stat. 884). The ESA:

- Authorizes the determination and listing of species as endangered and threatened
- Prohibits unauthorized taking, possession, sale, or transport of endangered species
- Provides authority to acquire land for the conservation of listed species, using land and water conservation funds
- Authorizes establishment of cooperative agreements and grants-in-aid to States that establish and maintain active and adequate programs for endangered and threatened wildlife and plants
- Authorizes the assessment of civil and criminal penalties for violating the ESA or regulations
- Authorizes the payment of rewards to anyone furnishing information leading to arrest and conviction for any violation of the ESA of any regulation issued there under
- Requires Federal agencies to ensure that any action authorized, funded, or conducted by them is not likely to jeopardize the continued existence of listed species or modify their critical habitat

6.1.2 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act states that whenever the waters or channel of a body of water are modified by a department or agency of the U.S., the department must first consult the USFWS, the National Marine Fisheries Service, and the lead state wildlife agency. The purpose of this act is to prevent or minimize impacts to wildlife resources and habitat resulting from water or land alterations. When modifications occur, provisions must be made for the conservation, maintenance, and management of wildlife resources and habitat in accordance with a plan developed with the wildlife protection agencies listed above.

6.1.3 Clean Water Act

The CWA (33 U.S.C. 1251 et seq.) was enacted to “restore and maintain the chemical, physical, and biological integrity of the Nation’s water.” The CWA includes a number of sections that are relevant to the SCI study.

- Section 303(d) of the CWA established a program to identify waters that do not support their designated uses and develop plans to address the impairments of these waters.
- Section 404 of the CWA established a program to regulate the discharge of dredged and fill material into waters of the United States, including wetlands.
- Section 401 of the CWA requires certification that a project does not violate the State’s water quality standards as administered by NCDENR.

Additionally, the CWA provides the regulatory authority for sanitary sewer overflows and NPDES stormwater programs.

6.1.3.1 Section 303(d) of the Clean Water Act

Section 303(d) of the CWA requires states to identify waters that do not support their classified uses. These waters must be prioritized, and a total maximum daily load (TMDL) must subsequently be developed. TMDLs are calculations that determine the maximum amount of a pollutant that a water body can assimilate and still meet water quality standards, and an allocation of that amount to the pollutant's sources. As part of the TMDL development process, the sources of the pollutant must be identified, and the allowable amount of pollutant must be allocated among the various sources within the watershed.

NCDWR will develop TMDLs or management strategies for the waters identified in Section 4.10. In addition, NCDWR developed a TMDL for the upper New Hope Creek arm of Jordan Lake and a nutrient management strategy for other portions of the lake. The TMDL and strategies require nonpoint source reductions of nitrogen and phosphorus, as discussed later in this section.

The Town will continue to work with NCDWR to implement TMDLs as they are developed. In addition, the Town will work with NCDWR on management strategies developed for impaired waters within its jurisdiction.

6.1.3.2 Sections 404 and 401 of the Clean Water Act

Two main regulatory programs that regulate impacts to jurisdictional waters, including streams and wetlands in the project area, both of which originate from CWA-Section 404, regulation of dredged and fill activities (administered by the U.S. Army Corps of Engineers [USACE]) and Section 401, certification that a project does not violate the State's water quality standards (administered by NCDWR). All private and public construction activities over a specific acreage or stream length that affect jurisdictional waters are required to obtain certifications and permits from NCDWR (Section 401 Water Quality Certification) and from the USACE (Section 404 Permits).

Although the State's 401 Water Quality Certification Program and the Federal 404 Wetlands Protection Program protect jurisdictional waters by requiring avoidance and mitigation for wetlands and streams across the State, permits can be issued under both the State and Federal programs, which allow small impacts to jurisdictional waters.

Section 401 of the CWA (33 U.S.C. 1341) requires any applicant for a federal license or permit that conducts any activity that may result in a discharge of a pollutant into waters of the United States to obtain a certification from the state in which the discharge originates or would originate, or, if appropriate, from the interstate water pollution control agency having jurisdiction over the affected waters. The jurisdiction is determined at the point where the discharge originates or would originate, and the discharge is required to comply with the applicable effluent limitations and water quality standards.

In 2006, the Supreme Court addressed the jurisdictional scope of Section 404 of the CWA specifically in terms of the scope of "the waters of the U.S." statement, in *Rapanos v. U.S.* and in *Carabell v. U.S.* The rulings of each case provide analytical standards for the determination of jurisdiction of water bodies that are not traditional navigable waters

(TNW) or wetlands adjacent to TNWs. Wetlands adjacent to non-TNWs are subject to jurisdiction of the CWA if: (1) the water body is a relatively permanent water (RPW), i.e. flows year-round or at least 3 months of the year, or is a wetland that directly abuts an RPW; or (2) a water body including adjacent wetlands that have a significant nexus based on the biological, physical, or chemical integrity with TNWs.

6.1.3.3 Sanitary Sewer Overflows

The USEPA prohibits discharges to waters of the United States from municipal separate storm sewer systems (MS4s), unless authorized by an NPDES permit. In April 2000, the USEPA released the *Compliance and Enforcement Strategy Addressing Combined Sewer Overflows and Sanitary Sewer Overflows* (USEPA, 2000). In summary, each USEPA region is responsible for developing an enforcement response plan, which includes an inventory of sanitary sewer overflow (SSO) violations. State regulations (15A NCAC 2B.05.06) require municipalities and other wastewater treatment operators to report wastewater spills from discharges of raw sewage from broken sewer lines and malfunctioning pump stations within 24 hours. NCDWR adopted policies, which include strict fines and other enforcement programs, to protect surface water quality from wastewater spills.

For public health, environmental, and regulatory reasons, eliminating SSOs is a high priority for the Town of Cary including the portion of its service area in the Town of Morrisville, as it is for the State of North Carolina. The Town of Cary seeks not only to comply with the minimum requirements regulating its operations, but also to eliminate SSOs in the Town system to the maximum extent feasible.

The North Carolina Clean Water Bill of 1999 provides for the development of permits for collection systems that include requirements for inspections, sewer maintenance, and other operational items. The Town's infrastructure is operated by the Town of Cary.

6.1.3.4 NPDES Stormwater Regulations

NPDES stormwater discharges are controlled by the Federal NPDES regulations and enforced by NCDENR. The program regulates all major discharges of stormwater to surface waters. NPDES permits are designed to require the development and implementation of stormwater management measures. These measures reduce or eliminate pollutants in stormwater runoff from certain municipal storm sewer systems and industrial activities.

The NPDES stormwater permitting system is being implemented in two phases. Phase I was implemented in 1991 and applied to 6 MS4s in North Carolina with populations greater than 100,000 people at that time (and thus, did not include the Town). USEPA's Phase II rules were finalized on October 29, 1999, and published in the Federal Register on December 8, 1999. The Town was required to develop and implement a stormwater management program.

In 2006, the North Carolina General Assembly enacted Session Law 2006-246 to provide for the implementation of Phase II stormwater management requirements. Session Law 2006-246 is related to, but is not a part of, the NPDES stormwater program and recognizes that urban development can impact surface waters regardless of whether the NPDES stormwater requirements apply. The Session Law established post-construction stormwater management requirements for development activities in areas outside of municipalities that

operate municipal separate storm sewer systems (permitted MS4s). The act requires that new development and redevelopment in these areas meet the post-construction requirements of the Phase II NPDES stormwater management program as of July 1, 2007. Permits under this program are issued by NCDEMLR. This law is applicable to new development and redevelopment activities that will result in a cumulative disturbance of 1 acre or more of land.

Under Session Law 2006-246, all unincorporated and incorporated areas within Wake County must meet the post-construction requirements of the Phase II NPDES stormwater management program beginning on July 1, 2007. The post-construction stormwater permit conditions, included in permits issued by NCDEMLR or other delegated programs, regulate the design, construction, operation, and maintenance of the post-construction stormwater control measures implemented by regulated developments.

An operation and maintenance plan that ensures the adequate long-term operation of the program's structural BMPs is required. The operation and maintenance plan requires the owner of each structural BMP to submit a maintenance inspection report on each structural BMP annually to the local jurisdiction.

Because the Town is located in the Cape Fear and Neuse River basins, additional rules apply. These include the Neuse River Basin- Nutrient Sensitive Water Management Strategy and the Jordan Lake Water Supply Nutrient Strategy, as discussed in more detail later in this section.

The Town Council renewed its NPDES Phase II permit in November 2011. The Town's stormwater programs are further discussed under Section 6.2.

6.1.4 Protection of Wetlands, Executive Order 11990

The Protection of Wetlands (Executive Order 11990) was set in place to avoid long- and short-term adverse impacts associated with the destruction or modification of wetlands. Every Federal agency must minimize the destruction, loss, and degradation of wetlands, as well as work to preserve and enhance the natural and beneficial values of wetlands. Federal projects must avoid wetland impacts and, where avoidance is not possible, minimize impacts to wetlands.

6.1.5 Isolated Wetland Protection

Isolated wetlands are those that have no visible connection to surface waters, and are therefore not regulated under Section 404 of the CWA. NCDWR has jurisdiction over isolated wetlands in the State's boundaries. NCDWR states that any activity that results in the loss of wetland function, including filling, excavating, draining, and flooding, shall be considered a wetland impact. Impacts to isolated wetlands are subject to the requirement of NCDWR permitting and mitigative measures.

6.1.6 Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) provides protection of public health by regulating the nation's drinking water supply. The SDWA authorizes the USEPA to set national health standards for drinking water to protect against natural and man-made contaminants that may be found in public drinking water. The USEPA is charged with the responsibility of

assessing and protecting drinking water sources, as well as ensuring the appropriate treatment of water by qualified operators. The USEPA is also to ensure the integrity of water delivery systems and inform the public of the quality of their drinking water supply.

6.1.7 Clean Air Act

The CAA (42 U.S.C. 7401 et seq.) is intended to “protect and enhance the quality of the Nation’s air resources so as to promote the public health and welfare and the productive capacity of its population.” Section 118 of the CAA (42 U.S.C. 7418) requires that each federal agency with jurisdiction over any property or facility engaged in any activity that might result in the discharge of air pollutants comply with “all Federal, state, interstate, and local requirements” with regard to the control and abatement of air pollution.

On April 15, 2004, the USEPA designated ozone nonattainment areas. These nonattainment areas have either violated the national 8-hour ozone standard or have contributed to its violation. The USEPA categorized these nonattainment areas into five groups, ranging from basic to severe, with basic having the least stringent requirements and severe having the most stringent requirements. As of June 2005, Wake County, which is identified as a maintenance area, is no longer subject to the 1-hour standard (USEPA, 2013).

As of December 26, 2007, USEPA approved the request of NCDENR to redesignate the Triangle area 8-hour ozone nonattainment area to attainment for the 8-hour NAAQS ozone standard (FR 72948). In 2008, the 8-hour ozone NAAQS was revised to 0.075 parts per million (ppm). The USEPA is moving forward with the implementation of the 2008 ozone standard and requested that states wishing to revise their boundary recommendations submit the revisions by October 28, 2011. North Carolina made its revised boundary recommendations based on the 2009-2011 data. These data did not show nonattainment of the ozone standard for the Triangle area. On December 8, 2011, the USEPA sent North Carolina its response, stating that the agency intends to support North Carolina's recommended area designations and boundaries for all areas (NCDENR, 2013a).

The North Carolina Division of Air Quality (NCDAQ) has implemented an aggressive Air Awareness Education Program that encompasses daily reports on the ozone forecasts by meteorologists reported using media, such as the internet, television, newspapers, and radio. The public has become very informed of ozone issues and steps they can take to reduce ozone emissions, which include combining errands into one trip, maintaining automobiles and lawn equipment, and using lawn equipment in the evening.

The Clean Smokestacks Act of 2002 requires coal-fired power plants to achieve a 77-percent reduction in nitrogen oxide (NO_x) emissions by 2009. NO_x is the main cause of ozone, one of North Carolina's biggest air quality problems, and it contributes to haze and acid rain. Under the act, utility companies must achieve these goals through actual reductions –and not by buying or trading emissions credits from utilities in other states, as allowed under federal regulations. The utilities also cannot sell credits for their emissions reductions (NCDENR, 2009).

North Carolina had its lowest ozone levels on record in 2013 since air monitoring began in the early 1970s. The declining ozone levels were generally concurrent with lower emissions from the State's power plants. A recent report by NCDAQ shows that the State's coal-fired power plants have cut their NO_x emissions, a primary industrial contributor to ozone pollution, by

more than 80 percent since the General Assembly enacted the Clean Smokestacks Act in 2002 (NCDENR, 2013a).

In addition to the effects on transportation, new and expanding industries in the County are subject to emission control requirements.

6.1.8 Floodplain Management, Executive Order 11988

Executive Order 11988, Floodplain Management, addresses the long- and short-term adverse impacts associated with the occupancy and modification of floodplains. Federal agencies must take action to reduce the risk of flood loss and flood impacts on human safety, health, and welfare. Agencies are also charged with the responsibility to restore and preserve the natural and beneficial values of floodplains. Federally supported projects that directly impact floodplains need to consider alternatives that avoid floodplains.

6.1.9 National Flood Insurance Program

The NFIP, managed by FEMA, was created in the 1960s in response to the rising cost of taxpayer-funded disaster relief for flood victims and the increasing amount of damage caused by floods. Floodplain management under the NFIP is an overall program of corrective and preventive measures for reducing flood damage. It includes, but is not limited to, emergency preparedness plans, flood control works, and floodplain management regulations; and generally covers zoning, subdivision, or building requirements and special-purpose floodplain ordinances. One aspect of the program is that it aids in the protection of stream riparian areas and wetlands and serves to protect water quality by restricting development in the floodplain. Information on the Town's flood protection programs are further discussed in Section 6.2.

6.1.10 Wild and Scenic Rivers Act

The Wild and Scenic Rivers Act charges the regulatory agencies with the protection of selected rivers of the nation. These rivers include those that possess remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values. These rivers shall be preserved for the benefit and enjoyment of future generations. The act prescribes the method for designating standards for selection of rivers to be protected under this act. Rivers under this act are classified into one of three categories, depending on their characteristics.

- Wild river areas: Rivers or sections of rivers that are free of impoundments and are generally inaccessible except by trail. Watersheds and shorelines surrounding this river class are essentially primitive and waters are unpolluted.
- Scenic river areas: Rivers or sections of rivers are similar in character to wild river areas, but can be accessed in places by roads.
- Recreational river areas: Rivers or sections of rivers that are readily accessible by road or railroad, and may have development along their shorelines. These rivers may have undergone some impoundment or diversion in the past.

No rivers protected by the Wild and Scenic Rivers Act exist in Wake County.

6.1.11 Archaeological Protection

Archaeological resources are protected on private and public lands through the North Carolina Archaeological Resources Protection Act, the Unmarked Human Burial and Human Skeletal Remains Protection Act, the North Carolina Archaeological Record Program, SEPA, and various Federal laws. These laws are only applicable to projects that are State or Federally approved, permitted or funded, or exist on State or Federal lands. Although this often exempts many private development projects, the USACE does require archaeological reviews for any project that needs a CWA Section 404 permit.

6.1.11.1 Archaeological and Historic Preservation Act

The Archaeological and Historic Preservation Act of 1974 provides protection of historical American sites, buildings, objects, and antiquities of national significance. The act protects all historical and archaeological data that could potentially be lost as a result of:

- Flooding
- Building of access roads
- Erection of laborer communities
- Relocation of highways and railroads
- Alteration of terrain caused by the construction of dams (by the U.S. government and private corporations)
- Any alteration of terrain as a result of any federal construction project or any federally licensed project

If any federal agency finds that a federally supported project may cause irreparable loss or destruction of scientific, prehistorical, historical, or archaeological data, the agency must notify the Department of the Interior so it may undertake recovery, protection, and preservation of the data.

6.1.11.2 National Historic Preservation Act

The National Historic Preservation Act (NHPA) is the central act that establishes historic preservation law. The act sets the policy for the U.S. government to promote conditions in which historic properties can be preserved in harmony with modern society. The NHPA authorizes the Department of the Interior to establish, maintain, and expand the National Register of Historic Places (NRHP). State Historic Preservation Officer (SHPO) responsibilities are established by this act, which charges the SHPO with the responsibility of developing a statewide plan for preservation, surveying historic properties, nominating properties to the NRHP, providing technical assistance to federal, State, and local agencies, and undertaking the review of federal activities that affect historic properties.

6.1.11.3 Protection and Enhancement of the Cultural Environment, Executive Order 11593

This Executive Order requires the federal government to provide leadership in preserving, restoring, and maintaining the historic and cultural environment of the nation. Federal agencies, in cooperation with state historic preservation agencies, are to locate, inventory, and nominate sites, buildings, districts, and objects as candidates for the NRHP. All sites

listed in the NRHP will be maintained to professional standards set by the Secretary of the Interior. Federal agencies that are directly or indirectly involved with the alteration or destruction of property listed on the NRHP shall take timely steps to make a record of all data present in that property. That record is kept in the Library of Congress.

6.1.12 Farmland Protection Policy Act

The purpose of the Farmland Protection Policy Act is to minimize the extent to which Federal programs contribute unnecessary and irreversible conversion of farmland to non-agricultural uses. This act, enforced by the U.S. Department of Agriculture (USDA), assures that Federal programs will be administered in such a manner that they are not incompatible with State and local governments, as well as private programs with policies to protect farmland.

6.1.13 Sediment and Erosion Control

The North Carolina Division of Energy, Mineral, and Land Resources (DEMLR) administers programs to control erosion and sedimentation caused by land-disturbing activities on 1 or more acres of land. Control measures must be planned, designed, and constructed to provide protection from the calculated peak rate of runoff from a 10-year storm.

Enforcement of the program is at the State level, but can be delegated to local governments with certified erosion control programs. Wake County enforces the Town's erosion and sedimentation control program, which is discussed further in Section 6.2 and Appendix B.

6.1.14 North Carolina Clean Water Management Trust Fund

The Clean Water Management Trust Fund (CWMTF) was created by the 1996 Legislature to help finance projects that specifically address water pollution problems. Its purpose was modified through the passage of the 2013-2014 North Carolina budget. It is a non-regulatory program that focuses its efforts on upgrading surface waters in distress, eliminating pollution, protecting and conserving unpolluted surface waters, and establishing a network of riparian buffers and greenways for environmental, educational, and recreational benefits, as well as acquiring lands of cultural and historic significance.

Possible use of CWMTF monies could be for wetland and/or riparian corridor identification and preservation (through acquisition and easement techniques) to allow comprehensive protection of wetlands and riparian buffers in the project area to protect water quality and sensitive aquatic species. To date, the Town has not received CWMTF monies to implement projects.

6.1.15 State Revolving Fund

In previous years, the CWMTF had been used to fund wastewater improvements and conventional stormwater projects, as well as the acquisition of lands. As part of Session Law 2013-360, the funding of wastewater improvements and conventional stormwater projects is now handled through the State Revolving Fund (SRF) and is administered by the Division of Water Infrastructure and State Water Infrastructure Authority.

6.1.16 North Carolina Ecosystem Enhancement Program

The EEP was established as a non-regulatory program within NCDENR to:

- Provide a systematic approach for meeting NCDOT's compensatory mitigation requirements
- Maximize the ecological benefit of compensatory mitigation projects
- Reduce delays in the construction of transportation improvement projects associated with compensatory mitigation requirements

The EEP also provides a compensatory mitigation option for permit applicants other than the NCDOT; administers the Mitigation Program for Protection and Maintenance of Existing Riparian Buffers in the Neuse, Tar-Pamlico, and Catawba River basins; and provides a repository for nutrient offset payments in the Neuse River basin.

6.1.17 Groundwater Protection

Several regulations and programs exist at the State and local levels that protect groundwater from urban growth:

- Wellhead Protection Program
- Regulation of potential contamination sources
- Management of groundwater contamination incidents
- Ambient groundwater monitoring
- Regulation of well construction

These regulations and programs may afford some protection to groundwater wells from the most common forms of groundwater pollution – point sources, such as chemical manufacturing facilities, underground storage tanks and accidental spills. However, more diffuse and evasive groundwater pollutants from agricultural uses (livestock facilities and chemical application on crops) and urban land uses (over-application of fertilizers and improper use of toxic household chemicals) may not be well managed under these regulations and programs.

6.1.18 Neuse River Basin Nutrient Sensitive Waters (NSW) Rules

The entire Neuse River basin was classified as NSW in 1988. As a result of the NSW classification, a nutrient management strategy was initially developed to manage phosphorus from point source dischargers, and nitrogen and phosphorus from nonpoint sources. At that time, most of the nutrient problems were occurring in the lower freshwater portion of the river, and phosphorus was considered the controlling nutrient.

Increasing algal blooms and fish kills in the estuarine portion of the Neuse River, attributed to nitrogen over-enrichment, led to a revision of the NSW strategy to address nitrogen inputs to the estuary. The Neuse River NSW Strategy Rules became effective on August 1, 1998. New development and redevelopment that drains, in whole or in part, to NSW must implement stormwater BMPs that reduce nutrient loading. NCDENR has specified

basinwide stormwater requirements for the Neuse River basin, as described in 15A NCAC 02B.0235.

The Neuse River NSW rules require that existing riparian buffer areas be protected and maintained on both sides of intermittent and perennial surface waters. A 50-foot buffer, consisting of 30 feet of undisturbed forest and 20 feet of grassed/vegetated area, must be maintained. The rule does not require restoration of buffers that no longer exist. Perennial and intermittent stream determinations are to be based on soil survey maps prepared by the National Resources Conservation Service (NRCS) or the most recent version of U.S. Geological Survey (USGS) topographic maps (7.5 minute quadrangle).

While this revised strategy places more stringent nutrient removal requirements on point source dischargers, it also addresses other sources of nutrients, including urban stormwater, agricultural sources, and nutrient application management. In addition, the strategy includes special provisions to protect stream buffers to prevent further degradation of the ecological integrity of the watershed.

The Neuse River NSW Rules were designed by the State and stakeholders to:

- Hold nitrogen loading from new development at 70 percent of that contributed by 1995 land uses in the non-urban areas of the Neuse River basin (using an export coefficient of 3.6 pounds per acre per year [lb/ac/yr]).
- Offset total nitrogen loads by funding wetland or riparian area restoration projects through payments to the EEP.
- Hold the increase in peak flow leaving the site during the 1-year, 24-hour storm to its levels under predevelopment conditions.

As part of this program, developers must determine the nitrogen loading attributed to the new development, and must meet a target of 3.6 lb/ac/yr through site design and BMPs. In the Neuse River basin, residential development may achieve 6 lb/ac/yr and buy down the difference. Commercial development may buy down after achieving 10 lb/ac/yr.

The Town was not named a community for stormwater controls in the Neuse Basin Rules, but does implement these nitrogen control performance standards. The Town's riparian buffer requirements are compliant with Neuse Basin Rules.

Rules specific to the Town are discussed further under the Local Regulations and Programs discussion in Section 6.2.

6.1.19 Jordan Lake Nutrient Management Strategy

The Jordan Lake Nutrient Management Strategy (Jordan Rules) were implemented to restore and maintain nutrient-related water quality standards in B. Everett Jordan Reservoir, and are described in 15A NCAC 02B.0262 through 02B.0311. The Jordan Lake TMDL was developed by NCDWR to identify the causes of impairment and strategies to meet the reservoirs designated uses. To meet the requirements of the TMDL, the Jordan Rules splits the reservoir and its drainage into three discrete areas:

- Haw River Arm - the watershed draining to the Haw River and the reservoir area immediately upstream of the Jordan Dam

- Upper New Hope Arm - the upper end of the reservoir (above Hwy 1088) and the watershed draining to it
- Lower New Hope Arm - the part of the reservoir below Hwy 1088 and above the Jordan Dam (excluding the Haw River Arm) and the watershed draining to it

Specific nutrient reduction targets for each of these arms are expressed as loading targets and percent reductions compared to the estimated annual average load from 1997 through 2001. A portion of the Town falls within the Upper New Hope Jordan, which has the following percent reduction requirements:

- Upper New Hope Arm – 35 percent reduction of nitrogen and a 5 percent reduction in phosphorus compared to the baseline 1997 through 2001 levels

The Jordan Rules also have specific guidance for both point and nonpoint sources, including agriculture existing development and new development. In general, the agriculture and existing development guidance requires achievement of the percent reductions as an aggregate from that source, for example, existing development in the Upper New Hope Arm watershed as a whole must reduce nitrogen load by 35 percent. New development has specific loading targets similar to those in the Neuse NSW Rules. They are as follows:

- Upper New Hope Arm - limit nitrogen unit area mass loading from new development to 2.2 lb/ac/yr and limit phosphorus unit area mass loading from new development to 0.82 lb/ac/yr

Developers have the option to offset their nitrogen loads by funding offsite management measures. Single Family residential development must first achieve 6 lb/ac/yr onsite and then developers can buy down the difference. Other developments (commercial, multi-family, industrial, etc.) may buy down after achieving 10 lb/ac/yr onsite. Implementation of the Jordan Rules regarding nutrient management have been delayed by the State until 2016 to allow for the completion of a pilot in situ nutrient management study. The existing development portion of the rules was also further delayed by the legislature. In February 2012 the Town voluntarily began implementing the Jordan Rules applying to new development throughout the Town's jurisdiction (including the Neuse Basins areas).

The Jordan Rules also require the preservation of a 50-foot-wide riparian buffer on all surface waters in the watershed, including intermittent and perennial streams, lakes, ponds and reservoirs. The portion of the regulation relating to buffers was not put on hold. The buffer component of the Jordan Rules are applied by the Town in the Cape Fear River basin as well as Neuse River basin, as discussed in Section 6.2.

6.1.20 Water Supply Watershed Protection Program

The EMC, NCDEMLR, and NCDWR have administered a WSW Protection Program since 1986. Initially, the program was administered voluntarily by counties and municipalities pursuing protective measures for their water supply watersheds. The measures included limitations on the number and type of wastewater discharges that were allowed in the water supply watersheds.

In 1989, the North Carolina General Assembly ratified the WSW Protection Act, codified as General Statutes 143-214.5 and 143-214.6. The WSW Protection Act mandated the EMC to

adopt minimum statewide water supply protection standards by January 1, 1991, and to reclassify all existing surface water supply watersheds to the appropriate classification by January 1, 1992. The goals of the WSW Protection Program include:

- Protection of surface drinking water supplies in North Carolina from nonpoint source and point source pollution from urban runoff and wastewater discharges
- Provision of a cooperative program of watershed management and protection that is administered by local governments consistent with minimum statewide standards

The NCDEMLR and NCDWR Water Quality Program manages the WSW program through oversight of local planning ordinances and monitoring of land use activities. Local WSW programs must be approved by the EMC. The WSW program requires local governments to adopt the following land use controls and limitations based on watershed classifications:

- Requires limitation of impervious surfaces around water supplies unless stormwater controls are used
- Requires protection of riparian buffers (100-foot-wide buffers in all development that exceeds the low-density option, or 30-foot-wide buffers otherwise along perennial waters)
- Limits some land uses
- Limits dischargers (NPDES permits in certain situations)
- Allows the use of clustering and density averaging to meet overall development density limits

Watersheds that are protected under the WSW Program have a classification of WS-I through WS-V, where WS-I has the most restrictive controls.

A portion of the Town (0.11 square mile) is within the Jordan Lake WSW. The State has developed special rules, under 15A NCAC 02B .0263 through .0273 and .0311(p), designed to restore and maintain nutrient-related water quality standards in B. Everett Jordan Reservoir. The reservoir's classified uses are set out in 15A NCAC 02B .0216, including use as a source of water supply for drinking water, and culinary and food processing purposes. Rules specific to the Town are discussed in Section 6.2.

6.1.21 Conservation Reserve Enhancement Program

The USDA and NCDENR manage the Conservation Reserve Enhancement Program. USDA and NCDENR, with the participation of the Natural Resources Conservation Service (NRCS), the Farm Service Agency, the EEP, and the CWMTF have protected 5,000 acres of buffers and conservation areas in the Jordan Lake watershed. Conservation Reserve Enhancement Program funds are also available in the Neuse River basin. This program uses financial incentives to encourage farmers voluntarily to remove sensitive land from agricultural use or implement BMPs. Currently, no lands in the Planning Area are farmed and, thus, this program is not currently applicable to the Town.

6.1.22 Miscellaneous Land Conservation Incentive Programs

Other, voluntary strategies exist at the Federal and State levels that provide incentives to protect natural lands, wetlands, agricultural lands, and sensitive species habitat and forest lands from development. These non-regulatory approaches include providing tax credits for donating lands to specific organizations (usually land trusts) and providing funding for various grants and trust funds to purchase or protect undeveloped lands. Note that there are no existing agricultural use areas within the Town.

6.2 Local Regulations and Programs

Environmental protection is a cornerstone value for the Town. The Town has developed several programs to meet its internal goals to provide a high-quality life for its residents. The following summary addresses relevant regulations and programs from environmental management and land use policy analysis perspectives. These local initiatives to prevent impacts to natural resources will offset future impacts resulting from growth. These measures to protect and preserve the natural environment are implemented through the Town's recently developed UDO. Table 6-2 summarizes local programs, and Table 6-3 illustrates the environmental resources protected by the various Town programs. Sections following the tables provide additional detail on each program.

TABLE 6-2
Summary of Existing Local Programs

Program	Summary
Riparian Buffers Protection	As a delegated authority for buffer protection, the Engineering Department is responsible for stream origin determinations and implementation of the riparian buffer ordinance.
Unified Development Ordinance (UDO) 6	The UDO requires that a 50-foot-wide undisturbed buffer be maintained on all perennial and intermittent streams, lakes, and ponds indicated on the most recent version of a USGS quadrangle topographic map or soil survey map.
Floodplain Protection UDO 5.6 Hazard Mitigation Plan	The goals of the hazard mitigation master plan, adopted in 2010, are to eliminate or reduce losses of life and property from natural forces, such as water and wind. This includes limiting development in the floodplain, developing structural mitigation measures to prevent flooding, and providing natural resource protection. The Town complies with the following FEMA requirements: no development or fill is allowed in the floodway, and the bottom floor elevation must be 2 feet above 100-year flood elevation.
Erosion and Sediment Control Program	Wake County implements the Town's Erosion and Sediment Control Program. An erosion and sediment control plan is needed for any disturbance of 1 acre or more. Further information on Wake County's Erosion and Sediment Control Program is found in Appendix B. Key elements include soil stabilization in accordance with the County's Phase II stormwater permit and the use of Performance and Maintenance Guarantee requirements. The Town recently developed and adopted a new engineering, design, and construction manual containing updated stormwater quantity and quality measures.

TABLE 6-2

Summary of Existing Local Programs

Stormwater Program UDO 7	<p>The Town renewed its Phase II Stormwater permit in November 2011, and adopted a new Stormwater Management Ordinance in February 2012. The Phase II program regulates discharges of stormwater to surface waters, requires control of TSS, fecal coliform, and nutrients town-wide, includes an illicit discharge detection and elimination (IDDE) program, and promotes public education and participation regarding stormwater issues. In 2012, the Town also established a stormwater utility. The Town's stormwater program also includes components to address the Jordan Rules and applies the development requirements for nitrogen and phosphorus loading levels across the entire Town.</p> <p>The Town implements the Jordan rules applying to new development and buffers throughout the Town's jurisdiction.</p> <p>The stormwater program includes provisions to control runoff rates and volume, including the use of discharge control facilities in new developments that limit post-development runoff to pre-development rates for the 1, 2, and 10-year design storms and set runoff volume drawdown requirements for new development. BMPs must safely pass the 100 year storm and treat the runoff from the first 1.5 inches of rain.</p> <p>Requirements of the program include: operation and maintenance agreements, performance and maintenance guarantees, annual maintenance inspection reporting, and inspections by the Town's Stormwater Inspector.</p> <p>The Town contracts a street sweeper 4 to 6 times per year.</p>
Open Space UDO 5.5	Open space requirements apply to both residential and non-residential land uses, ranging from 5 to 20%, depending on the land use type and district.

TABLE 6-3
Summary of Existing Local Programs and the Environmental Resources They Protect

Program	Terrestrial Habitat Protection	Aquatic Habitat Protection	Water Quality and/or Quantity Protection	Air Quality Protection	Noise Prevention
Open Space Preservation and Greenway Master Planning	X	X	X	X	X
Land Use Planning	X	X	X	X	X
Transportation Planning				X	X
UDO and Zoning process	X	X	X	X	
Parks, Greenways, and Pathways in Comprehensive Transportation Plan	X	X	X	X	X
Riparian Buffers and Floodplain Protection	X	X	X	X	X
Erosion and Sediment Control		X	X		
Stormwater Program		X	X		
Water Conservation		X	X		
Air Pollution Prevention				X	X
Tree Protection	X	X	X	X	X
Solid Waste Disposal and Recycling	X	X	X		

6.2.1 Managing Growth in the Town of Morrisville

The Town is focusing on managing continued growth within its boundaries to ensure that the Town can continue to provide needed services to its residents, while protecting water quality, air quality, open space, and wildlife habitat. One of the Town's continuing goals is to further develop districts that will contain some existing and planned concentrations of housing, shopping, and recreational opportunities. The recent creation of Activity Center Districts as well as the Town Center Districts will help maintain residents' travel and activities in centralized areas. Additionally, the portion of the Town that is within the airport's 65-decibel noise zone cannot be developed for residential use, which should aid in easing development pressures in some of the Town's outlying areas. Thus, environmental impacts from everyday living and activities will be reduced in the Town's outlying areas.

6.2.2.1 Town of Morrisville Land Use Plan

Land use plans contain a Town's official policy on the form and pattern of future development within its jurisdiction. These plans are used to direct growth by serving as a reference to guide Town staff and official boards when developing new standards and ordinances and when considering rezoning, annexation, subdivisions, and site plans. The plans are also used to direct public infrastructure and aid decisions for private sector investment.

The Town's most recent Land Use Plan was adopted on March 24, 2009. The Land Use Plan is administered by the Town's Planning Department and a Town Planning Board. The Planning Department administers the Land Use Plan and existing development policies and regulations. The Planning Department also makes recommendations to advisory boards and the Town Planning Board to promote long-range growth and development policies to enhance the quality of life for those living and working in the community (The Louis Berger Group, 2009). The Land Use Plan is enforced through Morrisville's UDO. Specific land use planning objectives relate to managing growth to prevent urban sprawl, protect natural resources, and prevent environmental degradation. They include:

- Preserve open space and conservation buffers.
- Prevent the overcrowding of land.
- Protect and preserve park lands, open space, floodplains, scenic areas, and historic sites.
- Conserve fish and wildlife.
- Promote forestry and grazing lands.
- Provide natural buffers between different zoning districts.
- Promote and preserve trees and urban forests during development.
- Preserve and maintain water quality and resources by protecting natural stream corridors and watersheds.
- Effectively manage long-term growth through a comprehensive and proactive planning process.
- Support effective zoning, land use, and development regulations and enforcement.

To achieve these goals, Morrisville has developed its Land Use Plan and UDO to direct growth within its boundaries in a manner that will protect streams, habitat, and other natural resources. A town center zoning district is planned. Higher-density residential and nonresidential development is focused in this preferred, already developed growth area. By concentrating urban development and living into a central area near shopping districts, the development of this town center will help protect local water resources as well as reduce air quality impacts. Open space will be protected with conservation and buffer districts throughout the southern portion of the Town.

Office/institutional and industrial development will be encouraged in the northeastern portion of the Town, which is adjacent to the RDU International Airport. Mixed office and institutional use will be encouraged in the north-central portion of the Town to serve as a transitional land use between commercial and industrial uses in the northeast and the low-density and agricultural uses in the northwestern areas of the Town. An historic crossroads village zone is among the Town Center Districts. The mixed-use and low-density residential areas are in close proximity to RTP. Commercial, residential, and agricultural mixed uses are planned for the west-central and southwestern areas of the Town.

6.2.2.2 Small Area Land Use Plans

Specific small area plans further detail open space preservation plans. The Town Center Plan, developed in 2007, creates a vision for the original center of the Town and identifies more concentrated residential and mixed-use development in this Town Center District, and

significant open space areas, including an historic Civil War battlefield and a “village green” or gathering place. In 2013, the Town developed a McCrimmon Transit small area plan that proposes a future activity center focused on transit service, linked with pedestrian walkways, concentrating on higher-density, mixed-use integrated with central public open space and parks.

6.2.2 Open Space Preservation

The Town has several programs to preserve open space. These include setting priorities for open space through the Town’s UDO as well as the Comprehensive Greenway Plan. These initiatives are described in greater detail below. The land use plans discussed above also serve to protect open space.

6.2.2.2 Unified Development Ordinance

In 2014, the Town adopted its UDO. Through the UDO, the Town’s Board of Adjustments and Planning and Zoning Board are established to enforce the ordinance and direct future community development and growth. Some of the purposes of the ordinance include:

- Prevent the overcrowding of land (not exceed amount supported by infrastructure)
- Avoid undue concentration of population
- Facilitate the adequate provision of transportation, water, sewerage, schools, parks, and other public requirements

Article 3 of the UDO defines 20 districts, within 6 base zoning districts, and 3 overlay districts for the Town. A zoning map was adopted as part of the UDO and is included in Appendix D. The ordinance is enforceable in the incorporated boundaries of the Town and in the ETJ of the Town. New construction, the continuation of existing conforming uses, and the continuation of non-conforming uses are subject to the provisions of the ordinance. Some of the residential use districts defined by the Town encourage infill development to prevent sprawl and allow for innovation, such as cluster development, in the arrangement of buildings. The use districts defined in the ordinance that are designed to aid in the preservation and protection of the natural environment are as presented in Table 6-4.

TABLE 6-4
Town of Morrisville Use Districts Defined by UDO Article 3

Use District	Code	Purpose
Conservation/Buffer District	CB	To protect and preserve park lands, open spaces, floodplains, scenic areas and historic sites, watersheds, and water supplies; to conserve fish and wildlife; and to promote forestry and grazing lands.
Very Low Density Residential	VLDR	To protect and preserve agricultural lands for the performance of agricultural function.
Medium Density Residential	MDR	Suitable for medium-density development that could infill in established areas; allows for innovation in the arrangement of buildings. Developments cannot interfere with or damage environmentally sensitive lands, and adequate open space must be located in or near the district.
Neighborhood Activity Center & Business Activity Center	NAC & BAC	To allow for the development of retail operations for residential neighborhoods to reduce travel for errands and lessen air quality impacts.

TABLE 6-4
Town of Morrisville Use Districts Defined by UDO Article 3

Use District	Code	Purpose
Town Center Districts include Historic Crossroads Village Main Street Town Center Commercial Town Center Residential Residential Transition Residential Neighborhood Preservation	HCV, MS, TCC, TCR, RT, RNP	To encourage the development of a central retail and residential center. The location of residential areas near the areas people shop helps to reduce travel, thus reducing air and noise pollution.
Mixed-Use Planned Development District	MUPD	To provide reasonable conservation of land resources through innovative design, efficient use of land, and development and preservation of open space.
Floodplain Overlay District	FO	To minimize obstructions in flood-prone areas.

The Town Center Districts are areas where the Town envisions a high-density mixture of retail and residential uses. To provide development incentives for this area and reduce sprawl in other areas, the Town provides flexibility in designs. Designs must still meet environmental ordinances, but the flexibility expedites the permitting process. In the Town Center Districts, the Town is also planning a train station, which will provide easy access to RTP and other areas within the Triangle.

The key growth management and environmental protection regulations included in the Town's UDO are as follows:

- Required open space regulations for both residential and non-residential land uses, ranging from 5 to 20 percent, depending on the land use type and district
- Requirements of 50-foot-wide undisturbed stream buffers on all intermittent and perennial streams
- Open space and recreational requirements for planned development to preserve natural resources
- Flexible design options to allow for pedestrian and vehicular connectivity between sites
- Landscape buffer requirements based on adjoining land uses, with varied densities based on width
- Standards to reduce noise pollution

The dimensional requirements for development also offer environmental benefits. The Town does not require a minimum lot size, except for with single-family residences and duplexes.

Section 5.5.2 of the Town's UDO requires that 1/35 acre be set aside as recreation or open space for each dwelling unit in a development. The Town may accept a fee in lieu of that set-aside space. The land may include recreation areas (tennis courts or ball fields), but may not include lakes. No more than 25 percent of the area may be in the floodplain.

Sections 5.4 and 5.12 of the UDO address tree protection and landscaping. The preservation and planting of vegetation serves to protect the environment in numerous ways. Vegetation prevents erosion and filters air, water, and noise pollution.

6.2.2.3 Comprehensive Parks, Recreation, Greenways, and Open Space Master Planning

The Town of Morrisville, the Town of Cary, and Wake County have been working together with the Triangle Land Conservancy, the Triangle Greenways Council, and the North Carolina Division of Parks and Recreation (Trails) to ensure connectivity of their greenways and other trails regionally.

Comprehensive Greenway Planning The Town's 2011 Parks and Recreation Master Plan includes existing and proposed greenways and multi-use paths (Town of Morrisville, 2011). The Town's greenways are 10-foot-wide paved paths. There are no design standards for private greenways, but each must be 8 to 10 feet wide, if it is along a road. Most greenways are along creeks, including Crabtree Creek, Indian Creek, and Cedar Creek, and provide interconnectivity to the parks. The Town views its 2011 Parks and Recreation Master Plan as an extension of its transportation plan and is striving for a reputation as a walkable and bikeable community. Therefore, the Town is working with surrounding communities to connect its greenways to other transportation corridors, as shown in the 2011 Parks and Recreation Master Plan map, by proposing greenways that connect with RTP and Town of Cary. This plan includes a comparison of the 2001, 2005, and 2006 Greenway Master Plan maps showing the Town's concerted effort to increase the greenway system (The Louis Berger Group, 2009b). The 2009 Transportation Plan contains a map of proposed greenways and paths, as well as sidewalks and bike lanes for the Town. More information regarding greenways is presented later in this section.

The Town has planned an extensive greenway network totaling over 58 miles. Much of the planned multi-use paths are tied to major roadway improvements or construction of new roads. As of March 2011, 7.8 miles of greenway and multi-use paths have been completed. Town staff anticipates an additional 3 miles constructed within the next 5 years (Town of Morrisville, 2011). Other greenway projects include:

- 1) Installation of Indian Creek Greenway
- 2) Shiloh Greenway, under construction, which will be 1.7 miles and pass through Park; over 10 percent of Town residents live within .5 mile of this trail
- 3) A Congestion Mitigation and Air Quality (CMAQ) grant with the Town of Cary to construct 1.2 miles of Crabtree Creek Greenway, running from Lake Crabtree Park to the Town Center area of Morrisville
- 4) Hatcher Creek Greenway, which will total 1.8 miles

Parks The Town's Parks, Recreation, and Cultural Resources Department strives to enhance the quality of life for residents while working to acquire, develop, vitalize, beautify, and conserve a system of parks, greenways, open spaces, and recreational areas. The Town's 2011 Comprehensive Parks and Recreation Master Plan aims to identify and preserve undeveloped areas as open space (Town of Morrisville, 2011).

In support of open space preservation, Town residents have approved two separate bond referendums. In November 2004, Town residents approved a referendum for issuing a \$4 million bond, part of which was used to acquire land for the development of active recreational park facilities. In November 2012, a \$5.7 million bond was approved for various projects including a greenway extension at the Morrisville Community Park.

As shown in Table 6-5, the Town has a total of 157 acres of dedicated land for parks and open space, with 90 acres developed, 44 acres undeveloped, and 23 acres dedicated for open space. Privately held recreation and preserved open space totals 585 acres, and primarily includes the Prestonwood Golf Course. The 25 acre RTP Park, or Church Street Park, with construction scheduled for completion in 2014, significantly adds to the amount of land devoted to developed parks, incorporating recreational fields, open space, and walking trails. The land for this site was purchased with grant assistance from Parks and Recreation Trust Fund and Wake County. Additional planned parks include a 5-acre Northwest Park, planned for 2015, as well as a 37-acre Crabtree Creek Nature Center, planned for 2040 (Town of Morrisville, 2011).

TABLE 6-5
Open Space within the Planning Area

Park	Total Acres	Acres within Planning Area	Owner
Morrisville Community Park	35	35	Town of Morrisville
Cedar Fork District Park	31	4	Wake County/Town of Morrisville
Shiloh Park	8	8	Town of Morrisville
Indian Trailhead and Open Space	18	18	Town of Morrisville
RTP Park	25	25	Town of Morrisville
Undeveloped ¹	44	44	Town of Morrisville
Dedicated Open Space	23	23	Town of Morrisville
Total	184	157	

Source: Town of Morrisville, 2011

¹ Includes the 37-acre Crabtree Creek Nature Center

Bikeways and Pedestrian Pathways

Morrisville's 2009 Transportation Plan lays out concepts for future transportation corridors. The plan aims to minimize environmental impacts, and includes corridors for bike and walking paths. The development of safe, non-vehicular pathways encourages travel by foot and bicycle. Currently, the Town is developing a non-vehicular transportation network that includes both pedestrian and bicycle components.

A pedestrian network will provide mobility for residents through sidewalks and pathways that connect neighborhoods and people with places. Implementing measures defined in the Transportation Plan will aid the Town in the development of its Town Center and provide pathways for local residents to have more convenient access to local attractions, such as Lake Crabtree County Park. In some cases, multi-use pathways will be developed for non-

motorized travelers. In other cases, single-use pathways will be developed for either pedestrians or bicyclists.

The Town applied for and obtained Community Development Block Grant (CDBG) funds through Wake County to construct sidewalks along Church Street, and along Barbee Road and Fiona Circle. A number of other public-funded road projects are currently in the planning stages, including widening with sidewalks along Morrisville-Carpenter Road, and installation of sidewalks along NC 54 near NC 540. The bicycle network also will connect people with places, and the Town's focus is on a regional network. Bicycle lane recommendations, presented in the 2009 Transportation Plan, are likely to occur along with planned road widening. The Town is also working with NCDOT to incorporate 2-foot-wide bicycle lanes along future roadways. New developments are constructed with bike lanes, where appropriate, as occurred along Crabtree Crossing Parkway, Preston Village Way, and Upchurch Meadow Road. In some instances, restriping can provide bicycle lanes without widening the road, as occurred in Parkside Valley Drive in 2007; this process is recommended in the Transportation Plan for Morrisville Parkway, Perimeter Park Drive, and Paramount Parkway.

Another example of regional cooperation is the Center for Regional Enterprise (CORE) Pedestrian-Bicycle-Green Space plan, sponsored by the Triangle J Council of Governments. As part of this effort, the connectivity of greenways and open space is discussed on a regional basis. The Towns of Morrisville and Cary, as well as the Cities of Raleigh and Durham, participated in this effort. The plan was initially adopted in 2005, and updated in 2009 and 2012. The 2012 update notes Davis Drive, a portion of which lies within Morrisville, as a top priority bicycle corridor.

An important component of the development of a non-vehicular transportation network is landscaping and vegetation. The vegetation planted along walkways and bicycle paths provides security for users. The Town's Transportation Plan recommends that the vegetated area for pathways be a minimum of 3 to 8 feet wide, depending on the road type. Street trees also are recommended to provide shade, protection, and shelter for walkers and bikers (Louis Berger Group, 2009a).

6.2.3 Riparian Buffers and Floodplain Protection

6.2.3.1 Riparian Buffers

The Neuse River NSW rules and Jordan Lake Rules require that existing riparian buffer areas be protected and maintained on both sides of intermittent and perennial surface waters. These rules are incorporated into the Town's UDO. This ordinance requires 50-foot-wide, undisturbed riparian buffers on all perennial and intermittent streams, lakes, and ponds that are indicated on the most recent version of a USGS quadrangle topographic map or the County soil survey map. USGS topographic maps do not always include accurate depictions of streams. As a delegated authority for buffers, the Engineering Department is responsible for stream origin determinations and implementation of the riparian buffer ordinance; NCDWR's methodology to determine whether a stream is present is followed. The Town requires that developers identify the location of streams on their site plans; a developer must delineate the top of bank of streams through field surveys in order to accurately show the 50 foot buffer extents. The Town and other municipalities recognize that the maps contain more streams than actually exist; therefore, where conflicts exist

between actual field conditions and USGS maps, the Town will perform a stream determination to verify the existence of the surface water. To ensure buffers are protected, the Town requires developers to show streams and buffers on their site plans.

The Town strives for undisturbed riparian corridors, as outlined in its UDO. However, where alternatives are not practicable, the UDO allows for some allowable uses, such as utility lines and roads, in the buffer. The exact location of allowable uses and their proximity to streams is determined during the design and permitting stages. Where practicable, utility lines are directionally bored, and roads are bridged. As another example, greenways are allowed within the riparian corridor provided disturbance is minimized and water quality is protected to the maximum extent practicable. Some allowable uses also require buffer mitigation. Mitigation may include a combination of onsite or offsite buffer enhancement, restoration, or preservation; payment of a compensatory mitigation fee; and/or donation of property. The amount of mitigation required ranges from 1.5:1 to 3:1, depending on the buffer zone impacted.

For Crabtree Creek, the Town protects a wider riparian corridor through its conservation/buffer zoning district, described in this section (map included in Appendix D). This zoning district was developed to keep development out of the floodplain.

6.2.3.2 Stream and Riparian Buffer Restoration

The Town funded and completed a stream restoration project on the Hatcher's Grove Stream segment, which parallels Morrisville Parkway. This Priority II stream restoration project is located within the Prestonwood Golf Course and consists of the relocation and restoration of 3,800 linear feet of stream and the creation of over 6 acres of vegetative riparian buffer. The objective of this project was to take a historically channelized stream and restore the natural channel pattern, profile, and functionality by isolating present golf course activities. As a result of the final restoration, the number of fairways crossing the creek was reduced from 6 to 3, and 3 of the 6 existing cart bridges were removed. This project increased the stream length by approximately 500 linear feet. The Town preformed this project within Town limits in order to ensure that the benefit of the potential mitigation credit would remain local.

The Town is proactively seeking restoration opportunities to improve its watersheds. The Town contracted to complete a watershed assessment for tributaries of Kit Creek. This included all the area of the Town within the Jordan Lake watershed. The assessment includes field investigations of stream stability, restoration opportunity, stream buffer integrity, invasive plant species, and stormwater outfall stability. The outcome of the assessment is to plan for and define potential restoration and retrofit projects. The Town plans to do a similar watershed assessment of the Neuse River basin areas of Town in different phases, beginning in 2014.

6.2.3.3 Hazard Mitigation Plan

The Town developed a hazard mitigation plan to eliminate or reduce losses of life and property from natural forces, such as water and wind, and adopted it in 2010. The plan contains provisions to mitigate the negative effects of natural disasters. By regulating development in floodplains, the Town is able to:

- Prevent or reduce public and private damage costs from storms
- Save lives and reduce injuries

- Reduce social, emotional, and economic disruption
- Maintain critical facilities in a functional order
- Protect infrastructure from damage
- Limit legal liability of the government and public officials
- Improve the ability to implement post-disaster recovery projects
- Prevent water quality degradation

During the planning process, the Town reviewed numerous potential hazards, including dam or levee failure, drought, earthquakes, flooding, hurricanes and coastal storms, tornadoes, tsunamis, volcanoes, wildfires, landslides, nor'easters, and winter storms or freezes. The Town's level of vulnerability was ranked as being low for earthquakes, landslides, hurricanes, and nor'easters. Vulnerability is high for tornadoes. Vulnerability is moderate for severe winter weather, flooding, and wildfires (Town of Morrisville, 2010).

Along with other goals to address potential vulnerability and hazard threats, one of the goal categories included in the plan is natural resource protection. Specific natural resource protection goals included in the Hazard Mitigation Plan are to:

- Minimize public and private losses resulting from flood conditions.
- Reduce the impact of future natural disasters by regulating development in known high-hazard areas.
- Seek funding to reduce the risks of natural hazards to existing developments, where hazards are clearly identified and mitigation efforts are cost effective.
- Ensure that hazard mitigation is considered during redevelopment efforts.
- Educate residents to protect themselves and their families.

Section III.B of the Hazard Mitigation Plan outlines mitigation provisions for natural resource protection, which are designed to preserve and restore natural areas. Proposed protection measures are floodplain protection, fire-resistant landscaping, fuel breaks, erosion and sediment control, wetland preservation and restoration, habitat preservation, and slope stabilization. This section also outlines possible structural mitigation projects through modification of the natural progression of a hazard. Structural mitigation measures include reservoirs, levees, diversions and detentions, and storm sewers.

The Town plans to use existing and future regulations to implement the identified mitigation measures. These include the Town's UDO, Water Conservation Policy, and Town Code. Land use planning and the North Carolina State Building Code also will aid the Town in minimizing and mitigating impacts from natural disasters. Mitigation goals are listed in Section III.D of the Hazard Mitigation Plan. One mitigation objective is to preserve open space in floodplain areas. When this is not feasible, the Town encourages appropriate development that will pose minimal risks in these areas.

6.2.3.2 Floodplain Development Regulations

The Town complies with FEMA regulations. No fill or development is allowed in the floodway, and for any development within the floodplain, the lowest floor elevation must be at least 2 feet above the 100-year flood level. For streams that are not mapped by FEMA,

there can be no encroachments within 20 feet of the top of stream bank or within a distance of 3 times the stream width, if no base flood elevation or floodway information is available, unless a professional engineer certifies that encroachment will not result in increase in base flood level. These regulations are summarized in Section 5.6 of the UDO, Floodplain Management.

The Town's zoning ordinance includes a Floodplain Overlay District, which supersedes standards applied by the underlying district, to keep development out of the floodplain. Within the Floodplain Overlay District, no structure shall be located, extended, converted, or altered, and no development activity shall occur, in any way except after approval of a Floodplain Development Permit, detailed in Section 2.5.9 of the Town's UDO. Although there are provisions in the UDO, floodplain development has not occurred in recent years. The Town also has established a conservation zoning district, which includes parks, greenways, and open space. The zoning map is included in Appendix D; it shows that Crabtree Creek and its floodplain is effectively protected with a wide riparian buffer through these zoning districts.

FIRMs for the Neuse River basin and Cape Fear River basin in Wake County, currently dated April 2007, are in the process of being updated and are expected to be available for public review in 2014.

6.2.4 Erosion and Sediment Control

Wake County implements the Town's Erosion and Sediment Control Program. The County's program requires a plan when 1 acre or more of land is disturbed. The Town proactively inspects erosion and sediment control measures to verify that measures are in compliance, and provides non-compliance reports to the County. The County's program is described in more detail in Appendix B.

The Town has various policies for controlling sedimentation and erosion. The Town's sediment and erosion control practices support an overall stream protection plan by limiting in-stream suspended sediment and sediment deposition. Policies in place include performance guarantee requirements, and maintenance guarantee requirements. These policies help the Town to ensure that soils are controlled on development sites and that sites are stabilized with vegetative cover as rapidly as possible.

General performance guarantees must be 150 percent of all required public improvements on a site plan, including: roads, sidewalks, and greenways; site grading; erosion control measures; seeding and stabilization; water mains, valves, hydrants, and other infrastructure related to water service; sanitary sewers and related infrastructure; storm sewers and stormwater management facilities; retaining walls; landscaping, such as buffer vegetation and street trees; and traffic control devices.

Another sediment and erosion control strategy used by the Town is to ensure the timely restoration of disturbed soils. The NPDES Stormwater General Permit (NCG 010000) for construction activities requires that stabilization occurs within 7 calendar days of the last land-disturbing activity for slopes steeper than 3 horizontal to 1 vertical (3: 1) and within 14 calendar days for non-slopes.

To ensure the continued function of stormwater BMPs, Section 7.4 of the UDO specifies performance securities for stormwater BMPs. An installation performance security deposit is required, equal to the total estimated construction cost, plus 50 percent. A maintenance performance security is also required, equal to 30 percent of the total estimated construction cost.

The Town recently developed and adopted a new Engineering, Design, and Construction Manual (EDCM) containing updated stormwater quantity and quality measures. The EDCM also provides clarifications of the BMP manual.

6.2.5 Stormwater Programs

The Town is only 9.8 square miles and is surrounded by the airport, RTP, and the Town of Cary, so it has limited potential to expand beyond its current ETJ. Given the proximity of the Town to employment opportunities in RTP and access to the airport, the Town has planned for higher-density development in much of its Planning Area. The Town has developed a stormwater management program to control the rate of stormwater runoff from high-density areas. The Town's stormwater program is administered by its Engineering Department. The staff is charged with upholding the local, State, and Federal regulations related to stormwater. These legal requirements include:

- Floodplain Management
- WSW Protection
- NPDES Phase II Stormwater Regulations
- Neuse River Basin Buffer Rules
- Jordan Lake Buffer & Stormwater Rules

The Town has assumed responsibility for administering the BMP program for quality from NCDENR. On February 28, 2012, the Town Council approved a stormwater funding resolution that gave the ability to establish a stormwater utility fee for developed property containing impervious surface within the Town. The fees collected will assist in the costs involved in administering the stormwater program.

6.2.5.1 Stormwater Regulations

In January 2012, the Town adopted a new Stormwater Management Ordinance, which substantially expanded the Town's stormwater management efforts. This ordinance is summarized in Article 7 of the Town's UDO. The ordinance establishes minimum requirements and procedures to control the adverse effects of stormwater runoff associated with increased development. The ordinance also prohibits any person from developing land without having proper stormwater control measures in place. The ordinance effectively implements the Jordan Lake rules for new development throughout the entire Town. The minimum requirements of the ordinance include that developers must also meet all other State and federal rules. Stormwater BMPs must be implemented to control and treat the runoff volume generated from 1.5 inches of rainfall. In addition, pre- and post-development peak runoff rates must be equivalent for the 1-year, 24-hour; 2-year, 24-hour; and 10-year, 24-hour storms.

Stormwater control is accomplished through the installation of best management practices (BMPs) with designs approved by the Stormwater Administrator. Before being approved, BMP design plans must include a determination that no facility will cause flooding or drainage problems for adjacent structures, a designation of easements needed for inspection and maintenance of facilities, and a plan for maintenance. Control facilities may include both structural and nonstructural elements, such as dry basins; wet ponds; detention swales; underground pipe storage; and facilities to encourage overland flow, slow flow, and flow through buffer zones. At a minimum, stormwater facilities must be able to manage the 1, 2, and 10-year design storms, and BMPs must be designed to safely pass the 100-year storm. All BMPs must also be designed to meet the minimum requirements of the NCDENR Stormwater BMP Manual.

To ensure long-term maintenance of stormwater facilities, all privately owned facilities must develop maintenance agreements with the Town. As part of the agreement, the Town is allowed access to inspect facilities and ensure that they are being maintained in working order. Maintenance agreements are recorded in the Wake County Register of Deeds and are binding on all subsequent owners of private discharge facilities. The Town maintains publicly owned, regional discharge control facilities.

The Town requires both a performance guarantee and maintenance security requirement for BMPs, in the amount of 150 percent and 30 percent, respectively, of the engineer's estimate cost of the BMP. The performance guarantee runs until the Town gives final approval of the required BMP (UDO Section 7.4 and Section 8). The maintenance security remains in escrow with the Town in perpetuity. The owner of each stormwater control structure will submit a Maintenance Inspection Report annually, conducted by a qualified professional, licensed in the state of North Carolina. All private and Town BMPs are inspected at least once a year by the Town's Stormwater Inspector.

6.2.5.2 NPDES Phase II Stormwater Program

The Town received a renewal of its NPDES permit on November 11, 2011 (Appendix F). The Phase II Permit requires that any new development that exceeds the 24 percent built-upon area must implement stormwater BMPs. The Town requires that all development, regardless of percent BUA, must provide stormwater BMPs. These BMPs are required to treat the runoff from the first 1.0 inches of rain, remove 85 percent average annual total suspended solids (TSS) and draw down the treatment volume no faster than 48 hours, but no slower than 120 hours. The Town requires treatment of the runoff from the first 1.5 inches of rain. The pre-development and post-development peak flows must be equivalent, regardless of the level of imperviousness in a given development.

Section 5.5 of the Town's UDO outlines required open space regulations for both residential and non-residential land uses, ranging from 5 to 20 percent, depending on the land use type and district. Article 3 of the UDO, regarding zoning, specifies the maximum lot coverage allowed, per zoning category, although open space and buffer requirements may further limit lot coverage.

The Town has an Illicit Discharge Detection and Elimination (IDDE) program, as part of its NPDES Phase II permit (UDO Section 7.6). The program prohibits illicit discharges, connections, and dumping to the stormwater conveyance system, and includes a provision for assessing civil penalties on violators. As a part of good housekeeping and pollution

preventions, the Town contracts a street sweeper to sweep all Town owned roads and parking lots 4 to 6 times per year.

Morrisville also has an active stormwater education program. The Town has teamed with other municipalities to provide outreach and education to help reduce stormwater pollution and nutrient loading from homeowners and businesses as part of the Clear Water Education Partnership (CWEP). This may include radio and television advertisements, handouts, website, etc. Other elements of the stormwater education program include the Town's monthly newsletter and other mailings, newspaper advertisements, workshops, and the internet. The Town also distributes stormwater materials to Cedar Fork and Morrisville Elementary Schools and displays information in the lobby of Town Hall, as well as at community events, including National Night Out, Green Day, and various homeowner association meetings. Town presence at these events sometimes includes a staff member dressed in costume as a fish character, for enhanced public involvement and engagement. Town staff also provides stormwater educational "giveaways" at these events and around Town. Giveaways includes pens, water bottles, rain gauges, reusable bags, pet waste bag dispensers, stickers, and temporary tattoos for the kids.

The Town has installed educational signs along greenways and at Town-owned BMPs. In addition to education, the Town seeks opportunities for involvement and participation. The Town is currently collecting responses to a stormwater survey that will allow the program to better target educational activities. The Town also oversees a resident advisory committee known as RAIN (Residents Active in Improving the eNvironment), whose purpose is to review and recommend stormwater improvement opportunities, as well as help facilitate public involvement and education. The RAIN committee plans to do a pilot stream clean event to determine if a formal stream clean program will be implemented in the Town. Public participation also is solicited for storm drain making. The Town sells rain barrels at cost, providing free delivery, and, in 2013, held a rain-water barrel workshop free of cost to the public.

The Town maintains a watershed map depicting the location and type of all of the storm drainage system and structural BMPs currently in place. Having data on a single map is required by the Town's Phase II permit and is also beneficial in Town stormwater education, good housekeeping, and IDDE efforts.

6.2.5.3 Stormwater Capital Improvement Plan

Several stormwater capital improvement projects are in process, including outfall retrofits, stream restoration, and BMP retrofits. These projects will improve both water quality and water quantity at each site. The Town stormwater program is currently working on a BMP retrofit at Fire Station 2 site, located within the Crabtree Creek Watershed. The retrofit will include a rain garden to be installed with public participation, as well as a 5,000-gallon cistern. The Town recently purchased property adjacent to a stream with plans to perform a stream restoration and/or BMP retrofits. A feasibility study is currently being performed for this stream project.

6.2.5.4 Water Supply Watershed

WSW rules apply to new development in the Jordan Lake watershed. These rules, similar to those of the NPDES Phase II permit, require most new development to control the runoff

that results from the first inch of precipitation from storm events, and to remove 85 percent of TSS from stormwater runoff using approved BMPs. These rules are addressed in the UDO's stormwater Section 7. All new impervious areas within the Town are being tracked for future analysis.

6.2.5.5 Neuse River Basin: Nutrient Sensitive Waters Management Strategy (Neuse Basin Rules)

The buffer requirements of the Neuse Basin Rules are met through the Town's UDO. The Town was not named a community for stormwater controls in the Neuse Basin Rules but does implement these nitrogen control performance standards. The buffer component of the Neuse Basin Rules do apply though, and is met by the Town's buffer requirements discussed previously in Section 6.2. Morrisville is one of only a few municipalities that has obtained delegation from NCDWR to locally implement the buffer rules.

Cooperative efforts in the Neuse River Basin include the Regional Watershed Plan in the upper Neuse River Basin. This project, managed by EEP, encompasses 580 square miles across Wake and Johnston Counties, including the upper Middle Creek and Swift Creek Watersheds. The goal of this project is to identify and prioritize potential EEP mitigation projects in the Neuse 01 subwatershed. These projects may include traditional stream and wetland mitigation as well as buffer restoration; nutrient offset; urban stormwater and agricultural BMPs; regenerative stormwater conveyances; fish and aquatic organism passage; aquatic habitat improvements; removal of flow obstructions; and species habitats preservation or enhancement (NCDENR, 2013b)

6.2.5.6 Jordan Water Supply Nutrient Strategy (Jordan Lake Rules)

The Town is subject to the Jordan Lake Rules, as required by the North Carolina General Assembly. Nitrogen and phosphorus loads contributed by the proposed new development will not exceed the following unit-area mass loading rates: 2.2 and 0.82 pounds per acre per year for nitrogen and phosphorus, respectively. The State has delayed implementation of the Jordan Rules regarding nutrient management until 2016. However, the Town voluntarily began implementing the Jordan new development stormwater rules in February, 2012 throughout the Town's entire jurisdiction. This is discussed in the UDO (Section 7.3). The portion of the regulation relating to buffers was not put on hold and application of this portion has been voluntarily expanded Town-wide. Morrisville is one of only a few municipalities that has obtained delegation from NCDWR to locally implement the buffer rules.

As part of the Jordan Lake Rules, the Town initiated the Jordan Lake Stage I Adaptive Management Strategy Program to address nutrient loading from existing development. In addition to the measures already in place as a result of the Town's NPDES Phase II permit, the Town is required annually to identify one potential stormwater BMP retrofit location in an existing development. NCDWR will determine in the future if the Town will be required to construct the BMP retrofits that were previously identified.

In 2013, the Town had an assessment performed for Kit Creek watershed in order to determine potential mitigation opportunities. The assessment considered streams, buffers, and outfalls, with metrics evaluated including bank stability, sediment deposition, aquatic habitat, water quality and presence of invasive species (Stantec, 2013).

6.2.6 Sanitary Sewer Installation and Maintenance and Road Crossings

Proper design and installation of wastewater infrastructure reduces spills. The Town of Cary operates the wastewater collection system for the Town of Morrisville under a Wastewater Collection and Maintenance permit, issued by the NCDWR. To make sure that flow is not exceeded, the Town uses a reconciliation process for new development. Through this process, estimated flows from new developments are added to the actual sewer flow. When the development is complete, the new flow is added to the system.

The Town of Cary's Standard Specifications and Details of July 1, 2004, address the design of pump stations, gravity sewers, and force mains to ensure proper design and installation while limiting spills. The document lists the minimum design standards for construction of these facilities, including standards for separation distances, materials, installation techniques, and overall design.

As part of its riparian buffer program, the Town avoids laying sewer lines within riparian buffers and avoids installing sewer line stream crossings, where practical. If stream crossings are necessary, the Town strives to minimize impacts by evaluating options, such as stream boring instead of above-ground crossings. Directional boring is used to the maximum extent practicable.

Final location and design is determined during the permitting process.

6.2.6 Water Conservation

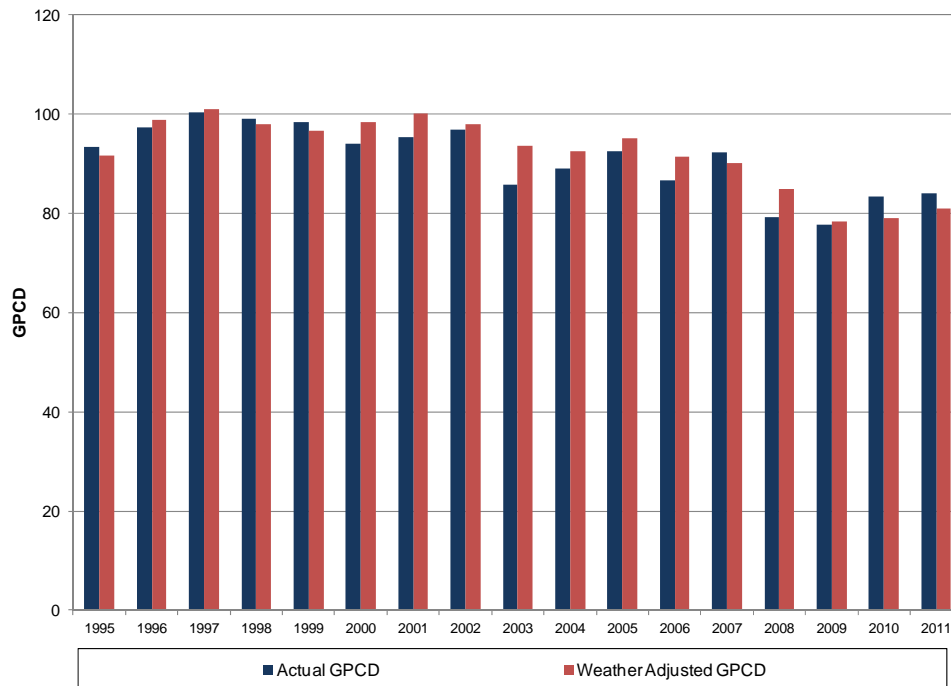
As the Town of Cary is responsible for the water and sewer systems for the Town, the Town of Cary's water conservation and restriction plans are now followed.

In 1996, the Cary Town Council established a goal to reduce per capita water consumption by 20 percent by 2015. The weather-adjusted trend data indicate that the per capita consumption values have reduced approximately 24 percent for the single-family residential customer class since 1996, and approximately 20 percent for the combined residential and non-residential consumption over the same time period (CH2M HILL and Brown and Caldwell, 2013). Figure 6-2 presents the trend in overall combined residential and non-residential gallons per capita day since 1995.

The Town of Cary's Water Conservation Program has a threefold approach to achieving water conservation by Town residents and businesses – voluntary, regulatory, and incentive mechanisms. This section provides a summary of the water conservation programs being implemented by the Town; a comprehensive description of each individual program is in the Town's LRWRP (CH2M HILL and Brown and Caldwell, 2013).

Figure 6-1

Annual Average Overall Water Use in Gallons per Capita per Day, 1995 through 2011



6.2.6.1 Voluntary Water Conservation

The Towns of Cary and Morrisville focus their voluntary water conservation programs on education. The Water Conservation team has developed a broad spectrum of initiatives to educate the public about water and water conservation issues. This team employs numerous educational programs designed to reach individuals, families, neighborhoods, and schools. These programs include direct mailings, community newsletters, general newspaper and utility bill inserts, television ads, flyers, yearly distribution of Annual Drinking Water Quality reports to all residents, and web site information. Other educational activities include: offering workshops on water-efficient landscaping, giving presentations to local civic groups, organizing and developing elementary school activities involving water conservation lessons, distributing low-flow showerheads and aerators at community functions, and conducting indoor water use audits for residents on request.

The Town's summer water conservation campaign, known as "Beat the Peak," involves utility bill inserts and other mailings; newspaper, radio, and TV advertisements; workshops; and the Town of Cary's web site. Staff members are available to speak to civic groups and to advise individual homeowners and businesses on using water efficiently. Workshops and special events address indoor and outdoor water use.

To address the special needs of the Town's automatic irrigation customers and the landscaping/ irrigation industry, the Water Conservation Program team sponsors workshops targeted at improving irrigation techniques and practices. The Irrigation Association conducts some of these workshops in conjunction with Town staff.

6.2.6.2 Regulatory Water Conservation

The Town of Cary requires alternate-day watering for all its customers, including those within the Town. Odd-numbered addresses may water on Tuesdays, Thursdays, and Saturdays, while even-numbered addresses may water on Wednesdays, Fridays, and Sundays. However, watering by hand (with cans, wands, or hand-held hoses) is allowed any day of the week. The Town modified its alternate-day watering standard procedure in April 2012 to allow residents who are reseeded or installing sod to obtain an alternate-day watering exception permit one time per year, regardless of turf type. Those who violate the alternate-day watering rule receive an oral or written notice. Repeat violations can lead to civil penalties of \$100 for the first citation, \$250 for the second, and \$500 for the third.

The Town of Cary requires rain sensors on new automatic irrigation systems that receive town water (Ordinance 97-032, Section 19-48, August 14, 1997). Once 0.25 inch of rainfall has occurred, the irrigation system must automatically shut off. Cary's land development ordinance also requires the use of drought-tolerant native plants in commercial landscaping. In 2003, the Town of Cary began requiring permits for all new customers installing automatic irrigation systems. Additionally, the Town of Cary requires the installation of separate irrigation meters for in-ground irrigation systems (Code of Ordinances, Article III, Division I, Chapter 36, Section 36-76).

The Town of Cary's Town Manager is authorized, by ordinance, to invoke water use reduction or rationing measures and to develop and enforce those conservation measures when a water emergency exists. Those within the Town also must follow these measures. The Town has a Water Shortage Response Plan that outlines policies to implement water use reductions. Voluntary, mandatory, and water-shortage-emergency measures may be imposed on all Town water customers for the duration of the water emergency.

If restrictions or bans are placed on certain types of water use, the Water Conservation Program team and other Town employees enforce the restrictions or bans. The first violation results in a written notice ordering that the violation be corrected within a specified time. If the violation is not corrected, any of the following penalties may apply: civil penalties, criminal penalties, termination of water service, injunctive relief, or any appropriately equitable remedy issuing from a court of competent jurisdiction.

6.2.11.3 Incentives for Water Conservation

The Town of Cary's Water Conservation Program team provides rebates for water conservation devices, such as early-closing toilet flappers that reduce water consumption from toilet use. They also provide rain barrels at cost to residents, as well as lower-cost kits for residents to build their own rain barrel. The Town has provided warm season grass incentives for new development, as well as a turf buy-back program, encouraging residents to replace their turf with natural area or warm season grass.

The Town of Cary has a tiered-rate system to provide incentives to use less water. The highest-rate tiers are based on a "water budget," which takes into account the amount of water needed for landscape irrigation. The residential water budgets (23,000 gallons per month) are based on a typical lot size, while non-residential water budgets are developed on a site-specific basis. An example is presented in Table 6-6. The Town also charges the lowest

rate for use of reclaimed water for non-potable uses, where applicable. Rates are higher for customers outside the Town limits (Town of Cary, 2014c).

TABLE 6-6
2014 Single-Family Residential: Customers Inside Cary or Morrisville Corporate Limits (charge per 1,000 gallons)

Tier	Cost per Kgal
Tier 1 (usage: 0 – 5,000 gallons)	\$3.60
Tier 2 (usage: 5,001 – 8,000 gallons)	\$4.08
Tier 3 (usage: 8,001 – 23,000 gallons) or up to water budget amount	\$5.79
Tier 4 (usage: > 23,000 gallons) or over water budget amount	\$11.29

Source: Town of Cary, 2014c

6.2.7 Solid Waste Disposal and Recycling

The Town’s Public Works Department is responsible for overseeing the contract with Waste Industries to provide solid waste collection and disposal for Town residents. To prevent littering and dumping, solid waste from residents is collected each week and large, recyclable bulk items, such as furniture, scrap metal, stoves, and cardboard, are collected twice per year. The Town encourages recycling and the solid waste contract includes weekly collection of recyclables. The Town’s UDO requires that provisions for the collection of recyclables be made at apartment and condominium developments. Newspapers, glass, aluminum beverage cans, plastic milk and soda containers, and corrugated cardboard may be recycled through the Town’s contract.

6.2.8 Air Quality Protection

6.2.8.1 Town of Morrisville Air Quality Efforts

The Town’s Transportation Plan, adopted in 2009, encourages the Town to support the development of a regional transportation network. The plan also includes pedestrian and bike elements, which will reduce air pollution by reducing vehicular traffic (Louis Berger Group, 2009a). The Town also passed a bond in 2012 to complete the McCrimmon Parkway Extension, which will serve as a bypass to NC54 and alleviate congestion. The Town has already reconnected Kit Creek Road, and has plans to reconnect Airport Boulevard in the future. These reconnection projects increase connectivity and decrease idle time. These efforts are intended to be further enhanced by synchronized signals, most of which are operated either through the Town of Cary or NCDOT. The purpose of the McCrimmon Transit small area plan is to prepare for expanded bus service and rail transit service, both of which will decrease air pollution by reducing vehicular traffic, discussed in more detail below.

The development of sidewalk, greenway, and bike trails encourages alternative forms of transportation, further decreasing air pollution. The Town also participated in an international walk-to-school day in 2013, with over 200 students participating. Other transportation planning efforts to improve pedestrian walkways and bikeways include installation of Indian Creek Greenway, grants for sidewalks along NC 54 in the vicinity of NC 540, the sidewalk development project along Church Street creating a “pedestrian loop”

around the heart of the Town Center, and a CMAQ grant with the Town of Cary to construct Crabtree Creek Greenway.

Trees and vegetation are integral to the improvement of air quality. The Town has tree requirements for developments, as described in UDO Section 5.4. This section requires preservation of some existing healthy vegetation and planting of new vegetation to meet tree and vegetation requirements for development. The requirements for retaining existing tree canopy vary inversely with the percentage of existing tree canopy.

Additionally, the Town is preparing a Sustainability Plan to organize and expand the Town's energy and resource conservation efforts. The plan includes current and proposed measures for the following focus areas: buildings, transportation, water systems, land use, solid waste, and Town operations. Efforts to conserve energy indirectly contribute to improve air quality; Town adoption is anticipated fall 2014 (Town of Morrisville, 2014).

The Town is partnering with the Town of Cary to install a major regional greenway link originating at Lake Crabtree County Park in Cary's jurisdiction, running along Aviation Parkway to Morrisville near the Crabtree Crossing bridge on NC 54, and eventually linking with the Indian Creek Greenway in the Town Center area of Morrisville.

6.2.8.2 Cooperative Efforts

There are several regional activities and planning efforts related to transportation that have the potential to improve air quality by reducing traffic congestion. In addition to local transportation activities, the Town continues to be active in regional planning through NCDOT, the Capital Area Metropolitan Planning Organization (CAMPO), the Turnpike Authority for the Western Wake Freeway and the Southeast Connector, which refers to the extension of the Triangle Expressway for the completion of the 540 Outer Loop around the greater Raleigh area. The Triangle Expressway has already improved commuter mobility, accessibility, and connectivity to western Wake County and RTP on the existing north-south routes that serve the Triangle Region, primarily NC 55 and NC 54 (NCDOT, 2013). These regional efforts allow for decreased congestion and alternative transportation. This improved connectivity improves air quality.

A number of Triangle organizations were working on and/or funding Transportation Demand Management (TDM) projects in 2006 and 2007 to create a long-term plan for improving TDM initiatives. During that period, Triangle Transit, formerly Triangle Transit Authority, brought together those organizations and one result was the Triangle Region 7-Year Long Range Travel Demand Management Plan. The purpose of the Triangle TDM Program is to reduce regional growth in Vehicle Miles Traveled (VMT) by 25 percent between 2007 and 2015 through a moderate package of TDM strategies that encourage alternative modes of transportation. The TJCOG is now coordinating the marketing and evaluation of this effort through a grant program, and promoting commute alternatives, such as mass transit, carpooling, biking, teleworking, and vanpooling (TJCOG, 2014).

TJCOG coordinated with CAMPO (of which the Town is a member) and other stakeholders to develop a 2040 Metropolitan Transportation Plan (MTP), which involved an air quality conformity analysis for 2012 to 2018. The 2040 MTP incorporates the recommendations of the 2035 Long Range Transit Plan released by CAMPO, including proposed bus service expansion and enhancement, as well as a light rail system linking the Cities of Raleigh and

Durham with the Towns of Cary, Morrisville, and RTP. The project explored and analyzed regional growth scenarios for associated trade-offs and impacts on the transportation network. The recommendations in these plans for appropriate sizing of roads are incorporated into the State's Transportation Improvement Program (TJCOG, 2013). Triangle Transit also coordinates a ride-sharing program for regional commuters.

In September 2012, Wake County released an updated draft of the Wake County Transit Plan, which is pending action from the Wake County Board of Commissioners. The Plan was developed in cooperation with several partners, including CAMPO, Triangle Transit, the RTA, and the City of Raleigh's Capital Area Transit. The Plan provides a dual approach to meet expanding transportation demands as the County continues to grow: (1) a core transit plan that broadens local and commuter bus service and includes a rush-hour commuter rail service from Garner to Durham; and (2) an enhanced transit plan that includes a regional light rail service (Wake County, 2012).

The EIS prepared for the regional light rail project indicates that parking areas to serve the light rail system will not impact levels of carbon monoxide. The EIS also indicates that the light rail system will result in lower levels of vehicle pollutant emissions (USDOT, 2002).

NCDOT is also in the process of planning for a southeast high-speed rail service that will connect Washington, D.C., to Charlotte. The project will be developed incrementally based on available funding. NCDOT has used federal stimulus funding to add commuter routes between Charlotte and Raleigh (SEHSR, 2012). Improved alternative transportation options have the potential to improve air quality by reducing traffic congestion.

The RTA, founded by the Cary, Chapel Hill-Carrboro, Durham, and Raleigh Chambers of Commerce in 1999, serves as a regional business voice for transportation initiatives. Currently, the RTA's members include more than 100 businesses, two metropolitan planning organizations (MPOs), Triangle Transit, and RDU. The Town is an active member of this group, which continues to focus on advancing multi-modal solutions needed to sustain prosperity and enhance quality of life (RTA, 2013). The Triangle Clean Cities Coalition was also founded in 1999, and brings together fleet managers, local and state government officials, fuel and vehicle providers, and interested resident groups, to reduce dependence on petroleum by promoting alternative transportation fuels (TCCC, 2010).

In 2009, Wake County appointed a sustainability task force to address conservation and reduction goals for solid waste, water, and energy which are related to improved air quality within the region. The 2011 sustainability task force report identified several strategies and performance measures for each of those goals related to air quality (Wake County, 2011). Further information on this program is included in Appendix B.

6.2.9 Tree Protection

Tree protection and planting is addressed in the Town's UDO, Transportation Plan, and other policies. The Town recognizes that preserving existing healthy vegetation on a site during development enhances the visual character of the community and provides environmental benefits, such as habitat and temperature control.

Sections 5.4, 5.12, and 8.1 of the UDO address tree protection and landscaping. Some of the specific provisions of ordinances related to protecting the natural environment include:

- Retention of existing trees and shrubs within required buffer areas, unless a plan is approved to replace all or part of the existing vegetation
- Requirement for a letter of credit or certified check in an amount equal to 150 percent of the cost of the planting and a signed statement from the developer to ensure compliance
- Imposition of fines on the property owner if required landscaping is not complete within the allotted timeframe
- Requirements for landscaping areas to be stabilized to prevent soil erosion
- Requirements for protective fencing to be placed around trees that will not be disturbed before development

The UDO includes minimum tree requirements for developments in Section 5.4, as well as requirements for retaining existing tree canopy, which varies inversely with the percentage of existing tree canopy. In addition, other types of vegetation are required by this ordinance. The Town provides specifications for planting in vehicle use areas, such as parking lots. For example, for interior vehicle use areas, every parking space will be located within 50 feet from the trunk of a shade tree. In addition, to provide spatial separation between differing uses, the Town requires buffers. While buffers provide aesthetic screens between land uses, they also can reduce noise and air pollution, prevent soil erosion, and slow and filter stormwater. To assist developers in selecting vegetation that is hardy and suitable for the area, the Town includes recommendations regarding the types of trees and shrubs that developers should plant to meet these requirements.

SECTION 7

Summary of Mitigation to Address Secondary and Cumulative Impacts

As described in Section 6, the Town of Morrisville is taking progressive steps to protect the environment. The Town is experiencing substantial growth and has developed many programs to balance the competing goals of this growth and environmental protection. In addition, the Town is working with NCWRC and NCNHP to ensure important habitat areas are protected. Table 7-1 (at the end of this section) summarizes the potential SCI to natural resources and the mitigation in place to address them.

7.1 Topography and Floodplains

Clearing and grading undeveloped lands changes a development site's topography. Wake County reviews erosion and sediment control plans on behalf of the Town to minimize grading in areas with steep slopes. The current Town floodplain ordinance protects FEMA-regulated floodplains and their functions, mitigating for any impacts associated with growth. Structures may be constructed outside the floodway, but base floor elevations must be at least two foot above the 100-year flood level. Floodplains of smaller streams that are not under FEMA's jurisdiction are protected by the stream buffer ordinance. No structures can be placed within the 50-foot-wide undisturbed stream buffer. The Town's floodplain overlay zoning district was also developed to keep development out of the floodplain. Additionally, the Town's Hazard Mitigation Plan guides policy to preserve and restore natural areas, including floodplains.

The floodplain maps for the Planning Area and County are being updated; the updated maps are likely to include rises in floodplain elevations in some areas, such that more areas will be designated as floodplain and protected from development.

Impacts to wetlands will be minimized by stream buffers, floodplain protection, and other development controls. While some wetland loss still occurs with permitting, overall SCI to wetlands in the Planning Area will be minimized by limiting or prohibiting construction and fill according to the Town's floodplain and stream buffer regulations. By preserving floodplains, their water storage capacity, habitat, filtration, and infiltration functions will also be preserved.

7.2 Soils

Soil loss will be minimized during development through the implementation of the Town's erosion and sediment control program, which is implemented by Wake County.

7.3 Land Use

The Town is mitigating for land use changes by focusing development in appropriate areas. The Town encourages development within its Town Center and Activity Center Districts by

allowing more flexibility in development design. This results in faster permitting, and provides an incentive for development near planned high-density areas, as defined in the 2035 Land Use Plan. Stream buffers, required open space in subdivisions along with clustered development, landscape buffers between different land uses, park lands, and greenways will limit the impacts to open space. A public open space requirement is part of the UDO, as described in Section 6. While open space, such as forests, will still be lost to development, the impacts will be minimized by these efforts.

7.4 Wetlands

Impacts to wetlands will be minimized by stream buffers, floodplain development limitations, and other development controls as well as State and Federal regulations. As described in Section 4.4, the majority of wetlands are located in riparian areas. While some wetland loss still occurs with permitting, the Town requires that all Federal and State wetland permits be obtained prior to final site approval. Overall SCI to wetlands in the Planning Area will be minimized by limiting or prohibiting construction and fill within 50 feet of the stream, as required by the stream buffer regulations in the UDO.

7.5 Prime or Unique Agricultural Land

The Town has no active farms, so impacts to agricultural land will be minimal. Agricultural land is allowed as a land use within the very low-density residential zoning category. However, as development occurs, prime farmland soils with potential for farming will be lost. The Town encourages development within its Town Center and Activity Center Districts by allowing more flexibility in development design. This results in faster permitting, and provides an incentive for development near planned high-density areas defined on the Land Use Plan. By encouraging development in these areas, preservation of prime farmland soils is promoted.

7.6 Public Lands and Scenic, Recreational, and State Natural Areas

With the continued implementation of the Town's Parks and Recreation Master Plan, 2035 Land Use Plan, and UDO, scenic areas, open space, and parks will be a high priority for the Town, providing mitigation for losses of open space as the Town grows. These planned greenways and additions to the park system will provide recreational opportunities and wildlife habitat. Lands adjacent to Lake Crabtree are also planned for preservation, protecting large areas of scenic and recreational areas.

7.7 Areas of Archaeological or Historical Value

The Town has three properties on the NRHP: the Morrisville Christian Church, the Williamson Page house, and the James M. Pugh House; the Town has taken steps to preserve these sites. The Town has proactively relocated the James M. Pugh House, as well as two historic tobacco barns, to prevent potential impact. Other historical areas may be impacted directly by future projects, but indirect impacts are unlikely. Other measures that will mitigate impacts include the Town's Historic Crossroads Village zoning district, which will further protect areas of historical value. The Town Center Plan, developed in 2007,

creates a vision for the original center of Morrisville and identifies more concentrated residential and mixed-use development. The plan also identifies significant open space areas, including an historic Civil War battlefield. The Town's Historic Crossroads Village zoning district, as well as the Town Center Plan, encourage preservation of historic resources. Minimal SCI is likely to occur to cultural and historical resources because of the permitting and review process established by the Town.

7.8 Air Quality

To address the impacts of growth on air quality, the Town is researching and developing alternative modes of transportation. Increasing the interconnections of sidewalks, greenways, trails, and bike lanes will also reduce the needs for vehicle use. Specifically, a trail will connect the Town to RTP, encouraging transportation alternatives to vehicles for commuting needs. The UDO also promotes pedestrian access to commercial areas by requiring 30 percent of dwelling units in new developments to have access to commercial areas by way of all-season bike paths. As growth occurs, these efforts to reduce vehicular use will curtail increases in air pollution. Additional efforts by the Town to extend streets will improve traffic flow and decrease congestion and air pollution. A tree ordinance is also in place to protect trees during construction. Because trees are natural air filters, this ordinance also helps to protect air quality. In addition, Wake County convened a sustainability task force, which have both identified several strategies and performance measures for goals relating to air quality (Wake County, 2011). The Town's and County's actions will keep SCI to air quality in check and limit impacts.

A regional light rail system is planned for the Triangle Area (Wake County, 2012). Documents prepared for this project indicate that parking areas to serve the light rail system will not impact levels of carbon monoxide. The document also indicates that the light rail system will result in lower levels of vehicle pollutant emissions (U.S. Department of Transportation, 2002). The Town's transit-oriented development zoning district and its Transportation Plan show a commitment to alternative transportation.

In 2013, North Carolina had its lowest ozone levels on record since air monitoring began in the early 1970s. The declining ozone levels were generally concurrent with lower emissions from the State's power plants. A recent report by the NCDAQ shows that the State's coal-fired power plants have cut their NO_x emissions, a primary industrial contributor to ozone pollution, by more than 80 percent since the General Assembly enacted the Clean Smokestacks Act in 2002 (NCDENR, 2013).

State legislation to decrease NO_x emissions from power plants has significantly reduced ozone pollution, as discussed above and in Section 6. Additionally, the Town's actions and regional efforts will keep SCI to air quality in check.

7.9 Noise Levels

Efforts taken to improve air quality by promoting alternative forms of transportation will also limit SCI to noise levels in the Planning Area. As more quiet, alternative forms of transportation (such as bike lanes and greenways) and increased interconnections of sidewalks and greenways promote more pedestrian activities, vehicular traffic noise levels

will potentially be reduced. In addition, landscape buffers and tree protection around different development types are required in the UDO. These buffers will help reduce noise.

Increase in grade separation projects for transportation corridors will limit the impact of noise levels from trains, including whistle noises. Additionally, NCDOT's noise abatement policy will mitigate noise on state-owned roads.

7.10 Water Resources

7.10.1 Surface Water

As growth occurs, impacts to water resources are and will be minimized by existing stream buffer regulations, the Town's existing Phase II stormwater program, erosion and sediment control, and open space preservation. The greatest water quality and quantity protection will be achieved by stream buffers preserved and stormwater control measures installed during development. Stream buffers will limit changes in stream channel morphology, erosion, and other habitat degradation. Buffers also filter water and provide shading. Stormwater controls will limit sediment loading and hydrology changes. The Town requires that stormwater volume be controlled for the 1-year, 24-hour storm to maintain the natural hydrograph and protect the channel morphology. The Town annually sponsors an LID workshop with the Town of Cary for residents as well as contractors and developers. Without these regulations and programs, SCI to water resources would be more pronounced.

It should also be noted that as redevelopment occurs, the Town has the opportunity to require stormwater controls and riparian buffer restoration to the maximum extent practicable. While the stormwater controls and riparian buffers for redevelopment may not be as extensive as those required for new development because of site constraints, they provide an opportunity to improve water quality and aquatic habitat. These practices may help improve water quality in Crabtree Creek, a 303(d) listed stream, and the Town's NSW waters.

All waters within the Planning Area are classified as NSW in response to excessive growth of macroscopic and/or microscopic vegetation in Jordan Lake and the Neuse River Estuary. Current strategies to limit nutrient loading will help protect water quality; however, as runoff volumes increase, nutrient loading could continue to impact water quality. The Jordan Lake watershed is subject to WSW rules, which limit impervious surfaces and development densities, and the Jordan Lake Rules, which limit nutrient loading for both nitrogen and phosphorus from new and existing development. In addition to the Town ordinances and policies described in Section 6, the Town will look for opportunities to improve water quality. For example, the Town has worked with State agencies to identify areas for stream restoration and other water quality improvement strategies, and pursue funding through the EEP, Section 319 program and other sources. The Town also actively participates in the development of any TMDLs where activities in Town may be affecting water quality.

The construction of sewer lines, water lines, and roads may also impact water quality, particularly where they cross streams. There are sediment impacts from construction, although the use of proper erosion and sediment controls help minimize this impact. In

general, these impacts are direct, but there is also a cumulative direct impact from previous crossings and other future crossings. The Town will review crossings as a cumulative direct impact in future EAs and EISs.

The Wake County Watershed Management Plan recommended that the County develop an in-stream monitoring program. Implementing an in-stream monitoring program at a regional level is more efficient than implementing a monitoring program at the Town level. Wake County is performing targeted in-stream monitoring.

7.10.2 Groundwater

As growth occurs, impacts to groundwater resources will be mitigated by stormwater programs. The amount of impervious surface generated in developments is restricted, limiting the impacts to groundwater recharge rates. Stormwater programs also address potential impacts to groundwater quality through improper disposal of wastes. Positive impacts will occur as fewer residents rely on groundwater as a public water supply source. Also, a number of septic tank/ground absorption systems that are serving residences may be eliminated, reducing the public health risk of groundwater contamination from leaking or failing septic tanks.

7.11 Forest Resources

The majority of the forested lands in the Planning Area are currently coniferous cultivated pines and will likely be converted. While this change provides a one-time source of timber products, this land use conversion is not suitable for sustainable silviculture activities. The main efforts to protect forest resources include stream buffers and open space requirements in residential developments. Bottomland forest communities will be preserved by the riparian buffer requirements, which will provide habitat corridors. The Town has a tree protection ordinance, and recognizes that preserving healthy vegetation during development provides environmental benefits, such as habitat and temperature control, as well as enhances the visual character of the community.

7.12 Shellfish or Fish and their Habitats

Fishery impacts are and will be limited in the Planning Area by the Town's current mitigation measures and regulations. As discussed in Section 7.10, water quality and quantity impacts will be limited by stream buffers, floodplain protection, stormwater BMPs, and open space preservation. Protecting the habitats of aquatic communities will, in turn, protect the aquatic species themselves.

There are sediment impacts from construction, although the use of proper erosion and sediment controls help minimize this impact. In addition, where culverts are used for road crossings and not sufficiently buried, a natural substrate will no longer exist to provide aquatic habitat. In general, these impacts are direct, but there is also a cumulative direct impact from previous crossings and other future crossings. The Town will review crossings as a cumulative direct impact in future EAs and EISs. For future infrastructure projects that may impact rare species, the Town will work with USFWS to determine whether surveys are needed to evaluate potential impacts.

7.13 Wildlife and Natural Vegetation

The mitigation measures to protect wildlife resources include protecting habitat through riparian buffer protection and open space requirements, and limiting habitat degradation through erosion and sediment control, and stormwater runoff control.

Impacts to the bald eagle population are not likely to occur. Lake Crabtree is in a park, and nearby Jordan Lake is on USACE-managed land; neither area should be impacted by surrounding development. The Town's stormwater and riparian buffer ordinances and the County's erosion and sediment control program will help protect Crabtree Lake, which supplies the bald eagle's food source.

The Northern long-eared bat is proposed for listing by the USFWS and is known to occur in Wake County. However this bat has not been observed within the Planning Area (NCNHP, 2014). Therefore, this species is unlikely to be impacted by SCI within the Planning Area.

The dwarf wedgemussel is not thought to inhabit streams within the Planning Area. Any freshwater mussel species that may inhabit streams within the Planning Area may be impacted, but regulations currently in place will minimize impacts. The construction of sewer lines, water lines, and roads may also impact water quality and the aquatic habitat of these rare mussels, particularly where they cross streams. The current established stream buffers will help to protect stream channel stability, limit sediment loading, and regulate water temperature. Overall, stream buffers and stormwater controls will continue to limit SCI to aquatic habitats and freshwater mussel communities.

In addition to the Town ordinances and policies described in Section 6, the Town will look for opportunities to improve water quality, particularly in 303(d) listed waters. For example, the Town will work with agencies to identify areas for stream restoration and other strategies, and pursue funding through the EEP, Section 319 program, and other programs. The Town will also actively participate in the development of any TMDLs where activities in Town may be impacting water quality.

A plant, Michaux's sumac, is listed as federally endangered and has been located elsewhere in Wake County; however, this plant has not been observed within the Planning Area (NCNHP, 2014). Therefore, this species is unlikely to be impacted by SCI within the Planning Area.

7.14 Introduction of Toxic Substances

The Town has programs to prevent toxic releases and to treat them when they occur. The Town has an active stormwater education program that provides the public with valuable knowledge to make residents aware of the impacts of toxins reaching the stormwater system. The education program encourages the public to limit the use of common toxins, such as lawn pesticides and herbicides, to help prevent the problem. The Town's Stormwater Program also promotes the use of BMPs and LID, which also reduce some of the toxic substance impacts.

Grade separation programs to reduce rail and vehicular traffic interaction will limit the potential for contamination of toxic substances.

TABLE 7-1
Areas of Potential Impacts to be Addressed by Permitting and Mitigation Programs

Environmental Resource	Potential for SCI	Types of SCIs	Mitigation
Topography and Floodplains	LI	Loss of floodplain water storage could occur in areas outside riparian buffers Isolation of floodplain from stream by channel entrenchment; loss of nutrient exchange capabilities; increased sedimentation	Unified Development Ordinance (UDO) <ul style="list-style-type: none"> - Open Space Preservation and Land Use Plans often preserve additional corridors along required riparian buffers - Floodplain Protection - no development or fill in floodway; development in floodplain must obtain special use permit which limits development in floodplain; Hazard Mitigation Plan - Stormwater Programs and Impervious Surface Limitations - Sanitary Sewer Installation – avoids laying sewer lines in riparian buffers - Floodplain Overlay District - prohibits development without a floodplain development permit Erosion and Sediment Control Program administered by Wake County
Soils	PI	Soil erosion and compaction from new development	Land Use Plans – encourages more intense development in Town Center, activity centers, and growth corridors to limit areas of disturbance Parks and Recreation Master Plan Erosion and Sediment Control Program administered by Wake County UDO <ul style="list-style-type: none"> - Riparian Buffers and Floodplain Protection - Stormwater Programs and Impervious Surface Limitations - Open Space Preservation
Land Use	PI	Conversion of agricultural and forested land uses to other developed land uses Redevelopment to higher density land uses	UDO <ul style="list-style-type: none"> - Open Space Preservation - Riparian Buffers and Floodplain Protection – restricts development in riparian buffer zones and prohibits nearly all floodplain encroachment - Stormwater Programs Land Use Plans to encourage development around Town Center and Activity Center Districts Parks and Recreation Master Plan

TABLE 7-1
Areas of Potential Impacts to be Addressed by Permitting and Mitigation Programs

Environmental Resource	Potential for SCI	Types of SCIs	Mitigation
Wetlands	LI	Loss through development; subsequent loss of habitat and habitat fragmentation, reduction in genetic diversity, and loss of attenuation of flow Loss of wetland function through pollutant loading	Wetland Protection through CWA Section 404 and Section 401 UDO <ul style="list-style-type: none"> - Open Space Preservation - Stormwater Programs to reduce pollutant loads and limit stormwater impacts to wetlands - Riparian Buffers and Floodplain Protection Land Use Plans to set aside natural open space and encourages development around Town Center, selected corridors, and mixed-use developments Parks and Recreation Master Plan Erosion and Sediment Control Program, administered by Wake County
Prime or Unique Agricultural Land	LI	Conversion to other uses	Land Use Planning – Note no agriculture activity at this time Supports regional farms by encouraging demand for products through the Western Wake Farmers Market.
Public Lands and Scenic, Recreational, and State Natural Areas	LI	Possibility of conversion of adjacent land uses	UDO <ul style="list-style-type: none"> - Open Space Preservation - Conservation Zoning District - protects environmentally important areas Land use planning Parks and Recreation Master Plan
Areas of Archaeological or Historical Value	LI	Possibility of conversion of adjacent land uses Structural damage from acid rain and vibrations from construction or adjacent transportation	Land use planning to control uses allowed UDO <ul style="list-style-type: none"> - Open space preservation Town Center Districts, including Historic Crossroads Village and Conservation/Buffer zones

TABLE 7-1
Areas of Potential Impacts to be Addressed by Permitting and Mitigation Programs

Environmental Resource	Potential for SCI	Types of SCIs	Mitigation
Air Quality	PI	Reduction in air quality from increased vehicular traffic Reduction in air quality benefits of trees Negative impacts to human health (e.g., asthma); acid rain; reduced visibility	Transportation Plan elements of bicycle and pedestrian planning, road reconnections to alleviate congestion and enhancements for decreasing idle time Wake County Sustainability Task Force Planning for regional connectivity, including a future regional light rail system UDO <ul style="list-style-type: none"> - Connectivity requirement - Open space preservation - Riparian Buffers Protection - Tree Protection Land Use Plan - Activity Center Districts and Town Center Districts Parks and Recreation Master Plan
Noise Levels	PI	Increase in overall noise level in Planning Area Negative impacts to human health	Land use planning UDO <ul style="list-style-type: none"> - Airport overlay district - Open Space Preservation - Riparian Buffers Protection – development buffers - Tree Protection Parks and Recreation Master Plan Increase in grade separation projects for transportation corridors (reduce train whistle noises) NCDOT Traffic Noise Abatement Policy

TABLE 7-1
Areas of Potential Impacts to be Addressed by Permitting and Mitigation Programs

Environmental Resource	Potential for SCI	Types of SCIs	Mitigation
Surface Water Resources	PI	Water quality degradation; increase in stormwater runoff and sedimentation Alteration of natural hydrograph (e.g., magnitude, timing, frequency, duration, rate of change); lower and more frequent low-flow conditions; alteration of channel morphology	UDO <ul style="list-style-type: none"> - Stormwater Programs - Sanitary Sewer Installation – stream crossings with directional borings - Water Conservation - Riparian Buffers and Floodplain Protection – no residential development or fill in floodplain Land Use Plans and open space preservation Parks and Recreation Master Plan Erosion and Sediment Control Program administered by Wake County
Groundwater Resources	LI	Possible reduction in groundwater inflow that provides baseflow in streams and supports aquatic life during droughts Reduction in use for private drinking water; potential to become contaminated	Land use planning UDO <ul style="list-style-type: none"> - Open Space Preservation - Riparian Buffers and Floodplain Protection – allow for natural infiltration - Stormwater Programs, including promotion of LID Water Conservation Programs
Forest Resources	PI	Conversion to other uses Reduction in air quality; increase in near-surface air temperature; habitat fragmentation	Land Use Planning - encourage development in Town Center and growth corridors, as well as tree and urban forest preservation Parks and Recreation Master Plan UDO <ul style="list-style-type: none"> - Conservation/Buffer District – promotes preservation of forest resources - Open Space Preservation Riparian Buffers and Floodplain Protection

TABLE 7-1
Areas of Potential Impacts to be Addressed by Permitting and Mitigation Programs

Environmental Resource	Potential for SCI	Types of SCIs	Mitigation
Shellfish or Fish and their Habitats	PI	<p>Possible aquatic habitat degradation</p> <p>Disruption of food chain; reduction in aquatic insect number and diversity through loss of riffle habitat by increased siltation and increased low-flow conditions; reduction in potential for long-term population sustainability</p>	<p>Wetland Protection through CWA Section 404 and Section 401</p> <p>Endangered Species Act</p> <p>Land Use Planning</p> <p>Parks and Recreation Master Plan</p> <p>Erosion and Sediment Control Program– plan view and pre-construction process; monitoring</p> <p>UDO</p> <ul style="list-style-type: none"> - Conservation/Buffer District – protect environmentally important areas - and open space preservation - Riparian Buffers and Floodplain Protection - Stormwater Programs - Phase II requires runoff volume be controlled - Sanitary Sewer Installation – stream crossings with directional borings
Wildlife and Natural Vegetation	PI	<p>Reduction in available habitat; no impact to Federally listed species</p> <p>Habitat fragmentation; reduction in genetic diversity; reduction in species tolerance; increased dispersal distance to suitable habitat; reduction in potential for long-term population sustainability</p>	<p>Endangered Species Act</p> <p>Parks and Recreation Master Plan - important habitat areas prioritized for protection</p> <p>Land Use Plan– encourage development in Town Center, tree protection</p> <p>Erosion and Sediment Control Program administered by Wake County</p> <p>UDO</p> <ul style="list-style-type: none"> - Open Space Preservation - Conservation/Buffer District - Riparian Buffers and Floodplain Protection -- Habitat protection and maintenance of habitat corridors - Stormwater Programs

TABLE 7-1
Areas of Potential Impacts to be Addressed by Permitting and Mitigation Programs

Environmental Resource	Potential for SCI	Types of SCIs	Mitigation
Introduction of Toxic Substances	LI	Increase in likelihood of contamination particularly in rail transportation corridors Negative impacts to human health	Land Use Planning to control uses and likely exposure Stormwater Programs and Impervious Surface Limitations, including education programs Sanitary Sewer Installation – design standards to limit spills Grade separation programs to reduce rail and vehicular traffic interaction

PI = Areas of Potential Impact (major relevance in SEPA documents and permitting applications)

LI = Areas of Limited Impact (minor relevance in SEPA documents and permitting applications)

SECTION 8

References

Arcadis G&M of North Carolina, Inc. 2003. Indirect and Cumulative Assessment: Western Wake Freeway, TIP No. R-2635, Wake, Chatham, and Durham Counties, North Carolina. Prepared for NC Department of Transportation.

CDM. 2013. Reclaimed Water Master Plan. Prepared for the Town of Cary.

CDM. 2003. Wake County Comprehensive Groundwater Investigation Final Report. Prepared for Wake County, North Carolina.

CDM and Hazen & Sawyer. 2004. Western Wake County Regional Wastewater Treatment Studies Project: Phase I.

CH2M HILL and Brown and Caldwell. 2013. Long Range Water Resources Master Plan. Prepared for the Towns of Cary, Apex, and Morrisville, North Carolina.

CH2M HILL. 2009. Town of Cary Water System Distribution Master Plan. Prepared for Town of Cary, North Carolina.

CH2M HILL. 2002a. Final Technical Memorandum: Planning Level Water Quality Assessment for Town of Cary Northwest Planning Area.

CH2M HILL. 2002b. Wake County Watershed Assessment – Biological, Habitat, and Geomorphologic Evaluations, Technical Memorandum No. 6. Raleigh, North Carolina.

Federal Emergency Management Agency. 2006. Flood Insurance Rate Maps. <http://floodmaps.nc.gov/fmis/Download.aspx>. Accessed January 2014.

Hazen and Sawyer. 2013. Town of Cary Wastewater Collection System Master Plan.

HNTB North Carolina, PC. 2003. Qualitative Indirect and Cumulative Effects Assessment: North Wake Expressway, TIP R-2000A, Wake/Durham County, North Carolina. Prepared for NC Department of Transportation, Office of Human Environment.

Kimley-Horn and Associates, Inc. 2003. Raleigh-Durham International Airport: Runway 5R-23L Safety Area Extension: Final Environmental Assessment.

Louis Berger Group. 2009a. Morrisville Transportation Plan: 2009-2035.

Louis Berger Group. 2009b. Morrisville Land Use Plan: 2009-2035.

National Park Service (NPS). 2014. National Register of Historic Places. <http://www.nps.gov/nr/research/> Accessed January 2014.

North Carolina Gap Analysis Program (NCGAP), McKerrow, A.J., S.G. Williams, J.A. Collazo. 2006. The North Carolina Gap Analysis Project: Final Report. North Carolina Cooperative Fish and Wildlife Research Unit, North Carolina State University, Raleigh, North Carolina.

North Carolina Center for Geographic Information and Analysis (NCCGIA). 2013. NC OneMap Spatial Portal. <http://data.nconemap.com/geoportal/catalog/main/home.page>

NCDCR North Carolina Department of Cultural Resources (NCDCR). 2014a. North Carolina Office of State Archaeology site file data base query for Wake County, as provided by Dolores Hall, Deputy State Archaeologist on March 7th, 2014.

NCDCR. 2014b. Historic preservation Fund Pass-Through Grants for Certified Local Government Jurisdictions.

North Carolina Department of Natural and Environmental Resources (NCDENR) Division of Air Quality. December 13, 2013a. North Carolina's ozone levels lowest on record in 2013 http://daq.state.nc.us/news/pr/2013/ozone_12132013.shtml. Accessed January, 2014

NCDENR. 2013b. Ecosystem Enhancement Program (EEP). Neuse 01 Regional Watershed Plan Fact Sheet.

NCDENR Division of Water Resources. 2012a. 2012 North Carolina Water Quality Assessment and Impaired Waters List (2012 Integrated 305(b) and 303(d) List). Raleigh, North Carolina.

NCDENR Division of Water Resources. 2012b. Basinwide Assessment Report, Neuse River Basin. Raleigh, North Carolina.

NCDENR Division of Air Quality. 2009. North Carolina's Clean Smokestacks Act. <http://daq.state.nc.us/news/leg/cleanstacks.shtml>. Accessed January, 2014.

NCDENR. 2005. Division of Water Resources. Basinwide Water Quality Plan, Cape Fear River Basin. Raleigh, North Carolina.

NCDENR Division of Water Resources. 2004. Basinwide Assessment Report, Cape Fear River Basin. Raleigh, North Carolina.

North Carolina Department of Transportation (NCDOT). 2013. Complete 540 Southeast Extension. <http://www.ncdot.gov/projects/complete540/>. Accessed January 2014

North Carolina Executive Order 96. 1984. Conservation of Prime Agricultural and Forest Lands. James B. Hunt, Jr., Governor. <http://www.cals.ncsu.edu:8050/wq/LandPreservationNotebook/statutes/nc/executiveorders/ExecutiveOrder96.htm>

North Carolina Natural Heritage Program (NCNHP). 2014. Natural Heritage Element Occurrence (NHEO) and Significant Natural Heritage Area (SNHA) Database. Provided by Suzanne Mason on January 8th, 2014.

North Carolina State Historic Preservation Office (NCSHPO). 2013. 2014 Historic preservation Fund Pass-Through Grants for Certified Local Government Jurisdictions. <http://www.hpo.ncdcr.gov/grants/grants2014.html>. Accessed February 2014.

NCSHPO. 2004. Wake County Fact Sheet. <http://www.hpo.dcr.state.nc.us/facts/Wake.htm>. Accessed January 2014.

North Carolina Wildlife Resources Commission (NCWRC). 2014. Mussels Species Distribution. <http://www.ncwildlife.org/Learning/Species.aspx>. Accessed January, 2014.

- NCWRC. 2013a. Gamelands GIS coverage for December 2013. Provided by Vann Stancil on December 4th, 2013.
- NCWRC. 2013b. North Carolina's White-nose Syndrome Surveillance and Response Plan. December, 2013.
- Southeast High Speed Rail (SEHSR). 2012. SEHSR Corridor from Washington, DC to Charlotte, NC. Project History. <http://www.sehsr.org/history.html>. Accessed January, 2014.
- Stantec. 2013. Kit Creek Watershed Assessment prepared for the Town of Morrisville.
- Town of Cary. 2014a . 2013 Annual Report on Interbasin Transfers for RTP South and the Towns of Cary, Apex, and Morrisville. Submitted April 2014.
- Town of Cary. 2014b. CAWTF Phase III Expansion EA. http://www.townofcary.org/Departments/waterresources/water/Water_Projects/CAWT_P-Ph3.htm. Accessed January 2014.
- Town of Cary. 2014c . FISCAL YEAR 2014 RATES AND FEES. <http://budget.townofcary.org/budget/fy2014proposed/017-bundle.pdf> Accessed January, 2014.
- Town of Cary. 2013. GIS. Provided by Town of Cary staff. November, 2013.
- Town of Morrisville. 2014 Draft Sustainability Master Plan.
- Town of Morrisville. 2013. McCrimmon Transit Plan.
- Town of Morrisville. 2012. Population Projections: Certified Estimates of Population Growth provided by the State Demographer.
- Town of Morrisville. 2011. Comprehensive Parks and Recreation Master Plan. July 26, 2011.
- Town of Morrisville. 2010. Hazard Mitigation Plan.
- Town of Morrisville. 2007. Town Center Plan.
- Triangle J Council of Governments (TJCOGG). 2014. Triangle Transportation Demand Management Program Description. <http://www.tjcog.org/triangle-transportation-demand-management-program.aspx> . Accessed January 31, 2014.
- Triangle Clean Cities Coalition (TCCC). 2010. <http://www.trianglecities.org/general-information.aspx>. Accessed January 2014.
- U.S. Census Bureau. 2010. Census 2010 Population Finder. <http://www.census.gov/2010census/>. Accessed January 2014.
- U.S. Department of Agriculture (USDA). 1970. Soil Survey of Wake County, North Carolina. U.S. Government Printing Office. Washington, DC.
- U.S. Department of Agriculture (USDA). May 1998. Important Farmlands of North Carolina. Natural Resource Conservation Service. Raleigh, North Carolina.

U.S. Department of Transportation, Federal Transit Administration, and Triangle Transit Authority. 2002. Phase I Regional Rail System, Durham and Wake Counties, North Carolina, Final Environmental Impact Statement and Section 4(F) Evaluation.

United States Environmental Protection Agency (USEPA). 2014. Cleanups in My Community Map. Search: Apex, NC. <http://ofmpub.epa.gov/apex/cimc/f?p=cimc:63>. Last accessed February 3, 2014.

USEPA. 2013. Greenbook of Nonattainment Areas for Criteria Pollutants. <http://www.epa.gov/oaqps001/greenbk> Accessed November, 2013.

USEPA. 2012a Air Quality Index Reports. http://www.epa.gov/airdata/ad_rep_aqi.html. Accessed January, 2014.

USEPA. September 2012b. Third 5-year review for Koppers, Inc. <http://www.epa.gov/superfund/sites/fiveyear/f2012040004369.pdf>.

USEPA. 2000. Compliance and Enforcement Strategy Addressing Combined Sewer Overflows and Sanitary Sewer Overflows. April 27, 2000.

U.S. Fish and Wildlife Service (USFWS). 2014a. Threatened and Endangered Species in North Carolina.

<http://www.fws.gov/raleigh/species/cntylist/wake.html>. Accessed January, 2014.

USFWS. 2014b. Species Profile, norther long-eared Bat (*Myotis septentrionalis*). <http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=A0JE> Accessed February 2014.

Wake County. September 2012. Wake County Draft Transit Plan. <http://www.wakegov.com/planning/transport/Pages/transitplan.aspx> Accessed January, 2014.

Wake County. 2011. Sustainability Quality Task Force. August 2011. Environmental Stewardship Agenda.

Appendix A

– Agency Involvement

1. Agency Meetings

-Kick-off Meeting Summary

-GIS Meeting Summary

2. Summary of Agency Comments

-Comment Response Matrix

-Agency Correspondence

1. *Agency Meetings*

-Kick-off Meeting Summary

- GIS Meeting Summary



Secondary and Cumulative Impacts Master Management Plans Kick-off Meeting

MEETING DATE: Tuesday, October 15, 2013

MEETING ATTENDEES:	Lyn Hardison / DENR	Jessica Bolin / Town of Apex
	Syd Miller & Leila Goodwin / Town of Cary	Kathryn Benson, Adam Sharpe, Sarah Braman / CH2MHill
	Heather Keefer / Town of Holly Springs	

Introduction/Background

This meeting served as the kick-off to the 2015 Secondary and Cumulative Master Management Plans (SCIMMP) for the Project Team. The meeting objectives included:

- Establish a common vision for this project
- Gain consensus on the scope of this project
- Confirm the path forward
- Establish communication procedures
- Provide an opportunity for questions and discussion of the process

During the initial discussions of the meeting it was confirmed that Kathryn Benson will be the project manager and Adam Sharpe will move to a Senior Technical Consultant role for the project.

Coordination between the SCIMMP project and the IBT Environmental Assessment project will occur between Adam and Kathryn to ensure efficient use of resources for the Towns.

The outcomes of Phase 1 were reviewed which included:

- Target milestones within the overall project schedule.
- Proposed document format
 - Draft SCIMMP submittal to Agencies for review will be in track changes with entire sections replaced as needed (potentially Section 4 – Existing Environment, Section 6- Mitigation, and Section 7- Summary).
 - Final SCIMMP submittal to the Clearinghouse will be a new document.
- Need for the GIS Working Group with Agency representatives.
- The 2014 Biennial Report will not be a separate document or submittal; the draft of 2015 SCIMMP to be submitted in lieu of 2014 Biennial Report.

Project Approach

The project objectives were reviewed with the Project Team. These objectives included:

- Submit 2015 SCIMMP to NC Department of Environment and Natural Resources (DENR)

- Use 2005 Document as base document
- Agency Review by April 2014
- State Clearinghouse submittal in December 2014
- Efficient use of Town Resources
 - Joint Meetings with DENR
 - Targeted Data Collection Meetings
 - Scheduling Town department meetings within the same day
- Consistency of format among documents
 - Ease of Review and use of Documents

The Team concurred that these objectives remain the core objectives for the project moving forward.

An overview of the project approach was reviewed by the Project Team, including a description of the major task items, including:

- Task 1 – Kick-off and Project Initiation
- Task 2 – Develop Draft SCIMMP Documents
- Task 3 – Geographic Information Systems Data Delivery to DENR Agencies
- Task 4 – Final SCIMMPs Delivered to DENR

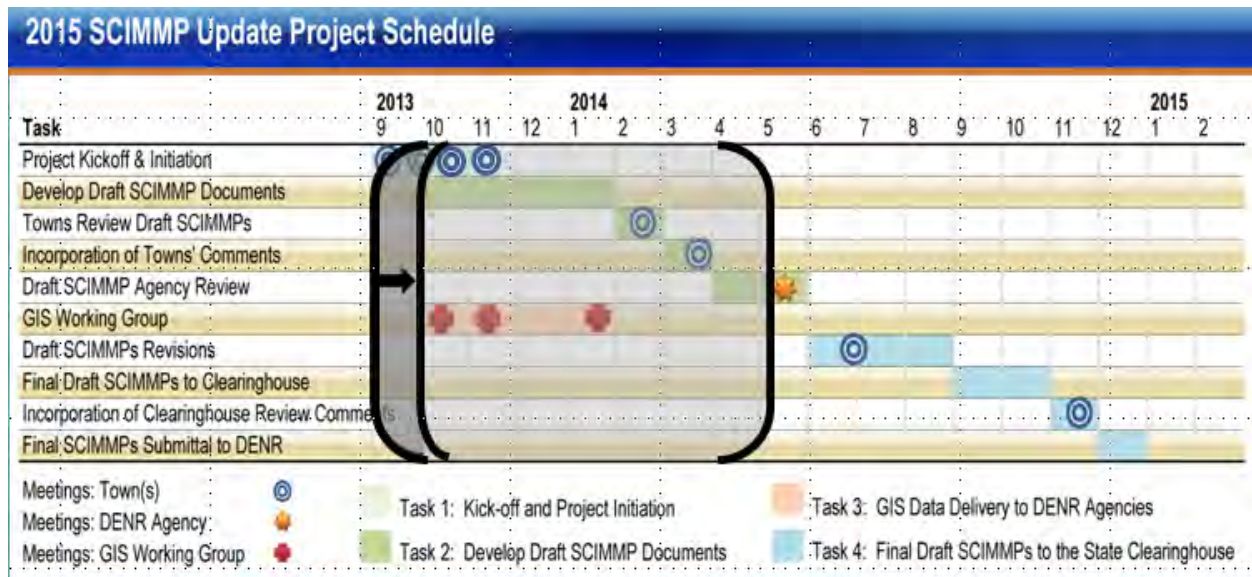
Schedule

Target Milestones

- April 2014 – Agency Review of Draft Document
- December 2014 – Submittal to State Clearinghouse

Schedule

To achieve the schedule below an accelerated data collection process will need to occur.



GIS Working Group Meeting with Agency Representatives

- Meeting No. 1 will include a discussion of data format for the transmission of spatial data to Agency staff for their use during the SCIMMP review process. Discussions will also occur to gather input on the consolidation of land use categories for presentation within the SCIMMP figures.
 - The goal is to have this meeting the week of November 4th or 11th
- Lyn is to confirm contacts and provide potential dates for Agency representatives.

Town Meetings

- Meetings within individual departments to be scheduled back-to-back for increased efficiency.
- Meetings to occur the week of October 21st or 28th
- Towns to confirm appropriate departmental contacts.

Project Framing

The Team was asked to provide critical success factors, areas of concern or potential obstacles, and expected outcomes for this project. The following bullets outline the feedback provided.

Critical Success Factors

- 2015 Update approved by DENR ; usable for project planning and reviews
 - Consider reframing mitigation section to not have separate Federal, State, County and local sections
- Good communication & coordination
- Acceptable GIS data delivery

Streamlined process

Areas of Concerns or Potential Obstacles

- Right people will be involved
 - *CH2M HILL will address by verifying with Lyn to ensure potential review members of the Agencies are included in the process.*
- New people brought up to speed; new decision makers aware of procedural impacts
 - *CH2M HILL will prepare a one-page background document that can be distributed to new Agency contacts/reviewers.*
- Potential change in process or SCIMPP concept
 - *CH2M HILL will remain flexible to incorporate the impact of changes but the document preparation process will proceed as discussed unless changes are legislated or confirmed required by the Agency. CH2M HILL has provided a well defined schedule and scope to meet the established milestones.*
- GIS team agreeing in timely fashion

- *CH2M HILL will provide a well defined schedule and facilitate the meeting for effective outcomes. All meetings will have an objective and summarized outcomes. Concerns regarding schedule will be promptly addressed. Key decision maker from DENR is Lyn.*
- Legislators concern with SEPA process
 - *Open communication with Lyn and project team regarding potential changes.*
- Consistency in GIS submittals to DENR
 - *CH2M HILL will address concerns with Towns in upcoming data collection meetings. Establishing a repetitive process for map creation is critical.*

Expected Outcomes

- Approved SCIMMP by 2015
- Project within budget
- SCIMMP accepted by DENR
- Agencies using map/data layers and documents all the time

Communication Procedures

- Each Town has a main point of contact, present at the kick-off meeting. Tim Gauss will be Town of Morrisville's main point of contact. Additional points of contact for relevant subject areas are to be established.
 - Eric Staehle will serve as the main point of contact for Wake County.
 - Apex/Cary – Towns to initiate contact with subject area points of contact, CH2M HILL to then communicate directly with use of meeting doodle.
 - Holly Springs – Heather to facilitate meetings with subject area points of contact.
- Status calls to occur as needed. The team felt it was not necessary to have an established biweekly or monthly call.
- Meeting Doodle to continue to be used for scheduling group meetings.

Data Needs and Path Forward

- Discussed GIS, Master Plan, CIP and other data needs. Please see attached detailed data request.

Action Items

CH2M HILL

- Follow-up with Wake County and Town of Morrisville
- Establish ftp site for uploading files for the Team:
 - Click on <https://transfer.ch2m.com>
 - Log on with "EXT\" directly in front of the username
Username = **ext\2015SCIMMP**
Password = **CH2MHill**
 - Enter the password and click OK

- Navigate to the folder and double click on the folder to open “2015_SCIMMP_Update”
- Double click the file to read or use the “Upload” button to add a file to this folder (copy and pasting a file to this location is not available as this is a website)
- Schedule Town meetings upon receiving contact information (Heather to schedule Holly Springs meetings)
- Create a one page summary of SCIMMP process for *new Agency contacts/reviewers*

Towns

- Identify and provide Town staff contact information
- Upload data needs specified to the ftp site detailed above and notify Kathryn when upload is complete.

Lyn

- Identify GIS Work group members
- Provide potential meeting dates for GIS Working Group Meeting No. 1 for week of November 4th or 11th



Secondary and Cumulative Impacts Master Management Plans (SCIMMP) Agency GIS Workgroup – Meeting Summary

MEETING DATE Friday, November 22, 2013; 1:30 PM – 3:30 PM
 TIME &
 LOCATION: CH2M HILL – Raleigh, NC

ATTENDEES	Name	Affiliation	Name	Affiliation	Name	Affiliation
	Lyn Hardison	NC DENR	Jessica Bolin	Apex	Scott Evenson	Holly Springs
	Jennifer Haynie	NC DWQ	Will Brown	Apex	Heather Keefer	Holly Springs
	Bethany	NC DEMLR	Mike Deaton,	Apex	Tim Gauss	Morrisville
	Georgoulas		Steve Nelson	Apex	Rodney Wadkins	Morrisville
	Fred Tarver	NC DWR	Leith Britt	Cary	Kathryn Benson	CH2MHILL
	Vann Stancil	NC WRC	Sydney Miller	Cary	Sarah Braman,	CH2MHILL
	John Amoroso	NC P&R	Mike Mull	Cary	Adam Sharpe	CH2MHILL
	Mike Medina	NC DEMLR				

Objectives

This meeting served as the initial GIS workgroup meeting for the 2015 Secondary and Cumulative Master Management Plans (SCIMMP) Update for the Towns of Apex, Cary, Holly Springs and Morrisville. The meeting objectives were:

- To familiarize Agency representatives with the SCIMMP process
- Review Agency GIS transmittal format
- Provide an opportunity for questions and discussion

SCIMMP Background Objectives

An overview of the purpose of the SCIMMP document was discussed (see attached slides). The Phase I Agency Meeting presentation is available upon request for additional background information.

The SCIMMP is for the SEPA process but can potentially be used in the NEPA processes with augmentation, as occurred with USACE EIS for the Western Wake Water Reclamation Facility. SCIMMP applies to indirect impacts (secondary & cumulative), not direct impacts.

GIS Data Sources

The following data sources were presented for discussion:

- Boundaries
 - Study Area - Towns
 - County– NC1Map
 - Riverbasins – NC1Map
- Hydrography – NC1Map

- Infrastructure - Towns
- Roads - NCDOT
- Topography & Floodplains - FEMA Maps, Towns
- Soils - USDA, Wake County
- Land Use – Towns, Wake County
- Wetlands – NC1Map – NWI (layer)
- Significant Natural Heritage Areas – NC1Map - SNHA
- 303(d) Streams - NC1Map - 2012 303d/Water Quality Assessment
- Rare, Threatened, or Endangered Species – NC1Map - NHEO

Feedback was provided to verify with the respective Agencies that the data presented on NC1Map, relevant to the Agencies function, is the most recent. Bethany Georgoulis will provide those contacts and CH2MHILL will request the most recent version from those contacts. No response by December 1, 2013 will be interpreted as concurrence.

Agreement was achieved that December 1, 2013 will serve as the data update threshold. Updates after this point will not be incorporated into the 2015 SCIMMP.

It was also suggested to verify with Towns regarding updated wetland layers to use in lieu of the National Wetland Inventory data, as well as updated buffer layers. It was also suggested that contact be made with the National Heritage Program (NHP) to discuss the use of data included in the conservation planning tool. CH2MHILL will be meeting with NHP to follow up.

SCIMMP GIS Submittal

Agreement was achieved on providing map packages for Figures 4-2 (Existing Land Use) and 5-1 (Future Land Use). Map packages (file extension “.mpk”) require ArcGIS version 10.0 or higher and provide data and symbology.

Concurrence was also achieved on the content of the figures will contain the following layers. Agency data will not be submitted.

- Residential
- Non-Residential
- Open Space
- Progress Energy
 - Gamelands
 - Undeveloped
- Undeveloped (Existing Land Use)
- WRC Gamelands
- FEMA
- Buffers
- Study Area Boundary
- Infrastructure

Data Needs and Path Forward

- Bethany Georgoulis – provide agency contacts to CH2MHILL by Monday, November 25
- CH2MHILL - Contact agencies to verify most recent version of data, Follow up with NHP

2. Summary of Agency Comments

- Comment Response Matrix
- Agency Correspondence

**Comment Response Matrix
2015 Secondary and Cumulative Impacts Master Management Plan (SCIMMP)**

Town of Morrisville

**Reviewed by: NC Department of Environment and Natural Resources (NCDENR), NC Department of Public Safety, US Fish and Wildlife Services (USFWS)
Review Period: April 14, 2014 - August 18, 2014**

Division	Point of Contact	Role/Office	Comment	Response to comment
NC Department of Public Safety; NC Floodplain Mapping Program	Dan Brubaker	NFIP Engineer	All four municipalities regulate impacts to the Special Flood Hazard Areas (SFHAs) in their respective ordinances as required under the National Flood Insurance Program (NFIP) regulations. Impacts are regulated as development occurs in specific areas, so specific impacts would be beyond the scope of a SCIMMP, other than pointing out that local ordinances govern such impacts. As such, it appears that the SCIMMPs address the NFIP regulations, and this office does not have any additional comments or recommendations to the documents provided.	Comment noted.
US Fish and Wildlife Service (USFWS)	Sarah McRae	Fish and Wildlife Biologist	No comments.	Comment noted.
NCDENR- Division of Parks & Recreation (DPR)	Justin Williamson	Environmental Review Coordinator	No comments.	Comment noted.
NCDENR-Division of Air Quality (DAQ)	Connie Horne	Environmental Senior Specialist	No comments.	Comment noted.
NCDENR-Division of Waste Management (DWM)	Dennis Shackelford	Eastern District Supervisor	During construction activities, the Town should make every feasible effort to minimize the generation of waste, to recycle materials for which viable markets exist, and to use recycled products and materials in development of this project where suitable. Any waste generated by these projects that cannot be beneficially reused or recycled must be disposed of at a solid waste management facility permitted by the Division. The Division strongly recommends that the Town of Morrisville require all Contractors to provide proof of proper disposal for all waste generated from these projects in the form of waste disposal tickets.	Comment noted. The Town does due diligence when acquiring land for infrastructure planning. All Town construction projects include the EJCDC C-700 Standard General Conditions of the Construction Contract. This document stipulates that construction professionals working with the Town will comply with any and all applicable laws, rules, ordinances and associated documentation. In addition, the Town is developing a <u>Sustainability Plan</u> one component of which entails minimizing waste and encouraging the use of recyclable materials. The Town's <u>Engineering Design and Construction Manual</u> prescribes the disposal of other construction debris at construction debris landfills. The Town's Code Enforcement Officer monitors storage and removal of debris during construction.
NCDENR-Division of Waste Management (DWM)	Jim Bateson	Superfund Section Chief	CERCLIS and other contaminated sites under the jurisdiction of the Superfund site that are located within the Town of Morrisville and may occur within close proximity to Town projects. It is recommended that the Town incorporate into its infrastructure planning, a process to locate potential contaminated sites that could affect infrastructure planning. The Superfund Section website contains information about location and online records of contaminated sites: http://portal.ncdenr.org/web/wm/sf	Comment Noted. The Town does due diligence when acquiring land for infrastructure planning. A superfund site is located within the Town of Morrisville (previous use of site for wood processing/treating); the Town has adopted the McCrimmon Transit Small Area Plan which includes the site. Residential and other sensitive land uses are not planned for the site under the Plan; rather, a major grade separation facility (flyover) is proposed on a portion of the superfund site which isolates the balance of the superfund site from the remaining portion of the planning area. The site may be used for parking. Remediation of the site has taken place (contaminated soil has been removed), and the property owner is now responsible for monitoring remaining trace pollutants.
NCDENR-Division of Water Resources (DWR)	Jackie Roddy	Environmental Engineer	No comments.	Comment noted.
NCDENR-Wildlife Resources Commission (WRC)	Vann Stancil	Fisheries/Wildlife Biologist; Special Project Coordinator	No objection to project as proposed.	Comment noted.
NCDENR-Raleigh Regional Office - Air Quality (AQ)	David Miller	Environmental Engineer	No comments.	Comment noted.

**Comment Response Matrix
2015 Secondary and Cumulative Impacts Master Management Plan (SCIMMP)**

Town of Morrisville

**Reviewed by: NC Department of Environment and Natural Resources (NCDENR), NC Department of Public Safety, US Fish and Wildlife Services (USFWS)
Review Period: April 14, 2014 - August 18, 2014**

Division	Point of Contact	Role/Office	Comment	Response to comment
NCDENR-Raleigh Regional Office - Land Quality (LQ)	John Holley	Regional Engineer	No comments.	Comment noted.
NCDENR-Raleigh Regional Office - Public Water Supply (PWS)	Michael Douglas	Regional Engineer	Plans and specifications for the construction, expansion, or alteration of a public water supply system must be approved by DWR Public Water Supply Section prior to contract or the initiation of construction. Systems must comply with state and federal drinking water monitoring requirements.	Comment noted.
NCDENR-Raleigh Regional Office - Underground Storage Tanks (UST)	Mark Powers	Regional Supervisor	Notification of the proper regional office is requested if "orphan" underground storage tanks (USTS) are discovered during any excavation operations.	Comment noted.
NCDENR-Raleigh Regional Office - Water Quality (WQ)	Danny Smith	Regional Supervisor	No comments.	Comment noted.

**Comment Response Matrix
2015 Secondary and Cumulative Impacts Master Management Plan (SCIMMP)**

Town of Morrisville

**Reviewed by: State Environmental Review Clearinghouse
Review Period: October 3, 2014 - October 30, 2014**

Division	Point of Contact	Role/Office	Comment	Response to comment
NC DENR - Legislative Affairs	Lyn Hardison	Environmental Review Coordinator	No comment	Comment noted.
NC Department of Transportation	Carrie Atkinson	State Clearinghouse Coordinator	No comment	Comment noted.
NC Department of Emergency Management - Floodplain Management Program	Carolyn Penny	State Clearinghouse Coordinator	No comment	Comment noted.
NC Department of Cultural Resources - State Historic Preservation Office	Renee Gledhill-Earley	Environmental Review Coordinator	No comment	Comment noted.



CH2M HILL
3120 Highwoods Blvd
Suite 214
Raleigh, NC
27604
Tel 919.875.4311
Fax 919.875.8491

December 10, 2014

Lyn Hardison
Environmental Review Coordinator
NCDENR
1639 Mail Service Center
Raleigh, NC 27699-1601

Subject: Final 2015 Secondary and Cumulative Impacts Master Management Plan (SCIMMP) for
the Town of Morrisville

Dear Ms. Hardison:

Per our discussion on November 13, 2014, no comments were received from the State Environmental Review Clearinghouse and Appendix A has been updated to include related correspondence. The final version is dated December 2014.

Per your request, I have enclosed 1 hard copy and 1 digital copy of the final 2015 Secondary and Cumulative Impacts (SCI) Master Management Plan for the Town of Morrisville. As required by the Memorandum of Agreement (MOA), electronic versions of the document will also be available to the public on the Town's website:

Town of Morrisville: <http://www.ci.morrisville.nc.us/>

This completes the SCI Master Management Plan Update process for the Town. At this time the Town has met all of the conditions of the MOA until the biennial report is due on September 30, 2017. Thank you for all your effort and support on developing this Plan. If you have any questions, please contact me at (919-607-4347)

Sincerely,

CH2M HILL

A handwritten signature in blue ink that reads "Kathryn Benson".

Kathryn Benson, PE
Project Manager

c: Tim Gauss, AICP, Town of Morrisville



North Carolina Department of Administration

Pat McCrory, Governor

Bill Daughtridge, Jr., Secretary

November 5, 2014

Ms. Kathryn Benson
Town of Morrisville
c/o CH2MHILL
3120 Highwoods Blvd, Suite 214
Raleigh, North Carolina 27604

Re: SCH File # 15-E-4300-0232; Secondary and Cumulative Impacts Master Management Plan for the Town of Morrisville.

Dear Ms. Benson:

The above referenced environmental impact information has been reviewed through the State Clearinghouse under the provisions of the North Carolina Environmental Policy Act.

No comments were made by any state/local agencies in the course of this review. Therefore, no further environmental review action on your part is required for compliance with the Act.

Sincerely,

A handwritten signature in cursive script that reads "Crystal Best".

Crystal Best

State Environmental Review Clearinghouse

cc: Region J

Mailing Address:
1301 Mail Service Center
Raleigh, NC 27699-1301

Telephone: (919)807-2425
Fax (919)733-9571
State Courier #51-01-00
e-mail state.clearinghouse@doa.nc.gov

Location Address:
116 West Jones Street
Raleigh, North Carolina

NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

COUNTY: WAKE

H12: OTHER

STATE NUMBER: 15-E-4300-0232
DATE RECEIVED: 09/30/2014
AGENCY RESPONSE: 10/27/2014
REVIEW CLOSED: 10/30/2014

MS LYN HARDISON
CLEARINGHOUSE COORDINATOR
DENR LEGISLATIVE AFFAIRS
GREEN SQUARE BUILDING - MSC # 1601
RALEIGH NC

REVIEW DISTRIBUTION

CC&PS - DIV OF EMERGENCY MANAGEMENT
DENR LEGISLATIVE AFFAIRS
DEPT OF CULTURAL RESOURCES
DEPT OF TRANSPORTATION
TRIANGLE J COG

PROJECT INFORMATION

APPLICANT: Town of Morrisville
TYPE: State Environmental Policy Act
Environmental Review

DESC: Secondary and Cumulative Impacts Master Management Plan for the Town of
Morrisville.

The attached project has been submitted to the N. C. State Clearinghouse for
intergovernmental review. Please review and submit your response by the above
indicated date to 1301 Mail Service Center, Raleigh NC 27699-1301.

If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: NO COMMENT COMMENTS ATTACHED

SIGNED BY:

Lyn B. Hardison

DATE:

10-29-14

NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

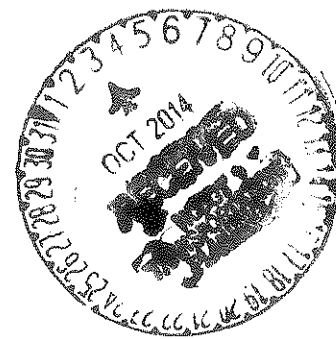
Rupal Desai

COUNTY: WAKE

H12: OTHER

STATE NUMBER: 15-E-4300-0232
DATE RECEIVED: 09/30/2014
AGENCY RESPONSE: 10/27/2014
REVIEW CLOSED: 10/30/2014

MS CARRIE ATKINSON
CLEARINGHOUSE COORDINATOR
DEPT OF TRANSPORTATION
STATEWIDE PLANNING - MSC #1554
RALEIGH NC



REVIEW DISTRIBUTION

CC&PS - DIV OF EMERGENCY MANAGEMENT
DENR LEGISLATIVE AFFAIRS
DEPT OF CULTURAL RESOURCES
DEPT OF TRANSPORTATION
TRIANGLE J COG

PROJECT INFORMATION

APPLICANT: Town of Morrisville
TYPE: State Environmental Policy Act
Environmental Review

DESC: Secondary and Cumulative Impacts Master Management Plan for the Town of Morrisville.

The attached project has been submitted to the N. C. State Clearinghouse for intergovernmental review. Please review and submit your response by the above indicated date to 1301 Mail Service Center, Raleigh NC 27699-1301.

If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: NO COMMENT COMMENTS ATTACHED

SIGNED BY: _____

Rupal

DATE: _____

10/17/14



NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

COUNTY: WAKE

H12: OTHER

STATE NUMBER: 15-E-4300-0232

DATE RECEIVED: 09/30/2014

AGENCY RESPONSE: 10/27/2014

REVIEW CLOSED: 10/30/2014

MS CAROLYN PENNY
CLEARINGHOUSE COORDINATOR
CC&PS - DIV OF EMERGENCY MANAGEMENT
FLOODPLAIN MANAGEMENT PROGRAM
MSC # 4719
RALEIGH NC

OCT 2 2014

REVIEW DISTRIBUTION

CC&PS - DIV OF EMERGENCY MANAGEMENT
DENR LEGISLATIVE AFFAIRS
DEPT OF CULTURAL RESOURCES
DEPT OF TRANSPORTATION
TRIANGLE J COG

PROJECT INFORMATION

APPLICANT: Town of Morrisville
TYPE: State Environmental Policy Act
Environmental Review

DESC: Secondary and Cumulative Impacts Master Management Plan for the Town of Morrisville.

The attached project has been submitted to the N. C. State Clearinghouse for intergovernmental review. Please review and submit your response by the above indicated date to 1301 Mail Service Center, Raleigh NC 27699-1301.

If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: NO COMMENT COMMENTS ATTACHED

SIGNED BY:

John D. Burbaker

DATE: 15 OCT 2014

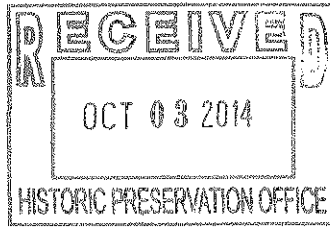


NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

COUNTY: WAKE

H12: OTHER

STATE NUMBER: 15-E-4300-0232
DATE RECEIVED: 09/30/2014
AGENCY RESPONSE: 10/27/2014
REVIEW CLOSED: 10/30/2014



ER 4 - 2300

MS RENEE GLEDHILL-EARLEY
CLEARINGHOUSE COORDINATOR
DEPT OF CULTURAL RESOURCES
STATE HISTORIC PRESERVATION OFFICE
MSC 4617 - ARCHIVES BUILDING
RALEIGH NC

REVIEW DISTRIBUTION

CC&PS - DIV OF EMERGENCY MANAGEMENT
DENR LEGISLATIVE AFFAIRS
DEPT OF CULTURAL RESOURCES
DEPT OF TRANSPORTATION
TRIANGLE J COG

DUE 10/12/14

A - (NC) DUE 10/7/14

PROJECT INFORMATION

APPLICANT: Town of Morrisville
TYPE: State Environmental Policy Act
Environmental Review

DUE 10/17/14

S - (NC) ADU 10/10/14

DESC: Secondary and Cumulative Impacts Master Management Plan for the Town of Morrisville.

The attached project has been submitted to the N. C. State Clearinghouse for intergovernmental review. Please review and submit your response by the above indicated date to 1301 Mail Service Center, Raleigh NC 27699-1301.

If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: NO COMMENT COMMENTS ATTACHED

SIGNED BY: Renee Gledhill-Earley

DATE: 10.13.14



OCT 06 2014



CH2M HILL
3120 Highwoods Blvd
Suite 214
Raleigh, NC
27604
Tel 919.875.4311
Fax 919.875.8491

September 19, 2014

Ms. Chrys Baggett
Department of Administration, State Clearinghouse
5th Floor Administration Building
1301 Mail Service Center
Raleigh, NC 27699-1302

Subject: 2015 Secondary and Cumulative Impacts Master Management Plan for Town of Morrisville, North Carolina

Dear Ms. Baggett:

I have enclosed two (2) hard copies and six (6) digital copies of the 2015 Secondary and Cumulative Impacts Master Management Plan (SCIMMP) for the Town of Morrisville. For your reference, a copy of correspondence from Lyn Hardison indicating approval from DENR for submittal to the State Clearinghouse is found in Appendix A and attached.

The Town previously worked with the Department of Environment and Natural Resources (DENR) to develop a SCIMMP process back in 2003 to 2005. The SCIMMP provides a holistic review of the Town's planned infrastructure, the potential secondary and cumulative impacts, and growth management plans to address these impacts.

In 2005, the Town of Morrisville developed its first SCIMMP and entered into a Memorandum of Agreement (MOA) with DENR that outlines how the SCIMMP will be used, for what time period it can be cited in individual environmental documents, reporting requirements, and under what circumstances it must be updated more frequently.

In accordance with the MOA, the period of standing for the 2005 SCIMMP is 10 years, and the MOA remains in effect until December 31, 2035. For this reason, an updated 2015 SCIMMP has been developed to take effect in 2015. The Town of Morrisville will submit Biennial Reports to DENR according to the following dates:

Document	Submittal Date
2015 SCIMMP	January 1, 2015
2017 Biennial Report	September 30, 2017
2019 Biennial Report	September 30, 2019
2021 Biennial Report	September 30, 2021
2023 Biennial Report	September 30, 2023
2025 SCIMMP	January 1, 2025

We respectfully request that the enclosed SCIMMP be distributed appropriately and be published in the October 3rd Environmental Bulletin.

If you have any questions, please contact me at (919) 607-4347.

Sincerely,

CH2M HILL

A handwritten signature in blue ink that reads "Kathryn Benson, PE". The signature is fluid and cursive, with the initials "PE" written in a larger, more distinct font at the end.

Kathryn Benson, PE
Project Manager
kbenson@ch2m.com

c: Tim Gauss, AICP, Town of Morrisville
Sarah McRae, USFWS
Jean Gibby, USACE



North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

John E. Skvarla, III
Secretary

September 17, 2014

Kathryn Benson, PE
CH2M Hill
3120 Highwoods Blvd.
Suite 214
Raleigh, NC 27604

Re: Draft 2015 Secondary Cumulative Impacts Master Management Plan
Town of Holly Springs
Wake County

Dear Mrs. Benson,

We appreciate the efficiency in addressing the agency comments that were received during the Department's internal review of the 2015 Draft Secondary Cumulative Impacts Master Management Plan (SCIMMP). In keeping with the timeline of the approved Memorandum of Agreement (MOA), the document can be forwarded to the State Clearinghouse for further State review.

In accordance with the MOA, the period of standing for the SCIMMP is 10 years, and the MOA remains in effect until December 31, 2035. Together we agreed on the following dates for future biennial reports and updates to the plan:

Document	Submittal Date
2015 SCIMMP	January 1, 2015
2017 Biennial Report	September 30, 2017
2019 Biennial Report	September 30, 2019
2021 Biennial Report	September 30, 2021
2023 Biennial Report	September 30, 2023
2025 SCIMMP	January 1, 2025

Please insert this schedule in the 2015 Secondary Cumulative Impacts Master Management Plan.

I look forward to working with you and the Town of Holly Springs in the near future. If I can be of further assistance please contact me at 252-948-3842 or lyn.hardison@ncdenr.gov.

Sincerely,

A handwritten signature in blue ink that reads "Lyn B. Hardison". The signature is written in a cursive style with a horizontal line under the name.

Lyn B. Hardison
Division of Environmental Assistance & Customer Service
Permit Assistance Coordinator and Environmental Projects Officer
252.948.3842 – direct
252.946.6481 - office

NC Department of Public Safety Response

From: Hardison, Lyn [<mailto:lyn.hardison@ncdenr.gov>]

Sent: Monday, August 18, 2014 5:20 PM

To: Benson, Kathryn/RAL

Subject: FW: Please Review the Draft SCIMMP for the Towns of Apex, Cary, Holly Springs and Morrisville

Hi Kathryn,

Please find attached Public Safety's comments which are no comments for your files.

Thanks,

Lyn

From: Brubaker, Dan [<mailto:Dan.Brubaker@ncdps.gov>]

Sent: Monday, August 18, 2014 4:59 PM

To: Hardison, Lyn

Cc: Ashe, Ken (NCEM); Gerber, John (NCEM)

Subject: RE: Please Review the Draft SCIMMP for the Towns of Apex, Cary, Holly Springs and Morrisville

Dear Ms Hardison:

Thank you for the opportunity to review the draft Secondary and Cumulative Impact Master Management Plans (SCIMMPs) for Apex, Cary, Morrisville, and Holly Springs.

All four municipalities regulate impacts to the Special Flood Hazard Areas (SFHAs) in their respective ordinances as required under the National Flood Insurance Program (NFIP) regulations. Impacts are regulated as development occurs in specific areas, so specific impacts would be beyond the scope of a SCIMMP, other than pointing out that local ordinances govern such impacts. As such, it appears that the SCIMMPs address the NFIP regulations, and this office does not have any additional comments or recommendations to the documents provided.

Please let me know if you have any questions or require further response or clarification. As always, we appreciate the opportunity to provide review and comments for environmental documentation.

Best regards,

Dan Brubaker

John D. Brubaker, PE, CFM
NFIP Engineer
NC Department of Public Safety
NC Floodplain Mapping Program
4218 Mail Service Center
Raleigh, NC 27699-4218
(919) 825-2300
dan.brubaker@ncdps.gov
www.ncdps.gov



Plan. Prepare. Stay informed.

Download the ReadyNC app – it's free!

www.readync.org



North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

July 9, 2014

John E. Skvarla, III
Secretary

Kathryn Benson, PE
CH2M Hill
3120 Highwoods Blvd.
Suite 214
Raleigh, NC 27604

Re: Draft 2015 Secondary Cumulative Impacts Master Management (SCIMM) Plan
Town of Holly Springs
Wake County

Dear Mrs. Benson,

NCDENR agencies reviewed the Draft 2015 SCIMMP for the Town of Holly Springs from April 14, 2014 through May 15, 2015. After sending the agencies comments to you on May 20, 2014, I received emails from Division of Water resources on May 22, 2014, indicating "no comment" and from US Fish and Wildlife on June 10, 2014 indicated "no comment". The comment review period ended on June 10, 2014.

This letter serves as a notice to you and Town of Holly Springs that the timeline of the approved Memorandum of Agreement (MOA) have been met.

I look forward to working with you and the Town. If I can be of further assistance please contact me at 252-948-3842 or lyn.hardison@ncdenr.gov.

Sincerely

Lyn B. Hardison
Division of Environmental Assistance & Customer Service
Permit Assistance Coordinator and Environmental Projects Officer
Washington Regional Office
943 Washington Square Mall
Washington NC 27889
252.948.3842 – direct
252.946.6481 - office

NC DWR Response

From: Hardison, Lyn [<mailto:lyn.hardison@ncdenr.gov>]
Sent: Tuesday, June 10, 2014 11:13 AM
To: Benson, Kathryn/RAL
Subject: FW: comments for SCIMMP's Cary, Apex, Holly Springs and Morrisville

From: Roddy, Jackie
Sent: Thursday, May 22, 2014 11:50 AM
To: Hardison, Lyn
Subject: RE: comments for SCIMMP's Cary, Apex, Holly Springs and Morrisville

Lyn,

Division of Water Resources has no comment on the SCIMMP's.

Thanks,

Jackie Roddy, P.E.

Environmental Engineer

Division of Water Resources

Raleigh, NC 27699-1634

NEW NUMBER Phone: (919) 807-6442

Fax: (919) 715-4374

E-mail correspondence to and from this address may be subject to the North Carolina Public Records Law and may be disclosed to third parties.

From: Hardison, Lyn
Sent: Tuesday, May 20, 2014 7:34 AM
To: Roddy, Jackie
Subject: comments for SCIMMP's Cary, Apex, Holly Springs and Morrisville

Hi Jackie,

I see where DWR regional office doesn't have any comments but I was wondering if headquarters has any comments.

Thanks,

Lyn

Lyn Hardison lyn.hardison@ncdenr.gov
Environmental Assistance and SEPA Coordinator
NCDENR Division of Environmental Assistance & Customer Services (DEACS)
Washington Regional Office
943 Washington Square Mall
Washington, NC 27889
Phone: 252-948-3842
Fax: 252-975-3716
DEACS.NCDENR.gov

E-mail correspondence to and from this address may be subject to the North Carolina Public Records Law and may be disclosed to third parties.

USFWS Response

From: Hardison, Lyn [<mailto:lyn.hardison@ncdenr.gov>]

Sent: Tuesday, June 10, 2014 11:45 AM

To: Benson, Kathryn/RAL

Subject: RE: SCIMMP reviews

Kathryn,

I have not received any comments from USACE but I have received a 'No Comment' from USFWS.

Thanks,

Lyn

From: Kathryn.Benson@ch2m.com [<mailto:Kathryn.Benson@ch2m.com>]

Sent: Tuesday, June 10, 2014 10:51 AM

To: Hardison, Lyn

Subject: RE: SCIMMP reviews

Lyn-

I hope all is well. I am checking in to see if I can get a copy of the DWR "no comment" email for the file and check the status for the NC Natural Heritage. I know you had also issued to USFWS and USACE and received a preliminary email from USFWS. I would like see if it is possible to have all comments received by Friday so we can proceed with developing our response matrix for Agency review. Is it possible to indicate to NC Natural Heritage Program, if no comment is received by Friday concurrence with document is assumed?

Thanks-

Kathryn

Kathryn Benson, PE | CH2M HILL | Raleigh Office (919) 760-1750 | Mobile (919) 607-4347 | Email - Kathryn.Benson@ch2m.com



North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

John E. Skvarla, III
Secretary

May 20, 2014

Kathryn Benson, PE
CH2M Hill
3120 Highwoods Blvd.
Suite 214
Raleigh, NC 27604

Re: Draft 2015 Secondary Cumulative Impacts Master Management (SCIMM) Plan
Town of Holly Springs
Wake County

Dear Mrs. Benson,

Thank you for providing copies of the Town's revised 2015 Draft SCIMM Plan. This submittal of the Plan is within the timeline of the approved Memorandum of Agreement (MOA). The purpose of the Plan identifies Secondary Cumulative Impacts associated with the Towns future growth and development including capital projects with respect to water, sewer and transportation and any mitigation measures for these impacts. Most of the DENR agencies have reviewed the revised Plan and have offered a few suggestions. The comments are attached for you and the Town's review and consideration.

Upon receipt of additional comments from NC Natural Heritage and Division of Water Resources, I will send it to you to be compiled with these attached comments.

Thank you for the opportunity to respond to the Town of Holly Springs revised SCIMM Plan. I look forward to working with you and the Town. If I can be of further assistance please contact me at 252-948-3842 or lyn.hardison@ncdenr.gov.

Sincerely

Lyn B. Hardison
Division of Environmental Assistance & Customer Service
Permit Assistance Coordinator and Environmental Projects Officer
Washington Regional Office
943 Washington Square Mall
Washington NC 27889
252.948.3842 – direct
252.946.6481 - office




North Carolina Department of Environment and Natural Resources


Pat McCrory
Governor

John E. Skvarla, III
Secretary

Date: May 1, 2014

To: Dexter Matthews, Director
Division of Waste Management

Through: Jim Bateson, Superfund Section Chief 

From: Pete Doorn, Special Remediation Branch Head 

Subj: SEPA Project #1600 Draft 2015 Secondary and Cumulative Impacts Master Management Plan for the Town of Holly Springs, NC

A review of the Draft 2015 Secondary and Cumulative Impacts Master Management Plan (SCIMMP) for the Town of Holly Springs by the Superfund Section has been completed. The SCIMMP includes backgrounds and descriptions of the Town of Holly Springs' infrastructure plans for its future wastewater, reclaimed water, and water systems, as well as its future transportation improvements throughout the town's planning area of approximately 61 mi².

CERCLIS and other contaminated sites under the jurisdiction of the Superfund Section are located within the Town of Holly Springs' planning area, and given the scope and extent of future infrastructure improvements, such sites may occur within close proximity to the town's projects. To help ensure that appropriate health and safety precautions are taken, it is recommended that the Town of Holly Springs incorporate into its infrastructure planning, a process to locate potential contaminated sites that could affect infrastructure projects. The Superfund Section's website: <http://portal.ncdenr.org/web/wm/sf>, is a resource that includes location information for contaminated sites and access to online records.

Please contact me at 919.707.8369 if you have any questions.

Cc: Jim Bateson



North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

John E. Skvarla, III
Secretary

MEMORANDUM

TO: Kathleen Lance, Administrative Assistant
Division of Waste Management

FROM: Dennis Shackelford, Eastern District Supervisor *D.S.*
Solid Waste Section

DATE: May 9, 2014

SUBJECT: SEPA Review - Project # 1600 SCIMMP 2015 Holly Springs, Wake County, NC
2015 Secondary and Cumulative Impact Master Management Plan

The Solid Waste Section has reviewed the Draft 2015 Secondary and Cumulative Impacts Master Management Plan for the Town of Holly Springs and has seen no adverse impact on the surrounding community and likewise knows of no situations in the community, which would affect these projects.

During construction activities, the Town of Holly Spring should make every feasible effort to minimize the generation of waste, to recycle materials for which viable markets exist, and to use recycled products and materials in the development of this project where suitable. Any waste generated by these projects that cannot be beneficially reused or recycled must be disposed of at a solid waste management facility permitted by the Division. The Division strongly recommends that the Town of Holly Springs require all Contractors to provide proof of proper disposal for all waste generated, from these projects, in the form of waste disposal tickets. The eight Permitted Facilities in Wake County are as follows: 9226-CDLF-2001, 9227-TRANSFER-2012, 9228-CDLF-2001, 9229T-TRANSFER-2009, 9230-CDLF-2000, 9231-CDLF-2012, 9234-TRANSFER-2012 and 9237T-TRANSFER-2010.

Questions regarding solid waste management should be directed to Ms. Shawn McKee, Environmental Senior Specialist, Solid Waste Section, at (919-707-8284).

cc: Michael Scott, Solid Waste Section Chief
Jason Watkins, Western District Supervisor
Shawn McKee, Environmental Senior Specialist

**Department of Environment and Natural Resources
Project Review Form**

Project Number # 1600	County Wake	Date Received 4/14/2014	Date Response Due 5/15/2014
Draft 2015 Secondary and Cumulative Impact Master Plan - Town of Holly Springs - Go to CH2MHill FTP site https://transfer.ch2m.com Log on with "EXTV" directly in front of the username Username = extvSCIMMP -Password = CH2MHill Enter the password and click OK			

This project is being reviewed as indicated below:

Regional Office	Sections	In-House Review
<input type="checkbox"/> Asheville	<input checked="" type="checkbox"/> Air <i>DS</i>	<input type="checkbox"/> Marine Fisheries <input type="checkbox"/> Coastal Management
<input type="checkbox"/> Fayetteville	<input checked="" type="checkbox"/> DWR -- All Water Quality Programs <i>DS</i>	<input checked="" type="checkbox"/> Waste Mgmt (Haz, Solid, Inactive, Superfund & UST)
<input type="checkbox"/> Mooresville	<input checked="" type="checkbox"/> Land Quality & Stormwater Programs <i>DS</i>	<input checked="" type="checkbox"/> Air Quality
<input checked="" type="checkbox"/> Raleigh	<input checked="" type="checkbox"/> UST <i>9/2/11</i>	<input checked="" type="checkbox"/> Water Resources Management (Public Water, Planning & Water Quality Programs)
<input type="checkbox"/> Washington	<input checked="" type="checkbox"/> Public Water <i>MLD 04/22/14</i>	<input type="checkbox"/> Shellfish Sanitation
<input type="checkbox"/> Wilmington		<input checked="" type="checkbox"/> Parks & Recreation
<input type="checkbox"/> Winston-Salem		<input type="checkbox"/> DWR -- Transportation Unit _____
		<input checked="" type="checkbox"/> Wildlife <u>Vann Stancil</u>
		<input type="checkbox"/> Wildlife (DOT) _____
Regional Coordinator Sign-off: <i>Jamene S. Childs</i>		In-House Reviewer Agency: <i>RRO</i>
		<i>5/13/14</i>

Response (check all applicable)

No objection to project as proposed No comment

Insufficient information to complete review Other (specify or attach comments)

RETURN TO:
Lyn Hardison – Lyn.Hardison@ncdenr.gov, 252-948-3842
943 Washington Square Mall
Washington N C 27889
Courier No. 16-04-01

INTERGOVERNMENTAL REVIEW - PROJECT COMMENTS

Project Number: #1600 Due Date 5/15/14

After review of this project it has been determined that the ENR permit(s) and/or approvals indicated may need to be obtained in order for this project to comply with North Carolina Law. Questions regarding these permits should be addressed to the Regional Office indicated on the reverse of the form. All applications, information and guidelines relative to these plans and permits are available from the same Regional Office.

PERMITS	SPECIAL APPLICATION PROCEDURES or REQUIREMENTS	Normal Process Time (statutory time limit)
Permit to construct & operate wastewater treatment facilities, sewer system extensions & sewer systems not discharging into state surface waters	Application 90 days before begin construction or award of construction contracts. On-site inspection. Post-application technical conference usual.	30 days (90 days)
NPDES - permit to discharge into surface water and/or permit to operate and construct wastewater facilities discharging into state surface waters	Application 180 days before begin activity. On-site inspection. Pre-application conference usual. Additionally, obtain permit to construct wastewater treatment facility-granted after NPDES. Reply time, 30 days after receipt of plans or issue of NPDES permit-whichever is later.	90-120 days (N/A)
Water Use Permit	Pre-application technical conference usually necessary.	30 days (N/A)
Well Construction Permit	Complete application must be received and permit issued prior to the installation of a well.	7 days (15 days)
Dredge and Fill Permit	Application copy must be served on each adjacent riparian property owner. On-site inspection. Pre-application conference usual. Filling may require Easement to Fill from N.C. Department of Administration and Federal Dredge and Fill Permit.	55 days (90 days)
Permit to construct & operate Air Pollution Abatement facilities and/or Emission Sources as per 15 A NCAC (2Q 0100 thru 2Q 0300)	Application must be submitted and permit received prior to construction and operation of the source. If a permit is required in an area without local zoning, then there are additional requirements and timelines (2Q 0113).	90 days
Permit to construct & operate Transportation Facility as per 15 A NCAC (2D 0800, 2Q 0601)	Application must be submitted at least 90 days prior to construction or modification of the source.	90 days
Any open burning associated with subject proposal must be in compliance with 15 A NCAC 2D.1900	N/A	60 days (90 days)
Demolition or renovations of structures containing asbestos material must be in compliance with 15 A NCAC 20 1110 (a) (1) which requires notification and removal prior to demolition. Contact Asbestos Control Group 919-707-5930.		
Complex Source Permit required under 15 A NCAC 2D.0800		
The Sedimentation Pollution Control Act of 1973 must be properly addressed for any land disturbing activity. An erosion & sedimentation control plan will be required if one or more acres to be disturbed. Plan filed with proper Regional Office (Land Quality Section) At least 30 days before beginning activity. A fee of \$65 for the first acre or any part of an acre. An express review option is available with additional fees.		20 days (30 days)
Sedimentation and erosion control must be addressed in accordance with NCDOT's approved program. Particular attention should be given to design and installation of appropriate perimeter sediment trapping devices as well as stable stormwater conveyances and outlets.		(30 days)
Mining Permit	On-site inspection usual. Surety bond filed with ENR Bond amount varies with type mine and number of acres of affected land. Any acre mined greater than one acre must be permitted. The appropriate bond must be received before the permit can be issued.	30 days (60 days)
North Carolina Burning permit	On-site inspection by N.C. Division Forest Resources if permit exceeds 4 days.	1 day (N/A)
Special Ground Clearance Burning Permit - 22 counties in coastal N.C. with organic soils	On-site inspection by N.C. Division Forest Resources required "if more than five acres of ground clearing activities are involved. Inspections should be requested at least ten days before actual burn is planned."	1 day (N/A)
Oil Refining Facilities	N/A	90-120 days (N/A)
Dam Safety Permit	If permit required, application 60 days before begin construction. Applicant must hire N.C. qualified engineer to prepare plans, inspect construction, certify construction is according to ENR approved plans. May also require permit under mosquito control program. And a 304 permit from Corps of Engineers. An inspection of site is necessary to verify Hazard Classification. A minimum fee of \$200.00 must accompany the application. An additional processing fee based on a percentage of the total project cost will be required upon completion.	30 days (60 days)

PERMITS		SPECIAL APPLICATION PROCEDURES or REQUIREMENTS	Normal Process Time (statutory time limit)
<input type="checkbox"/>	Permit to drill exploratory oil or gas well	File surety bond of \$5,000 with ENR running to State of NC conditional that any well opened by drill operator shall, upon abandonment, be plugged according to ENR rules and regulations.	10 days N/A
<input type="checkbox"/>	Geophysical Exploration Permit	Application filed with ENR at least 10 days prior to issue of permit. Application by letter. No standard application form.	10 days N/A
<input type="checkbox"/>	State Lakes Construction Permit	Application fee is charged based on structure size. Must include descriptions & drawings of structure & proof of ownership of riparian property	15-20 days N/A
<input type="checkbox"/>	401 Water Quality Certification	N/A	60 days (130 days)
<input type="checkbox"/>	CAMA Permit for MAJOR development	\$250.00 fee must accompany application	55 days (150 days)
<input type="checkbox"/>	CAMA Permit for MINOR development	\$50.00 fee must accompany application	22 days (25 days)
<input type="checkbox"/>	Several geodetic monuments are located in or near the project area. If any monument needs to be moved or destroyed, please notify N C Geodetic Survey, Box 27687 Raleigh, NC 27611		
<input type="checkbox"/>	Abandonment of any wells, if required must be in accordance with Title 15A, Subchapter 2C 0100		
<input checked="" type="checkbox"/>	Notification of the proper regional office is requested if "orphan" underground storage tanks (USTS) are discovered during any excavation operation		
<input type="checkbox"/>	Compliance with 15A NCAC 3H 1000 (Coastal Stormwater Rules) is required.		45 days (N/A)
<input type="checkbox"/>	Tar Pamlico or Neuse Riparian Buffer Rules required.		
<input checked="" type="checkbox"/>	Plans and specifications for the construction, expansion, or alteration of a public water system must be approved by the Division of Water Resources/Public Water Supply Section prior to the award of a contract or the initiation of construction as per 15A NCAC 18C .0300 et. seq. Plans and specifications should be submitted to 1634 Mail Service Center, Raleigh, North Carolina 27699-1634. All public water supply systems must comply with state and federal drinking water monitoring requirements. For more information, contact the Public Water Supply Section, (919) 707-9100		30 days
<input type="checkbox"/>	If existing water lines will be relocated during the construction, plans for the water line relocation must be submitted to the Division of Water Resources/Public Water Supply Section at 1634 Mail Service Center, Raleigh, North Carolina 27699-1634. For more information, contact the Public Water Supply Section, (919) 707-9100		30 days
* Other comments (attach additional pages as necessary, being certain to cite comment authority)			

REGIONAL OFFICES

Questions regarding these permits should be addressed to the Regional Office marked below.

Asheville Regional Office
090 US Highway 70
Swannanoa, NC 28778
(828) 296-4500

Mooresville Regional Office
610 East Center Avenue, Suite 301
Mooresville, NC 28115
(704) 663-1699

Wilmington Regional Office
127 Cardinal Drive Extension
Wilmington, NC 28405
(910) 796-7215

Fayetteville Regional Office
225 North Green Street, Suite 714
Fayetteville, NC 28301-5043
(910) 433-3300

Raleigh Regional Office
3800 Barrett Drive, Suite 101
Raleigh, NC 27609
(919) 791-4200

Winston-Salem Regional Office
585 Waughtown Street
Winston-Salem, NC 27107
(336) 771-5000

Washington Regional Office
943 Washington Square Mall
Washington, NC 27889
(252) 946-6481

**Department of Environment and Natural Resources
Project Review Form**

Project Number # 1600	County Wake	Date Received 4/14/2014	Date Response Due 5/15/2014
Draft 2015 Secondary and Cumulative Impact Master Plan - Town of Holly Springs - Go to CH2MHill FTP site https://transfer.ch2m.com Log on with "EXTN" directly in front of the username Username = ext\SCIMMP -Password = CH2MHill Enter the password and click OK			

This project is being reviewed as indicated below:

Regional Office	Sections	In-House Review
<input type="checkbox"/> Asheville	<input checked="" type="checkbox"/> Air	<input type="checkbox"/> Marine Fisheries <input type="checkbox"/> Coastal Management
<input type="checkbox"/> Fayetteville	<input checked="" type="checkbox"/> DWR - All Water Quality Programs	<input checked="" type="checkbox"/> Waste Mgmt (Huz, Solid, Inactive, Superfund & UST)
<input type="checkbox"/> Mooresville	<input checked="" type="checkbox"/> Land Quality & Stormwater Programs	<input checked="" type="checkbox"/> Air Quality
<input checked="" type="checkbox"/> Raleigh	<input checked="" type="checkbox"/> UST	<input checked="" type="checkbox"/> Water Resources Management (Public Water, Planning & Water Quality Programs)
<input type="checkbox"/> Washington	<input checked="" type="checkbox"/> Public Water	<input type="checkbox"/> Shellfish Sanitation
<input type="checkbox"/> Wilmington		<input checked="" type="checkbox"/> Parks & Recreation
<input type="checkbox"/> Winston-Salem		<input type="checkbox"/> DWR - Transportation Unit _____
		<input checked="" type="checkbox"/> Wildlife <u>Yann Stancel</u>
		<input type="checkbox"/> Wildlife (DOT) _____
Regional Coordinator Sign-off:		In-House Reviewer/Agency:
		5-15-14 <i>[Signature]</i> / NCWR

Response (check all applicable)


<input checked="" type="checkbox"/> No objection to project as proposed	<input type="checkbox"/> No comment
<input type="checkbox"/> Insufficient information to complete review	<input type="checkbox"/> Other (specify or attach comments)

RETURN TO:
 Lyn Hardison - Lyn.Hardison@ncdenr.gov, 252-948-3842
 943 Washington Square Mall
 Washington N C 27889
 Courier No. 16-04-01

**Department of Environment and Natural Resources
Project Review Form**

Project Number # 1600	County Wake	Date Received 4/14/2014	Date Response Due 5/15/2014
<u>Draft 2015 Secondary and Cumulative Impact Master Plan - Town of Holly Springs -</u> Go to CH2MHill FTP site https://transfer.ch2m.com Log on with "EXT" directly in front of the username Username = ext\SCIMMP -Password = CH2MHill Enter the password and click OK			

This project is being reviewed as indicated below:

Regional Office	Sections	In-House Review
<input type="checkbox"/> Asheville	<input checked="" type="checkbox"/> Air	<input type="checkbox"/> Marine Fisheries <input type="checkbox"/> Coastal Management
<input type="checkbox"/> Fayetteville	<input checked="" type="checkbox"/> DWR --All Water Quality Programs	<input checked="" type="checkbox"/> Waste Mgmt (Haz, Solid, Inactive, Superfund & UST)
<input type="checkbox"/> Mooresville	<input checked="" type="checkbox"/> Land Quality & Stormwater Programs	<input checked="" type="checkbox"/> Air Quality
<input checked="" type="checkbox"/> Raleigh	<input type="checkbox"/> UST	<input checked="" type="checkbox"/> Water Resources Management (Public Water, Planning & Water Quality Programs)
<input type="checkbox"/> Washington	<input checked="" type="checkbox"/> Public Water	<input type="checkbox"/> Shellfish Sanitation
<input type="checkbox"/> Wilmington		<input checked="" type="checkbox"/> Parks & Recreation
<input type="checkbox"/> Winston-Salem		<input type="checkbox"/> DWR - Transportation Unit _____
		<input checked="" type="checkbox"/> Wildlife <u>Vann Stencil</u>
		<input type="checkbox"/> Wildlife (DOT) _____
Regional Coordinator Sign-off:		In-House Reviewer/Agency: 

Response (check all applicable)

No objection to project as proposed No comment

Insufficient information to complete review Other (specify or attach comments)

RETURN TO:
 Lyn Hardison – Lyn.Hardison@ncdenr.gov, 252-948-3842
 943 Washington Square Mall
 Washington N C 27889
 Courier No. 16-04-01

Appendix B

– Wake County Mitigation

1. Summary of Programs

2. Southwest Land Use Area Plan

- Excerpt, Maps, Land Class Description

3. CAMPO 2040 Metropolitan Transportation Plan

- Executive Summary

4. UDO

- Open Space
- Density Bonuses
- Stormwater
- Erosion & Sediment Control
- Buffers
- Tree Protection
- Flood Hazard
- Zoning Overlay District

1. Summary of Programs

APPENDIX B

Wake County Programs to Mitigate Secondary and Cumulative Impacts

Wake County (County) lies in central North Carolina and includes 12 municipalities.

The County is consistently ranked as one of the best places in the United States in which to live, work, and raise a family. This area offers business and industry, higher education, historic attractions, arts and culture, and recreation and leisure services, all of which provide a quality lifestyle for many County residents, whether they prefer rural or urban settings. The size of the County is 860 square miles. From east to west, it measures 46 miles; from north to south, it measures 39 miles. The Neuse River and its tributaries drain about 80 percent of the County, and the southwestern part is drained by tributaries of the Cape Fear River.

To ensure the quality of life for its residents and continue to make it an attractive place to live and raise a family, the County is managing its growth using innovative planning approaches and techniques. The County has a series of planning documents to ensure that growth occurs in a manner that will protect environmental resources and meet the needs of its residents. These documents include the Unified Development Ordinance (UDO), Comprehensive Watershed Management Plan, Land Use Plan, Consolidated Open Space Plan, Growth Management Strategy, Transportation Plan, Comprehensive Groundwater Investigation, Agriculture Economic Development Plan, Stormwater Management Task Force Reports, and a Sustainability Task Force Report. Additionally, there is the Swift Creek Land Management Plan that is established by state law and administered by the Wake County and the Towns of Apex, Cary, Garner and the City of Raleigh.

The County has developed and improved programs to implement these management plan recommendations. For example, the County has implemented programs to preserve open space, protect floodplain and riparian buffers, and maintain water quality through aggressive erosion, flood and sediment control and stormwater programs.

This appendix identifies and discusses these County programs. Because federal and State of North Carolina (State) programs were described in Section 6 of the Town of Morrisville's (Town's) Secondary and Cumulative Impacts Master Management Plan (SCIMMP), these descriptions have been omitted here. While Wake County does not develop infrastructure, it has jurisdiction over land that is outside municipal limits and their extra territorial jurisdictions (ETJs) but within municipal urban service areas (USAs). It is intended that these USAs – at some point in the future – will be served by urban facilities and services, developed at urban intensities, and eventually absorbed into an adjacent municipality. Thus, the County's programs are important components of a program to protect the environment against secondary and cumulative impacts (SCI) related to growth. The programs described below contribute toward the mitigation

of the potential SCI discussed in Section 5 of the Town’s SCIMMP. Only programs affecting to the Planning Area are discussed not all portions of Wake County.

B.1 Local Regulations and Programs

Environmental protection is a cornerstone value in the County. The County has developed several programs to meet its internal goals for providing a high-quality life for its residents. To meet those goals, the County established a Consolidated Open Space Plan that includes protection of important habitat areas, growth management strategy to protect water quality, and land use plans that encourage growth in certain areas and discourage growth in other areas. The County also revised its ordinances to modify its cluster and open space development provisions to encourage the preservation of more open space around environmentally sensitive areas within new residential developments. These regulations don’t allow for higher densities than that allowed by the zoning district – instead they allow for lot sizes to be reduced below the standard requirement with the land “saved” by the reduced lot size being preserved as open space – for example in R-40W instead of creating 40,000 square-foot lots, the developer can create 20,000 square-foot lots with the 20,000 square-foot difference being preserved as open space. In addition, the County developed a riparian protection program, floodplain program, erosion and sediment control program, and stormwater program to protect water quality and in-stream habitat. Table B-1 summarizes the programs that impact development procedures. Table B-2 illustrates the environmental resources that the various programs protect.

TABLE B-1
Summary of Selected Wake County UDO Protection Measures

Program	Summary
Erosion and Sediment Control (UDO Article 10)	<p>An erosion and sediment control permit is required for land disturbing activity over 1 acre. Silt fences and construction entrances are required on all sites, even those that are less than 1 acre.</p> <p>Sediment basins (sized according to drainage area), silt fencing, perimeter ditches, and/or other approved measures are required to control sediment from development activity. Soil stabilization by establishing a grass cover or mulching and tacking must occur within the current NCDENR stabilization timeframes.</p> <p>Plans to identify areas subject to severe erosion, limit time of exposure, and limit exposed area are required.</p> <p>Land disturbance in proximity to a lake or natural water course requires an undisturbed 50-foot-wide buffer, provided that the undisturbed zone is of sufficient width to confine visible siltation within the first 20 feet.</p> <p>Encourages contractor education and training related to erosion and sediment control.</p>
Stormwater and Impervious Surface Limits (UDO Article 9 and Article 5)	<p>Post-development site runoff curve number for residential development may not exceed target curve numbers contained in Article 9, Part 2 of the UDO based on precipitation depth of 3 inches over a 24-hour period. Stored water must be drained over a period of not less than 2 days or more than 5 days.</p> <p>Stormwater credit system provides incentives for better site design and locating new development that causes less impact to aquatic resources. Approved methods include: disconnected impervious surfaces, reforestation, and cluster and open space subdivisions. Practices reduce generation of stormwater as well as size and cost of stormwater storage, and provide partial removal of pollutants.</p> <p>Impervious surface limits in water supply watersheds range from 6 to 30percent for residential areas and up to 30 percent for non-residential areas. Stormwater best</p>

TABLE B-1
Summary of Selected Wake County UDO Protection Measures

Program	Summary
	<p>management practices (BMPs) are required to mitigate for target curve number exceedances, peak flow, and sometimes nitrogen. Stormwater permits are required for all regular subdivisions and for non-residential projects that cumulatively disturb more than 0.5 acre.</p> <p>Compliance with Neuse River basin and Jordan Lake watershed nutrient sensitive waters (NSW) nutrient management strategies is required.</p>
<p>Riparian Buffers (UDO, Article 11)</p>	<p>In Water Supply Watersheds: (Swift Creek and Jordan Lake)</p> <ul style="list-style-type: none"> • Buffer requirements: <ul style="list-style-type: none"> – 100 feet from the flood pool elevation of the water supply impoundment (measured perpendicular to the shoreline) – 50 feet from the normal pool elevation of any non-water supply impoundment with a drainage area of 25 acres or more – 100 feet along perennial streams on the most recent edition of U.S. Geological Survey (USGS) topographic maps; inner 50 feet (Zone 1) is undisturbed vegetated; outer 50 feet (Zone 2) is stable vegetated – 50 feet along non-perennial watercourse, channel, ditch, or similar physiographic feature with a drainage area of 25 acres or more – 30 feet from the normal pool elevation of a non-water supply impoundment with a drainage area of at least 5 acres but less than 25 acres – 30 feet along each side of a water course, channel, ditch, or similar physiographic feature with a drainage area of at least 5 acres but less than 25 acres • Minimum building setback from all buffers is 20 feet, except in the 100-foot-wide perennial stream buffer, which has no required setback • The inner 50 feet (Zone 1) of the 100-foot buffer required along perennial streams must either be platted as part of a development lot and included within a conservation easement, or set aside as a reserved conservation parcel. <p>In Resource Conservation Overlay (Bass Lake):</p> <ul style="list-style-type: none"> • Buffer requirements: <ul style="list-style-type: none"> – 100 feet required around special water impoundment (Special watershed: a watershed area in Wake County zoning jurisdiction that contains a special water impoundment[s] that provide[s] significant wildlife habitat, characteristics unique to Wake County, public recreation, or potential for future recreation) – 50 feet along each side of a stream or impoundment draining 25 or more acres of land – 25 feet along each side of a stream or impoundment which drains between 5 and 25 acres • Vegetation within buffers will be undisturbed except for specific uses (such as boat docks, greenways, and drainage facilities or utilities). • Minimum building setback from buffer is 20 feet. <p>All riparian surface waters in the County’s jurisdiction are required to have a 50-foot-wide buffer if the feature is present on either the most recent version of the USDA Soils Map or 7.5-minute quadrangle topographic map prepared by the USGS. The first 30 feet of buffer (Zone 1) must remain essentially undisturbed, while the other 20 feet (Zone 2) are to be covered with vegetation but certain uses would be allowed in this zone.</p>
<p>Floodplain Protection (UDO Article 14)</p>	<p>In floodways and the 100-year floodplain:</p> <ul style="list-style-type: none"> • No new structures shall be constructed. • No fill shall be placed in floodway unless a no-rise certification is approved. • Encroachments in floodway are limited to roads, bridges, culverts, or water-dependent structures, and no-rise certification is required. <p>In special flood hazard areas (non-Federal Emergency Management Agency [FEMA])</p>

TABLE B-1
Summary of Selected Wake County UDO Protection Measures

Program	Summary
	potential flood areas based on the location of flood hazard soils), areas that drain 4 acres or more usually require a flood study if there is an encroachment into the flood hazard soils.
Open Space Protection (UDO Articles 5 & 8)	Article 5 establishes building set-backs from property line, buffers around parcels, and other site development restrictions. Subdivision development rules include options for cluster and open space developments to encourage the preservation of more environmentally sensitive areas within proposed residential development

TABLE B-2
Summary of Existing Wake County Programs and the Environmental Resources They Protect /Address

Program	Terrestrial Habitat Protection	Aquatic Habitat Protection	Water Quality and/or Quantity Protection	Air Quality Protection	Noise Limitations
Growth Management Strategy	X	X	X	X	X
Land Use Planning	X	X	X	X	X
UDO and Zoning Process	X	X	X	X	X
Consolidated Open Space Plan	X	X	X	X	X
Riparian Buffers and Floodplain Protection	X	X	X	X	X
Water Supply Watershed Protection	X	X	X		
Erosion and Sediment Control Program	X	X	X		
Stormwater Program and Impervious Surface Limitations	X	X	X		
Air Pollution Prevention and Transportation Planning				X	X

B.2 Wake County Growth Management Strategy

The County has a strategic location in the Research Triangle area, an excellent quality of life that consistently ranks high in national surveys, and an exciting mix of urban, small town, and rural lifestyles. The Research Triangle Park (RTP) and the Raleigh-Durham International Airport (RDU) act as major growth engines not only for the County, but also for the surrounding region. The County had grown to over 900,000 residents in 2010 (U.S. Census Bureau, 2010).

By early 2000, the County and the 12 municipalities were facing significant challenges as a result of rapid growth. These challenges included traffic jams, overcrowded schools, and loss of open space and natural areas. Communities grew closer to their neighbors as sprawling development extended across the County. Increasingly, County and municipal officials saw the need for a more comprehensive effort to address growth concerns in the County. The Wake County Growth Management Task Force was created

at the initiative of the Wake County Board of Commissioners to develop a county-wide consensus for growth management. Building on existing collaborative approaches, the task force sought to develop a new, comprehensive growth management strategy that recognized both the interdependence and uniqueness of each of the communities. Local officials realized that effective regional solutions would only occur through the cooperation of all the governments working together in an open and participatory process.

Wake County's Growth Management Strategy, which was drafted in 2002, laid the foundation for achieving many of the County's goals and objectives. The County periodically reconvenes the Growth Management Task Force, now the Growth Issues Task Force, to evaluate progress on the Strategy's goals. In 2008, the Growth Issues Task Force met and asked each participating entity to identify the most pressing growth and development issues facing the County. The top three issues were:

- A high-quality educational system
- Increased mass transit opportunities
- Local government joint planning and cooperation

Other goals identified included utility collaboration, economic stability, sustainable development and environmental protection, land use planning, and water supply security (Wake County, 2008).

The County developed a Land Use Plan, adopted in 1997 and updated in 2003, which laid the groundwork for growth management (Wake County, 2003). This Plan called for comprehensive Area Land Use Plans that would provide further detailed land use classifications. The Southwest Wake County Area Land Use Plan, which occurs in the SCIMMP Planning Area, was developed in 2007. This Appendix includes excerpts from the 2007 Southwest Wake Land Use Plan and Land Use Map, which was amended in 2010 for updates in the Harris Lake Drainage Basin (Wake County, 2010a).

B.3 Open Space Preservation

In the County, open space protection can provide additional land around the municipalities that serves as wildlife corridors between important habitat areas within the municipal boundaries. The County has several mechanisms to preserve open space. These include open space plans and initiatives, land use plans, and UDO provisions. In addition, programs such as the Voluntary Agricultural Districts help preserve the County's rural character. Each of these initiatives is described in greater detail below.

B.3.1 Wake County Consolidated Open Space Plan

The purpose of the Wake County Consolidated Open Space Plan accepted by the Board of Commissioners on March 17, 2003, and revised in September 2006 is to protect and conserve County land and water for current residents and future generations. Open space is defined as protected lands and waters that are owned and managed by the County, its public-sector partners, the municipal governments of the County, State of North Carolina, the federal government, and the County's private-sector partners, including non-profit land trusts (CH2M HILL, 2006). Open space consists of any parcel or area of land and water that is devoted to:

- Preservation of natural resources
- Managed production of resources (forest and farm land)
- Outdoor recreation
- Preservation of historic and cultural property
- Protection of scenic landscapes

The Wake County Consolidated Open Space Plan sets forth a plan of action to identify and protect the County's natural resources, historic areas, and other special environmental and cultural features. The purpose of the Plan is to identify, evaluate, and prioritize resources; establish preservation goals; and guide the implementation of an open space program. One goal of the Plan is to eventually protect a minimum of 30 percent, or roughly 165,000 acres, of the County's land area. As of the 2006 revision of the plan, about 60,000 acres were protected, including federal lands around Falls and Jordan Lakes, Umstead State Park, County-owned parks, and open space and municipal parks (pers. comm. Christopher Snow, 2014). The County has partnered with each of its 12 municipalities to support open space planning. The County has awarded monetary grants and asked that each municipal government develop and adopt a local open space plan.

One of the main goals established for the open space plan prior to its development was the protection of water quality and important ecological features. The open space planning process was integrated with the watershed planning process at the inception of both plans. The Watershed Management Plan (CH2M HILL, 2002) used a geographic information system (GIS) model to identify and prioritize watershed areas for protection within the county, based on important human and ecological use perspectives. For example, stakeholders identified drinking water supplies as the most important watershed use. Other important uses included rare species habitats. This feedback from the stakeholders was used to prioritize small watershed areas that warranted additional protection.

Roughly 30,000 acres of land throughout the County have been identified for targeted acquisition; these targeted lands protect water supply, limit exposure to flooding, support water contact recreation, improve access to outdoor resources, and protect wetlands and unique plant and animal species native to the County. As the mix of strategies to protect open space evolves, this volume of acquisition may vary; for example, if the actual acreage protected by regulation increased, then not as much land needs to be acquired. The lands were targeted through GIS methodology. Prohibiting future development and building in flood-prone areas should preserve an estimated 60,000 acres of land. Innovative methods for subdividing and developing land could conserve as much as 22,000 acres of land in future years.

Final cost estimates to acquire the land to implement the open space plan were developed as part of the planning process. Open space program costs were estimated to vary as a function of the methods of preservation (such as outright purchase, conservation easements, and stream buffers). Outright acquisition of all parcels would cost hundreds of millions of dollars. The Wake County Open Space Bond allowed \$15 million in fiscal year (FY) 2000, \$26 million in FY2005, \$50 million in FY2007, and \$21 million in FY2013 to begin implementation of the Wake County Consolidated Open

Space Plan; the bond allows for additional implementation of the open space system priorities by providing the “matching” funds portion of grants. As of February 2014, there is approximately \$23 million remaining to spend (pers. comm. Christopher Snow, 2014). Some of the primary purchases using bond funds in partnerships with others include:

1. Holly Springs – 9-acre addition to Bass Lake Park
2. Morrisville – RTP tract, 18 acres (in Jordan Lake Watershed)
3. Cary – White Oak Church Road, 116 acres (in Jordan Lake Watershed)
4. Apex – Holleman tract (to be used in connection with American Tobacco Trail)

Implementation of the County open space program has been occurring for years, but began in earnest in 1999 with the acquisition of key parcels of land. After the completion of the 2003 County Consolidated Open Space Plan, the County began to implement elements of the Plan by first focusing its efforts on nine key corridors and watersheds. As of February 2014, the County has made progress in conservation of open space, adding an estimated 5,460 acres to its open space program. Two partnerships with the Town of Apex have protected approximately 106 acres and a Wake County easement deal has protected 3.5 acres at a cost of \$1.3 million from Wake County and the Town of Apex (pers. comm. Christopher Snow, 2014).

Open space will continue to be acquired through various means. Some examples of acquisition methods include:

- Outright purchase by the County
- Negotiation of a conservation easement or other agreement between the County and property owners
- Land dedication requirements, such as the County’s stream buffer rules
- Donation or bargain sale by property owners for federal and State tax incentives
- Cooperative arrangements with other governmental agencies

Fee-simple acquisition is the most common method for open space preservation.

B.3.2 Voluntary Agricultural Districts

The Wake Soil and Water Conservation District Board of Supervisors provide oversight to Wake County’s Voluntary Agricultural District Program. The Voluntary Agriculture District Ordinance was adopted by the Board of Commissioners in 2002. This ordinance promotes additional open space preservation within the County. The purpose of this program is to:

- Increase the visibility of farm communities in the county.
- Focus more attention on the importance of these communities to the County.
- Work with the County to make it easier for people to stay in farming if they want.
- Advise the county on issues affecting agriculture.
- Give farm owners a greater voice in local government decisions that affect their communities.
- Reduce conflicts between farm and non-farm land uses.

The guidelines for this program are covered by State Statute (NCGS 106-735 through 106-743, *Farmland Preservation Enabling Act*). Since these statutes were enacted, 86 county programs have been created. Key components of the Wake County Voluntary Agricultural program are:

- A seven-member Agricultural Advisory Board, appointed by the County Board of Commissioners, manages the program. Members include five farm owners, one agribusiness representative, and one Soil and Water Conservation District Supervisor.
- The Advisory Board considers applications from landowners to form agricultural districts, conduct hearings on public projects (such as roads and schools) that might negatively affect agriculture in a district, and advise the county on other issues affecting local agriculture.
- Farmers wishing to participate in the program sign a simple application indicating that they plan to remain in farming for the next 10 years. They may withdraw from the program at any time.
- Signs are erected along the roads in agricultural districts identifying the areas as such.
- Participants in the program are exempt from paying assessments for water/sewer lines that extend past their property.
- All purchasers of land near agricultural districts are notified that they should expect dust, machinery noise, animal waste/chemical odors, and other similar elements associated with living in a farming area.

B.3.3 Farmland Protection and Wake County Agricultural Economic Development Program

The Wake Soil and Water Conservation District Board of Supervisors works cooperatively with landowners to encourage farmland preservation and protection. A voluntary farmland program was established in 1998 and includes efforts to offer estate planning to farmers, and protect farms through the purchase or donation of easements and tax relief. The program received limited funding, but was successful where funding was available.

In 2012, Wake Soil and Water Conservation District received its first donated easement for 47 acres for permanent farmland protection.

In 2013, the Wake County Board of Commissioners endorsed their new farmland preservation plan, the Wake County Agriculture Economic Development Plan (WCAEDP) to replace the 1998 plan (Wake County, 2013). The recommendations of the WCAEDP are:

- Integrate economic development with farmland protection
- Expand County voluntary land preservation programs through conservation partnerships

- Promote understanding and appreciation of agriculture to the non-farm public
- Enhance business development programs to incorporate agriculture and forestry interest
- Promote opportunities for profitability of Wake County family farms and agribusinesses

In addition, under N.C.G.S. § 105-277.4, the County provides the “Present Use Value” tax exemption to qualifying farm owners. Typically, as an area develops, property values rise and agricultural use of the land becomes economically unfeasible. The present use value tax exemption program helps address this issue.

B.3.4 Wake County Land Use Plan

The Wake County Land Use Plan, and its component area land use plans, contain the County’s official policy on the form and pattern of future development within its jurisdiction. These plans are used to direct growth by guiding County staff and official boards in the development of new standards and ordinances and in the evaluation of development proposal and land use and transportation policies.

The County’s Land Use Plan was updated in 2003 (Wake County, 2003), and has been more recently supplemented by several area land use plans. The Southwest Area Plan was adopted in 2007 and revised in 2010 to include an analysis of the Harris Lake Drainage Basin Land Use Study (Wake County, 2010a). An open space plan for the Harris Lake area is now included in the Land Use Plan. Specific land use planning goals established by the County relate to managing growth to prevent urban sprawl, protecting natural resources, and preventing environmental degradation. These goals accomplish the following:

- Guide quality growth throughout the County in conjunction with affected local governments.
- Encourage growth close to municipalities to take advantage of existing and planned infrastructure, such as transportation, water, and sewer facilities.
- Encourage the development of communities that provide adequate land for anticipated demands, in a pattern that allows a mixture of uses.
- Encourage maintenance of open space, scenic aspects of rural areas, entranceways to urban areas, and transition areas between urban areas.
- Encourage the conservation of environmentally significant areas and important natural and cultural resources.
- Allow owners of significant farmlands and forest lands the opportunity to maintain the productivity of their land.
- Ensure that the land use plan and transportation plan mutually support each other.
- Ensure that the County always protects the property rights of landowners.

- Maintain the quality and develop the capacity of surface water resources, using them for recreation sites, when appropriate.
- Prevent the contamination and maintain the capacity of groundwater resources.
- Ensure that local governments provide adequate, properly located land for recreational and leisure opportunities.

To achieve these goals, the County developed its Land Use Plan to direct growth to growth corridors. Lower-density development is planned in water supply watersheds to protect the drinking water supply and important habitat areas. For example, portions of the Jordan Lake watershed are under the County’s jurisdiction; the urban service areas for local governments largely do not extend into these watersheds. The policies help protect the drinking water supply and habitat, and also reduce air quality impacts by concentrating the population in areas near employment and commercial centers.

Generally, the Land Use Plan is implemented in the rezoning process to ensure that an area is rezoned in keeping with the plan. UDO Article 3, Zoning, sets forth two criteria for approving text amendments or rezoning:

- Is it consistent with the Wake County Land Use Plan?
- Would it otherwise advance the public health, safety, and general welfare?

B.3.5 Zoning

Wake County’s UDO, consolidates development regulations into a single document that allows the County to respond uniformly and consistently to development proposals, while promoting the health, safety, and general welfare of its residents. This uniform application of policies and regulations can occur because a UDO combines into one document ordinances for subdivision development, zoning, groundwater protection, sediment and erosion control, and stormwater management. The County implements the UDO in two modules, zoning and subdivision, to provide an in-depth review and approval of substantive regulatory changes to each segment.

B.4 Comprehensive Watershed Management Plan

In May 2001, the Wake County Board of Commissioners appointed a Watershed Management Task Force to recommend immediate strategies to protect its sensitive watershed areas to ensure clean drinking water for the future; reduce flooding and erosion; preserve wildlife habitats; and improve and expand swimming, hiking, fishing and other recreational opportunities for the community. That task force included developers, environmental groups, elected officials, and other stakeholders. The group met monthly for 18 months to study protection strategies and recommend a plan that could be implemented county wide to protect and preserve sensitive stream and watershed areas.

The Board of Commissioners accepted the Watershed Management Plan on January 21, 2003. Wake County Watershed Management Plan implementation actions are presented in Table B-3.

TABLE B-3
Wake County Watershed Management Plan Implementation Actions and Status

Area	Implementation Action	Status/Notes
Riparian Buffers	Increase stream buffers to 100 feet on perennial streams in water supply watersheds as a first step, then in other priority watersheds as part of the UDO rewrite.	These have been implemented.
Floodplain Protection	Prohibit development and filling in the 100-year floodplain.	This has been implemented.
Stormwater Runoff	<p>Limit imperviousness or control overall stormwater runoff volume in priority and healthy watersheds. Review all existing development ordinances to remove impediments to reducing impervious surfaces.</p> <p>Encourage use of low-impact development site planning principles.</p> <p>Use offset fees if development exceeds impervious surface limits.</p>	<p>Impervious surface limits exist in water supply watersheds.</p> <p>UDO includes a credit system to provide incentives for better site design.</p>
Conservation Subdivisions	Review regulations to allow conservation subdivisions. Where there is municipal water and sewer, a minimum of 30 percent of open space should be preserved to qualify as a conservation subdivision.	UDO (Section 6-23) grants a 20 percent density bonus to subdivisions that preserve 65 percent or more as open space.
Open Space Preservation	Pursue the methods to preserve open space outlined in the Consolidated Open Space Plan.	<p>The County developed a Conservation Subdivision Ordinance that grants a 20% density bonus to subdivisions that preserve 65% or more as open space.</p> <p>Voters passed bond referendums in 2000, 2004, and 2007, totaling \$91 million which has been used to purchase additional open space, with roughly \$23 million remaining to spend.</p>
Erosion and Sediment Control	<p>Cross-train inspectors from other divisions to identify erosion problems.</p> <p>Update the erosion and sediment control manual to incorporate new technologies.</p> <p>Provide education programs for contractors and residents.</p>	<p>Watershed Managers perform ride-alongs in other territories to identify problems and ensure consistency.</p> <p>The website has been enhanced with design details, individual lot control, and other information. A new manual is also currently under construction.</p> <p>Information on silt fences and entrance way requirements has been developed.</p>
Septic Systems	<p>Improve the data monitoring system for septic systems; creating a database for trend analysis.</p> <p>Inform homeowners of locations of well and septic systems, and provide compact discs (CDs) or videos regarding well and septic system maintenance to people buying houses with septic systems.</p> <p>Require certification for septic system installers.</p>	<p>These have been implemented.</p> <p>The state passed this legislation in 2012 and contractors are now</p>

TABLE B-3
Wake County Watershed Management Plan Implementation Actions and Status

Area	Implementation Action	Status/Notes
	Conduct a pilot study to obtain better information on the causes of septic system failure and failure rates. If the study indicates that a management entity would be appropriate to assist homeowners on maintenance and operation practices for their septic systems, formulate recommendations relative to such a management entity.	registering as required. This study was completed and published in 2005. The study recommended a management program that has not yet been implemented.
Stream Restoration	Actively pursue stream restoration, enhancement, and preservation for healthy, impacted, and degraded streams and wetlands through collaboration and partnerships.	Partnering with other groups has occurred to obtain CWMTF funds to purchase stream corridors. The Soil and Water Conservation department partnered with environmental engineering firms to install BMPs on land connected to stream restoration projects. Along with state funds, EPA-319 funds are used to protect streams. Through the Soil and Water Conservation District, stream restoration plans were funded for Lower Williams, Higgins and White Oak creeks to the Town of Cary totaling over \$672,000 from USDA NRCS.
	Develop a high-level funding program to implement the watershed management plan.	
	Develop an in-stream monitoring program to continue to characterize the quality and quantity of the County's water resources.	The County has performed targeted in-stream monitoring, and maintains a Recreational Beach Water Quality Monitoring Program.
	Work with Environmental Education and Environmental Information Providers to develop effective programs and services for a variety of audiences on watershed science, data, and trends; pollution sources and their environmental, economic, and societal impacts; and BMPs and stewardship actions that protect and sustain surface water resources.	The County provided environmental education programs that address surface water and watershed issues through its Soil and Water Conservation Department.

B.5 Riparian Buffers and Floodplain Protection

This section describes the County's riparian buffer and floodplain protection programs, including its 2010 Hazard Mitigation Plan (Wake County, 2010b).

B.5.1 Riparian Buffers

Wake County's Riparian Buffer Protection Program meets or exceeds the Neuse River Nutrient Sensitive Waters (NSW) rules and Jordan Lake Rules, discussed in Section 6 of

this SCIMMP. These rules require that existing riparian buffer areas be protected and maintained on both sides of intermittent and perennial surface waters.

Article 11 of the UDO requires that all riparian surface waters in the County's jurisdiction have a 50-foot-wide buffer if the feature is present on either the most recent version of the USDA Soils Map or 7.5-minute quadrangle topographic map prepared by the USGS. Wider riparian buffers are required in water supply watersheds (WSWs) and Resource Conservation Overlay Districts, as described below.

The Swift Creek Watershed falls within portions of the planning area for Wake County, the towns of Apex, Cary, Gardner and Holly Springs, and the City of Raleigh. Swift Creek is identified as a water supply watershed (WSW). According to Article 11 of the UDO, the following buffer requirements apply in WSWs:

- 100 feet from the flood pool elevation of a water supply impoundment that are 25 or more acres (measured perpendicular to the shoreline)
- 50 feet from the normal pool elevation of a non-water supply impoundment with a drainage area of 25 acres or more
- 100 feet along perennial streams on the most recent edition of USGS topographic maps; inner 50 feet (Zone 1) is undisturbed vegetated; outer 50 feet (Zone 2) is stable vegetated
- 50 feet along non-perennial watercourse, channel, ditch, or similar physiographic feature with a drainage area of 25 acres or more
- 30 feet from the normal pool elevation of the water supply impoundment with a drainage area of at least 5 acres but less than 25 acres
- 30 feet along each side of a watercourse, channel, ditch, or similar physiographic feature with a drainage area of at least 5 acres but less than 25 acres
- Minimum building setback from all buffers of 20 feet, except the 100-foot perennial stream buffer, which has no required setback
- Inner 50 feet (Zone 1) of the 100-foot-wide required buffer along perennial streams either platted as part of a development lot and included within a conservation easement, or set aside as a reserved conservation parcel

Bass Lake is located within the Town of Holly Springs Planning Area and within the County's Resource Conservation Overlay districts. According to Article 11 of the UDO, the following buffers apply in a Resource Conservation Overlay district:

- 100 feet required around special water impoundment (special watershed: a watershed area in Wake County zoning jurisdiction that contains [a] special water impoundment[s] that provide[s] significant wildlife habitat, characteristics unique to Wake County, public recreation, or potential for future recreation)
- 50 feet along each side of a stream or impoundment draining 25 or more acres of land

- 25 feet along each side of a stream or impoundment that drains between 5 and 25 acres
- Vegetation within buffers that is undisturbed except for under specific uses (such as boat docks, greenways, drainage facilities, or utilities)
- Minimum building setback from buffer of 20 feet

B.5.2 Floodplain Development Regulations

The County's UDO Article 14 limits development in the floodplain. In recognition that flood hazard areas are subject to periodic inundation (flooding), which may result in the loss of life or damage to property as well as other adverse effects, these areas are subject to regulations designed to:

- Restrict or prohibit uses dangerous to public health, safety, and property when flooded.
- Require that uses vulnerable to floods be protected against flood damages at the time of initial construction.
- Preserve the flood-carrying capacity of floodplains.
- Control filling, grading, dredging and other obstructions that may increase flood damages.
- Prevent or regulate the construction of flood barriers that will divert floodwaters and/or increase flood hazards elsewhere.
- Protect individuals from purchasing lands that are unsuitable for their intended purposes because of flood hazards.
- In floodways and the floodway fringe, which are the two elements that compose the 100-year floodplain, ensure the following:
 - No new structures shall be constructed or placed in the 100-year floodplain, with few exceptions (such as water-dependent structures).
 - No fill shall be placed in the 100-year floodplain, with few exceptions (such as onsite cut and fill balance), and no-rise certification is required.
 - Encroachments in floodway shall be limited (including roads, bridges, culverts or water-dependent structures), must be flood-proofed, and cannot raise the base flood elevation above the elevation with floodway as established by the floodway data tables.

The County regulates additional areas outside the 100-year floodplain that still have potential for flooding. Special Flood Hazard Areas, identified on Flood Insurance Rate Maps (FIRMs), which are provided by the National Flood Insurance Program arm of FEMA, as well as Flood Hazard Soils Areas, which are identified on Wake County GIS, are regulated by the County. Encroachments (such as fill material, roads, and buildings) in these areas are discouraged and, when allowed, must meet rigorous design standards.

In addition the encroachment must be proven (usually through a flood study) to not adversely affect existing or proposed onsite structures or offsite properties.

In FEMA-identified Special Flood Hazard Areas, where a detailed flood study has already been performed, 100-year flood limits and elevations, as well as the floodway have been delineated; therefore, an additional flood study is not needed. Where FEMA has not performed a detailed flood study, the entire floodplain area is considered to be a floodway until a flood study is performed at the applicant's expense.

In new, detailed study areas and limited, detailed study areas (which are unnumbered "A" Zones), FEMA mapping will illustrate the 100-year floodplain under existing and future (buildout) conditions throughout Wake County. As a result, more than half of the river miles and associated floodplains in the Wake County jurisdiction will be mapped with future conditions (100-year floodplain noted). After completion of this process, a change to the UDO will occur that will restrict uses (including solid water disposal facilities, hazardous waste management facilities, salvage yards, and chemical storage facilities) in the future floodplain areas and require structures to be elevated above future floodplain elevations.

B.5.3 Hazard Mitigation Plan

The County's 2004 Hazard Mitigation Plan and its 2009 update were developed in an effort to be eligible to receive federal and State disaster relief funds if a natural disaster occurred. The plan includes hazard mitigation strategies, including for flooding-related natural disasters. An implementation schedule is also included and the County is working through the implementation activities (Wake County, 2010b). An update to the county's Hazard Mitigation Plan is currently under way which will result in the creation of a consolidated, multi-jurisdictional Hazard Mitigation Plan for the county and all twelve municipalities.

B.6 Water Supply Watershed Protection Regulations

A large portion of the County is within Water Supply Watersheds (WSWs), a majority of which is zoned as residential. The County has established limitations on impervious surface areas and densities within the WSWs primarily through zoning districts R-40W and R-80W for residential development, presented in Article 5 of the UDO. The County also has zoning overlay districts for the few areas in WSWs that are non-residential, presented in Articles 3 and 11 of the UDO. If there is a conflict between provisions within these two articles, then the most strict limitations apply. Special buffer requirements for Water Supply Watersheds are discussed in section B.5.

All residential development in the county is limited to 30 percent impervious surface coverage regardless of the watershed. Zoning districts R-80W and R-40W have impervious surface limitation include for non-residential development of 6 and 12 percent respectively, with allowance of up to 24 percent if the first 0.5 inch of rainfall is retained on site. Additionally, in these zoning districts, densities are limited to 0.5 units per acre for R-80W and 1.0 unit per acre for R-40W.

WSW Overlay District WS-III, which in the Swift Creek Watershed, has an impervious surface limitation of 12 percent are applied, but these impervious surface limits are not

applied to cluster and open-space subdivisions, if overall density does not exceed one lot per acre. WSW Overlay District WS-IV, which is in the Jordan Lake Watershed, impervious surface limitations of 24 percent are applied, but these impervious surface limits are not applied to cluster and open-space subdivisions if the development is served by curb-and-gutter residential lots of at least 20,000 square feet in area, and cluster subdivisions with an overall lot density of no more than 2 lots per acre. These policies ensures that low-impact development and conservation subdivisions, which help maintain the predevelopment hydrograph, are not discouraged.

B.7 Erosion and Sediment Control

Erosion and sediment control requirements are presented in Article 10 of the County's UDO. Erosion and sediment control plans must be submitted for activities that disturb more than 1 acre. The Erosion and Sediment Control Program has eliminated a substantial amount of sediment transport to local streams.

Wake County has six objectives for the Erosion and Sediment Control Program:

- Identify critical areas that are subject to severe erosion and ensure they receive special attention.
- Limit time of exposure to shortest feasible time.
- Limit exposed area – plan and conduct activities to minimize the size of the area to be exposed at any one time.
- Control surface water originating upgrade of exposed areas to reduce erosion and sediment loss during the exposure period.
- Control sedimentation to prevent offsite damage from sedimentation.
- Manage stormwater runoff -control the velocity at the point of discharge to minimize erosion of the site and increased sedimentation of the stream.

Wake County's sediment and erosion control practices support an overall stream protection plan by limiting in-stream suspended sediment and sediment deposition. Erosion and sediment control strategies are discussed at pre-construction conferences through the permit and plan approval processes. These processes also allow for the review of stormwater controls. A pre-construction conference provides the County with an opportunity to educate developers about the requirements for effective erosion and sediment control.

The County requires the use of the proven latest technology related to erosion and sediment control practices in sediment and erosion control plans. The sediment and erosion control plans usually will include a sediment basin, which is sized according to the drainage area. Silt fences and construction entrances are required on all sites, even those that fall under the 1-acre threshold for requiring an erosion and sediment control plan.

As part of its erosion and sediment control program, the County does not allow land-disturbing activity near a lake or natural watercourse within the 50-foot-wide undisturbed buffer. In addition, all sediment and erosion control measures must be within the limits of disturbance, remaining outside the undisturbed buffer.

The possibilities for phased construction are reviewed in the sediment and erosion control plan submittal process on a site-specific basis. Site conditions, topography, soils, and type of construction determine the size of the phases. Wake County requires land-disturbing activities to be planned and conducted to limit exposure consistent with the most up to date NCDENR stabilization timeframes. Soils are stabilized as rapidly as possible by establishing a grass cover or mulching and tacking.

The County requires the identification of especially vulnerable areas in the development plan, and these areas receive special attention in the permit, plan approval, and inspection processes. Those projects deemed high risk for sediment and erosion control concerns, such as projects with steep slopes or water courses, receive more frequent inspections. Steep slope areas are discussed in a pre-construction conference and avoided to the maximum extent possible. The County allows steep slopes to be used as conservation areas or to meet buffer requirements.

The County also encourages contractor education and training related to erosion and sediment control. The purpose of this educational program is to ensure that contractors understand the erosion and sediment control requirements and work to minimize the potential for sedimentation.

B.8 Stormwater Programs and Impervious Surface Limitations

Wake County is unique in that it has its own volume control SW ordinance and is subject to three state nutrient management strategies in addition to the Swift Creek Land Management Plan.

Wake County administers its own stormwater ordinance for unincorporated areas of Wake County in addition to a different urban stormwater ordinance for three municipalities in eastern Wake County. For the unincorporated areas, Wake County uses a volume-control stormwater ordinance with Target Curve Number (TCN) runoff volume limits for residential development. Both residential and commercial developments adhere to *The Neuse Rules* stormwater requirements for peak flow, nutrient management, and riparian buffer rules. Wake County also adopted the Neuse regulations countywide (including within the Cape Fear Basin). In 2012, Article 9, Part 2 of their UDO was amended to incorporate, by reference, the State mandated stormwater rules for new development for the Falls Lake and Jordan Lake Nutrient Management Strategies.

The County has developed stormwater management programs that address the adverse effects of stormwater runoff associated with new development as well as limit nutrient enrichment in the Jordan Lake and the Neuse River Nutrient Sensitive Waters (NSW) rules.

The County created a Stormwater Management Section within its Environmental Services Department, whose goal is to minimize the impacts of stormwater runoff. The department staff is charged with upholding the local, state, and federal regulations related to stormwater, including:

- Floodplain management
- Sediment and erosion control
- WSW protection
- Neuse River Basin NSW stormwater rules
- National Pollutant Discharge Elimination System (NPDES) Phase II Stormwater Regulations

Stormwater management permits are also required. The County requires the use of the Wake County Stormwater Hybrid Design Tool for all stormwater management submittals. Its purpose is to streamline the many different stormwater requirements and facilitate a more timely review and approval of stormwater management plans.

Complete stormwater requirements can be found in the 2014 Wake County Stormwater Manual: Submittal and Design Guidance. The purpose of this document is to provide guidance for the management of stormwater runoff resulting from development in the County's jurisdiction. It provides support to Article 9 of the UDO and applicable State regulations, which establish minimum requirements to address impacts of stormwater runoff associated with new development and expansions.

The County requires that the pre-development peak runoff rate be maintained. If the difference between pre- and post- runoff exceeds 10 percent for the 1-year, 24-hour storm then the developer must mitigate peak flow within the drainage area. Nitrogen export must not exceed of 3.6 pounds per acre per year (lbs/acre/year) in the Neuse River. The County additionally requires that residential post-development curve number not exceed target curve numbers. Article 9, Part 2 of the UDO requires volume management for target curve number matching.

The County has established a stormwater credit system that provides incentives for better site design and the locating of new development in areas that cause less impact to aquatic resources. Approved methods to receive credit include: disconnected impervious surfaces, reforestation, and cluster and open space subdivisions. These stormwater practices reduce generation of stormwater, reduce size and cost of stormwater storage, and provide partial removal of pollutants.

The County has impervious surface limitations in its WSWs. The impervious surface limitations range from 6 to 30 percent for residential areas, and up to 30 percent for non-residential areas. Under NPDES Phase II rules, development that exceeds 24 percent is required to implement stormwater best management practices (BMPs). Stormwater permits are required for non-residential projects that cumulatively disturb more than 0.5 acre.

Wake County is required to implement the Neuse River and Jordan Lake NSW stormwater rules, as previously described, and stormwater program submittals are required for developments to ensure compliance with the rules. These rules supersede the Neuse Rules within the Jordan Lake watershed portion of the Cape Fear River Basin.

Nitrogen and phosphorus limits have been set, with a nitrogen export limit of 2.2 pounds per acre per year (lbs/acre/year) in the Neuse River (Falls Lake) area and 2.2 and 4.4 lbs/acre/year for the Upper and Lower New Hope Creek watersheds respectively of the Jordan Lake watershed. Phosphorus exports limits are 0.33 lb/acre/year in the Neuse River watershed and 0.82 and 0.78 lb/acre/year in the Upper and Lower New Hope Creek watersheds.

Stormwater Management Task Force

In 2004, the County established a stormwater management task force as part of an inter-local agreement to evaluate, develop, and possibly implement a county-wide collaborative stormwater management program.

The Wake County Collective Stormwater Management Evaluation was completed in August 2005 and focused on defining the need for a new, more coordinated approach to county-wide stormwater management. It included a facilitated focus group composed of staff-level representatives from the County and each of the 12 municipalities. Individual needs assessments were performed for each jurisdiction for existing and future stormwater management programs. The assessments identified the existing levels of service provided in the three major stormwater program areas: operations and maintenance, program management, and capital improvements. The evaluation focused on water quality protection and flood prevention through stormwater management and compliance with regulatory mandates, and identified how these programs should respond to future growth. Deficiencies identified in the current levels of service include:

- Lack of adequate staffing and program funding exists to enforce current policies.
- Operation and maintenance of drainage systems is mostly reactive.
- Planning for stormwater impacts resulting from future growth has yet to be considered in many cases.
- Unfunded federal mandates, such as NPDES Phase II stormwater regulations, will further strain local organizational resources used to manage stormwater.
- Rapid and inevitable growth should be considered when projecting future expenditures for stormwater management because the same service must be provided over a larger and more developed area.

The Wake County Collective Stormwater Management Evaluation report recommended the creation of a representative residents' Task Force. The County and 12 municipalities appointed a 20-member Task Force, which met from February 2006 through August 2007 and was charged with the following activities:

- Review and assess current and future required stormwater levels of service.
- Identify citizen expectations for stormwater levels of service.
- Develop recommendations for a county-wide collaborative stormwater program.
- Develop program funding recommendations, where appropriate.
- Develop an implementation plan.

The Task Force gauged public support for improvements in stormwater management and determined whether a collaborative approach and/or program was a logical and cost-effective way to provide these improvements. The final report was produced in November 2007 and contains an implementation plan that clearly defines nine recommendations. Using the plan developed by the Task Force, the County and the participating municipalities, if desired, will implement the selected collaborative stormwater management programs.

The following implementation activities have occurred to date:

- Developed a model municipal stormwater ordinance adopted by Wendell, Rolesville, and Zebulon and administered Wake County under an inter-local agreements with those municipalities
- Identified and inspected construction sites where erosion is most likely ongoing
- Met with potential partners to establish interlocal agreements for a common stormwater ordinance
- Developed extensive stormwater education programming targeting residents, businesses, and government partners

B.9 Wastewater System and Well Programs

To help ensure water quality in rural areas, the County administers programs for septic systems, discharging and non-discharging wastewater systems permitted by North Carolina Division of Water Resources (NCDWR), and private (individual) and semi-public (community) wells. The County conducts evaluations, inspects, and issues permits for septic systems. The County also conducts periodic operation and maintenance inspections on wastewater systems using more complex technologies. Additionally, the County provides a technical resource to residents on wastewater disposal technologies. Finally, the County enforces a local mobile home park ordinance and investigates all sanitation complaints related to mobile home parks. The County's regulations are more stringent than those of the State.

The County recognized that many homeowners do not understand proper maintenance procedures for septic systems, and have even had calls from homeowners who did not understand that they were served by a septic system. Thus, the County teamed with the Raleigh Regional Realtors Association to develop an educational program. The County developed educational materials and CDs that realtors provide to buyers purchasing homes on septic systems. The County currently has a project to scan existing septic system permits. The permits will be available to the public through the County's iMaps application.

The County also issues well permits, performs site inspections on wells, and collects water samples for analysis as required by the State since 2008. The County investigates complaints related to private water supplies (individual wells) and works cooperatively with the State Public Water Supply Section to mediate problems with community well supplies. The County also regulates irrigation wells and open loop geothermal wells where well water is used.

The County completed a comprehensive groundwater investigation to assess the quality and quantity of groundwater in the county (CDM, 2003). This study assessed future conditions and recommended development of a monitoring well network as well as groundwater management strategies. In July 2003, the Groundwater Study Advisory Committee completed its recommendations, which include the following:

- Lead planning and development of an Environmental Monitoring Program involving local, State, and federal governments, departments, and agencies.
- Implement a long-term monitoring well network, including monitoring wells and stream gauging stations, throughout the County.
- Implement a community-based process to develop principles and policies for groundwater resource sustainability.
- Conduct a study to assess the water quality and quantity impacts to both surface and groundwater from development activities.
- Develop and implement a public education program to provide basic information about groundwater, wells, and the risk and responsibilities of well ownership.
- Conduct additional investigation of radionuclides in groundwater throughout the County.
- Sample and analyze groundwater for constituents likely to be associated with agricultural practices (such as pesticides and herbicides) in the County.
- Sample and analyze groundwater for constituents likely to be associated with industrial or land disposal practices (such as underground fuel storage, wood treating operations, and landfills) in the County.
- Collect data on new wells that contain constituents that threaten public health or do not yield sufficient water.
- Work with environmental education and environmental information providers to develop effective programs and services for a variety of County audiences on groundwater science, data, and trends; pollution sources and their environmental, economic, and societal impacts; and BMPs and stewardship actions that protect and sustain groundwater resources.

A comprehensive groundwater study has not occurred since 2003, but the County has made targeted efforts (2008 ordinance) to address lost capacity in wells during drought conditions.

B.10 Air Quality Protection

B.10.1 Wake County Efforts

In September 2012, the County released an updated draft of the Wake County Transit Plan, which is pending action from the Wake County Board of Commissioners. The Plan was developed in cooperation with several partners, including Capital Area Metropolitan Planning Organization (CAMPO), Triangle Transit, the Regional

Transportation Alliance, and the City of Raleigh’s Capital Area Transit. The Plan provides a dual approach to meeting expanding transit demands as the County continues to grow: (1) a core transit plan that broadens local and commuter bus service and includes a rush-hour commuter rail service from the Town of Garner to the City of Durham; and (2) an enhanced transit plan that involves building a regional light rail service from downtown Cary through downtown Raleigh, up to Millbrook Road (Wake County, 2012). Many of the projects identified in the Wake County Draft Transit Plan are included in the CAMPO 2040 Metropolitan Transportation Plan (MTP), discussed in the following section.

The Environmental Impact Statement (EIS) prepared for the regional light rail project indicates that affiliated parking areas will not impact levels of carbon monoxide. The document also indicates that the light rail system will result in lower levels of vehicle pollutant emissions (USDOT, 2002).

In 2009, the County appointed a sustainability task force to address conservation and reduction goals related to solid waste, water, and energy related to air quality within the region. The 2011 sustainability task force report identified several strategies and performance measures for each of those goals related to air quality (Wake County, 2011).

Open space, trees, and vegetation are integral to the improvement of air quality. Voters in Wake County passed bond referendums in 2000, 2004, and 2007, totaling \$91 million to provide funds for parks and open space. The County continues to use these funds to purchase and preserve significant tracts of open space.

B.10.2 Regional Efforts

Triangle Transit, formerly Triangle Transit Authority, is expanding bus and shuttle services that link the Cities of Chapel Hill, Durham, and Raleigh with RTP and RDU. Triangle Transit is working to develop plans to expand the system to include rail transit operations. Triangle Transit also coordinates a ride-sharing program for regional commuters and is exploring the possibility of running some of its van-pool vehicles on compressed natural gas.

CAMPO and the Durham –Chapel Hill-Carrboro MPO coordinated with the Triangle J Council of Governments (TJCOG) to develop a 2040 MTP, which involved an air quality conformity analysis for 2012 to 2018. The 2040 MTP incorporates the recommendations of the 2035 Long Range Transit Plan released by CAMPO, including proposed bus service expansion and enhancement as well as a light rail system, linking the Cities of Raleigh and Durham with RTP and the Towns of Cary and Morrisville. The project explored and analyzed regional growth scenarios for associated trade-offs and impacts on the transportation network. The recommendations in these plans for appropriate sizing of roads are incorporated into North Carolina Department of Transportation’s (NCDOT’s) Transportation Improvement Program (TJCOG, 2013).

In 2006/2007, Triangle Transit brought together the Triangle organizations that were working on and/or funding Transportation Demand Management (TDM) projects with the goal of creating a long-term plan for improving TDM efforts. The result was the Triangle Region 7-Year Long Range Travel Demand Management Plan. The purpose of the Triangle TDM Program is to reduce regional growth in vehicle miles traveled (VMT)

by 25 percent between 2007 and 2015 through a moderate package of TDM strategies that encourage alternative modes of transportation. TJCOG is now coordinating the marketing and evaluation of this effort through a grant program and promoting commute alternatives, such as mass transit, carpooling, biking, teleworking, and vanpooling (TJCOG, 2014).

In 1999, the Greater Raleigh Chamber of Commerce organized the Regional Transportation Alliance, a group of government and business leaders, to consider ways to address the region's traffic problems. Today the RTA counts as members more than 100 businesses, along with two metropolitan planning organizations (MPOs) for transportation, Triangle Transit, and RDU. The group serves as a regional business voice for transportation initiatives and continues to focus on advancing multimodal solutions needed to sustain prosperity and enhance quality of life (RTA, 2013). The Triangle Clean Cities Coalition was also founded in 1999, and brings together fleet managers, local and state government officials, fuel and vehicle providers, and interested citizen groups, to reduce dependence on petroleum by promoting alternative transportation fuels (TCCC, 2010).

NCDOT is also in the process of planning for a southeast high-speed rail service that will connect Washington, D.C., to Charlotte, NC. The project will be developed incrementally based on available funding, upgrading existing rail rights-of-way. NCDOT has used federal stimulus funding to add commuter routes between the cities of Charlotte and Raleigh (Southeast High Speed Rail, 2012). Improved alternative transportation options have the potential to improve air quality by reducing traffic congestion.

The southern section of NC 540, referred to as the Triangle Expressway is the State's first modern toll road, beginning at I-40 in Durham County and currently ending at NC 55 in the Town of Holly Springs. A key proposed project is the "Complete 540" project, which will extend the Triangle expressway to the U.S. 64/U.S. 264 Bypass in the Town of Knightdale, completing the NC 540 Outer Loop around the greater Raleigh area, linking the Towns of Apex, Cary, Clayton, Garner, Fuquay Varina, Holly Springs, and the City of Raleigh. NCDOT is currently in the process of performing a detailed study of alternatives for the extension, to be followed by an EIS (NCDOT, 2013).

B.11 Historic Preservation

The County has a Historic Preservation Commission, which has jurisdiction in several towns including the Towns of Apex, Cary, Holly Springs, and Morrisville and the unincorporated areas of the County. The Wake County Historic Preservation Commission is staffed by Capital Area Preservation (CAP), a non-profit organization that focuses on the security of historic resources.

The goals of the Wake County Historic Preservation Commission are to:

- Safeguard the heritage of the County by preserving districts and landmarks that embody important elements of its culture, history, architectural history, or prehistory.

- Promote the use and conservation of such districts and landmarks for the education, pleasure, and enrichment of the residents of the County and State.
- Promote preservation concepts in the County and participation in municipal planning programs.

The Commission's primary responsibilities are to:

- Initiate and recommend properties for designation as historic landmarks.
- Review Certificates of Appropriateness.
- Keep the historic architecture survey up-to-date and maintain the historic resources database.
- Initiate National Register listing and comment on National Register nominations.
- Develop a historic preservation plan and ensure that historic resources are recognized in County and municipal plans.
- Provide information to the public about the County's preservation program and historic resources.

B.12 References

CDM. 2003. *Wake County Comprehensive Groundwater Investigation Final Report*. Prepared for Wake County, North Carolina. June.

CH2M HILL. 2006. *Wake County Consolidated Open Space Plan*. Revised September 2006. <http://www.wakegov.com/parks/openspace/pages/plan.aspx>

CH2M HILL. 2002. *Wake County Watershed Assessment – Biological, Habitat, and Geomorphologic Evaluations, Technical Memorandum No. 6*. Raleigh, North Carolina.

North Carolina Department of Transportation (NCDOT). 2013. *Complete 540 Southeast Extension*. <http://www.ncdot.gov/projects/complete540/>. Accessed January 2014.

Regional Transportation Alliance (RTA). 2013. <http://www.letsgetmoving.org/about/>. Accessed January 2014.

Snow, Christopher. 2014. Director of Wake County Parks, Recreation & Open Space. February 7th, 2014.

Southeast High Speed Rail (SEHSR). 2012. *SEHSR Corridor from Washington, D.C. to Charlotte, NC. Project History*. <http://www.sehsr.org/history.html>. Accessed January, 2014.

Triangle J Council of Governments (TJCOGG). 2014. *Triangle Transportation Demand Management Program Description*. <http://www.tjcog.org/triangle-transportation-demand-management-program.aspx>. Accessed January 31, 2014.

TJCOG. 2013. *Research Triangle Region Conformity Determination Report. 2040 Metropolitan Transportation Plan. 2012-2018 Transportation Improvement Program*. May 8, 2013.

- Triangle Clean Cities Coalition (TCCC). 2010. <http://www.trianglecleancities.org/general-information.aspx>. Accessed January 2014.
- United States Census Bureau. 2010. Census 2010 Population Finder. <http://www.census.gov/2010census/>. Accessed January 2014.
- United States Department of Transportation (USDOT), Federal Transit Administration, and Triangle Transit Authority. 2002. Phase I Regional Rail System, Durham and Wake Counties, North Carolina, Final Environmental Impact Statement and Section 4(F) Evaluation.
- Wake County. 2013. Wake county Agriculture Economic Development Plan. Endorsed by the Wake County Board of Commissioners August 5, 2013.
- Wake County. September 2012. Wake County Draft Transit Plan. <http://www.wakegov.com/planning/transport/Pages/transitplan.aspx>. Accessed January, 2014.
- Wake County Sustainability Quality Task Force. 2011. Environmental Stewardship Agenda. August
- Wake County. 2010a. 2010 Updated Southwest Wake Area Land Use Plan Classifications Map. http://www.wakegov.com/planning/growth/Documents/SouthwestALUP_DSize.pdf.
- Wake County. 2010b. 2010 Wake County Hazard Mitigation Plan. Adopted June 7, 2010.
- Wake County. 2008. Growth Issues Task Force Issues. <http://www.wakegov.com/planning/growth/Documents/WakeGrowthIssuesSorted3.pdf>.
- Wake County. 2003. Wake County Land Use Plan. Prepared by the Wake County Planning Department. <http://www.wakegov.com/planning/growth/pages/lup.aspx>.
- Wake County. 2007. Southwest Wake Area Land Use Plan. <http://www.wakegov.com/planning/growth/Documents/SWALUPFinalWithCoverPage.pdf>.

2. Southwest Land Use Area Plan

- Excerpt, Maps, Land Class Description

Area Land Use Plans

Area land use plans augment the Wake County Land Use Classifications Map. Reflecting more defined, smaller geographic planning regions, the area land use plans revise and expand upon adopted joint municipal plans, the land use aspects of the water-supply watershed protection plan, and create new plans where no joint plans have been adopted with municipalities or in non-urban areas. Area plans' USA boundaries are re-evaluated to determine where municipal sewer and water utilities will be extended. The new delineations revise Short-Range and Long-Range USA boundaries.

Area plans have a long-term timeframe [20-25 years] and incorporate the following objectives:

- Emphasize the development of communities;
- Encourage development in and around municipalities;
- Maintain resources including natural areas, historic sites, major wildlife corridors, potential parks and greenways; and
- Coordinate with transportation plans.

These area plans also address open space, scenic and transitional areas along highways and recreation and leisure resources.

Main Uses of the Plan

A plan filled in with greenways, parks, residential densities, and other future uses, can help the Wake County Commissioners (and municipalities that grow into the area) do at least the following three things.

1. **Decide on Landowners' Development Application Petitions**

The plan does not rezone land, but is a source of advice to the Commissioners when they have to decide on a landowner's rezoning petition. Other sources of advice include neighbors' comments at the public hearing and other information each Commissioner considers relevant.

2. **Decide Timing, Direction and Scale of Growth**

The plan's goals guide growth into the municipal Short-Range Urban Service Areas. Multi-use activity centers are the preferred locations for more dense and intense land uses.

3. **Plan Services and Infrastructure**

Because the plan, in a very general way, projects land use it may help in the long-term planning of services, community buildings, and other infrastructure

Southwest Wake Area Land Use Plan (SWALUP)

The Phase One of the Wake County Land Use Plan, adopted in 1997, included a vision, goals, strategies, and a map. The map showed ultimate urban service boundaries for each municipality in Wake County. Urban services area designation applies to lands within the Wake County Planning jurisdiction that are expected to become part of a municipality in the future. These areas are located outside a city's or a town's corporate and extraterritorial jurisdiction. The previous Wake County Land Use Plan map did not show activity centers, future greenways, parks, residential densities, and other future uses.

On May 19, 1999 the County Commissioners adopted **the Southwest Wake County Area Land Use Plan** that included activity centers, greenways, parks, residential densities and other future uses, generally missing from the Phase One Plan. The 1999 Wake County Southwest Area Land Use Plan encouraged growth close to the municipalities to take advantage of existing and planned infrastructure, such as transportation, water and sewer facilities. Also, the Plan encouraged higher densities and a wider range of land uses where existing and planned short-range community facilities and infrastructure could support them.

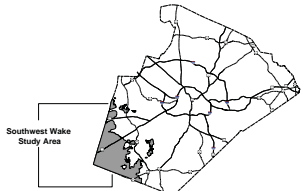
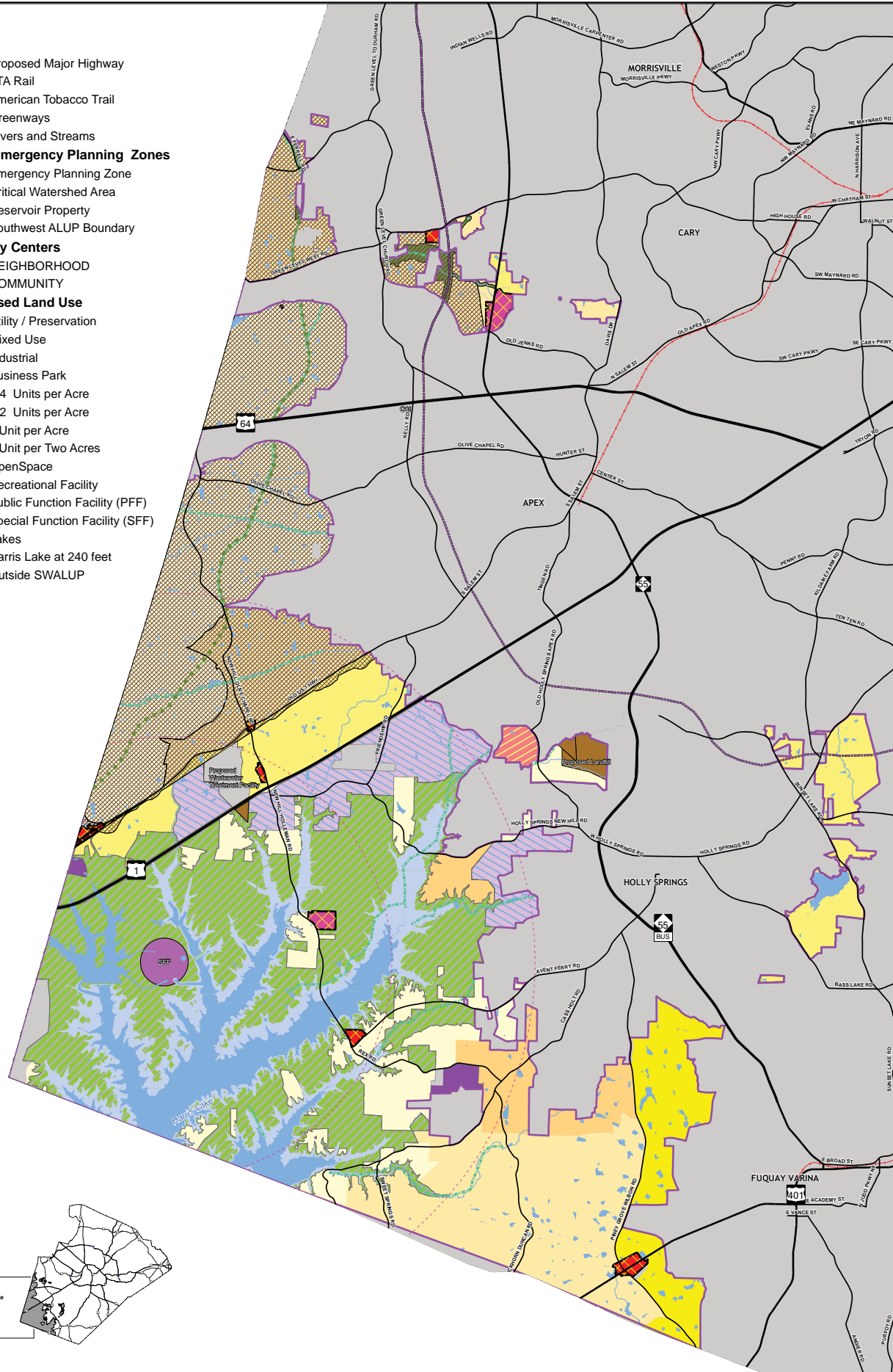
SWALUP Land Use Classifications

The following table describes the Land Use Classifications that are applicable to both the Urban Services Areas and Non-Urban Areas in the Southwest Wake County Area Land Use Plan (see Proposed Southwest ALUP Update Map). The description and policies associated with these Land Use Classifications applied to Urban Services Areas represent the County's vision for how areas so classified will be developed in conjunction with the provision of urban facilities and services that make urban uses and intensities possible.

Land Use Classification	Description
Critical Watershed Area	Land in a water supply watershed that is adjacent and draining to the water source, where it is most important to filter out potential pollutants.
Neighborhood Activity Center	Land uses include shopping, services, recreation, and small-scale office and institutional uses needed to meet the day-to-day needs of the neighborhood. Examples are grocery or convenience store, pharmacy, video rental, dry cleaning or laundry, restaurant, service station, medical or dental practice, insurance agency, law firm, small neighborhood business office, school, daycare, church, park, and civic club.
Community Activity Center	Land uses include those uses permitted in neighborhood activity centers, plus uses that provide goods and services needed less frequently than on a daily basis. Examples are commercial, civic or office and institutional, and medium and low density residential.
Residential Area Densities	<p><u>Water Supply Watershed Critical Area (Jordan Lake):</u> Residential use – cluster and other subdivisions - up to 0.5 dwelling units per acre. The current recommended density for the water supply watershed critical area, which is shown on the Southwest Wake Area Land Use Plan Map (see pocket fold-out map), is proposed to be changed from a density of 1.75 dwelling units per acre to a recommended density of 0.5 dwelling units per acre.</p> <p><u>Water Supply Watershed Non-Critical Area:</u> The recommended density for this area is up to 1 dwelling unit per acre.</p> <p><u>Non-Water Supply Watershed Area (Harris Lake-Cape Fear Watersheds):</u> The recommended density for this area is up to 0.5 dwelling units per acre.</p> <p><u>Non-Water Supply Watershed Area:</u> The recommended density for this area is up to 1.5 dwelling units per acre.</p>
Main Stream or Lake Buffer	Main stream or lake buffers provide strips of natural vegetation that remove pollutants from stormwater runoff before they reach a water supply source or a watercourse that drains to a water supply source.
Forestry / Light Industry (FLI)	Land uses include mostly forestry or possibly the making of electricity (non-nuclear) where at least 75% of site stays in its natural state. Includes lake / stream buffers.

















Office / Research Park (ORP)	Land uses include mostly offices, labs, research facilities, maintenance facilities, and lake / stream buffers.
Industrial	Land uses include manufacturing, warehousing, freight handling, wholesaling, research and development activities with office support services.
Office & Institutional (O&I)	Land uses include institutional, office, and limited commercial activities that are less intensive than other commercial districts.
Open Space	Areas of publicly or privately owned natural area that is protected for natural and cultural resources.
Recreational Facility	A facility or site that consists of land dedicated for public recreational use.
Public Function Facility (PFF): <ul style="list-style-type: none"> • Existing Feltonville Sanitary Solid Waste Facility • Proposed South Wake Sanitary Solid Waste Facility • Proposed Western Regional Wastewater Treatment Facility 	A facility or site which functions to serve public, including existing or proposed sanitary landfills, regional wastewater treatment facility, and fire and emergency management stations. <ul style="list-style-type: none"> ▪ The Feltonville Sanitary Solid Waste Landfill, is located on the north side of the terminus of Old Smithfield Road (west of NC 55 Bypass). ▪ The proposed South Wake Sanitary Solid Waste Landfill, is to be located on the south side of the terminus of Old Smithfield Road (west of NC 55 Bypass). Planned to begin operations in 2008. ▪ The proposed Western Regional Water Reclamation Facility, is to be located southwest of the New Hill Community between US Hwy 1 and Old US Hwy 1. Planned to begin operations in 2011.
Special Function Facility (SFF)	A facility or site designated for a special function that could make typical urban development costly or hazardous to public health and safety. Surrounding land uses should be developed with an awareness of the special function and any particular needs, such as emergency evacuation, that may arise from it.

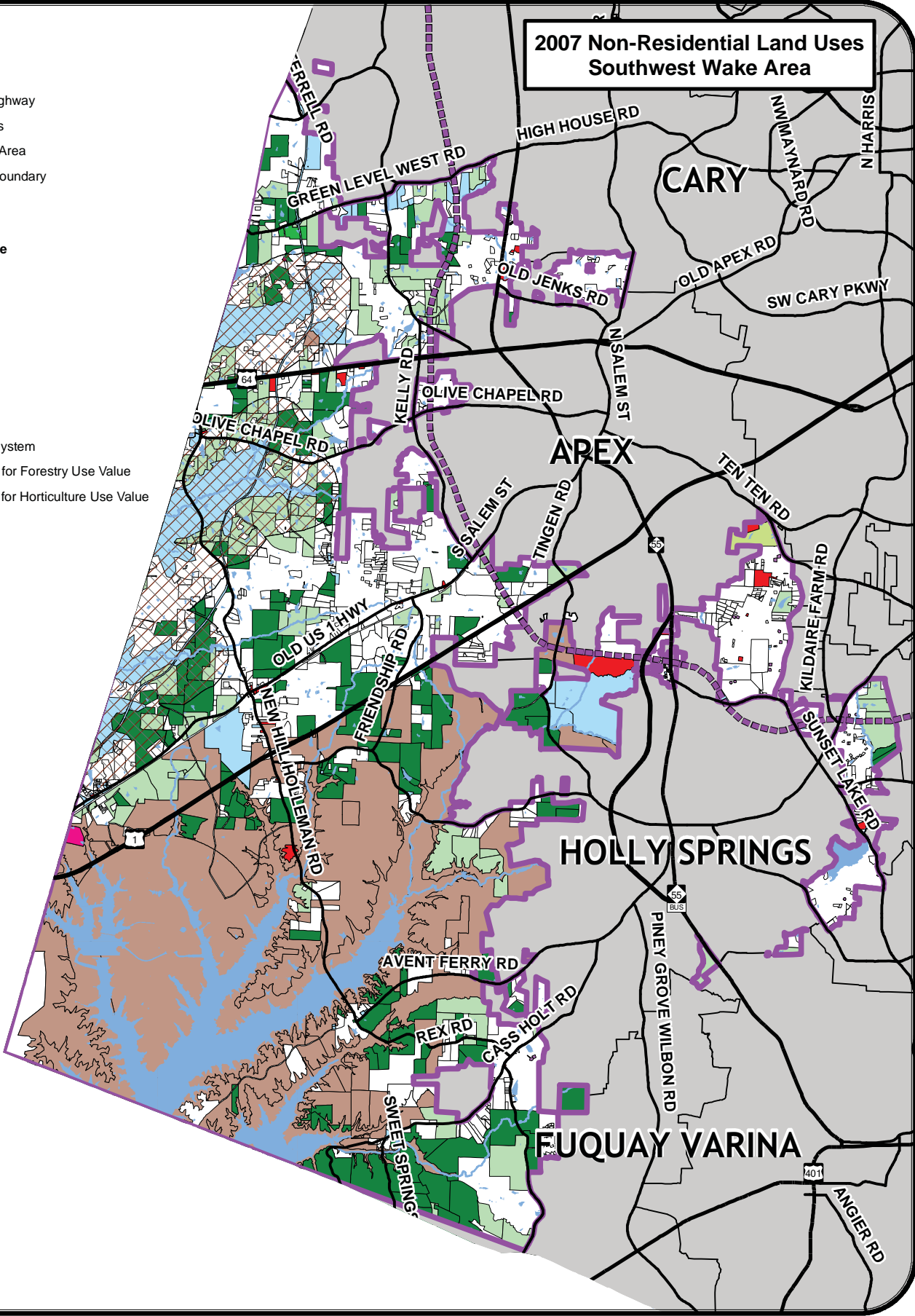
- Proposed Major Highway
- TTA Rail
- American Tobacco Trail
- Greenways
- Rivers and Streams
- NRC Emergency Planning Zones**
 - Emergency Planning Zone
 - Critical Watershed Area
 - Reservoir Property
 - Southwest ALUP Boundary
- Activity Centers**
 - NEIGHBORHOOD
 - COMMUNITY
- Proposed Land Use**
 - Utility / Preservation
 - Mixed Use
 - Industrial
 - Business Park
 - 1-4 Units per Acre
 - 1-2 Units per Acre
 - 1 Unit per Acre
 - 1 Unit per Two Acres
 - OpenSpace
 - Recreational Facility
 - Public Function Facility (PFF)
 - Special Function Facility (SFF)
 - Lakes
 - Harris Lake at 240 feet
 - Outside SWALUP



**2007 Non-Residential Land Uses
Southwest Wake Area**

Legend

-  Proposed Major Highway
-  Rivers and Streams
-  Critical Watershed Area
-  Southwest ALUP Boundary
-  Jurisdictions
-  Lakes
- Non Residential Land Use**
-  C - Commercial
-  D - Industrial
-  E - Tax Exempt
-  F - Agri- Farm
-  S - State Assessed
-  U - Golf Course
-  V - Vacant
-  W - Water/Sewer System
-  Y - Farm approved for Forestry Use Value
-  Z - Farm approved for Horticulture Use Value



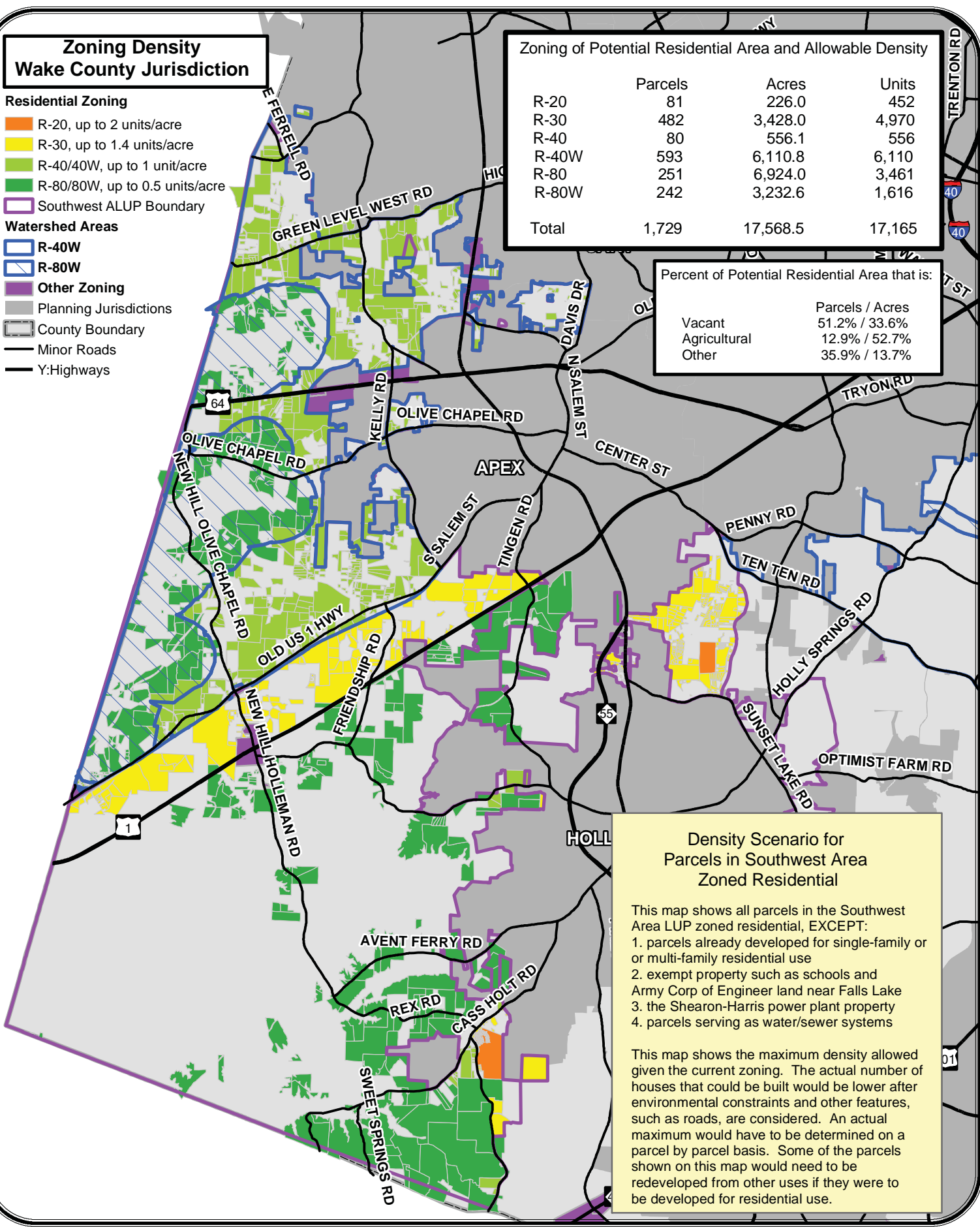
Zoning Density Wake County Jurisdiction

- Residential Zoning**
- R-20, up to 2 units/acre
 - R-30, up to 1.4 units/acre
 - R-40/40W, up to 1 unit/acre
 - R-80/80W, up to 0.5 units/acre
 - Southwest ALUP Boundary

- Watershed Areas**
- R-40W
 - R-80W
 - Other Zoning
 - Planning Jurisdictions
 - County Boundary
 - Minor Roads
 - Y:Highways

	Parcels	Acres	Units
R-20	81	226.0	452
R-30	482	3,428.0	4,970
R-40	80	556.1	556
R-40W	593	6,110.8	6,110
R-80	251	6,924.0	3,461
R-80W	242	3,232.6	1,616
Total	1,729	17,568.5	17,165

	Parcels / Acres
Vacant	51.2% / 33.6%
Agricultural	12.9% / 52.7%
Other	35.9% / 13.7%



**Density Scenario for
Parcels in Southwest Area
Zoned Residential**

This map shows all parcels in the Southwest Area LUP zoned residential, EXCEPT:

1. parcels already developed for single-family or or multi-family residential use
2. exempt property such as schools and Army Corp of Engineer land near Falls Lake
3. the Shearon-Harris power plant property
4. parcels serving as water/sewer systems

This map shows the maximum density allowed given the current zoning. The actual number of houses that could be built would be lower after environmental constraints and other features, such as roads, are considered. An actual maximum would have to be determined on a parcel by parcel basis. Some of the parcels shown on this map would need to be redeveloped from other uses if they were to be developed for residential use.

PLANNING JURISDICTION		LAND CLASS		EXTERIOR WALL CONTINUED		AIR		TYPE & USE CONTINUED	
AP	APEX	A	AC-W/IMP	N	ENAMELED STEEL	A	SEPARATE	32	HOTEL/MOTEL-IND
AN	ANGIER	B	AC> 10-HS	O	METAL	B	COMBINED		OFFICE BLDGS
CA	CARY	C	COMMERCIAL	R	BRICK & METAL	C	UNIT AIR COND	34	TYPICAL OFFICE
CL	CLAYTON	D	INDUSTRIAL	P	INSULATED PANEL	D	% SEP	35	OFC/RTL/RES CONV
DU	DURHAM	E	EXEMPT	S	PRECAST CONCRETE	E	% COMB	36	MEDICAL TYPE
FD	FIRE DISTRICT	F	AGRI-FARM	T	SOLAR GLASS	F	% UNIT	37	OFFICE/APARTMENT
FV	FUQUAY VARINA	G	APARTMENT	U	GLASS ALUMINUM	G	LIMITED/PARTIAL	38	OFFICE BLDG-H.R.
GA	GARNER	H	HISTORIC	W	SIMULATED BRICK	H	NO AIR COND		RESTAURANTS
HS	HOLLY SPRINGS	I	HOA	X	SIMULATED STONE	I	% CLIMATE CONTROL	39	RESTAURANT
KN	KNIGHTDALE	J	CEMETERY	Y	FACTORY SASH		BATH	40	FAST FOOD
MO	MORRISVILLE	K	RET HOME	Z	ALUM VINYL SIDING	A	ONE BATH	41	PLAIN DRIVE
RA	RALEIGH	L	LEASED	Q	LOG	B	1 1/2 BATH	42	STORE TYPE BLDG
RD	RDU AIRPORT	M	MFG HOME		COMMON WALLS	C	TWO BATH	43	BAR/CLUB
RO	ROLESVILLE	N	CONDO		Code no longer used	D	1/2 BATH	44	CAFETERIA
WC	WAKE COUNTY	O	MA+CONDO		ROOF TYPE	E	THREE BATH		RETAIL TYPE BLDGS
WE	WENDELL	P	PART EXEMPT		Code no longer used	F	3 1/2 BATH	46	FOOD MART
WF	WAKE FOREST	R	R<10-HS		ROOF FLOOR	G	LIMITED PLBG	47	SINGLE TENANT
ZB	ZEBULON	S	ST ASSESS	A	WOOD JOIST	H	NO PLUMBING	48	MULTI TENANT
	TOWNSHIPS	T	MOBILE HOME PK	B	TIMBER	I	ADEQUATE	49	SUPERMARKET
01	RALEIGH	U	GOLF COURSE	C	EXPOSED STEEL	J	NO OF FIXTURES	50	DISCOUNT STORE
02	BARTON'S CREEK	V	VACANT	D	FIREPROOF STEEL		BUILT INS	51	DEPARTMENT STORE
03	BUCKHORN	W	WATER/SEWER	E	REINF CONCRETE	1	ONE FIREPLACE	52	BULK RETAIL
04	CARY	Y	FOR-FARM	F	CELLULAR STEEL	2	2 OR MORE FIREPL	53	MALL
05	CEDAR FORK	Z	HOR-FARM			3	RANGE DISHWASHER	54	COMMUNITY CTR
06	HOLLY SPRINGS	U	GOLF COURSE		FLOOR FINISH	4	RNGE/DISHWR/ DISPOS	55	NHBD CENTER
07	HOUSE CREEK		UTILITIES	G	CARPET	5	OVEN	56	JUNIOR ANCHOR
08	LEESVILLE	A	ALL	D	MIXED	6	RANGE	57	STORES W/APTS
09	LITTLE RIVER	E	ELECTRIC	A	HARDWOOD	7	DISHWASHER	58	STORES W/OFCs
10	MARK'S CREEK	G	GAS	C	PINE	8	DISPOSAL	59	STORES W/ OFC & APT
11	MEREDITH	W	WATER	J	CEMENT/CONCRETE		OTHER BUILT-INS	60	JUNIOR DEPT STORE
12	MIDDLE CREEK	S	SEWER	H	GLAZED TILE	14	SPRINKLER SYS	OTHER	FINISHED BLDGS
13	NEUSE		TOPOGRAPHY	P	ASPHALT TILE	15	PASS ELEVATOR	62	AIRPORT TERMINAL
14	NEW LIGHT		Code no longer used	I	PART TERRAZZO	16	FREIGHT ELEV	63	VET CLINIC
15	PANTHER BRANCH		STORY HEIGHT	B	EARTH FLOOR	18	ESCALATOR	64	CLINIC
16	ST MARY'S	A	ONE STORY	K	BRICK FLOOR		CITY	65	CLUB
17	ST MATTHEW'S	B	1 1/2 STORY	Q	VINYL FLOOR	ANG	ANGIER	66	CHURCH
18	SWIFT CREEK	C	TWO STORY	O	VARIOUS MTLs	APE	APEX	67	DORMITORY
19	WAKE FOREST	D	2 1/2 STORY	E	SINGLE	CAR	CARY	68	FIRE STATION
20	WHITE OAK	E	THREE STORY	R	RUBBER COVERING	FUQ	FUQUAY VARINA	69	GYMNASIUM
	FIRE DISTRICTS	F	3 1/2 STORY		INTERIOR FINISH	GAR	GARNER	70	HOSPITAL
1	BAYLEAF	G	FOUR STORY		Code no longer used	HOL	HOLLY SPRINGS	71	LIBRARY
2	DURHAM HIGHWAY	H	MULTI STORY		INTERIOR FINISH 1 & 2	KNI	KNIGHTDALE	72	MOBILE HOME
3	STONE HILL	I	1 3/4 STORY	A	% FINISHED	MOR	MORRISVILLE	73	MUNICIPAL BLDG
4	ROLESVILLE	J	1.4 STORY	B	% SEMI-FINISHED	OUT	OUTSIDE CITY LIMIT	74	NURSING HOME
5	CARY	K	1.63 STORY	C	FULLY FINISHED	RAL	RALEIGH	75	FUNERAL HOME
6	RALEIGH	L	1.88 STORY	S	FULLY SEMI-FINISHED	ROL	ROLESVILLE	76	RETIREMENT HOME
7	WAKE-NEW HOPE	M	2.4 STORY		MEZZANINE	WEN	WENDELL	77	SCHOOL
8	SIX FORKS	N	2.63 STORY	D	% FLOOR ONLY	WAK	WAKE FOREST	78	THEATER
9	WAKE FOREST	R	2.75 STORY	E	% FINISHED	ZEB	ZEBULON		INDUSTRIAL TYPE BLDGS
10	ZEBULON		DESIGN STYLE	F	% SEMI-FINISHED		TYPE & USE	79	LIGHT MANUF
11	MORRISVILLE	A	CONVENTIONAL		UNFINISHED INTERIOR		RESIDENTIAL	80	MANUFACTURING
12	SWIFT CREEK	B	DUPLEX	G	% UNFINISHED	1	ONE FAMILY	81	PHARM PLANT
13	KNIGHTDALE	C	TOWNHOUSE	H	% SEMI-FINISHED	2	TWO FAMILY	82	PREFAB WHSE
14	FAIRVIEW	D	CONDO	I	FULLY UNFINISHED	3	THREE FAMILY	83	WAREHOUSE
15	FALLS	E	CONVERSION	T	FULLY SEMI-FINISHED	4	FOUR FAMILY	84	BULK/DIST WHSE
16	FUQUAY VARINA	F	COLONIAL		ATTIC FINISH	5	MULTI-FAMILY	85	FLEX WAREHOUSE
17	HOLLY SPRINGS	G	RANCH	J	FULLY FINISHED	6	RES. W/BUSI USE	86	MINI WAREHOUSE
18	WENDELL	H	CAPE	K	% FINISHED		APARTMENTS	87	BOTTLING PLANT
19	FAIRGROUNDS	I	SPLIT LEVEL	L	FULLY SEMIFINISHED	7	GARDEN	88	CHEMICAL PLANT
20	HOPKINS	J	SPLIT FOYER	M	% SEMI-FINISHED	8	TOWNHOUSE	89	BIOLOGICAL PLANT
21	APEX	K	CONTEMPORARY		BASEMENT FINISH	9	ELEVATOR	90	R & D
22	GARNER	L	LOG	N	FULLY FINISHED	10	ROOMING HOUSE	91	HANGAR
23	FIRE TAX DISTRICT	M	MANUF SNGL	O	% FINISHED		BANKS	92	POWER HOUSE
	ZONING	N	MANUF MULTI	P	% REC ROOM	11	BANK BUILDING	94	TELEPHONE FIX
		O	MODULAR	Q	FULLY SEMI-FINISHED	12	DRIVE-IN ONLY	95	TRUCK TERMINAL
	WWW.WAKEGOV.COM/COUNTY/ PLANNING/ZONING/DISTRICTS		FD OR BASEMENT	R	% SEMI-FINISHED		BOWLING ALLEY	96	LABORATORY
		A	FULL BASEMENT		HEATING		BOWLING ALLEY	98	LAUNDRY
	SPECIAL DISTRICTS	B	% BASEMENT	A	FORCED AIR		SPECIALTY BLDGS	99	SPECIAL WRITE-INS
AMD	APEX MUNICIPAL	C	PIER FOUNDATION	K	HEAT PUMP	16	DAY CARE	100	STUDENT APTS
BKR	ANGIER BLACKRVR	D	NO BASEMENT	C	STEAM	17	CLUB HOUSE	101	LUXURY APTS
FMD	FUQUAY MUNICIPAL		EXTERIOR WALL	D	ELECTRIC	18	BATH HOUSE	102	MUSEUM
HMD	HILLSBOROUGH STREET	A	FRAME	E	NO AUTOM-BURNER		GARAGE BLDGS	103	CAR SALES
RMD	RALEIGH MUNICIPAL	B	BRICK	F	% FORCED AIR	19	SALES & SERVICE	104	FRATERNITY
RML	RALEIGH MUNICIPAL I	C	C-BLOCK	G	UNIT HEATERS	20	SERVICE GARAGE	105	SORORITY
RMS	RALEIGH MUNICIPAL II	D	BRICK & FRAME	H	CENTRAL SYST-UNITS	21	PARKING DECK	106	POST OFFICE
RTP	RESEARCH TRIANGLE	E	BRICK & C-BLOCK	I	LIMITED/PARTIAL	22	OIL & LUBE	107	ARMORY
WMD	WAKE FOREST	F	C-BLOCK & FRAME	J	NO HEATING	23	CAR WASH	108	GROUP HOME
	BILLING CLASS	V	C-BLOCK & METAL	B	HOT WATER	24	WAND CAR WASH	109	RESTROOM BUILDING
1	CORPORATIONS	G	STUCCO	L	SOLAR		GASOLINE STATIONS	110	GUARD HOUSE
2	INDIVIDUALS	H	STUCCO MASONARY		GRADE FACTOR	25	SERVICE STATION	111	PRISON/JAIL
3	EXEMPT	I	STONE	AA	HIGHEST	27	OTHER/BOOTH	113	SPORTS ARENA
4	PUBLIC SERVICE	J	STONE & FRAME	A	HIGH		HOTELS/MOTELS	114	ROOMING HSE CONV
5	LIFE ESTATE	K	STONE & BRICK	B	ABOVE AVERAGE	28	HOTEL/MOTEL-FULL	210	PARKING DECK (PUB)
6	HOA	L	SGL FR SIDING	C	AVERAGE	29	HOTEL/MOTEL-LTD	340	TYPICAL OFFICE (NET)
		M	REINF CONCRETE	D	BELOW AVERAGE	30	MOTEL EXT STAY	360	MEDICAL OFFICE (GROSS)
				E	LOW	31	HOTEL HIGH-RISE		

QUALIFYING SALE FLAGS

A	QUALIFIED SINGLE PROPERTY SALE
C	QUALIFIED MULTI PROPERTY SALE
DISQUALIFYING SALE FLAGS	
D	THE INSTRUMENT RECORDED IS NOT A WARRANTY DEED (SUCH AS A DEED OF TRUST, RELEASE DEED, QUIT-CLAIM DEED, SHERIFF'S DEED, ETC.).
E	THE TRANSACTION IS BETWEEN PARTIES OF THE SAME FAMILY NAME, RELATIVES, OR WHERE CONSIDERATION STATES "FOR LOVE AND AFFECTION."
F	THE DEED CONVEYS AN UNSPECIFIED, UNDIVIDED, OR FRACTIONAL INTEREST IN PROPERTY.
G	THE DEED RESERVES UNTO THE GRANTOR A LIFE ESTATE, OR SOME OTHER INTEREST.
H	THE DEED RESERVES UNTO THE GRANTOR THE POSSESSION OF, OR LEASE OF, THE PROPERTY FOR A SPECIFIED PERIOD FOLLOWING THE SALE.
I	ONE OR BOTH OF THE PARTIES INVOLVED IN THE TRANSACTION IS GOVERNMENTAL, A PUBLIC UTILITY, OR A LENDING INSTITUTION.
J	THE DEED CONVEYS A CEMETERY LOT OR OTHER TAX EXEMPT PROPERTY.
K	ONE OR BOTH OF THE PARTIES INVOLVED IN THE TRANSACTION IS A CHURCH, SCHOOL, LODGE, OR SOME OTHER BENEVOLENT, EDUCATIONAL OR FRATERNAL ORGANIZATION.
L	THE TRANSACTION IS BETWEEN KNOWN AFFILIATED COMPANIES OR CORPORATIONS, SUCH AS A PARENT COMPANY AND A SUBSIDIARY, OR BETWEEN THE COMPANY AND ITS OFFICERS, PRINCIPLES, ETC.
N	THE TRANSACTION IS FOR MINERALS, TIMBER, ETC., OR THE RIGHTS TO MINE OR CUT SAME.
O	THE TRANSACTION INCLUDES THE CONVEYANCE OF PERSONAL PROPERTY, AND THE VALUE OF SUCH NOT SPECIFIED, SEPARATE FROM THE REAL PROPERTY VALUE IN THE DEED.
P	THE TRANSACTION IS THE RESULT OF A FORCED SALE.
R	THE TRANSACTION INVOLVES THE TRADE OR EXCHANGE OF REAL PROPERTY, OR A LOAN ASSUMPTION.
S	SALES FOR WHICH THE IMPROVEMENTS SOLD ARE NOT INCLUDED IN THE TAX ASSESSMENT OR THE ASSESSMENT INCLUDED IMPROVEMENTS BUILT AFTER THE SALE.
T	OTHER
U	A REVOCABLE TRUST (IN WHICH THE GRANTOR RESERVES THE RIGHT TO REVOKE THE TRUST AT ANY TIME) OR AN IRREVOCABLE TRUST (IN WHICH THE TRUST MAY NOT BE REVOKED AFTER ITS CREATION) – BOTH ARE ENCUMBERED.
V	LAND SPLIT OCCURRING AFTER SALE.

3. CAMPO 2040 Metropolitan Transportation Plan

- Executive Summary

1. Executive Summary

Transportation investments link people to the places where they work, learn, shop and play, and provide critical connections between businesses and their labor markets, suppliers and customers.

This document contains the 2040 Metropolitan Transportation Plans (MTPs) for the two organizations charged with transportation decision-making in the Research Triangle Region: the Capital Area Metropolitan Planning Organization (CAMPO) and the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC MPO). These organizations, and the areas for which they are responsible, are commonly called “MPOs.”

The Metropolitan Transportation Plans are the guiding documents for future investments in roads, transit services, bicycle and pedestrian facilities and related transportation activities and services to match the growth expected in the Research Triangle Region.

The areas covered by this plan are part of a larger economic region. Transportation investments should consider the mobility needs of this larger region and links to the other large metro regions of North Carolina and throughout the Southeast. The Triangle Region is expected to accommodate a phenomenal amount of future growth; we need to plan for the region we will become, not just the region we are today.

<i>Estimated 2010 and Forecast 2040 Population and Jobs</i>	2010		2040		2010 to 2040 Growth	
	Population	Jobs	Population	Jobs	Population	Jobs
Capital Area MPO	1,060,000	530,000	1,990,000	840,000	930,000	310,000
Durham-Chapel Hill-Carrboro MPO	400,000	260,000	630,000	430,000	230,000	170,000
Areas outside MPO boundaries	160,000	60,000	310,000	100,000	150,000	40,000
Total for area covered by the region’s transportation model	1,620,000	850,000	2,930,000	1,370,000	1,310,000	520,000

The Triangle has historically been one of the nation’s most sprawling regions and current forecasts project both continued outward growth and infill development in selected locations, most notably in the central parts of Raleigh, Durham and Chapel Hill and at community-defined activity centers like the planned mixed use center within the Research Triangle Park. A key challenge for our transportation plans is to match our vision for how our communities should grow with the transportation investments to support this growth.

No region has been able to “build its way” out of congestion; an important challenge for our transportation plans is to provide travel choices that allow people to avoid congestion where we can not prevent it.

Our population is changing. The population is aging, more households will be composed of single-person and two-person households without children, the number of households without cars is increasing, and more people are interested in living in more compact neighborhoods with a mix of activities. Our plans must provide mobility choices for our changing needs.

Our MPOs are tied together by very strong travel patterns between them; our largest commute pattern and heaviest travel volumes occur at the intersection of the MPO boundaries. Our MPO plans should recognize the mobility needs of residents and businesses that transcend our MPO borders.

The region has a common vision of what it wants its transportation system to be:

a seamless integration of transportation services that offer a range of travel choices to support economic development and are compatible with the character and development of our communities, sensitive to the environment, improve quality of life and are safe and accessible for all.



Each MPO has adopted goals and objectives to accomplish this vision that reflect the unique characteristics and aspirations of the communities within the MPOs. The *2040 Transportation Plan* commits our region to transportation services and patterns of development that contribute to a more sustainable place where people can successfully pursue their daily activities.

To analyze our transportation investment choices we have, the MPOs followed a painstaking process involving significant public engagement. It began with an understanding of how our communities' plans envision guiding future growth. Community plans anticipate that five regional activity centers in Raleigh, Durham, Cary, Chapel Hill and the Research Triangle Park are expected to contain large concentrations of employment and/or intense mixes of homes, workplaces, shops, medical centers, higher education institutions, visitor destinations and entertainment venues. Linking these activity centers to one another, and connecting them with communities throughout the region by a variety of travel modes can afford expanded opportunities for people to have choices about where they live, work, learn and play.



Next, planners used sophisticated software to forecast the types, locations and amounts of future population and job growth based on market conditions and trends, factors that influence development and local plans.



Based on the forecasts, we looked at mobility trends and needs, and where our transportation system may become deficient in meeting these needs.

Working with a variety of partners and based on public input, we developed different transportation system alternatives and analyzed their performance, comparing the performance of system alternatives against one another and to performance targets derived from our goals and objectives.

The result of this analysis and extensive public engagement was a set of planned investments, along with recommended land use development to match the investments and additional studies to ensure that the investments are carefully designed and effectively implemented. The core of the plan is the set of transportation investments described in Section 7, including:

- New and expanded roads;
- Local and regional transit facilities and services, including bus and rail;
- Aviation and long-distance rail services;
- Bicycle and pedestrian facilities, both independent projects and in concert with road projects;
- Transportation Demand Management: marketing and outreach efforts that increase the use of alternatives to driving alone;
- Intelligent Transportation Services: the use of advanced technology to make transit and road investments more effective; and
- Transportation Systems Management: road projects that improve safety and traffic flow without adding new capacity.

In addition to these investments, the plan includes a focus on three issues where the ties between development and our transportation investments are most critical: transit station area development, major roadway access management and “complete streets” whose designs are sensitive to the neighborhoods of which they are a part. The two MPOs will work with their member communities, the state and regional organizations on these three issues to match land use decisions with transportation investments.

The maps on the following pages show roadway and transit investments that are planned; Section 7 of the Plan provides greater detail. The plan anticipates that the region will match its historic focus on roads with a sustained commitment to high-quality transit service as well, emphasizing three critical components:

- Greatly expanded local and regional bus service to provide service in and between communities throughout the region;
- Rail transit service to link our regional centers to one another and to walkable, mixed-use neighborhoods along heavily-travelled corridors; and
- Frequent, high quality transit circulator service to extend the reach of regional bus and rail services within key centers.




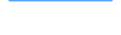

Although the plan includes a new emphasis on transit investment, it envisions significant additional roadway investment as well; major road projects are shown below and all projects are listed in Appendix 1.

Durham Chapel Hill-Carrboro MPO		
2011-20	2021-30	2031-40
Triangle Expressway extension of the Durham Freeway (I-40 to NC 540)	Managed lanes added to I-40 from Wade Avenue (Wake County) to NC 147 (Durham Freeway)	Managed lanes added to I-40 from NC 147 (Durham Freeway) to US 15-501 (Durham County)
East End Connector completed linking US 70 to NC 147 (Durham Freeway)	I-85 widening (I-40 to Lawrence Rd)	I-85 widening (Lawrence Rd to Durham County)
I-40 widening (US 15-501 to I-85)	I-85 widening (US 70 to Red Mill Road)	US 15-501 freeway conversion (I-40 to US 15-501 bypass)
	US 70 freeway conversion (Lynn Road to Wake County line)	Northern Durham Parkway (Aviation Pkwy to US 501)
Capital Area MPO		
2011-20	2021-30	2031-40
I-40 widened from Wade Ave. to Lake Wheeler Road	I-40 widened from I-440 to NC 42 in Johnston County	NC 50 widened from I-540 to Dove Road
I-40 widening through Cary	US 1 upgrade to freeway from I-540 to NC 98	Managed lanes added to I-540 (Northern Wake Expressway) from I-40 to US 64 bypass
US 401 widened from I-540 to Louisburg with a Rolesville bypass	NC 540 completed as a toll road from Holly Springs to US 64 bypass	US 401 widened from Garner to Fuquay-Varina
NC 540 completed as a toll road from Apex to Holly Springs	I-440 widened from Wade Avenue to Crossroads	Managed lanes added to I-40 from MPO boundary in Johnston County to Cornwallis Road
Brier Creek & TW Alexander Drive Interchanges on US 70	NC 54 widened through Cary and Morrisville	US 1 widening south from US 64 to NC 540
NC 42 widening from US 70 to Rocky Branch Road	I-40 Managed lanes added from Durham County line to Cornwallis Rd.	




2040 Metropolitan Transportation Plan

February 28, 2013




Roadway Improvements

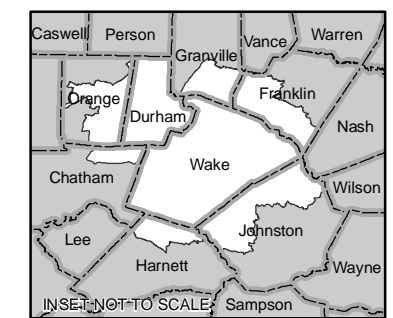
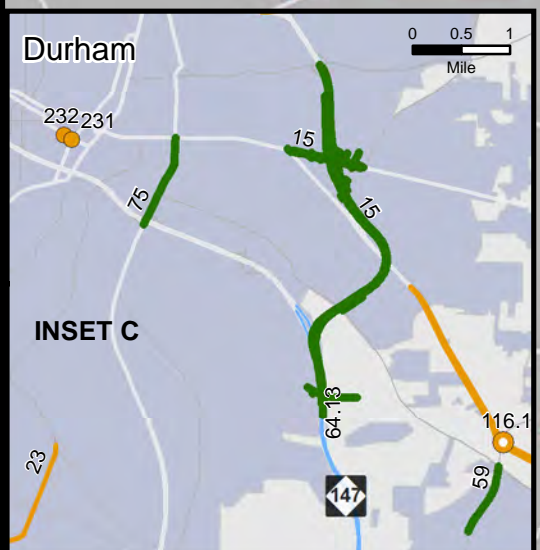
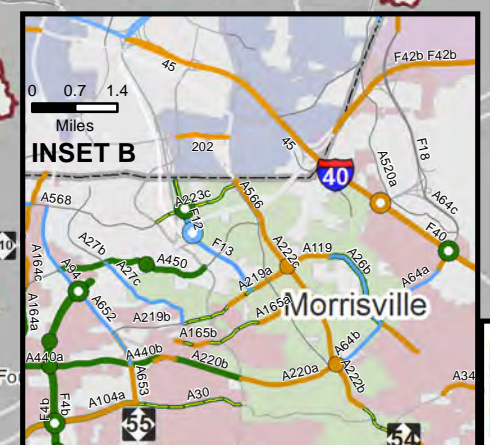
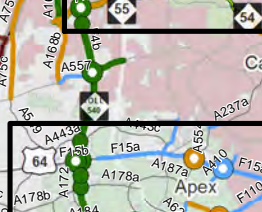
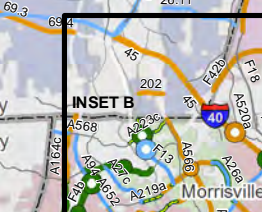
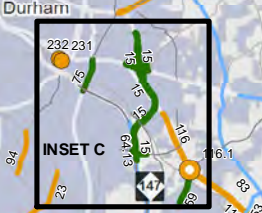
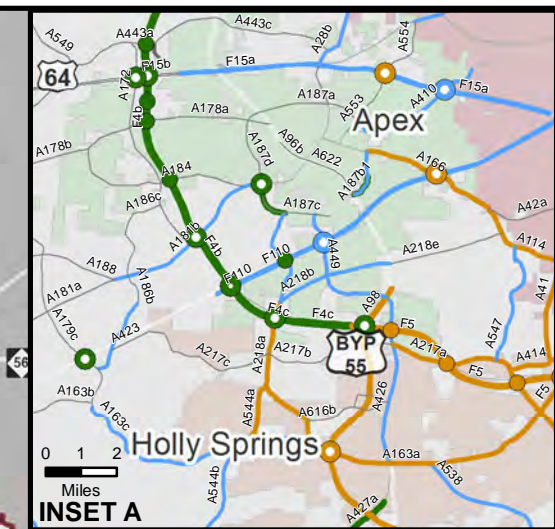
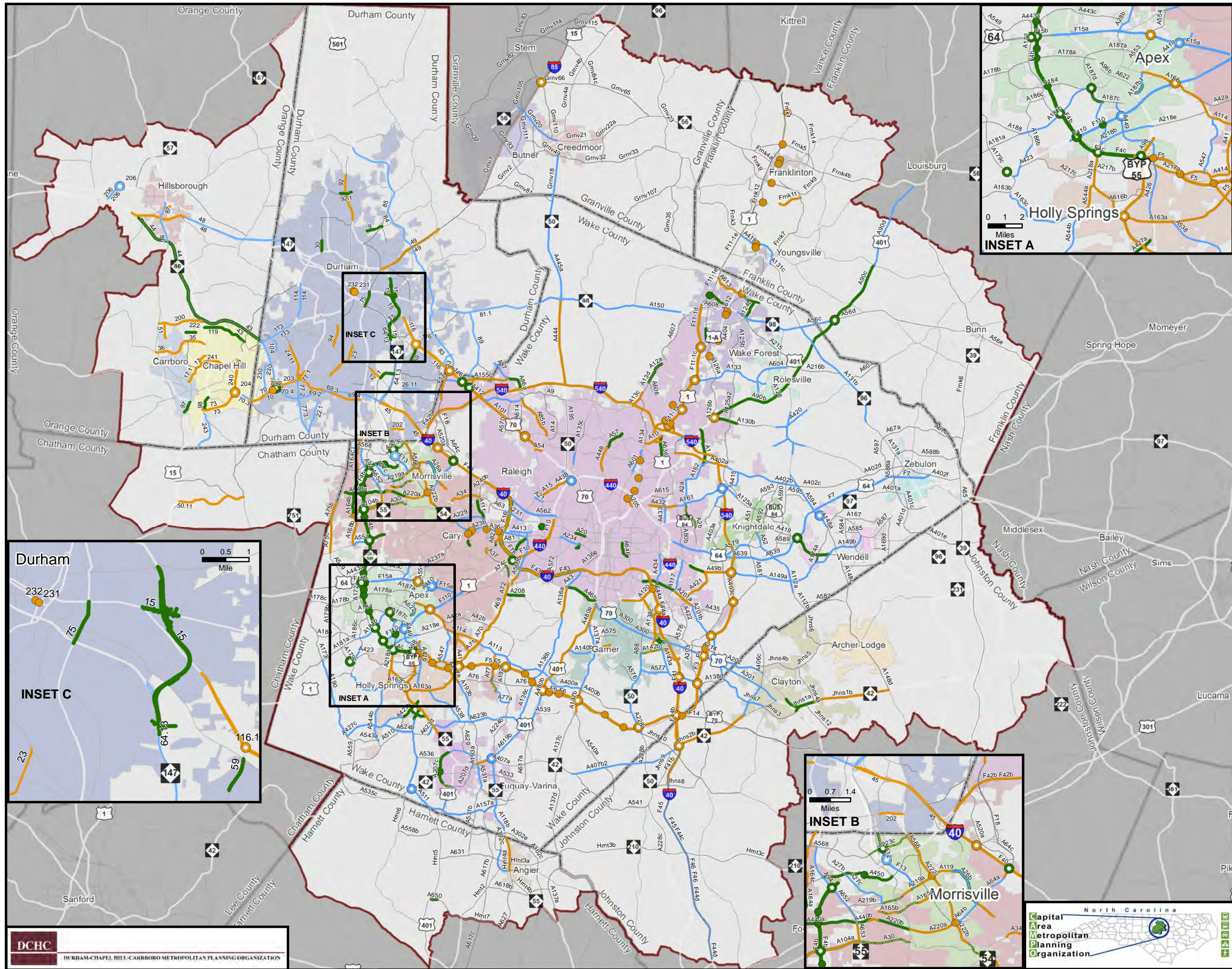
-  Completed 2020 Projects
-  2020
-  2030
-  2040
-  CTP

Interchanges

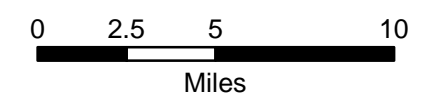
-  2020
-  2030
-  2040

Grade Separations

-  2020
-  2030
-  2040








This map was compiled using the best available data, however, the Capital Area MPO is not responsible for errors, omissions, and/or misuse. Subject to change.



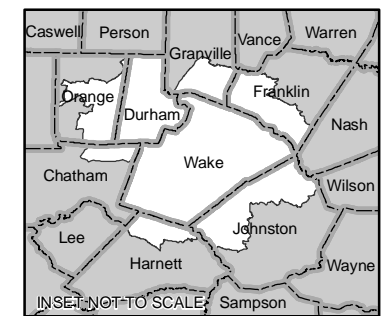
2040 Metropolitan Transportation Plan

February 20, 2013

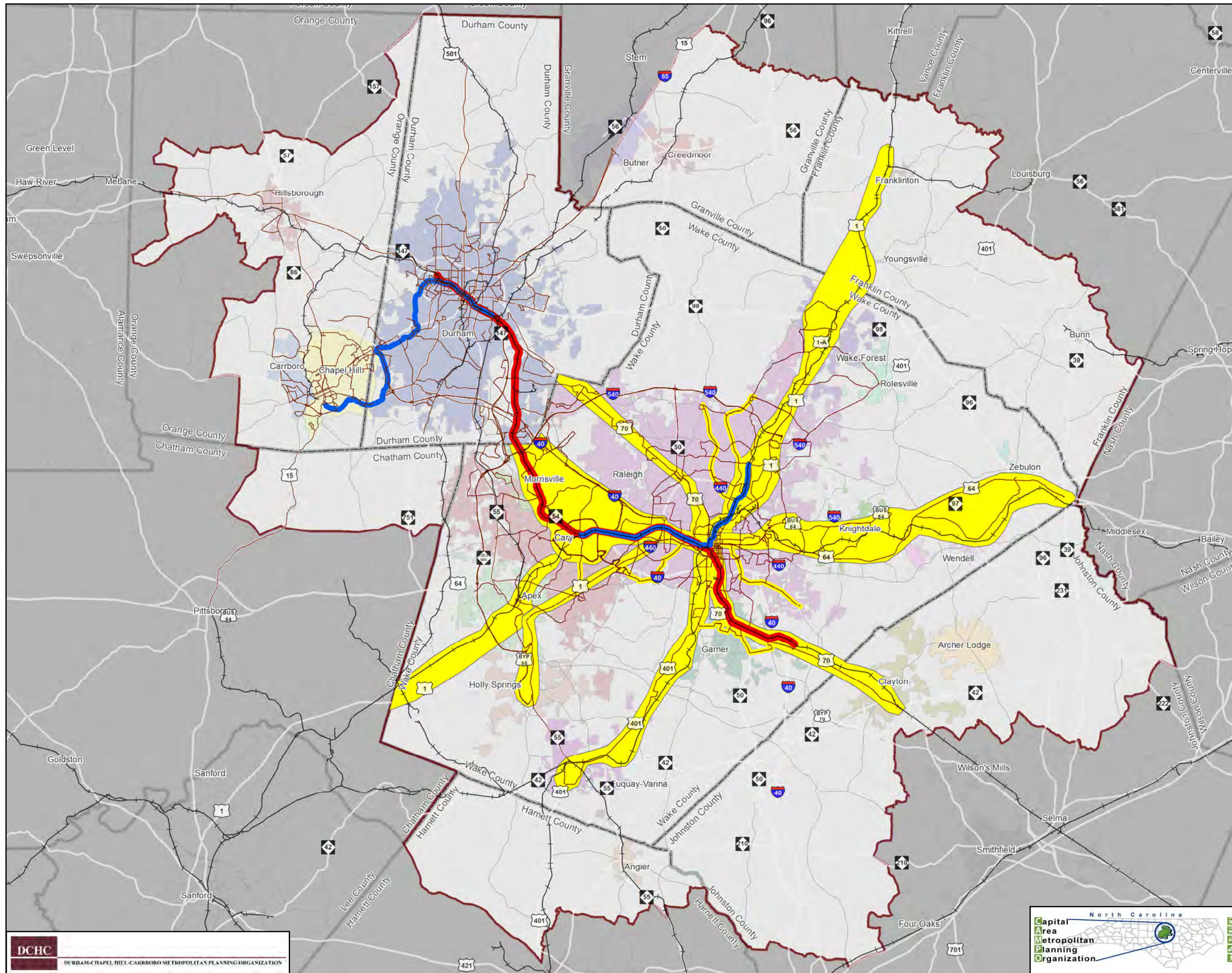
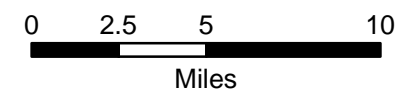
Preliminary Preferred Alternative

-  Light Rail
-  Commuter Rail
-  Premium Transit Study Corridors
-  NC Railroads
-  Triangle Region Bus Routes

*Routes are subject to change based on further study for service optimization.



This map was compiled using the best available data, however, the Capital Area MPO is not responsible for errors, omissions, and/or misuse. Subject to change.



4. UDO

- Open Space
- Density Bonuses
- Stormwater
- Erosion & Sediment Control
- Buffers
- Tree Protection
- Flood Hazard
- Zoning Overlay District

Article 5. Lot and Building Standards

Part 1 Residential Districts

5-10 General

Residential development must comply with the conventional development standards of Sec. 5-11 or the cluster or open space development standards of 5-12.

5-11 Conventional Development

5-11-1 Residential Watershed Districts

The following standards apply in the residential watershed districts unless otherwise expressly stated. Special standards apply, for example, to approved cluster or open space developments, attached houses and lot line houses. See Part 3 of this article [p. 5-11] for rules governing measurement of and exceptions to these standards.

	R-80W	R-40W
Maximum Density (units/acre)	0.50	1.00
Minimum Lot Area per Dwelling Unit [1](square feet)	80,000	40,000
Minimum Lot Width (feet)	150	110
Minimum Lot Frontage (feet)	30	30
Minimum Required Setbacks (feet)		
Front and Corner	40	30
Side	20	15
Rear	30	30
Maximum Impervious Coverage (% of lot)		
Residential Development [1] [2] [3]	30	30
Nonresidential Development [1] [2] [3]	6	12 [4]
Maximum Building Height (feet)	35	35

[1] In some cases, more restrictive standards may apply to lots within the Swift Creek, Little River and Smith Creek Water Supply Watersheds. See Article 11.Part 3.

[2] Lots created after 7/01/2001 are subject to Wake County stormwater management regulations.

[3] Nitrogen export check required and is limited to 3.6 lbs./ac./yr. without best management practices or payments made to the N.C. Ecosystem Enhancement Program. Does not apply to nonresidential development in R-80W and R-40W districts.

[4] Limit may be increased to 24% provided that first ½" of rainfall runoff is retained.

[Amended on 6/4/2012 by OA 02-12.]

5-11-2 Non-Watershed Residential Districts

The following standards apply in the non-watershed residential watershed districts unless otherwise expressly stated. Special standards apply, for example, to approved cluster or open space developments, attached houses and lot line houses. See Part 3 of this article [p. 5-11] for rules governing measurement of and exceptions to these standards.

	R-80	R-40	R-30	R-20	R-15	R-10	R-5	HD	RHC
Minimum Lot Area per Dwelling Unit [1] (square feet)	80,000	40,000	30,000	20,000	15,000	10,000	5,000	30,000	30,000
Minimum Lot Width (feet)	150	110	95	75	65	55	55	95	95
Minimum Lot Frontage (feet)	30	30	30	30	30	30	30	30	30
Minimum Required Setbacks (feet)									
Front and Corner	40	30	30	30	20	20	20	30	30
Side	20	15	10	10	10	10	10	10	10

Article 5 Lot and Building Standards

5-12 Cluster and Open Space Development

	R-80	R-40	R-30	R-20	R-15	R-10	R-5	HD	RHC
Rear	30	30	30	30	30	30	30	30	30
Maximum Impervious Coverage (% of lot)									
Residential Development [1] [2] [3]	30	30	30	30	30	30	30	30	30
Nonresidential Development [1] [2] [3] [5]	30	30	30	30	30	30	30	30	30
Maximum Building Height (feet)	35	35	35	35	35	35	[4]	35	35
Minimum Building Separation (feet)	NA	NA	NA	NA	NA	NA	20	NA	NA

[1] In some cases, more restrictive standards may apply to lots within the Swift Creek, Little River and Smith Creek Water Supply Watersheds. See Article 11.Part 3.

[2] Lots created after 7/01/2001 are subject to Wake County stormwater management regulations.

[3] Nitrogen export check required and is limited to 3.6 lbs./ac./yr. without best management practices or payments made to the N.C. Ecosystem Enhancement Program. Does not apply to nonresidential development in R-80W and R-40W districts.

[4] Maximum height in R-5 = 35 feet or 1 foot of building height for each 3 feet that the building is set back from front, side and rear property lines, whichever allows the greater height.

[5] Nonresidential Development in HD may exceed 30 percent maximum impervious. See 3-23-5(A)(2).

Commentary: At the time of subdivision plat review, Wake County's Department of Environmental Services will review subdivisions for compliance with impervious surface coverage limitation. This review will be based on the total impervious surface coverage of the subdivision as a whole, as opposed to the impervious cover on individual lots. Stormwater management devices will be required if the subdivision as a whole exceeds 15% impervious cover.

[Amended on 1/22/2008 by OA 04-07.]

5-12 Cluster and Open Space Development

5-12-1 Purpose

The regulations of this section are intended to encourage subdivision design that is more efficient and provides greater protection of open space and natural resources than conventional subdivision designs. Cluster and open space subdivision designs allow more compact and less costly networks of roads and utilities. They also help reduce stormwater run-off and non-point source pollutant loading rates and may help to preserve an area's rural character. Cluster and open space subdivisions are intended to encourage the provision of needed open space and recreational amenities for residents, while also helping to retain an area's character and preserve natural, environmentally sensitive and historic resources.

5-12-2 General Description

- (A) The cluster and open space development standards of this section require that a specified portion of each subdivision be set aside and permanently preserved as open space. The primary difference between cluster developments and open space developments is the amount of open space that must be preserved. Cluster developments are required to set aside a modest amount of open space, while open space developments are required to set aside a far greater amount.
- (B) The required open space area within cluster or open space developments can be used to provide recreational opportunities for the subdivision's residents, to conserve and protect significant natural resources, or to conserve productive farming and forestry uses.

5-12-3 Minimum Subdivision Site Size

(A) Cluster Development

The minimum required land area for a cluster development is 10 acres.

Article 5 Lot and Building Standards

5-12 Cluster and Open Space Development

(B) Open Space Development

The minimum required land area for an open space development is 25 acres.

5-12-4 Minimum Open Space

(A) Cluster Development

- (1) At least 10% of the land area within a cluster development must be set aside and permanently preserved as open space if the development is located within an Urban Services Area or Urban Services Area/Water Supply Watershed.
- (2) Cluster developments located in a Non-Urban Area, and Non-Urban Area/Water Supply Watershed must set aside and permanently preserve at least 25% of the subdivision's total land area as open space.

(B) Open Space Development

- (1) At least 30% of the land area within an open space development must be set aside and permanently preserved as open space if the development is located within an Urban Services Area or Urban Services Area/Water Supply Watershed.
- (2) Open space developments located within Non-Urban Services Areas or Non-Urban Services Areas/Water Supply Watershed must set aside and permanently preserve at least 40% of the subdivision's total land area as open space.

[Amended on 8/1/2011 by OA 02-11.]

5-12-5 Density and Lot Size

(A) Cluster Development

The following density and lot size standards apply to all cluster developments. (See Part 3 of this article [p. 5-11] for rules governing measurement of and exceptions to these standards):

District	Cluster Development		
	Maximum Density (units/acre) [1]	Minimum Lot Size Area (square feet) [1] [2] [3]	Width (feet)
R-80W	0.50	40,000	110
R-80	0.50	40,000	110
R-40W	1.00	20,000	75
R-40	1.00	20,000	75
R-30	1.45	12,000	60
R-20	2.17	6,000	50
R-15	2.90	5,000	45
R-10	4.35	3,000	40
R-5	8.70	3,000	40
RHC	1.45	12,000	60
HD	1.45	12,000	60
GB	2.17	6,000	50
O&I	1.45	12,000	60

[1] More restrictive standards may apply to lots within the Swift Creek, Little River and Smith Creek Water Supply Watersheds. See Article 11.Part 3.

[2] Minimum lot area per dwelling unit. For example, duplex in R-80 district requires minimum lot area of 80,000 square feet.

Article 5 Lot and Building Standards

5-12 Cluster and Open Space Development

[3] Residential uses in the GB and O&I districts must comply with the requirements of the R-20 and the R-30 districts, respectively.

[Amended on 1/22/2008 by OA 04-07.]

(B) Open Space Development without Community Water and Wastewater Service

The following density and lot size standards apply to all open space developments that are not served by community water and sewer facilities. (See Part 3 of this article [p. 5-11] for rules governing measurement of and exceptions to these standards):

District	Open Space Development		
	Maximum Density (units/acre)	Minimum Lot Size	
		Area (square feet) [1] [2] [3]	Width (feet)
R-80W	0.50	30,000 if ≥40% open space	90
R-80	0.50	35,000 if ≥30% open space	90
		32,500 if ≥35% open space	
		30,000 if ≥40% open space	
R-40W	1.00	14,000 if ≥40% open space	60
R-40	1.00	16,000 if ≥30% open space	60
		15,000 if ≥35% open space	
		14,000 if ≥40% open space	
R-30	1.45	10,000 if ≥30% open space	50
		9,500 if ≥35% open space	
		9,000 if ≥40% open space	
R-20	2.17	6,000	50
R-15	2.90	5,000	45
R-10	4.35	3,000	40
R-5	8.70	3,000	40
RHC	1.45	10,000 if ≥30% open space	50
		9,500 if ≥35% open space	
		9,000 if ≥40% open space	
HD	1.45	10,000 if ≥ 30% open space	50
		9,500 if ≥ 35% open space	
		9,000 if ≥ 40% open space	
GB	2.17	6,000	50
O&I	1.45	10,000	50

[1] More restrictive standards may apply to lots within the Swift Creek, Little River and Smith Creek Water Supply Watersheds. See Article 11.Part 3.

[2] Minimum lot area per dwelling unit. For example, duplex in R-80W district requires minimum lot area of 60,000 square feet.

[3] Residential uses in the GB and O&I districts must comply with the requirements of the R-20 and the R-30 districts, respectively.

[Added a row for HD on 1/22/2008 by OA 04-07.]

(C) Open Space Development With Community Water and Wastewater Service

The following density and lot size standards apply to all open space developments that are served by community water and sewer facilities. (See Part 3 of this article [p. 5-11] for rules governing measurement of and exceptions to these standards):

District	Open Space Development		
	Maximum Density (units/acre)	Minimum Lot Size	
		Area (square feet) [1] [2] [3]	Width (feet)
R-80W	0.50	20,000	75
R-80	0.50	20,000	75

Article 5 Lot and Building Standards

5-12 Cluster and Open Space Development

District	Open Space Development		
	Maximum Density (units/acre)	Minimum Lot Size	
		Area (square feet) [1] [2] [3]	Width (feet)
R-40W	1.00	10,000	60
R-40	1.00	10,000	60
R-30	1.45	6,000	50
R-20	2.17	6,000	45
R-15	2.90	5,000	45
R-10	4.35	3,000	40
R-5	8.70	3,000	40
RHC	1.45	6,000	50
HD	1.45	6,000	50
GB	2.17	6,000	45
O&I	1.45	6,000	50

[1] More restrictive standards may apply to lots within the Swift Creek, Little River and Smith Creek Water Supply Watersheds. See Article 11.Part 3.

[2] Minimum lot area per dwelling unit. For example, duplex in R-80 district requires minimum lot area of 40,000 square feet.

[3] Residential uses in the GB and O&I districts must comply with the requirements of the R-20 and the R-30 districts, respectively.

[Added a row for HD on 1/22/2008 by OA 04-07.]

5-12-6 Additional Lot and Building Standards

The following additional lot and building standards apply to cluster and open space developments. (See Part 3 of this article [p. 5-11] for rules governing measurement of and exceptions to these standards):

	R-80W R-80	R-40W R-40	R-30	R-20	R-15	R-10	R-5	RHC	HD	GB	O&I
Minimum Lot Frontage (feet)	30	30	30	30	30	30	30	30	30	30	30
Min. Perimeter Setback (feet)[1]	30	30	30	30	30	30	30	30	30	30	30
Minimum Required Setbacks (ft)											
Cluster Subdivisions [2]											
Front	20	15	15	15	10	10	10	15	15	10	10
Corner	20	15	15	15	10	10	10	15	15	10	10
Side	10	7.5	5	5	5	5	5	5	5	5	5
Rear	15	15	15	15	15	15	15	15	15	15	15
Minimum Required Setbacks (ft)											
Open Space Subdivisions [2]											
Front	20	15	15	15	10	10	10	15	15	10	10
Corner	20	15	15	15	10	10	10	15	15	10	10
Side	10	7.5	5	5	5	5	5	5	5	5	5
Rear	15	15	15	15	15	15	15	15	15	15	15

[1] Minimum perimeter setback applies only around the perimeter of the cluster or open space subdivision. Minimum perimeter setback standards apply to principal buildings. No additional perimeter setback is required for cluster or open space subdivisions abutting other cluster or open space subdivisions that have already provided the required perimeter setback.

[2] Minimum required front yard and corner yard setbacks on a corner lot cannot be reduced.

OA 04/11 January 18, 2005

[Amended on 1/22/2008 by OA 04-07.]

[Amended on 6/4/2012 by OA 02-12.]

Article 5 Lot and Building Standards

5-12 Cluster and Open Space Development

5-12-7 General Requirements

(A) Maximum Density

- (1) The maximum number of dwelling units allowed within a cluster or open space development is equal to the site's total land area (developable area + open space) multiplied by the maximum density standard shown in Sec. 5-12-5.
- (2) If the cluster or open space development site (subdivision) is located in more than one zoning district, the maximum number of dwelling units allowed must be determined separately for each portion of the site lying within a different zoning district. Density may be transferred from one portion of the site to another, provided that such transfers do not result in an increase in the number of dwelling units allowed on the overall site.

(B) Lot Design

Each lot must be regularly shaped and meet or exceed the minimum lot area and lot width standards in this section. Side lot lines extending from a road must be approximately perpendicular or radial to the road's right-of-way boundary.

(C) Open Space

(1) Required Open Space

The amount of open space within a cluster or open space development must equal or exceed the minimum open space requirements of Sec. 5-12-4. Open space provided to meet minimum open space requirements must be in one or more parcels dedicated or otherwise protected as permanent, active or passive open space.

(2) Use, Location, and Design

- (a) Open space must be dedicated or reserved for one or more of the following uses:
 - i. conservation of, and avoidance of development in, any readily identifiable natural hazard areas, i.e., areas that potentially pose a significant hazard to people or property (e.g., designated floodways, other perennially wetlands, and lands whose slope and/or soils make them particularly susceptible to erosion when disturbed by development activities);
 - ii. conservation and protection of any identified significant natural areas (e.g., rare plant communities, important wildlife habitat) or other environmentally sensitive areas where development might threaten water quality or ecosystems (e.g., watershed buffers, groundwater recharge areas);
 - iii. conservation and protection of any identified important historic resources (e.g., homesteads, mills, barns, archeological sites);
 - iv. provision of active and/or passive outdoor recreation opportunities (e.g., ballfields, playgrounds, tennis courts, swimming pools, basketball courts, golf courses, bikeways, walking trails, nature trails, and picnic areas), either for the general public or for the subdivision's residents or

Article 5 Lot and Building Standards

5-12 Cluster and Open Space Development

employees and their guests (Note: this does not preclude a membership requirement or monetary charge for use of recreation facilities such as a golf, swim or tennis club, as long as subdivision residents or employees have an opportunity to join the club or pay to use club facilities; or

- v. retention of productive farmland or forestland for continued agricultural and/or forestry use.
- (b) Highest priority for the location, design, and use of open space must be given to conserving, and avoiding development in, any natural hazard areas on the subdivision site.
- (c) Open space may contain only such buildings, structures, accessways, and parking facilities as are necessary and accessory to its principal uses (e.g., pedestrian path, recreational club house, utility lines, driveway, small parking area, barns and other farm storage and processing facilities). Open space areas may be utilized for irrigation of reclaimed water meeting the standards set forth in 15A NCAC 02H .0219(k) of the North Carolina Administrative Code. Open space areas may not contain sewage treatment ponds that are utilized as the primary means of wastewater treatment or be utilized for irrigation of wastewater that does not meet reclaimed water standards as specified above.
- (d) Open space may contain individual water supply wells or subsurface sewage disposal fields serving dwelling units on adjacent lots, or community wells, provided they do not conflict with the principal uses of the open space. Open space areas may not contain sewage treatment ponds that are used as the primary means of treatment of wastewater and the spray application of wastewater that does not meet applicable water reuse standards.
- (e) The location, size, character, and shape of required open space must be appropriate to its intended use(s). (e.g., open space proposed to be used for recreation, particularly active recreation, should be located and designed so that it can be accessed conveniently and safely by intended users, and open space to be used for ballfields, playing fields, or other active recreational facilities should be located on land that is relatively flat and dry.)

(D) Open Space Dedication or Reservation

- (1) Subdivision occupants must be ensured direct access to and use of an amount of the subdivision's open space equal to a minimum of 10% of the area of the development site, by conveying that portion of open space to a property owners association or similar legal entity meeting the provisions of Sec. 8-23, or to a public agency or nonprofit organization that is organized for, capable of, and willing to accept responsibility for managing the open space for its intended purpose, and that will ensure subdivision occupants direct access to and use of the open space. Any other open space provided may be conveyed to such organizations as listed above or to any agency, organization, person, or other legal entity that is organized for, capable of, and willing to accept responsibility for managing the open space for its intended purpose, provided such conveyance is restricted to ensure continued maintenance and preservation of the open space.
- (2) Each dedicated or reserved open space parcel must be shown on all subdivision plans and on a record plat recorded with the Wake County Register of Deeds, with a

Article 5 Lot and Building Standards

5-12 Cluster and Open Space Development

notation of its area and its intended open space use (subparagraph 5-12-7(C)(2)). The owner of an open space parcel may re-dedicate or re-reserve the parcel for another open space use allowed under this subsection by recording a record plat showing the parcel and its new intended open space use.

(E) Maintenance

- (1) The owner of the open space is responsible for maintaining the open space so that it continues to effectively function for its intended use, and any dedication or conveyance of an open space parcel must provide for such responsibility.
- (2) Where the cluster or open space development is located within a R-40W, R-80W, WSO-2NC, WSO-3CA, WSO-3NC, or WSO-4P district, retention of undeveloped open space in a vegetated or natural state (as required in subsection 5-12-9) must be ensured by maintenance provisions filed with the Wake County Register of Deeds, either as part of recorded documentation providing for establishment of an appropriate legal entity (e.g. homeowners association, property owners association or land conservation organization) that is to be responsible for maintenance and control of open space (as provided for in Sec. 8-23), or in a maintenance agreement recorded with the property deeds.

5-12-8 Potential Future Development Sites

- (A) When a cluster or open space development is located within an Urban Services Area or Urban Services Area/Water Supply Watershed and the maximum allowed density under the site's current zoning is less than the density called for in the Land Use Plan, the cluster or open space development may contain one or more parcels designated as reserved for potential future development. Such a parcel does not count as part of the development's required open space or in calculating allowed density or impervious surface coverage.
- (B) A parcel reserved for potential future development may not be developed, other than for open space uses or as a community well or septic field site serving the cluster or open space development, until the development site, or part thereof, is rezoned to a classification allowing higher densities (so that the parcel's land area is no longer needed to maintain the subdivision's compliance with applicable density standards).

Commentary: The provisions of Sec. 5-12-8 support the Land Use Plan's Transitional Urban Development (TUD) policies by accommodating higher density urban development within short-range urban service areas.

5-12-9 Water Supply Watersheds

When a cluster or open space development is located within an R-40W, R-80W, WSO-2NC, WSO-3CA, WSO-3NC, or WSO-4P district, it must be designed so that:

- (A) lots and development sites are concentrated in upland areas and to the maximum extent practicable away from surface waters and drainageways, and the remainder of the site, i.e., undeveloped open space dedicated or reserved for one of the natural area conservation purposes authorized in 5-12-7(C)(2), is retained in a vegetated or natural state; and;
- (B) built-upon (impervious) areas are, to the maximum extent practicable, as approved by Wake County Environmental Services, sited and designed to minimize stormwater runoff impact to the watershed's receiving waters by minimizing concentrated stormwater flow, breaking up or disconnecting large areas of impervious surface into smaller areas, maximizing the use of sheet flow through vegetated areas, and maximizing the flow length

Article 5 Lot and Building Standards

5-14 Attached (single-family) Houses

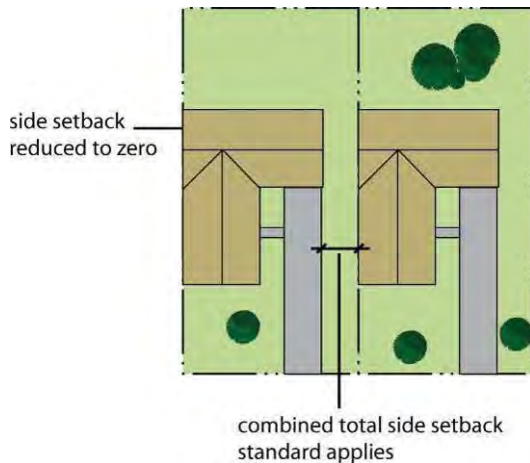
through vegetated areas. (See also Sec. 8-43 and subsection 8-32-18 for standards applicable in Water Supply Watersheds.)

5-13 Lot Line (single-family) Houses

5-13-1 Lot line houses are allowed in accordance with the use table of Sec. 4-11.

5-13-2 All lot line houses must comply with the lot and building standards that apply to the type of development (conventional, cluster or open space) in which such houses are located, except when those standards are expressly modified by the lot line house standards of this section.

5-13-3 The side setback on one side of a lot line house may be reduced to zero. The minimum setback on the other side of the lot must equal at least 2 times the side setback standard of Sec. 5-11.



5-13-4 Eaves and other building projections on the side of a house with a reduced setback may not project over the abutting lot line unless: (a) an easement for the projection is obtained from the abutting owner and recorded with the Wake County Register of Deeds and (b) such projections are located at least 9 feet above the ground.

5-13-5 When the exterior wall or eaves are set back less than 2 feet from the lot line, an easement must be obtained from the abutting owner and recorded with the Wake County Register of Deeds. The easement must ensure at least 2 feet of unobstructed space between the furthestmost projection of the structure (including the eave) and the edge of the easement. This provision is intended to ensure the ability to conduct maintenance and upkeep activities on the lot line house.

5-13-6 Windows or other openings that allow for visibility into the side yard of the adjacent lot are allowed on lot line houses pursuant to compliance with the building code.

5-13-7 Lot line houses must be determined at the time of subdivision.

[Amended on 7/21/2008 by OA 02-08.]

5-14 Attached (single-family) Houses

5-14-1 General

Attached (single-family) houses are allowed in accordance with the use table of Sec. 4-11.

(A) All attached houses must comply with the lot and building standards that apply to the type of development (conventional, cluster or open space) in which such houses are located, except when those standards are expressly modified by the attached house standards of this section.

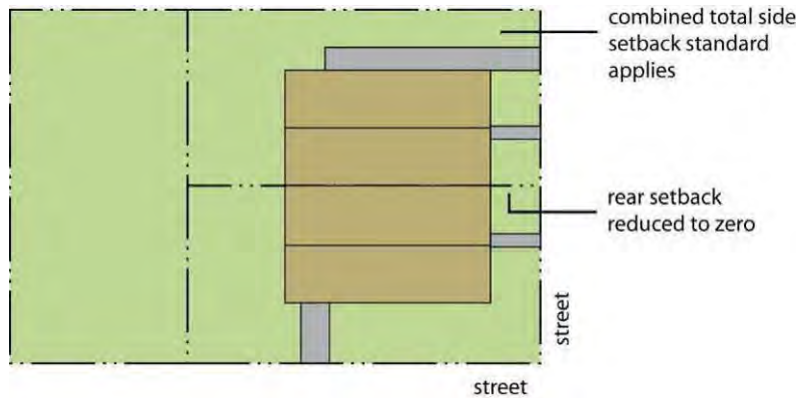
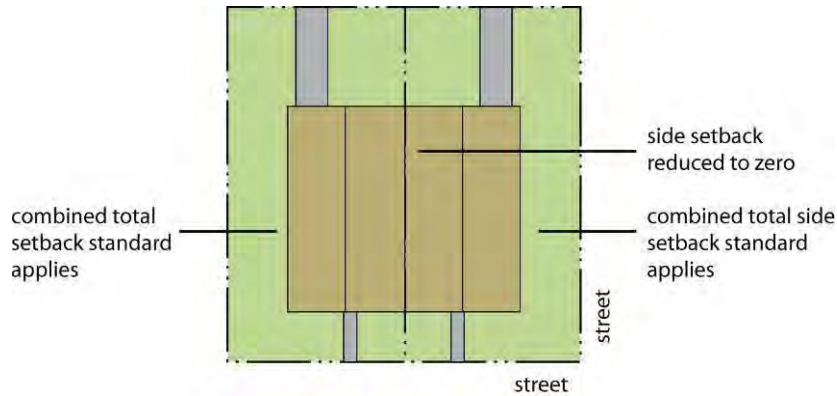
Article 5 Lot and Building Standards

5-14 Attached (single-family) Houses

- (B) The common or abutting wall between attached units must be shared for at least 50 percent of the length of each unit.
- (C) No side setback is required for common or abutting walls.



- (D) On corner lots, either the rear setback or side setback may be reduced to zero. However, the remaining side or rear setback must comply with the conventional development lot and building standards of Sec. 5-11.



- (E) The minimum side setback standard of Sec. 5-11 applies along the sides of the building that do not have common or abutting walls.

Article 5 Lot and Building Standards

5-30 Setbacks

5-14-2 Limitation on Number of Attached Units

When 3 or more units are attached, common access is required for access to rear-loaded parking area. Such access drives must be at least 12 feet wide if designed for one-way traffic and at least 20 feet wide if designed for two-way traffic.

Sections 5-15 through 5-19 are reserved for future use

Part 2 Nonresidential Districts

5-20 Conventional Development

The following standards apply to all lots other than those located in approved cluster or open space developments (See Part 3 of this article [p. 5-11] for rules governing measurement of and exceptions to these standards):

	O&I	GB	HC	I-1 and I-2
Minimum Lot Area (square feet) [1]	None			
Minimum Required Setbacks (feet)				
Front and Corner	40	50	50	50
Side	20	25; none when abutting railroad		25; none when abutting railroad
Rear	25	25; none when abutting railroad; 50 from right-of-way		25; none when abutting railroad; 50 from right-of-way
Maximum Impervious Coverage [1] [2] [3]	None			
Maximum Building Height (feet)	None			

[1] In some cases, more restrictive standards may apply to lots within the Swift Creek, Little River and Smith Creek Water Supply Watersheds. See Article 11.Part 3.

[2] Lots created after 7/01/2001 are subject to Wake County stormwater management regulations.

[3] Nitrogen export check required and is limited to 3.6 lbs./ac./yr. without best management practices or payments made to the N.C. Ecosystem Enhancement Program. Does not apply to nonresidential development in the R-80W and R-40W districts.

[Amended of 1/22/2008 by OA 04-07.]

Sections 5-21 through 5-29 are reserved for future use

Part 3 General Rules and Exceptions (in all districts)

5-30 Setbacks

The following setback standards and exceptions apply in all districts unless otherwise expressly stated.

5-30-1 General

Setbacks must be unobstructed from the ground to the sky except as expressly stated. Parking and driveways are allowed within required setbacks except where they conflict with required bufferyards or tree and vegetation protection zones. For definitions and illustrations of front, rear, side and corner setbacks, see Article 21.

5-30-2 Measurement from Ultimate Right-of-way

The minimum depth of a setback abutting a road must be measured from the edge of the ultimate right-of-way (as recommended in the *Transportation Plan*).

Article 5 Lot and Building Standards

5-30 Setbacks

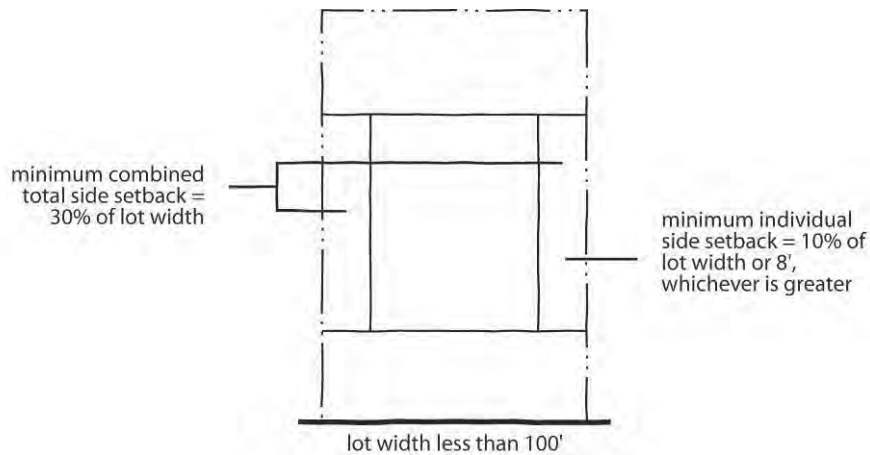
5-30-3 Features Allowed within Required Setbacks

In nonresidential districts, shelters such as canopies, awnings, and covered walkways, may be permitted in required setbacks up to half the width of the required setback, provided such structures in no way obstruct the line of sight along a thoroughfare. Features allowed within required setbacks are subject to applicable impervious surface limitations.

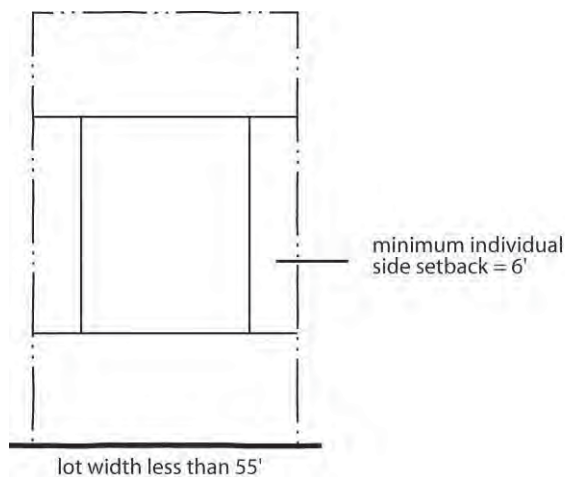
5-30-4 Side Setbacks on Narrow Lots

The following special side setback standards apply in residential districts to lots recorded in a plat or deed under one ownership on January 4, 1960:

- (A) On lots having an average width of less than 100 feet the combined total width of both side setbacks may be reduced to 30% of the lot width, and individual side setbacks may be reduced to 10% of the lot width or 8 feet, whichever is greater.



- (B) On lots having an average width of less than 55 feet, individual side setbacks may be reduced to 6 feet.



5-30-5 Setbacks on Irregularly Shaped Lots

(A) **Purpose**

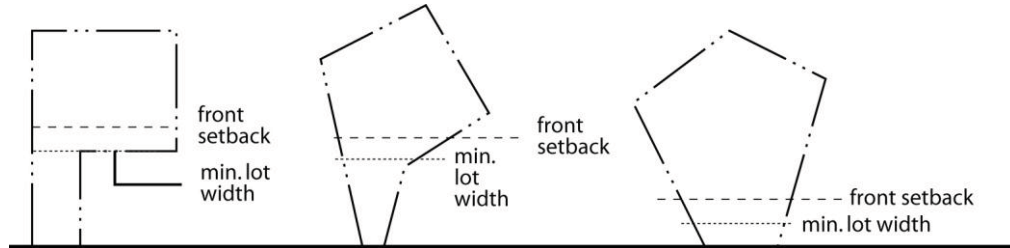
Required setback distances are generally based on rectangular lots. Nonrectangular lots, lots with 3 sides or more than 4 sides and other irregularly shaped lots require special measurement techniques to ensure proper separation between structures and lot lines.

Article 5 Lot and Building Standards

5-30 Setbacks

(B) Front Setbacks

Front setbacks must be measured from the front property line unless the front property line does not meet the minimum lot width standard (as is the case on a flag lot), in which case the front setback must be measured from a point on the lot, nearest the front line, that complies with the minimum lot width standard of the subject zoning district. The Planning Director is authorized to establish the front property line and/or the front setback line in cases of uncertainty.

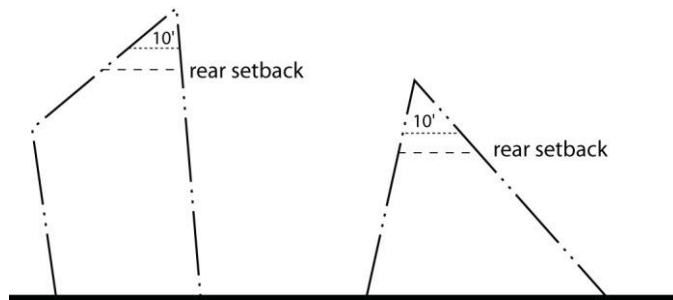


(C) Rear Setbacks

(1) On irregularly shaped lots, the rear setback is measured from an imaginary line that:

- (a) is within the lot;
- (b) is drawn at a point most distant from the front property line where the lot is 10 feet in width;
- (c) is parallel to the front property line; and
- (d) extends across the entire width of the lot.

(2) The Planning Director is authorized to establish the rear setback line in cases of uncertainty.

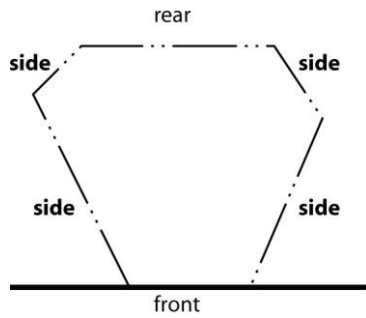


(D) Side Setbacks

All property lines that are not front or rear property lines will be considered side property lines for purposes of measuring setbacks. The Planning Director is authorized to establish the rear setback line in cases of uncertainty.

Article 5 Lot and Building Standards

5-40 Thoroughfare Density Credits



Part 4 Thoroughfare and School Density Credits

5-40 Thoroughfare Density Credits

5-40-1 Intent

It is the intent of this section to encourage applicants for development approval to reserve or dedicate those undeveloped areas needed for proposed major thoroughfares by providing them density credits on those portions of their land or other properties that will not be needed for major thoroughfare construction.

5-40-2 Standards for Provision of Density Credits

(A) Scope

This section may apply to any parcel of land abutting or intersected by a proposed major thoroughfare which has been resolved by the Wake County Board of Commissioners as having county- or region-wide impact because of its traffic-carrying capacity and effect on the major thoroughfare system. Density credits may be provided for any residential use in any residential district.

(B) Calculation of Density Credits

- (1) To the extent that an applicant for a density credit dedicates or reserves undeveloped land for a proposed major thoroughfare as designated by the Wake County Board of Commissioners, an applicant may apply for density credits. Density credits are to be determined by calculating twice the maximum number of residential units that could have been constructed in the reserved or dedicated area under the zoning regulations then in effect.
- (2) In cases where the specific alignment of the major thoroughfare has not been determined, County staff must request such a determination from North Carolina Department of Transportation (NCDOT). Should NCDOT fail to make a determination in a timely manner, the Wake County Administration may determine the alignment.

(C) Reservation or Dedication

As a condition to applying for density credits, the owner of land must:

- (1) Reserve land for the corridor which abuts or intersects the subject property and record in the office of the Wake County Register of Deeds sufficient legal documentation in the chain of title of the reserved land to evidence permanent alienation of development rights in that land; or

Article 5 Lot and Building Standards

5-41 School Density Credits

- (2) Dedicate land for the corridor that abuts or intersects the subject property to Wake County or the State of North Carolina, without any restrictions on its use.

5-40-3 Application of Density Credits

This density credit may be applied to increase the allowed density of any other land as provided herein.

- (A) Density credits may be applied to any tract of land located within the county's zoning jurisdiction, regardless of ownership, except land located within a water supply watershed.
- (B) In order to apply density credits to the same or different tracts, the application must be approved as a special use in accordance with the special use procedures Sec. 19-23.
- (C) By applying a density credit to a particular parcel, the owner or developer may increase the allowable density of uses by decreasing the size of the lot below that required in the district; however, in no case may density for the entire tract exceed 10,000 square feet per dwelling unit in all planning areas to which this subsection applies.
- (D) The owner of the density credits must apply for a special exception within 5 years of the date the land is reserved or dedicated. After this period, density credits become null and void.

5-40-4 Required Yards

The depth and width of all required yards and minimum lot widths may be reduced to correspond with those requirements for the zoning district with which the reduced lot size most closely complies. Should the development have lots sized between the minimum lot sizes of 2 districts, the requirements of the higher density district apply.

5-40-5 Maximum Lot Coverage Allowed

The maximum amount of a lot which may be covered with impervious surfaces after application of density credits may not exceed 50%.

5-41 School Density Credits

5-41-1 Intent

It is the intent of this section to encourage applicants for development approval to dedicate those undeveloped areas needed for proposed public school sites by providing them density credits on those portions of their land or other properties that will not be needed for major public school site construction.

5-41-2 Standards for Provision of Density Credits

(A) Scope

This section may apply to any parcel of land which is the proposed site of a school within the Wake County Public School System, as resolved by the Wake County Board of Education with the concurrence of the Wake County Board of Commissioners. Density credits may be provided for any residential use in any residential district.

(B) Calculation of Density Credits

To the extent that an applicant for a density credit dedicates undeveloped land for a proposed public school site as designated by the Wake County Board of Education, with

Article 5 Lot and Building Standards

5-41 School Density Credits

the concurrence of the Wake County Board of Commissioners, an applicant may apply for density credits. Density credits are to be determined by calculating twice the maximum number of residential units that could have been constructed in the dedicated area under the zoning regulations then in effect.

(C) Reservation or Dedication

As a condition to applying for density credits, the owner of land must dedicate land for the school site to the Wake County Board of Education, without any restriction on its use.

5-41-3 Application of Density Credits

This density credit may be applied to increase the allowed density of any other land as provided herein.

- (A)** Density credits may be applied to any tract of land located within the County's zoning jurisdiction regardless of ownership, except land located within a water supply watershed.
- (B)** In order to apply density credits to the same or different tracts, the application must be approved in accordance with the special use procedures of Sec. 19-23.
- (C)** By applying density credits to a particular parcel, the owner or developer may increase the allowable density of uses by decreasing the size of the lot below that required in the district; however, in no case may density for the entire tract exceed 12,000 square feet per dwelling unit in all planning areas to which this section applies.
- (D)** The owner of the density credits must apply for a special exception within 5 years of the date the land is dedicated. After this period, density credits become null and void.

5-41-4 Required Yards

The depth and width of all required yards and minimum lot widths may be reduced to correspond with those requirements for the zoning district with which the reduced lot size most closely complies. Should the development have lots sized between the minimum lot sizes of 2 districts, the requirements of the higher density district shall apply.

5-41-5 Maximum Lot Coverage Allowed

The maximum amount of a lot which may be covered with impervious surfaces after application of density credits shall not exceed 50%.

Article 6. Density Bonuses

Part 1 General

6-10 Review and Approval Procedure

Projects requesting density bonuses will be reviewed as part of the subdivision plat, special use, conditional use rezoning process, as applicable.

6-11 General Bonus Limits

Unless otherwise expressly stated, the bonuses listed in this article may be combined, provided that the total cumulative density bonus may not exceed the maximum density allowed in the underlying zoning district by more than 35%. Bonuses that are in direct conflict with the density guidelines of the Land Use Plan are prohibited.

6-12 No Guarantee of Density

The provisions of this article are not to be construed as guarantees of achievable density. Developments using density bonus provisions are subject to all other applicable regulations of this ordinance unless otherwise expressly stated. These other regulations or site-specific conditions may prevent full realization of a site's base or bonus density.

Commentary: The density bonus provisions of this article do not permit transfer of development rights. Density bonuses may only be used on the site that qualifies for bonus density. Density may not be transferred from the subject site to other sites.

6-13 No Transfer of Density

The density bonuses achieved under this article may be used only on the site for which the bonus was granted. Bonus density may not be transferred from the subject site to other sites.

Part 2 Available Bonuses

6-20 Joint Platting

In order to encourage integrated planning of adjoining subdivisions, a density bonus of 10% will be granted when subdivision applications are submitted jointly for two or more adjoining parcels. The following criteria must be met to qualify for this bonus:

- 6-20-1 the subdivisions must include an integrated circulation and access pattern covering all parcels;
- 6-20-2 each subdivision plat must cover a minimum land area of 25 acres; and
- 6-20-3 the parcels to be subdivided must have been in separate ownership for at least 24 consecutive months immediately prior to application filing.

6-21 Workforce Housing

6-21-1 Purpose

The density bonus for workforce housing is intended to encourage the provision of housing that serves the region's workforce.

Article 6 Density Bonuses

6-21 Workforce Housing

6-21-2 Bonuses

The following density bonuses will be granted to developments in which the developer commits to restricting housing rental or sales prices to the following levels:

- (A) One extra dwelling unit is allowed for each 4 rental units restricted to occupancy by households with incomes of less than 50% of the Wake County median income, as determined by the U.S. Department of Housing and Urban Development (HUD); and
- (B) One extra dwelling unit is allowed for each 4 sales (ownership) units restricted to occupancy by households with incomes of less than 80% of the Wake County median income, as determined by the U.S. Department of Housing and Urban Development (HUD).

6-21-3 Combination with County Financial Incentives

Workforce housing density bonuses are not allowed for housing units that receive direct financial assistance or subsidies from Wake County.

6-21-4 Rental Contracts

Approval of any plans or plats that include bonus density for providing rental workforce housing units may not occur until there is a contract between the property owner and Wake County, which must be binding on future owners of the designated workforce housing lots. The contract must be administered by the Housing and Community Revitalization Division of the Wake County Human Services Department, and include at least the following provisions:

- (A) All rentals must be approved by the Housing and Community Revitalization Division of the Wake County Human Services Department to ensure occupancy by qualifying households in accordance with the following eligibility criteria:
 - (1) Family income at the time of occupancy may not exceed the limits set forth in Sec. 6-21-2. Families whose income increases above the eligibility requirements may continue to occupy the rental unit, unless otherwise required through terms of the lease.
 - (2) At least one member of a qualifying household must have lived or worked in Wake County for the past 12 months.
- (B) The contract must apply to each of the designated workforce housing units, and continue to affect a particular unit for a minimum period of 15 years after the initial rental of that unit.
- (C) Every change in occupancy during the 15-year term of the contract must be approved by the Housing and Community Revitalization Division of the Wake County Human Services Department to assure continued compliance with eligibility criteria.
- (D) The maximum rent allowed must be computed by multiplying the applicable percentage of median income by HUD's reported Wake County median income at the time of the transaction, then multiplying the resulting value by the maximum percentage of income spent for housing, as recommended by the mortgage banking industry. The value for median income used in calculating maximum allowable rent must be adjusted to reflect the maximum family size appropriate for the number of bedrooms, as determined by the Housing and Community Revitalization Division of the Wake County Human Services Department.

Article 6 Density Bonuses

6-22 Activity Center Design

6-21-5 Sales Contracts

Approval of any plans or plats that include bonus density for providing “for-sale” workforce housing units may not occur until there is a contract between the property owner and Wake County, which must be binding on future owners of the designated workforce housing lots. The contract must be administered by the Housing and Community Revitalization Division of the Wake County Human Services Department, and include at least the following provisions:

- (A) All sales and resales must be approved by the Housing and Community Revitalization Division of the Wake County Human Services Department to ensure ownership by qualifying buyers in accordance with the following eligibility criteria:
 - (1) Family income at the time of purchase may not exceed the limits set forth in Sec. 6-21-2.
 - (2) At least one member of a qualifying household must have lived or worked in Wake County for the past 12 months.
- (B) The contract must apply to each of the designated workforce housing lots, and continue to affect a particular lot for a minimum period of 15 years after the initial sale of that lot.
- (C) Designated workforce housing units may not be occupied prior to their sale to a qualifying buyer.
- (D) The contract must include a schedule by which construction and sale of the reserved units will be accomplished.
- (E) The resale price of any designated workforce housing unit may not, at any time during the life of the contract, exceed maximum sale or resale prices established by the Housing and Community Revitalization Division of the Wake County Human Services Department, in accordance with HUD income guidelines, which take into account interest rates, percentage of annual income allowed for housing, and amount of down payment among other factors.
- (F) Designated workforce housing units must be identified on the record plat.

6-22 Activity Center Design

- 6-22-1 Mixed-use projects (developments that include residential and nonresidential land uses) within designated activity center locations are eligible for density bonuses of up to 20%, subject to compliance with the standards of this section.
- 6-22-2 Projects for which activity center design density bonuses are requested must be located with a mixed-use district and reviewed and approved as a mixed-use development, in accordance with Sec. 3-53.
- 6-22-3 In order to approve requested density bonuses, review and approval bodies must determine that the proposed project complies with the activity center guidelines from Chapter III of the Wake County Land Use Plan. This determination must be based on whether the project is in strict compliance with the following plan guidelines:
 - (A) Proper access to thoroughfares;
 - (B) Connectivity;
 - (C) Building architecture and materials;

- (D) Signs; and
- (E) Activity center size and spacing.

6-23 Open Space Preservation

Developments that set aside more than 65% of a subdivision's total land area as permanent open space will receive a 20% density bonus. In order to receive this density bonus, the subdivision must be more than 25 acres in area and all lots within the subdivision must be served by a community wastewater system or municipal sewer.

OA 05-01 June 6, 2005

Article 9. Stormwater Management

Part 1 General Provisions

9-10 Purpose

The stormwater management regulations of this article establish minimum requirements to address adverse effects of stormwater runoff associated with new development. Proper management of stormwater runoff will protect property, control stream channel erosion, reduce flooding, protect floodplains, wetlands, water resources, riparian and aquatic ecosystems, and otherwise provide for environmentally sound use of the county's natural resources.

9-11 Scope

Except as otherwise expressly stated, the stormwater management regulations of this article apply to all development within unincorporated Wake County outside the extraterritorial jurisdiction and incorporated boundaries of any municipality.

9-12 Exemptions

The stormwater management regulations of this article do not apply to any of the following development activities:

- 9-12-1 Agriculture, forestry, or mining.
- 9-12-2 Office, institutional, commercial, or industrial development that disturbs a land area of one-half acre or less.
- 9-12-3 Any development in which the owner has accrued a vested right. Wake County recognizes a vested right if either of the following occurred:
 - (A) A subdivision plan, site plan, or development permit was officially approved by Wake County or the State before August 13, 2006 and that plan or permit remains unexpired.
 - (B) The landowner otherwise demonstrates a vested right has accrued under North Carolina Law.

Part 2 Standards for Managing Stormwater Runoff

9-20 Maximum Curve Number after Development

Developers must manage residential runoff so that after development the site will not exceed the following curve numbers, in accordance with procedures specified in the United States Department of Agriculture, Natural Resource Conservation Service, Technical Release 55, Urban Hydrology for Small Watersheds.

Zoning District	Maximum Composite Curve Number, By Soil Group			
	A	B	C	D
R-80W and R-80	37	60	73	79
R-40W and R-40	41	62	75	80
R-30, R-20, R-15, R-10, R-5, Residential Highway, Highway District, General Business and Office and Institutional	43	63	76	81

[Amended on 1/22/2008 by OA 04-07.]

9-20-1 Precipitation Depth

Calculations must be based on a precipitation depth of 3 inches over a 24-hour period.

9-20-2 Draw-down Period

Stored water must be drained over a period of not less than 2 days or more than 5 days.

9-20-3 Option for Minor Subdivisions

Developers of residential minor subdivisions have the option of meeting the standards in Sec. 9-20 or limiting the proposed subdivision's impervious surfaces to a maximum of 15%.

9-20-4 Stormwater Credits

(A) Purpose

The purpose of establishing a stormwater credit system is to provide incentives to implement better site design and locate new development in a manner that causes less impact to aquatic resources. Certain development practices reduce the generation of stormwater from the site; thereby reducing the size and cost of stormwater storage. In addition these practices can provide partial removal of many pollutants. The credit system directly translates into cost savings and better protection of water resources.

(B) Disconnected Impervious Surfaces

Disconnected rooftops and other disconnected impervious surfaces are encouraged. Runoff from these disconnected surfaces must be spread over pervious areas as sheet flow. As a credit, these disconnected impervious surfaces will be assigned the lower curve number specified by procedures of the United States Department of Agriculture, Natural Resource Conservation Service, Technical Release 55, *Urban Hydrology for Small Watersheds*.

(C) Reforestation

The planting of trees/shrubs is encouraged as a means of reducing runoff. As credit for such practices, reforested areas will be assigned the curve number for woods in good condition per procedures in the United States Department of Agriculture, Natural Resource Conservation Service, Technical Release 55, *Urban Hydrology for Small Watersheds*. Areas planted with trees/shrubs must meet the following standards to qualify for the credit.

(1) Tree/shrub Density and Spacing

Planted trees or shrubs must meet the minimum density and spacing standards of the USDA, Natural Resources Conservation Service, as specified in the *Field Office Technical Guide for Tree/Shrub Establishment*. Existing trees or shrubs may be used towards meeting the planting standard.

(2) Mulching

An initial application of mulch is required for the area designated for reforestation. Mulching must meet applicable standards of the USDA, Natural Resources Conservation Service, as specified in the *Field Office Technical Guide for Mulching-Temporary Protection of Critical Areas without Seeding*. Existing groundcover may be used towards meeting the mulching standard.

(D) Cluster and Open Space Subdivisions

Cluster and open space subdivisions are encouraged. In applying curve number calculations to such developments, the county may not penalize such subdivisions. Calculations must take into account the lots' proportionate share of right-of-way and permanent open space.

9-21 State Nutrient Management Strategy Rules

- 9-21-1** State stormwater management rules that implement the Neuse River Basin Nutrient Sensitive Waters Management Strategy (15A NCAC 02B .0235) apply in both the Neuse and the Cape Fear River Basins and are hereby incorporated by reference.
- 9-21-2** State stormwater management rules for new development that implement the Falls Reservoir Water Supply Nutrient Strategy (15A NCAC 02B .0277) are hereby incorporated by reference.
- 9-21-3** State stormwater management rules for new development that implement the Jordan Water Supply Nutrient Management Strategy (15A NCAC 02B .0265) are hereby incorporated by reference. These rules shall supersede the Neuse Rules within the Jordan Lake watershed portion of the Cape Fear River Basin.
- 9-21-4** Copies of related codes, standards and guidelines are on file in the office of the Wake County Department of Environmental Services Water Quality Section.

[Amended by OA 03-12 on 7/2/2012.]

9-22 Stormwater Design Manual

The Wake County Department of Environmental Services may furnish additional guidance and standards for the proper implementation of the regulations of this article and may provide such information in the form of a *Stormwater Design Manual*. Stormwater management practices that are designed, constructed, or maintained in accord with the *Stormwater Design Manual* must be presumed to comply with these regulations.

9-23 Miscellaneous

- 9-23-1 Calculations Regarding Ponds, Lakes, and Streams**
Surface water bodies may not be assigned a curve number for impervious surfaces. Instead such water bodies will be removed from calculations so that developments are not penalized for their presence.

Part 3 Completion and Maintenance of Improvements
--

9-30 Party Responsible for Completion of Improvements

The developer is responsible for completing all stormwater improvements in accordance with the requirements of this article and other applicable ordinances and laws.

9-31 Assurance that Improvements will be Completed

9-31-1 Performance Guarantee

The county may not approve a record plat, or in the case of single-lot development not requiring a record plat may not issue a building permit, until those stormwater improvements required of the developer have been completed or a performance guarantee has been provided. Such performance guarantees must comply with the performance guarantee provisions of Sec. 8-22.

9-31-2 As-Built Plans

Upon completion of required improvements, the developer or the developer's representative must submit as-built plans of required stormwater improvements to the Wake County Department of

Article 9 Stormwater Management
9-32 Assurance that Improvements will be Maintained

Environmental Services. These plans must indicate whether stormwater improvements were constructed in accordance with the county approved stormwater plan.

9-32 Assurance that Improvements will be Maintained

9-32-1 Maintenance Required

All stormwater improvements must be maintained so they will continue to serve their intended functions.

9-32-2 Parties Responsible for Maintenance of Improvements

- (A) The developer must maintain stormwater improvements until accepted by a property owners association or lot owner. The developer must disclose which party will be responsible for continued maintenance on the record plat and on the stormwater management plan.
- (B) Before improvements are accepted for maintenance by the property owners association or lot owner, the developer or the developer's engineer or other representative, as authorized by Statute, must certify to the property owners association or lot owner and to the county that improvements are complete and functioning as designed.

9-32-3 Maintenance Plan

- (A) The developer must record, and reference on the record plat, a maintenance plan that instructs the property owners association or lot owner about the annual maintenance tasks and associated costs for at least a 20-year period.
- (B) It will be the responsibility of the property owners association or lot owner to update the maintenance plan at least every 10 years.

9-32-4 Maintenance Agreement

- (A) The developer must record, and reference on the record plat, a maintenance agreement, or restrictive covenant that sets forth the property owners association's or lot owner's continuing responsibilities for maintenance, including specifying how cost will be apportioned among lot owners served.
- (B) The maintenance agreement must provide that the association and its individual members are jointly and severably liable for maintenance.

9-32-5 Maintenance Easements

The developer must record easements for access, maintenance and inspections by any property owners association and by Wake County Government.

9-32-6 Documents Required Before Plat Approval or Building Permit

All maintenance documents required by this article must be submitted to the Subdivision Administrator or Stormwater Engineer before record plat approval, and such documents must be referenced on the record plat, or, in the case of single-lot developments not requiring record plats, documentation must be submitted to the Zoning Administrator or Stormwater Engineer before building permit issuance.

Part 4 Administration

9-40 Application Requirements

9-40-1 Stormwater Plan Required

For any development requiring stormwater improvements, no applicant may receive a grading, building or other permit required for land disturbance without first having a county approved stormwater management plan.

9-40-2 Submittal Procedures

Stormwater management plans must be submitted and reviewed in conjunction with subdivision plans, or, in the case of single-lot developments requiring stormwater management, in conjunction with site plans.

9-41 Modifications and Waivers

Requests for modifications or waivers of the stormwater management standards of this article must be processed in accordance with the procedures of 19-36.

9-42 Appeals

9-42-1 Authority

- (A) Any person affected by any decision of the county that relates to interpretation or application of this ordinance may appeal to the hearing panel of the Wake County Human Services and Environmental Services Board.
- (B) Any alleged error of the county in making or refusing to make a decision may be basis for an appeal.

9-42-2 Filing

The appeal must be filed in writing with the Wake County Stormwater Engineer within 30 days of the decision complained of and must specify the grounds for appeal.

9-42-3 Hearing

- (A) The hearing panel of the Human Services and Environmental Services Board must fix a time and place for the hearing.
- (B) At least 10 days prior to the hearing, the hearing panel must publish notice of the hearing in a newspaper of general circulation within the county.
- (C) The hearing panel must render a decision in writing within 45 days of receiving the appeal.

9-42-4 Decision-Making Criteria

In acting on appeals the hearing panel of the Human Services and Environmental Services Board must determine, by simple majority vote, if the appellant has presented substantial evidence that the county erred and whether the county correctly interpreted the stormwater management regulations of Article 9.

9-42-5 Subsequent Appeals

The appellant may appeal the hearing panel's decision to the full Human Services and Environmental Services Board by filing an appeal within 10 days of the hearing panel's decision. Such appeals must follow the same procedure as the original hearing before the Board's hearing panel.

Part 5 Enforcement and Penalties
--

9-50 General

Failure to complete required improvements or failure to maintain improvements so they continue to function as required are violations and subject to a fine of up to \$1,000 per day and other penalties, remedies, and enforcement powers specified in Article 20.

9-51 Inspection of Stormwater Improvements

Wake County agents and officials have the right to inspect sites to determine whether required stormwater improvements are being installed and maintained in compliance with this ordinance.

OA 05/05 May 15, 2006

Article 10. Erosion and Sedimentation Control

Part 1	General	10-1
10-10	Jurisdiction.....	10-1
10-11	Purposes	10-2
10-12	Definitions.....	10-2
10-13	Applicability.....	10-6
Part 2	Standards	10-7
10-20	Land-Disturbing Activities.....	10-7
10-21	Stormwater Outlet Protection.....	10-12
10-22	Special Neuse And Cape Fear River Basin Regulations.....	10-13
10-23	Maintenance.....	10-18
Part 3	Review and Approval Procedures	10-19
10-30	Erosion and Sedimentation Control Plan and Land Disturbance Permit.....	10-19
10-31	Inspections	10-25
10-32	Appeals.....	10-26
Part 4	Enforcement and Penalties	10-27
10-40	Violations	10-27
10-41	Notice of Violation	10-27
10-42	Civil Penalties.....	10-28
10-43	Stop Work Order	10-28
10-44	Road Cleaning.....	10-29
10-45	Criminal Penalties	10-29
10-46	Injunctive Relief	10-29
10-47	Civil Relief.....	10-29
10-48	Restoration After Non-Compliance	10-30

Part 1	General
---------------	----------------

10-10 Jurisdiction

10-10-1 The erosion and sedimentation control regulations of this article apply to all of unincorporated Wake County with the exception of municipal extraterritorial jurisdictions.

Article 10 Erosion and Sedimentation Control

10-12 Definitions

The regulations of this article may also apply within the incorporated areas and the extraterritorial jurisdictions of municipalities upon proper resolution by the governing bodies of the respective municipalities and agreement by the Wake County Board of Commissioners.

10-10-2 Notwithstanding the provisions of G.S. 113A-56(a)(4) and Sec. 10-13-2(E) of this ordinance, the Wake County Board of Commissioners hereby declares that all departments and agencies of the County and its contractors and subcontractors must comply with the regulations of this article when they are more restrictive than similar regulations of the North Carolina Sediment Control Commission.

10-10-3 The Wake County Department of Environmental Services is responsible for the administration and enforcement of this article, including approval, issuance of permits related to, and enforcement of erosion and sedimentation control plans.

10-11 Purposes

The erosion and sedimentation control regulations of this article are adopted for the purposes of:

10-11-1 regulating certain land-disturbing activities to control accelerated erosion and sedimentation in order to prevent the pollution of water and other damage to lakes, watercourses, and other public and private property by sedimentation; and

10-11-2 establishing procedures through which these purposes can be fulfilled.

10-12 Definitions

Unless the context clearly indicates otherwise, the definitions of this section are to be used only in interpreting and administering the erosion and sedimentation control provisions of this article.

Accelerated Erosion

Any increase over the rate of natural erosion as a result of land-disturbing activity.

Active Construction

Activities that contribute directly to the building of facilities including land-disturbing activities for roads, parking lots, footings, etc.

Adequate Erosion Control Measure, Structure, or Device

A measure, structure or device that controls the soil material within the land areas under responsible control of the person conducting the land-disturbing activity.

Affiliate

A person that directly, or indirectly through one or more intermediaries, controls, is controlled by, or is under common control of another person.

Best Management Practices

Management and structural practices designed to reduce the quantities of pollutants washed by rain and snow melt into nearby waters.

Borrow

Fill material that is required for on-site construction and is obtained from other locations.

Buffer Zone

A strip of land adjacent to a lake or natural watercourse.

Article 10 Erosion and Sedimentation Control

10-12 Definitions

Certificate of Completion for Soil Erosion and Sedimentation Control

A certificate issued by the Wake County Department of Environmental Services indicating that the permittee has achieved acceptable stabilization in accordance with the approved plan and has completed all work necessary on the site related to soil erosion, issued according to Sec. 10-31-2.

Certificate of Compliance for Preliminary Soil Erosion and Sedimentation Control

A certificate issued according to Part 3 of this article by the Wake County Department of Environmental Services indicating that the initial erosion control devices shown on the approved plan have been installed and are operating correctly.

Completion of Construction or Development

The stage of a project in which no further land-disturbing activity is required on a phase of a project except that which is necessary for establishing a permanent ground cover.

Contiguous

Sharing the same boundary of property.

Director of Environmental Services

The Wake County official charged with administration and enforcement of the sedimentation and erosion control regulations of this article, including the Director's duly authorized agent or delegate.

Director of North Carolina Division of Land Resources

The Director of the North Carolina Division of Land Resources of the Department of Environment and Natural Resources, including the official's duly authorized agent or delegate.

Discharge Point

The point at which stormwater runoff leaves a tract of land.

Energy Dissipater

A structure or shaped channel section with mechanical armoring placed at the outlet of pipes or conduits to receive and break down the energy from high velocity flow.

Erosion

The wearing away of land surface by the action of the wind, water, gravity, or any combination thereof.

Erosion and Sedimentation Control Plan

A plan, as required by this article, for the control of erosion and sedimentation during land-disturbing activities.

Ground Cover

Any natural vegetative growth or other approved material that renders the soil surface stable against accelerated erosion.

High Quality Waters

Waters classified as such in 15A NCAC 2B.0101(e)(5) - General Procedures, which is incorporated herein by reference to include further amendments pursuant to G.S. 150B-14 (c).

High Quality Water (HQW) Zones

Areas in the Coastal Counties that are within 575 feet of High Quality Waters and for the remainder of the state, areas that are within one mile and draining to HQWs.

Article 10 Erosion and Sedimentation Control

10-12 Definitions

Lake or Natural Watercourse

Any stream, river, brook, swamp, sound, bay, creek, run, branch, canal, waterway, estuary, and any reservoir, lake or pond, natural or impounded, in which sediment may be moved or carried in suspension, and which could be damaged by accumulation of sediment.

Land Disturbance Permit

The approval document allowing land-disturbing activities to be initiated.

Land-Disturbing Activity

Any use of the land by any person in residential, industrial, educational, institutional, or commercial development, or highway and road construction and maintenance that results in a change in the natural cover or topography and that may cause or contribute to sedimentation.

Local Government

Any county, incorporated village, town, or city, or any combination of counties, incorporated villages, towns and cities, acting through a joint program pursuant to the provisions of the North Carolina Sedimentation Pollution Control Act.

Natural Erosion

The wearing away of the earth's surface by water, wind, or another natural agent under natural environmental conditions undisturbed by humans.

North Carolina Sedimentation Pollution Control Act

The North Carolina Sedimentation Pollution Control Act of 1973 (NCGS Chapter 113A Article 4, as amended) and all rules and orders adopted pursuant to it.

Parent

An affiliate that directly, or indirectly through one or more intermediaries, controls another person.

Person

Any individual, partnership, firm, association, joint venture, public or private corporation, trust, estate, commission, board, public or private institution, utility, cooperative, interstate body, or other legal entity.

Person Conducting Land-Disturbing Activity

Any person who meets any of the following criteria:

- (a) a developer or other person who has or holds himself out as having financial or operational control over a land-disturbing activity; or
- (b) a landowner or person in possession or control of the land that directly or indirectly allows land-disturbing activity or has benefited from it; or
- (c) a contractor or subcontractor who is authorized to perform land-disturbing work for the landowner.

Phase of Grading

One of two types of grading: rough or fine.

Sediment

Solid particulate matter, both mineral and organic, that has been or is being transported by water, air, gravity, or ice from its site of origin.

Article 10 Erosion and Sedimentation Control

10-12 Definitions

Sedimentation

The process by which sediment resulting from accelerated erosion has been or is being transported off the site of the land-disturbing activity or into a lake, natural watercourse or on other property.

Siltation

Sediment resulting from accelerated erosion which is settleable or removable by properly designed, constructed, and maintained control measures; and which has been transported from its point of origin within the site of a land-disturbing activity; and which has been deposited, or is in suspension in water.

Spoils

Refuse material removed from an excavation.

Stabilization

The process of restoring a site with ground cover as defined by this article, which renders the soil stable against accelerated erosion.

Stop Work Order

A written order to stop work, issued by the Director of Environmental Services, upon determining that work is being conducted in violation of this ordinance.

Storm Drainage Facilities

The system of inlets, conduits, channels, ditches, and appurtenances which serve to collect and convey stormwater through and from a given drainage area.

Stormwater Runoff

The surface flow of water resulting from precipitation in any form and occurring immediately after rainfall or melting.

Subsidiary

An affiliate that is, either directly or indirectly through one or more intermediaries, controlled by another person.

Ten-year Storm

A storm with an intensity expected to be equaled or exceeded, on the average, once in ten years, and of a duration that will produce the maximum peak rate of stormwater runoff for the watershed of interest under average antecedent wetness conditions.).

Tract

All contiguous land and bodies of water being disturbed or to be disturbed as a unit, regardless of ownership.

Twenty-Five Year Storm

A storm with an intensity expected to be equaled or exceeded on the average, once in 25 years, and of a duration that will produce the maximum peak rate of stormwater runoff for the watershed of interest under average antecedent wetness conditions.

Uncovered

The removal of ground cover from, on, or above the soil surface.

Velocity

The average velocity of flow through the cross section of the main channel at the peak flow of the storm of interest. The cross section of the main channel is the area defined by the geometry of the

Article 10 Erosion and Sedimentation Control

10-13 Applicability

channel plus the area of flow below the flood height defined by vertical lines at the main channel banks. Overload flows are not to be included for the purpose of computing velocity of flow.

Wake County Department of Environmental Services

The Wake County Department of Environmental Services or successor agencies.

Wake County Soil Erosion and Sedimentation Control Checklist

A form containing the list of items required in order for an erosion and sedimentation control plan to be considered complete for review, as provided by the Wake County Department of Environmental Services.

Waste

Surplus materials resulting from on-site land-disturbing activities and being disposed of at a location other than the site of the land-disturbing activity.

Working Days

Days exclusive of Saturday and Sunday during which weather conditions or soil conditions permit land-disturbing activity to be undertaken.

10-13 Applicability

10-13-1 Except for the exemptions noted in Section 10-13-2, the erosion and sedimentation control regulations of this article apply to all land disturbances exceeding one acre in disturbed surface area. For land disturbances of one acre or less of disturbed surface area, refer to Section 10-20-5 of this article for erosion and sedimentation control requirements. This article expressly applies to the following land-disturbing activities:

(A) Access and Haul Roads

Temporary access and haul roads, other than public roads, constructed or used in connection with any land-disturbing activity are considered a part of such activity.

(B) Borrow and Waste Areas

When the person conducting the land-disturbing activity is not the person obtaining borrow and/or disposing of the waste, these areas are considered a separate land-disturbing activity. When the person conducting the land-disturbing activity is also the person conducting the borrow or waste disposal activity, the borrow or waste area must be considered part of the land-disturbing activity when:

- (1)** areas from which borrow is obtained are not regulated by the provisions of the Mining Act of 1971;
- (2)** waste areas for surplus materials that are not landfills regulated by the North Carolina Department of Environment and Natural Resources' Division of Waste Management; or
- (3)** waste areas for surplus materials that are not landfills regulated by Wake County under its Solid Waste Ordinance.

(C) Utility Construction

Land-disturbing activities connected with utility construction over which the State of North Carolina does not have exclusive regulatory jurisdiction as provided in G.S. 113A-56 are considered part of such activity.

Article 10 Erosion and Sedimentation Control
10-20 Land-Disturbing Activities

10-13-2 Exemptions

The erosion and sedimentation control regulations of this article do not apply in the following situations:

(A) Agricultural Activities

Land-disturbing activities undertaken on agricultural lands for the production of plants and animals useful to man, including but not limited to forage and sod crops, grain and feed crops, tobacco, cotton, and peanuts; dairy animals and dairy products; poultry and poultry products; livestock, including the breeding and grazing of any or all such animals; bees and apiary products; and fur animals.

(B) Forestland Activities

Land-disturbing activities undertaken on forestland for the production and harvesting of timber and timber products and which are conducted in accordance with best management practices set out in *Forest Practice Guidelines Related to Water Quality* as adopted by the North Carolina Department of Environment and Natural Resources. If such land-disturbing activity is not conducted in accordance with *Forest Practice Guidelines Related to Water Quality*, the provisions of this article apply to the activity on the tract.

(C) Mining

An activity for which a permit is required under the Mining Act of 1971, Article 7 of Chapter 74 of the General Statutes.

(D) Emergency Activities

Activities essential to protect human life during an emergency.

(E) Activities Under State Jurisdiction

Land-disturbing activities over which the state has exclusive regulatory jurisdiction as provided in G.S. 113A-56, including land-disturbing activities that are:

- (1) conducted by the local, state or federal government;
- (2) conducted by persons having the power of eminent domain; or
- (3) funded in whole or in part by the state or federal government.

Sections 10-14 through 10-19 are reserved for future use.

Part 2 Standards

10-20 Land-Disturbing Activities

Land-disturbing activities shall not be undertaken except in accordance with the following standards:

10-20-1 Minimum Standards

All soil erosion and sedimentation control plans and measures must conform to the minimum applicable standards specified in North Carolina's *Erosion and Sediment Control Planning and Design Manual* and the *Wake County Sedimentation and Erosion Control Plan Review Manual*. Erosion control devices must be installed to prevent any offsite sedimentation for any construction site regardless of the size of the land disturbance.

Article 10 Erosion and Sedimentation Control
10-20 Land-Disturbing Activities

10-20-2 Buffer Zone

No land-disturbing activity during periods of construction or improvement to land is permitted in proximity to a lake or natural watercourse unless a buffer zone is provided along the margin of the watercourse of sufficient width to confine visible siltation within the 25% of the buffer zone nearest the land-disturbing activity.

(A) Projects On, Over or Under Water

A buffer is not required for a land-disturbing activity in connection with the construction of facilities to be located on, over, or under a lake or natural watercourse.

(B) Buffer Measurement

Unless otherwise provided, the width of a buffer zone is measured horizontally from the edge of the water to the nearest edge of the disturbed area, with the 25% of the strip nearer the land-disturbing activity containing natural or artificial means of confining visible siltation.

10-20-3 Operation in Lakes or Natural Watercourses

Land disturbing activity in connection with construction in, on, over, or under a lake or natural watercourse must minimize the extent and duration of disruption of the stream channel. Where relocation of a stream forms an essential part of the proposed activity, the relocation must minimize unnecessary changes in the stream flow characteristics.

10-20-4 Fill Material

Unless a permit from the North Carolina Division of Waste Management to operate a landfill is on file for the official site, acceptable fill material must be free of organic or other degradable materials, masonry, concrete and brick in sizes exceeding 12 inches, and any materials which would cause the site to be regulated as a landfill by the State of North Carolina.

10-20-5 Standards for Erosion and Sedimentation Control Devices

(A) Land Disturbances Requiring A Permit (Greater Than One Acre of Disturbed Area)

- (1)** Whenever land disturbing activities disturb more than one acre on a tract, an erosion and sedimentation control permit is required. The person conducting the land-disturbing activity must install erosion and sedimentation control devices and practices that are sufficient to retain the sediment generated by the land disturbing activity within the boundaries of the tract during the development of said tract; and
- (2)** Must plant or otherwise provide a permanent ground cover sufficient to restrain erosion after completion of construction or development within 15 working days or 21 calendar days following completion of construction or development, whichever period is shorter, except as provided in 15A NCAC 4B .0124(e).

(B) Land Disturbances Not Requiring A Permit (One Acre or Less of Disturbed Area)

- (1)** Whenever land-disturbing activities disturb one acre or less on a tract, an erosion and sedimentation control permit is not required. However, the person conducting the land disturbing activity must install erosion and sedimentation control devices and practices that are sufficient to retain the sediment generated by the land disturbing activity within the boundaries of the tract during the development of said tract; and

Article 10 Erosion and Sedimentation Control

10-20 Land-Disturbing Activities

- (2) Must install a gravel pad, 10 foot in width and 30 foot in length or equivalent, at the access point(s) for construction vehicles; and
- (3) Must install silt fences on the low side of the lot prior to the initial footing inspection conducted by the Building Inspections Division
- (4) Areas within 25 feet of the edge of pavement or gravel of the road must be stabilized before issuance of a Certificate of Occupancy
- (5) All uncovered areas that result from land disturbing activities, and are subject to continued and accelerated erosion, and are causing the movement of sediment offsite from the tract, must be provided with a ground cover or other protective measures, structures or devices sufficient to restrain accelerated erosion and control off-site sedimentation.
- (6) The property owner or agent must be given notice of responsibility for compliance at the issuance of a building permit for said land disturbing activity.
- (7) While a permit is not required for land disturbances of one acre or less on a tract, the County retains the right to take enforcement actions and assess penalties if the movement of sediment offsite from the tract is observed during an inspection. Enforcement actions and penalties are described in Part 4 of this article.

10-20-6 Inspection by Landowner

- (A) The landowner, the financially responsible party, or the landowner's or the financially responsible party's agent must perform an inspection of the area covered by the erosion and sedimentation control plan after each phase of the plan has been completed and after establishment of temporary ground cover in accordance with G.S. 113A-57(2).
- (B) The person who performs the inspection must maintain and make available a record of the inspection at the site of the land-disturbing activity. The record must set out any significant deviation from the approved erosion and sedimentation control plan, identify any measures that may be required to correct the deviation, and document the completion of those measures. The record must be maintained until permanent ground cover has been established as required by the approved erosion and sedimentation control plan.
- (C) The inspections required by this subsection are in addition to inspections required by G.S. 113A-61.1.

10-20-7 Protection of Property

Persons conducting land-disturbing activities must take all reasonable measures to protect all public and private property from damage caused by such activities.

10-20-8 Maximum Peak Rate of Runoff

During construction, the planned soil erosion and sedimentation control practices and devices must be employed to restrict sedimentation soil losses from each land-disturbing site in accordance with plans approved by the Wake County Department of Environmental Services Sedimentation and Erosion Control Section. Such erosion and sedimentation control measures, structures, and devices must be planned, designed, and constructed to provide protection from the calculated maximum peak rate of runoff from the ten-year storm. Runoff rates must be calculated using the procedures in the USDA, Soil Conservation Service's *National Engineering Field Manual for Conservation Practices*, or other calculation procedures acceptable to the County.

10-20-9 Grade

- (A) The angle for graded slopes and fills shall not be greater than the angle that can be retained by vegetative cover or other adequate erosion control devices or structures.
- (B) Slopes left exposed must be planted or otherwise provided with ground cover, devices, or structures sufficient to restrain erosion within 21 calendar days following completion of any phase of grading, or when grading equipment leaves the site.
- (C) The angle for graded slopes and fills must be demonstrated to be stable. Stable is the condition where the soil remains in its final modified configuration, with or without mechanical constraints.

10-20-10 Standards for High Quality Water (HQW) Zones

Land-disturbing activities to be conducted in High Quality Water Zones must be designed as follows:

(A) Uncovered Areas

Uncovered areas in High Quality Water (HQW) zones must be limited at any time to a maximum total area of 20 acres within the boundaries of the tract. Only the portion of the land-disturbing activity within a HQW zone is governed by this rule. Larger areas may be uncovered within the boundaries of the tract with the written approval of the Director of the North Carolina Division of Land Resources.

(B) Maximum Peak Rate of Runoff

Erosion and sedimentation control measures, structures, and devices within HQW zones must be planned, designed and constructed to provide protection from the runoff of the 25-year storm which produces the maximum peak rate of runoff as calculated according to procedures in the United States Department of Agricultural, Natural Resources Conservation Service's *National Engineering Field Manual for Conservation Practices* or according to procedures adopted by any other agency of this state or the United States or any generally recognized organization or association.

(C) Settling Efficiency

Sediment basins within HQW zones must be designed and constructed so that the basin will have a settling efficiency of at least 70% for the 40 micron (0.04mm) size soil particle transported into the basin by the runoff of that 2-year storm which produces the maximum peak rate of runoff. The maximum peak rate of runoff must be calculated according to procedures in the United States Department of Agriculture Natural Resources Conservation Services *National Engineering Field Manual for Conservation Practices* or according to procedures adopted by any other agency of this state or in the United States or any generally recognized organization or association.

(D) Grade

Newly constructed open channels in HQW zones must be designed and constructed with side slopes no steeper than 2 horizontal to 1 vertical if a vegetative cover is used for stabilization unless soil conditions permit a steeper slope or where the slopes are stabilized by using mechanical devices, structural devices or other acceptable ditch liners. In any event, the angle for side slopes must be sufficient to restrain accelerated erosion.

(E) Ground Cover

Ground cover sufficient to restrain erosion must be provided for any portion of a land-disturbing activity in a HQW zone within 15 working days or 21 calendar days, whichever

Article 10 Erosion and Sedimentation Control

10-20 Land-Disturbing Activities

period is shorter, following completion of any phase or grading, or when grading equipment leaves the site.

10-20-11 Standards for Landfills

- (A) Land disturbance permits for landfills are valid for five (5) calendar years. If no construction activity has begun within 2-years, the land disturbance permit becomes null and void.
- (B) A valid land disturbance permit is required for the duration of the “active life” of the landfill or phased permitted portion thereof until completion of closure activities.
- (C) Land disturbance permits for landfills may be renewed in 5-year increments.
- (D) Land Disturbance permits for landfills may be automatically renewed upon the certification of Financially Responsible Party and upon concurrence by County staff that there are no major modifications to the approved plan and that the project adheres to all current applicable standards.
- (E) Automatic permit renewals will not be subject to plan review and land disturbance permit fees.
- (F) No plan shall be approved unless it complies with all applicable state and Wake County erosion and sedimentation control and stormwater management requirements. Approval assumes the applicant’s compliance with federal and state water quality and landfill laws, regulations and rules in addition to Wake County’s regulations.
- (G) Adequate erosion and sediment control measures consisting of vegetative cover, materials, structures or devices must be utilized to prevent sediment from leaving the landfill facility.
- (H) Whenever the County determines that significant erosion and sedimentation is occurring as a result of land-disturbing activity, despite application and maintenance of protective practices, the party conducting the land-disturbing activity will be required to and shall take additional protective action.
- (I) Adequate erosion and sediment control measures consisting of vegetative cover, materials, structures or devices must be utilized to prevent excessive on-site erosion of the landfill facility or portion thereof.
- (J) Erosion and sedimentation control measures, structures and devices for landfills must be designed, constructed and maintained to manage the calculated maximum peak rate of runoff generated by the 24-hour, 25-year storm event. Runoff rates must be calculated using the procedures in the USDA, Soil Conservation Service’s National Engineering Field manual for Conservation Practices, or the North Carolina Department of Environment and Natural Resources Erosion and Sediment Control Planning and Design Manual or other calculation procedures acceptable to Wake County.
- (K) Stormwater plan review for landfills shall be included in the plan review for erosion and sedimentation control and stormwater improvements shall be permitted under the land disturbance permit upon payment of applicable land disturbances review and permit fees.
- (L) Landfills shall conform to the requirements of the Sedimentation and Pollution Control Law (15A NCAC 04) and any required NPDES permits.

Article 10 Erosion and Sedimentation Control

10-21 Stormwater Outlet Protection

- (M) Phased permits may be closed upon compliance with Wake County’s certificate of completion requirements.

[Amended on 11/17/2008 by OA 07-08.]

10-21 Stormwater Outlet Protection

10-21-1 Applicability

This section does not apply where it can be demonstrated to the County that stormwater discharge velocities will not create an erosion problem in the receiving watercourse.

10-21-2 Purpose

Stream banks and channels downstream from any land-disturbing activity must be protected from increased degradation by accelerated erosion caused by increased velocity of runoff from the land-disturbing activity.

10-21-3 Maximum Permissible Velocity

- (A) All land-disturbing activities must be planned and conducted so that the velocity of stormwater runoff in the receiving watercourse at the point of discharge resulting from a 10-year storm after development shall not exceed the greater of:
- (1) the velocity as determined from the table in this subsection; or
 - (2) the velocity in the receiving watercourse determined for the 10-year storm prior to development.
- (B) If the conditions in Sec. 10-21-3(A)(1) and Sec. 10-21-3(A)(2) cannot be met, then the receiving watercourse to and including the discharge point must be designed and constructed to withstand the expected velocity anywhere the velocity exceeds the “prior to development” velocity by 10%.
- (C) The following is a table for maximum permissible velocity for stormwater discharges:

Material	Maximum Stormwater Discharge Velocities	
	Feet per Second	Meters per Second
Fine sand (noncolloidal)	2.5	0.8
Sandy loam (noncolloidal)	2.5	0.8
Silt loam (noncolloidal)	3.0	0.9
Ordinary film loam	3.5	1.1
Fine gravel	5.0	1.5
Stiff clay (very colloidal)	5.0	1.5
Graded, loam to cobbles (noncolloidal)	5.0	1.5
Graded, silt to cobbles (colloidal)	5.5	1.7
Alluvial silts (noncolloidal)	3.5	1.1
Alluvial silts (colloidal)	5.0	1.5
Coarse gravel (noncolloidal)	6.0	1.8
Cobbles and shingles	5.5	1.7
Shales and hard pans	6.0	1.8

For sinuous channels: multiply allowable velocity by 0.95 for slightly sinuous, by 0.9 for moderately sinuous channels, and by 0.8 for highly sinuous channels.

10-21-4 Acceptable Management Measures

Measures applied alone or in combination to satisfy the intent of this section are acceptable if there are no objectionable secondary consequences. The County recognizes that the management of stormwater runoff to minimize or control downstream channel and bank erosion is a developing technology. Innovative techniques and ideas will be considered and may be used when shown to have the potential to produce successful results. Some alternatives include:

- (A) avoiding increases in surface runoff volume and velocity by including measures to promote infiltration to compensate for increased runoff from areas rendered impervious;
- (B) avoiding increases in surface water discharge velocities by using vegetated or roughened swales or waterways in lieu of closed drains and high velocity paved sections;
- (C) providing energy dissipators at outlets of storm drainage facilities to reduce flow velocities at the point of discharge;
- (D) protecting watercourses subject to accelerated erosion by improving cross sections and/or providing erosion-resistant lining; or
- (E) upgrading or replacing the receiving device, structure, or watercourse so that it will receive and conduct the flow to a point where it is no longer subject to degradation from the increased rate of flow or increased velocity.

10-22 Special Neuse And Cape Fear River Basin Regulations

10-22-1 Adoption

- (A) Section 15 A NCAC 2B.0233 has been adopted with changes as published 12:6 NCR 462-479 (Subchapter 2b - Surface Water and Wetlands Standards, Monitoring; Section .0200 - Classifications and Water Quality Standards Applicable to Surface Waters and Wetlands of North Carolina .0233 Neuse River Basin: Nutrient Sensitive Waters Management Strategy: Protection and Maintenance of Riparian Areas with Existing Forest Vegetation).
- (B) The riparian buffer protection rules of 15 A NCAC 2B.0233 (Neuse River Basin: Nutrient Sensitive Waters Management Strategy: Protection and Maintenance of Existing Riparian Buffers) apply to all lands within the Neuse River and Cape Fear River basins.

10-22-2 Applicability

All plans must meet the requirements of this management strategy or receive an exemption from the North Carolina Department of Environment and Natural Resources, Division of Water Quality. The following is the management strategy for maintaining and protecting riparian areas in the Neuse River Basin:

- (A) Riparian areas must be protected and maintained in accordance with the Neuse River regulations of this section on all sides of surface waters in the Neuse and Cape Fear River Basins (intermittent streams, perennial streams, lakes, ponds, and estuaries) as indicated on the most recent versions of United States Geological Survey 1:24,000 scale (7.5 minute quadrangle) topographic maps, and/or the Soil Survey for Wake County, North Carolina, whichever is more restrictive. The regulations of this section only apply to riparian areas where forest vegetation is established in Zone 1 as of July 22, 1997. Forest vegetation, as defined in 15A NCAC2B. 0202, of any width in Zone 1 must be protected and maintained in accordance with the Neuse River regulations of this section. The Neuse River regulations of this section do not establish new buffers in riparian areas. Exceptions to the Neuse River

Article 10 Erosion and Sedimentation Control
10-22 Special Neuse And Cape Fear River Basin Regulations

regulations for riparian areas are described in Sec. 10-22-2(B). Maintenance of the riparian areas should be so that, to the maximum extent possible, sheet flow of surface water is achieved. The Neuse River regulations of this section specify requirements that must be implemented in riparian areas to ensure that the pollutant removal functions of the riparian area are protected and maintained.

(B) Exceptions

The following water bodies and land uses are exempt from the riparian area protection requirements.

- (1)** Ditches and manmade conveyances other than modified natural streams;
- (2)** When evidence from a field investigation reveals that areas mapped as intermittent streams, perennial streams, lakes, ponds, or estuaries on the most recent versions of United States Geological Survey 1:24,000 scale (7.5 minute quadrangle) topographic maps and/or the Soil Survey for Wake County, North Carolina, are not present as shown on the maps; then the property owner shall present the evidence from the field investigation to Wake County (Neuse of Cape Fear River Basins) or the North Carolina Division of Water Quality (Neuse River Basin only) for concurrence.
- (3)** Ponds and lakes created for animal watering, irrigation, or other agricultural uses that are not part of a natural drainage way that is classified in accordance with 15A NCAC 2B.0100;
- (4)** Water dependent structures as defined in 15A NCAC2B.0202, provided that they are located, designed, constructed and maintained to provide maximum nutrient removal, to have the least adverse effects on aquatic life and habitat and to protect quality;
- (5)** The following uses may be allowed where no practical alternative exists. A lack of practical alternatives may be shown by demonstrating that, considering the potential for a reduction in size, configuration or density of the proposed activity and all alternative designs, the basic project purpose cannot be practically accomplished in a manner which would avoid or result in less adverse impact to surface waters. Also, these structures must be located, designed, constructed, and maintained to have minimal disturbance, to provide maximum nutrient removal and erosion protection, to have the least adverse effects on aquatic life and habitat, and to protect water quality to the maximum extent practical through the use of best management practices.
 - (a)** road crossings, railroad crossings, bridges, airport facilities, and utility crossings;
 - (b)** stormwater management facilities and ponds, and utility construction and maintenance corridors for utilities such as water, sewer or gas, provided they are located in Zone 2 of the riparian area; are located at least 30 feet from the top of bank or mean high water line; and that they comply with the requirements for utility construction and maintenance corridors in Sec. 10-22-2 (B)(6).
- (6)** A corridor for the construction and maintenance of utility lines, such as water, sewer or gas, (including access roads and stockpiling of materials) running parallel to the stream and located within Zone 2 of the riparian area, as long as no practical alternative exists and they are located at least 30 feet from the top of bank or mean

high water line and best management practices are installed to minimize runoff and maximize water quality protection to the maximum extent practicable. Permanent, maintained access corridors must be restricted to the minimum width practicable and shall not exceed 10 feet in width except at manhole locations. A 10 feet perpendicular vehicle turnaround is allowed provided that turnarounds are spaced at least 500 feet apart along the riparian area.

- (7) Stream restoration projects, scientific studies, stream gauging, water wells, passive recreation facilities such as boardwalks, trails, pathways, historic preservation and archaeological activities are allowed, provided that they are located in Zone 2 and are least 30 feet from the top of bank or mean high water line and are designed, constructed and maintained to provide the maximum nutrient removal and erosion protection, to have the least adverse effects on aquatic life and habitat, and to protect water quality to the maximum extent practical through the use of best management practices. Activities that must cross the stream or be located within Zone 1 are allowed as long as all other requirements of this subsection are met.
- (8) Stream crossings associated with timber harvesting are allowed if performed in accordance with the *Forest Practices Guidelines Related to Water Quality* (15A NCAC 11.0201-0209).

10-22-3 Riparian Area Zones

The protected riparian area has two zones as follows:

(A) Zone 1

Zone 1 is intended to be an undisturbed area of forest vegetation. Any forest vegetation, as defined in Rule .0202 of 15A NCAC 2B, in Zone 1 as of July 22, 1997 must be maintained and protected in accordance with this section.

(1) Location

- (a) For intermittent streams and perennial streams, Zone 1 begins at the top of bank and extends landward a distance of 30 feet on all sides of the water body, measured horizontally on a line perpendicular to the water body.
- (b) For all other water bodies, Zone 1 begins at the top of bank or mean high water line and extends landward a distance of 30 feet, measured horizontally on a line perpendicular to the water body.

(2) Activities Allowed

The following practices and activities are allowed in Zone 1:

- (a) natural regeneration of forest vegetation and planting vegetation to enhance the riparian area if disturbance is minimized, provided that any plantings primarily consist of locally native trees and shrubs;
- (b) selective cutting of individual trees of high value in the outer 20 feet of Zone 1, provided that the basal area (measured at 12-inch diameter at breast height) remains at or above 0.52 square feet per running feet of the over 20 feet of Zone 1, as measured along the bank of the stream or water body. Limited mechanized equipment is allowed in this area;
- (c) horticultural or silvicultural practices to maintain the health of individual trees;

- (d) removal of individual trees that are in danger of causing damage to dwellings, other structures or the stream channel;
- (e) removal of dead trees and other timber cutting techniques necessary to prevent extensive pest or disease infestation if recommended by the Director of the North Carolina Division of Forest Resources and approved by the Director of the North Carolina Division of Water Quality; and
- (f) ongoing agricultural operations, provided that existing forest vegetation is protected and requirements in Rules .0236 and .0238 of 15A NCAC 2B are followed.

(3) Activities Prohibited

The following practices are expressly prohibited in Zone 1:

- (a) land-disturbing activities and placement of fill and other materials that would disturb forest vegetation, as defined in Rule .0202 of 15A NCAC 2B, other than those allowed in Sec. 10-22-2(B) and Sec. 10-22-3(A)(2);
- (b) new development, except as provided in Sec. 10-22-2(B);
- (c) new on-site sanitary sewage systems that use ground adsorption;
- (d) the application of fertilizer; and
- (e) any activity that threatens the health and function of the vegetation including, but not limited to, application of chemicals in amounts exceeding the manufacturer's recommended rate, uncontrolled sediment sources on adjacent lands, and the creation of any areas with bare soil.

(B) Zone 2

Vegetation in Zone 2 must consist of a dense ground cover composed of herbaceous or woody species that provides for diffusion and infiltration of runoff and filtering of pollutants.

(1) Location

Zone 2 begins at the outer edge of Zone 1 and extends landward a minimum of 20 feet as measured horizontally on a line perpendicular to the water body. The combined minimum width of Zones 1 and 2 must be at least 50 feet on all sides of the water body.

(2) Activities Allowed

The following practices and activities are allowed in Zone 2 in addition to those allowed in Zone 1:

- (a) periodic moving and removal of plant products such as timber, nuts, and fruit on a periodic basis, provided the intended purpose of the riparian area is not compromised by harvesting, disturbance, or loss of forest or herbaceous ground cover.
- (b) forest vegetation in Zone 2 may be managed to minimize shading on adjacent land outside the riparian area if the water quality function of the riparian area is not compromised.

- (c) ongoing agricultural operations, provided that requirements of Rules .0236 and .0238 of 15A NCAC 2B are followed.

(3) Activities Prohibited

The following practices and activities are not allowed in Zone 2:

- (a) land-disturbing activities and placement of fill and other materials, other than those allowed in Sec. 10-22-2(B), Sec. 10-22-3(A)(2) and Sec. 10-22-3(B)(2);
- (b) new development, except as provided in Sec. 10-22-2(B);
- (c) new on-site sanitary sewage that use ground adsorption;
- (d) the application of fertilizer; and
- (e) any activity that threatens the health and function of the vegetation including, but not limited to, application of chemicals in amounts exceeding the manufacture’s recommended rate, uncontrolled sediment sources on adjacent lands, and the creation of any area with bare soil.

(4) Tree Removal

Timber removal and skidding of trees must be directed away from the watercourse or water body. Skidding must be done in a manner to prevent the creation of ephemeral channels perpendicular to the water body. Any tree removal must be performed in a manner that does not compromise the intended purpose of the riparian area and is in accordance with the *Forest Practices Guidelines Related to Water Quality* (15A NCAC 1I .0201-.0209).

(5) Sheet Flow

Maintenance of sheet flow in Zones 1 and 2 is required in accordance with this subsection.

- (a) Sheet flow must be maintained to the maximum extent practical through dispersing concentrated flow and/or re-establishment of vegetation to maintain the effectiveness of the riparian area.
- (b) Concentrated runoff from new ditches and manmade conveyances must be dispersed into sheet flow before the runoff enters Zone 2 of the riparian area. Existing ditches and manmade conveyances, as specified in Sec. 10-22-2(B)(1), are exempt from this requirement; however, care should be taken to minimize pollutant loading through these existing ditches and manmade conveyances from fertilizer application or erosion.
- (c) Periodic corrective action to restore sheet flow should be taken by the landowner if necessary to impede the formation of erosion gullies which allow concentrated flow to bypass treatment in the riparian area.

(6) Maintenance Access

- (a) Periodic maintenance of modified natural streams such as canals is allowed provided that disturbance is minimized and the structure and function of the riparian area is not compromised.

- (b) A grassed travel way is allowed on one side of the water body when alternative forms of maintenance access are not practical. The width and specifications of the travel way must be limited to only that needed for equipment access and operation. The travel way must be located to maximize stream shading.

(7) Municipal Stormwater Management

If a local government has been issued a Municipal Separate Stormwater Sewer System permit or has been delegated to implement a local stormwater program, then the local government must ensure that the riparian areas to be protected are, as a standard practice, recorded on new or modified plats.

10-22-4 Variances

Where application of the regulations of this section would prevent all reasonable uses of a lot platted and recorded before June 3, 1974, a variance may be granted by the North Carolina Environmental Management Commission if it finds that:

- (A) practical difficulties or unnecessary hardships would result in strict application of applicable regulations.
- (B) such difficulties or hardships result from conditions which are peculiar to the property involved; and
- (C) the general purpose and intent of the regulations would be preserved, water quality would be protected and substantial justice would be done if the variance were granted.

10-23 Maintenance

10-23-1 During the development of a site, the person conducting the land-disturbing activity must install, routinely inspect and maintain in good working order all temporary and permanent erosion and sedimentation control measures as required by the approved plan or any provision of this article, the North Carolina Sedimentation Pollution Control Act, or any order adopted pursuant to the erosion and sedimentation control regulations of this article or the North Carolina Sedimentation Pollution Control Act.

10-23-2 After site development, the property owner or person in possession or control of the land must install and/or maintain all necessary permanent erosion and sediment control measures, except those measures installed within a road or street right-of-way or easement accepted for maintenance by a governmental agency.

10-23-3 Whenever the County determines that significant erosion and sedimentation is occurring as a result of land-disturbing activity, despite application and maintenance of protective practices, the person conducting the land-disturbing activity will be required to and shall take additional protective action.

10-23-4 All streets, sidewalks, greenways or other travel ways must be kept free from mud, dirt, dust or other material that may create a hazard to public safety or cause the travel way to be unreasonably muddy, as determined by the County.

Sections 10-24 through 10-29 are reserved for future use.

Part 3	Review and Approval Procedures
---------------	---------------------------------------

10-30 Erosion and Sedimentation Control Plan and Land Disturbance Permit

10-30-1 Applicability

- (A) Except as provided in Section 10-13, it is unlawful to conduct any land disturbing activity that will disturb more than one acre until both an approved erosion and sedimentation control plan and a land disturbance permit issued by the County have been obtained.
- (B) The County may require preparation and approval of an erosion and sedimentation control plan for land-disturbing activities that are one acre or less in area when sediment control measures are needed to protect against off-site damages.
- (C) A project may be developed in phases with separate erosion and sedimentation control plans and land disturbing permits for each phase.

10-30-2 Application Submittal and Acceptance of Erosion and Sedimentation Control Plan

(A) Submittal

A complete erosion and sedimentation control plan must be filed with the Wake County Department of Environmental Services at least 30 days prior to the anticipated start of the land-disturbing activity.

(B) Contents

The erosion and sedimentation control plan application submittal must include all of the following, with sufficient copies for necessary referrals and records, those forms, maps, plans, sets of calculations and other documents as prescribed by the Director of Environmental Services as necessary to determine compliance with applicable regulations or to address the required conclusions:

(1) Erosion and Sedimentation Control Checklist

The erosion and sedimentation control plan must contain at least all of the items specified on the Wake County Erosion and Sedimentation Control Checklist, including an application, administrative fees; architectural and engineering drawings; maps; assumptions; calculations; and narrative statements as needed to adequately describe the proposed development of the tract and the measures planned to comply with the erosion and sedimentation control regulations of this article. Detailed guidelines for plan preparation may be obtained from the Wake County Department of Environmental Services upon request.

(2) Financial Responsibility and Ownership

The erosion and sedimentation control plan must include an authorized statement of financial responsibility and ownership that complies with the following:

- (a) is signed by the financially responsible party for the land-disturbing activity or his authorized agent, including the mailing and street addresses of the principal place of business of the financially responsible party the owner of the land; and any designated agents. A post office box is not an acceptable mailing address;

Article 10 Erosion and Sedimentation Control

10-30 Erosion and Sedimentation Control Plan and Land Disturbance Permit

- (b) if the financially responsible party is not a resident of Wake County, a resident Wake County agent must be designated for the purpose of receiving notices of compliance or non-compliance with the erosion and sedimentation control plan, this article, the North Carolina Sedimentation Pollution Control Act or any other applicable erosion and sedimentation control regulations;
 - (c) if the applicant is not the owner of the land to be disturbed, the erosion and sedimentation control plan must include the owner's written consent for the applicant to submit an erosion and sedimentation control plan and to conduct the anticipated land-disturbing activity.
- (3) The Director of Environmental Services may waive one or more application requirements by certifying in writing that such information is unnecessary in the particular case to determine compliance with the applicable regulations.

(C) Acceptance

- (1) The Director of Environmental Services must review a submitted plan and determine whether it complies with submittal requirements.
- (2) If the erosion and sedimentation control plan does not comply with submittal requirements, the Director of Environmental Services must notify the applicant of the submittal deficiencies and invite the applicant to revise the erosion and sedimentation control plan to correct the deficiencies.
- (3) No further processing of incomplete plans will occur until the deficiencies are corrected.
- (4) If or when the erosion and sedimentation control plan complies with all submittal requirements, the Director of Environmental Services must accept the application as complete.
- (5) An erosion and sedimentation control plan will be considered complete and ready for processing only if submitted according to the application completeness requirements of this article. The Director of Environmental Services must promptly notify the person submitting the erosion and sedimentation control plan that the 30-day time limit for review will not begin until the plan is deemed complete.

10-30-3 Review and Decision

- (A) The County must forward a copy of each erosion and sedimentation control plan for a land-disturbing activity that involves the utilization of ditches for the purpose of de-watering or lowering the water table of the tract to the Director of the North Carolina Division of Water Quality.
- (B) After accepting an erosion and sedimentation control plan as complete, the Director of Environmental Services must refer it to appropriate staff for review.
- (C) The review staff must review the erosion and sedimentation control plan, determine whether the proposed activity complies with all applicable regulations, identify any noncompliant features, and whenever feasible, suggest modifications to correct the noncompliant features.

Article 10 Erosion and Sedimentation Control

10-30 Erosion and Sedimentation Control Plan and Land Disturbance Permit

- (D) Within 30 days of receipt of a complete initial plan submittal, and within 15 days of receipt of each revised plan, the Wake County Department of Environmental Services must notify the applicant that the plan has been approved, approved with modifications, approved with performance reservations, or disapproved.
- (E) Failure to approve, approve with modifications, approve with performance reservations or disapprove a complete initial erosion and sedimentation control plan within 30 days of receipt constitutes an action of approval.
- (F) Failure to approve, approve with modifications, approve with performance reservations or disapprove a resubmission of an erosion and sedimentation control plan within 15 days of receipt constitutes an action of approval.
- (G) No plan shall be approved unless it complies with all applicable state and County regulations for soil erosion and sedimentation control. Approval assumes the applicant's compliance with federal, state water quality laws, regulations and rules.
- (H) Applicant shall provide documentation, when requested, of compliance with federal, state and local laws, regulations and rules.
- (I) Denial of the erosion and sedimentation control plan must specifically state in writing the reasons for denial.
- (J) If an erosion and sedimentation control plan has been disapproved, the applicant has 12 months to submit revised plans addressing the reasons for disapproval or the erosion and sedimentation control plan is deemed null and void.

10-30-4 Decision-making Criteria

- (A) An erosion and sedimentation control plan may be disapproved if the erosion and sedimentation control plan fails to adequately address the following control objectives:
 - (1) **Identify Critical Areas**
On-site areas that are subject to severe erosion, and off-site areas that are especially vulnerable to damage from erosion and/or sedimentation, must be identified and receive special attention.
 - (2) **Limit Time of Exposure**
All land-disturbing activities must be planned and conducted to limit exposure to the shortest feasible time.
 - (3) **Limit Exposed Areas**
All land-disturbing activity must be planned and conducted to minimize the size of the area to be exposed at any one time.
 - (4) **Control Surface Water**
Surface water runoff originating upgrate of exposed areas must be controlled to reduce erosion and sediment loss during the period of exposure.

Article 10 Erosion and Sedimentation Control

10-30 Erosion and Sedimentation Control Plan and Land Disturbance Permit

(5) Control Sedimentation

All land-disturbing activity must be planned and conducted to prevent off-site sedimentation damage.

(6) Manage Stormwater Runoff

When the increase in the velocity of stormwater runoff resulting from a land-disturbing activity is sufficient to cause accelerated erosion of the receiving watercourse, plans must include measures to control the velocity at the point of discharge to minimize accelerated erosion of the site and increased sedimentation of the stream.

(B) The County must disapprove an erosion and sedimentation control plan or draft plans if implementation of the erosion and sedimentation control plan would result in a violation of the rules adopted by the Environmental Management Commission to protect riparian buffers along surface waters.

(C) The County may disapprove an erosion and sedimentation control plan upon finding that an applicant, or a parent, subsidiary, or other affiliate of the applicant, within the 2 years prior to the application date:

(1) is conducting or has conducted land-disturbing activity without an approved plan, or has received a notice of violation on a previously approved erosion and sedimentation control plan and has not complied with the notice within the time specified;

(2) has failed to pay a civil penalty assessed pursuant to the North Carolina Sedimentation Pollution Control Act or a local ordinance adopted pursuant to the North Carolina Sedimentation Pollution Control Act by the time the payment is due;

(3) has been convicted of a misdemeanor pursuant to G.S. 113A-64(b) or any criminal provision of a local ordinance adopted pursuant to the North Carolina Sedimentation Pollution Control Act; or

(4) has failed to substantially comply with state rules or local ordinances and regulations adopted pursuant to the North Carolina Sedimentation Pollution Control Act.

(5) When an erosion and sedimentation control plan is disapproved under the provisions of this subsection, the County must notify the Director of the North Carolina State Division of Land Resources of such disapproval within 10 days. The County must advise the applicant and the North Carolina State Division of Land Resources in writing as to the specific reasons that the erosion and sedimentation control plan was disapproved.

10-30-5 Amendment of Plans

(A) Application for amendment of an erosion and sedimentation control plan in written and/or graphic form may be made at any time under the same conditions as the original application. Until the County approves the amendment, the land-disturbing activity shall not proceed except in accordance with the erosion and sedimentation control plan as originally approved.

(B) The County must require a revised plan if it determines, upon review of an erosion and sedimentation control plan or inspection of the job site, that a significant risk of accelerated

Article 10 Erosion and Sedimentation Control

10-30 Erosion and Sedimentation Control Plan and Land Disturbance Permit

erosion or off-site sedimentation exists, and the erosion and sedimentation control plan is inadequate to meet the requirements of this article. Pending the preparation of the revised plan, work must stop or continue only under conditions outlined by the appropriate authority.

10-30-6 Validity of Plan, Lapse of Approval

An approved erosion and sedimentation control plan is valid for 2 calendar years from the date of approval. If a land disturbance permit has not been obtained within the 2-year period, the erosion and sedimentation control plan approval becomes null and void.

10-30-7 Land Disturbance Permit Requirements

Land disturbance permits may be obtained upon satisfaction of the following items:

(A) Application

The applicant must provide to the Wake County Department of Environmental Services the number of copies of the approved erosion and sedimentation control plan as prescribed by the Director of Environmental Services.

(B) Fees

Payment of fees established by the Wake County Board of Commissioners for administration of these erosion and sedimentation control regulations must be made at the pre-construction conference.

(C) Pre-Construction Conference

A pre-construction conference with County staff is required prior to issuance of the land disturbance permit.

(D) Certificate of Compliance

A certificate of compliance for preliminary soil erosion and sedimentation control must be issued confirming that initial soil erosion and sedimentation controls have been installed in accordance to the approved plan.

- (1)** Grading, other than for installation of soil erosion and sedimentation control measures, is prohibited prior to the issuance of a certificate of compliance.
- (2)** The certificate of compliance must be issued prior to the approval by the County of an application for building construction in the County, in any of the incorporated areas of the County, or extraterritorial jurisdictional areas of the municipalities of the County subject to the erosion and sedimentation control regulations of this article.

(E) Additional Requirements

- (1)** No land disturbance permit may be issued until the County is assured that the proposed land-disturbing activity will be carried out in accordance with the proposed soil erosion and sedimentation control plan;
- (2)** No land disturbance permit will be issued on property owned by the same individual, corporation, etc. that is in violation of the erosion and sedimentation control regulations of this article until that violation is corrected.

Article 10 Erosion and Sedimentation Control

10-30 Erosion and Sedimentation Control Plan and Land Disturbance Permit

10-30-8 Actions Required Prior to Land Disturbance

(A) Onsite Plan and Permit

An erosion and sedimentation control plan approval and land disturbance permit issued under this article must be prominently displayed until all construction is complete, all permanent sedimentation and erosion control measures are installed and the site has been stabilized. A copy of the approved plan must be kept on file at the job site.

(B) Notice of Activity Initiation

No person shall initiate a land-disturbing activity until notifying the agency that issued the erosion and sedimentation control plan approval of the date that the land-disturbing activity will begin.

10-30-9 Effect of Permit Issuance; Lapse of Approval

- (A)** The land disturbance permit is valid for 2 calendar years except as otherwise noted in Section 10-20-11 Standards for Landfills. If no construction activity has begun within the 2-year period, the land disturbance permit becomes null and void. If construction activity has begun, but the certificate of completion has not been issued within the 2 years, the land disturbance permit must be renewed.

[Amended on 11/17/2008 by OA 07-08.]

- (B)** The land disturbance permit may be renewed for a maximum of two years as either a single two-year extension or in two one-year extensions by submitting a request for a permit extension 30 days prior to the expiration date and payment of all applicable land disturbance fees. Permit renewal fees for the one-year extension will be prorated at 50% of the two-year renewal fee. Extension of the original permit approval beyond the maximum two-year renewal period is not allowed. Any change of ownership must be reflected in a revised financial responsibility form.
- (C)** Projects may be phased using multiple permits. The phasing of a project under a single permit is not allowed. Each project phase requires a separate and independent plan submittal, review fees, permit approval and payment of applicable land disturbance fees.

Commentary: The phasing of large and/or complex projects should be considered when it is anticipated that the maximum permit validity period of 4 years (the original permit has a 2 year validity, plus the maximum renewal period of 2 years) may be insufficient to complete all work or in instances where it may be desirable to obtain certificates of completion for phases, rather than one certificate of completion for the entire project.

- (D)** Failure to renew the land disturbance permit, in accordance with this section, is the same as failure to submit an erosion and sedimentation control plan in accordance with this article and may be subject to a civil penalty of up to \$5,000 per day. Any person who is subject to civil penalty under this subsection may be subject to additional civil penalties for violation of any other provisions of this article, or rules or orders adopted or issued pursuant to the erosion and sedimentation control regulations of this article.
- (E)** All site improvements, as shown on the approved plan, must be completed by the end of the one-year renewal period and before the certificate of completion is issued, if the land disturbance permit is not renewed for an additional 1-year period as allowed by this section. Any person who fails to meet the conditions of the renewal will be subject to a civil penalty as set forth in Part 4 of this article.

Article 10 Erosion and Sedimentation Control

10-31 Inspections

- (F) If the property associated with the approved plan is sold in whole or in part before all conditions of the approved plan are met, the land disturbance permit holder must provide notice to the new owner of conditions of the land disturbance permit and provide Wake County Environmental Services with revised financial responsibility forms.

10-31 Inspections

10-31-1 Authority

- (A) The County has the power to conduct investigations as it reasonably deems necessary to carry out its duties as prescribed in this article. For this purpose, County officials may enter any property, public or private, at reasonable times for the purpose of investigating and inspecting the sites of any land-disturbing activity. No person shall refuse entry or access to any authorized representative or agent for the County who requests entry for purposes of inspections, and presents appropriate credentials, nor shall any person obstruct, hamper, or interfere with any such representatives while in the process of carrying out their official duties.
- (B) Agents and officials of the County will periodically inspect land-disturbing activities to ensure compliance with the North Carolina Sedimentation Pollution Control Act, this article, or rules or orders adopted or issued pursuant to this article, and to determine whether the measures required in the erosion and sedimentation control plan are effective in controlling erosion and sedimentation resulting from land-disturbing activity. Notice of right to inspect must be included in the certificate of approval of each plan.
- (C) Any land-disturbing activity will be the responsibility of the person(s) conducting the land disturbing activity, including the property owners. Failure to prevent off site sedimentation will be deemed a violation of the erosion and sedimentation control regulations of this article.
- (D) The County may require written statements, or the filing of reports under oath, with respect to pertinent questions relating to land-disturbing activity.
- (E) If through inspections the County determines that significant erosion or sedimentation is occurring as a result of land-disturbing activity, despite application and maintenance of protective practices, the person conducting the land-disturbing activity will be required by the Director of Environmental Services or authorized representative to take additional protective action.

10-31-2 Certificate of Completion

- (A) A certificate of completion must be issued when inspections indicate that:
- (1) all conditions of the approved land disturbance permit are met;
 - (2) all disturbed areas are stabilized with permanent ground cover, permanent armor, or impervious surface;
 - (3) all proposed roads, utilities, permanent erosion control devices, and other infrastructure has been installed according to approved plans;
 - (4) all requirements of the approved stormwater plan are met; and

Article 10 Erosion and Sedimentation Control

10-32 Appeals

- (5) all temporary sediment control devices required by the approved erosion and sedimentation control plan are removed or are converted to permanent stormwater devices pursuant to an approved stormwater plan.
- (B) For approved plans involving a proposed public road dedication:
 - (1) once a certificate of completion is issued and a petition for North Carolina Department of Transportation acceptance is submitted to the Wake County Department of Environmental Services, notification must be mailed to the North Carolina Division of Highways District 1 Office; and
 - (2) the notification must state that the project has been issued a certificate of completion and must describe the project in detail with publicly dedicated streets described by name and approximate length.

10-32 Appeals

10-32-1 Local Appeal of Plan Disapproval or Modification

(A) Authority

If any proposed erosion and sedimentation control plan is disapproved or modified by the County, the person submitting the erosion and sedimentation control plan is entitled to a public hearing before the Director of Environmental Services.

(B) Filing

The person who submitted the erosion and sedimentation control plan must submit a written request for a hearing within 15 days after receipt of the written notice of the disapproval or modification.

(C) Hearing

- (1) A hearing before the Director of Environmental Services must be conducted within 30 days after receipt of the request.
- (2) At least 7 days prior to the hearing, the Director of Environmental Services must publish a notice of the hearing, at least once, in a newspaper of general circulation in the County.
- (3) The Director of Environmental Services must render a decision in writing within 7 days of the public hearing.

(D) Notice of Decision

- (1) In the event that the appeal is not granted, the Director of Environmental Services must notify the Director of the North Carolina Division of Land Resources of the disapproval within 10 days.
- (2) The Director of Environmental Services must advise the applicant and the Director of the North Carolina Division of Land Resources in writing as to the specific reasons that the request was disapproved.

Article 10 Erosion and Sedimentation Control

10-41 Notice of Violation

(E) Subsequent Appeals

If the Director of Environmental Services does not grant the appeal, the person submitting the erosion and sedimentation control plan has 15 days following the denial to appeal the County's decision to the North Carolina Sedimentation Control Commission as provided in G.S. 113A-61(c) and 15A NCAC 4B .0118(d).

10-32-2 Direct Appeal to State Agency

If any proposed erosion and sedimentation control plan is disapproved, the applicant may appeal the Director of Environmental Service's decision directly to the North Carolina Sedimentation Control Commission.

Sections 10-33 through 10-39 reserved for future use.

Part 4 Enforcement and Penalties

10-40 Violations

Unless lawfully exempted, the following actions constitute a violation of this article and will be deemed in violation of this article and subject to the enforcement and penalty provisions of this article and Article 20 of the UDO:

- 10-40-1** to engage in land-disturbing activity without filing an erosion and sedimentation control plan in accordance with the regulations of this article;
- 10-40-2** to conduct a land-disturbing activity except in accordance with provisions of an approved plan;
- 10-40-3** to fail to protect against off-site sedimentation damage when conducting any land-disturbing activity;
- 10-40-4** to leave dirt, mud or other material on any travel way in a manner that is determined to be a hazard to public safety or deemed detrimental to the waters of the State;
- 10-40-5** to violate or continue to violate any other provisions of this article, the North Carolina Sedimentation Pollution Control Act, or rules or orders adopted pursuant to this article.

10-41 Notice of Violation

10-41-1 If the Director of Environmental Services determines that a person conducting a land-disturbing activity has violated this article, a notice of violation shall be served upon that person. The notice may be served by any means authorized under GS 1A-1, Rule 4. The notice must:

- (A)** specify a date by which the person must come into compliance with the applicable standards; and
- (B)** inform the person of the actions that need to be taken to be brought into compliance.

10-41-2 Any person who fails to comply within the time specified is subject to additional civil and criminal penalties for a continuing violation as provided in G.S. 113A-64 and this ordinance.

10-42 Civil Penalties

10-42-1 Maximum Penalty

Any person who commits a violation according to Sec. 10-40 is subject to a maximum civil penalty of up to \$5,000 per violation per day. A civil penalty may be assessed from the date of the violation. Each day of a continuing violation constitutes a separate violation.

10-42-2 Civil Penalty Assessment Factors

The Director of Environmental Services is authorized to assess the penalty. Fines will be determined by considering the following:

- (A) the degree and extent of harm caused by the violation;
- (B) the cost of rectifying the damage;
- (C) the money saved by the violator by non-compliance
- (D) whether the violation was willful; and
- (E) the prior record of the violator.

10-42-3 Notice of Civil Penalty Assessment

The governing body of the County must provide notice of the civil penalty amount and the basis for assessment to the person assessed. The notice of assessment must be served by any means authorized under G.S. 1A-1, Rule 4 and must direct the violator to either pay the assessment or appeal the assessment within 30 days after receipt of the notice of assessment.

10-42-4 Appeal of Civil Penalties

The person conducting the land-disturbing activity may appeal the assessment of civil penalties to the Director of Environmental Services within 30 days of receipt of the notice of assessment. The Director of Environmental Services must consider any and all extenuating or mitigating circumstances.

10-42-5 Demand for Payment

- (A) The Director of Environmental Services must make a written demand, by registered or certified mail, return receipt requested, or other means provided in GS 1A-1, Rule 4 for payment upon the person in violation, and must set forth, in detail, a description of the violation for which the penalty has been imposed.
- (B) If the payment is not received or equitable settlement reached within 30 days after demand for payment is made, the matter must be referred to the County Attorney for institution of a civil action in the name of the County, in the appropriate division of the General Court of Justice in Wake County for recovery of the penalty.

10-42-6 Payment of Penalties

Civil penalties collected pursuant to this ordinance must be credited to the Civil Penalty and Forfeiture Fund.

10-43 Stop Work Order

If the County, upon site inspection determines that due care for plan implementation is inadequate to meet the requirements of this article the County may issue a stop work order in accordance with the decision-

Article 10 Erosion and Sedimentation Control

10-47 Civil Relief

making criteria of Sec. 10-30-4. Upon the issuance of a stop work order, the Director of Environmental Services must require that all provisions of this article be met.

10-44 Road Cleaning

Any person or companies determined in violation of Sec. 10-23 will be charged for road cleaning at the rate of \$300 per hour for the first hour or part of hour and \$200 per hour or part of hour thereafter until work is completed as specified by the County's authorized agent.

10-45 Criminal Penalties

Any person who knowingly or willfully violates or continues to violate any provision of this article according to Sec. 10-40 is guilty of a class 2 misdemeanor which may include a fine not to exceed \$5,000 per violation per day as provided in G.S. § 113A-64.

10-46 Injunctive Relief

10-46-1 Initiation

- (A) Whenever the Director of Environmental Services has reasonable cause to believe that a person is violating or threatening to violate this article, a rule or order adopted or issued pursuant to this article, or any term, condition, or provision of an approved erosion and sedimentation control plan, the Director may institute a civil action in the name of the County for injunctive relief to restrain the violation or threatened violation.
- (B) The action must be brought in the Superior Court of Wake County, either before or after the institution of any other action or proceeding authorized by the erosion and sedimentation control regulations of this article,.

10-46-2 Court Action

- (A) Upon determination by a court that an alleged violation is occurring or is threatened, the court must enter orders or judgments as are necessary to abate the violation, to ensure that restoration is performed, or to prevent the threatened violation.
- (B) The institution of an action for injunctive relief under this section does not relieve any party to the proceeding from any civil or criminal penalty prescribed for violations of the erosion and sedimentation control regulations of this article.

10-47 Civil Relief

10-47-1 Any person injured by a violation of this article, or of any rule, regulation, or order duly adopted by the Wake County Board of Commissioners, or by the initiation or continuation of a land-disturbing activity for which an erosion and sedimentation control plan is required other than in accordance with the terms, conditions, and provisions of an approved plan, may bring a civil action against the person alleged to be in violation. The action may seek:

- (A) injunctive relief;
- (B) an order enforcing the erosion and sedimentation control regulations of this article or rule, regulation, order or erosion and sedimentation control plan violated;
- (C) damages caused by the violation;
- (D) both damages and injunctive relief; or

Article 10 Erosion and Sedimentation Control

10-48 Restoration After Non-Compliance

(E) both damages and enforcement order.

10-47-2 Civil action under this section may be brought in the Superior Court of Wake County. The court, in issuing any final order in any action brought pursuant to this section may award costs of litigation (including reasonable attorney and expert witness fees) to any party, whenever it determines that such an award is appropriate. The court may, if a temporary restraining order or preliminary injunction is sought, require the filing of a bond or equivalent security with the amount of the bond or security to be determined by the court.

10-47-3 Nothing in this section restricts any right that any person (or class of persons) may have under any statute or common law to seek injunctive or other relief.

10-48 Restoration After Non-Compliance

The County may require a person who engaged in a land-disturbing activity and failed to retain sediment generated by the activity, as required by this article and G.S. 113A-57 (3), to restore the affected waters and land to minimize the detrimental effects of the resulting pollution by sedimentation. This authority is in addition to any other civil or criminal penalty or injunctive relief authorized under this ordinance.

[Article 10 amended 11/19/2007 by OA 02-07]

Article 11. Environmental Standards

Part 1 Neuse Riparian Buffers

11-10 Applicability of Neuse Riparian Buffer Protection Rules

The riparian buffer protection rules of 15 A NCAC 2B.0233 (Neuse River Basin: Nutrient Sensitive Waters Management Strategy: Protection and Maintenance of Existing Riparian Buffers) apply to all lands within the Neuse River and Cape Fear River basins.

Sections 11-11 through 11-19 are reserved for future use

Part 2 Water Supply Watershed Buffers

11-20 Purpose

Water supply watershed buffers provide strips of natural vegetation that remove pollutants from stormwater runoff before they reach a water supply source or a watercourse that drains to a water supply source. They do so by allowing infiltration of runoff and filtration of pollutants through the ground and soil, slowing runoff flow to allow settling and deposition of pollutants, and providing vegetation that absorbs pollutants through root systems. The provision of vegetated, undisturbed buffers within water supply watersheds, therefore, is an important and effective means of maintaining the quality of public water supply sources and protecting those sources from potential polluting activities associated with development.

Commentary: A summary of the Wake County Water Supply Watershed Buffers and Regulations and classifications are attached in Appendix B.

11-21 Buffer Location and Width

Water supply watershed buffers and building setbacks from such buffers must be provided in accordance with the following table.

11-21-1 General

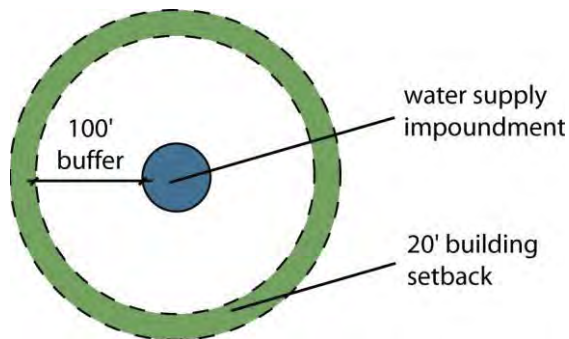
- (A) In the event of conflict with other applicable regulations, the more restrictive regulation governs. Note: Some streams may require both water supply watershed buffers and Neuse River riparian buffers. In such cases, the more restrictive of the either the U.S.G.S. 1:24,000 (7.5 minute) scale topographic maps or the USDA Soils Map must be used to determine a perennial stream.
- (B) Buffers described in Sec. 11-21-6 and Sec. 11-21-3 were previously identified and platted as “drainageway buffers.” Because they serve the same function and are subject to the same limitations as water supply watershed buffers, they have been re-designated as “water supply watershed buffers.”
- (C) Some streams may require both water supply watershed buffers and Neuse River riparian buffers.
- (D) All limits of disturbance within watershed buffers apply to each side of the water body.

Article 11 Environmental Standards

11-21 Buffer Location and Width

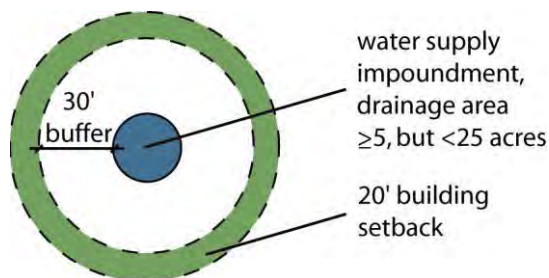
11-21-2 Water Supply Impoundments

- (A) A water supply watershed buffer with a minimum width of 100 feet must be provided around all water supply impoundments with a drainage area of 25 acres or more that are located inside the water supply watershed draining into the water supply water impoundment.
- (B) The buffer width is to be measured perpendicular to the shoreline starting at the flood pool elevation of the water supply impoundment.
- (C) Buildings must be setback at least 20 feet from the outer boundary of the required buffer area.



11-21-3 Water Supply Impoundments, 5 to 25 Acres

- (A) A water supply watershed buffer with a minimum width of 30 feet must be provided around all water impoundments with a drainage area of at least 5 acres, but less than 25 acres, located inside the watershed draining into the water supply impoundment.
- (B) Required buffers are to be measured perpendicular to the shoreline starting at the normal pool elevation of the water impoundment.
- (C) Buildings must be setback at least 20 feet from the outer boundary of the required buffer area.



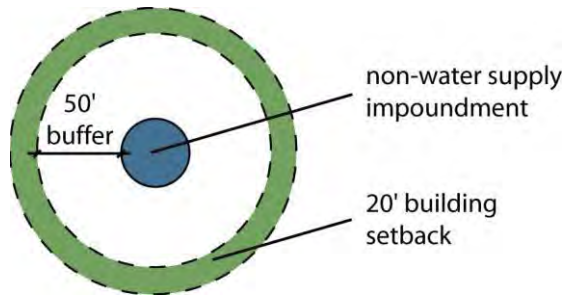
11-21-4 Non-Water Supply Impoundments

- (A) A water supply watershed buffer with a minimum width of 50 feet must be provided around all non-water supply impoundments with a drainage area of 25 acres or more that are located inside the watershed draining into the non-water supply impoundment.
- (B) The buffer width is to be measured perpendicular to the shoreline starting at the normal pool elevation of the non-water supply impoundment.

Article 11 Environmental Standards

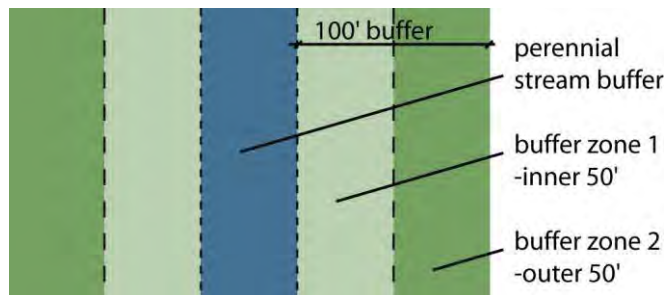
11-21 Buffer Location and Width

- (C) Buildings must be setback at least 20 feet from the outer boundary of the required buffer area.



11-21-5 Perennial Streams

- (A) A water supply watershed buffer with a minimum width of 100 feet must be provided along each side of a stream shown as a perennial stream on the most recent edition of U.S.G.S. 1:24,000 (7.5 minute) scale topographic maps. [1]
- (B) The buffer width is to be measured perpendicular to the river or stream bank starting at the river or stream bank.
- (C) The area of the required buffer that begins at the stream bank and extends landward 50 feet is subject to the Zone 1 standards of Sec. Section 11-22-1(A).
- (D) The area of the required buffer that begins at the outer edge of Zone 1 and extends landward 50 feet is subject to the Zone 2 standards of Sec. Section 11-22-1(B).
- (E) There is no minimum building setback from the required buffer.

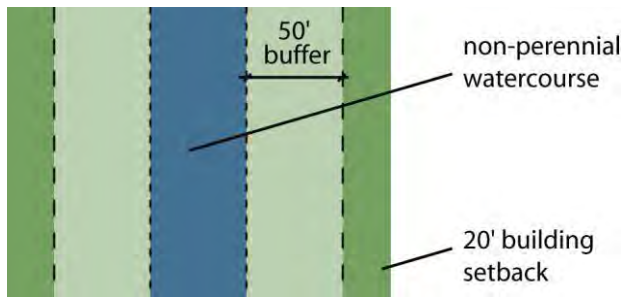


11-21-6 Non-Perennial Watercourses

- (A) A water supply watershed buffer with a minimum width of 50 feet must be provided along each side of non-perennial watercourses, channels, ditches or similar physiographic features with a drainage area of 25 acres or more that are located inside the watershed draining into the stream.
- (B) The buffer width is to be measured perpendicular to the drainageway starting at the natural drainage flow line of the watercourse.
- (C) Buildings must be setback at least 20 feet from the outer boundary of the required buffer area.

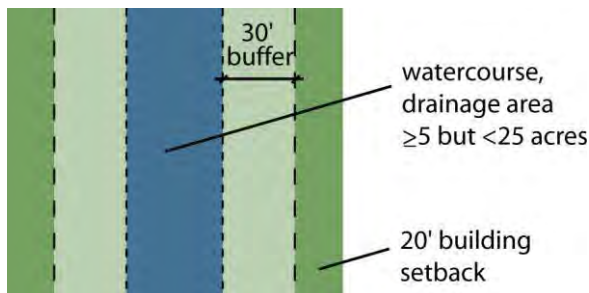
Article 11 Environmental Standards

11-22 Activities Allowed Within Buffers



11-21-7 Watercourses and Channels, 5 to 25 Acres

- (A) A water supply watershed buffer with a minimum width of 30 feet must be provided along each side of a watercourse, channel, ditch, or similar physiographic feature with a drainage area of at least 5 acres, but less than 25 acres, located inside the drainage area of the drainageway.
- (B) Required buffers are to be measured perpendicular to the drainageway starting at the natural drainage flow line of the watercourse.
- (C) Buildings must be setback at least 20 feet from the outer boundary of the required buffer area.



11-22 Activities Allowed Within Buffers

11-22-1 General

- (A) The inner 50 feet (“Zone 1”) of required 100-foot buffers along perennial streams and all other water supply watershed buffers must consist of a vegetated area that is undisturbed except for the activities expressly allowed to occur within water supply watershed buffers pursuant to subsection 11-22-2.
- (B) The outer 50 feet (“Zone 2”) of required 100-foot buffers along perennial streams must consist of a stable vegetated area that is undisturbed except as necessary to accommodate the activities expressly allowed to occur within water supply watershed buffers pursuant to subsection 11-22-2. Grading and revegetation, as well as lawns and landscaping, are allowed within Zone 2 of the perennial stream buffer.
- (C) Any allowed disturbance that occurs as a result of the activities expressly permitted in subsection 11-22-2 must be designed, constructed, and maintained to:
 - (1) minimize impervious or partially impervious surface coverage;

Article 11 Environmental Standards

11-22 Activities Allowed Within Buffers

- (2) diffuse the flow of stormwater runoff, encourage sheet flow and avoid concentrated discharge of stormwater into surface waters;
- (3) maximize the use of Best Management Practices (BMPs) to minimize adverse water quality impacts; and
- (4) comply with all applicable standards and conditions of subsection 11-22-2.

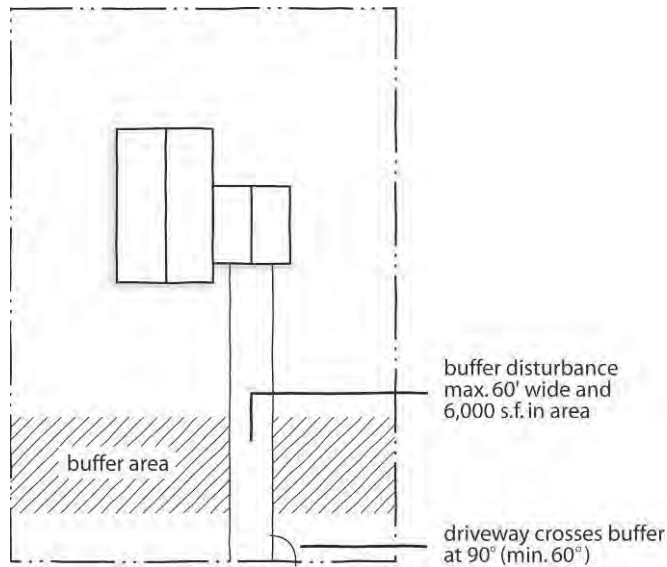
11-22-2 Activities Allowed within Buffers

Only the activities listed below are allowed within required water supply watershed buffer areas:

- (A) Archeological activities, provided any vegetation removed is restored with vegetation of a comparable assimilative capacity
- (B) Bridges, provided no alternative to their location in the buffer exists
- (C) Dam maintenance activities
- (D) Drainage ditches, roadside ditches, and stormwater outfalls, provided:
 - (1) no alternative to their location in the buffer exists; and
 - (2) a stormwater management facility is installed to control nitrogen and attenuate flow before the conveyance discharges through the buffer
- (E) Drainage of a pond, provided a new vegetated water supply watershed buffer meeting the purpose and requirements of this section is established along the new drainageway
- (F) Driveway crossings that access single-family dwellings, provided:
 - (1) no alternative to their location in the buffer (including opportunity for shared driveways) exists;
 - (2) buffer disturbance is no more than 60 feet wide;
 - (3) buffer disturbance is no more than 6,000 square feet in area (this area of disturbance may occur on “both” sides of the buffer);
 - (4) the driveway crosses the buffer at an angle as close to 90 degrees as possible (and not less than 60 degrees);
 - (5) side slopes do not exceed a 2:1 (horizontal to vertical) ratio (bridging and/or retaining walls may be used to meet this and the disturbance width standard); and
 - (6) all culverts are designed and constructed for the 25-year storm event or as otherwise required by the Department of Environmental Services.

Article 11 Environmental Standards

11-22 Activities Allowed Within Buffers



Commentary: The State of North Carolina does not recognize pervious pavements as a Best Management Practice. Therefore, it cannot be credited as pervious area, although the county continues to encourage the use of pervious paving materials and/or dual ribbon design.

(G) Utility lines, provided:

- (1)** no alternative to their location in the buffer exists;
- (2)** a line crossing the buffer is combined with other permitted buffer crossings where practicable;
- (3)** buffer disturbance is not more than 40 feet wide;
- (4)** woody vegetation is removed by hand (no land grubbing or grading);
- (5)** vegetative root systems and stumps from cut trees are retained;
- (6)** no rip rap is used unless necessary to stabilize a pole or tower;
- (7)** active measures are taken after construction and during routine maintenance to ensure diffuse flow of stormwater through the buffer;
- (8)** mats are used to minimize soil disturbance (in wetlands);
- (9)** poles or towers are not installed within 10 feet of the lake, pond, river, stream, or drainageway;
- (10)** the area within 10 feet of the lake, pond, river, stream, or drainageway is managed so that only vegetation posing a hazard or with a potential to grow tall enough to interfere with the line is removed;
- (11)** construction activities minimize removal of woody vegetation, the extent of disturbed area, and the time during which areas remain in a disturbed state;
- (12)** cables are installed by vibratory plow or trenching; and

Article 11 Environmental Standards

11-22 Activities Allowed Within Buffers

- (13) trenches are backfilled with the excavated material immediately following line installation.
- (H) Pedestrian, bikeway, equestrian, golf cart, and other recreation trails (public or private), provided:

 - (1) no alternative to their location in the buffers exists
 - (2) a trail crossing the buffer is combined with other permitted buffer crossings where practicable;
 - (3) buffer disturbance is no more than 20 feet wide (unless otherwise approved by the Department of Environmental Services);
 - (4) the trail is no more than 12 feet wide;
 - (5) a trail crossing the buffer does so at an angle as close to 90 degrees as possible (and not less than 60 degrees); and
 - (6) a trail running linearly within the buffer must be located, where possible, in the outer 20 feet of the buffer and in no instances may such trail be closer than 10 feet to the edge of the lake, pond, river, stream or drainageway
- (I) Railroad crossings, provided:

 - (1) no alternative to their location in the buffer exists;
 - (2) buffer disturbance is not more than 60 feet wide; and
 - (3) buffer disturbance is no more than 6,000 square feet in area (this area of disturbance may occur on “both” sides of the buffer).
- (J) Removal of previous fill or debris, provided:

 - (1) diffuse flow is maintained; and
 - (2) any vegetation removed is restored with vegetation of comparable assimilative capacity
- (K) Road crossings (public or private roads), provided:

 - (1) no alternative to their location in the buffer exists;
 - (2) buffer disturbance does not extend beyond the required right-of-way or easement width, or in no case is more than 90 feet wide;
 - (3) buffer disturbance is no more than 9,000 square feet in area (this area of disturbance may occur on “both” sides of the buffer);
 - (4) the road crosses the buffer at an angle as close to 90 degrees as possible (and not less than 60 degrees);

Article 11 Environmental Standards

11-22 Activities Allowed Within Buffers

- (5) side slopes do not exceed a 2:1 horizontal: vertical ratio (bridging and/or retaining walls may be used to meet this and the disturbance width standard); and
- (6) all culverts are designed and constructed for the 25-year storm event or as otherwise required by the Department of Environmental Services.

Commentary: The State of North Carolina does not recognize pervious pavements as a Best Management Practice. Therefore, it cannot be credited as pervious area, although the county continues to encourage the use of pervious paving materials and/or dual ribbon design.

- (L) Scientific studies and stream gauging
- (M) On-site sewage disposal systems and irrigation of reclaimed water meeting the standards set forth in 15A NCAC 02H .0219 (k) of the North Carolina Administrative Code, provided that such facilities may be located only within areas of water supply watershed buffers that are subject to Zone 2 standards as specified in Sec. 11-21.
- (N) Stormwater management ponds, provided
 - (1) no alternative to their location in the buffer exists; and
 - (2) a new vegetated water supply watershed buffer meeting the purpose and requirements of this Paragraph is established around the new pond
- (O) Stream restoration
- (P) Stream bank stabilization
- (Q) Temporary in-stream sediment and erosion control measures for work within a stream channel
- (R) Vegetation management, including:
 - (1) emergency fire control measures, provided topography is restored;
 - (2) planting vegetation to enhance the buffer's function;
 - (3) pruning forest vegetation, provided the health and function of the vegetation is not compromised;
 - (4) removing individual trees that are in danger of causing damage to dwellings, other structures, or human life;
 - (5) removing poison ivy; and other noxious growth; and
 - (6) removing understory nuisance vegetation as defined in Exotic Plant Guidelines (Guideline #30, NC DENR, Div. of Parks and Recreation. 1998)
- (S) Water-dependent structures
- (T) Wetland restoration

11-23 Building Setbacks from Buffers

Buildings must be setback at least 20 feet from the outer edge of water supply watershed buffers. In the event of conflict between this buffer setback standard and other applicable standards, the more restrictive standard (the one requiring the greater setback) governs.

11-24 Platting of Lots

11-24-1 Options

The inner 50 feet (“Zone 1”) of required 100-foot buffers along perennial streams must either be: (1) platted as part of a development lot and included within a conservation easement or (2) set-aside as a reserved conservation parcel, in accordance with the standards of this section.

11-24-2 Development Lots and Reserve Parcels

(A) “Development Lots”

For purposes of this section, “development lots,” are lots that are used or intended to be used for principal uses allowed by the underlying zoning district.

(B) “Reserved Conservation Parcels”

For purposes of this section, “reserved conservation parcels” are parcels of land that are not used and are not intended to be used for principal uses allowed by the underlying zoning district, but are set-aside to conserve and protect natural areas in perpetuity.

11-24-3 Conservation Easement Option

Under the conservation easement option, the inner 50 feet (“Zone 1”) of required 100-foot buffers along perennial streams must be covered by a perpetual conservation easement in accordance with the following standards.

- (A)** The inner 50 feet (“Zone 1”) of required 100-foot buffers along perennial streams may be platted in development lots only if a perpetual conservation easement is dedicated covering the entire inner 50 feet.
- (B)** Conservation easements must run in favor of the Wake County Soil and Water Conservation District or any other recognized land conservation agency approved by the Planning Director.
- (C)** The easement grantee must grant permission to authorized employees and agents of Wake County to enter upon the property, inspect, maintain or repair the required buffer whenever the county deems necessary. This provision is not to be interpreted as an express or implicit obligation for the county to maintain or repair buffer areas.
- (D)** The grantee of a conservation easement is responsible for ensuring conservation and stewardship of the water supply watershed buffer and for carrying out conservation-related activities. Easement grantees are authorized to assign all or a portion of their conservation and stewardship duties to another appropriate entity approved by the Planning Director.
- (E)** A conservation easement and any related access easements must be shown on the record plat, noting the purpose of the easement as well as the names of the grantees and grantors.

11-24-4 Reserve Parcel Option

Under the reserve parcel option, the inner 50 feet (“Zone 1”) of required 100-foot buffers along perennial streams must be set aside as reserved conservation parcels in accordance with the following standards.

Article 11 Environmental Standards

11-30 Swift Creek Water Supply Watershed

- (A) The inner 50 feet (“Zone 1”) of required 100-foot buffers along perennial streams that is not covered by a conservation easement must be labeled on the plat as a “reserved conservation parcel” and restricted from future use or conveyance as a development lot. Reserved conservation parcels must be dedicated to a property owners’ association or recognized land conservation agency.
- (B) Reserved conservation parcels and remnants are exempt from the lot area and width standards of the underlying zoning district and from UDO standards requiring frontage on a public or private road, provided that a pedestrian access easement is provided to the parcel, with a minimum width of 10 feet.
- (C) Under the reserve parcel option, development lots may not be platted within the inner 50 feet of required 100-foot buffers along perennial streams.

11-25 Density and Impervious Surface Calculations

- 11-25-1** The land area included within conservation easements and reserved conservation parcels will be included in calculating the allowable density for a cluster or open space subdivision.
- 11-25-2** The land area included within conservation easements and reserved conservation parcels will be included in calculating the allowable impervious surface coverage within a subdivision.

Sections 11-26 through 11-29 are reserved for future use

Part 3 Special Watershed Areas

11-30 Swift Creek Water Supply Watershed

- 11-30-1** Development in the Swift Creek Water Supply Watershed is subject to the requirements of the Swift Creek Land Management Plan in addition to other applicable standards of this ordinance. See also Article 9 of this ordinance.
- 11-30-2** All residential and commercial properties require a preliminary site plan prepared by a licensed professional land surveyor, landscape architect, architect, or engineer.
- 11-30-3** An as-built plan prepared by a licensed professional land surveyor is required for all lots before a Certificate of Occupancy may be issued.
- 11-30-4** In addition to the standards of the underlying zoning districts, the following standards apply to all land within the Swift Creek Water Supply Watershed:

Standards	Critical Area		Non-Critical Area						
	Rural	Urban	Rural		Suburban – New		Urban - New		Existing Urban
	Limited Res*	Limited Res*	Res	Nonres	Res	Nonres	Res	Nonres	Res & Nonres
Maximum Density (DU/acre)	0.5	2.5	1	n/a	2.5	n/a	6 east of Holly Springs Rd.; may exceed 6 west of Holly Springs Rd.	n/a	Res. Controlled by underlying zoning; Nonres. n/a
Max. Impervious Surface Ratio (%) [8]	6	6 [1]	12 [2]	12 [2]	12 [3]	12 [3]	12 [4]	12 [4]	12 [4]
Impoundments and Maintenance [5]	Allowed	[9]	Required if over 12% impervious, public or private maintained						
Municipal Sewer [6]	Prohibited [7]	Required if over 6%	Prohibited [7]		Required if over 12% impervious				

Article 11 Environmental Standards

11-31 Little River Water Supply Watershed

Standards	Critical Area		Non-Critical Area						
	Rural	Urban	Rural		Suburban – New		Urban - New		Existing Urban
	Limited Res*	Limited Res*	Res	Nonres	Res	Nonres	Res	Nonres	Res & Nonres
		Impervious							
Private Sewer [6]	Prohibited		Allowed		Allowed if under 12%				

- [1] Limit may be increased to 35% if consistent with the impervious surface limitations of the underlying zoning district and the first 1" of rainfall runoff is retained
- [2] Limit may be increased to 30% if consistent with the impervious surface limitations of the underlying zoning district and the first ½" of rainfall runoff is retained
- [3] Limit may be increased to 30% if consistent with the impervious surface limitations of the underlying zoning district and the first 1" of rainfall runoff is retained
- [4] Limit may be increased to 30% and 70% (respectively) if consistent with the impervious surface limitations of the underlying zoning district and the first ½" or 1" of rainfall runoff is retained
- [5] Refer to minimum state construction standards and inspection requirements
- [6] Point source discharge is prohibited in basin
- [7] Municipal sewer is allowed to protect public health when private systems fail
- [8] Lots created after 7/01/2001 are subject to Wake County stormwater management regulations.
- [9] Required if over 12% impervious, public or private maintained

* excludes public, civic and institutional uses such as colleges, schools, public libraries, museums and art galleries

11-31 Little River Water Supply Watershed

11-31-1 General Requirements

- (A) All residential and commercial properties require a preliminary site plan to be prepared by a licensed professional engineer, surveyor, architect or landscape architect in order to initiate the permit process effective July 2, 2001.
- (B) An as-built plan prepared by a licensed professional land surveyor is required for all lots before a Certificate of Occupancy may be issued.

11-31-2 Lot Sizes

- (A) The minimum lot size for all residential lots in the Little River Water Supply Watershed is 40,000 square feet per dwelling unit.
- (B) The minimum lot size for all nonresidential lots in the Little River Water Supply Watershed is 40,000 square feet plus 40,000 square feet for each additional 1,250 gallons per day or portion thereof of anticipated wastewater generated in excess of 1,250 gallons per day.

11-31-3 Impervious Surface Ratios

The following maximum impervious surface ratios apply to all nonresidential development in the Little River Water Supply Watershed:

Zoning District	Maximum Nonresidential Impervious Surface Ratio (% of lot/site)
R-80W	6
R-40W	12

11-32 Smith Creek Water Supply Watershed

11-32-1 General Requirements

- (A) All residential and commercial properties require a preliminary site plan prepared by a licensed professional land surveyor, landscape architect, architect or engineer effective July 2, 2001.
- (B) An as-built plan prepared by a professional land surveyor is required for all lots before a Certificate of Occupancy may be issued.

11-32-2 Lot Sizes

- (A) The minimum lot size for all residential lots in the Smith Creek Water Supply Watershed is 40,000 square feet per dwelling unit.
- (B) The minimum lot size for all nonresidential lots in the Smith Creek Water Supply Watershed is 40,000 square feet plus 40,000 square feet for each additional 1,250 gallons per day or portion thereof of anticipated wastewater generated in excess of 1,250 gallons per day.

11-32-3 Impervious Surface Ratios

The following maximum impervious surface ratios apply to all nonresidential development in the Smith Creek Water Supply Watershed:

Zoning District	Maximum Nonresidential Impervious Surface Ratio (% of lot/site)
R-80W	6
R-40W	12

Article 16. Landscaping and Tree Protection

16-10 Landscaping and Bufferyards

16-10-1 Off-Street Parking Area Landscaping

(A) Perimeter Landscaping

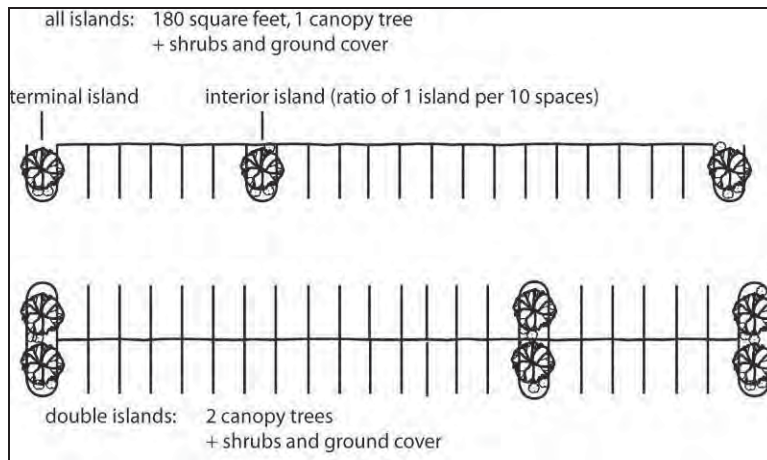
- (1) The parking lot perimeter landscaping requirements of this section apply to all off-street parking lots and vehicular use areas containing 10 or more parking spaces or an area of 3,000 square feet or more. "Vehicular use areas" include drive-through lanes, travel lanes, and other areas upon which vehicles traverse the lot as a function of the primary use.
- (2) The parking lot perimeter landscaping standards of this section do not apply where a lot to be used for the erection of a place of worship was purchased by a religious organization for that purpose and the purchase thereof is evidenced by a deed to the religious organization or the trustee or other proper officers thereof in their representative capacity and filed for registration in the Office of the Register of Deeds of Wake County on or prior to August 15, 1950.
- (3) Parking and vehicular use areas must be screened from view of adjacent properties and public rights-of-way by a solid evergreen hedge a minimum of 3 feet in height. At least one canopy tree must be planted for each 40 linear feet of parking lot perimeter.

(B) Interior Landscaping

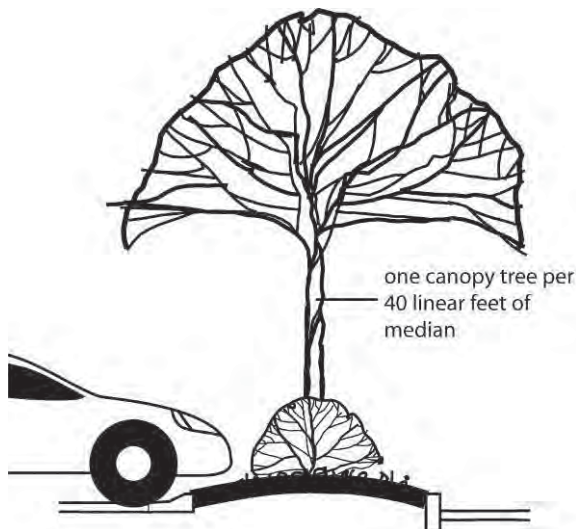
- (1) The interior parking lot landscaping requirements of this section apply to all off-street parking lots containing 10 or more parking spaces except those expressly exempted under Sec. 16-10-1(A)(2), above. Interior landscaping must consist of the following:
 - (a) terminal landscape islands at the end of each row of parking spaces, and either;
 - i. interior landscape islands within each row of parking; or
 - ii. a landscape divider median between abutting rows of parking spaces. Each terminal and interior landscape island must be at least 180 square feet in size and be planted with a minimum of 1 canopy tree, as well as shrubs, and ground cover. Double islands within a double row of parking (typically the area of 2 abutting parking spaces combined into a single parking lot island) must be planted with 2 canopy trees, shrubs, and ground cover.

Article 16 Landscaping and Tree Protection

16-10 Landscaping and Bufferyards



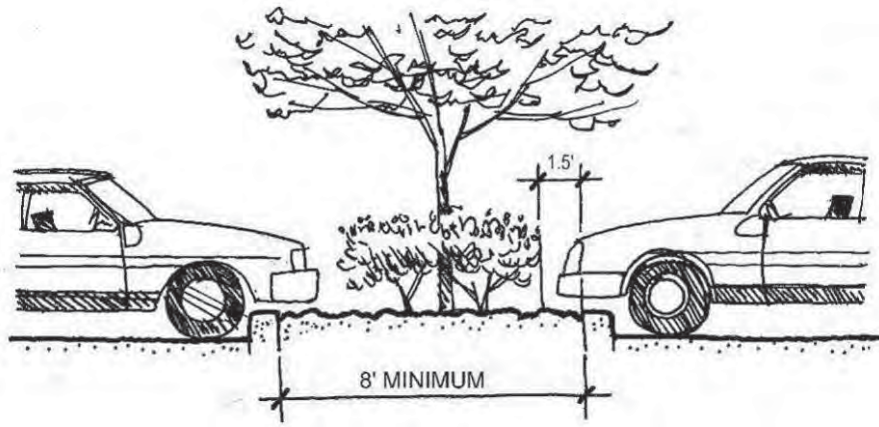
- (2) Each landscape island must have a horizontal dimension of at least 9 feet, as measured back-of-curb to back-of-curb.
- (3) Where interior parking lot islands are provided, ratio of 1 landscape island must be provided for every 10 parking spaces, but in no case may any parking space be located more than 50 feet from the trunk of a tree in a single landscape island, or 75 feet from the trunk of a tree in a double landscape island or landscape median.
- (4) Where landscape divider medians are provided to meet the minimum landscaped area, they must be a minimum of 8 feet in width (measured back-of-curb to back-of-curb), and be planted with a minimum of 1 canopy tree for every 40 feet of linear median, as well as shrubs and ground cover. Divider medians that are at least 15 feet in width may include a pedestrian walkway, in addition to the required landscape plantings. Landscape divider medians may serve as the first 1.5 feet of required parking stall depth for parking spaces that are designated for non-compact vehicles only. A maximum of 25 percent of the total required number of parking spaces may be designated for compact vehicles.



- (5) All parking spaces must be blocked or curbed to prevent vehicles from damaging adjacent fences or overhanging planting islands or landscaped yards by an average of more than 2 feet.

Article 16 Landscaping and Tree Protection

16-10 Landscaping and Bufferyards



(C) Plans

Whenever a parking area is required to be landscaped, the information included in the approved landscaping plan must be submitted to the Planning Director as part of the plan for a parking lot or site or development plan.

16-10-2 Bufferyards

(A) Purpose

The bufferyard regulations of this section are intended to:

- (1) utilize spacing and screening to buffer lower density and intensity uses from higher density or intensity uses and reduce adverse visual effects and the impacts of traffic, noise, dust, and odor;
- (2) tailor bufferyard requirements to suit the varying intensities of use; and
- (3) require adequate screening of commercial and industrial uses along thoroughfares to preserve building values and to enhance the visual appearance of road corridors.

(B) Applicability

- (1) Any new nonresidential use or high-density residential use must provide bufferyards and screening in accordance with the requirements of this section.
- (2) Any change in a nonresidential use to a more intensive class of use, or expansion of an existing nonresidential or high-density residential use by 25% or more of the floor area and/or impervious surface associated with the use as of August 15, 1996 must provide bufferyards and screening in accordance with the requirements of this section.
- (3) In the case of an expansion of a lawful existing use, when the degree of expansion does not exceed 50%, such expansion need only provide a bufferyard and screening that meets the requirements of this section to a degree proportional to the degree of expansion. For example, a 30% expansion of an existing use must provide a bufferyard meeting 30% of required bufferyard depth and plant density (screen) requirements. For purposes of this section, existing uses include proposed uses for which a land use permit has been issued and remains valid, and the class of a use and zoning of vacant land must be determined from the bufferyard table in Sec. 16-10-2(D). These bufferyard regulations apply whether or not the adjoining lot is in the

Article 16 Landscaping and Tree Protection

16-10 Landscaping and Bufferyards

same zoning district. (See Sec. 16-10-2(I) for other instances in which bufferyards are required).

- (4) No landscaping material will be allowed within a minimum radius of 3 feet around any fire hydrant. Additionally, each fire hydrant must be provided with a minimum 3-foot wide access, from the adjacent parking lot, driveway, or street, that is unobstructed by any landscaping material (other than grass). Access roads must be maintained so as to remain clear of all vegetation for a width of 20 feet and a height of 13 feet 6 inches to allow for emergency vehicle access.
- (5) The buffers required by this section do not apply to temporary uses.

(C) Location of Bufferyards

Bufferyards must be located:

- (1) along the perimeter of a lot or parcel, but not within any portion of an existing or planned road right-of-way; or
- (2) in instances where the area represented by a site plan is significantly less than the total area of the lot of record, the Planning Director may permit the screening required between the proposed use and adjacent lots to be located in a bufferyard surrounding the smaller area provided that:
 - (a) the depth of the bufferyard and type of screening provided for the smaller area is equal to or greater than required by the bufferyard table of Sec. 16-10-2(D);
 - (b) the bufferyards required in Sec. 16-10-2(D) are also provided around the perimeter of the lot of record; and
 - (c) the total area of the lot of record, less the smaller area represented by the subject site plan, could meet the minimum requirements within the applicable zoning district, if considered as if it were an independent lot of record.
- (3) Around the perimeter of a leased lot or parcel utilized for telecommunication towers. A 40-foot, type C bufferyard is required.

[Amended on 1/22/2008 by OA 04-07.]

(D) Bufferyard Table

The following table establishes minimum bufferyard depth and screen (landscape planting) standards. To determine the applicable requirements, first identify the class of the proposed (new, changed, or expanded) use. Then identify the class of each adjacent existing use and the zoning of each adjacent vacant lot. The intersection of the row associated with the proposed use and the column associated with the adjacent use shows the minimum depth and screening requirement; the number indicates the bufferyard depth (in feet) and the letter indicates the type of screen required.

Article 16 Landscaping and Tree Protection

16-10 Landscaping and Bufferyards

Bufferyard Depth and Screening (feet/screen type)

Class of Adjacent Existing Use	Class of Proposed Use					
	Residential			Nonresidential		
	Low-density [1]	Medium-density [2]	High-density [3]	Low-intensity [4]	Medium-intensity [5]	High-intensity [6]
Low-density residential [1]	NA	20/E	30D	40C	60/B	80/A
Medium-density [2]	NA	NA	20E	30D	40/C	60/B
High-density residential [3]	NA	NA	NA	20E	30/D	40/C
Low-intensity nonresidential [4]	NA	NA	NA	NA	20/E	30/D
Medium-intensity nonresidential [5]	NA	NA	NA	NA	NA	20/E
High-intensity nonresidential [6]	NA	NA	NA	NA	NA	NA
Zoning of Adjacent Vacant Lot						
R-80W, R-80, R-40W, R-40, R-30, R-20	NA	20/E	30/D	40/C	60/B	80/A
R-15, R-10, RHC, HD	NA	NA	20/E	30/D	40/C	60/B
R-5, RMH	NA	NA	NA	20E	30/D	40/C
OI, GB	NA	NA	NA	NA	20E	30D
HC, RA	NA	NA	NA	NA	NA	20E
I-1, I-2, AD-1, AD-2	NA	NA	NA	NA	NA	NA

NA—no bufferyard required

[1] A low-density residential use is a residential use with a density less than 3 dwelling units per acre.

[2] A medium-density residential use is a residential use with a density between 3 and 6 dwelling units per acre.

[3] A high-density residential use is a residential use with a density of more than 6 dwelling units per acre.

[4] A low-intensity nonresidential use is a nonresidential use with a floor area ratio (gross floor area/site area) no greater than 0.15 and an impervious surface coverage no greater than 30%.

[5] A medium-intensity nonresidential use is a nonresidential use with a floor area ratio (floor area/site area) greater than 0.15 but no greater than 0.30, or an impervious surface coverage greater than 30%, but no greater than 60%.

[6] A high-intensity nonresidential use is a nonresidential use with a floor area ratio (floor area/site area) greater than 0.30 or an impervious surface coverage greater than 60%.

[7] The buffers listed in the table above may not be reduced except as expressly authorized by Sec. 16-10-2(G) or Sec. 16-10-2(H) or by the granting of a variance in accordance with Sec. 19-26.

[8] Child Care Center Class "A" must provide a 20' bufferyard with Class C screen

[9] Child Care Center Class "B" must provide a 20' bufferyard with Class E screen

[Amended on 7/21/2008 by OA 04-08.]

(E) Overlap with Required Setbacks

In the event that bufferyard depth requirements conflict with zoning district setback requirements, the stricter standard governs.

(F) Screen Types

(1) Landscape Plan Variations

(a) The quantities of plant materials noted below represent the number of deciduous canopy trees, full size evergreen trees, deciduous understory trees, evergreen understory trees, and shrubs that are necessary to create the type of screen specified. These stated quantities represent the number of each plant type (e.g.—deciduous canopy tree or shrub) that is necessary to achieve the specified type of screen.

(b) The Planning Director has the authority to allow variations in the mix of plants required, up to a maximum of 25% of the total required number of each type of tree (i.e.—deciduous canopy tree, evergreen tree, deciduous understory tree, or evergreen understory tree) and up to a maximum of 35% of the shrubs

Article 16 Landscaping and Tree Protection

16-10 Landscaping and Bufferyards

(depending upon species), in order to encourage creativity in landscape design, to more effectively create a buffer or screen, to address site issues such as topography or geological features, or to allow for more efficient irrigation or water use practices so long as the intent of this Sec. 16-10-2(A) is still met. In evaluating the allowance of plant variations, the Planning Director must also give due consideration to the use of fences, walls, or berms.

- (c) The following options are examples of the plantings needed to meet the required screening, however, the applicant can propose an alternative design, prepared by a licensed landscape architect that meets the same screening standard.

(2) Type A Opaque Screen

Whenever a Type A screen is required, the applicant may choose to provide any of the following screen options. The examples below are expressed in terms of the number of plants required per 100 feet of bufferyard length, and an 80-foot width.

(a) Example 1—Evergreen Screen

- i. 0 deciduous canopy trees
- ii. 10 evergreen trees
- iii. 0 deciduous understory trees
- iv. 20 evergreen understory trees
- v. 80 shrubs

(b) Example 2—Deciduous Screen

- i. 10 deciduous canopy trees
- ii. 0 evergreen trees
- iii. 12 deciduous understory trees
- iv. 0 evergreen understory trees
- v. 80 shrubs

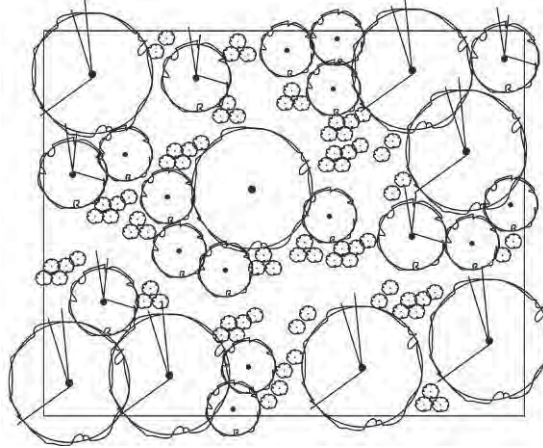
(c) Example 3— Mixed (Evergreen–Deciduous) Screen

- i. 7 deciduous canopy trees
- ii. 1 evergreen tree
- iii. 5 deciduous understory trees
- iv. 12 evergreen understory trees
- v. 85 shrubs

Article 16 Landscaping and Tree Protection

16-10 Landscaping and Bufferyards

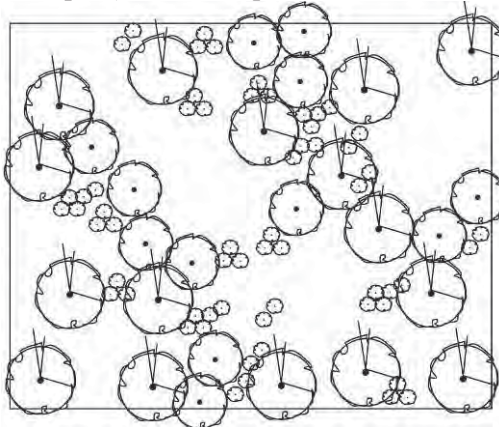
Example (100' x 80'):



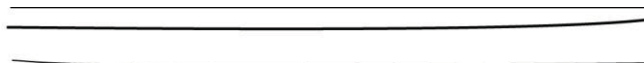
(d) Example 4—Overhead Utility Screen

- i.** 0 deciduous canopy trees
- ii.** 0 evergreen trees
- iii.** 16 deciduous understory trees
- iv.** 12 evergreen understory trees
- v.** 65 shrubs

Example (100' x 80', plan view):



Example (100' x 80', elevation view):



overhead utility lines



Article 16 Landscaping and Tree Protection

16-10 Landscaping and Bufferyards

(3) Type B Intermittent-1 Screen

Whenever a Type B screen is required, the applicant may choose to provide any of the following screen options. The examples below are expressed in terms of the number of plants required per 100 feet of bufferyard length, and a 60-foot width.

(a) Example 1—Evergreen Screen

- i. 0 deciduous canopy trees
- ii. 8 evergreen trees
- iii. 0 deciduous understory trees
- iv. 17 evergreen understory trees
- v. 75 shrubs

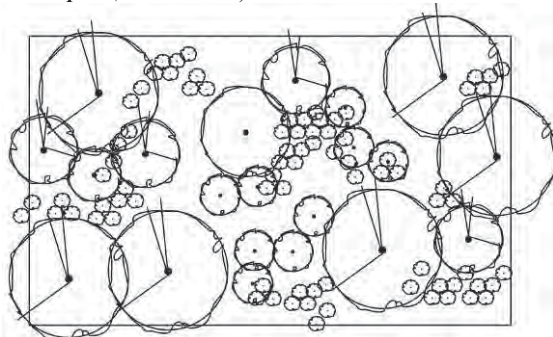
(b) Example 2—Deciduous Screen

- i. 8 deciduous canopy trees
- ii. 0 evergreen trees
- iii. 11 deciduous understory trees
- iv. 0 evergreen understory trees
- v. 75 shrubs

(c) Example 3—Mixed (Evergreen–Deciduous) Screen

- i. 6 deciduous canopy trees
- ii. 1 evergreen tree
- iii. 4 deciduous understory trees
- iv. 10 evergreen understory trees
- v. 80 shrubs

Example (100' x 60'):



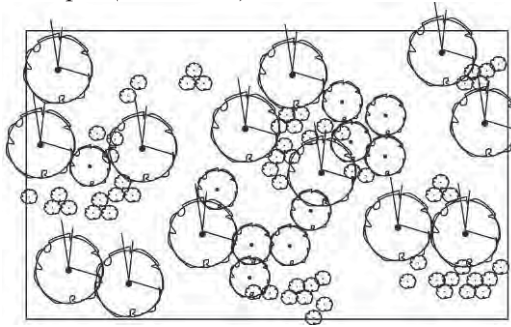
(d) Example 4—Overhead Utility Screen

Article 16 Landscaping and Tree Protection

16-10 Landscaping and Bufferyards

- i. 0 deciduous canopy trees
- ii. 0 evergreen trees
- iii. 13 deciduous understory trees
- iv. 10 evergreen understory trees
- v. 60 shrubs

Example (100' x 60'):



(4) Type C Intermittent-2 Screen

(a) Whenever a Type C screen is required, the applicant may choose to provide any of the following screen options. The examples below are expressed in terms of the number of plants required per 100 feet of bufferyard length, and a 40-foot width. Example 1—Evergreen Screen

- i. 0 deciduous canopy trees
- ii. 5 evergreen trees
- iii. 0 deciduous understory trees
- iv. 12 evergreen understory trees
- v. 72 shrubs

(b) Example 2—Deciduous Screen

- i. 5 deciduous canopy trees
- ii. 0 evergreen trees
- iii. 8 deciduous understory trees
- iv. 0 evergreen understory trees
- v. 71 shrubs

(c) Example 3—Mixed (Evergreen–Deciduous) Screen

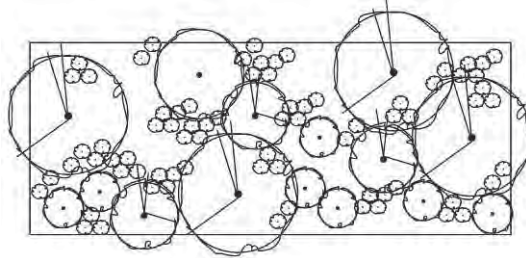
- i. 4 deciduous canopy trees

Article 16 Landscaping and Tree Protection

16-10 Landscaping and Bufferyards

- ii. 1 evergreen tree
- iii. 3 deciduous understory trees
- iv. 7 evergreen understory trees
- v. 75 shrubs

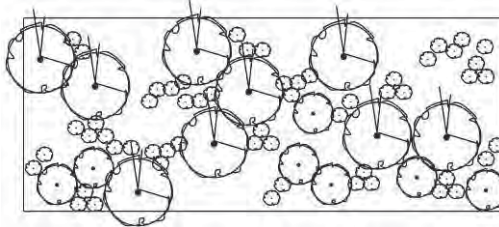
Example (100' x 40'):



(d) Example 4—Overhead Utility Screen

- i. 0 deciduous canopy trees
- ii. 0 evergreen trees
- iii. 9 deciduous understory trees
- iv. 7 evergreen understory trees
- v. 57 shrubs

Example (100' x 40'):



(5) Type D Intermittent-3 Screen

Whenever a Type D screen is required, the applicant may choose to provide any of the following screen options. The examples below are expressed in terms of the number of plants required per 100 feet of bufferyard length, and a 30 -foot width

(a) Example 1—Evergreen Screen

- i. 0 deciduous canopy trees
- ii. 5 evergreen trees
- iii. 0 deciduous understory trees
- iv. 12 evergreen understory trees
- v. 69 shrubs

Article 16 Landscaping and Tree Protection

16-10 Landscaping and Bufferyards

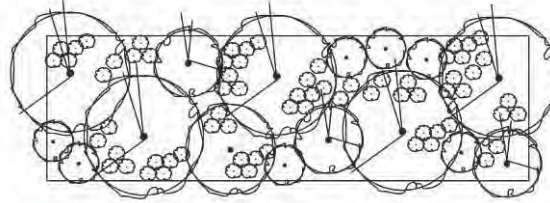
(b) Example 2—Deciduous Screen

- i.** 5 deciduous canopy trees
- ii.** 0 evergreen trees
- iii.** 8 deciduous understory trees
- iv.** 0 evergreen understory trees
- v.** 67 shrubs

(c) Example 3—Mixed (Evergreen–Deciduous) Screen

- i.** 5 deciduous canopy trees
- ii.** 1 evergreen tree
- iii.** 3 deciduous understory trees
- iv.** 7 evergreen understory trees
- v.** 70 shrubs

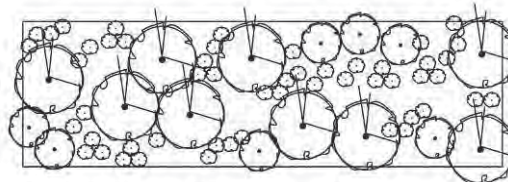
Example (100' x 30'):



(d) Example 4—Overhead Utility Screen

- i.** 0 deciduous canopy trees
- ii.** 0 evergreen trees
- iii.** 9 deciduous understory trees
- iv.** 7 evergreen understory trees
- v.** 53 shrubs

Example (100' x 30'):



(6) Type E Intermittent-4 Screen

(a) Whenever a Type E screen is required, the applicant may choose to provide any of the following screen options. The examples below are expressed in terms of the number of plants required per 100 feet of bufferyard length, and a 20-foot width. Example 1—Evergreen Screen

- i.** 0 deciduous canopy trees
- ii.** 4 evergreen trees
- iii.** 0 deciduous understory trees
- iv.** 9 evergreen understory trees
- v.** 40 shrubs

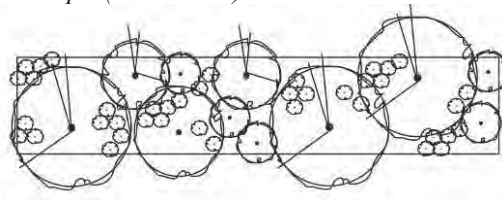
(b) Example 2—Deciduous Screen

- i.** 4 deciduous canopy trees
- ii.** 0 evergreen trees
- iii.** 6 deciduous understory trees
- iv.** 0 evergreen understory trees
- v.** 40 shrubs

(c) Example 3—Mixed (Evergreen–Deciduous) Screen

- i.** 3 deciduous canopy trees
- ii.** 1 evergreen tree
- iii.** 2 deciduous understory trees
- iv.** 5 evergreen understory trees
- v.** 40 shrubs

Example(100' x 20'):



(d) Example 4—Overhead Utility Screen

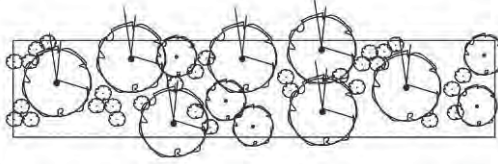
- i.** 0 deciduous canopy trees
- ii.** 0 evergreen trees

Article 16 Landscaping and Tree Protection

16-10 Landscaping and Bufferyards

- iii. 7 deciduous understory trees
- iv. 5 evergreen understory trees
- v. 30 shrubs

Example(100' x 20'):



(7) Type F Streetfront Screen

Whenever a Type F screen is required, the applicant may choose to provide any of the following screen options. The examples below are expressed in terms of the number of plants required per 100 feet of bufferyard length, and a 10-foot width.

(a) Example 1—Evergreen Screen

- i. 0 deciduous canopy trees
- ii. 2 evergreen trees
- iii. 0 deciduous understory trees
- iv. 3 evergreen understory trees
- v. 15 shrubs

(b) Example 2—Deciduous Screen

- i. 2 deciduous canopy trees
- ii. 0 evergreen trees
- iii. 2 deciduous understory trees
- iv. 0 evergreen understory trees
- v. 14 shrubs

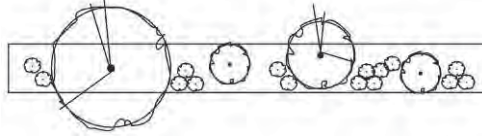
(c) Example 3—Mixed (Evergreen–Deciduous) Screen

- i. 1 deciduous canopy tree
- ii. 0 evergreen trees
- iii. 1 deciduous understory tree
- iv. 2 evergreen understory trees
- v. 15 shrubs

Article 16 Landscaping and Tree Protection

16-10 Landscaping and Bufferyards

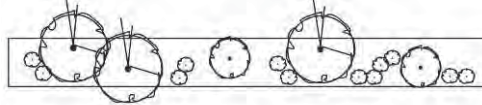
Example (100' x 10'):



(d) Example 4—Overhead Utility Screen

- i.** 0 deciduous canopy trees
- ii.** 0 evergreen trees
- iii.** 3 deciduous understory trees
- iv.** 2 evergreen understory trees
- v.** 12 shrubs

Example (100' x 10'):



(G) Depth Reductions for Walls, Fences or Berms

The Planning Director may allow a reduction in bufferyard depth by up to 25% if a solid wall, solid fence, or berm is provided within the interior portion of the bufferyard. For purposes of this section a solid wall or fence will be considered any completely opaque wall or fence without any openings, including shadowbox fences. Walls and fences provided pursuant to this provision must have a minimum height of 6 feet and berms must have a minimum height of 4 feet. Any such fencing must have the dress side facing outward toward the right-of-way or adjacent properties. When a bufferyard depth reduction is taken pursuant to this provision, the number of shrubs required within the bufferyard may also be reduced to 50%. In order to approve such reduction, the Planning Director must determine that the proposed bufferyard plan is at least as effective in achieving the purposes of this section, as is strict compliance with the bufferyard standards.

(H) Plant Density Reductions

The Planning Director may allow a reduction in a bufferyard screening (plant) density by up to 25% if the bufferyard's depth is increased to effectively mitigate the density reduction. In order to approve a reduction in plant density, the Planning Director must determine that the proposed bufferyard plan is at least as effective in achieving the purposes of this section as is strict compliance with bufferyard standards.

(I) Additional Bufferyards and Screening

- (1)** Any outside storage of junk, refuse, salvage, or discarded materials must be screened from adjacent rights-of-way and adjacent properties by means of a Type A screen.
- (2)** Whenever a nonresidential use is proposed along a thoroughfare, a 10-foot deep bufferyard and Type F screening must be provided adjacent to the thoroughfare right-of-way.

Article 16 Landscaping and Tree Protection

16-10 Landscaping and Bufferyards

- (3) Whenever a nonresidential use is proposed next to a residential use and is separated from the residential use by a public road, a 10-foot-deep bufferyard and Type F screening must be provided adjacent to the public road right-of-way.
- (4) Any outside storage existing on August 21, 1989, must be screened from adjacent properties and rights-of-way on or before December 31, 1992, by means of Type A screening or its equivalent as determined by the Planning Director.

(J) Features Allowed within Bufferyards

- (1) A bufferyard may be traversed by utility lines, water supply and wastewater lines, septic systems (if a qualified soil scientist determines that such location is the only feasible alternative), sidewalks, driveways, roads and other similar improvements, provided that:
 - (a) the proposed locations of such uses are necessary for their proper functioning, and such uses cross the bufferyard where feasible, rather than lie along the length of the bufferyard;
 - (b) the total width of the bufferyard is maintained; and
 - (c) no screen required by this ordinance is reduced or eliminated.
- (2) The required undisturbed radius around a well may lie within the bufferyard, but the well head itself may not encroach within the bufferyard.
- (3) Signs are permitted within bufferyards provided that:
 - (a) they are completely screened from view from any point on adjacent residential properties; and
 - (b) placement of such signs will not violate other provisions of this ordinance.
- (4) Bufferyards may not be used for parking, loading, storage, or any activity that is either part of or accessory to the proposed use.

16-10-3 Plant Material, Installation and Maintenance

[Section 16-10-3 "Landscaping of Freestanding Signs" was moved to Section 18-10-2 (P) on 1/22/2008 by OA 04-07. Section 16-10-4 "Plant Material, Installation and Maintenance" became the new Section 16-10-3.]

(A) Time of Installation

- (1) All landscaping, bufferyards and screening materials must be in place prior to final inspection by the Wake County Zoning Inspector.
- (2) When weather conditions do not permit planting, installation of plant material may be delayed until the start of the next growing season (for the particular species), provided that adequate financial guarantees are posted to ensure compliance. This performance guarantee must provide for the cost of the plant material, the labor costs of installation, and a 25 percent contingency. The process for providing such performance guarantee must parallel that described in Sec. 8-22 and is required before the issuance of a Certificate of Occupancy, or the approval of the final plat, whichever may be applicable.

(B) Plant Materials

(1) Existing Vegetation

Existing vegetation that meets or exceeds applicable screening requirements may be used to satisfy the requirements of this section, provided the bufferyard contains sufficient area surrounding the vegetation to ensure its protection from encroachments that may threaten its continued healthy growth. Due to their effectiveness in immediately providing a more effective screen, the retention and protection of existing vegetation must be given preference over the installation of new plant materials in the achievement of the required screening. Existing vegetation that is in a healthy condition, meets the minimum planting size requirements, and will meet the required mature plant size must be given credit plant for plant toward meeting the required screening. Existing vegetation must be noninvasive in nature. If nonnative invasive plants are found within the buffer, they must be permanently removed through mechanical or herbicidal means. No disposal of these plants (whole plants, clippings, root masses, etc...) may occur within buffers, easements, open space areas, or along rights-of-way. See *Appendix A* for a USDA list of nonnative invasive species.

(2) Location and Spacing

Plants must be staggered or clustered as necessary to maximize screening objectives and to meet the needs of the particular species of plants for root space, water, light, and circulation.

(3) General Standards

All landscaping materials must comply with the American Nurseryman's Standards. Nonnative or invasive plant species may not be used for planting in landscaping and bufferyards (see the USDA list of these species). Native species used in replantings are encouraged over ornamentals. All species chosen for planting should be chosen from amongst those species that typically grow in our geographical area, Zone 7. The developer is responsible for researching the biological requirements of each species utilized in the plantings.

(4) Trees

- (a)** Deciduous canopy trees must have a minimum size of 2-inch caliper and a minimum height of 10 feet at the time of planting and be planted at least 18 feet apart.
- (b)** Deciduous understory trees must have a minimum height of 8 feet at the time of planting and be planted at least 12 feet apart.
- (c)** Evergreen trees must have a minimum height of 8 feet at the time of planting (unless mixed with deciduous trees in which case a minimum height of 4 feet is required).
- (d)** Evergreen understory trees must have a minimum height of 6 feet at the time of planting.

(5) Shrubs

- (a)** All shrubs must be cold hardy and heat tolerant.

Article 16 Landscaping and Tree Protection

16-10 Landscaping and Bufferyards

- (b) Upright shrubs must have a minimum height of 15 inches at the time of planting.
- (c) Shrubs may not be planted closer than 3 feet on-center or closer than 3 feet to planted trees.

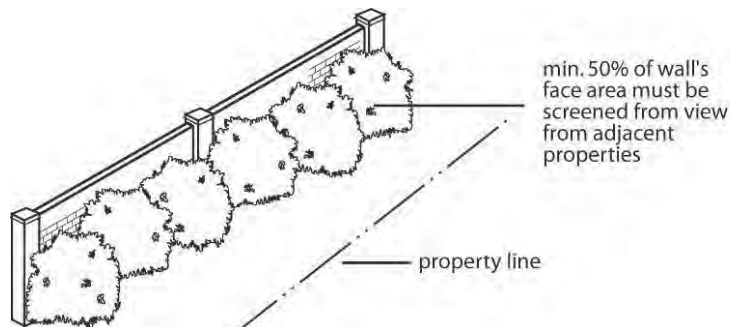
(6) Minimum Height at Maturity

Trees and shrubs must be of a variety that has a minimum mature height that will meet the minimum screening requirements for which they were chosen. Deciduous canopy trees must be of a species that will reach a minimum height of 35 feet at maturity. Deciduous understory trees must be of a species that will reach a minimum height of 15 feet at maturity. Evergreen trees must be of a species that will reach a minimum height of 35 feet at maturity. Evergreen understory trees must be of a species that will reach a minimum height of 20 feet at maturity. Shrubs must be of a species that will grow to a minimum height of 36 inches at maturity.

(C) Fences, Walls and Berms

(1) Fences and Walls

Fences and walls must be screened over at least 50% of their exterior face area by plantings that provide year round screening to obstruct the view of the fence or wall from adjacent properties. This may be achieved with a tight evergreen hedge that is one-half ($\frac{1}{2}$) the height of the fence or wall; or by using plants other than the evergreen hedge meeting the above requirement, provided that figures on the average mature height and spread of each species to be planted are submitted with the site plan for approval by the Planning Director. The plantings required by this section may be included in the totals listed in the various options that are established in Sec. 16-10-2(F). In evaluating the allowance of plant variations, the Planning Director must also give due consideration to the use of fences, walls, or berms.



(2) Berms

Berms must be planted with trees, shrubs, vines, grasses, or other groundcover. Part of a berm may be devoted to a nonliving screen such as a fence or wall.

(3) Location of Required Planting Materials

Whenever a wall, fence or berm is proposed, the placement of the required plant materials (other than that required by 16-10-3(C)), in relation to the wall, fence or berm, must take into consideration such factors as the intensity level of the proposed use, the degree of dissimilarity of the proposed use to the adjacent use, the site topography, the road curvature and other factors. The applicant may propose the location of the wall, fence or berm and the amount of the landscaping material that will be placed on each side of the wall, fence or berm. The Planning Director must

Article 16 Landscaping and Tree Protection

16-11 Trash Storage Area Screening

consider these factors noted above in determining whether the proposal complies with the intent of Sec. 16-10-2(A).

(D) Maintenance

All required landscaping and screening must be maintained. If necessary to ensure the continued effectiveness and intended purpose of the screen, plantings that deteriorate or dies must be repaired or replaced during the next planting season, or within 6 months. Failure to maintain required landscaping and buffers is a violation of this ordinance (including the limbing of growing trees and the pruning of shrubs to encourage compact new growth). Plant materials must be located and maintained by the property owner, or property owner association, in such a manner that they do not overhang into utility easements or the fire hydrant access ways that are required by Sec. 16-10-2(B)(4). Access roads must be maintained so as to remain clear of all vegetation for a width of 20 feet and a height of 13 feet 6 inches to allow for emergency vehicle access.

(E) Clear View of Intersections

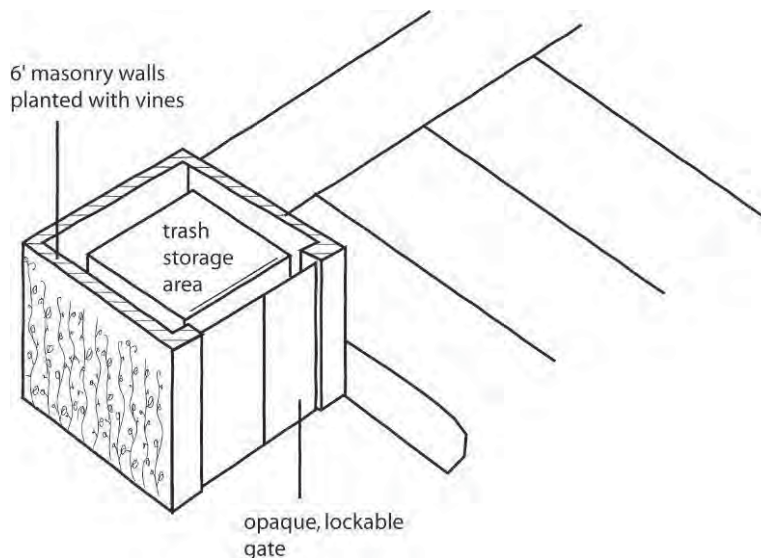
Bufferyards and visual screens may not interfere with sight lines at intersections.

OA 05/03 September 19, 2005

16-11 Trash Storage Area Screening

16-11-1 Screening Methods

- (A) Required trash storage area screening may be achieved by designating an enclosed space for trash facilities within a principal building or within an accessory building such as a garage.
- (B) When trash storage areas are not enclosed within a principal building or accessory building, they must be screened from off-site view on all sides by masonry walls with a minimum height of 6 feet. One side of the storage area must be furnished with an opaque, latchable gate.



- (C) The screening walls required by this section must be planted with vines or surrounded with other landscape material.

16-12 Tree Protection

16-12-1 General Intent

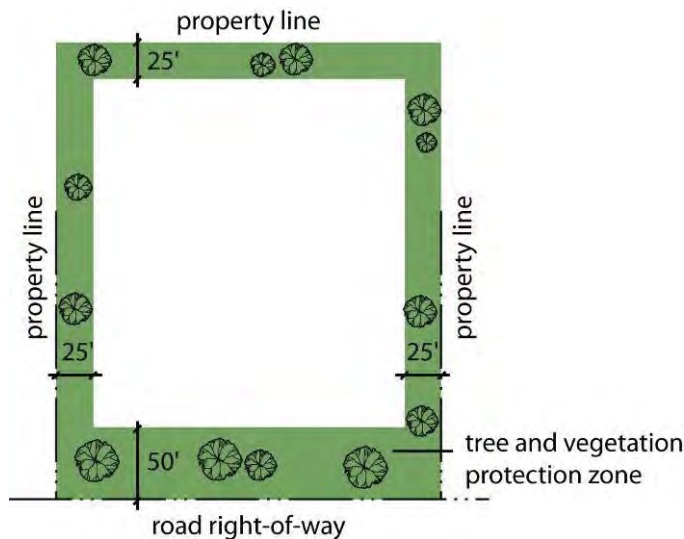
The regulations of this section are intended to preserve trees and other significant vegetation along the outer perimeter of development sites. Such regulations will help to ensure that trees and vegetation along the perimeter of a site are not removed or disturbed so as to preserve and enhance the visual character of the County, control surface water runoff, and moderate temperatures. Tree and vegetation protection will also help conserve water because of increased absorption ability of retained plants.

[Amended of 1/22/2008 by OA 04-07.]

16-12-2 Applicability; Effect

(A) The tree and vegetation protection standards of this section apply to the outer perimeter of parcels proposed to be graded, disturbed or subdivided—an area known as the “tree and vegetation protection zone.” The boundaries of the tree and vegetation protection zone extend the following distances from the outer perimeter of a parent parcel:

- (1) 50 feet from all public road rights-of-way; and
- (2) 25 feet from all other property lines.



(B) The standards of this section generally require that the tree and vegetation protection zone remain undisturbed and that trees and vegetation within the zone be preserved, except that the Planning Director or Planning Board may permit land disturbance and tree and vegetation removal within the protection zone when deemed necessary to allow for reasonable use and development of the property.

(C) A permanent tree and vegetation protection zone is required on the outer perimeter of lands included in the initial approved preliminary plan of a parent tract of land. Subsequent subdivisions of lots within the parent tract are not required to provide additional tree and vegetation protection zones.

[Amended on 1/22/2008 by OA 04-07.]

16-12-3 Exemptions

The following activities are exempt from the tree and vegetation protection standards of this section:

Article 16 Landscaping and Tree Protection

16-12 Tree Protection

- (A) the removal of dead or naturally fallen or severely damaged trees or vegetation, or the removal, by an approved method, of trees or vegetation that are a threat to the public health, safety, or welfare;
- (B) the removal, by hand, of diseased or insect-infected trees or vegetation that pose a risk to adjoining trees as determined by the North Carolina Division of Forest Resources or by a certified arborist (International Society of Arboriculture);
- (C) the selective and limited removal of trees or vegetation necessary to obtain clear visibility at driveways, intersections, or within required sight triangles;
- (D) the removal of trees on tracts of 2 acres or less in area located within a single-family residential zoning district. Land within public rights-of-way is excluded from the area calculation.

Commentary: Since tracts of 2 acres or less are exempt from compliance with tree and vegetation protection standards, it is intended that development and building on such lots will be subject only to the building setback standards of the underlying zoning district. The "tree and vegetation zone" definition is not to be interpreted as additional building setback requirements in those instances in which tree and vegetation preservation is not required.

- (E) the removal of trees as part of normal forestry activities on property taxed under the present-use value standard or conducted pursuant to a forestry management plan prepared or approved by a forester registered pursuant to NCGS Chapter 89B. However, for such properties, the County may deny a building permit or refuse to approve a site plan or subdivision plan for a period of 3 years following completion of the harvest if all or substantially all of the trees that should have been protected within the tree and vegetation protection zone were removed from the tract of land for which the permit or plan is sought. The County may deny a permit or refuse to approve a site plan or subdivision plan for a period of 2 years if the owner replants the protection zone within 120 days of harvest with plant material that is consistent with buffer areas required under the County buffer area standards;

Commentary: As its name implies, the "tree and vegetation protection zone" is intended as an area in which tree and vegetation removal is prohibited or otherwise strictly limited. It is not intended as an additional building setback requirement in those instances in which tree and vegetation preservation is not required.

- (F) the removal of trees or vegetation for the purpose of sale by commercial garden centers, greenhouses, or nurseries; and
- (G) the removal of damaged or dead trees or vegetation during or after emergencies or inclement weather such as wind storms, ice storms, fire, or other disasters.

16-12-4 Maximum Size of Tree and Vegetation Protect Zone

The total area of a tree and vegetation protection zone is not required to exceed 20% of the total area of the parcel, excluding any land area located within public road rights-of-way and any required conservation easements. (Note: Conservation easements located within tree and vegetation protection zones will be credited toward compliance with the tree and vegetation protection standards of this section)

16-12-5 Delineation of Tree and Vegetation Protection Zone

Subdivision plans must indicate the limits of the tree and vegetation protection zone. Tree surveys of individual trees are not required, but whenever protected trees are proposed for removal, such plans must indicate the location and size of all protected trees within the tree and vegetation protection zone that are proposed for removal (and replacement).

16-12-6 Allowed Encroachments

- (A)** It is the intent of this section to permit reasonable predevelopment activity on lands that are subject to the tree and vegetation protection standards of this section. It is recognized that encroachment into the tree and vegetation protection zone may be necessary to allow for reasonable use and development of the subject parcel. The Planning Director or Planning Board may approve encroachments it deems necessary to permit reasonable use and development. Examples of encroachments that may be permitted include utilities, driveways, sidewalks, entrances and entrance features, supplemental landscaping, as well as access routes for construction vehicles or equipment where no alternative means of access exists on the site. Septic fields must be allowed to encroach into the tree and vegetation protection zone if a qualified soil scientist determines that such location is the only feasible and safe alternative.
- (B)** At the time of consideration of a site plan or other authorized development plan for the subject site, review and decision-making bodies are authorized to approve land disturbance, development activity and tree and vegetation removal in accordance with applicable zoning and site development regulations.
- (C)** When encroachment is deemed necessary by the Planning Director or Planning Board, any protected trees that are removed or that die within 1 year after the encroachment must be replaced in accordance with Sec. 16-12-7. In addition, when encroachment must occur, care must be taken to remove and/or disturb the minimum amount of trees and vegetation, possible. Any proposed encroachment within tree and vegetation protection zones must be indicated on subdivision plans.

16-12-7 Replacement of Protected Trees

No protected tree may be removed from tree and vegetation protection zones unless the applicant or developer replaces such trees within the tree and vegetation protection zone at a rate of 1 inch of replacement tree (DBH) per 2 inches of removed tree (DBH). For example, if a 24-inch tree is removed, the following options exist for replacement: 1, 12-inch tree; 2, 6-inch trees; 3, 4-inch trees; 4, 3-inch trees; or 6, 2-inch trees.

- (A)** The minimum size (DBH) of a replacement tree is 2 inches.
- (B)** The Planning Board or Planning Director may allow replacement trees to be placed outside the tree and vegetation protection zone when adequate area does not exist within the tree and vegetation protection zone, or when placement in other areas of the site, or protection of other significant trees adjacent to the perimeter of the site, would better meet the general intent of this section.
- (C)** It is the intent of this section to preserve protected trees and other vegetation and understory plant material that surrounds protected trees. It is recognized that clearing or disturbance of vegetation in and adjacent to protection zones can significantly impact protected trees within close proximity. Therefore, while there is no replacement requirement for the clearing of vegetation surrounding protected trees, clearing of any vegetation in these areas is strongly discouraged.

16-12-8 Tree Protection During Construction

(A) Owner’s Responsibility

During development of the property, the owner is responsible for the erection and maintenance of any and all barriers necessary to ensure protection of protected trees and vegetation from damage during construction.

(B) Protective Fencing

(1) Where Required

All protected trees that are to be preserved must be surrounded by a clearly visible fence before grading begins. Required fencing must extend as far as practical from a protected tree; preferably at least 1 foot from the tree for each inch of DBH. Protective fencing is not required to extend beyond the tree’s dripline. No construction, grading, equipment or material storage, or any other activity is allowed within the tree and vegetation protection zone, unless approved by the Planning Director or Planning Board in accordance with Sec. 16-12-6.

(2) Plans

The location and a detail of the proposed protective fencing or other means of demarcation must be clearly shown on subdivision plans.

(3) Type of Fencing

All fencing required by this section must be a minimum 4 feet in height and of durable construction. Orange polyethylene laminar fencing is acceptable. Passive forms of tree and vegetation protection may be utilized to delineate tree and vegetation protection zones that are not located near areas of land disturbance. These must be surrounded by fencing, continuous rope, or durable taping that is a minimum of 4 inches wide.

(4) Signs

Signs must be installed on the protective fence so that they are visible on all sides of the area to be protected. At least one sign must be placed on each side, with signs spaced no more than 150 linear feet apart. The size of each sign must be a minimum of 2 feet by 2 feet and must contain the following language: “KEEP OUT, TREE AND VEGETATION PROTECTION ZONE,” both in Spanish and in English.

OA 04/10 January 18, 2005

Article 14. Flood Hazard Areas

14-10 Purpose

14-10-1 Flood hazard areas of the county are subject to periodic inundation that may result in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety or general welfare. The cumulative effect of obstructions in floodplains causes increased flood heights and velocities and, therefore, increase flood losses.

14-10-2 It is the purpose of the flood hazard area standards of this article to promote the public health, safety and general welfare by reducing public and private losses caused by flood conditions in specific areas by provisions designed to:

- (A) restrict or prohibit uses that are dangerous to health, safety and property when flooded;
- (B) require that uses vulnerable to floods, including ancillary facilities that serve such uses, be protected against flood damage at the time of initial construction;
- (C) control the alteration of natural flood plains, stream channels, and natural protective barriers, which are involved in passage of flood waters;
- (D) control filling, grading, dredging and other land alterations which may increase flood damage;
- (E) prevent or regulate the construction of flood barriers which will unnaturally divert flood waters or increase flood hazards elsewhere; and
- (F) protect individuals from purchasing lands which are unsuitable for intended purposes because of flood hazards.

14-11 Disclaimer

While the degree of flood protection required by this ordinance is considered reasonable, it does not imply total flood protection.

14-12 Definitions

Unless specifically defined below, words or phrases used in this section must be interpreted in accordance with Article 21 or, if not defined therein, to give them their most common dictionary meaning, and to give this ordinance its most reasonable application.

Area of Special Flood Hazard

The land in a floodplain subject to a one percent or greater chance of flooding in any given year. Such areas, which are also referred to as “special flood hazard areas,” are:

- (A) Those areas identified under the Cooperating Technical State (CTS) agreement between the State of North Carolina and FEMA in its Flood Insurance Study (FIS) and its accompanying Flood Insurance Rate Map (FIRM), for Wake County dated April 16, 2013, which are adopted by reference and declared to be a part of this ordinance;

[Amended by OA 01-13 on 3/18/2013.]

Article 14 Flood Hazard Areas

14-12 Definitions

- (B) those areas specified as “regulated discharge floodplain areas;” and
- (C) those areas specified as flood hazard soils in the Soil Survey, Wake County, North Carolina, dated November 1970, and any subsequent revisions thereto, as delineated by transparent photographic enlargements of soil maps taken therefrom, hereafter referred to as “soil overlay maps.” (These maps must be used in all areas of the county where flood hazards exist but are not shown on maps in the Flood Insurance Study.) Soil overlay maps were produced at the same scale as the county tax maps in order that flood hazard areas may be located with reference to property lines. Flood hazard areas are identified by those soils (listed in the definition below) described in the Soil Survey, Wake County, North Carolina, subject to flooding and having severe limitations for home sites and certain other uses because of flooding.

Base Flood

The flood having a one percent chance of being equaled or exceeded in any given year (100-year flood).

Base Flood Elevation (BFE)

A determination of the water surface elevations of the base flood in Special Flood Hazard Areas as published in the *Flood Insurance Study* or as determined by a licensed professional engineer in flood hazard soils areas.

Basement

The lowest level or story which has its floor subgrade on all sides.

Breakaway Wall

A wall that is not part of the structural support of the building and is intended, through its design and construction, to collapse under specific lateral loading forces without causing damage to the elevated portion of the building or the supporting foundation system. A breakaway wall must have a design safe loading resistance of not less than 10, and no more than 20, pounds per square foot. A wall with loading resistance of more than 20 pounds per square foot requires a licensed architect or licensed professional engineer to certify that the designs proposed meet the following conditions: (1) Breakaway wall collapse must result from a water load less than that which would occur during the base flood; and (2) The elevated portion of the building and supporting foundation system may not be subject to collapse, displacement, or other structural damage due to the effects of wind and water loads acting simultaneously on all building components (structural and nonstructural). Maximum wind and water loading values to be used in this determination must each have no more than a one percent chance of being equaled or exceeded in any given year (100-year mean recurrence interval). Such enclosed space (formed by the breakaway wall and the elevated building) must be usable solely for parking of vehicles, building access, or storage. It may not be used as habitable space.

Chemical Storage Facility

A building, portion of a building, or exterior area adjacent to a building used for the storage of any chemical or chemically reactive products.

Development

Any man-made change to improved or unimproved real estate, including, but not limited to, buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, or storage of equipment or materials.

Article 14 Flood Hazard Areas

14-12 Definitions

Disposal

the discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste into or on any land or water so that the solid waste or any constituent part of the solid waste may enter the environment or be emitted into the air or discharged into any waters, including groundwaters, as defined in NCGS 130A-290(a)(6),.

Elevated Building

A nonbasement building which has the lowest floor elevated above the ground level by means of fill, solid foundation perimeter walls, pilings, columns (posts and piers), shear walls, or breakaway walls.

Expansion of an Existing Mobile Home Park

The preparation of additional sites by the construction of facilities for servicing the lots on which the mobile homes are to be affixed (including the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads.

Existing Mobile Home Park

A mobile home park for which the construction of facilities for servicing the lots on which the mobile homes are to be affixed (including, at a minimum, the installation of utilities, either final site grading or the pouring of concrete pads, and the construction of roads) is completed before January 17, 1983.

FEMA

The Federal Emergency Management Agency or its successor.

Flood or Flooding

A general and temporary condition of partial or complete inundation of normally dry land areas from the overflow of inland or tidal water or the unusual and rapid accumulation of runoff or surface waters from any source.

Flood Hazard Soils

Soils described in the Soil Survey, Wake County, North Carolina, as being subject to flooding, and identified in engineering interpretations therein as having severe limitations for home sites and certain other uses because of flooding, and recommended for inclusion among flood hazard areas by the Wake County District Conservationist, U.S. Department of Agriculture, Soil Conservation Service. (See also Sec. 14-13)

Flood Insurance Rate Map (FIRM)

An official map of a community issued by the Federal Emergency Management Agency on which the areas of special flood hazard and the applicable risk premium zones applicable to the community are delineated.

Flood Insurance Study (FIS)

The official report (Flood Insurance Study for the County of Wake) issued by the Federal Emergency Management Agency. The report contains flood profiles, as well as the Flood Insurance Rate Map and the water surface elevation of the base flood.

Flood Study

A study of the potential changes in the base flood elevation caused by the obstruction, encroachment, alteration or relocation of: (1) a FEMA mapped floodway; (2) a non-encroachment area; (3) a FEMA mapped area of special flood hazard that has not previously been studied in detail; (4) flood hazard soils areas with a total drainage area of more than 5 acres but no more than 25 acres;

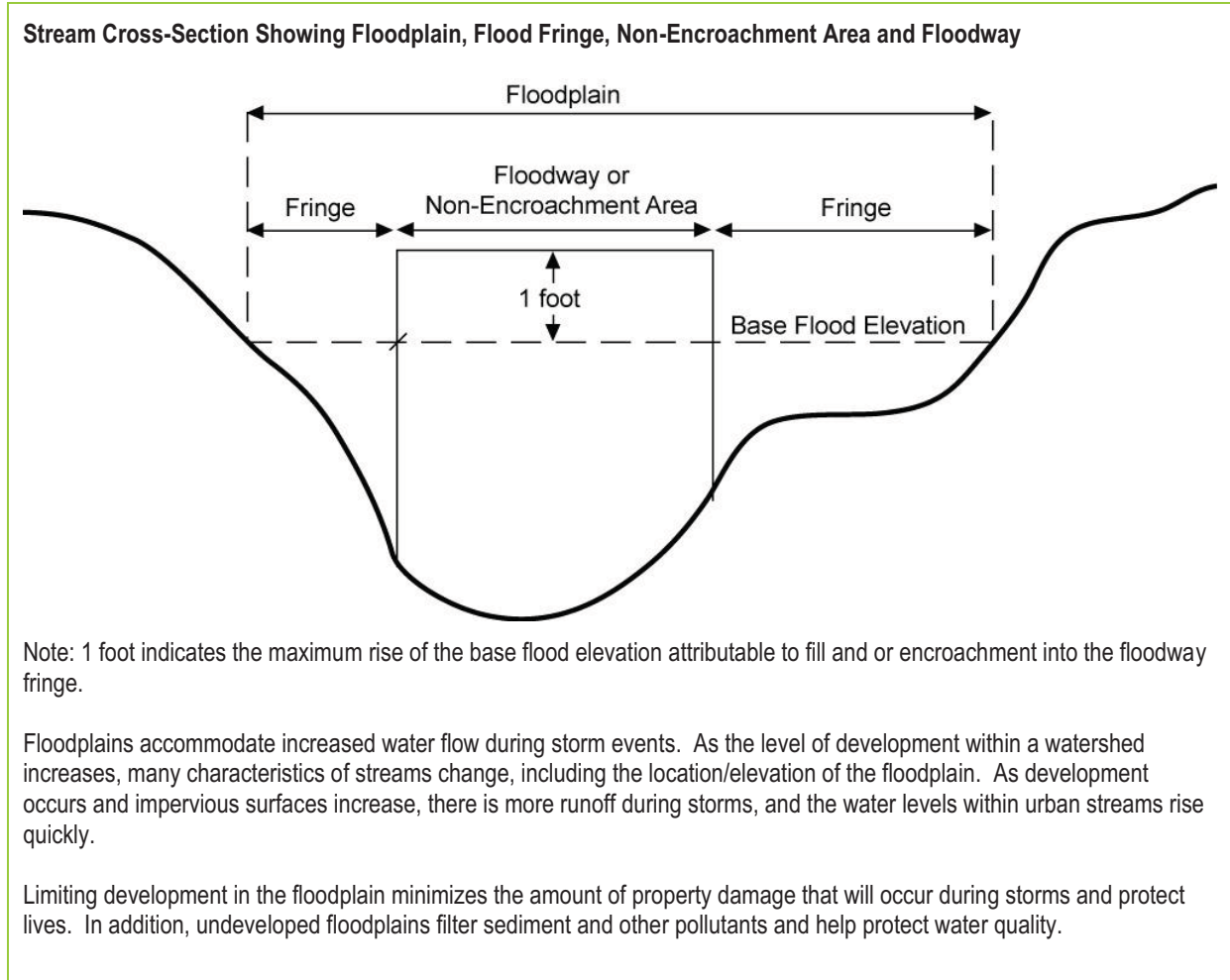
Article 14 Flood Hazard Areas

14-12 Definitions

(5) flood hazard soils areas with a total drainage area of more than 25 acres, but less than 100 acres; and (6) flood hazard soils area with a total drainage area of 100 acres or more.

Floodplain

Any land area susceptible to being inundated by water from the base flood. The floodplain includes the floodway or non-encroachment area plus the flood fringe.



Floodplain Administrator

The individual appointed to administer and enforce the floodplain management regulations.

Floodproofing

Any combination of structural and nonstructural features, additions, changes, or adjustments to land and structures in accordance with or comparable to guidelines set forth in *Floodproofing Regulations* (June 1972 edition, published by the Office of the Chief of Engineers, U.S. Army, Washington, D.C.), which reduce or eliminate flood damage to lands, water and sanitary facilities, structures, and contents of buildings.

Floodway

(1) For areas which have been studied and mapped in detail by FEMA, the floodway must be the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot.

Article 14 Flood Hazard Areas

14-12 Definitions

(2) For areas designated as Zone A on the Flood Insurance Rate Map where no base flood elevation data has been provided by FEMA, the entire area designated as Zone A must be considered as the floodway.

Floodway Fringe

That part of the area of special flood hazard, shown on the Federal Emergency Management Agency's maps, exclusive of the floodway or non-encroachment area.

Functionally Dependent Facility

A facility which cannot be used for its intended purpose unless it is located or carried out in close proximity to water, such as docking or port facility necessary for the loading and unloading of cargo or passengers, shipbuilding, ship repair, or seafood processing facilities. The term does not include long-term storage, manufacture, sales, or service facilities.

Hazardous Waste Facility

A facility for the collection, storage, processing, treatment, recycling, recovery, or disposal of hazardous waste, as defined in NCGS Article 9 of Chapter 130A.

Highest Adjacent Grade

The highest natural elevation of the ground surface, prior to construction, next to the proposed walls of the structure.

Historic Structure

Any structure that is: (1) Listed individually in the National Register of Historic Places (a listing maintained by the U.S. Department of the Interior), or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register of Historic Places; (2) Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary as qualifying as a registered historic district; or (3) Listed individually on the State Study of Historic Places (a listing maintained by the North Carolina Department of Cultural Resources, Division of Archives and History).

Lowest Floor

The lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access, or storage in an area other than a basement area, is not considered a building's lowest floor provided that such enclosure is not built to render the structure in violation of the applicable non-elevation design requirements of this section.

Major Repairs

Any repair, reconstruction, or improvement of a structure, the cost of which equals or exceeds 50% of the market value of the structure. The market value must be determined at the time the improvement or repair is started, or if the structure has been damaged and is being restored, at the time immediately preceding the damage. For the purposes of the definition, major repair is considered to occur when the first alteration of any wall, ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimensions of the structure. The term does not, however, include:

- (D) Any project for improvement of a structure to comply with existing state or local health, sanitary, or safety code specifications which are necessary to assure safe living conditions;
- or

Article 14 Flood Hazard Areas

14-12 Definitions

- (E) Any alteration of a structure listed on the National Register of Historic Places or a State inventory of historic places.

Mean Sea Level

For purposes of this ordinance, the National Geodetic Vertical Datum (NGVD) as corrected in 1929, the North American Vertical Datum (NAVD) as corrected in 1988, or other vertical control datum used as a reference for establishing varying elevations within the floodplain, to which Base Flood Elevations (BFEs) shown on a FIRM are referenced. Refer to each FIRM panel to determine datum used.

Minimum Finished Floor Elevation

The highest water surface elevation predicted for the base flood in a non-FEMA mapped area obtained by the methods prescribed by Sec. 14-14 and Sec. 14-15.

Mobile Home

Any vehicle or structure built on a chassis, designed to be transported, and intended for human occupancy for unlimited periods of time. Such vehicle must contain as an integral part of its construction, kitchen facilities and a completely equipped bathroom consisting of a flush toilet, lavatory, and bathtub or shower. Recreational vehicles are not mobile homes.

New Construction

Structures for which the start of construction commenced on or after January 17, 1983, and includes any subsequent improvements to such structures.

New Mobile Home Park

A mobile home park is considered new if the construction of facilities for servicing the lots on which the mobile homes are to be affixed (including, at a minimum, the installation of utilities, final site grading or pouring of concrete pads, and the construction of roads), is completed on or after January 4, 1960.

Non-detailed Flood Hazard Area

A Special Flood Hazard Area designated as Zone A on the Flood Insurance Rate Map where no base flood elevation data has been provided by FEMA. The entire area designated as Zone A will be considered to be the floodway until the area is studied and a floodway or non-encroachment area is established.

Non-Encroachment Area

The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot as designated in the Flood Insurance Study report.

Nuisance Flooding

The ponding of water in ditches, watercourses, yards, sites, or parcels, created by a rainfall event occurring in total drainage areas of less than 5 acres.

Recreational Vehicle

A vehicle that is:

1. built on a single chassis;
2. 400 square feet or less in area when measured at its largest horizontal projections;
3. designed to be self-propelled or permanently towable by a light duty truck; and

Article 14 Flood Hazard Areas

14-12 Definitions

4. designed primarily for use as temporary living quarters for recreational, camping, travel, or seasonal use, and not for use as a permanent dwelling.

Regulated Discharge Floodplain Areas

Those areas subject to reservoir-regulated flood releases within Special Flood Hazard Areas are designated as “Special Limited Use Areas” as delineated by the U.S. Army Corps of Engineers and adopted by the Wake County Board of Commissioners.

Regulatory Flood Protection Elevation (RFPE)

The highest water surface elevation reached by the base (100-year) flood, also known as the base flood elevation or the 100-year flood elevation. In FEMA areas of detailed study, the RFPE will be considered to be the base flood elevation with floodway as listed in the floodway data tables of the Flood Insurance Study.

Remedy a Violation

To bring a structure or other development into compliance with State or local flood plain management regulations, or, if this is not possible, to substantially reduce the impacts of its noncompliance.

Salvage Yard

Any nonresidential property used for the storage, collection, and/or recycling of any type of equipment, and including but not limited to vehicles, appliances and related machinery.

Soil Overlay Maps

Transparent photographic enlargements of soils maps taken from Soil Survey, Wake County, North Carolina. These overlay maps are at the same scale as the Wake County Tax Maps.

Soil Survey

The Soil Survey, Wake County, North Carolina.

Solid Waste Disposal Facility

Any facility involved in the disposal of solid waste as defined in NCGS 130A-290(a)(35).

Solid Waste Disposal Site

Any place at which solid wastes are disposed of by incineration, sanitary landfill, or any other method as defined in (NCGS 130A-290(a)(36).

Special Flood Hazard Areas

Same as “Area of Special Flood Hazard.”

Start of Construction

The first placement of permanent construction of a structure on a site, such as the pouring of slabs or footings or the placement of pilings, columns, or piers or any work beyond the stage of excavation; or the placement of a mobile home on a foundation. Permanent construction does not include clearing or grading; neither does it include excavation for a basement, footing, piers, or foundations, or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the start of construction is the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not the alteration affects the external dimensions of the building.

Article 14 Flood Hazard Areas

14-13 List of Flood Hazard Soils

Structure

A walled and roofed building, including a gas or liquid storage tank that is principally above ground, as well as a mobile home.

Substantial Damage

Damage, of any origin, sustained by a structure whereby the cost of restoring the structure to its before-damaged condition would equal or exceed 50% of the market value of the structure before the damage occurred.

Substantial Improvement or Major Repairs

Any repair, reconstruction, rehabilitation, addition, or other improvement of a structure, the costs of which equals or exceeds 50% or more of the market value of the structure before the “start of construction” of the improvement. This term includes structures that have incurred “substantial damage,” regardless of the actual repair work performed. The term does not include either (1) any improvement of a structure needed to comply with existing State and local health, sanitary, or safety code specifications, or (2) any alteration of a “historic structure,” provided the alteration will not preclude the structure’s continued designation as a “historic structure.”

Violation of Flood Hazard Regulations

The failure of a structure or other development to fully comply with the provisions of Article 14. A structure or other development without the elevation certificate, other certifications, or other required evidence of compliance is presumed to be in violation until such time as that documentation is provided.

Water Surface Elevation (WSE)

The height, in relation to mean sea level, of floods of various magnitudes and frequencies in the floodplains of coastal or riverine areas.

14-13 List of Flood Hazard Soils

14-13-1 The following are classified as “flood hazard soils” in Wake County.

Soil Map Symbol	Name
AfA	Altavista fine sandy loam 0 to 4% slopes
Au	Augusta fine sandy loam 0 to 4% slopes
Bu	Buncombe 0 to 2% slopes
Cm	Chewacla 0 to 2% slopes
Cn	Colfax sandy loam 0 to 6% slopes
Co	Congaree fine sandy loam 0 to 2% slopes
Cp	Congaree silt loam 0 to 2% slopes
Ly	Lynchburg sandy loam 0 to 2% slopes
Me	Mantachie soils 0 to 4% slopes
Ps	Plummer sand 0 to 4% slopes
Ra	Rains fine sandy loam 0 to 2% slopes
Ro	Roanoke fine sandy loam 0 to 2% slopes
Sw	Swamp
Wh	Wahee fine sandy loam 0 to 2% slopes
Wn	Wehadkee silt loam 0 to 2% slopes
Wo	Wehadkee and Bibb soils 0 to 2% slopes
Wy	Worsham sandy loam 0 to 4% slopes

14-13-2 Flood hazard soil boundaries may be modified by field investigation by a soil scientist. The report of the field investigation must conclude with a description of the actual soil

Article 14 Flood Hazard Areas
14-14 Permit and Certification Requirements

horizons which were encountered on the site. These soils must be placed in a soil complex or major soil association as prescribed by the standards and guidelines of the American Registry of Certified Professionals in Agronomy, Crops, and Soils, or the checklist of the Department of Environmental Services.

- 14-13-3** Base flood elevation studies, prepared and certified by a design professional, as appropriate for their licensing, may supersede existing flood hazard soil boundary designations when approved by the Department of Environmental Services. Base flood elevation studies may be prepared only by licensed professional engineers.

14-14 Permit and Certification Requirements

- 14-14-1** No permit for any new construction, substantial improvements, or other development proposed in an area of special flood hazard must be issued until the Department of Environmental Services has reviewed the plans for the development and has accepted the findings of the applicant that the development, as proposed, would comply with all relevant requirements of this section. As provided in 19-42-1(C), those land uses otherwise exempted from the general permit requirements of 19-42-1(A) and 19-42-1(B), including land uses associated with bona fide farms, may not be so exempted where the proposed development is located within an area of special flood hazard.

- 14-14-2** In addition to the requirements imposed by Sec. 19-42, all applications for building permits for property located in areas of special flood hazards must be accompanied by evidence showing:

- (A) elevation of the base flood, in relation to mean sea level, on the property;
- (B) existing or proposed cut and fill;
- (C) existing or proposed drainage facilities;
- (D) as-built elevations, certified by a licensed professional land surveyor, of the lowest floor (basement floor or otherwise) of all existing structures or the proposed lowest floor elevation of all proposed structures;
- (E) as-built elevations to which any nonresidential structure has been floodproofed;
- (F) certification from a licensed professional engineer or architect showing that nonresidential floodproofing meets the floodproofing criteria referenced in Sec. 21-11;
- (G) the extent to which any watercourse will be altered or relocated as a result of proposed development, including sufficient hydraulic information to show that such alteration or relocation will not increase the base flood elevation at any point along the watercourse above the allowable rise listed in the FEMA floodway tables or, in non-FEMA mapped areas, increase the depth of flood waters on property not controlled by the property owner; and
- (H) permit approval for proposed development from those federal, state, or local governmental agencies from which prior approval is required.

- 14-14-3** If a nonresidential structure must be floodproofed, the applicant must provide a Floodproofing Certificate (FEMA Form 81-65), with supporting data and an operational plan, that such structure must meet the floodproofing criteria specified in 14-14-2(F), Subsection C(6), and a post-construction certification from a licensed professional

Article 14 Flood Hazard Areas
14-15 Exemptions and Special Requirements

engineer or architect which states that such structures do in fact comply with the required floodproofing criteria. The floodplain administrator must review the certificate data and plan. Deficiencies detected by such review must be corrected by the applicant prior to permit approval. Failure to submit the certification or failure to make required corrections is cause to deny a floodplain development permit. Failure to construct in accordance with the certified design is cause to withhold the issuance of a Certificate of Compliance/Occupancy.

14-14-4 If any watercourse is to be altered or relocated, the applicant must provide financial sureties and deed restrictions to ensure that sufficient maintenance of the altered or relocated portion of said watercourse will be provided to ensure that the flood-carrying capacity of the watercourse is undiminished.

14-14-5 A final as-built Elevation Certificate (FEMA Form 81-31) is required after construction is completed and prior to Certificate of Compliance/Occupancy issuance. It is the duty of the permit holder to submit to the floodplain administrator a certification of final as-built construction of the elevation of the reference level and all attendant utilities. The floodplain administrator must review the certificate data submitted. Deficiencies detected by such review must be corrected by the permit holder immediately and prior to Certificate of Compliance/Occupancy issuance. In some instances, another certification may be required to certify corrected as-built construction. Failure to submit the certification or failure to make required corrections is cause to withhold the issuance of a Certificate of Compliance/Occupancy.

14-15 Exemptions and Special Requirements

14-15-1 Driveways are exempt from all flood hazard soil area regulations in this section provided the conditions of Sec. 14-15-2, Sec. 14-15-3, Sec. 14-15-4 and Sec. 14-21 are met. Driveways are not exempt from floodway, non-encroachment area and floodway fringe regulations.

14-15-2 Development in flood hazard soil locations involving less than 5 acres of drainage area are exempt from all flood hazard soil area regulations in this section.

14-15-3 Development in flood hazard soil locations involving 5 or more acres but less than 25 acres of drainage area are subject to the following requirements:

(A) Natural Conditions

All relevant information related to development occurring adjacent to a flood hazard soils area but not encroaching into the area must be certified by a licensed professional land surveyor. The certification must be based on the Wake County Soils Map which will be adjusted to conform to the Wake County Topographic Maps. Alternatively, the certification may be based upon the results of field investigations, surveys and engineering studies conducted by appropriate professionals if found to be acceptable by the Department of Environmental Services. The licensed professional land surveyor must establish the limits of the flood hazard soil area based on the adjusted soils map and the proposed property lines.

(B) Modified Conditions

Encroachments into a flood hazard soils area must be designed and certified by an appropriate design professional. The design must be based upon the establishment of a temporary or permanent benchmark and an analysis of the effects of the proposed encroachment to establish a base flood elevation or depth of flow, using Manning's Equation, field surveyed cross-sections including channel slope, Wake County Topographic Maps, and, where appropriate, use of Culvert Headwater Charts. No

Article 14 Flood Hazard Areas
14-15 Exemptions and Special Requirements

benchmarks are required when establishing a depth of flow. A minimum of one vertical foot must be added to the calculated base flood elevation or depth of flow to provide a factor of safety due to the potential backwater effects of the encroachment. The analysis must conclude that no existing or proposed structures or offsite properties will be inundated by the base flood. As-built certification of compliance with the construction drawings must be provided prior to receiving a footing inspection from the Wake County Building Inspections Division on any structures on any lots involved in the analysis. The as-built certification with the construction drawings is in addition to any elevation certifications which may be required for the structures.

14-15-4 Development in flood hazard soil locations involving 25 acres or more of drainage area but less than 100 acres of drainage area are subject to the following requirements:

(A) Natural Conditions

Certification is required in accordance with 14-15-3(A).

(B) Modified Conditions

Encroachments into a flood hazard soils area must be designed and certified by an appropriate design professional. The design must be based upon the establishment of a temporary or permanent benchmark and an analysis of the effects of the proposed encroachment to establish a base flood elevation or depth of flow; using Manning's Equation, field surveyed cross sections including channel slope, Wake County Topographic Maps, and where appropriate use of Culvert Headwater Charts. No benchmarks are required when establishing a depth of flow. A minimum of one vertical foot must be added to the calculated base flood elevation or depth of flow to provide a factor of safety due to the potential backwater effects of the encroachment. The analysis must conclude that no existing or proposed structures, or offsite properties will be inundated by the base flood. As-built certification of compliance with the construction drawings must be provided prior to receiving a footing inspection from the Wake County Building Inspections Division on any structures on any lots involved in the analysis. The as-built certification with the construction drawings is in addition to any elevation certifications which may be required for the structures.

14-15-5 Development in flood hazard soil locations involving 100 acres or more of drainage area are subject to the following requirements:

(A) Natural Conditions

Certification must be provided in accordance with 14-15-3(A).

(B) Modified Conditions

Encroachments into a flood hazard soils area must be designed and certified by an appropriate design professional. The design must be based upon the establishment of a temporary or permanent benchmark based on National Geodetic Vertical Datum and an analysis of the effects of the proposed encroachment to establish a base flood elevation; using Manning's Equation, the Standard Step Method to analyze backwater effect, field-surveyed cross sections including channel slope, and where appropriate, use of Culvert Headwater Charts. The analysis must conclude that no existing or proposed structures, or offsite properties will be inundated by the base flood. As-built certification of compliance with the construction drawings must be provided prior to receiving a footing inspection from the Wake County Building Inspections Division on any structures on any lots involved in the analysis. The as-built certification with the construction drawings is in addition to any elevation certifications which may be required for the structures.

Article 14 Flood Hazard Areas
14-17 Delineation of Special Flood Hazard Areas

14-15-6 Development of farm ponds as part of a bona fide farm use in flood hazard soil locations must either comply with the provisions of paragraph (2), (3), (4), or (5) of this subsection, as appropriate to the size of the drainage area, or comply with the following alternative requirements:

(A) Natural Conditions

Certification is required in accordance with Sec. 14-15-3(A).

(B) Modified Conditions for Farm Ponds

Farm ponds must be designed and constructed such that no offsite properties will experience an increase in flood elevations resulting from the 100-year storm event, unless the property is obtained or controlled through a recorded easement in favor of the party introducing the use. Furthermore, the dam must comply with all State and federal laws and regulations including the Dam Safety Law of 1967 (NCGS 143-215.23 through 143-215.37).

14-16 Administration

The Director of the Department of Environmental Services (also referred to as the “Floodplain Administrator”) must, in addition to other power and duties identified in this ordinance, perform the following:

- 14-16-1** notify, or see that notification is given to, adjacent communities and to the State Coordinator of the National Flood Insurance Program (located in the North Carolina Department of Crime Control and Public Safety, Division of Emergency Management) prior to any alteration or relocation of a watercourse, or submit evidence of such notification to the Federal Emergency Management Agency, or successor agency;
- 14-16-2** ensure, by requiring appropriate financial sureties and deed restrictions, that maintenance will be provided within the altered or relocated portion of said watercourse so that the flood carrying capacity is not diminished;
- 14-16-3** ensure that any base flood elevation data available from a federal, State, or other source is considered when base flood elevation data has not been provided by the Federal Emergency Management Agency, or successor agency, in order to administer the provisions of Sec. 14-19, Sec. 14-20 and Sec. 14-21;
- 14-16-4** advise permittee that additional federal or State permits may be required, and if specific federal or State permits are known, require that copies of such permits be provided and maintained on file with the development permit;
- 14-16-5** determine the exact location of boundaries of the areas of special flood hazard (for example, where there appears to be a conflict between a mapped boundary and actual field conditions) when interpretation is necessary. The person contesting the location of the boundary must be given a reasonable opportunity to appeal the Director of the Department of Environmental Services’ interpretation to the Wake County Board of Adjustment as provided in Sec. 19-41; and
- 14-16-6** maintain all records pertaining to the flood hazard regulations of Wake County, which must be open for public inspection.

14-17 Delineation of Special Flood Hazard Areas

The areas of special flood hazard within the jurisdiction of Wake County are divided into 4 categories:

- 14-17-1** floodway, as defined in 14-12, and as shown on the FIRM;

Article 14 Flood Hazard Areas
14-18 Special Flood Hazard Area Standards

14-17-2 non-encroachment areas, as defined in 14-12, and as described in the Limited Detailed Flood Hazard Data Tables in the Flood Insurance Rate Study Report;

14-17-3 floodway fringe, as defined in 14-12, and as shown on the FIRM; and

14-17-4 flood hazard soils, as defined in 14-12, and as shown on the soil overlay maps.

14-18 Special Flood Hazard Area Standards

An appropriate design professional, must certify that the standards of this section are satisfied. The certification must be submitted to the Department of Environmental Services.

14-18-1 In all areas of special flood hazards, the following general provisions apply:

- (A) all new construction and major repairs must be anchored to prevent floatation, collapse, or lateral movement of the structure;
- (B) all new construction and major repairs must be floodproofed;
- (C) all new construction or major repairs must be constructed by methods and practices that minimize flood damage;
- (D) all new construction and substantial improvements must be constructed with materials and utility equipment resistant to flood damage;
- (E) all new and replacement water supply systems must be designed to eliminate infiltration of flood waters into the system;
- (F) new and replacement sanitary sewage systems must be designed to eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters;
- (G) on-site waste disposal systems must be located to prevent impairment of them, or contamination from them, during the flooding;
- (H) all other public utilities such as gas and electrical systems must be located and constructed to minimize or eliminate flood damage; and
- (I) in regulated discharge floodplain areas, roads must be constructed so that surface elevations are no lower than the RFPE.
- (J) All new construction or major repairs [substantial improvements] must have adequate drainage provided to reduce exposure to flood hazards.

14-18-2 Any alteration, repair, reconstruction, or improvements to a structure which is in compliance with the provisions of this ordinance must meet the requirements of “new construction” contained in this ordinance.

14-18-3 In all areas of special flood hazard:

- (A) new residential construction or major repairs of any residential structure must have the lowest floor, including basement, elevated to or above the regulatory flood protection elevation (RFPE);

Article 14 Flood Hazard Areas
14-18 Special Flood Hazard Area Standards

- (B)** new nonresidential construction or major repairs of any commercial, industrial or other nonresidential structure must have the lowest floor, including basement, elevated to or above the level of the regulatory flood protection elevation (RFPE);
- (C)** electrical, heating, ventilation, plumbing, and air-conditioning equipment and other service facilities must be designed and/or located to prevent water from entering or accumulating within the components during conditions of flooding; and
- (D)** for all new construction, major repairs, and substantial improvements, fully enclosed areas below the lowest floor that are subject to flooding must be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a licensed professional engineer or architect or must meet or exceed the following minimum criteria: A minimum of 2 openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding must be provided. The bottom of all openings must be no higher than one foot above grade. Openings may be equipped with screens, louvers, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

14-18-4 Any recreational vehicle placed on a site must either:

- (A)** be on the site for fewer than 180 consecutive days;
- (B)** be fully licensed and ready for highway use, that is, is on its wheels or jacking system, is attached to the site only by quick-disconnect-type utilities and security devices, and has no permanently attached additions; or
- (C)** meet the permit requirements of Sec. 14-14 and the elevation and anchoring requirements for mobile homes in subparagraph 14-18-5(A) below.

14-18-5 In all areas of special flood hazard, the following provisions apply for mobile homes:

- (A)** no mobile home may be placed in a floodway or non-encroachment area except in a mobile home park existing prior to January 17, 1983;
- (B)** all mobile homes and accessory structures must be anchored to prevent floatation, collapse, or lateral movement by providing over-the-top and frame ties to ground anchors. Mobile homes must be anchored in accordance with the requirements in the “State of North Carolina Regulations for Manufactured Homes,” as adopted, and subsequently amended, by the North Carolina Commissioner of Insurance. Any additions to mobile homes must be similarly anchored;
- (C)** for any mobile home to be placed or substantially improved on a site located within a new mobile home park, within an expansion to an existing mobile home park, within a mobile home park that has incurred substantial damage as a result of a flood, or outside of a mobile home park:
 - (1)** the mobile home must be elevated on a permanent foundation so that its lowest floor is at or above the base flood elevation;
 - (2)** the mobile home must be securely anchored to an adequately anchored foundation system to resist flotation, collapse, and lateral movement;

Article 14 Flood Hazard Areas
14-19 Floodways and Non-Encroachment Areas

- (3) adequate surface drainage and access for a hauler must be provided; and
- (4) in the instance of elevation on pilings:
 - (a) lots must be large enough to permit steps;
 - (b) piling foundations must be placed in stable soil no more than 10 feet apart (Piling foundations must be certified (sealed) by a licensed professional engineer); and
 - (c) lateral reinforcement must be provided for pilings extending more than 6 feet above the ground level (Reinforcements must be certified by a licensed professional engineer).
- (D) For a mobile home to be placed or substantially improved on a site within an existing mobile home park not subject to the provisions in (c) above:
 - (1) The mobile home must be elevated so that:
 - (a) its lowest floor is at or above the base flood elevation; and
 - (b) its chassis is supported by reinforced piers or other foundation elements of at least equivalent strength.
 - (2) The mobile home must be securely anchored to an adequately anchored foundation system to resist flotation, collapse, and lateral movement.

14-18-6 In all Special Limited Use Areas, the following additional provisions apply:

- (A) New residential construction or development and all public or joint-use access roads must be constructed to a level that is at or above the RFPE.
- (B) Exception may be allowed to requirements in (A) above for access to facilities and/or equipment (pump stations, substations, etc.), as determined by the Department of Environmental Services.

14-19 Floodways and Non-Encroachment Areas

14-19-1 General Provisions

Floodways and non-encroachment areas are extremely hazardous because of the velocity of flood waters which carry debris, potential projectiles, and erosion potential. Therefore, the following provisions apply:

- (A) All uses permitted in 14-19-2(A) through 14-19-2(F) and 14-19-2(I) through 14-19-2(L) requiring encroachments, including fill, new construction, major repairs, or other developments are prohibited unless certification by the developer's engineer or other representative authorized by statute shows that all encroachments are floodproofed and that no encroachments will result in an increase in the elevation of the base flood above the elevation with floodway as established by the Floodway Data Tables. .
- (B) All uses permitted in subparagraphs 14-19-2(G) and 14-19-2(H) are allowed to increase the elevation of the base flood provided they are elevated or floodproofed and certified by the developer's engineer or other representative authorized by statute and provided:

Article 14 Flood Hazard Areas
14-19 Floodways and Non-Encroachment Areas

- (1) all changes in the base flood elevations as established in the Federal Emergency Management Agency's Flood Insurance Study report must be submitted to and approved by the Federal Emergency Management Agency, or successor agency;
 - (2) all dams which fall under the purview of the North Carolina Dam Safety Act (NCGS 143.215) must meet the standards of said Act;
 - (3) all areas inundated by the base flood as a result of such uses must be owned by, or controlled through a recorded easement in favor of the party introducing the use. Additionally, the party introducing the use must be responsible for floodproofing all utilities susceptible to the hazards of flooding;
 - (4) full compliance with the standards and procedures listed in 14-21-4 and 14-21-5 is required; and
 - (5) full compliance with Sections 60.3, 65.6, 65.7, and 65.12 of the National Flood Insurance Program, 44 CFR Chapter 1, 10-1-88 Edition, and any subsequent changes to these sections as contained in the most current edition.
- (C) Any violation of this Article constitutes a misdemeanor under the authority of NCGS 143-215.58.
- (D) Failure to remove any artificial obstruction or enlargement in the floodway or non-encroachment area that violates the regulations of this Article (or the provision of any permit issued) under the authority of NCGS 143-215.58 constitutes a separate violation for each 10 days that such failure continues after written notice from the county.

14-19-2 Uses Permitted in Floodways and Non-Encroachment Areas

The following uses, and uses listed in 14-19-1(A) are permitted in floodway and non-encroachment areas, provided that they are not prohibited by this or any other law; permanent facilities are floodproofed; they will not adversely affect the capacity of the channels, floodway or non-encroachment areas of any river, creek, stream, tributary, or other drainage areas; and provided, still further, that no such use will raise the elevation of the base flood except as provided in 14-19-1(A):

- (A) temporary facilities (for a specified number of days) such as displays, circuses, carnivals, or similar transient amusement enterprises upon filing an evacuation plan with Wake County Office of Emergency Management Services, or successor agency;
- (B) archaeological activities;
- (C) boat docks, ramps, piers, or similar water-dependent structures;
- (D) any use employing a structure provided that all portions of any structure, including foundation and supports, must be located outside the floodway area or non-encroachment area and that any structure which overhangs the floodway or non-encroachment area is elevated above the depth of the 500-year flood;
- (E) quarrying provided spoilage is not stored in the floodway or non-encroachment area;
- (F) any other use not employing a structure and not subject to floating away during a flood;
- (G) reconstruction, rehabilitation, or restoration of structures listed on the National Register of Historic Places or the State Inventory of Historic Places;

Article 14 Flood Hazard Areas

14-20 Floodway Fringe

- (H) roads, bridges, overhead utility lines, hydroelectric plants, railway lines and rights-of-way, creek and storm drainage facilities, sewage or waste treatment plant outlets, water supply intake structures, manholes and wastewater mains, and other similar public, community or utility uses; and
- (I) dams (including fill) provided they are constructed perpendicular to the floodway or non-encroachment area flow; provided still further that the emergency spillway is designed to safely pass the maximum expected peak discharge of the 100-year storm event; and provided still further that the dam complies with all state and federal laws and regulations. The construction of dams within jurisdictional waters of the United States may be prohibited by the federal and/or state government;
- (J) drainage ditches, roadside ditches, and stormwater outfalls, provided no alternative exists and any necessary stormwater management device(s) is/are installed to control nitrogen, to attenuate the velocity of the discharge, and to return the discharge to a diffuse flow (all to the maximum extent practicable), prior to the conveyance of the discharge through the buffer;
- (K) pedestrian, bikeway, equestrian, golf cart, and other recreation trails; and
- (L) stream and wetland restoration and stream bank stabilization.

14-19-3 Uses Prohibited in Floodway and Non-Encroachment Areas

- (A) No new structures may be constructed or placed within a floodway or non-encroachment area except as otherwise provided by subsection 14-19-2;
- (B) No fill may be placed in a floodway or non-encroachment area except as otherwise provided by subsection 14-19-2;
- (C) No new solid waste disposal facilities, hazardous waste management facilities, salvage yards, and chemical storage facilities or similar uses that may result in environmental contamination is permitted within floodways and non-encroachment areas. A structure or tank for chemical or fuel storage incidental to an allowed use or to the operation of a water treatment plant or wastewater treatment facility may be located in a floodway or non-encroachment area only if the structure or tank is either elevated or floodproofed to at least the regulatory flood protection elevation and certified accordingly.

14-20 Floodway Fringe

14-20-1 Uses Permitted (Below the Regulatory Flood Protection Elevation)

The following uses are permitted within floodway fringe areas below the regulatory flood protection elevation to the extent that they are not otherwise prohibited by this or any other law or ordinance:

- (A) uses permitted and regulated in floodways and non-encroachment areas; and
- (B) underground storage and structure foundations and supports which are watertight and substantially impermeable to the passage of water and are designed to withstand the flood depths, velocities, impact and uplift forces associated with the base flood at the location of the structure.

Article 14 Flood Hazard Areas

14-22 Uses Allowed Without a Permit

14-20-2 Uses Prohibited in the Floodway Fringe

- (A) No new structures may be constructed or placed within the floodway fringe except as otherwise provided by subsection 14-20-1.
- (B) No fill may be placed in the floodway fringe except as otherwise provided by this ordinance unless cut and fill is balanced on the site and a licensed professional engineer provides a no-rise certification accompanied by sufficient documentation to verify that there will be no increase in the base flood elevation. Subsequently, no portion of the property may be permitted to be included in a request for a Letter of Map Amendment (LOMA).
- (C) No new solid waste disposal facilities, hazardous waste management facilities, salvage yards, and chemical storage facilities or similar uses that may result in environmental contamination are permitted in the floodway fringe. A structure or tank for chemical or fuel storage incidental to an allowed use or to the operation of a water treatment plant or wastewater treatment facility may be located in the floodway fringe only if the structure or tank is either elevated or floodproofed to at least the regulatory flood protection elevation and certified accordingly.

14-21 Flood Hazard Soil Areas

14-21-1 Uses Permitted

All uses permitted in Sec. 14-19 and Sec. 14-20, or in subsection 11-22-2 are permitted in flood hazard soil areas, and such uses may raise the elevation of the base flood in excess of one foot, provided that any use which raises the elevation of the base flood meets the following conditions:

- 14-21-2** the Department of Environmental Services must review and approve any hydrologic or other data prepared to show regulatory flood protection elevations;
- 14-21-3** all areas upstream of the use which become inundated by the base flood as a result of that use must be owned by or controlled through a recorded easement in favor of, the party introducing the use. Additionally, the party introducing the use must be responsible for floodproofing all utilities that are susceptible to the hazards of flooding because of their location below the base flood elevation; and no floodwaters must be in excess of the pre-development base water surface elevation on properties not owned or controlled by the applicant; and
- 14-21-4** such uses are subject to standards and procedures established by the Department of Environmental Services, including: Section 1, Subsection 104; Section 3, Table 300.1; and Section 3, Subsection 301.03 of the North Carolina State Highway Commission's Handbook of Design for Highway Surface Drainage Structures.
- 14-21-5** such uses are subject to the standards set out in the Wake County Standards and Specifications for Soil Erosion and Sediment Control.

14-22 Uses Allowed Without a Permit

The following uses are allowed within a floodway, non-encroachment, floodway fringe, or flood hazard soils area without a permit provided the existing topography and drainage is not altered by construction, the level of the base flood is not increased, and the use does not involve any man-made change to improved or unimproved real estate (including, but not limited to, buildings or other structures, mining, dredging, filling, grading, paving, excavation, drilling operations, or storage of equipment or materials).

Article 14 Flood Hazard Areas

14-22 Uses Allowed Without a Permit

- 14-22-1** general farming, pasture, outdoor plant nurseries, horticulture, forestry, wildlife sanctuary, game farm, and other similar agricultural, wildlife and related uses;
- 14-22-2** ground level loading areas, parking areas, rotary aircraft ports and other similar ground level area uses;
- 14-22-3** lawns, gardens, play areas, and similar uses; and
- 14-22-4** golf courses, tennis courts, driving ranges, archery ranges, picnic grounds, parks, hiking or horseback riding trails, open space and other similar private and public recreational uses.

OA 05/04 May 1, 2006

Article 3 Zoning Districts

3-72 RCOD-1, Resource Conservation Overlay District

- (c) Where public necessity requires the location of major public utility lines adjacent to a Special Highway and the easement or right-of-way for a line precludes provision of a Special Highway bufferyard immediately adjacent to the highway right-of-way, the required bufferyard must be provided adjacent to the outer edge of the utility easement or right-of-way. The public utility line easement or right-of-way must be screened in accordance with the requirements of (C)(2) below.

(2) Bufferyard Screening and Vegetation

- (a) Along that part of the Special Highway bufferyard closest to the Special Highway, existing vegetation must be retained or supplemented with additional planting as necessary to provide Type A Screening. Within the remainder of the bufferyard existing vegetation must be left undisturbed except as necessary to allow the construction or installation of structures permitted in the bufferyard (see (c) below). The provisions of subsections 16-10-3, 16-10-3(B), 16-10-3(C) and 16-10-3(D), applicable to bufferyards, also apply to Special Highway bufferyards.
- (b) Where public necessity requires the location of major public utility lines adjacent to a Special Highway, sufficient vegetation and/or other screening must be retained or provided within the Special Highway right-of-way (with approval from NCDOT) or the public utility line easement or right-of-way to minimize any dominating linear view of the cleared utility line easement or right-of-way seen by travelers on the Special Highway.
- (c) The following minor structures are allowed in a Special Highway bufferyard:
 - i. pedestrian or bicycle paths, including steps;
 - ii. planters, retaining walls, fences, park tables and seating, hedges, and other landscaping structures; and
 - iii. utility lines (above or below the ground), their support structures, and minor structures accessory to utility lines, provided that they generally cross rather than run along the length of the bufferyard.

(D) Exterior Lighting

All exterior lighting must be constructed or located so that the light source is not directly visible from a vehicle traveling on the Special Highway.

3-72 RCOD-1, Resource Conservation Overlay District

3-72-1 Purpose; Locational Criteria

(A) The RCOD-1, Resource Conservation overlay district is intended to:

- (1) protect and preserve the water quality of designated special water impoundments while allowing the orderly development of land in the watersheds of these sensitive areas;

Article 3 Zoning Districts

3-72 RCOD-1, Resource Conservation Overlay District

- (2) protect the water quality in these impoundments by requiring vegetated buffer areas around them as well as along drainageways leading to them; and
 - (3) be applied within special watersheds and such other significant physical and biological areas and habitats as the Wake County Board of Commissioners deems appropriate.
- (B) Special water impoundments provide significant wildlife or plant life habitats, possess characteristics unique to Wake County, public recreation, or offer potentials for future public recreation.

3-72-2 Allowed Uses

Principal uses are allowed in the RCOD-1 overlay district in accordance with the use regulations of the underlying base zoning district, except that location of such uses are restricted as required by the requirements of this section.

3-72-3 Other District-Specific Regulations

The standards of both the RCOD-1 overlay district and the underlying district apply. Where the standards of the overlay district and the underlying district differ, the more restrictive standards control. All limits of disturbance within watershed buffers apply to each side of the water body.

- (A) 100-foot-wide special water impoundment buffers must be maintained around special water impoundments. Special water impoundment buffers must be measured perpendicular to the normal pool shoreline of the special water impoundment, and must extend 100 feet from the normal pool shoreline of the special water impoundment, inside the watershed draining into that impoundment.
- (B) 50-foot-wide drainageway buffers must be maintained along each side of a stream, and 25-foot wide drainageway buffers must be maintained along each side of an upper watershed drainageway, up to a point where less than 5 acres are drained by such upper watershed drainageway. In order to determine the amount of land drained by an upper watershed drainageway or a stream, USGS or Wake County topographic maps may be used.
- (C) 50-foot-wide water impoundment buffers must be maintained around water impoundments located on a stream, and 25-foot-wide water impoundment buffers must be maintained around water impoundments located on an upper watershed drainageway.
- (D) Drainageway buffers, water impoundment buffers, and special water impoundment buffers must be designated on lots created after November 19, 1986. Vegetation within such buffers must remain undisturbed except as may be necessary to accommodate any of the following uses:
 - (1) boat docks, ramps, piers, or similar structures;
 - (2) greenways, pedestrian paths, path shelters and benches, and related recreational uses;
 - (3) reconstruction, rehabilitation, or restoration of structures listed on the National Register of Historic Places;
 - (4) drainage facilities or utilities;
 - (5) roads, provided they cross the buffer at a horizontal angle of at least 60 degrees;

Article 3 Zoning Districts

3-73 RCOD-2, Resource Conservation Overlay District 2

- (6) forestry and husbandry activities that eliminate diseased, infected or damaged timber or nuisance vegetation;
 - (7) sedimentation and erosion control measures and devices as approved by the Department of Environmental Services;
 - (8) grassed yards; and
 - (9) construction of new lakes or ponds, provided that applicable buffers are designated around such new lakes or ponds.
- (E) All buildings must be set back at least 20 feet from the edge of any drainageway buffer, special water impoundment buffer, or water impoundment buffer.
- (F) In the event of conflict with other applicable regulations, the more restrictive regulation will govern.
- (G) Some streams may require both special watershed buffers and Neuse River riparian buffers.

3-73 RCOD-2, Resource Conservation Overlay District 2

3-73-1 Purpose and Intent

- (A) The RCOD-2 overlay district is intended to protect and preserve the water quality of special watersheds while allowing the orderly development of land in the watersheds of these sensitive areas. The purpose of these regulations is consistent with the Wake County Land Use Plan and otherwise advance the public health, safety, and general welfare.
- (B) Special watersheds provide significant wildlife, aquatic and other organisms, or plant life habitats; possess characteristics unique to Wake County. It is the intent of these regulations to protect the water quality in these watersheds by requiring vegetated buffer areas along perennial streams and stormwater runoff controls.
- (C) As is the case with any regulation or provision of this ordinance, when practical difficulties or unnecessary hardships would result from carrying out the strict letter of the regulation, the Board of Adjustment may vary or modify said regulation after making findings of fact supporting its conclusions in accordance with Sec. 19-26.

3-73-2 District Boundary

RCOD-2 overlays districts must be appropriately located within special watersheds and such other significant physical and biological areas and habitats, as the Wake County Board of Commissioners deems appropriate.

3-73-3 Regulation Of Uses

The uses permitted or prohibited in the RCOD-2 district will be those uses permitted or prohibited in the underlying zoning district.

3-73-4 Existing Development, Redevelopment, And Expansions

- (A) Existing development is not subject to the requirements of this section; existing development will be considered to be any impervious surfaces created, or for which a vested right has been established, as of May 31, 2005.

Article 3 Zoning Districts

3-73 RCOD-2, Resource Conservation Overlay District 2

- (B)** Redevelopment and expansions of any existing nonresidential development will be subject to the requirements of this section; however, the impervious surface coverage of the existing development is not required to be included when applying the impervious surface coverage limits of this section.

3-73-5 Uses Exempted

Bona fide farms, including land held for forestry practices, are exempt from the provisions of this section, provided that farming constitutes the primary use of the property. Any use of farm property for non-farm purposes is subject to these regulations.

3-73-6 Development Standards

The following standards apply in RCOD-2 district. The standards of both the RCOD-2 district and the underlying district will apply. Where the standards of the Overlay District and the underlying district differ, the more restrictive standards will control on lots created after May 31, 2005.

(A) Stormwater Runoff Control

- (1)** Peak stormwater runoff leaving any site for the one-year storm may be no greater for post development conditions than pre-development conditions. The same methodologies used to calculate stormwater runoff must be used for both pre-development and post-development conditions.
- (2)** In addition to those activities exempted above, the stormwater runoff control requirements of this section will not apply to one or more of the following:
- (a)** The increase in peak stormwater runoff between pre-development and post development conditions for the one-year storm is 10 percent or less.
 - (b)** The maximum impervious surface coverage of the lot is no more than 15 percent and the remaining pervious portions of the lot are utilized to convey and control the stormwater runoff of the lot to the maximum extent practical. In determining a subdivision lot's eligibility for this exemption, the amount of impervious surface coverage in a lot will be increased by the lot's proportional share of impervious surface coverage devoted to roadways and improvements in the subdivision and will be decreased by the lot's proportional share of subdivision parcels devoted to open space, had they been created as building lots. Any lot which is exempted from the runoff control requirements by this subsection, must comply with all the requirements of this section whenever:
 - i.** The exempted lot is subdivided; or
 - ii.** The exempted lot size is reduced by recombination; or
 - iii.** Impervious surfaces on the exempted lot equal or exceed the maximum allowable as determined in Section 3-73-6(A)(2)(b).
 - (c)** Compliance with the runoff limitations in Section 3-73-6(A) would result in greater adverse downstream impact, such as local flooding, as determined by County approved engineering studies.
 - (d)** The County reserves the right to require stormwater runoff control measures for projects without any measures, and the County reserves the right to require

Article 3 Zoning Districts

3-73 RCOD-2, Resource Conservation Overlay District 2

additional stormwater runoff control measures for projects which are complying with this section if stormwater runoff from the site will cause adverse effects on other properties including without limitation public streets, greenway, and utility easements.

(B) Location and Width of Special Watershed Buffers

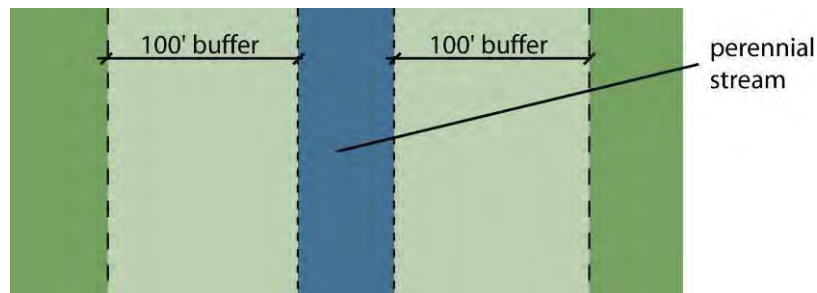
The location and width of the special watershed buffer must be maintained as shown below:

(1) General

- (a)** In the event of conflict with other applicable regulations, the more restrictive regulation will govern.
- (b)** Some streams may require both special watershed buffers and Neuse River riparian buffers.

(2) Perennial Streams

- (a)** A special watershed buffer with a minimum width of 100 feet must be provided along each side of a stream shown as a perennial stream from the 1999 Wake County Surface Water Survey Mapping Project – 1:1,200 scale map.
- (b)** The buffer width is to be measured perpendicular to the river or stream bank starting at the river or stream bank.
- (c)** There is no minimum building setback from the required buffer.



3-73-7 Activities Allowed within Special Watershed Buffers

(A) General

The required 100-foot buffer along a perennial stream must consist of a vegetated area that is undisturbed except for the activities expressly allowed to occur within special watershed buffers pursuant to Section 3-73-7(B). All limits of disturbance within watershed buffers apply to each side of the water body.

(B) Activities Allowed within Required Special Watershed Buffers

Only the activities listed below are allowed within required special watershed buffer areas:

- (1)** Archeological activities, provided any vegetation removed is restored with vegetation of a comparable assimilative capacity

Article 3 Zoning Districts

3-73 RCOD-2, Resource Conservation Overlay District 2

- (2) Bridges, provided no reasonable alternative to their location in the buffer exists
- (3) Dam maintenance activities
- (4) Vegetated swales, provided:
 - (a) no reasonable alternative to their location in the buffer exists; and
 - (b) a stormwater management facility is installed to control nitrogen and attenuate flow before the conveyance discharges through the buffer
- (5) Drainage of a pond, provided a new vegetated special watershed buffer meeting the purpose and requirements of this Section is established along the new drainageway
- (6) Driveway crossings that access single-family dwellings, provided:
 - (a) no reasonable alternative to their location in the buffer (including opportunity for shared driveways) exists;
 - (b) buffer disturbance is no more than 60 feet wide [1];
 - (c) buffer disturbance is no more than 6,000 square feet in area;
 - (d) the driveway crosses the buffer at an angle as close to 90 degrees as possible (and not less than 60 degrees);
 - (e) side slopes do not exceed a 2:1 (horizontal to vertical) ratio (bridging and/or retaining walls may be used to meet this and the disturbance width standard); and
 - (f) all culverts are designed and constructed for the 25-year storm event or as otherwise required by Wake County Environmental Services.
- (7) Utility lines, provided:
 - (a) no reasonable alternative to their location in the buffer exists;
 - (b) a line crossing the buffer is combined with other permitted buffer crossings where practicable;
 - (c) buffer disturbance is not more than 40 feet wide;
 - (d) woody vegetation is removed by hand (no land grubbing or grading);
 - (e) vegetative root systems and stumps from cut trees are retained;
 - (f) no rip rap is used unless necessary to stabilize a pole or tower;
 - (g) active measures are taken after construction and during routine maintenance to ensure diffuse flow of stormwater through the buffer;
 - (h) mats are used to minimize soil disturbance (in wetlands);

Article 3 Zoning Districts

3-73 RCOD-2, Resource Conservation Overlay District 2

- (i) poles or towers are not installed within 10 feet of the lake, pond, river, stream, or drainageway;
 - (j) the area within 10 feet of the lake, pond, river, stream, or drainageway is managed so that only vegetation posing a hazard or with a potential to grow tall enough to interfere with the line is removed;
 - (k) construction activities minimize removal of woody vegetation, the extent of disturbed area, and the time during which areas remain in a disturbed state;
 - (l) cables are installed by vibratory plow or trenching; and
 - (m) trenches are backfilled with the excavated material immediately following line installation.
- (8) Wells, subject to applicable local, state, and federal regulations.
- (9) Sewage disposal systems, on-site (including but not limited to septic tanks, pumps, and ground absorption areas), provided that this is a replacement of an existing sewage disposal system, approved by the Director of Environmental Services.
- (10) Recreation trails (public or private), provided:
 - (a) no reasonable alternative to their location in the buffers exists
 - (b) a trail crossing the buffer is combined with other permitted buffer crossings where practicable;
 - (c) buffer disturbance is no more than 20 feet wide (unless otherwise approved by Wake County Environmental Services);
 - (d) the trail is no more than 12 feet wide;
 - (e) a trail crossing the buffer does so at an angle as close to 90 degrees as possible (and not less than 60 degrees); and
 - (f) trail running linearly within the buffer must be located in the outer 20 feet of the buffer
 - (g) [Use of pervious surfacing materials is encouraged]
- (11) Railroad crossings, provided:
 - (a) no reasonable alternative to their location in the buffer exists;
 - (b) buffer disturbance is not more than 60 feet wide; and
 - (c) buffer disturbance is no more than 6,000 square feet in area
- (12) Removal of fill deemed harmful to the stream's water quality, provided:
 - (a) no excavation below the prior natural elevation;

Article 3 Zoning Districts

3-73 RCOD-2, Resource Conservation Overlay District 2

- (b) diffuse flow is maintained; and
 - (c) any vegetation removed is restored with woody native species of equivalent or better quality
- (13) Road crossings (public or private roads), provided:
 - (a) no reasonable alternative to their location in the buffer exists;
 - (b) buffer disturbance does not extend beyond the required right-of-way or easement width, or in no case is more than 90 feet wide;
 - (c) buffer disturbance is no more than 9,000 square feet in area;
 - (d) the road crosses the buffer at an angle as close to 90 degrees as possible (and not less than 60 degrees);
 - (e) side slopes do not exceed a 2:1 horizontal: vertical ratio (bridging and/or retaining walls may be used to meet this and the disturbance width standard); and
 - (f) all culverts are designed and constructed for the 25-year storm event or as otherwise required by Wake County Environmental Services.
- (14) Scientific studies and stream gauging
- (15) Stormwater management ponds, provided
 - (a) no reasonable alternative to their location in the buffer exists; and
 - (b) a new vegetated buffer is established around the new pond
- (16) Stream restoration and bank stabilization for mitigation purposes only
- (17) Temporary in-stream sediment and erosion control measures for work within a stream channel
- (18) Manual vegetation management is permitted but no grubbing or excavation; manual vegetation management may include:
 - (a) emergency fire control measures, provided topography is restored;
 - (b) planting vegetation to enhance the buffer's function;
 - (c) pruning forest vegetation, provided the health and function of the vegetation is not compromised;
 - (d) removing individual trees that are in danger of causing damage to dwellings, other structures, or human life; and
 - (e) removing poison ivy; and other noxious growth
- (19) Water dependent structures (See definition, Section 21-11)

(20) Wetland restoration

3-73-8 Design, Construction, and Maintenance of Disturbances within Special Watershed Buffers

Any allowed disturbance that occurs as a result of the activities expressly permitted in Section 3-73-7(B) must be designed, constructed, and maintained so as to:

- (A)** minimize impervious or partially impervious surface coverage;

Commentary: The use of pervious surfacing materials and/or dual ribbon design is encouraged.

- (B)** diffuse the flow of stormwater runoff, encourage sheet flow and avoid concentrated discharge of stormwater into surface waters;
- (C)** maximize the use of Best Management Practices (BMPs) to minimize adverse water quality impacts; and comply with all applicable standards and conditions of Section 3-73-7(B).

OA 05/02 May 16, 2005

3-74 WSO, Water Supply Watershed Overlay District

3-74-1 Purpose

The WSO, Water Supply Watershed Overlay district is intended to ensure that the quality of public water supplies is protected while allowing limited orderly development. The regulations of the WSO overlay district protect water quality by requiring vegetated watershed buffers around surface water bodies and streams and by limiting the area of impervious coverage. The subdistricts and their accompanying development standards are consistent with the classifications used by North Carolina Department of Environment and Natural Resources and recognize the varying function and sensitivity of different watershed areas.

3-74-2 Subdistricts Established

The WSO overlay district includes the following subdistricts:

(A) WSO-2NC, Water Supply Watershed II (Non-Critical Area)

The WSO-2NC overlay district is intended to be applied to the area outside of the designated critical area of all WS-II watersheds outside of the watershed's critical area, as classified by the North Carolina Department of Environment and Natural Resources.

(B) WSO-3NC, Water Supply Watershed III (Non-Critical Area)

The WSO-3NC overlay district is intended to be applied to the area outside of the designated critical area of all WS-III watersheds, as classified by the North Carolina Department of Environment and Natural Resources.

(C) WSO-3CA, Water Supply Watershed III (Critical Area)

The WSO-3CA overlay district is intended to be applied to the designated critical area of all WS-III watersheds, as classified by the North Carolina Department of Environment and Natural Resources.

(D) WSO-4P, Water Supply Watershed IV (Protected Area)

The WSO-4P overlay district is intended to be applied to the designated protected area of all WS-IV watersheds, as classified by the North Carolina Department of Environment and Natural Resources. The overlay contains two subdistricts: WSO-4P-1 and WSO-4P-2.

3-74-3 Applicability

(A) WSO-2NC Designated Area

Land in a water supply watershed classified WS-II (e.g., the Little River watershed) that is outside of the watershed's critical area and that:

- (1) is already located in an underlying district that does not apply appropriate watershed protection standards; or
- (2) is located within an Urban Services Area/Water Supply Watershed (as designated in the Land Use Plan) and is being rezoned, in accordance with an adopted joint land use plan, to an underlying district that does not apply appropriate watershed protection standards.

(B) WSO-3NC, Designated Area

Land in a water supply watershed classified WS-III (e.g., the Swift Creek watershed) that is outside of the watershed's critical area and that:

- (1) is already located in an underlying district that does not apply appropriate watershed protection standards; or
- (2) is located within an Urban Services Area/Water Supply Watershed (as designated in the Land Use Plan) and is being rezoned, in accordance with an adopted joint land use plan, to an underlying district that does not apply appropriate watershed protection standards.

(C) WSO-3CA, Designated Area

Land in the critical area of a water supply watershed classified WS-III (e.g., the Swift Creek watershed) that:

- (1) is already located in an underlying district that does not apply appropriate watershed protection standards; or
- (2) is located within an Urban Services Area/Water Supply Watershed (as designated in the Land Use Plan) and is being rezoned, in accordance with an adopted joint land use plan, to an underlying district that does not apply appropriate watershed protection standards.

(D) WSO-4P, Designated Area

(1) WSO-4P-1

The WSO-4P-1 subdistrict includes land in the protected area of a water supply watershed classified WS-IV—other than the Falls Lake watershed (e.g., the Jordan Lake, Cape Fear (Lillington), Cape Fear (Sanford) and Upper Neuse River/Richland Creek watersheds)—that:

- (a) is located in an underlying district that does not apply appropriate watershed protection standards; or
- (b) is located within an Urban Services Area/Water Supply Watershed (as designated in the Land Use Plan) and is being rezoned, in accordance with an

Article 3 Zoning Districts

3-74 WSO, Water Supply Watershed Overlay District

adopted joint land use plan, to an underlying district that does not apply appropriate watershed protection standards.

(2) WSO-4P-2

The WSO-4P-2 subdistrict includes land in the protected area of a water supply watershed classified WS-IV—other than the Falls Lake watershed (e.g., the Jordan Lake, Cape Fear (Lillington), Cape Fear (Sanford) and Upper Neuse River/Richland Creek watersheds)—that:

- (a) has been, or is committed to being, developed with basin-wide or other large-area stormwater management systems with lakes and detention facilities that provide protection of water quality beyond that provided by limiting the impervious surface coverage of individual developments; and
- (b) makes up no more than 10% of the total land area of that portion of the watershed outside of its critical area and within the county's zoning jurisdiction as of July 1, 1995.

3-74-4 Exemptions

Existing development is not subject to the requirements of Sec. 3-74; existing development must be considered to be any impervious surfaces created, or for which a vested right has been established, as of December 31, 1993. Redevelopment and expansions of any existing development are subject to the requirements of this section; however, the impervious surface coverage of the existing development is not required to be included when applying the impervious surface coverage limits of this section. The land area to which this section's impervious surface coverage limits are applied is the total area of a parcel minus the area of impervious surfaces existing or vested as of December 31, 1993.

3-74-5 General Standards

All development within WSO overlay districts must, to the maximum extent practicable, minimize impervious or partially pervious surface coverage, direct stormwater away from surface waters, incorporate Best Management Practices (BMPs) to minimize water quality impacts, and transport stormwater runoff from the development by vegetated conveyances.

3-74-6 Allowed Uses

Principal uses are allowed in all WSO overlay districts in accordance with the use regulations of the underlying base zoning district.

3-74-7 Lot and Building Standards

(A) General

The use and development of land or structures within all WSO overlay districts must comply with the use and development regulations applicable to the underlying zoning district, except that the standards of this subsection apply whenever they are more restrictive than those of the underlying zoning district.

(B) WSO-2NC, WSO-3CA and WSO-3NC Districts

Development within WSO-2NC, WSO-3CA and WSO-3NC overlay districts must comply with the following standards whenever they are more restrictive than those of the underlying zoning district.

Article 3 Zoning Districts

3-74 WSO, Water Supply Watershed Overlay District

Overlay District	Minimum Lot Area (sq. ft.)	Maximum Density (lots/acre)	Max. Impervious Surface
WSO-2NC [1]	40,000	1	12%
WSO-3CA [1]	40,000	1	12%
WSO-3NC [2]	20,000	2	24%

[1] In WSO-2NC and WSO-3CA districts, residential lots of at least 40,000 square feet in area and residential lots in a cluster subdivision, open space subdivision or existing Consolidated Open Space Development with an overall lot density no more than one lot per acre are not subject to impervious surface coverage limits except as required by the underlying zoning. For all other residential lots and for nonresidential developments in those districts, impervious surface coverage may not exceed 12% of the total area of the site, as designated on the site plan.

[2] In WSO-3NC districts, residential lots of at least 20,000 square feet in area and residential lots in a cluster subdivision, open space subdivision or existing Consolidated Open Space Development with an overall lot density of no more than 2 lots per acre are not subject to impervious surface coverage limits except as required by the underlying zoning. For all other residential lots and for nonresidential developments in those districts, impervious surface coverage may not exceed 24 percent of the total area of the site, as designated on the site plan.

(C) WSO-4P Districts

Development within WSO-4P districts must comply with the following standards whenever they are more restrictive than those of the underlying zoning district.

(1) With Curb and Gutter

In a development served by a curb and gutter system, residential lots of at least 20,000 square feet in area and residential lots in a cluster subdivision, open space development or existing consolidated open space development with an overall lot density no more than 2 lots per acre, are not subject to impervious surface coverage limits except as required by the underlying zoning. For all other residential lots and for nonresidential developments, the following standards apply:

(a) WSO-4P1

In the WSO-4P1 district, impervious surface coverage may not exceed 24 percent of the total area of the site, as designated on the site plan.

(b) WSO-4P2

In the WSO-4P2 district, impervious surface coverage may not exceed 30 percent of the total area of the site, as designated on the site plan.

Commentary: Curb and gutter are limited in water supply watersheds. See Sec. 8-32-18.

(2) Without Curb and Gutter

In a development not served by a curb and gutter system, residential lots of at least 15,000 square feet in area and residential lots in a cluster subdivision, open space development or existing consolidated open space development with an overall lot density no more than 2 lots per acre, are not subject to impervious surface coverage limits except as required by the underlying zoning. For all other residential lots and for nonresidential developments, impervious surface coverage may not exceed 30 percent of the total area of the site, as designated on the site plan.

(3) Engineered Stormwater Control Structures

Engineered stormwater control structures must meet design guidelines of the State Division of Water Quality, or its successor agency. Responsibility for maintenance of all permanent infiltration, retention, and detention control measures and facilities, after site development is completed, rests with the owner of the use. When designed in accord with the guidelines of the State Division of Water Quality, or its successor

Article 3 Zoning Districts

3-75 Airport Overlay District

agency, lakes and ponds used singularly or in a system for stormwater runoff control may be included as a pervious surface for the purpose of calculating the impervious surface coverage of a site.

3-74-8 Other District-Specific Regulations

(A) Watershed Buffers

Any development in water supply watershed buffer areas is subject to the requirements of Article 11.Part 2 (Water Supply Watershed Buffers)

(B) Limitations on Use and Storage of Hazardous Materials in Nonresidential Developments

In designated Water Supply Watershed Overlay districts, the use and storage of hazardous materials is permitted in accord with local, state, and federal legislation regulating the use and storage of hazardous materials.

[Amended on 7/21/2008 by OA 03-08.]

(C) Requirements for Forestry Activities

Silvicultural activities are subject to the provisions of the Forest Practices Guidelines Related to Water Quality (15 NCAC 11 .0101-.0209), implemented by the State Division of Forest Resources.

(D) Prohibited Land Applications

Land application of sludge residuals or petroleum-contaminated soils is prohibited.

(E) Gasoline Sales Prohibited

The sale of gasoline is prohibited.

3-75 Airport Overlay District

3-75-1 Purpose

(A) The Airport Overlay District (AO) is established as an overlay district of all general zoning districts located within Wake County's jurisdiction that are in the general vicinity of the Franklin County Airport. The purpose of the AO district is to protect the airport environs from encroachment of incompatible land uses that would present hazards to users of the airport or to persons residing or working in the airport vicinity. The supplemental regulations imposed in the AO district are designed to place a height restrictions of 1,050 feet on buildings and structures, as well as some limitations on uses and lighting within this area.

(B) It is the intent of this section:

- (1)** to prevent creation of conditions hazardous to aircraft operation,
- (2)** to prevent conflict with land development which may result in a loss of life and property, and
- (3)** to encourage development this is compatible with airport use characteristics within the intent and purpose of zoning.

Appendix C

– Capital Improvement Projects

- 2014 Budget Report 5 year CIP Descriptions

CAPITAL INVESTMENT PROGRAM

5-YEAR CAPITAL INVESTMENT PROGRAM

OVERVIEW

Annually, local governments assess financial capacity to plan for capital investment projects. These large financial investments are required to maintain and expand public facilities and public infrastructure. Ongoing service delivery can be assured only if adequate consideration is given to capital needs by the budget process. A Capital Investments Program is a tool used by governments in conjunction with the 5-Year Long Range Financial Model (5YrLRFM) to ensure that decisions on capital projects and funding are made wisely and are well planned.

The Town's Five Year Capital Investment Plan (5YrCIP) is a multi-year planning period for capital projects, currently for the 2014-2018 timeframe. The program outlines project details including estimated timeframes, cost, and funding sources and discusses impacts to future operational budgets. A Capital Investments Program should not be confused with a Capital Investment Budget. A Capital Investment Budget represents the first year defined by the Capital Investment Program that appropriates funds for capital spending. Morrisville's Annual Capital Budget is reported, and adopted in conjunction with the Annual Operating Budget. Capital investment planning is a dynamic process; changes do and should occur in the process from year to year to adapt to changing elements.

The plan is updated and re-adopted every two years to fine-tune cost, adjust availability of resources, and plan projects within the projected financial capacity.

PURPOSE

The 5YrCIP serves a number of important functions for local government. Capital project planning should plan for projects that maintain or improve the Town's fixed assets. The Town is primarily responsible for the public service in those assets. In addition, capital project planning should:

- Support Town Goals and Initiatives
- Prevent deterioration of the Town's existing public infrastructure
- Encourage and sustain economic development within the Town
- Increase efficiency and productivity of Town operations
- Enhance Decision Making

- Plan for irregular capital expenditures

ADVANTAGES

- Build public consensus for projects and improves community awareness
- Improves Inter-/Intragovernmental cooperation and communication
- Avoids waste of resources
- Helps ensure financial stability

DIFFERENTIATING CAPITAL FROM OPERATING BUDGET

Capital projects typically are large, non-recurring expenditures that would distort the annual operating budget if appropriated. Typical criteria utilized to determine types of expenditures are cost and useful life. Cost is a value limit placed on the expense. Useful life is defined as projects having a long service life and non-recurring nature. Annual items such as salaries, office supplies, routine maintenance, and service contracts are typical of operating expense and therefore are not appropriate for capital expenses. The difference between departmental capital outlay items in annual operating budget and capital project items in CIP:

1. Departmental capital outlay items shall not be submitted as part of CIP. Departmental capital outlay items include equipment/tools, furniture, office equipment, minor remodeling, or construction below \$100,000.
2. All fire apparatus equipment items are funded through a Capital Reserve Fund and are therefore not associated with the 5YrCIP.

To qualify as a capital project for the 5YrCIP the project should meet the following criteria:

1. Construction and/or acquisition of public asset is greater than \$100,000
2. Project requires debt funding
3. Provide for the acquisition or construction of land or any public facility, to include consultant or professional service related to the facility
4. Provide for the acquisition of equipment for any public facility when first constructed or acquired
5. Expenditures, including additions to existing public facilities, which increase the square footage or value of the facility

6. Expenditures for major maintenance or replacement projects on existing public facilities

CAPITAL INVESTMENTS PLANNING CALENDAR

The Capital Investment Planning Calendar will coincide with the Annual Operating Budget Planning Calendar every other year providing for a two-year CIP cycle. The most recent adopted 5YrCIP will be used in the annual budget development process.

POLICIES

The CIP will be subject to the same financial policies as the Annual Operating Budget.

STEPS IN CIP PROCESS

1. Prepare Capital Needs Assessment once every other Fiscal Year.
 - a. Conduct departmental needs survey for repair and/or replacement needs on odd fiscal year
 - b. Conduct community needs survey to collect input on areas of focus on even fiscal year
2. Develop Capital Projects and match to needs assessment
 - a. Review status of previously approved projects
 - b. Use departmental and community survey data to identify and develop information for new Capital Projects
 - c. Examine capital project alternatives
 - d. Staff completes and submits to budget office update and/or new capital project forms
3. Evaluate and Prioritize Projects
 - a. Review project application submittals
 - b. Staff uses Project Evaluation Criteria to preliminarily prioritize all capital projects
 - c. Prepare a CIP Prioritization Listing for Council to evaluate and adjust
4. Assess financial capacity and Funding Options
 - a. Upon completion & Council acceptance of Annual Audit, the 5YrLRFM will be updated to project potential financial capacity within a five-year timeframe.
 - b. Program in long-range planning model prioritized capital projects based on the current adopted 5YCIP document and test

- financial capacity in terms of sustainability of future budgets.
 - c. Allow for revisions to prioritization and budget as Council directs
 - d. Select projects to activate, schedule in CIP within the five year timeframe based on 5YrLRFM projected financial capacity
5. Present an Updated Capital Investments Program in conjunction with Annual Operating Budget
 - a. Prepare every other year an Updated 5YrCIP document
 - b. Engage in formal Public Hearing in conjunction with Annual Operating Budget on the Updated CIP.
 - c. Allow for revisions as Council directs
6. Implement and Monitor Capital Budget in conjunction with Annual Operating Budget
 - a. Project manager assigned to active projects
 - b. Refine project milestones and cost schedules
 - c. Project manager prepares progress reports bi-annually in conjunction with preparation of Updated 5YrCIP
 - d. Assess Bond funded projects
7. Evaluate CIP Process
 - a. Consider organizational/process issues and adapt
 - b. Review forms, documents and survey effectiveness and adapt
 - c. Examine financial assumptions and funding sources and adapt

EVALUATE AND PRIORITIZE PROJECTS

Formal methods of priority setting tools follow a defined, consistent, and written process. More specifically, a criterion is established to measure whether the Town Goals will be met and mandates are addressed. Utilizing such a tool can level the competition for limited resources among competing demands more efficiently and effectively.

Staff utilizes the Project Evaluation Criteria adopted by Council to aid in the prioritization of proposed projects. A preliminary prioritization list will be created based on the application of the adopted criteria. Staff presents the list to Council to evaluate, modify prioritized list, and direct staff to activate project for funding within financial capacity. Please see the Project Evaluation Criteria form in this section.

PUBLIC PARTICIPATION

Capital decisions are typically of keen interest to citizens because of their impact on community growth, development, and tax rate. Citizen input can help to assure that the most desirable projects receive highest priority. Involving citizens in the process can gain support for the capital plan and budget, and for funding options, such as issuance of bonds where citizen approval is required. Morrisville will utilize a survey tool to gather citizen input on areas of focus every other year.

In addition, a public comment portal via the website will be open for citizen comments and suggestions throughout the CIP Process in conjunction with the Annual Budget Process. Such forms of communication and input techniques have the potential of reaching a wider audience within the community lending valuable perspectives to the review. A formal Public Hearing will be required and conducted in conjunction with the Annual Operating Budget.

As in all community matters, the public is encouraged to provide input by actively communicating their opinions on service needs or key issues facing the community to their representative Town Council via email, letters and phone calls.

STAFF PARTICIPATION

A department needs survey will be conducted to identify, document, and justify staff CIP requests. Departments will provide scope, project cost estimates and revenue sources (Finance/Budget will assist). Departments will use the CIP Request Form to submit new projects to be considered. This will include submissions of the Project Evaluation Criteria Form. The forms will be updated every other year.

FUNDING SOURCES

Typically, Morrisville plans capital projects using some form of debt service instrument. The use of debt is considered under the following circumstances:

1. The capital item is a long-living asset with a useful life greater than three years.
2. The asset has a useful life expectancy that equals or exceeds the length of the debt-financing period.

In many cases, a project may be financed through a combination of several funding sources. Below are the various funding sources typically used to finance and fund CIP items:

General Fund – the capital item may require advanced funding from the General Fund to begin design work.

The financing instrument reimburses funding provided for by the General Fund prior to the close of the capital project.

Grants – funding of the capital item was secured upon application of a governmental grant (e.g. CDBG, Law Enforcement Grants, EPA Water Quality, Fire Safety Grants, CAMPO, Wake County Park Grants) The capital item is used for a public facility or equipment that is a public good and that may or may not have a revenue producing capability. (e.g. streets, municipal buildings, structures, or parks). Typically, grant funds are designed to be seed money and are a short-term financing source.

Installment Purchase – the capital item is used for a public facility or equipment that is a public good and may or may not have revenue-producing capability. These asset-backed loans involve an installment purchase or financing agreement and perhaps a trust indenture.

General Obligation Bonds – the capital item is used for a public facility or equipment that is a public good and that has no revenue producing capability (e.g. streets and municipal buildings or structures). Generally, GO Bonds are used for major projects. Growth in tax based could be leveraged when a project is in response to community demands.

Revenue Bonds – the capital item is used for a non-public good in which a revenue stream is associated with the capital item (e.g. airport, water, wastewater, and electric systems capital items).

ACTIVATED PROJECTS

Once Staff and Council produce a final capital projects prioritized list, it will be determined how many project(s) might be activated (funded) across the 5YrCIP. This consideration is evaluated in conjunction with the 5YrLRFM projected financial capacity. If financial capacity does not exist, the projects will remain in the prioritized list as unfunded. This will occur once every other year. The following is the current Project List showing funded and unfunded projects.

CURRENT STATUS

Council entered into a CIP/Bond Referendum planning cycle for the purpose of identifying what Capital

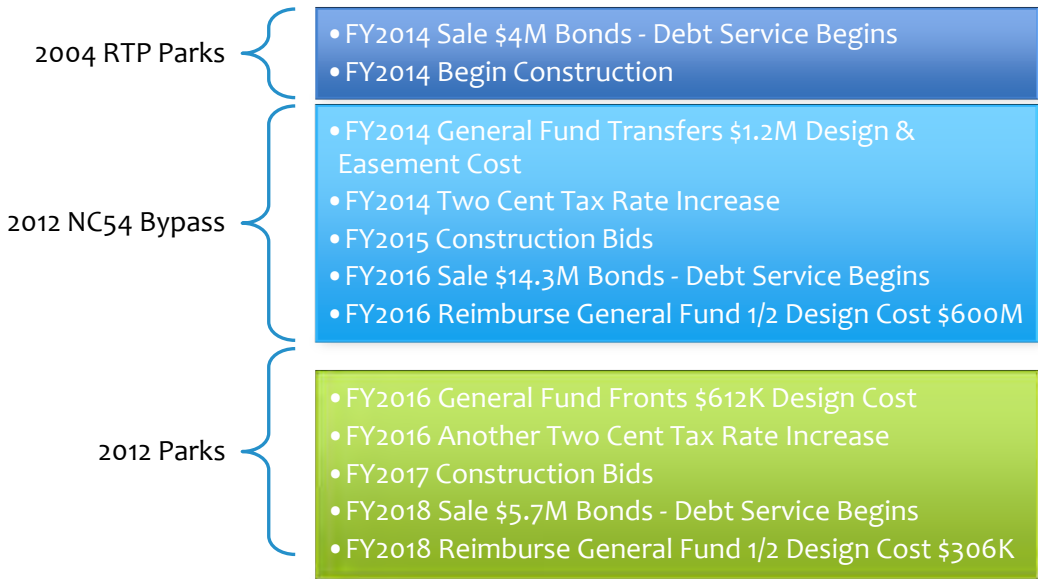
Investment Projects to pursue funding in future budgets. FY2014 Capital Budget or debt service does activate funding for a previously approved 2004 GO Bond RTP Park Capital Investment Project. Additionally, because of the 2012 Bond Referendum the LRFM plans for three newly activated Capital Investment Projects:

- \$14.3M in Street Improvement Bonds; Completing the McCrimmon Parkway Extension from NC54 to Evans Road
- \$5.7M in Parks & Recreation Bonds; Renovating the Morrisville Aquatics & Fitness

Center and completing Phase II of the Morrisville Community Park

On November 6, 2012, the voters approved the 2 Bond Referendums authorizing the issuance of up to \$20M in general obligation bonds. A total of 80% (6,228 votes) voted for the Street Improvement Bonds and 74% (5,757 votes) voted for the Parks and Recreational Bonds. These projects are now considered Activated Projects as a Funding Source has been identified. Staff has begun planning for the execution and future construction of these projects with the FY2014 Annual Budget.

The LRFM assumes a 2 year span from Project Year (design) to the first year of Debt Service. The timing of construction bids, Bond Sale (Issuance) and construction may vary depending on the progression of each step between fiscal years. The following represents an assumed timeline for the purposes of planning and evaluation.



NOTE: Council and Staff will evaluate the feasibility of shifting the 2012 bond park projects forward.

CAPITAL INVESTMENTS PROGRAM –PROJECT LIST

	Funding Sources Identified	Project Year (Design)	Total Cost Incurring Debt	Project Year Estimated Cost	Debt Service First Year	Interest Rate	Equivalent Tax Rate Assumption	Adopted Plan/Input Source
ACTIVE Capital Investment Projects								
1300	2004 Bond Projects – Recreational Facilities (includes RTP Park, Northwest Park and Cedar Fork Ball Fields)	2011	\$4,000,000	\$ 5,783,000	2014	5%	1.27	MP
1420	2012 Bond Project - NC54 Bypass	2014	\$14,300,000	\$ 14,300,000	2016	5%	3.86	TP
1290	2012 Bond Project - MAFC Reconstruction	2016	\$ 3,500,040	\$ 3,500,000	2018	5%	0.92	MP
1350	2012 Bond Project - Morrisville Community Park Ph II	2016	\$ 2,200,020	\$ 2,200,000	2018	5%	0.58	MP
Unfunded Capital Investments Project Concepts								
Town Roadway Projects								
1000	International Drive 01 & East 01	Unfunded	\$ 3,597,900	\$ 4,557,712	2022	4%	1.22	TP
1060	Southport Drive Extension	Unfunded	\$ 2,867,500	\$ 3,632,463	2022	4%	0.97	TP
1010	International Drive 02	Unfunded	\$ 2,382,400	\$ 3,017,953	2022	4%	0.81	TP
1050	Morrisville East Connector	Unfunded	\$ 3,737,600	\$ 4,734,680	2022	4%	1.27	TP
1100	Town Hall Drive Medians/Bike Lanes	Unfunded	\$ 895,000	\$ 1,133,759	2022	4%	0.59	TP
1410	International Drive 03	Unfunded	\$ 7,839,500	\$ 9,930,844	2022	4%	2.66	TP
Town Facilities Projects								
1260	Public Works Facility	Unfunded	\$ 4,500,000	\$ 5,064,790	2022	4%	1.57	
1270	Northwest Fire Station	Unfunded	\$ 2,320,000	\$ 5,888,907	2022	5%	1.76	
1370	Police/Fire Training Facility	Unfunded	\$ 1,170,000	\$ 4,982,121	2022	4%	1.00	
1340	Crabtree Nature Park*	Unfunded	\$ 2,895,000	\$ 4,127,578	2022	4%	1.17	MP
1490	Crabtree Crossing Greenway Extension	Unfunded	\$ 785,250	\$ 920,046	2022	4%	0.48	MP
1510	Sawmill Creek Greenway	Unfunded	\$ 4,390,000	\$ 5,143,584	2022	4%	1.38	MP
1600	Fire Radio Equipment	Unfunded	\$ 1,028,250	\$ 1,204,759	2022	4%	0.62	
Town Center Projects								
1360	Train Depot (Railroad Town)	Unfunded	\$ 3,470,000	\$ 4,395,692	2022	4%	1.25	TC
1520	Recreation Center and Main Street Plaza - Town Center	Unfunded	\$ 6,346,175	\$ 7,435,555	2022	4%	1.99	TC
1530	Town Center Gateway	Unfunded	\$ 134,922	\$ 158,083	2022	4%	0.08	TC
1540	Morrisville Rural Heritage Park and Farmer's Market - Town Center	Unfunded	\$ 5,464,000	\$ 6,401,947	2022	4%	1.71	TC
1550	Main Street Stormwater Treatment - Town Center	Unfunded	\$ 595,000	\$ 697,137	2022	4%	0.20	TC
1560	Carolina Street Connection - Town Center	Unfunded	\$ 302,500	\$ 354,427	2022	4%	0.18	TC
1570	Civil War Battleground Park - Town Center	Unfunded	\$ 5,576,000	\$ 6,533,173	2022	4%	1.75	TC
1580	Town Center Parking Lot	Unfunded	\$ 351,000	\$ 411,252	2022	4%	0.21	TC
1590	Main Street Park & Amphitheater	Unfunded	\$ 3,523,040	\$ 4,127,803	2022	4%	1.10	TC

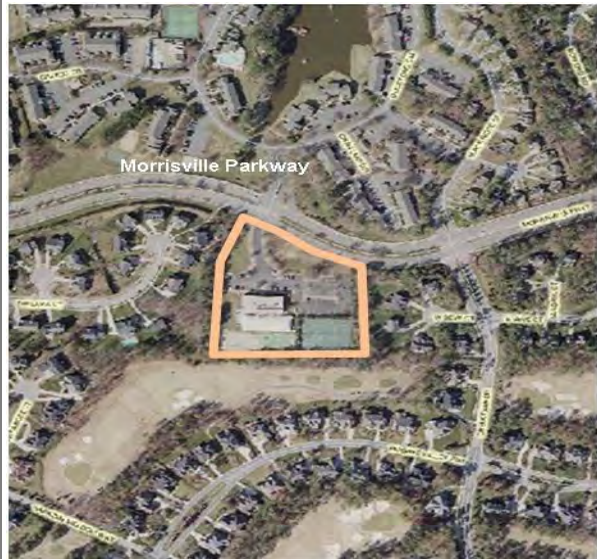
Note: The Equivalent Tax Rate assumptions are based on the estimated cost of the 1st years Debt Service Payment calculated on using the projected tax base in that year. Unfunded Projects default to 2022.

Key: TC = Town Center Plan; MP = Parks Master Plan; TP = Town's Transportation Plan

PROJECT CONCEPT PROFILES

The project profiles listed below are conceptual resulting from past community feedback, Town Council direction, adopted plans, and staff recommendations. Some concepts are now activated, meaning Council has identified a means to fund the project and depending on the project year (or design year) may have a Capital Project Fund established in the Non-Major Governmental Funds section. Other project concepts remain unfunded and available for future prioritization.

MAFC Expansion/Renovation (FY12 Bond Project) - ACTIVATED						
Project Description: Design and construction of an expanded Morrisville Aquatics and Fitness Center. The facility could be designed to incorporate a new indoor pool, new locker rooms, additional parking, and renovation of existing indoor spaces to provide more room for exercise programs. Reconstruction of the existing tennis courts may be included, if budget allows.						
Town Goals	Manage Resources	Invest in Infrastructure and Transportation				
	Serve the Community	Provide an Environmentally Sensitive & Livable Community				
	Serve the Community	Provide a Safe Community				
	Run the Operations	Model a Positive Town Image				
Benefits of Project:			Lead Department:		PRCR and PW	
Utilizes voter approved bond funds.			Date Added to CIP:		2012	
Expands space for aquatics programming and recreation.			Review Date:		4-Apr-12	
Cost of dome installation helps offset increased utility cost of the larger indoor pool facility.			Design Start Year:		2016	
Expanded/improved weight training area.			Construction Start Year:		2017	
Expanded/improved group fitness space.			Estimated Project Costs:		\$3,500,000	
			Additional Staffing Required:		No	
			Number of New Positions:		0	
Operations and Maintenance Estimates		2018	2019	2020	2021	2022
Equipment and Furniture		\$ 15,000	\$ 15,000	\$ 7,000	\$ 7,000	\$ 7,000
Utilities						
Maintenance		\$ 8,000	\$ 8,000	\$ 8,250	\$ 8,250	\$ 8,500
Supplies		\$ 5,000	\$ 3,000	\$ 3,000	\$ 3,250	\$ 3,250
Personnel		\$ 67,000	\$ 68,000	\$ 69,000	\$ 70,000	\$ 71,000
Other Funding Sources and Related Revenue Projections						
None						
Potential PARTF grant project		\$ 500,000				
Revenue from programs, fitness		\$ 80,000	\$ 500,000	\$ 500,000	\$ 500,000	\$ 500,000
Financing Plan		Bond 5/5/5		Tax on \$100k		
Debt Service Schedule		Tax Base	c Tax	\$ 104.10		
1	2018	\$ 350,000	\$ 3,820,063,216	0.92	\$ 9.20	
2	2019	\$ 341,250	\$ 3,934,665,113	0.87	\$ 8.70	
3	2020	\$ 332,500	\$ 4,052,705,066	0.82	\$ 8.20	
4	2021	\$ 323,750	\$ 4,174,286,218	0.78	\$ 7.80	
5	2022	\$ 315,000	\$ 4,299,514,804	0.73	\$ 7.30	
6	2023	\$ 306,250	\$ 4,428,500,249	0.69	\$ 6.90	
7	2024	\$ 297,500	\$ 4,561,355,256	0.65	\$ 6.50	
8	2025	\$ 288,750	\$ 5,245,558,544	0.55	\$ 5.50	
9	2026	\$ 280,000	\$ 5,402,925,301	0.52	\$ 5.20	
10	2027	\$ 271,250	\$ 5,565,013,060	0.49	\$ 4.90	
11	2028	\$ 262,500	\$ 5,731,963,452	0.46	\$ 4.60	
12	2029	\$ 253,750	\$ 5,903,922,355	0.43	\$ 4.30	
13	2030	\$ 245,000	\$ 6,081,040,026	0.40	\$ 4.00	
14	2031	\$ 236,250	\$ 6,263,471,227	0.38	\$ 3.80	
15	2032	\$ 227,500	\$ 6,451,375,363	0.35	\$ 3.50	
16	2033	\$ 218,750	\$ 7,096,512,900	0.31	\$ 3.10	
17	2034	\$ 210,000	\$ 7,238,443,158	0.29	\$ 2.90	
18	2035	\$ 201,250	\$ 7,383,212,021	0.27	\$ 2.70	
19	2036	\$ 192,500	\$ 7,530,876,261	0.26	\$ 2.60	
20	2037	\$ 183,750	\$ 7,681,493,786	0.24	\$ 2.40	
Comments:						Capital Project Fund does not exist yet.
						Town Facilities Projects
						Group Priority
						Total Group Projects
						Total Projects
						Town Priority
						Project Number 1290



Morrisville Community Park Phase II (2012 Bond Project) - ACTIVATED

Project Description: Design and construct the last phase of the Morrisville Community Park master plan. The plan calls for a walking trail, a picnic shelter, recreation game area (horseshoes, volleyball) and tennis courts near the parking lot at the end of Kudrow Lane.

Town Goals	Manage Resources	Invest in Infrastructure and Transportation
	Serve the Community	Provide an Environmentally Sensitive & Livable Community
	Serve the Community	Provide a Safe Community
	Serve the Community	Foster a healthy community
	Run the Operations	Model a Positive Town Image

Benefits of Project:	Lead Department:	Public Works Department
Town owned property, no acquisition costs.	Date Added to CIP:	2009
The walking trails could connect the adjacent apartment communities to the park and the greenway system.	Review Date:	3-Dec-12
Provides facilities to meet growing demands for recreation.	Design Start Year:	2016
	Construction Start Year:	2017
	Estimated Project Costs:	\$2,200,000
	Additional Staffing Required:	No
	Number of New Positions:	0


Operations and Maintenance Estimates	2018	2019	2020	2021	2022	O&M Remarks:	
Equipment and Furniture	\$ -	\$ -	\$ -	\$ -	\$ -		Mostly open space, little recurring expense.
Utilities	\$ 1,500	\$ 1,500	\$ 1,500	\$ 1,500	\$ 1,500		
Maintenance	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000		
Supplies	\$ 3,000	\$ 3,000	\$ 3,000	\$ 3,000	\$ 3,000		
Personnel	\$ -	\$ -	\$ -	\$ -	\$ -		


Other Funding Sources and Related Revenue Projections	Rentals and program revenue	\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000

Financing Plan		Bond 5/5/5		Tax on \$100k	
Debt Service Schedule		Tax Base	¢ Tax	\$ 65.50	
1	2018	\$ 220,000	\$ 3,820,063,216	0.58	\$ 5.80
2	2019	\$ 214,500	\$ 3,934,665,113	0.55	\$ 5.50
3	2020	\$ 209,000	\$ 4,052,705,066	0.52	\$ 5.20
4	2021	\$ 203,500	\$ 4,174,286,218	0.49	\$ 4.90
5	2022	\$ 198,000	\$ 4,299,514,804	0.46	\$ 4.60
6	2023	\$ 192,500	\$ 4,428,500,249	0.43	\$ 4.30
7	2024	\$ 187,000	\$ 4,561,355,256	0.41	\$ 4.10
8	2025	\$ 181,500	\$ 5,245,558,544	0.35	\$ 3.50
9	2026	\$ 176,000	\$ 5,402,925,301	0.33	\$ 3.30
10	2027	\$ 170,500	\$ 5,565,013,060	0.31	\$ 3.10
11	2028	\$ 165,000	\$ 5,731,963,452	0.29	\$ 2.90
12	2029	\$ 159,500	\$ 5,903,922,355	0.27	\$ 2.70
13	2030	\$ 154,000	\$ 6,081,040,026	0.25	\$ 2.50
14	2031	\$ 148,500	\$ 6,263,471,227	0.24	\$ 2.40
15	2032	\$ 143,000	\$ 6,451,375,363	0.22	\$ 2.20
16	2033	\$ 137,500	\$ 7,096,512,900	0.19	\$ 1.90
17	2034	\$ 132,000	\$ 7,238,443,158	0.18	\$ 1.80
18	2035	\$ 126,500	\$ 7,383,212,021	0.17	\$ 1.70
19	2036	\$ 121,000	\$ 7,530,876,261	0.16	\$ 1.60
20	2037	\$ 115,500	\$ 7,681,493,786	0.15	\$ 1.50



Comments:	Capital Project Fund does not exist yet.
Town Facilities Projects	
Priority	30.53795066
Total Group Projects	0
Total Projects	0
Town Priority	
Project Number	1350

International Drive Phase 2							
Project Description: Design and construct International Drive Extension (0.24 Miles) from the terminus of Project International Drive Phase 1 at the intersection with Morrisville East Connector (future) to the future intersection of McCrimmon Parkway/Evans Extension (color coded green on the project map below). On the 2009 Transportation Plan the road is shown as a 4-Lane Collector (57 feet b-b) within a 97 foot ROW.							
Town Goals	Manage Resources	Invest in Infrastructure and Transportation					
	Serve the Community	Provide a Safe Community					
Benefits of Project:			Lead Department:		Public Works Department		
1. Reduce congestion on NC54			Date Added to CIP:		2009		
2. Provide connectivity between Airport Blvd and Aviation Pkwy			Review Date:		30-Oct-12		
3. Reduce truck left turns onto Aviation Parkway			Design Start Year:		2020		
4. Reduce truck traffic on NC54			Construction Start Year:		2021		
			Estimated Project Costs:		\$3,017,953		
			Additional Staffing Required:		No		
			Number of New Positions:		0		
Operations and Maintenance Estimates		2022	2023	2024	2025	2026	O&M Remarks:
Equipment and Furniture							
Utilities		\$ 2,000	\$ 2,000	\$ 2,000	\$ 2,000	\$ 2,000	
Maintenance		\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	
Supplies							
Personnel							
Other Funding Sources and Related Revenue Projections		None					
Financing Plan		Bond 7.5/5/2.5		Tax on \$100k			
Debt Service Schedule		Tax Base		C Tax		\$ 71.40	
1	2022	\$ 347,065	\$ 4,299,514,804	0.81	\$ 8.10		
2	2023	\$ 338,011	\$ 4,428,500,249	0.76	\$ 7.60		
3	2024	\$ 328,957	\$ 4,561,355,256	0.72	\$ 7.20		
4	2025	\$ 319,903	\$ 5,245,558,544	0.61	\$ 6.10		
5	2026	\$ 235,400	\$ 5,402,925,301	0.44	\$ 4.40		
6	2027	\$ 229,364	\$ 5,565,013,060	0.41	\$ 4.10		
7	2028	\$ 223,328	\$ 5,731,963,452	0.39	\$ 3.90		
8	2029	\$ 217,293	\$ 5,903,922,355	0.37	\$ 3.70		
9	2030	\$ 211,257	\$ 6,081,040,026	0.35	\$ 3.50		
10	2031	\$ 205,221	\$ 6,263,471,227	0.33	\$ 3.30		
11	2032	\$ 199,185	\$ 6,451,375,363	0.31	\$ 3.10		
12	2033	\$ 193,149	\$ 7,096,512,900	0.27	\$ 2.70		
13	2034	\$ 187,113	\$ 7,238,443,158	0.26	\$ 2.60		
14	2035	\$ 181,077	\$ 7,383,212,021	0.25	\$ 2.50		
15	2036	\$ 175,041	\$ 7,530,876,261	0.23	\$ 2.30		
16	2037	\$ 169,005	\$ 7,681,493,786	0.22	\$ 2.20		
17	2038	\$ 87,521	\$ 7,835,123,662	0.11	\$ 1.10		
18	2039	\$ 84,503	\$ 7,991,826,135	0.11	\$ 1.10		
19	2040	\$ 81,485	\$ 8,151,662,658	0.10	\$ 1.00		
20	2041	\$ 78,467	\$ 8,966,828,924	0.09	\$ 0.90		
Comments: Construction Cost includes the road, purchase of ROW, street lights, 12 inch watermain and 10% contingency.							
Town Roadway Projects							
Priority						27.3115117	
Total Group Projects						0	
Total Projects						0	
Town Priority							
Project Number						1010	

Police/Fire Training Facility								
Project Description: Design and construct a training facility for Police and Fire Department personnel.								
Town Goals	Manage Resources	Invest in Infrastructure and Transportation						
	Serve the Community	Provide a Safe Community						
	Serve the Community	Deliver Quality Services						
	Run the Operations	Enhance Community Preparedness & Responsiveness						
Benefits of Project:			Lead Department:		Public Works Department			
Provide facility to train police and fire personnel.			Date Added to CIP:		2009			
			Review Date:		6-Apr-09			
			Design Start Year:		2020			
			Construction Start Year:		2021			
			Estimated Project Costs:		\$3,500,000			
			Additional Staffing Required:		No			
			Number of New Positions:		0			
Operations and Maintenance Estimates			2022	2023	2024	2025	2026	O&M Remarks:
Equipment and Furniture			\$ 175,000	\$ -	\$ -	\$ -	\$ -	The training facility project is proposed to be a 50% cost share project with another entity. The equipment and furniture cost are included in the CIP projections.
Utilities			\$ 6,500	\$ 6,630	\$ 6,763	\$ 6,898	\$ 7,036	
Maintenance				\$ 3,000	\$ 3,060	\$ 3,121	\$ 3,184	
Supplies				\$ 2,500	\$ 2,550	\$ 2,601	\$ 2,653	
Personnel			N/A	N/A	N/A	N/A	N/A	
Other Funding Sources and Related Revenue Projections	None							
	Grant Opportunities		\$ 2,500,000					
	Other Entity cost share		\$ 1,750,000					
Financing Plan			Installment 10		Tax on \$100k			
Debt Service Schedule			Tax Base	¢ Tax	\$			
1	2022	\$ 428,097	\$ 4,299,514,804	1.00	\$ 10.00			
2	2023	\$ 428,097	\$ 4,428,500,249	0.97	\$ 9.70			
3	2024	\$ 428,097	\$ 4,561,355,256	0.94	\$ 9.40			
4	2025	\$ 428,097	\$ 5,245,558,544	0.82	\$ 8.20			
5	2026	\$ 428,097	\$ 5,402,925,301	0.79	\$ 7.90			
6	2027	\$ 428,097	\$ 5,565,013,060	0.77	\$ 7.70			
7	2028	\$ 428,097	\$ 5,731,963,452	0.75	\$ 7.50			
8	2029	\$ 428,097	\$ 5,903,922,355	0.73	\$ 7.30			
9	2030	\$ 428,097	\$ 6,081,040,026	0.70	\$ 7.00			
10	2031	\$ 428,097	\$ 6,263,471,227	0.68	\$ 6.80			
11	2032	\$ -	\$ 6,451,375,363	0.00	\$ -			
12	2033	\$ -	\$ 7,096,512,900	0.00	\$ -			
13	2034	\$ -	\$ 7,238,443,158	0.00	\$ -			
14	2035	\$ -	\$ 7,383,212,021	0.00	\$ -			
15	2036	\$ -	\$ 7,530,876,261	0.00	\$ -			
16	2037	\$ -	\$ 7,681,493,786	0.00	\$ -			
17	2038	\$ -	\$ 7,835,123,662	0.00	\$ -			
18	2039	\$ -	\$ 7,991,826,135	0.00	\$ -			
19	2040	\$ -	\$ 8,151,662,658	0.00	\$ -			
20	2041	\$ -	\$ 8,966,828,924	0.00	\$ -			
Comments:								
The training facility is proposed to be a 50% cost share with another entity. The facility would have two classrooms so police and fire departments could conduct classroom training at the same time. The facility would have a burn building and a four-story drill tower that would have moveable partitions so fire and police could conduct scenario based training. The burn building would be gas fired. There should be an area designated for gas props that would be installed by staff. The facility will include an indoor shooting range with four lanes. The facility will accommodate space for fire and police to conduct new recruit and annual physical agility testing.								
Town Facilities Projects								
Priority							28.443074	
Total Group Projects							0	
Total Projects							0	
Town Priority								
Project Number							1370	

Crabtree Nature Park

Project Description: Design and construct a nature park adjacent to Crabtree Creek near the Weston Subdivision. Conceptual plan calls for a park office/information center, a network of walking trails, interpretive signage, play areas, and a picnic shelter.

Town Goals	Manage Resources	Invest in Infrastructure and Transportation
	Serve the Community	Provide an Environmentally Sensitive & Livable Community
	Serve the Community	Provide a Safe Community
	Run the Operations	Model a Positive Town Image

Benefits of Project:	Lead Department:	Parks and Rec./Public Works Department
No land acquisition costs - Town owned property	Date Added to CIP:	2009
Convenient road access from NC54 on Keybridge Drive.	Review Date:	15-Mar-09
Utilities nearby to support the nature center and restrooms.	Design Start Year:	2020
	Construction Start Year:	2021
	Estimated Project Costs:	\$4,127,578
	Additional Staffing Required:	No
	Number of New Positions:	0

Operations and Maintenance Estimates	2022	2023	2024	2025	2026	O&M Remarks:
Equipment and Furniture						Staffing plan calls for 2 staff positions.
Utilities	\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000	
Maintenance	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000	
Supplies	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000	
Personnel	\$ 100,000	\$ 110,000	\$ 120,000	\$ 130,000	\$ 140,000	

Other Funding Sources and Related Revenue Projections	None					

Financing Plan		Installment 10		Tax on \$100k	
Debt Service Schedule		Tax Base	C Tax	\$	
1	2022	\$ 504,858	\$ 4,299,514,804	1.17	\$ 11.70
2	2023	\$ 504,858	\$ 4,428,500,249	1.14	\$ 11.40
3	2024	\$ 504,858	\$ 4,561,355,256	1.11	\$ 11.10
4	2025	\$ 504,858	\$ 5,245,558,544	0.96	\$ 9.60
5	2026	\$ 504,858	\$ 5,402,925,301	0.93	\$ 9.30
6	2027	\$ 504,858	\$ 5,565,013,060	0.91	\$ 9.10
7	2028	\$ 504,858	\$ 5,731,963,452	0.88	\$ 8.80
8	2029	\$ 504,858	\$ 5,903,922,355	0.86	\$ 8.60
9	2030	\$ 504,858	\$ 6,081,040,026	0.83	\$ 8.30
10	2031	\$ 504,858	\$ 6,263,471,227	0.81	\$ 8.10
11	2032	\$ -	\$ 6,451,375,363	0.00	\$ -
12	2033	\$ -	\$ 7,096,512,900	0.00	\$ -
13	2034	\$ -	\$ 7,238,443,158	0.00	\$ -
14	2035	\$ -	\$ 7,383,212,021	0.00	\$ -
15	2036	\$ -	\$ 7,530,876,261	0.00	\$ -
16	2037	\$ -	\$ 7,681,493,786	0.00	\$ -
17	2038	\$ -	\$ 7,835,123,662	0.00	\$ -
18	2039	\$ -	\$ 7,991,826,135	0.00	\$ -
19	2040	\$ -	\$ 8,151,662,658	0.00	\$ -
20	2041	\$ -	\$ 8,966,828,924	0.00	\$ -



Comments:		
		Town Facilities Projects
		Priority 28.38646426
		Total Group Projects 28.38646426
		Total Projects 0
		Town Priority
		Project Number 1340

Train Depot (Railroad Town)

Project Description: Design and construct a replica of 1800's Train Depot in the Town Center identifying the town as a Railroad Town.

Town Goals	Manage Resources	Invest in Infrastructure and Transportation
	Serve the Community	Provide an Environmentally Sensitive & Livable Community
	Serve the Community	Foster a Healthy Community
	Run the Operations	Model a Positive Town Image

Benefits of Project:	Lead Department:	Public Works Department
1. Commemorate Morrisville's origins as a depot village	Date Added to CIP:	2009
2. Enhance the historic character of the Crossroads area	Review Date:	15-Mar-09
3. Help mark the gateway into the Town Center core	Design Start Year:	2020
4. Create a distinctive space to tell the railroad history of the town	Construction Start Year:	2021
5. Help draw visitors to Morrisville	Estimated Project Costs:	\$4,395,692
	Additional Staffing Required:	No
	Number of New Positions:	0

Operations and Maintenance Estimates	2022	2023	2024	2025	2026	O&M Remarks:
Equipment and Furniture						
Utilities						
Maintenance						
Supplies						
Personnel						
Other Funding Sources and Related Revenue Projections	None					

Financing Plan		Installment 10		Tax on \$100k	
Debt Service Schedule		Tax Base	C Tax	\$	
1	2022	\$ 537,652	\$ 4,299,514,804	1.25	\$ 12.50
2	2023	\$ 537,652	\$ 4,428,500,249	1.21	\$ 12.10
3	2024	\$ 537,652	\$ 4,561,355,256	1.18	\$ 11.80
4	2025	\$ 537,652	\$ 5,245,558,544	1.02	\$ 10.20
5	2026	\$ 537,652	\$ 5,402,925,301	1.00	\$ 10.00
6	2027	\$ 537,652	\$ 5,565,013,060	0.97	\$ 9.70
7	2028	\$ 537,652	\$ 5,731,963,452	0.94	\$ 9.40
8	2029	\$ 537,652	\$ 5,903,922,355	0.91	\$ 9.10
9	2030	\$ 537,652	\$ 6,081,040,026	0.88	\$ 8.80
10	2031	\$ 537,652	\$ 6,263,471,227	0.86	\$ 8.60
11	2032	\$ -	\$ 6,451,375,363	0.00	\$ -
12	2033	\$ -	\$ 7,096,512,900	0.00	\$ -
13	2034	\$ -	\$ 7,238,443,158	0.00	\$ -
14	2035	\$ -	\$ 7,383,212,021	0.00	\$ -
15	2036	\$ -	\$ 7,530,876,261	0.00	\$ -
16	2037	\$ -	\$ 7,681,493,786	0.00	\$ -
17	2038	\$ -	\$ 7,835,123,662	0.00	\$ -
18	2039	\$ -	\$ 7,991,826,135	0.00	\$ -
19	2040	\$ -	\$ 8,151,662,658	0.00	\$ -
20	2041	\$ -	\$ 8,966,828,924	0.00	\$ -



Comments:

Ed Lynch needed here per BH to better estimate project cost and location. - Include land acquisition.


Town Center Projects	
Priority	24.0199241
Total Group Projects	0
Total Projects	0
Town Priority	
Project Number	1360

Recreation Center and Main Street Plaza (Town Center)																																																
Project Description: Design and construct a recreation center and public plaza in the Town Center Main Street Area.																																																
Town Goals	Serve the Community	Promote an environmentally sensitive and livable community																																														
	Run the Operations	Model a positive town image																																														
	Serve the Community	Foster a healthy community																																														
	Serve the Community	Provide a safe community																																														
Benefits of Project:			Lead Department:		Parks and Rec./Public Works																																											
1. Provide high quality public open space			Date Added to CIP:		2012																																											
2. Provide focal point for community gatherings and events			Review Date:		31-Oct-12																																											
3. Provide beautiful, high quality greenspace to enhance Main Street appearance			Design Start Year:		2020																																											
4. Provide citizens a variety of recreational opportunities			Construction Start Year:		2021																																											
5. Provide space for senior programs			Estimated Project Costs:		\$7,435,555																																											
6. Provide space for at-risk programs			Additional Staffing Required:		No																																											
7. Provide gymnasium space			Number of New Positions:		0																																											
Operations and Maintenance Estimates			2017	2018	2019	2020																																										
Equipment and Furniture			\$ 31,500	\$ 31,500	\$ 31,500	\$ 31,500																																										
Utilities			\$ 21,000	\$ 21,000	\$ 21,000	\$ 21,000																																										
Maintenance			\$ 27,510	\$ 27,510	\$ 27,510	\$ 27,510																																										
Supplies			\$ 26,250	\$ 26,250	\$ 26,250	\$ 26,250																																										
Personnel			\$ 341,250	\$ 341,250	\$ 341,250	\$ 341,250																																										
TOTAL			\$ 447,510	\$ 447,510	\$ 447,510	\$ 447,510																																										
Other Funding Sources and Related Revenue Projections	Bonds																																															
	Grant Opportunities																																															
Financing Plan			Installment 10		Tax on \$100k																																											
Debt Service Schedule			Tax Base	c Tax	\$ 175.70																																											
1	2022	\$ 855,089	\$ 4,299,514,804	1.99	\$ 19.90																																											
2	2023	\$ 832,782	\$ 4,428,500,249	1.88	\$ 18.80																																											
3	2024	\$ 810,475	\$ 4,561,355,256	1.78	\$ 17.80																																											
4	2025	\$ 788,169	\$ 5,245,558,544	1.50	\$ 15.00																																											
5	2026	\$ 579,973	\$ 5,402,925,301	1.07	\$ 10.70																																											
6	2027	\$ 565,102	\$ 5,565,013,060	1.02	\$ 10.20																																											
7	2028	\$ 550,231	\$ 5,731,963,452	0.96	\$ 9.60																																											
8	2029	\$ 535,360	\$ 5,903,922,355	0.91	\$ 9.10																																											
9	2030	\$ 520,489	\$ 6,081,040,026	0.86	\$ 8.60																																											
10	2031	\$ 505,618	\$ 6,263,471,227	0.81	\$ 8.10																																											
11	2032	\$ 490,747	\$ 6,451,375,363	0.76	\$ 7.60																																											
12	2033	\$ 475,876	\$ 7,096,512,900	0.67	\$ 6.70																																											
13	2034	\$ 461,004	\$ 7,238,443,158	0.64	\$ 6.40																																											
14	2035	\$ 446,133	\$ 7,383,212,021	0.60	\$ 6.00																																											
15	2036	\$ 431,262	\$ 7,530,876,261	0.57	\$ 5.70																																											
16	2037	\$ 416,391	\$ 7,681,493,786	0.54	\$ 5.40																																											
17	2038	\$ 215,631	\$ 7,835,123,662	0.28	\$ 2.80																																											
18	2039	\$ 208,195	\$ 7,991,826,135	0.26	\$ 2.60																																											
19	2040	\$ 200,760	\$ 8,151,662,658	0.25	\$ 2.50																																											
20	2041	\$ 193,324	\$ 8,966,828,924	0.22	\$ 2.20																																											
<p>Comments: Recreation Center includes gymnasium, multi-purpose rooms, kitchen, game room, senior programs space, and office/storage space. Recreation center by itself is estimated to cost \$5,787,500. Public Plaza includes water feature, benches, footpaths, and tree plantings. Public Plaza is estimated to cost \$250,000. Partial property acquisition required to assemble at least 1 acre using Upchurch Property on north side of Carolina backing up to Jeremiah St.</p>																																																
<table border="1"> <tr> <td colspan="7">Town Facilities Projects</td> </tr> <tr> <td colspan="7">Priority</td> </tr> <tr> <td colspan="7">Total Group Projects</td> </tr> <tr> <td colspan="7">Total Projects</td> </tr> <tr> <td colspan="7">Town Priority</td> </tr> <tr> <td colspan="7">Project Number</td> </tr> </table>							Town Facilities Projects							Priority							Total Group Projects							Total Projects							Town Priority							Project Number						
Town Facilities Projects																																																
Priority																																																
Total Group Projects																																																
Total Projects																																																
Town Priority																																																
Project Number																																																



Morrisville Rural Heritage Park and Farmer's Market (Town Center)						
Project Description: Design and construct a new Rural Heritage Park and Farmer's Market						
Town Goals	Serve the Community	Promote an environmentally sensitive and livable community				
	Run the Operations	Model a positive town image				
	Serve the Community	Foster a healthy community				
Benefits of Project:			Lead Department:		Parks and Rec./Public Works	
1. Provide high quality public open space			Date Added to CIP:		2012	
2. Provide unique cultural experience for the community			Review Date:		31-Oct-12	
3. Provide space for a farmer's market that sells locally grown produce			Design Start Year:		2020	
4. Provide recreational opportunities for families			Construction Start Year:		2021	
5. Educate citizens on Morrisville's agricultural past			Estimated Project Costs:		\$6,401,947	
			Additional Staffing Required:		No	
			Number of New Positions:		0	
Operations and Maintenance Estimates			2018	2019	2020	2021
Equipment and Furniture						
Utilities			\$ 4,000	\$ 4,100	\$ 4,200	\$ 4,300
Maintenance			\$ 10,000	\$ 10,250	\$ 10,500	\$ 10,750
Supplies			\$ 600	\$ 700	\$ 800	\$ 900
Personnel						
TOTAL			\$ 14,600	\$ 15,050	\$ 15,500	\$ 15,950
Other Funding Sources and Related Revenue Projections			NCDOT			
			Agricultural Healthy Living Grant			
			Eat Smart and Move More Grant			
Financing Plan			Installment 10		Tax on \$100k	
Debt Service Schedule			Tax Base	c Tax	\$ 151.10	
1	2022	\$ 736,224	\$ 4,299,514,804	1.71	\$ 17.10	
2	2023	\$ 717,018	\$ 4,428,500,249	1.62	\$ 16.20	
3	2024	\$ 697,812	\$ 4,561,355,256	1.53	\$ 15.30	
4	2025	\$ 678,606	\$ 5,245,558,544	1.29	\$ 12.90	
5	2026	\$ 499,352	\$ 5,402,925,301	0.92	\$ 9.20	
6	2027	\$ 486,548	\$ 5,565,013,060	0.87	\$ 8.70	
7	2028	\$ 473,744	\$ 5,731,963,452	0.83	\$ 8.30	
8	2029	\$ 460,940	\$ 5,903,922,355	0.78	\$ 7.80	
9	2030	\$ 448,136	\$ 6,081,040,026	0.74	\$ 7.40	
10	2031	\$ 435,332	\$ 6,263,471,227	0.70	\$ 7.00	
11	2032	\$ 422,529	\$ 6,451,375,363	0.65	\$ 6.50	
12	2033	\$ 409,725	\$ 7,096,512,900	0.58	\$ 5.80	
13	2034	\$ 396,921	\$ 7,238,443,158	0.55	\$ 5.50	
14	2035	\$ 384,117	\$ 7,383,212,021	0.52	\$ 5.20	
15	2036	\$ 371,313	\$ 7,530,876,261	0.49	\$ 4.90	
16	2037	\$ 358,509	\$ 7,681,493,786	0.47	\$ 4.70	
17	2038	\$ 185,656	\$ 7,835,123,662	0.24	\$ 2.40	
18	2039	\$ 179,254	\$ 7,991,826,135	0.22	\$ 2.20	
19	2040	\$ 172,852	\$ 8,151,662,658	0.21	\$ 2.10	
20	2041	\$ 166,451	\$ 8,966,828,924	0.19	\$ 1.90	
Comments: Farmer's market and Rural Heritage Park could potentially be built separately in phases. Both facilities would share parking, shelters, bathrooms, and certain road improvements. Land acquisition would cost approximately \$1,000,000. The site could accommodate community events and possibly a future site for a bus stop for commuters. Possible Local Farmer's Market public/private partnership opportunities for operations. The Parks Master Plan identifies as a park opportunity within the general area. Desired location would be the Page/Smith property of approximately 15 acres. Town Center Plan identifies the this project concept for the same area. Potential funding available in FY2013 budget to begin concept planning. Required roadway improvements along Morrisville Carpenter and Crabtree Crossing are primary contributors to cost.						
Town Facilities Projects						
Priority						
Total Group Projects						
Total Projects						
Town Priority						
Project Number						



Carolina Street Connection							
Project Description: Connect Carolina Street to Town Hall Drive to form the new Main Street for the community.							
Town Goals	Serve the Community	Provide an Environmentally Sensitive & Livable Community					
	Serve the Community	Foster a Healthy Community					
	Run the Operations	Model a Positive Town Image					
	Manage the Resources	Invest in Infrastructure and Transportation					
Benefits of Project:			Lead Department:				
1 Provide access to the Main Street			Date Added to CIP:		2012		
2 Create a walkable Main Street			Review Date:		31-Oct-12		
3 Help establish central gathering place for the community			Design Start Year:		2020		
			Construction Start Year:		2021		
			Estimated Project Costs:		\$354,427		
			Additional Staffing Required:		No		
			Number of New Positions:		0		
Operations and Maintenance Estimates		2016	2017	2018	2019	2020	O&M Remarks:
Equipment and Furniture							
Utilities							
Maintenance							
Supplies							
Personnel							
Other Funding Sources and Related Revenue Projections	Payment in Lieu of infrastructure	Possible					
Financing Plan		Installment 10		Tax on \$100k			
Debt Service Schedule		Tax Base	c Tax	\$ 8.30			
1	2022	\$ 78,914	\$ 4,299,514,804	0.18	\$ 1.80		
2	2023	\$ 78,914	\$ 4,428,500,249	0.18	\$ 1.80		
3	2024	\$ 78,914	\$ 4,561,355,256	0.17	\$ 1.70		
4	2025	\$ 78,914	\$ 5,245,558,544	0.15	\$ 1.50		
5	2026	\$ 78,914	\$ 5,402,925,301	0.15	\$ 1.50		
6	2027	\$ -	\$ 5,565,013,060	0.00	\$ -		
7	2028	\$ -	\$ 5,731,963,452	0.00	\$ -		
8	2029	\$ -	\$ 5,903,922,355	0.00	\$ -		
9	2030	\$ -	\$ 6,081,040,026	0.00	\$ -		
10	2031	\$ -	\$ 6,263,471,227	0.00	\$ -		
11	2032	\$ -	\$ 6,451,375,363	0.00	\$ -		
12	2033	\$ -	\$ 7,096,512,900	0.00	\$ -		
13	2034	\$ -	\$ 7,238,443,158	0.00	\$ -		
14	2035	\$ -	\$ 7,383,212,021	0.00	\$ -		
15	2036	\$ -	\$ 7,530,876,261	0.00	\$ -		
16	2037	\$ -	\$ 7,681,493,786	0.00	\$ -		
17	2038	\$ -	\$ 7,835,123,662	0.00	\$ -		
18	2039	\$ -	\$ 7,991,826,135	0.00	\$ -		
19	2040	\$ -	\$ 8,151,662,658	0.00	\$ -		
20	2041	\$ -	\$ 8,966,828,924	0.00	\$ -		
Comments: This project would connect the existing western stub of Carolina Street to Town Hall Drive. The projected cost is a rough estimate that is based on the cost to build Jeremiah Street. A separate project would be needed to improve Carolina Street along its full length to Church Street to bring it up to the standards needed to serve as a Main Street, with 20-foot wide sidewalks, street trees, and angled parking.			Budget: This project may not require installment purchase should payment in lieu funds be acquired through Main Street Development.				
						Town Facilities Projects	
						Priority	
						Total Group Projects	
						Total Projects	
						Town Priority	
						Project Number	

Town Center Parking Lot							
Project Description: Build a public parking lot to support community use and business development in the Town Center.							
Town Goals	Serve the Community	Provide an Environmentally Sensitive & Livable Community					
	Serve the Community	Foster a Healthy Community					
	Run the Operations	Model a Positive Town Image					
	Manage the Resources	Invest in Infrastructure and Transportation					
Benefits of Project:			Lead Department:				
1 Enable residents and visitors to access the Town Center.			Date Added to CIP:		2012		
2 Support business development in the Town Center.			Review Date:		31-Oct-12		
3 Support siting of new community facilities in the Town Center.			Design Start Year:		2020		
			Construction Start Year:		2021		
			Estimated Project Costs:		\$411,252		
			Additional Staffing Required:		No		
			Number of New Positions:		0		
Operations and Maintenance Estimates		2015	2016	2017	2018	2019	O&M Remarks:
Equipment and Furniture							
Utilities							
Maintenance							
Supplies							
Personnel							
Other Funding Sources and Related Revenue Projections	None						
Financing Plan		Installment 10		Tax on \$100k			
Debt Service Schedule		Tax Base	c Tax	\$ 9.60			
1	2022	\$ 91,567	\$ 4,299,514,804	0.21	\$ 2.10		
2	2023	\$ 91,567	\$ 4,428,500,249	0.21	\$ 2.10		
3	2024	\$ 91,567	\$ 4,561,355,256	0.20	\$ 2.00		
4	2025	\$ 91,567	\$ 5,245,558,544	0.17	\$ 1.70		
5	2026	\$ 91,567	\$ 5,402,925,301	0.17	\$ 1.70		
6	2027	\$ -	\$ 5,565,013,060	0.00	\$ -		
7	2028	\$ -	\$ 5,731,963,452	0.00	\$ -		
8	2029	\$ -	\$ 5,903,922,355	0.00	\$ -		
9	2030	\$ -	\$ 6,081,040,026	0.00	\$ -		
10	2031	\$ -	\$ 6,263,471,227	0.00	\$ -		
11	2032	\$ -	\$ 6,451,375,363	0.00	\$ -		
12	2033	\$ -	\$ 7,096,512,900	0.00	\$ -		
13	2034	\$ -	\$ 7,238,443,158	0.00	\$ -		
14	2035	\$ -	\$ 7,383,212,021	0.00	\$ -		
15	2036	\$ -	\$ 7,530,876,261	0.00	\$ -		
16	2037	\$ -	\$ 7,681,493,786	0.00	\$ -		
17	2038	\$ -	\$ 7,835,123,662	0.00	\$ -		
18	2039	\$ -	\$ 7,991,826,135	0.00	\$ -		
19	2040	\$ -	\$ 8,151,662,658	0.00	\$ -		
20	2041	\$ -	\$ 8,966,828,924	0.00	\$ -		
Comments: Cost estimate is based on cost to build PSMS Parking Lot. Cost estimate assumes 60-space parking lot @ \$5,000 per space. Land acquisition. Approximately 1 acre.				Budget: This project likely is a Capital Cash Outlay planned through the annual budget process. The Town would not necessarily incur debt for such a project unless grouped with another CIP project concept due to relationship.			
Town Facilities Projects							
Priority							
Total Group Projects							
Total Projects							
Town Priority							
Project Number							



Main Street Park & Amphitheater (Town Center)							
Project Description: Design and construct a public park and amphitheater in the Town Center Main Street Area.							
Town Goals	Serve the Community	Promote an environmentally sensitive and livable community					
	Run the Operations	Model a positive town image					
	Serve the Community	Foster a healthy community					
	Serve the Community	Provide a safe community					
Benefits of Project:			Lead Department:		Parks and Rec./Public Works		
1. Provide high quality open space for public use			Date Added to CIP:		2012		
2. Provide greenspace to enhance Main Street appearance			Review Date:		31-Oct-12		
3. Provide recreational opportunities for families			Design Start Year:		2020		
4. Provide amphitheater for a wide variety of performances and events			Construction Start Year:		2021		
5. Progress towards adopted Town Center Plan			Estimated Project Costs:		\$4,127,803		
			Additional Staffing Required:		No		
			Number of New Positions:		0		
Operations and Maintenance Estimates		2018	2019	2020	2021	2022	O&M Remarks: Some minor offsetting User Fee Revenue for Shelter Rentals and Amphitheater use
Equipment and Furniture							
Utilities		\$ 3,500	\$ 3,600	\$ 3,700	\$ 3,800	\$ 3,900	
Maintenance		\$ 8,000	\$ 8,250	\$ 8,500	\$ 8,750	\$ 9,000	
Supplies		\$ 500	\$ 550	\$ 600	\$ 650	\$ 700	
Personnel		\$ -	\$ -	\$ -	\$ -	\$ -	
TOTAL		\$ 12,000	\$ 12,400	\$ 12,800	\$ 13,200	\$ 13,600	
Other Funding Sources and Related Revenue Projections		<est ?> PIL should offset cost of about 2 acres of land acquisition					
Financing Plan		Installment 10		Tax on \$100k			
Debt Service Schedule		Tax Base	c Tax	\$ 97.30			
1	2022	\$ 474,697	\$ 4,299,514,804	1.10	\$ 11.00		
2	2023	\$ 462,314	\$ 4,428,500,249	1.04	\$ 10.40		
3	2024	\$ 449,930	\$ 4,561,355,256	0.99	\$ 9.90		
4	2025	\$ 437,547	\$ 5,245,558,544	0.83	\$ 8.30		
5	2026	\$ 321,969	\$ 5,402,925,301	0.60	\$ 6.00		
6	2027	\$ 313,713	\$ 5,565,013,060	0.56	\$ 5.60		
7	2028	\$ 305,457	\$ 5,731,963,452	0.53	\$ 5.30		
8	2029	\$ 297,202	\$ 5,903,922,355	0.50	\$ 5.00		
9	2030	\$ 288,946	\$ 6,081,040,026	0.48	\$ 4.80		
10	2031	\$ 280,691	\$ 6,263,471,227	0.45	\$ 4.50		
11	2032	\$ 272,435	\$ 6,451,375,363	0.42	\$ 4.20		
12	2033	\$ 264,179	\$ 7,096,512,900	0.37	\$ 3.70		
13	2034	\$ 255,924	\$ 7,238,443,158	0.35	\$ 3.50		
14	2035	\$ 247,668	\$ 7,383,212,021	0.34	\$ 3.40		
15	2036	\$ 239,413	\$ 7,530,876,261	0.32	\$ 3.20		
16	2037	\$ 231,157	\$ 7,681,493,786	0.30	\$ 3.00		
17	2038	\$ 119,706	\$ 7,835,123,662	0.15	\$ 1.50		
18	2039	\$ 115,578	\$ 7,991,826,135	0.14	\$ 1.40		
19	2040	\$ 111,451	\$ 8,151,662,658	0.14	\$ 1.40		
20	2041	\$ 107,323	\$ 8,966,828,924	0.12	\$ 1.20		
Comments: Amphitheater would be comprised of sloping grass leading down to a flat performance space. Amphitheater would be designed to support multiple functions and needs such as restrooms, storage, and picnic shelter when not in use for events. Cost of amphitheater by itself is approximately \$200,000. Land acquisition cost is a large portion of total cost. Park would also contain walking trails, playground area, shelters, and restrooms. Desired location is the North and South side of Carolina at Church Streets - up to 4 acres. Town Center adopted plan identifies this as a desired project concept. The Parks Master Plan identifies the opportunity for a recreational site within the general area. The Type of Use may not afford grant opportunities in future based on typical grant source requirements.		PIL should offset cost of about 2 acres of land acquisition.					
					Town Facilities Projects		
					Priority		
					Total Group Projects		
					Total Projects		
					Town Priority		
					Project Number		

ESTIMATED OPERATING COST SUMMARY

The chart below depicts possible cost implications for additional basic operational needs associated with capital development based on the year new construction is projected to be completed. These cost are approximate in nature and can change based on re-evaluation of project scope, change in direction, inflation, and other unforeseen circumstances. This evaluation is merely meant to gain some general understanding of the influence capital investment projects can have on a future basic operational budgets once a facility comes online.

CIP Project Concepts	Onetime Outlay Equipment	Annual Utilities	Annual Maintenance	Annual Supplies	Annual Personnel	Annual Debt Service	Cumulative Impact
2012 Bond MAFC Expansion/ Renovation	\$ 15,000	\$ -	\$ 8,000	\$ 5,000	\$ 67,000	\$ 350,000	\$ 445,000
2012 Bond Morrisville Community Park PH II	\$ -	\$ 1,500	\$ 5,000	\$ 3,000	\$ -	\$ 220,000	\$ 229,500
International Dr. PH 1 and Morrisville East Connector 01	\$ -	\$ 1,500	\$ 1,000	\$ -	\$ -	\$ 524,137	\$ 526,637
Southport Dr. Extension	\$ -	\$ 1,500	\$ 1,000	\$ -	\$ -	\$ 417,733	\$ 420,233
International Dr. PH 2	\$ -	\$ 2,000	\$ 1,000	\$ -	\$ -	\$ 347,065	\$ 350,065
Morrisville East Connector New Roadway	\$ -	\$ 1,200	\$ 1,000	\$ -	\$ -	\$ 544,488	\$ 546,688
Town Hall Dr. Medians and Bikelanes	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 252,435	\$ 252,435
International Drive Extension PH 3	\$ -	\$ 1,200	\$ 1,000	\$ -	\$ -	\$ 1,142,047	\$ 1,144,247
Public Works Facility	\$ 1,000	\$ 18,000	\$ 15,000	\$ -	\$ -	\$ 675,220	\$ 709,220
Northwest Fire Station	\$ 147,500	\$ 7,500		\$ -	\$ -	\$ 755,513	\$ 910,513
Police/ Fire Training Facility	\$ 175,000	\$ 6,500	\$ 3,000	\$ 2,500	\$ -	\$ 428,097	\$ 615,097
Crabtree Nature Park	\$ -	\$ 6,000	\$ 10,000	\$ 15,000	\$ 100,000	\$ 504,858	\$ 635,858
Crabtree Crossing Greenway Extension	\$ -	\$ -		\$ 2,500	\$ 500	\$ 204,851	\$ 207,851
Sawmill Creek Greenway	\$ -	\$ -	\$ 3,000	\$ 500	\$ -	\$ 591,512	\$ 595,012
Public Safety Radio Replacement	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 268,243	\$ 268,243
Train Depot	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 537,652	\$ 537,652
Recreation Center & Main Stree Plaza	\$ 31,500	\$ 21,000	\$ 27,510	\$ 26,250	\$ 341,250	\$ 855,089	\$ 1,302,599
Town Center Gateway	\$ -	\$ -	\$ 1,100	\$ -	\$ -	\$ 35,198	\$ 36,298
Morrisville Rural Heritage Park and Farmer's Market (Town Center)	\$ -	\$ 4,000	\$ 10,000	\$ 600	\$ -	\$ 736,224	\$ 750,824
Main Street Stormwater Treatment (Town Center)	\$ -	\$ -	\$ 10,000	\$ -	\$ -	\$ 85,269	\$ 95,269
Carolina Street Connection	\$ -	\$ -		\$ -	\$ -	\$ 78,914	\$ 78,914
Civil War Battleground Park	\$ -	\$ 4,000	\$ 10,000	\$ 500	\$ -	\$ 751,315	\$ 765,815
Town Center Parking Lot	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 91,567	\$ 91,567
Main Street Park & Amphitheater (Town Center)	\$ -	\$ 3,500	\$ 8,000	\$ 500	\$ -	\$ 474,697	\$ 486,697
Total	\$ 370,000	\$ 79,400	\$ 115,610	\$ 56,350	\$ 508,750	\$ 10,872,124	\$ 12,002,234

PROJECT EVALUATION CRITERIA – CRITICAL THINKING MODEL

Project Name		Criteria Last Updated			
Project Lead Person					
Points Scale	Rating Criteria	Criteria Statement	Council Scoring of Criteria	Staff Rating (select most appropriate point)	Criteria Weighted based on Council Scoring
	#1 Goals/objectives	Extent to which project aligns with Town Goals and Initiatives	27.6		8.7%
1	Low	Aligns to no Goal of Town			0
2		Aligns to at least 2 Goals of Town			0
3	Medium	Aligns to at least 3 to 4 Goals of Town			0
4		Aligns to at least 5 Goals of Town			0
5	High	Aligns to 6 to 9 Goals of Town			0
	#2 Safety	Extent to which project eliminates, prevents, or reduces an immediate hazard to safety.	32		10.1%
1	Low	Project has no relation to a hazardous condition			0
2		Project reduces a perceived minor hazardous condition which is not life threatening			0
3	Medium	Project eliminates an existing minor hazardous condition which is not life threatening			0
4		Project eliminates an existing hazardous condition that may be life threatening if left unchecked			0
5	High	Project eliminates an immediate hazardous condition that is life threatening			0
	#3 Mandates	Extent to which project helps town meet federal/state/local mandates policies and plans.	27.7		8.8%
1	Low	Project has no local or other legal mandates			0
2		Project indirectly supports a local mandate, policy or adopted plan			0
3	Medium	Project supports a local mandate, policy or adopted plan but does not significantly accomplish (will require future project phases or steps to meet 100% of mandate, policy, or adopted plan)			0
4		Project significantly accomplishes a local mandate, policy or adopted plan (will likely not require future project phases or steps to meet 100% of mandate, policy or adopted plans)			0
5	High	Project has a state and/or federal legal compulsory mandate			0
	#4 Project Readiness	Extent to which project is shovel ready.	23.9		7.6%
1	Low	Project is not ready			0
2		Project is not shovel ready but is a continuation of an existing approved plan			0
3	Medium	Project is a continuation of an existing approved plan and shovel ready			0
4		Project is shovel ready and rates high for safety or mandates			0
5	High	Project is shovel ready and rates high for safety and high for mandates			0
	#5 Economic impact	Extent to which project enhances economic development in town, or directly or indirectly adds to the tax base.	24.2		7.7%
1	Low	has no impact to tax base or no enhancement to economic development			0
2		has little impact to tax base or economic development			0
3	Medium	Indirectly adds to tax base and contributes to economic development			0
4		directly contributes to economic development, but indirectly adds to tax base			0
5	High	directly contributes to economic development and adds to tax base			0

Points Scale	Rating Criteria	Criteria Statement	Council Scoring of Criteria	Staff Rating (select most appropriate point)	Criteria Weighted based on Council Scoring
	#6 Fiscal Efficiencies	Extent to which project contributes to savings in Town's operational and/or capital spending.	31.5		10.0%
1	Low	Major increase to operational or capital spending			0
2		Moderately increases operational or capital spending			0
3	Medium	Neither increase or reduces operational or capital spending			0
4		Moderately reduces operational or capital spending			0
5	High	Significantly reduces existing operational or capital spending			0
	#7 Level of service	Extent to which project is necessary for town to continue current service standards or improve a services standards.	29.3		9.3%
1	Low	Has no effect to service levels			0
2		Has an indirect impact to service levels			0
3	Medium	Moderately impacts service levels			0
4		Directly impacts service levels			0
5	High	Significantly enhances service levels			0
	#8 Community support	Extent to which project has broad and/or strong support from the community.	33.5		10.6%
1	Low	Received an average score of 1 or less from Citizen Survey Panel			0
2		Received an average score of 1-2 from Citizen Survey Panel			0
3	Medium	Received an average score of 2-3 from Citizen Survey Panel			0
4		Received an average score of 3 -4 from Citizen Survey Panel			0
5	High	Received an average score of 4 -5 from Citizen Survey Panel			0
	#9 Availability of Funding	Extent to which project can be financed or qualifies for an outside funding source.	30		9.5%
1	Low	No funding plan prepared- no sources identified			0
2		Financing only			0
3	Medium	Financing and grant funding applied for but not awarded			0
4		Financing and use of a restricted revenue source			0
5	High	Financing and Grant funding awarded			0
	#10 Project Cost	Extent to which project is affordable	32.5		10.3%
1	Low	Above \$10,000,000			0
2		> \$5,000,000 < \$10,000,000			0
3	Medium	>\$1,000,000 <\$5,000,000			0
4		>\$250,000 <\$1,000,000			0
5	High	Under \$250,000			0
	#11 Investment of Towns Fixed Assets	Extent to which project improves a Town's Public Fixed Asset.	24		7.6%
1	Low	Does not directly or indirectly improve an existing Town Fixed Asset			0
2		Indirectly improves an existing Town Fixed Asset			0
3	Medium	Moderately improves an existing Town Fixed Asset			0
4		Directly improves an existing Town Fixed Asset or future Town Fixed Asset			0
5	High	Significantly improves or replaces an existing Town Fixed Asset			0
	Total Council Score produces % Weight per Criteria	316.2	Score	0	

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION'S STIP

The NCDOT STIP Projects are listed as reference only in lieu of Town Policy 2009-068. These projects are worked through our adopted Transportation Plan for regional or joint funding sources considering the magnitude and cross-jurisdictional cooperation necessary for such projects.

			Total Cost Incurring Debt	Project Year Estimated Cost	Debt Service First Year	Interest Rate	Comparative Tax Rate (First Year debt) Cents	Adopted Plan/Input Source
North Carolina Department of Transportation's Roadway STIP								
NCDOT Roadway Projects -								
1230	<u>NC54 Widening (Central)</u>	2021	\$ 22,141,338	\$ 23,055,215	2022	4.00%	6.17	TP
1210	<u>NC54 Widening (North)</u>	2021	\$ 16,656,003	\$ 21,099,326	2022	4.00%	5.64	TP
1120	<u>NC54 Widening (South)</u>	2021	\$ 8,428,003	\$ 10,676,341	2022	4.00%	2.86	TP
1020	<u>Watkins Road Widening</u>	2021	\$ 2,610,000	\$ 3,306,270	2022	4.00%	0.88	TP
1030	<u>Church Street Widening</u>	2021	\$ 14,348,749	\$ 18,176,566	2022	4.00%	0.79	TP
1040	<u>Little Drive</u>	2021	\$ 3,100,000	\$ 3,926,987	2022	4.00%	1.22	TP
1080	<u>Slater Road Widening</u>	2021	\$ 5,679,760	\$ 7,194,950	2022	4.00%	1.92	TP
1110	<u>Airport Boulevard Widening</u>	2021	\$ 5,325,000	\$ 7,592,177	2022	4.00%	2.03	TP
1130	<u>Davis Drive Widening (North)</u>	2021	\$ 2,075,000	\$ 2,958,454	2022	4.00%	0.79	TP
1140	<u>Davis Drive Widening (South)</u>	2021	\$ 3,200,000	\$ 4,562,435	2022	4.00%	1.22	TP
1150	<u>McCrimmon Parkway Widening</u>	2021	\$ 16,107,470	\$ 20,404,461	2022	4.00%	5.46	TP
1170	<u>Airport Boulevard Extension</u>	2021	\$ 13,961,861	\$ 17,686,468	2022	4.00%	4.73	TP
1180	<u>Morrisville Carpenter Road Widening</u>	2021	\$ 12,999,114	\$ 16,466,888	2022	4.00%	4.40	TP
1190	<u>Aviation Parkway Widening</u>	2021	\$ 14,827,553	\$ 18,783,100	2022	4.00%	5.02	TP
1200	<u>Airport Boulevard RR Crossing</u>	2021	\$ 18,200,000	\$ 23,055,215	2022	4.00%	6.17	TP
1220	<u>McCrimmon Parkway RR Crossing</u>	2021	\$ 18,200,000	\$ 23,055,215	2022	4.00%	6.17	TP
1240	<u>Carrington Mill RR Crossing</u>	2021	\$ 17,480,000	\$ 22,143,141	2022	4.00%	5.92	TP
1470	<u>Louis Stephens Drive Extension and Widening</u>	2021	\$ 9,400,000	\$ 11,013,598	2022	4.00%	2.95	TP

Note: The Equivalent Tax Rate assumptions are based on the estimated cost of the 1st years Debt Service Payment calculated on using the projected tax base in that year. Unfunded Projects default to 2022.

Key: TC = Town Center Plan; MP = Parks Master Plan; TP = Town's Transportation Plan



This page intentionally left blank

Appendix D

– Land Use Definitions & Maps

- Land Use Plan Excerpts
- McCrimmon Transit Oriented Development Plan
- Zoning Definitions (excerpts from UDO Section 3)
- Town Center Plan



Town of Morrisville, North Carolina
Land Use Plan
2009 - 2035

Adopted March 24, 2009



Town Council

Jan Faulkner, Mayor
Liz Johnson, Mayor Pro Tem
Linda Lyons
Pete Martin
Tom Murry
Mike Snyder
Mark Stohlman

Planning and Zoning Board

Esther Dunnegan, Co-Vice Chair
Vinnie Goel
John Gretz, Co-Vice Chair
Peter Prichard, Chair
Michael Roberts
Catherine Willis
Jacob Yackenovitch
Kris Gardner

Prepared by

The Louis Berger Group, Inc.
Renaissance Planning Group, Inc.
Town of Morrisville Staff

With input from members of the Plan Advisory Committee:

Stephen Diehl
Dan Dzamba
John Gretz, Chair
Jackie Holcombe, Vice Chair
Pete Nicholas
Stefanie Reed
Kenneth Sack
Michael Schlink
Suvas Shah
Ed White

FIGURES

1.1 Town of Morrisville 4

2.1 Regional Context 6

2.2 Population Growth in Morrisville 1970 to 2007 9

2.3 Commute Time for Morrisville Residents 1990 - 2000 9

2.4 Development Constraints..... 10

3.1 Existing Land Use..... 12

3.2 Percentage of Existing Land Uses 13

3.3 Development Recently Approved and Under Construction 13

3.4 Current Zoning 14

5.1 Future Land Use 20

5.2 Percentage of Future Land Uses..... 19

6.1 Community Areas 37

6.2 Superfund Site Redevelopment Illustration..... 38

6.3 Church Street Streetscape Illustration..... 39

6.4 Morrisville-Carpenter Road Streetscape Illustration 39

6.5 NC 54 Streetscape Illustration..... 41

6.6 Morrisville Outlet Mall Redevelopment Illustration 42

This report was prepared by The Louis Berger Group, Inc. and Renaissance Planning Group, Inc. for the Town of Morrisville, with the assistance of the Plan Advisory Committee and Town staff. Additional copies are available through the Town of Morrisville Planning Department. Special thanks to Town staff, Louis Berger Group staff and Suvas Shah for photos.

Morrisville Planning Department
 260 Town Hall Drive, Suite B
 Morrisville, NC 27560
 (919) 463-6194
<http://www.ci.morrisville.nc.us>

Ben Hitchings, Planning Director
 Michele Hane, Project Manager
 Ashley Jones, Project Staff

Special thanks to Town staff who assisted with this project: Tim Gauss, Rodney Wadkins, Courtney Tanner, Alycia Kempf, and Dawn Raab.



The Louis Berger Group, Inc.
 1001 Wade Avenue, Suite 400
 Raleigh, NC 27605
 (919) 866-4412
<http://www.Berger-NC.com>
 Scott Lane, Planning Director



RENAISSANCE PLANNING GROUP

Renaissance Planning Group, Inc.
 200 Sixth Street, NE
 Charlottesville, VA 22902
 (434) 296-2554
<http://www.citiesthatwork.com/>
 Vlad Gavrilovic, Principal of Planning

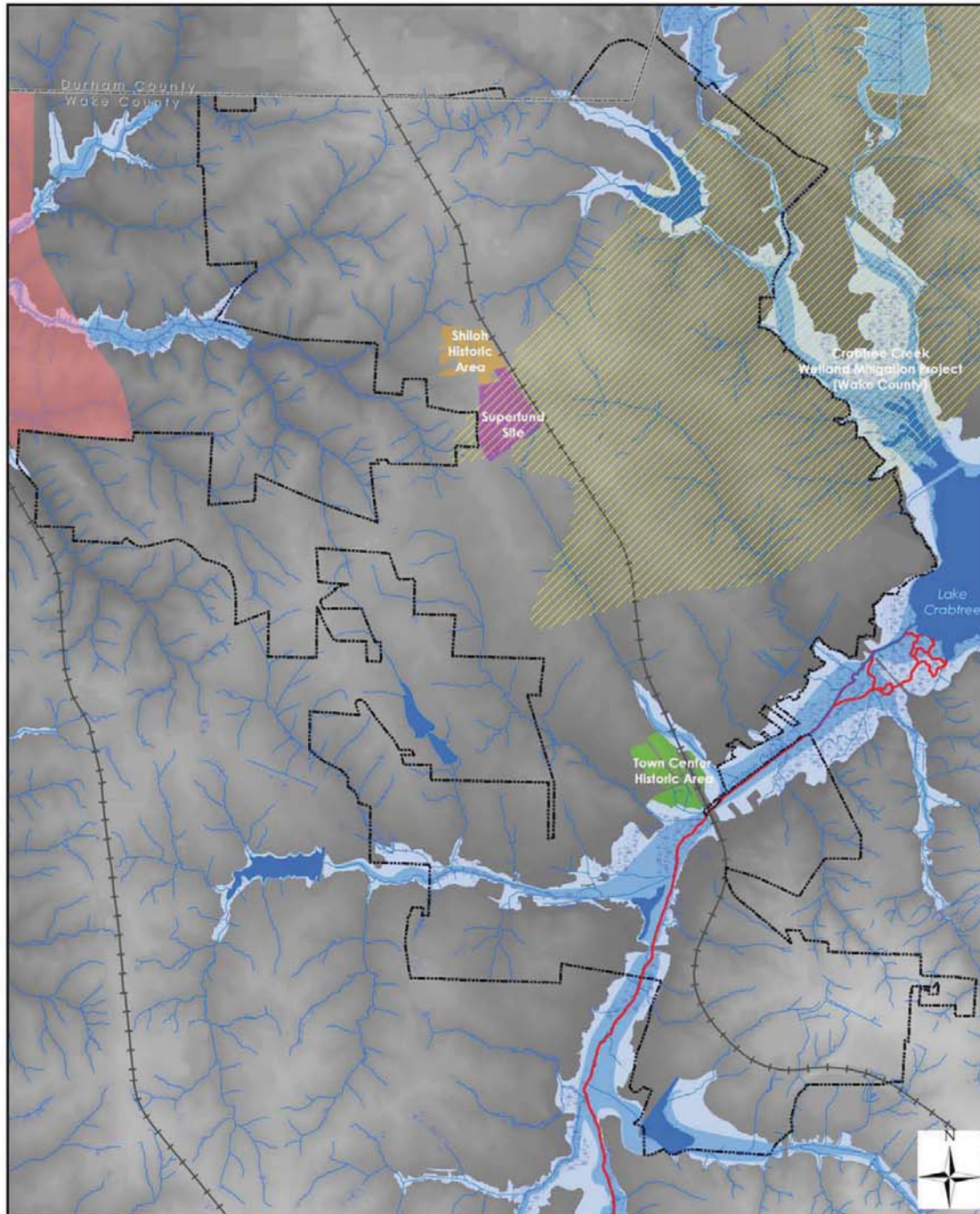


Figure 2.4 Development Constraints



2.4 Development Constraints

Understanding Morrisville's development constraints prior to beginning the planning process can avoid unnecessary negative impacts on the environment and capitalize on the assets of the community.

Water Features

Lake Crabtree, a major man-made lake, is located just east of Morrisville (Figure 2.4). A County Park on the north side of the lake provides boating and recreation access (see photo at right). Crabtree Creek flows east into Lake Crabtree, crossing through the southern portion of Morrisville. Topography in Morrisville gently slopes down to Crabtree Creek, with few steep slopes. The tributary streams of Indian Creek and Sawmill Creek feed Crabtree from the north, forming broad floodplains and wetlands along the eastern and southern portions of the Town. Wake County has preserved much of the wetland and floodplain land northwest and southwest of Lake Crabtree as part of a wetland mitigation project, restricting it from any future development. Two smaller lakes, one near the Airport Boulevard interchange at I-40 and one adjacent to the Preston Golf Course, are also owned by Wake County.

Crabtree Creek has been identified by the North Carolina Department of Natural Resources (NCDENR) as a 303(d) impaired stream, which means that the water quality does not meet Environmental Protection Agency (EPA) water quality standards. As a result, NCDENR has created a specific management plan for this stream in order to improve the water quality. This management plan may affect how much and where development can occur near Crabtree Creek.



Lake Crabtree, from Lake Crabtree County Park.

Airport Noise Overlay

Raleigh-Durham International Airport (RDU) is located adjacent to Morrisville's eastern boundary, on the opposite side of Interstate 40. Several of the airport's flight patterns cross over Morrisville, creating substantial noise. To avoid negative impacts, RDU has been working with neighboring jurisdictions for years to restrict sensitive land uses in noise impacted areas. These restrictions are in acknowledgement of the fact that excessive noise has been shown to cause hearing and other physical problems over a long period of exposure. In addition to protecting its citizens, Morrisville's implementation of the Airport Noise Overlay District protects it from legal liability for allowing substantial negative impacts to occur. Generally speaking, residences, schools and other sensitive uses like daycares, should not be located in areas with greater than 65 decibels of airport noise (shown by yellow diagonal lines in Figure 2.4). For Morrisville, this area covers approximately 26% of the town, much of which remains undeveloped. Nonresidential uses, such as offices, retail and industrial facilities are allowed in these areas. Hotels are permitted if soundproofing is installed. The Town Council has recently changed the Town's ordinance to permit residential uses within the 65 decibel areas west of NC 54 if soundproofing is installed and the right to overflight is granted.

Railroad Corridor

The railroad through the center of Morrisville, as described earlier, has been an integral part of the town's history and success. The tracks currently separate the town into two halves, with limited crossings restricting automobile, pedestrian and bicycle traffic. The North Carolina Railroad Company owns the rail corridor and has taken the position that there can be no expansion of auto traffic crossing the railroad at-grade (without an overpass), and that no sidewalks or greenways may cross at-grade. Thus, east-west connectivity is limited in the town until funds can be secured to build additional overpasses.

Areas of Historical Significance

Morrisville has two areas of historical significance, neither of which has yet been given a formal designation, such as inclusion on the National Register of Historic Places. The Shiloh area near the north end of town is a historically black community dating from the 1820s, with a church and other historical buildings. The Shiloh Heritage Preservation Area was established by the town through the adoption of the North Morrisville-Shiloh Small Area Plan on January 6, 2003.

In addition, there are numerous historic buildings in the Town Center area, the preservation of which have been addressed in more detail in the Town Center Plan, adopted in 2007.

Superfund Site

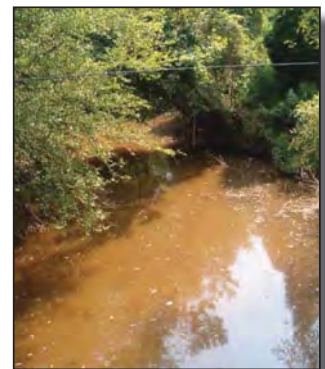
Just south of the Shiloh area, on the northwest corner of McCrimmon Parkway and NC 54 is the former Koppers Co., Inc. plant. The plant, which dates to 1896, processed and treated wood products, releasing contaminants into the soil, groundwater and surface water. Contamination at the site was discovered by the EPA in 1980, and cleanup was performed from 1990 to 1997. Cleanup involved removal of contaminated soil; bioremediation, carbon adsorption and filtration to treat water onsite; and revegetation. The property is being actively monitored by EPA before it can be formally removed from the Superfund list, but there is currently no environmental hazard at the site. The site is currently owned by two companies, with part of the site actively operating as a wood laminating facility, while the other is vacant. Now that the site has been cleaned up, it represents an opportunity to find a more appropriate community-oriented use.

Development Restrictions

Floodway: Undevelopable

100-year Floodplain: 1% chance of flooding in any given year. Development is acceptable if building is located at least 2 feet above base flood elevation (FEMA elevation certificate is required).

National Wetlands Inventory: Require permits from state agencies for any major development, such as subdivisions or commercial development. May require developers to mitigate wetland losses.



Crabtree Creek, just east of the crossing with NC 54.

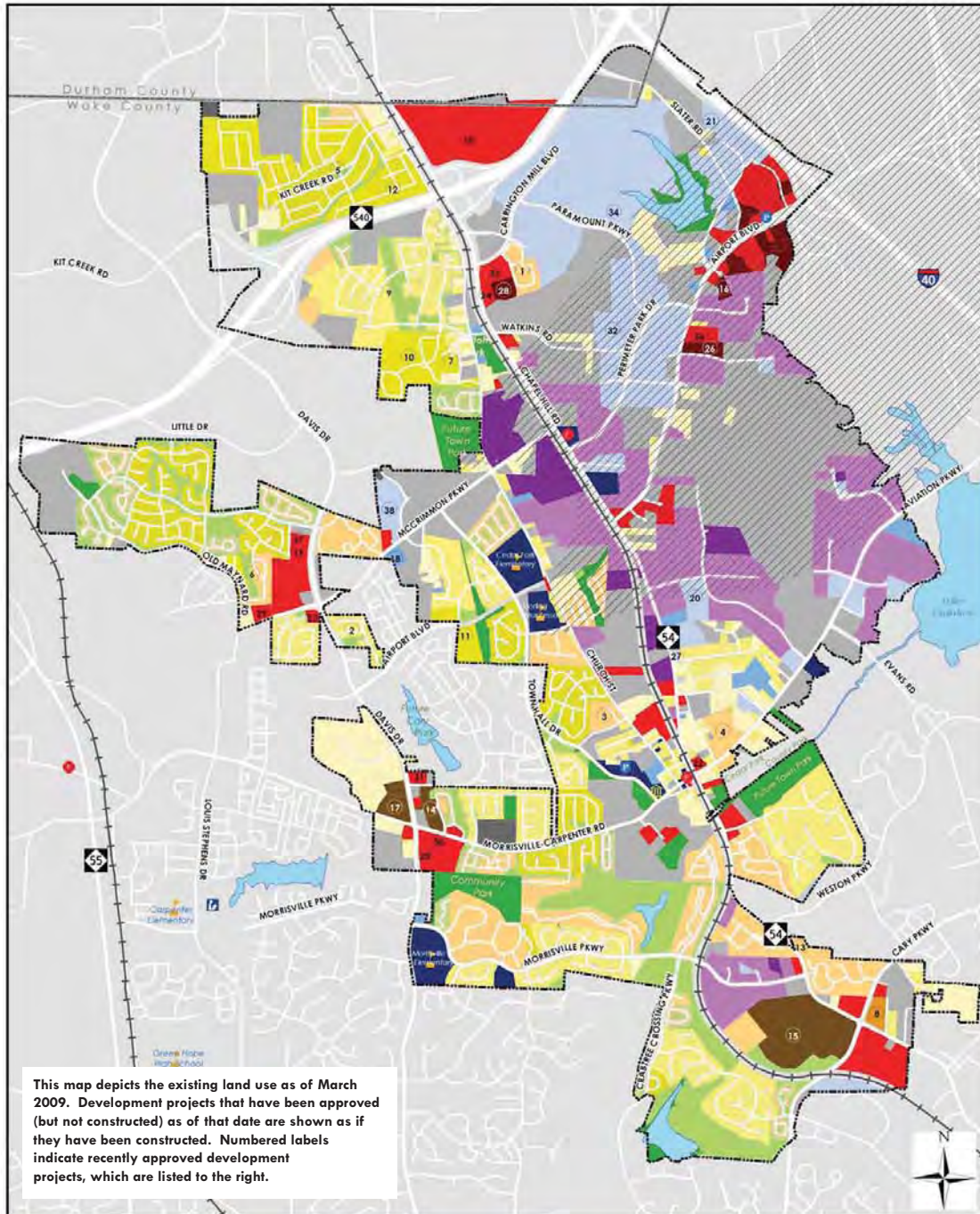


Figure 3.1 Existing Land Use



3.0 EXISTING CONDITIONS

The purpose of this section is to describe the current land use conditions in the Town of Morrisville, as well as the rapid change and development that is occurring so that planning for the future of Morrisville will have an accurate baseline.

3.1 Land Use

Existing land use in Morrisville is shown in Figure 3.1 to the left, with categories for different general land use types and some distinction by the density of residential development. The RDU Airport Noise Overlay District, shown on the map as black diagonal lines, indicates that for the most part residential development is only permitted west of NC 54 (although a few older residences pre-dating the restriction still exist in that area). A numerical version of this map, with percentages of land in each category, is shown in Figure 3.2.

The term "existing land use," as it is used in this Plan, refers to what is physically on the ground as of March 2009. The exception is that development projects that have been approved but not constructed at that time are shown as if they have been constructed. Existing land use is distinct from zoning (the legal control for how a property owner may develop his or her land) or future land use (the general land development pattern the Town would like to see in the future). Following are the existing major land use patterns in Morrisville:

- Residential areas of the town are largely dispersed throughout the western and southern sections, which are not subject to the airport noise overlay. A majority of the residential development is single family detached homes (at very low, low and medium densities), laid out in self-contained subdivisions with little connectivity to adjacent areas. There are several semi-attached and attached townhome communities and a number of apartment communities, all of which are classified as high density. Other than large developments where housing types have been mixed (such as Breckenridge and Kitts Creek), residential housing types are largely separated.
- Retail shopping in Morrisville is concentrated in several locations. One is at the Airport Boulevard interchange with Interstate 40. This area includes an outlet mall, several hotels and restaurants, which are largely used by visitors rather than residents. Two shopping centers with current or pending grocery store anchors are located at the far south of Morrisville (NC 54 and Cary Parkway) and the far west (Davis Drive and McCrimmon Parkway, and Davis Drive and Morrisville-Carpenter Road). Very little retail is located in the Town Center.
- There are three schools in Morrisville - two elementary schools and one Montessori school. Public facilities, such as Town Hall and the police station, are mostly located in the center of town along Town Hall Drive. These facilities are well-sited

Figure 3.2 Percentage of Existing Land Uses

Existing Land Use Type	Percentage of Town Area
Very Low Density Residential	6%
Low Density Residential	10%
Medium Density Residential	8%
High Density Residential	9%
Group Living Facility	< 1%
Mixed Use	2%
Commercial - Lodging	1%
Commercial - Retail/Services	6%
Office	9%
Place of Worship/Cemetery/Civic Group	1%
Public Facility/School/Institution	2%
Industrial - Distribution/Warehouse	10%
Industrial - Manufacturing	2%
Private Open Space/Recreation*	7%
Public Park/Greenway/Open Space	4%
Utilities	< 1%
Vacant/Undeveloped	23%

* All development must have on-site greenspace. This category includes only properties that are exclusively greenspace or recreation.

Figure 3.3 Development Recently Approved and Under Construction (October 2004 - March 2009)

Residential			Commercial, Industrial and Office		
1. Carrington Park Apartments	Apartments	266 du	16. Best Western	Hotel	70,800 sf
2. Chessington Subdivision	Single Family Detached Houses	53 du	17. Bethany Village	Retail, Office	99,500 sf
3. Church Street Townes	Townhomes	81 du	18. Church of Jesus Christ of Latter Day Saints	Place of Worship	16,587 sf
4. Cotten Place	Attached cottages, Townhomes	113 du	19. Circle K	Convenience Store, Gas Station, Car Wash	5,415 sf
5. Kitts Creek Subdivision	Single Family Detached Houses, Townhomes	722 du	20. Coastal Carolina Pumping	Office	11,800 sf
6. McCrimmon at the Park	Single Family Detached Houses, Townhomes	131 du	21. Copley Place - Building B	Office	80,982 sf
7. Morrisville Gardens	Single Family Detached Houses	8 du	22. Cruizers	Convenience Store, Gas Station, Car Wash	4,944 sf
8. Morrisville Manor	Congregate Care Facility	214 du	23. Davis Corners	Retail	17,001 sf
9. Providence Place	Single Family Detached Houses, Townhomes	575 du	24. Duke Medical Office	Medical Office	20,000 sf
10. Shiloh Grove	Townhomes	211 du	25. Dunkin Donuts	Restaurant	2,190 sf
11. Town Hall Terraces	Townhomes	70 du	26. eSuites Hotel	Hotel	153,294 sf
12. Townes at Everett Crossing	Single Family Detached Houses, Townhomes	203 du	27. Green Drive Office Building	Office	3,342 sf
13. Stephen's Gate	Townhomes	37 du	28. Hotel Sierra	Hotel	90,248 sf
Mixed Use			29. McCrimmon Pointe	Office, Daycare	36,258 sf
14. Grace Park	Retail, Office, Townhomes, Brownstones, Condos, Flats	42,880 sf; 180 du	30. McDonalds	Restaurant	4,882 sf
15. Park West Village	Retail, Office, Movie Theater, Hotel, Apartments, Flats	890,000 sf; 321 du	31. Morrisville Animal Hospital	Animal Hospital	11,208 sf
			32. Perimeter Park- 2200 & 2250	Office	212,862 sf
			33. Perimeter Park Retail	Retail	32,400 sf
			34. Time Warner Cable Offices	Office	250,000 sf
			35. Shiloh Crossing	Wal-Mart, Other Retail	538,427 sf
			36. Shoppes at Airport Boulevard	Retail, Office, Day-care, Restaurant	45,449 sf
			37. The Goddard School	Daycare	8,290 sf
			38. Town Hall Commons Office Building #2	Office	75,030 sf

Notes:
Residential development reported in dwelling units (du)
Nonresidential development reported in square footage of building space (sf)
Some figures are approximate and subject to change during the development review process

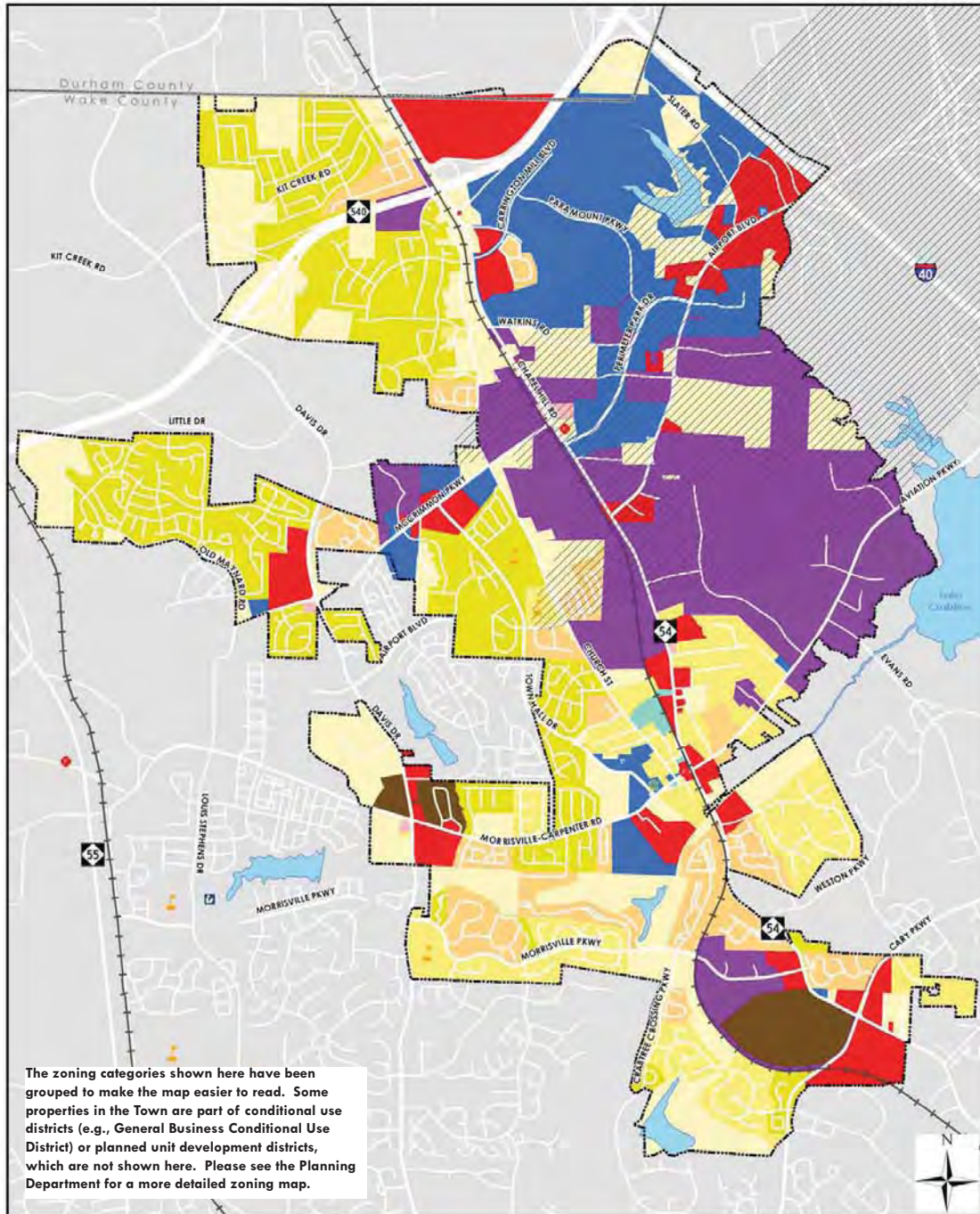


Figure 3.4 Current Zoning



3.1 Land Use cont'd

- and within walking distance of some of Morrisville's residents.
- Parks in Morrisville are dispersed throughout the town, with the exception of the eastern area between Airport Boulevard and Aviation Parkway.
- Offices in Morrisville, which comprise 9% of the total land area, are clustered north of Airport Boulevard and east of NC 54. This area is home to the Perimeter Park office complex, which includes older 1- to 2-story buildings as well as newer mid-rise buildings. While some of the buildings are within walking distance of each other, they are largely separated from other uses, such as restaurants or convenience retail.
- The Airport Noise Overlay District, which does not permit residential uses east of NC 54, is largely comprised of industrial uses, vacant land and some offices. There is a large piece of vacant land located between Airport Boulevard and Aviation Parkway. This is the largest undeveloped area remaining in the town.
- Industrial uses are prominent in Morrisville, comprising 12% of the total land area. There are relatively few industrial manufacturing facilities, but many distribution facilities. This is not surprising because Research Triangle Park does not permit distribution facilities in its jurisdiction, and the adjacent Raleigh-Durham International Airport creates a significant volume of truck freight traffic. These facilities are a concern from a planning perspective because they place a large number of heavy trucks on Morrisville's roadways.
- Vacant land in Morrisville, while comprising 23% of the total area, is largely confined to the eastern, noise-restricted area. The remaining vacant land outside the Airport Overlay District, located at the intersection of McCrimmon Parkway and Town Hall Drive, is planned as an office and neighborhood retail center. A large piece of vacant land north of Perimeter Park Drive has been purchased by Wake Technical Community College for a future campus.



Residential construction at the Savannah subdivision.

3.2 Recent Development

In addition to showing existing land uses, Figure 3.1 shows recently approved developments. These are categorized according to their final land use on the map even though they may not have completed construction at this time. Numbers on the map correspond to the numbered list of recently approved developments shown in Figure 3.3. The total number of approved developments since October 2004 is 3,062 residential dwelling units, and 2,691,499 square feet of nonresidential building space.

The quantity of recently approved development for a small town like Morrisville is quite substantial. Several of the projects are large, and are likely to have considerable impact on the character of the town. Two major residential projects have taken up much of the remaining vacant land outside the airport noise overlay (Kitts Creek and Providence Place subdivisions). These subdivisions are in the process of constructing more than 1200 new homes in Morrisville. Two major development projects with commercial space are Shiloh Crossing, at the far north end of town, and Park West Village, at the far south end of town. These two developments, while very different in style and composition, will together contribute 1,428,427 square feet of commercial building space. Shiloh Crossing will offer a Wal-Mart and other major retail stores in one-story highway retail buildings. Park West Village will include multi-story buildings, structured parking and commercial uses including office space, a movie theater, major retail anchor, hotel and restaurants. Park West Village also incorporates a substantial residential component.

Some of the public comments received during the planning process were centered around the need for more shopping and other services in the town. Unfortunately for residents, there is an inevitable disconnect between residential and commercial development. Commercial businesses cannot afford to locate in an area that does not have the population to support them; many will go out of business waiting for the population to catch up. So businesses follow the population. In the meantime, especially in areas experiencing rapid growth, there is a disconnect between the residential population and the commercial services available to them. As the amount of available land for residential development dwindles in Morrisville, the commercial development will catch up.



Mixed use construction (rental flats over retail) at Grace Park.

3.3 Zoning

Current zoning in Morrisville is shown in Figure 3.4 for the purpose of documenting the current baseline conditions. Unlike a land use plan, zoning has the weight of law and determines how a property owner may develop his or her land. New developments sometimes require rezoning to an appropriate category to permit the desired development type. Rezoning involves an application and public hearing process. Much of the vacant land that is left in the town is currently zoned either Industrial Management (in the case of the eastern portion), Office & Institutional, or Agricultural (which allows very low density residential). For full information on what is allowed in each zoning category, please see the Town Ordinances (a link is provided in the References section in Appendix B).

The Town of Morrisville currently plans to revise its zoning codes starting in 2009, creating a Unified Development Ordinance (UDO). A UDO combines the zoning ordinance and the subdivision ordinance into one document, which is easier to understand and interpret. Additional changes to better address future development, such as allowing for small-scale mixed use development (the current zoning ordinance allows mixed use only on parcels larger than 10 acres), may be included.

4.0 POLICY DIRECTION

4.1 Vision

From January 26th through January 28th of 2007, the Town Council and staff conducted a retreat to establish a future Vision and Goals to serve as a shared understanding of the challenges the Town of Morrisville faces today, and a collective sense of the direction in which the Town would like to focus its resources. Through a collaborative planning process, seven Town goals with associated initiatives were established.

On February 26, 2007, the Morrisville Town Council unanimously approved those goals and initiatives for FY 2007. These goals and initiatives were used as a starting point for the Vision and Land Use Plan Goals and Policies listed below. In addition to the Town Council's Vision, the input of the citizens and the Plan Advisory Committee were incorporated into the final Goals and Policies for this Plan.

The Vision for Morrisville established by the Town Council is as follows:

The Town of Morrisville will be an innovative crossroads where cultural heritage meets the next generation nurturing vibrant communities of thriving families and businesses while preserving small-town values.

Innovation is one of the central themes of this Plan, and is a necessity to provide services and opportunity to a diverse and increasingly older range of citizenry. Providing non-motorized transportation and housing options are important factors in establishing opportunities for aging baby boomer populations around the country, and in Morrisville.



Morrisville Road Race, 2007.

4.2 Goals and Policies

The development of goals is crucial to the land use and transportation planning process. Adopted goals and policies form the framework for adding or amending ordinances and regulations that guide the development of land within the Town's planning jurisdiction. Goals are unifying statements of a community's preferred future direction. Policies attached to Goals provide a means for translating Vision into action, and represent a set of guidelines for decision making for the Town on land use and transportation issues, programs and projects in the future.

It is expected that the Goals and Policies in this Plan will be used by the Town as a framework for many future decision-making processes and actions, including:

- Decisions on rezoning and special use permit applications
- Funding and fiscal priorities
- Departmental priorities and action plans

All elements of the Morrisville Land Use and Transportation Plans must be administered fairly, equitably and consistently in order to ensure that the Town's goals are met. The intent of these goals is to preserve and enhance community character, encourage pride in our community, and augment the quality of life desired by the Town's citizens. In order to fully implement the Plans, the goals are accompanied by targeted Action Items (Section Seven) to ensure that the future Vision will be realized.

The goals from the Board's Vision were used as the primary basis for developing the Goals and Policies. In addition, the input from the public workshops, the Plan Advisory Committee and the goals from the existing 1999 *Land Use Plan* were also used to establish the following comprehensive set of land use goals and policies for the future of the Town.

Growth and Development Pattern

Goal 1: Ensure a diverse development pattern that sustains livability and the environment by encouraging future development and public infrastructure that is complementary with existing development.

Policy 1A: Promote growth and development that contributes to and builds upon the Town's overall image as a well-planned, attractive, livable, and unique community in the Triangle Region.

Policy 1B: Promote and plan for the future of Morrisville as an environmentally friendly and energy efficient community.

Policy 1C: Plan, develop and support vibrant, walkable gathering places at Morrisville's historic crossroads.

Policy 1D: Concentrate higher-density, mixed-use development near existing and proposed transit centers, and at activity centers to provide services to Town citizens and day-time employees in a pedestrian-friendly environment.

Policy 1E: Develop and re-develop with detached residential land use outside activity centers when in context with surrounding uses.

Policy 1F: Implement strategies that minimize threats to life and property from natural and man-made disasters.

Character and Quality of Development

Goal 2. Ensure that Morrisville retains a small town atmosphere by integrating attractively and sustainably designed communities of complementary uses.

Policy 2A: Promote development that fosters a sense of place by improving the character of the built environment, including visually appealing buildings, streetscapes, amenities, and public spaces.

Policy 2B: Protect water quality and quantity in the Town's streams, lakes, and groundwater and consider the potential regional impacts on water supply and wastewater management of proposed developments.



Unveiling of the Shiloh Historic Marker, October 14, 2006.

4.2 Goals and Policies, cont'd

- Policy 2C: Provide a system of interconnecting greenways and natural corridors that link parks, natural areas, and open space, as well as residential and non-residential destinations.
- Policy 2D: Clearly communicate the character of development that is encouraged in the Town, including land use, design and development standards, utility extensions, and transportation needs/design.
- Policy 2E: Promote lifecycle housing options that allow residents to continue to live in our community even as their needs change over time.

Transportation and Land Use Integration

Goal 3: Improve transportation mobility by integrating land uses with transportation infrastructure.

- Policy 3A: Establish development patterns supportive of a walkable, multi-modal community, including higher-density residential development and complementary land uses in the Town Center and around planned and potential transit and activity centers.
- Policy 3B: Actively encourage pedestrian-oriented development through site design, building orientation, interconnected parking facilities, and streetscape improvements.
- Policy 3C: Encourage infill and redevelopment of existing areas as a way to promote compact, efficient development, and support transportation options.
- Policy 3D: Provide a variety of recreational opportunities connected to residential areas and places of employment by streets, greenways, sidewalks, and bicycle facilities that protect and enhance sensitive environmental areas.
- Policy 3E: Encourage interconnected street patterns in new development and redevelopment that promote effective circulation of car, transit, bicycle, and foot traffic.
- Policy 3F: Ensure that transit provisions, such as turn-outs, shelters, right-of-way, and good pedestrian connections are accommodated.
- Policy 3G: Consider acquiring control of streets within the Town where it is fiscally prudent to expand the opportunities available for designing and creating travelways that complement and support adjacent land uses.



Day at the Park, 2006.

Community Facilities and Services

Goal 4: Provide community services and public infrastructure to maintain and enhance the quality of life for Town citizens of today; the elderly that have enriched our past, and future generations.

- Policy 4A: Incorporate an understanding of the tax revenue and fee benefits of potential new development in land use decisions; ensure that these benefits are balanced against the infrastructure and service costs needed to serve various kinds of new development and redevelopment.
- Policy 4B: Encourage building and site design that conserves water and energy; reduces wastewater; reduces future infrastructure costs; and lengthens the lifespan of existing and future infrastructure.
- Policy 4C: Ensure that Morrisville has adequate resources and prepared responses for potential natural or man-made emergencies, such as evacuation plans and hazard response programs.
- Policy 4D: Provide excellence in educational opportunities that are accessible to all citizens, including convenient access to libraries, schools, and other institutional and cultural arts facilities that serve as community focal points, as well as sponsoring unique educational opportunities for citizens of all ages.
- Policy 4E: Provide parks, recreation and cultural opportunities for citizens of all ages.

Cooperation and Coordination

Goal 5: Foster a collaborative environment internally and with relevant local, regional, state, and federal partners to develop new opportunities for Morrisville's residents and business community.

- Policy 5A: Encourage cooperation/coordination with other governments and agencies to ensure that sufficient land areas are retained for future needs of schools, parks, greenways, streets and other public purposes.
- Policy 5B: Consider the consolidation of services and sharing of expenses with other agencies and surrounding communities, including mutual agreements for fire, transit, and police services.
- Policy 5C: Work closely with and take into consideration other local government and regional plans when making day-to-day and long-term land use and transportation decisions.
- Policy 5D: Take a lead in creating a joint development review process that describes how Morrisville and neighboring entities can review and comment on developments along the borders of the Town and their anticipated impact to services and facilities.
- Policy 5E: Continue to create meaningful public involvement opportunities in town government programs and processes that are responsive to public input.
- Policy 5F: Ensure the availability of information and the transparency of town government actions and functions.



Civil War Re-Encampment, March 15, 2008.

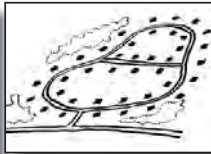
5.0 RECOMMENDED FUTURE LAND USES

5.1 Development Principles

The following Design Principles set a framework for guiding the design of development throughout Morrisville. New and infill development should strive to realize these principles to ensure the development of high-quality, well connected places that minimize land consumption, balance pedestrian and vehicular traffic, foster a vibrant civic environment, and balance the small town qualities of Morrisville with its vital economic future. A mix of land use and development types also supports the diverse population mix that is the hallmark of healthy and vibrant communities.



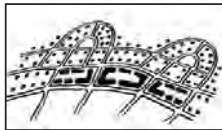
compact development



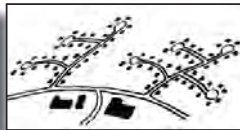
dispersed development

Preserving Open Space

Development in a growing community like Morrisville presents a unique set of design challenges. Paramount among these is the efficient use of land and the arrangement of buildings, roads and open space in a visually harmonious manner. Carefully planned green space is necessary to maintain the natural beauty and quality of life of Morrisville over time. Environmental and natural features should be integrated into open space planning. Viewsheds and natural features, including water bodies, wetlands, and steep slopes, should be preserved as open space wherever possible. The contrasting development strategies illustrate the difference between dispersed development and more compact development, which better protects open space. When compact development is combined with a connected network of streets and circulation paths, it allows better connections within a neighborhood and ultimately enriches the range of choices and experiences for the Town's residents.



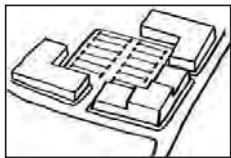
interconnected development



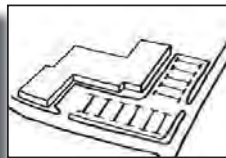
conventional development

Street Connectivity

Portions of Morrisville have been developed with conventional transportation patterns that minimize any connections between neighborhoods or surrounding roadways. While this achieves more privacy, particularly for residential developments, it also can limit accessibility, impair emergency response times, and increase traffic congestion. Creating a more interconnected circulation pattern allows more choices, and provides the advantages of enhanced access, reduced congestion, and more responsive emergency services. The image to the left contrasts conventional development patterns with an interconnected development pattern. Well-connected neighborhoods and centers promote pedestrian activity and encourage walking in place of driving for local trips. Additionally, this framework promotes smaller block sizes and a greater diversity of building types within close proximity. Small blocks are an important element within a walkable area, because they create a comfortable scale for pedestrians through an increased sense of location and direction, breaking down the space between intersections and destinations, and providing increased visibility for businesses and offices. As new development or redevelopment occurs in Morrisville over time, consideration should be given to ensuring street connectivity with the existing and proposed road, bicycle, pedestrian and transit systems in the area.



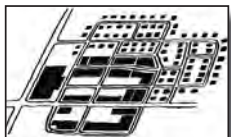
encouraged



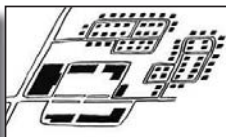
conventional development

Site Design + Parking

Successful site design balances car and pedestrian accessibility and creates an environment that is welcoming to both drivers and pedestrians from the street. A key factor is the organization of buildings and parking relative to adjacent streets. Many of the commercial developments in Morrisville have been designed in a way that places buildings far back from the road, leaving a large, open expanse of pavement visible to visitors from the roadway. A more desirable alternative reverses this placement, drawing the building to the street edge and moving parking to the rear. Doing so provides a prominent and pedestrian-friendly edge for the site - one where buildings frame the street, giving them a town-like quality with entrances fronting the sidewalk while presenting a more attractive and inviting look to the public. Additionally, the visual impact of parking is minimized, as it is shielded to the rear of the buildings. It is important to note that standard parking requirements can lead to an oversupply of parking spaces and open expanses of asphalt. The Town should consider further reducing minimum off-street parking requirements and allowing mitigation strategies such as shared parking and on-street parking in place of peak-usage standards to reduce parking needs and required development area.



mixed-use development



conventional development

Land Use

The land use pattern of much of Morrisville has developed around separate areas for residential, commercial and employment uses. This results in additional traffic congestion on major arterial roadways as people need to get onto the main road to get from home to shops, parks, schools and workplaces. Future development should strive to integrate better connections between uses and foster more of a mixed use development pattern in the Town. To be successful, mixed-use development must provide strong connections between different uses, allowing residents, employees, and patrons to naturally overlap and cross between uses. The illustration to the left shows the use of connections to draw together residential and commercial blocks into a unified center. Additionally, the diversity of uses balances activity between the daytime, nighttime, and weekend hours, fostering a busier, safer, and more exciting environment for all residents, employees, and visitors and at all times of day. Certain areas of Morrisville may not be conducive to a full complement of mixed uses - for example, areas within the Airport Noise Overlay District or areas of predominantly existing residential neighborhoods.

5.2 Future Land Use Map

The purpose of the Future Land Use Map (Figure 5.1) is to graphically depict a general land development pattern that seeks to achieve the goals of the Plan. A numerical summary of the percentage of land in each category is also provided in Figure 5.2. Using a 20-year planning horizon, the Future Land Use Map projects preferred locations for different land use types. In creating this map numerous interests had to be balanced, including maintaining the quality of life for a small town and the demands of the growing Triangle region. There was also a need to balance the need for residential housing and the restrictions placed upon the town by the Airport Noise Overlay District.

The Future Land Use Map evolved through the public input process and the application of goals and policies of the Plan. As part of the Town-wide public planning forums, several conceptual future land use scenarios were evaluated by the public and the Plan Advisory Committee. In addition, questions about the relative amounts of development of different land use types were a key feature of the public survey. These comments and evaluations were incorporated into the final Future Land Use Plan. For example, survey respondents and many public workshop participants commented that they would not like any more apartments in Morrisville, but would like more greenspace and recreational opportunities. These have been addressed in the Land Use and Transportation Plans by including no new high density residential development outside of activity centers (low or medium density only) and incorporating specific new park locations as well as recommendations for general park locations in undeveloped areas (see Section Six). These are just part of the public comments received relating to land use. For more information, many of the themes of the public comments received and results of the survey are included in Appendix C, and a detailed description of the future land use mapping process is included in Appendix E.

It is important to note that this map only addresses broad density and land use objectives, not detailed standards. In most cases, proposed densities and intensities are expressed in terms of ranges that are appropriate for the types of uses proposed. In the case of activity centers, several compatible land use types are discussed, without restricting the area to a single land use. These ranges of intensity and use are intended to provide flexibility in two ways: first, to allow the Town and property owners to adapt to the changing needs of the future population without rewriting the plan; second, to apply development principles to the unique characteristics of individual properties as they are evaluated during the review of a specific development proposal. The focus is on the quality of development, not just the use.

Future events and the evolution of the town will undoubtedly change the Future Land Use Map. The Future Land Use Map should be reviewed and evaluated on a regular basis, with minor updates every other year and a major update every five years, to determine what amendments are appropriate as inevitable variations from the projected land development patterns are to be expected. To be effective, the Land Use Map must be consistently consulted as a guide in reviewing and evaluating proposed property rezonings and land development plans. It is important to note that the Future Land Use Map cannot be interpreted independently from the written land use goals and policies presented in Section Four.

Comparisons to Existing Land Use, Zoning and the 1999 Future Land Use Map

Direct comparisons between the percentage of existing land uses (Figure 3.2) and future land uses (Figure 5.2) are difficult due to the different purposes of the maps. Existing land uses are intended to be very specific according to what exists on the ground, whereas future land uses are broader, more flexible categories, applied to larger areas of the town. Although effort has been made to employ the same residential density categories in both maps, it would be inaccurate to make conclusions by comparing the percentage of land area of each category. While some residential areas, such as those on very large lots within the Airport Noise Overlay District, are planned for redevelopment to another use, most others are not planned to change density categories. Differences in percentage are mostly due to the fact that many existing residential areas are within other planning areas, such as the Town Center Planning Area or activity centers, and that is how they are categorized in the Future Land Use Map.

The future land use categories, while broad, are intended to translate roughly to the current zoning categories for ease of interpretation. The zoning categories may well be altered in the future, as in the planned conversion to a Unified Development Ordinance (UDO) starting in 2009. For this reason, the plan is specific where the future land use categories differ from current zoning. To further assist in interpreting the Future Land Use Map, more detailed place-specific recommendations are included in Section Six, and design guidelines for different land use types are presented with the category descriptions in Section 5.3.

Comparing the 2009 Future Land Use Map to the map adopted in the 1999 Land Use Plan (which has been updated to reflect map changes as a result of development since the adoption of the plan), several general trends emerge:

- The 2009 map increases the low and medium residential areas in town by 227 acres. In other words, 227 acres of town were previously designated for nonresidential use, but are designated as residential in the 2009 map. There have been some changes in residential categories between the two maps as a result of development between 1999 and 2009, and differences in the definitions of the low and medium density categories.

Figure 5.2 Percentage of Future Land Uses

Future Land Use Category	Percentage of Town Area	Page # of Description
Regional Activity Center	8%	page 23
Neighborhood Activity Center	3%	page 24
Southern Activity Center	4%	page 25
Business Activity Center	3%	page 26
Corridor Commercial	4%	page 27
Heritage Preservation Area	1%	page 28
Offices	7%	page 29
Public/Institutional	3%	page 30
Industrial	8%	page 31
Very Low Density Residential	1%	page 32
Low Density Residential	15%	page 32
Medium Density Residential	9%	page 32
High Density Residential	7%	page 32
Private Open Space/Recreation	7%	N/A
Public Park/Greenway/Open Space*	5%	page 33
Future McCrimmon Small Area/ Master Plan	6%	page 34
Town Center Plan	9%	page 35
Superfund Redevelopment Site	1%	page 36

* This category includes only properties that are exclusively greenspace or recreation. Additional greenspace exists in nonresidential developments and is not included in this number. Additional private open space is expected as part of new residential and nonresidential development (at least 440 acres or 8%) according to current ordinance requirements. In a large area such as the McCrimmon Small Area Plan, planners may be able to negotiate a public park, rather than private open space, to meet the ordinance requirement.



Historic Page House in the Town Center

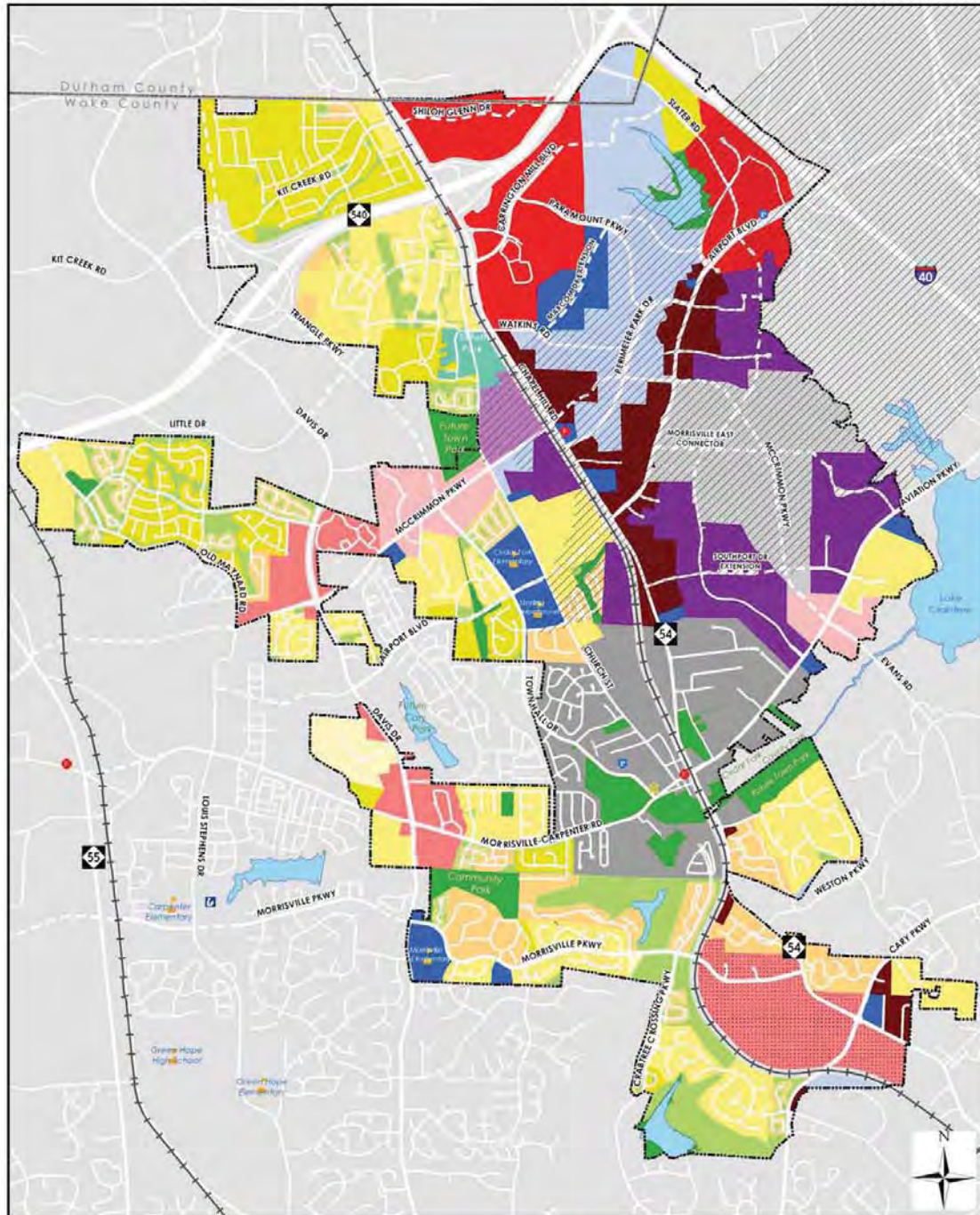


Figure 5.1 Future Land Use



5.2 Future Land Use Map, cont'd

The following images illustrate the Future Land Uses. Page numbers refer to the full description for each category.



Very Low Density Residential (Page 32)
 ≤ 1 du/ac net density
 Single family detached houses
 Ex: Crabtree Crossing Estates, Holly Creek Road

Low Density Residential (Page 32)
 > 1 and ≤ 4.5 du/ac net density
 Single family detached houses
 Ex: Providence Place, Weston Estates, Preston, Town Hall Commons, Addison Park

Medium Density Residential (Page 32)
 > 4.5 and ≤ 7.5 du/ac net density
 Single family detached houses, semi-attached or townhouses
 Ex: Savannah, Breckenridge (single family)

High Density Residential (Page 32)
 > 7.5 du/ac net density
 Semi-attached houses, townhouses or apartments
 Ex: Gables @ Town Hall Commons, Kitts Creek (townhouse), Breckenridge (townhouse), apartment complexes



Note: The TOD district is a "floating district" and, therefore, not mapped. This district may be applied to the Superfund Redevelopment Site.

5.2 Future Land Use Map, cont'd

- More park space is included, showing parcels recently acquired by the Town for future park development.
- The 2009 map reduces the overall acreage of industrial use, but keeps the designation in core areas around existing industrial development. The previous plan map showed industrial use for virtually all land east of NC 54 south of Airport Boulevard and north of Aviation Parkway. This has been changed to a combination of office, corridor commercial, and future master planned areas.
- The name and purpose of some of the categories have changed. Mixed use and commercial categories from the 1999 plan have been traded in favor of several different activity center categories and a corridor commercial category. A floating Transit Oriented Development category has been created so that it may be applied via rezoning to land in the future when transit services exist. These category name and definition changes reflect the desire for flexibility in the future land use map.



Cedar Fork Elementary School and Community Center.

School Siting

During the planning process, numerous comments were received from members of the public requesting the plan to call out locations suitable for future schools in the town, specifically for a middle school, so that their children can attend school close to home. Although the Town is responsible for land use planning, Wake County Public School System (WCPSS) is responsible for locating school sites and pursuing their development. The Town can only make suggestions to the school system, which is not currently pursuing school sites in the vicinity of Morrisville. For a middle school, WCPSS requires a minimum of 30-40 acres of land that is not too expensive (e.g., not located near highway interchanges or along major commercial corridors). Given the shortage of vacant land located outside the Airport Noise Overlay District in Morrisville, few sites meet those criteria. The following potential sites were discussed:

- Build "up" at the current Cedar Fork Elementary School site. A community center currently located on the site may move to another location, providing enough space for a 6th grade center.
- Redevelop areas within the Town Center Planning Area.
- Redevelop the Holly Creek subdivision, located off Davis Drive, which is currently a very low density residential area. This site was considered and removed as a potential site.

Following are strategies recommended by the Town Council for staff to pursue additional educational opportunities in Morrisville:

- Continue coordination with Wake County Public School System.
- Consider "adaptive reuse" (redevelopment) of sites within Morrisville for schools.
- Work collaboratively with Cary and RTP to locate suitable sites outside Morrisville's jurisdiction for schools that would serve Morrisville residents. Potential sites may include vacant land west of Davis Drive (in Cary's jurisdiction) between Morrisville-Carpenter Road and McCrimmon Parkway; and vacant land in RTP on the east and west sides of Davis Drive, just north of the town's boundary.
- Pursue attracting private schools to locate in Morrisville.
- Coordinate with Wake Technical Community College for the proposed campus in Morrisville to offer the "Earn and Learn" program, which provides unique high school and college classes addressing the health and sciences theme.



Morrisville residents enjoy a day at the Morrisville Aquatic and Fitness Center.

5.3 Future Land Use Categories

Following is a description of land use categories from the Future Land Use Map. The categories were modified from those used in the 1999 Land Use Plan, in order to address the changing circumstances in the Town since the adoption of the 1999 Plan and to better reflect the public and Plan Advisory Committee input received during the Plan update process.

The overall land-development strategy in the Land Use Plan is to protect existing, stable residential areas where a continuation of the compatible low-density residential pattern is envisioned and to encourage compact, mixed-use developments that provide people with the opportunity to live, work, recreate, and shop in a pedestrian-friendly environment in strategic locations. The exceptions are for areas within the Airport Noise Overlay District east of NC 54, where residential uses are not allowed.

Because much of the Town's land area is already developed, this Plan envisions that new projects will be modest in scope and therefore will be evaluated based on their compatibility with the larger community of which they will be a part. However, there are a few larger areas of vacant land in Town as well, such as the large, vacant area in the McCrimmon Master Plan area. The overall future land use categories and policies guiding their development for the Town are described on the following pages. For each future land use type, function, preferred uses, and policies are listed, with photos illustrating encouraged and discouraged design.

In addition, Section Six divides the town into several community areas in order to describe how the recommended future land uses described in this section will combine with the recommended improvements from the Transportation Plan to affect the look, feel, and function of areas of the town.

5.3 Future Land Use Categories, cont'd

1. REGIONAL ACTIVITY CENTER (RAC)

A. Function

- i. Provide significant regional employment, retail, education, health care, entertainment or mixed use destinations at key interchanges/intersections of major transportation corridors in Town.
- ii. Provide improved access to jobs, a compatible mix of uses and access to a variety of transportation options.

B. Preferred Uses

- i. Land uses should include a mix of uses, such as of office and institutional (including medical, senior, and child care related institutional use), entertainment, retail and major commercial land uses. Medium and high density residential uses should be included as part of an RAC if the area is located outside the Airport Noise Overlay District.
- ii. Commercial uses within the RAC should not include destination retail uses such as a building supply, nursery operation, or auto dealership that would require significant outdoor display or storage. Outdoor display or storage associated with major retail or shopping centers is allowed.

C. General Policies + Development Character

- i. Regional Activity Centers should be planned with the highest density and intensity of uses centered within 1/4 mile of a thoroughfare or transit stop, tapering to less dense and intense uses at the edges.
- ii. Land uses within the RAC district should be mixed – including vertically and horizontally (i.e. among separate buildings, or within the same floor of a building or among floors in multi-story buildings) - to create a diverse center to live, work, play and shop.
- iii. RAC districts should contain a complementary mix of land uses that promote pleasant, safe and convenient access for pedestrians and bicyclists, and provide a strong orientation to existing or potential future transit service.
- iv. Multi-modal transportation connections or easements should be provided to link surrounding uses to each RAC, and link the RAC to activity centers in adjacent areas.
- v. Connections to undeveloped parcels should be designed and built to the property line and in a manner that can be continued.
- vi. The RAC should feature well-configured squares and greens and a traditional network of landscaped streets with pedestrian-friendly activities and frontages. Rectilinear pattern of small blocks and the location of civic buildings that act as landmarks and symbols of community identity are desired.
- vii. For the purpose of providing a transition from the RACs to surrounding areas, each RAC district should be designed to center on a compact core where the development of highest intensity/density should be located, with progressively lower-density and intensity spreading outwards. Where existing uses and built areas do not fit this pattern, it is intended that as redevelopment occurs over time this pattern should be encouraged in the future.
- viii. Major land development proposals within the RAC area should consider the provision of a full complement of public facilities and services, the adequacy of roads and utilities, and the compliance of the proposal with the community-design policies and guidelines of this Plan.
- ix. Parking areas should be de-emphasized through location, landscaping, fencing, or other decorative elements to minimize visual impact from the public right of way.



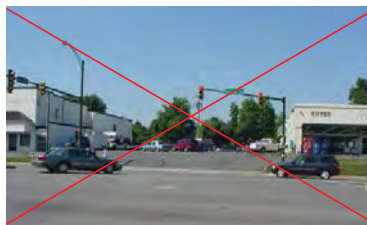
This fountain and plaza located at the entrance of a large retail establishment act as a central meeting and gathering place.



The Morrisville Outlet Mall, although located at an important transportation crossroads in Town, does not have the mix of uses and other features of a Regional Activity Center.



encouraged



discouraged

Brick sidewalks, street trees, small setbacks, and store fronts with plenty of windows create an inviting pedestrian shopping experience. Street trees and on-street parking buffer pedestrians and diners from traffic. The street tables for cafes and restaurants are located near the curb so people walking past get the sense of being a part of a gathering space.

Where possible, it is desirable for building frontages to span the entire width between side lot setbacks on primary streets, creating an uninterrupted street wall to promote a vibrant and active streetscape. Large gaps in street wall are incompatible with the design intent of the RAC. Interrupting the street wall can discourage pedestrian activity by increasing the distance between potential destinations.

Trails provide walkers and cyclists access to neighboring communities. Multi-use trails should be a minimum of 8' wide. Where adjacent to roadways, trails can replace sidewalks. Trails should be paved, with the exception of those in environmentally sensitive areas, where pervious surfaces are recommended. Trails should be clearly marked and easily accessible to pedestrian and bicycle traffic.

5.3 Future Land Use Categories, cont'd

2. NEIGHBORHOOD ACTIVITY CENTER (NAC)

A. Function

- i. Provide for moderate scale, mixed use activity centers that serve as convenient, walkable service and retail destinations for surrounding neighborhoods.
- ii. Provide for a mix of residential, retail, cultural, entertainment and office opportunities in a mixed use village center, with street-level uses that generate pedestrian activity and upper-story uses that provide complementary residential and employment uses to "keep the street level active."

B. Preferred Uses

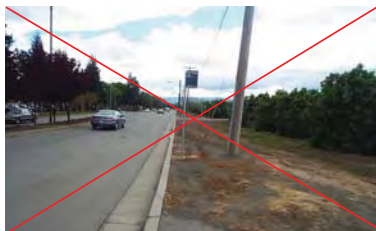
- i. A compatible mix of land uses including housing (if located outside the Airport Overlay District), commercial and office uses, restaurants, entertainment, personal and household service establishments, institutional uses, public facilities, parks, playgrounds and other similar uses meeting the needs of the adjoining neighborhoods.
- ii. In general, residential uses should be located above the first floor, reserving first floor storefront space for activity-generating uses such as retail shops, restaurants or grocery stores.

C. General Policies + Development Character

- i. Neighborhood Activity Centers should include, where feasible, a vertical mix of residential and non-residential uses within buildings to create a complementary mix of uses and activities and foster a sense of identity and place. NACs should provide a pedestrian-friendly environment with short block lengths and connected, walkable streets.
- ii. Development density and intensity should be sufficient to permit maximum use of small lots and the development of structures that support ground-floor shops and upper-level residential and office uses. However, buildings should remain small scale and compatible with the surrounding neighborhood – generally from two to four stories.
- iii. Development should combine uses vertically, as well as horizontally (i.e. mixing uses among buildings and within individual buildings), to achieve convenience, variety and walkability in the center.
- iv. Design elements should be integrated with wide sidewalks, street trees, pedestrian-scaled lighting, benches, and entrances to buildings at the edges of street rights-of-way. Bicycle facilities, on-street parking, and usable public spaces should be provided.
- v. Connections to undeveloped parcels should be designed and built to the property line and in a manner that can be continued.
- vi. Land use or intensity/density transitions should be provided between non-residential uses and existing residential communities.
- vii. Development should be oriented away from sensitive natural resources, such as floodplains and ponds to minimize the environmental impacts of new development.
- viii. Development proposals in Neighborhood Activity Centers should combine open and civic space in features such as pedestrian promenades and plazas, public art, entrance features, linear parks and trails, outdoor seating, lawns or greens and similar design features that invite pedestrian activity.
- ix. Parking areas should be de-emphasized through location, landscaping, fencing, or other decorative elements to minimize visual impact from the public right of way.



Neighborhood Activity Centers incorporate multiple uses into a walkable, pedestrian-friendly environment with compact block sizes.



encouraged

discouraged

The sidewalk is one of a variety of design elements that together contribute to an active and vibrant streetscape. Promoting a walkable environment requires safe, accessible, and connected sidewalks that unite the pedestrian with a desired destination or activity. Public sidewalks on both sides of urban roadways should be designed to a width that encourages pedestrian activity desired in a particular area.

Building setbacks strongly influence street character. Minimal front setbacks are recommended to encourage pedestrian activity along the sidewalk. Additional setbacks may be used where necessary for outdoor dining, pedestrian promenades, courtyards, or plazas. Development that lacks street frontage may discourage pedestrian activity and/or require automobile access.

Bicycle racks should be placed in safe, visible locations, preferably near building entrances and transit stops, and should not obstruct pedestrian traffic. Effective racks support the bicycle frame upright in two places. The rack must be anchored and resistant to metal cutting tools to prevent theft or vandalism. Covered racks are encouraged to prevent damage to bikes from rain.

5.3 Future Land Use Categories, cont'd

3. SOUTHERN ACTIVITY CENTER (SAC)

A. Function

- i. Provide community-wide employment, retail, education, health care, entertainment or mixed use destinations at key intersections of major transportation corridors in Town.
- ii. Provide improved access to jobs and daily institutional and service needs, a compatible mix of uses and access to a variety of transportation options.

B. Preferred Uses

- i. Land uses should include a mix of uses, such as of office and institutional (including medical, senior, and child care related institutional uses), entertainment, retail and major commercial land uses. Low, medium, and high density residential uses should be balanced with existing residential uses both within and near the SAC. New residential uses on redeveloped parcels are discouraged from being stand-alone multifamily housing.
- ii. Commercial uses within the SAC should not include destination retail uses such as a building supply, nursery operation, or auto dealership that would require significant outdoor display or storage. Outdoor display or storage associated with major retail or shopping centers is allowed.

C. General Policies + Development Character

- i. The Southern Activity Center should be planned with the highest density and intensity of uses centered at the Park West Village Development, tapering to less dense and intense uses at the edges that are compatible with the adjacent neighborhoods.
- ii. Land uses within the SAC district should be mixed – including vertically and horizontally (i.e., among separate buildings, or within the same floor of a building or among floors in multi-story buildings) - to create a diverse center to live, work, play and shop.
- iii. The SAC district should contain a complementary mix of land uses that promote pleasant, safe and convenient access for pedestrians and bicyclists, and provide a strong orientation to existing or potential future transit service.
- iv. The SAC district should have an integrated and high-quality design, with consideration for the adjacent land uses and adjacent neighborhoods.
- v. Multi-modal transportation connections or easements should be provided to link surrounding uses to the SAC, and link the SAC to activity centers in adjacent areas.
- vi. Connections to undeveloped parcels should be designed and built to the property line and in a manner that can be continued.
- vii. The SAC should feature well-configured squares and greens and a traditional network of landscaped streets with pedestrian-friendly activities and frontages. Rectilinear pattern of small blocks and the location of civic buildings that act as landmarks and symbols of community identity are desired.
- viii. For the purpose of providing a transition from the SAC to surrounding areas, the district should be designed to center on a compact core where the development of highest intensity/density should be located, with progressively lower-density and intensity spreading outwards. Where existing uses and built areas do not fit this pattern, it is intended that as redevelopment occurs over time this pattern should be encouraged.
- ix. Major land development proposals within the SAC area should consider the provision of a full complement of public facilities and services, the adequacy of roads and utilities, and the compliance of the proposal with the community-design policies and guidelines of this Plan.
- x. Parking areas should be de-emphasized through location, landscaping, fencing, or other decorative elements to minimize visual impact from the public right of way.
- xi. Design elements should be integrated with wide sidewalks, street trees, pedestrian-scaled lighting, benches, and entrances to buildings at the edges of street rights-of-way. Bicycle facilities, on-street parking, and usable public spaces should be provided.



This rendering of Park West Village, currently under construction within the Southern Activity Center, illustrates its small-scale mixed use buildings and pedestrian-friendly streetscape.



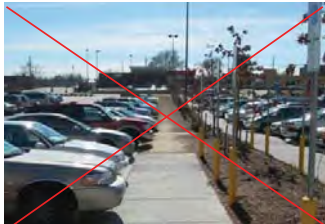
Pedestrian amenities should be continuous and appropriately sized to their setting. Where appropriate, they should incorporate transit facilities such as bus shelters.



Buildings should be incorporated into a site plan that includes gathering and open spaces, aesthetically pleasing design, and pedestrian connectivity between buildings.



Building storefronts should be well-designed, with adequate space for outdoor uses (such as café seating) to avoid blocking the sidewalk.



encouraged

discouraged

5.3 Future Land Use Categories, cont'd

4. BUSINESS ACTIVITY CENTER (BAC)

A. Function

- i. Provide access to daily retail and service needs within walking distance of primary of-
fice/industrial uses.
- ii. Provide for a mix of residential, local retail, and office opportunities in the nature of a
small mixed-use community center, primarily oriented around a surrounding office or
industrial concentration.

B. Preferred Uses

- i. Land uses in this district should be small-scale mixed commercial uses including local
services, workshops, professional offices, institutional, housing (if located outside the
Airport Overlay District) and specialty shops catering to local workers.
- ii. Retail uses should generally provide the goods and services needed by local employ-
ment and residential communities in the vicinity of the BAC.

C. General Policies + Development Character

- i. The Business Activity Center use should be compatible with and should illustrate a co-
ordinated design, transportation connection or other relationship with the surrounding
communities that exist or have been approved.
- ii. Buildings should remain compatible with the surrounding neighborhood – generally
from two to six stories.
- iii. Development should combine uses vertically, as well as horizontally (i.e. mixing uses
among buildings and within individual buildings), to achieve convenience, variety and
walkability. In general, residential uses should be located above the first floor, reserving
first floor storefront space for activity-generating uses such as retail shops, restaurants or
grocery stores.
- iv. New automobile-oriented retail uses such as building supply, nursery operations, auto
dealers, truck terminals, warehousing, service stations, furniture stores, drive-through res-
taurants and drive-through banks are not intended for Business Activity Centers.
- v. Design elements should be integrated with wide sidewalks, street trees, benches, and
entrances to buildings at the edges of street rights-of-way. Bicycle facilities, on-street
parking, and usable public spaces should be provided.
- vi. Land use or intensity/density transitions should be provided between non-residential
uses and existing low-density residential communities.
- vii. Development should be oriented away from sensitive natural resources, such as flood-
plains and ponds to minimize environmental impacts and provide open space.
- viii. Access to surrounding major thoroughfares should be limited, but local vehicular, tran-
sit, bicycle and pedestrian links to adjacent parcels should be provided.
- ix. Vehicular, bicycle, and pedestrian links should extend into the surrounding develop-
ment.
- x. Development proposals in BACs will combine open and civic space in features such
as pedestrian promenades and plazas, public art, entrance features, linear parks and
trails, outdoor seating, lawns and greens or similar design features that invite pedestrian
activity.



Mixed use buildings that locate residences above retail or service uses, known as live-work units, allow people to conveniently access daily destinations.



encouraged

discouraged

Development should combine uses vertically, as well as horizontally (i.e. mixing uses among buildings and within individual buildings), to achieve convenience, variety and walkability. In general, residential or employment uses should be located above the first floor, reserving first floor storefront space for activity-generating uses such as retail shops, restaurants or grocery stores.

Access to surrounding major thoroughfares should be limited, but local vehicular, transit, bicycle and pedestrian links to adjacent parcels should be provided.

Buildings should remain compatible with the surrounding neighborhood – generally from two to six stories.

5.3 Future Land Use Categories, cont'd

5. CORRIDOR COMMERCIAL

A. Function

- i. Provide commercial areas located along transportation corridors to meet local and regional needs for sale of goods and services.
- ii. Ensure that streets, buildings, structures and sites located along the primary transportation corridors and gateways to Morrisville present a positive visual image of the community and support Morrisville's small town character.

B. Preferred Uses

- i. Land uses should include retail uses, office and service uses, small scale business park uses (light industrial, office), institutional uses, cultural/public uses, entertainment, and residential (if located outside the Airport Overlay district).
- ii. Retail buildings offering residential or office uses on upper floors are encouraged.

C. General Policies + Development Character

- i. Design standards and signage requirements for this district should be consistent with those in the Town Center area.
- ii. Within this district, new development, re-development, infill development and structural additions to existing development should be sensitively designed to reflect a positive image of the community as expressed through architectural guidelines and appearance standards for development and redevelopment.
- iii. Retail development within this designation should establish and maintain a pedestrian scale, walkable shopping experience offering such features as entrances immediately adjacent to sidewalks, pedestrian amenities, outdoor eating areas, screened parking, on street parking (where feasible), plazas and open spaces, and a variety of small retail shops and services.
- iv. New development should avoid large expanses of blank walls, should provide frequent street level entries, and should provide sidewalk amenities such as street furniture, seating areas, trash cans, and lighting that enhance pedestrian use.
- v. Building entrances should be placed close to the street, with ground floor windows, articulated façades, appropriately scaled signs and lighting, and awnings or other weather protection to encourage pedestrian activity.
- vi. Parking and vehicle drives should be located away from building entrances, and not located between a building entrance and the street. Surface parking should be oriented behind or to the side of a building, accessed from an alley when possible, and not on street corners.
- vii. Development should be oriented away from sensitive natural resources, such as floodplains and ponds to minimize the environmental impacts of new development and provide green space.
- viii. Parking lots should be screened from adjacent street frontages and residential uses.
- ix. Vehicular, bicycle, and pedestrian links should extend into the surrounding development.



This mixed-use project features local and national stores and restaurants, office space, housing, public open space, and public parking, along a formerly declining commercial corridor.



This Morrisville example incorporates some of the policies and development character featured in the proposed district, but could better accommodate parking behind the buildings and additional landscaping to support Morrisville's small town character.



encouraged



discouraged

Signs that are sensitive to nearby uses, respect the scale and proportion of buildings, and contribute to the sense of place can help secure and maintain a healthy economic climate. Facade-mounted and street level signage is preferred to tall, isolated signs that create visual clutter and distract motorists.

Transparent building façades generate interest for the pedestrian and improve security through enhanced visibility. Storefront windows and doors help create an inviting environment for pedestrians by breaking up monotony of a street wall and welcoming pedestrians along the sidewalk. Awnings, typically used to highlight entryways or windows, appear out of place when not part of a window or door.

In pedestrian-oriented areas, lighting should be scaled to the pedestrian (not the automobile,) and oriented towards the sidewalk and the roadway to help maintain safety and visibility. Scale, intensity, and fixture design vary between areas of different densities and uses. Ornamental light posts and fixtures help to create an attractive streetscape and should be consistent with the architectural character of the immediate area.

5.3 Future Land Use Categories, cont'd

6. HERITAGE PRESERVATION AREA

A. Function

- i. To protect and preserve the important historic and cultural features of the existing Shiloh Community in Morrisville.

B. Preferred Uses

- i. Land uses in this designation should consist primarily of single-family attached and detached dwellings with some multi-family houses, including those containing 2-4 dwelling units per structure, and single-family houses which have been converted into two-family or multi-family dwelling units.
- ii. A number of publicly owned lands and buildings currently exist in this district, in addition to the Shiloh Baptist Church, Luther Green Center, Park, and residences. New uses that support the civic and recreational needs of Town residents are appropriate in this designation if they are compatible with the existing residential character of the area.

C. General Policies + Development Character

- i. Alterations and additions to heritage buildings should maintain or enhance rather than detract from the existing architectural style and character of the building and those surrounding it.
- ii. New buildings, alterations, and additions to historically unrated existing buildings should be designed to be compatible with the heritage buildings in terms of scale, massing, height, setback, and entry level.
- iii. The general open space character of the existing Shiloh community should be reinforced by maintaining spacious setbacks and large frontage for new development.
- iv. Parking lots should not front on existing or new streets to maintain the area's historic visual character. The Town should promote a parking strategy for the district that protects streetscape character.
- v. Existing trees that lend a scenic character to the streetscapes in the community should be protected from damage due to site development, redevelopment and paving modifications, street and infrastructure works.
- vi. Future design and infrastructure investment in the community should include the following compatible streetscape components: heritage street signage, improved lighting, plantings, enhanced paving, and rural landscaping to enhance the visual character of existing streets and help establish gateways to the community.

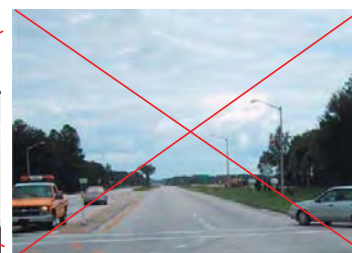
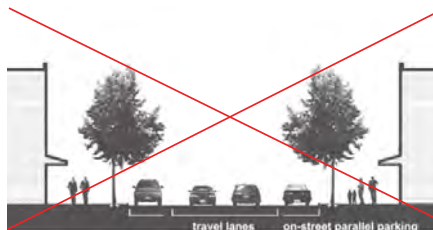


Appropriate signage helps to reinforce the significance of the Shiloh community as an important destination in the Town.

encouraged



discouraged



New buildings, alterations, and additions to historically unrated existing buildings should be designed to be compatible with the heritage buildings in terms of scale, massing, height, setback, and entry level.

To maintain historic character, homes and buildings are substantially set back from the roadway. The placement of residences should be sensitive to views and open spaces to preserve the rural experience along the roadway.

Street trees help to integrate the roadway with the surrounding area. Street trees buffer the sidewalk from the roadway and break down the scale of the street. They provide shade, aesthetically enhance the streetscape, and can be used to highlight important gateways or districts.

5.3 Future Land Use Categories, cont'd

7. OFFICE

A. Function

- i. Provide a broad spectrum of local and regional employment that offers high quality employment opportunities and supports a balanced tax base.
- ii. Provide suitably located sites for single-use with the ancillary services necessary to support the predominant office use, in locations with good regional transportation accessibility.

B. Preferred Uses

- i. Land uses in the designation should consist of large-scale regional office developments that feature high visual quality and high trip-generating uses, including office parks, research and development parks, corporate headquarters, and emerging technologies facilities that support local and regional employment opportunities balanced with the Town's small town historic character.
- ii. Open space and recreational uses, such as walkways, greenways, and public plazas and promenades, should be incorporated within this designation as an important amenity to the Town and employees that work there.

C. General Policies + Development Character

- i. Projects should be designed architecturally and functionally as a well-integrated unit. Vehicular, transit, pedestrian and bicycle circulation should tie the district together internally and provide linkages with surrounding office, service and residential areas.
- ii. Concentrations of office uses have high visibility along major corridors, their structures accented with heavily landscaped greens and tree-lined boulevards, and reflect the Town's growing prominence as a local crossroads for business.
- iii. Office buildings should be located close to the roadways with parking behind, or underneath and/or located in the interior of the development, so that building fronts and entrances face the street.
- iv. The use of structured parking, shared parking or parking contained within buildings is encouraged as a way of minimizing impervious surfaces and large expanses of surface parking on sites.
- v. In general, buildings should be of moderate scale, from three to seven stories. However, land use or intensity/density transitions should be provided between this designation and surrounding areas.
- vi. Development along new or existing public streets should foster a walkable and enjoyable pedestrian environment. New development should avoid large expanses of blank walls, should provide frequent street level entries, and should provide sidewalk amenities such as street furniture and lighting that encourage year round pedestrian use.
- vii. Development should minimize impacts to sensitive natural resources, such as floodplains and ponds, and should consider green building design techniques as an approach to minimizing impacts.
- viii. Design elements should be integrated with transit shelters, wide sidewalks, pedestrian scaled lighting, street trees, benches, and entrances to buildings at the edges of street rights-of-way. Bicycle facilities and usable public spaces should be provided.
- ix. Alleys, thoroughfares, and service ways should be utilized to ensure trash pickup and deliveries for commercial establishments do not take place along public right of ways.



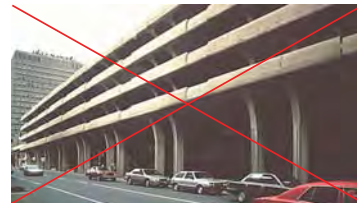
Office buildings can reduce the loss of green space and increase energy efficiency by incorporating green building design techniques. In this example, the roof of the building is covered with native grasses and wildflowers, which provides habitat for plants and animals, slows water runoff into local storm drains, and provides extra insulation to help heat and cool the building.



This Morrisville example shows an attractive but singular building isolated from the roadway and nearby buildings, and surrounded by parking. Such a design conflicts with the desire to create a walkable center that is connected to surrounding neighborhoods with building frontages facing the street.



encouraged



discouraged

Reducing impervious surfaces on site, such as parking lots, rooftops, sidewalks, and roads, helps to minimize water velocity and storm-water run-off associated with rain events. Incorporating planting strips in parking lot design, narrowing road widths, replacing driveways/parking lots with porous paving, adding green roofs and other green building techniques, will aid the reduction of pollutants and sediment deposits in waterways.

Planted medians help to create a sense of place, enhance roadway aesthetics, and improve air quality. Median landscaping includes low landscape shrubs, grasses, flowers, or well-manicured street trees that are limbed high enough to preserve visibility between cars, bicycles and pedestrians. The Town should work with NCDOT to request waivers to allow median landscaping where appropriate.

Structured parking should be hidden behind or under buildings, rather than fronting on the streetscape.

5.3 Future Land Use Categories, cont'd

8. PUBLIC/INSTITUTIONAL

A. Function

- i. Accommodate such civic or institutional activities as governmental and public buildings, schools, and places of worship and ensure that they are compatible with the overall character of the town and their surroundings.

B. Preferred Uses

- i. This designation includes government-owned administration buildings and offices, fire stations, hospitals and health care facilities, utilities, day care centers, senior centers, community centers, community facilities, schools, colleges and educational research facilities.

C. General Policies + Development Character

- i. Civic and institutional facilities are "focal points", both visually and functionally, within the Town. Unlike other land uses, these facilities are often seen as landmarks that should visually stand apart from their surroundings while compatible with other uses in their setting.
- ii. When possible, locate facilities adjacent to or within publicly accessible open spaces.
- iii. Public entrances should be clearly defined and face the street. Porticoes, awnings and other entryway features that are integral to the building design are encouraged.
- iv. Service areas such as refuse containers, transformers, and loading docks should not be visible from public areas
- v. Access to civic and institutional facilities should provide for safe and convenient access by pedestrians, bicycles, automobiles and public transit. Pedestrians should be given the ability to safely cross at intersections near civic and institutional facilities. Special consideration should be made where high concentrations of youth, senior, and disabled persons exist. Marked crosswalks, medians, and pedestrian activated signals should be used to promote safe crossings. In addition, appropriate pedestrian amenities should be provided, such as pedestrian scale lighting, seating, and trash receptacles.
- vi. Off-street parking should be provided primarily by parking lots located to the rear or other sides of buildings that face away from public streets.
- vii. Parking areas should be screened by buildings or landscaping. Long, unbroken rows of parking should be avoided. Large parking lots should be adequately landscaped.
- viii. Development should minimize impacts to sensitive natural resources, such as floodplains and ponds.
- ix. Vehicular, bicycle, and pedestrian links should extend into the surrounding development.

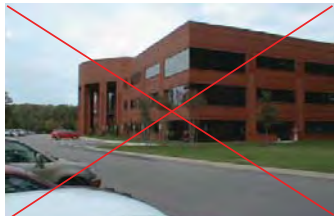


The Morrisville Town Hall is a good example of a landmark building that stands apart from its surroundings, but is compatible with neighboring uses.

encouraged



discouraged



Civic and institutional facilities are "focal points", both visually and functionally, within the Town. Unlike other land uses, these facilities are often seen as landmarks that should visually stand apart from their surroundings while compatible with other uses in their setting.

Safe and convenient crosswalks make a sidewalk system usable and appealing, encouraging pedestrian activity. Pedestrian crossings should be designed to reduce the crossing distance and provide high visibility to both the pedestrian and oncoming vehicular traffic. This can be accomplished by changing pavement color or texture, and making use of white paint striping and/or reflective materials.

Parking, particularly surface parking lots, occupy an increasing percentage of developed land. Carefully considered landscaping, lighting, and paving can minimize the impact of parking lots on pedestrians, surrounding land uses, and the environment. Trees and landscaping may be used to break-up large expanses of surface parking, provide refuge for pedestrians, shade vehicles, and collect stormwater runoff.

5.3 Future Land Use Categories, cont'd

9. INDUSTRIAL

A. Function

- i. To provide for industrial uses as an integral component of the Town's employment land use areas.
- ii. To encourage the co-location of industrial uses that are compatible with office, commercial, and other employment or institutional uses in the Town in an integrated and harmonious development character.
- iii. Campus-style industrial parks are appropriate along the major corridors of the Town. Warehouse, manufacturing and repair uses should be located along the less visible industrial collector roads.

B. Preferred Uses

- i. Within the Industrial classification, land uses should include manufacturing, distribution, wholesale operations, warehouses, research facilities, flex space, business parks and nonresidential planned developments, and telecommunications facilities such as cell towers.
- ii. Limited retail and commercial services that serve the needs of adjacent industrial uses are appropriate in this designation.

C. General Policies + Development Character

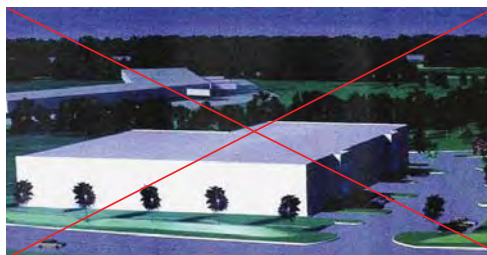
- i. Industrial projects should be compatible with the overall character and visual improvements in the surrounding areas.
- ii. Industrial uses are appropriate in this designation that are compatible with office, commercial, and residential development by virtue of size and the lack of outdoor storage, or manufacturing activities, and other activities or emissions that could have a detrimental impact on surrounding residential or business uses.
- iii. Building placement, design details, and landscaping and screening should be used to minimize visual impacts on adjacent residential and other mixed uses. Heavy Industrial uses should be screened from major roads, public amenities, and surrounding uses that are not industrial.
- iv. Industrial uses should locate in areas where public utilities and facilities are adequate to support such uses. The provision of adequate facilities such as roads, water, sewer, electrical, telephone, and natural gas systems should be considered in review of an industrial rezoning request.
- v. Industrial districts should incorporate the provision of safe, convenient, and attractive pedestrian access to nearby residential areas and to local businesses for ancillary retail services and goods.
- vi. Development should be oriented away from sensitive natural resources, such as floodplains and ponds to minimize the environmental impacts of new development.
- vii. Vehicular, bicycle, and pedestrian links should extend into the surrounding development.



This example of an industrial building features generous landscaping to reduce the visual impact along major roadways.



encouraged



discouraged

Building placement, design details, and landscaping and screening should be used to minimize visual impacts on adjacent residential and other mixed uses. Heavy Industrial uses should be screened from major roads, public amenities, and surrounding uses that are not industrial.

Industrial projects should be compatible with the overall character and visual improvements in the surrounding areas. Incorporating design features such as brick and extensive window openings helps to integrate industrial uses into the Town's character.

5.3 Future Land Use Categories, cont'd

10. RESIDENTIAL

A. Function

- i. To provide a variety of housing options that support the existing character of the Town.
- ii. To encourage residential neighborhoods that incorporate a mix of housing types and lot sizes to provide options for a range of lifestyles and incomes, as well as a mix of land uses to allow residents the opportunity to work and shop nearby.

B. Preferred Uses

- i. Land uses in this designation should consist primarily of residential uses.
- ii. Housing is the principal function in Residential districts, but small scale business, entertainment and service uses also are permitted to provide support services to local residents.

C. General Policies + Development Character

- i. Residential neighborhoods should have a variety of housing types and lot sizes, and should be developed in accordance with design guidelines and performance standards for efficient site layout, a pedestrian-friendly scale, and adequate open space (active, passive, and natural).
- ii. Compact site layout is encouraged to reduce trips within the neighborhood, facilitate alternative forms of transportation, preserve natural features and reduce transportation and utilities infrastructure costs.
- iii. Pedestrian circulation should be designed as an integral part of the development project. In addition, vehicular, bicycle, and pedestrian links should extend into the surrounding development.
- iv. Residential areas should provide for a combination of neighborhood parks, squares, and greens located throughout the neighborhood within 1,500 feet of all residences, and a formal civic square or other public space located in conjunction with a civic facility, Neighborhood Center, or other use, to create a focal point for the community.
- v. Public and civic uses such as places of worship, daycares, and community centers may be located in prominent sites to act as landmarks within the neighborhood.
- vi. Off-street parking lots should be located to the rear of civic and business uses to ensure the building is the prominent sight from the street.
- vii. The following scales of residential uses are provided for in this plan (photo illustrations appear on page 21):
 - a. Very low density residential (Less than or equal to 1 unit per acre net density)
 - b. Low density residential (Greater than 1 <= 4.5 units per acre net density)
 - c. Medium density residential (Greater than 4.5 <= 7.5 units per acre net density)
 - d. High density residential (Greater than 7.5 units per acre net density)
- viii. Residential development should consider green building and site design techniques as an approach to minimizing environmental impacts.



A range of residential densities are mixed in a compact neighborhood with both attached and detached single family dwellings of various sizes, usually centered around a communal green or open space. This type of design is compatible with Morrisville's small town character, allows for a diversity of housing and incorporates environmentally-sensitive site planning principles.



This Morrisville example incorporates a variety of housing styles and design elements that promote a pedestrian friendly scale.

encouraged



discouraged



Parking lots relegated to the rear of buildings or internal to the block (rather than adjacent to the roadway) allow buildings to be drawn to the street edge and contribute to the pedestrian atmosphere of the street. This also provides convenient building entry access from the sidewalk and transit. This strategy reduces walking distances and enlivens the streetscape while still providing for adequate parking.

Sidewalks should be designed as an integral part of the development project and be separated from the road to provide a buffer between pedestrians and vehicular traffic. Street trees are recommended to provide shade for pedestrians and are also an effective way to ensure a comfortable pedestrian zone protected from moving traffic.

Residential areas should provide for a combination of neighborhood parks, squares, and greens located throughout the neighborhood within 1,500 feet of all residences.

5.3 Future Land Use Categories, cont'd

11. PARK/GREENWAY/OPEN SPACE

A. Function

- i. Provide open space and recreation areas to meet the physical and natural resource needs of the Town and its residents.
- ii. Enhance the Town's aesthetic appeal within its neighborhoods and along transportation corridors.
- iii. Reduce stormwater runoff with increased pervious surfaces that allow water infiltration.

B. Preferred Uses

- i. Land uses in the Park/Greenway designation should consist of passive and active recreational uses, natural resource protection and conservation, and landscaped buffers.
- ii. Types of active recreation areas include ball fields, tennis or basketball courts, swimming pools, tot lots, golf courses, dog parks, and other areas for recreational sports or games. Types of passive recreation areas include trails (hiking, biking, walking), picnic, camping, or fishing areas. Natural open space is land left in a mostly undeveloped state including forests, meadows, hedgerows, and wetlands.

C. General Policies + Development Character

- i. Park/Greenway/Open Space areas should retain existing vegetation where possible, particularly mature trees and woodlands. Reforestation and revegetation of open areas of the site with native plant materials should be encouraged.
- ii. Where feasible, currently damaged or degraded landscapes and wildlife habitats should be restored and enhanced creating new natural areas and wetlands on the site.
- iii. All active recreation open space should be readily accessible to pedestrians, wheelchairs, strollers, and cyclists by sidewalk, path, trail, and/or bike lane.
- iv. Site elements should be arranged to protect and enhance special land characteristics, natural features, rare or endangered species areas, historic resources, archeological sites, and other unusual natural or man-made site features.



The open space network should consist of a range of open space types, including large natural areas, passive and active recreational uses, landscaped buffers and small pocket parks are critical components of the open space network.



Curb ramps should be included at all intersections and pedestrian crossings, and be directed towards crosswalks to improve safety and connectivity.



Integrating parks and open space into the community both provides local active and passive recreational opportunities and can contribute to localized stormwater management. By incorporating design elements, such as open swales and infiltration areas, parks can serve critical environmental functions.



Pocket parks act as scaled-down neighborhood parks, but still meet a variety of needs, including small event space, play areas for children, spaces for relaxing or meeting friends, taking lunch breaks, etc. Pocket parks can be tucked into and scattered throughout the community where they serve nearby residents and businesses.

encouraged

discouraged

5.3 Future Land Use Categories, cont'd

12. FUTURE McCRIMMON SMALL AREA/MASTER PLAN AREA



This example of contemporary planned development uses diverse building types to blend office, residential, and retail uses on the same streets.

A. Function

- i. Encourage creative master planning for the large undeveloped area east of NC54 between Airport Boulevard and Aviation Parkway, which should incorporate office, small scale retail (e.g., restaurants, convenience services such as dry cleaning), and parks in an integrated design.
- ii. The Town is looking to coordinate with stakeholders to preserve a large contiguous area for open space or recreation in this area, ideally open for public use.

B. Preferred Uses

- i. Land uses within the Future McCrimmon Small Area Master Plan Area should be compatible with others in the town and immediate surroundings.
- ii. Regional office and light industrial uses will be the predominant component of this area. Small scale retail such as restaurants and convenience services should be included if they are primarily oriented toward serving the surrounding office and industrial uses, not a regional market.

C. General Policies + Development Character

- i. The Town anticipates the development of a coordinated master plan for this area with a mix of uses that will function as a planned business community with a harmonious design character. New residential uses and institutional uses are not permitted in this area because of the Airport Overlay district.
- ii. Commercial uses should be integrated with complementary uses to form compact, walkable, mixed use employment centers.
- iii. New development should achieve and maintain acceptable levels of transportation service by completing planned road networks and supporting alternative transportation modes. It is anticipated that new road and transportation improvements will be provided in the initial phases of new developments.
- iv. Multi-modal circulation should be designed as an integral part of the development project.
- v. Vehicular, bicycle, and pedestrian links should extend into the surrounding development.
- vi. The Town should encourage the submission of architectural guidelines for all new developments in this area. Particular emphasis should be placed on the architectural quality and site design of buildings along thoroughfares and in high visibility locations.
- vii. This area should feature well-configured squares and greens and a traditional network of landscaped streets within a framework of open spaces and recreational areas that unite the whole community and provide an amenity for the employees who work there.
- viii. Development should be oriented away from sensitive natural resources, such as floodplains and ponds, to minimize the environmental impacts of new development.

encouraged



discouraged



Small scale retail such as restaurants and convenience services should be included if they are primarily oriented toward serving the surrounding office and industrial uses, not a regional market.

The Town should encourage the submission of architectural guidelines for all new developments in this area. Particular emphasis should be placed on the architectural quality and site design of buildings along thoroughfares and in high visibility locations.

Multi-modal circulation should be designed as an integral part of the development project.

5.3 Future Land Use Categories, cont'd

13. TOWN CENTER PLANNING AREA

The Morrisville Town Center Plan was adopted in 2007 and is currently being implemented through a variety of projects. Refer to the Town Center Plan for more detailed policies and standards for development in this district.

A. Function

- i. Create a vibrant Town Center at Morrisville's historic crossroads to help ensure that residents continue to enjoy the best qualities of small town living as the community grows.

B. Preferred Uses

- i. Within the Town Center Planning Area, land uses could include residential, civic/cultural uses, professional offices, small-scale commercial, institutional, educational, small-scale entertainment, and park uses.

C. General Policies + Development Character (Also see Town Center Plan)

- i. Development in the Main Street area should generally have a small town character, such as that found around the historic Town crossroads, with a fine-grained land use pattern at a human scale.
- ii. Development should combine uses vertically, as well as horizontally (i.e. mixing uses among buildings and within individual buildings), to achieve convenience, variety and walkability in the district.
- iii. Design elements should be integrated with sidewalks, street trees, benches, and entrances to buildings at the edges of street rights-of-way. Bicycle facilities, on-street parking, and usable public spaces should be provided.
- iv. Vehicular, bicycle, and pedestrian links should extend into the surrounding development.
- v. Land use or intensity/density transitions should be provided between non-residential uses and existing residential areas.
- vi. It is important to maintain and improve the aesthetics of the Town Center for continued economic revival, and to protect historic buildings from demolition. Renovation in a historically appropriate manner should be encouraged.
- vii. In general, the scale of buildings should be two to three stories to ensure compatibility with the historic character of the area.
- viii. Consideration should be given to lowering the parking requirements in this district to allow the development of a compact traditional pattern of buildings, rather than wide expanses of surface parking.
- ix. Alleys, thoroughfares, and service ways should be utilized where possible to ensure trash pickup and deliveries for commercial establishments do not take place along public right of ways.



Morrisville's Town Center contains a number of already appropriate land uses, such as institutional and park uses. Additional small scale commercial and service uses, and multi-modal transportation connections would further support the center's development as a vibrant, historic crossroads.



encouraged



discouraged

Development in the Main Street area should generally have a small town character, such as that found around the historic Town crossroads, with a fine-grained land use pattern at a human scale.

It is important to maintain and improve the aesthetics of the Town Center for continued economic revival, and to protect historic buildings from demolition. Renovation in a historically appropriate manner should be encouraged.

5.3 Future Land Use Categories, cont'd

14. TRANSIT ORIENTED DEVELOPMENT (TOD) DISTRICT **

The Transit Oriented Development (TOD) District is not mapped on the Future Land Use Map, but will be located based on the future location of one or several planned rail transit stops in Town. The purpose of the TOD District is to provide supportive development around a transit center. Transit centers are places where transit services connect in the transportation network and where passengers transfer between transportation modes. The TOD District should be structured as a floating zone in the Zoning Ordinance so that a rezoning is needed in order to map this district in a particular location.



Transit Oriented Development emphasizes the creation of compact, walkable communities centered around high quality transit systems and multi-modal design features, making it easier to live a high quality life without complete dependence on a car for mobility and survival.

** It is anticipated that the TOD district would be applied to the Superfund Redevelopment Site at McCrimmon Parkway and Church Street.

A. Function

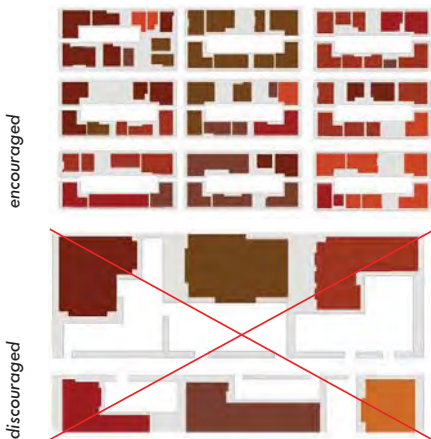
- i. To provide the "critical mass" of development types and intensities needed to support rail transit.
- ii. To provide a development alternative that promotes the separation of automobile-oriented land uses from transit-oriented land uses.
- iii. To provide a pedestrian-scale environment with a mix of residential, commercial, public, and employment uses to support the adjacent transit center.

B. Preferred Uses

- i. The TOD will contain a mix of uses including residential uses as well as two or more significant tax-producing land uses that are mutually supporting.
- ii. TOD land uses should include convenience retail uses and civic uses, such as public plazas, libraries, day care, and postal services. The commercial core of the TOD will contain the highest land use intensities. Use intensities will step down from the commercial core to the edges.

C. General Policies + Development Character

- i. The location of a TOD should clearly provide a transit opportunity that can serve the TOD, such as along the existing rail line in the Town. The location of the TOD should not harm the planned regional road network or planned regional transit facilities.
- ii. The location of a TOD should not negatively affect established neighborhoods by promoting through-traffic and other such intrusions to the neighborhood.
- iii. The TOD should consist of a commercial core and an outer core. Transit stations should be located in the commercial core, which should extend 1/4-mile from the transit stop. The outer core should extend from 1/4-mile to 1/2-mile out from the transit stop.
- iv. The TOD should provide pedestrian-scale development with a surrounding mix of high-density uses. Pedestrian circulation should be enhanced by short blocks arranged in a rectilinear grid-street pattern.
- v. The TOD should have an "urban feel" with pedestrian-oriented building facades, ground-floor shops, and streets culminating in distinctive public spaces.
- vi. The surrounding street network should complement and support the TOD area street network by providing multiple and direct vehicular, bicycle, and pedestrian connections to the transit station.
- vii. A vertical mix of uses is encouraged in multi-story buildings in the commercial core, with ground floor retail and upper story residences or offices.
- viii. The provision of structured parking garages is encouraged in the design of the transit station and TOD in order to make a more compact, walkable environment.
- ix. The TOD land use intensity should be phased as alternative modes of transit are available. Use intensities may increase as the specified mode of transit is planned, scheduled, designed, and funded to serve the TOD.



Land use diversity and inter-connectivity support transit-oriented development by making connections between destinations accessible and convenient. A greater diversity of land uses in the core area creates more opportunities for short trips, which are more likely to be made by walking. Fostering the walkability of the district as a whole ultimately encourages people to leave their cars behind and use transit.



Well designed shelters should be integrated into the streetscape and provide a safe and comfortable place for transit patrons. Bus stops and shelters must be clearly marked and identifiable.



Transit oriented design improves mobility and leverages public investment in transit systems through the support of transit-friendly development patterns. These development patterns encourage a compatible mix of residential, commercial, and other land uses, facilitate employment opportunities convenient to transit, and enhance connectivity to transit stations and surrounding land uses.

Overview of Study Area

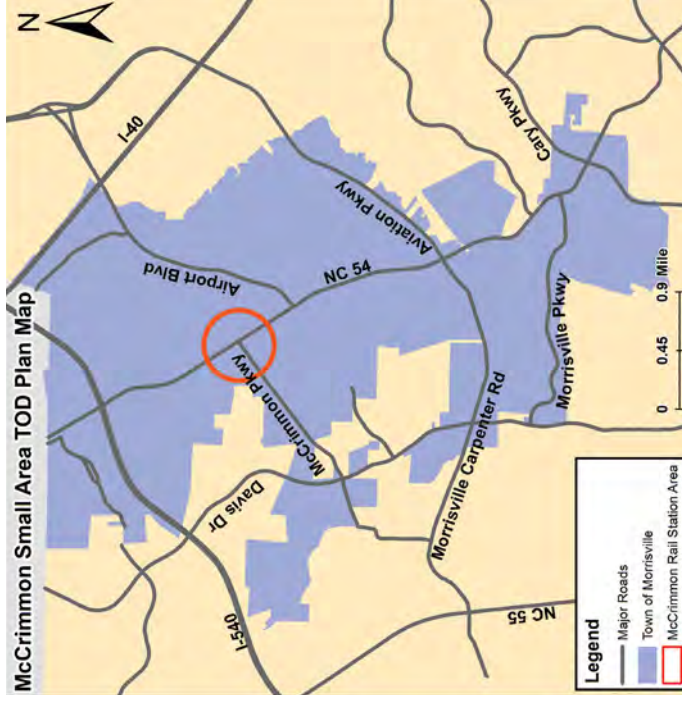
Focused around the intersection of McCrimmon Parkway and NC Highway 54 in northern Morrisville, the study area extends for approximately one half mile in each direction. The main development parcel is the northwest quadrant of the intersection where the transit station is planned. This is an aging office and industrial area located along a major commuting corridor between the Town of Cary and Research Triangle Park. The study area includes part of Perimeter Park, a major office park that extends to the east and northeast. It is also home to Adams Products (subsidiary of Oldcastle), a long-time Morrisville business that offers masonry, stonework, and pavers for commercial and residential construction. In addition, it contains a Superfund site which has been undergoing clean up for a number of years. The northeastern edge of the study area includes the new RTP campus of Wake Technical Community College, slated for construction starting in 2015.

The study area is bisected from north to south by Chapel Hill Road (NC 54). This two-lane road hasn't changed much in the past decade, and neither has its traffic load — 18,000 vehicles per day (vpd) in 2001 and 18,000 vpd in 2011, according to NCDOT traffic counts. The likely reason for this is not that there isn't more demand for travel from these fast-growing areas, but instead that the roadway has reached its limit of the amount of cars it can carry. This reality highlights the need for more transportation options. While all of the major

roadways serving and around the study area are over capacity, the construction of I-540 and the Triangle Expressway have increased the accessibility in the vicinity of the study area, improving its market potential.

Also bisecting the study area from north to south is the North Carolina Railroad Corridor. Currently, it carries 8-12 freight trains daily. In addition, Amtrak passenger service is currently set at six trains per day, and is ultimately planned to carry 10 trains per day en route between Charlotte and Raleigh. Traffic congestion and safety issues associated with crossing this corridor at grade highlight the need for a bridge to carry McCrimmon Parkway over the railroad tracks.

The eastern half of the study area is located in a section of Morrisville's Airport Overlay Zone that does not allow new residential development and other noise sensitive land uses such as day cares and primary and secondary schools. In contrast, new residential development and other noise sensitive uses are allowed west of NC 54 as long as they include sound proofing and grant the right to overflight to the Raleigh-Durham Airport Authority.



Past planning efforts conducted by the Town of Morrisville have identified the purpose and need for transit-oriented development in the Town. Specifically, the 2009 Land Use and Transportation Plans note that the purpose of transit-oriented development is to “provide supportive development around a transit center.” The adopted plans also state the function, preferred land uses, and general policy direction related to a TOD-style development (see sidebar).

The objectives listed in the sidebar are appropriate for the higher-level view of a community-wide plan. The McCrimmon Transit Small Area Plan requires additional detail in order to address the specific location and conditions of the study area. The table on the following page outlines the four main goals of the McCrimmon Transit Small Area Plan and supporting strategies and features. While each strategy is listed under a particular goal, note that every strategy plays a role in at least two of the goals. Together, these goals and strategies describe the community vision for the McCrimmon TOD, and the key features that are needed to realize it.

Function

- » To provide the “critical mass” of development types and intensities needed to support rail transit.
- » To provide a development alternative that promotes the separation of automobile-oriented land uses from transit-oriented land uses.
- » To provide a pedestrian-scale environment with a mix of residential, commercial, public, and employment uses to support the adjacent transit center.

Preferred Uses

- » The TOD will contain a mix of uses including residential uses as well as two or more significant tax-producing land uses that are mutually supporting.
- » TOD land uses should include convenience retail uses and civic uses, such as public plazas, libraries, day care, and postal services. The commercial core of the TOD will contain the highest land use intensities. Use intensities will step down from the commercial core to the edges.

General Policies and Development Character

- » The location of a TOD should clearly provide a transit opportunity that can serve the TOD, such as along the existing rail line in the Town. The location of the TOD should not harm the planned regional road network or planned regional transit facilities.
- » The location of a TOD should not negatively affect established neighborhoods by promoting through-traffic and other such intrusions to the neighborhood.
- » The TOD should consist of a commercial core and an outer core. Transit stations should be located in the commercial core, which should extend 1/4- mile from the transit stop. The outer core should extend from 1/4-mile to 1/2-mile out from the transit stop.
- » The TOD should provide pedestrian-scale development with a surrounding mix of high density uses. Pedestrian circulation should be enhanced by short blocks arranged in a rectilinear grid-street pattern.
- » The TOD should have an “urban feel” with pedestrian-oriented building facades, ground-floor shops, and streets culminating in distinctive public spaces.
- » The surrounding street network should complement and support the TOD area street network by providing multiple and direct vehicular, bicycle, and pedestrian connections to the transit station.
- » A vertical mix of uses is encouraged in multi-story buildings in the commercial core, with ground floor retail and upper story residences or offices.
- » The provision of structured parking garages is encouraged in the design of the transit station and TOD in order to make a more compact, walkable environment.
- » The TOD land use intensity should be phased as alternative modes of transit are available. Use intensities may increase as the specified mode of transit is planned, scheduled, designed, and funded to serve the TOD.

SOURCE: 2009 Town of Morrisville Land Use and Transportation Plans



PROJECT GOAL 1: Create a Vibrant, Well-Designed Center of Activity

How a place is designed affects how people use it. The TOD should use high-quality design to create a vibrant center of activity within the community. Design details should include inviting public spaces, interesting vistas, recognizable landmarks, and well-placed connections.

Key features should include:

- » An iconic social gathering spot energized by perimeter retail that creates a valuable amenity for the TOD and the community
- » Active streets framed by buildings and landscaping that create an outdoor room using height, massing, and spacing of elements to encourage multiple uses and travel modes
- » A transition in scale to relate to the existing adjacent residential development
- » Block lengths no longer than 500 feet on a side to encourage connectivity between uses
- » Substantial residential development (e.g. multi-family units), especially on the Main Parcel to transition from retail, restaurant, and office uses to single-family attached development
- » Pedestrian-accessible public green space and parks in and near the TOD to provide ready access to this important amenity
- » A concept plan for each quadrant of the study area that shows how development will connect and dovetail across parcel lines within that quadrant

PROJECT GOAL 2: Expand Transportation Choices

Create a mutually reinforcing pattern of land use and transportation system development that encourages more options for mixed use development and travel while addressing near term congestion problems.

Key features should include:

- » A grid network of streets to provide frequent routes for traveling within the TOD
- » Land uses that support transit service and active travel modes such as walking and biking
- » Roadway improvements such as an extension of McCrimmon Parkway east toward Airport Boulevard and Aviation Parkway, and a bridge on McCrimmon Parkway over NC 54 and the railroad tracks
- » Sidewalk, bicycle, and trail connections to Research Triangle Park, adjacent parcels, transit centers and along roadways, including the planned McCrimmon bridge
- » A minimum of 25 dwelling units per acre in the core of the TOD on the master parcel, with 15-25 dwelling units per acre immediately adjacent to the core to support high-quality transit service
- » Automobile parking oriented towards rear of buildings, with bicycle, carpool/vanpool and handicap parking near entrances
- » A TOD design that protects the integrity of the N.C. Railroad corridor and does not limit its ability to provide freight rail service
- » A TOD design that protects the safety of pedestrians, residents, and businesses, since the site is adjacent to an active freight and passenger rail corridor



PROJECT GOAL 3: Provide Workforce Housing

Provide quality living and transportation choices for a range of users, including teachers, nurses, police and fire personnel, and others that make our Town work.

Key features should include:

- » Housing with at least 20% of the dwelling units affordable to families making 50% – 80% of the Area Median Family Income (AMFI)
- » Housing with at least 10% of the dwelling units affordable to families making 80% – 120% of AMFI
- » Allowance for a reduction in meeting the two previous workforce housing goals if housing is provided for seniors and/or the disabled making 30% or less of AMFI, with a maximum allowable amount for this type of housing of 10% of the total dwelling units approved for a given quadrant of the TOD
- » Workforce housing units that remain affordable in perpetuity, or for at least 30 years, across multiple owners
- » A substantial percentage of the workforce housing units on the master parcel where the transit station and retail development are located
- » Design requirements for workforce housing to help ensure visual compatibility

PROJECT GOAL 4: Promote Economic Development

Catalyze private investment, job creation, and tax base growth in Morrisville through the redevelopment of an aging industrial area into an inviting mixed use activity center linked to transit. In this way, Morrisville can help attract the next generation of creative workers that will drive the New Economy and establish a foundation for sustainable future prosperity.

Key features should include:

- » A retail catalyst and anchor development such as a grocery at or near the corner of McCrimmon Parkway and NC54
- » A destination concentration of restaurants
- » Transit stops and station that are well-connected by active travel modes and readily accessible to the remainder of the parcel, adjacent parcels, and workforce housing
- » One new access point off McCrimmon Parkway between Church Street and NC 54 that aligns with south parcel access point
- » Multiple access points off Church Street, with one most direct route to station commuter parking
- » Limits on required parking to reduce development costs and promote walking, biking, and transit
- » A prominent, inviting pedestrian and vehicular link from the activity center to the rail station

Together, these goals and strategies outline key elements of the vision to create a vibrant, successful transit oriented development. The next section of the plan uses these policy goals and objectives to craft a Concept Design for the McCrimmon TOD.



3.4.6. Transit Oriented Development (TOD) District¹²³

TRANSIT-ORIENTED DEVELOPMENT (TOD) DISTRICT¹²⁴

A. Purpose

The Transit-Oriented Development District provides for transit-supportive development types and intensities within convenient walking distance of a transit station. The district is intended to create a vibrant, well-designed center of activity, expand transportation choices, provide workforce housing, and promote economic development. The district is also intended to accommodate compact and pedestrian-friendly development that:

- Includes a well-integrated mix of complementary high-activity uses, including transit-supportive commercial, residential, civic, and employment uses;
- Provides multiple, direct, and safe vehicular, bicycle, and pedestrian connections between the transit station and the surrounding uses, with sufficient—but not excessive—parking to accommodate transit users and district visitors and residents;
- Includes distinctive, attractive, and engaging public spaces that help create a sense of place for the station area;
- Includes a range of housing choices for households of different incomes; and
- Is consistent with the McCrimmon Transit Small Area Plan.

B. Principal Intensity and Dimensional Standards

Cross References

A, etc. are symbols used in the illustrations showing application of dimensional standards

	Single-Family Detached Dwellings	Duplex Dwellings	Single-Family Attached Dwellings	Multi-family Dwellings	Other Uses	
						Art. 2: Administration Sec. 2.5.4
						Art. 4: Use Standards
						Art. 5: Development Standards
Lot Standards						Sec. 5.2.2
Min. Net Lot Area (sf)	3,500	5,000	n/a	5,000	n/a	Sec. 5.3.1
A Min. Lot Width (ft)	35	50	24	50	24	Sec. 5.3.2
Min. Net Density (du/ac)	7.5	10	15	15	15	Sec. 5.4.4.A.1
Max. Net Density (du/ac)	12	17	35	35	35	Sec. 5.5.1.C.2
Min. Floor Area Ratio (FAR)	n/a	n/a	n/a	n/a	0.75	Sec. 5.8.6.E.2.e
Max. Floor Area Ratio (FAR)	n/a	n/a	n/a	n/a	4.0	Sec. 5.8.8.C.2
Min. Lot Coverage (%)	50	50	60	60	60	Sec. 5.9.6
Max. Lot Coverage (%)	75	75	100	100	100	Sec. 5.10.6
Setbacks						Sec. 5.10.9.G
B Min. Front (ft)	0	0	0	0	0	Sec. 5.10.9.H
C Min. Side (ft)	0 [1]	0 [1]	0 [1]	0 [1]	0 [1]	Sec. 5.12.6
D Min. Corner Side (ft)	0	0	0	0	0	Sec. 5.13.3.B
E1 Min. Rear	Alley-loaded	6	6	6	6	Sec. 5.14.4
E2 (ft)	Other	15 [1]	15 [1]	0 [1]	0 [1]	Sec. 5.14.7.F
Build-to Zone						Sec. 5.14.8.C
H Min. Build-to Line (ft)	0	0	0	0	0	Sec. 5.15.7
I Max. Building-to Line (ft)	15	15	15	15	15	Sec. 5.16.7.C.1
Min. Build-to Zone Street Frontage Occupied by Buildings (%)	80 [2]	80 [2]	80 [2]	80 [2]	80 [2]	Art. 6: Riparian Buffers Art. 7: Stormwater Management
Building Standards						
F Max. Structure Height (ft)	35	35	75	75	75	
G Min. Building Separation (ft)	6	6	n/a	n/a	n/a	

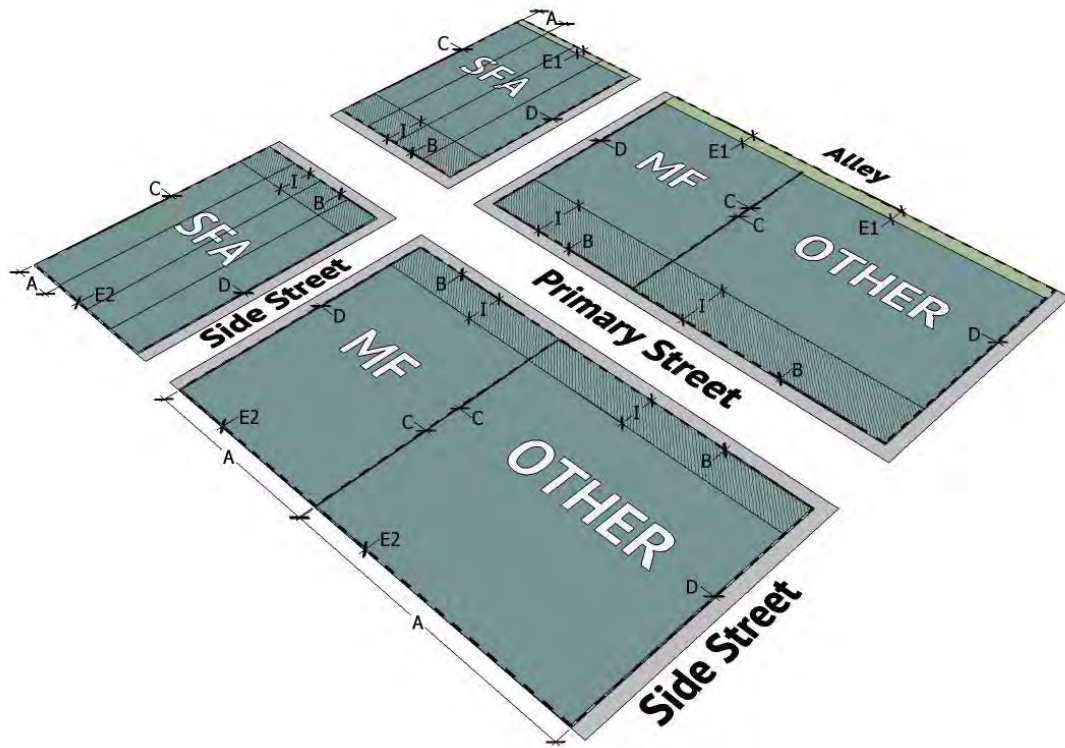
¹²³ This is a new district intended to implement the Land Use Plan's Transit Oriented Development land use category.

¹²⁴ This is a new district intended to be applied around the planned transit station along the railroad tracks near the intersection of Chapel Hill road and McCrimmon Parkway. District standards reflect Land Use Plan policies for its Transit-Oriented Development (TOD) District land use category, preliminary work on the McCrimmon Transit Small Area Plan, and TOD design principles and practices from across the nation.

Notes: sf = square feet; ft = feet; du = dwelling unit; ac = acre; % = percent; n/a = not applicable

[1] 30 feet along lot lines shared with lots within a residential zoning district.

[2] The remaining build-to zone street frontage may be occupied by outdoor gathering spaces, driveways, or pedestrian walkways—and before rail transit is available, by surface parking located to the sides of buildings.





C. Consistency with McCrimmon Transit Small Area Plan

All new development within the TOD District shall be generally consistent with the comprehensive plan and the McCrimmon Transit Small Area Plan. Proposed development may deviate from the TOD Concept Design included in the McCrimmon Transit Small Area Plan in terms of the specific uses and development types designated for the development site or locations within the development site, but only through approval of a Conceptual Master Plan (see Section 2.5.4) that shows the deviation(s) and is consistent with the TOD Policy Goals and Objectives of the McCrimmon Transit Small Area Plan.

D. Development Agreement for Large Developments¹²⁵

If the site of a development proposed in the TOD District contains 25 or more acres of developable property, the applicant is strongly encouraged to propose a development agreement with the Town in accordance with development agreements between the applicant and the Town in accordance with Section 2.5.23, Development Agreement.

¹²⁵ This is added at the request of Town staff, in recognition that TOD District may consist of large-scale phased development occurring over a period of years. Development agreements are authorized and regulated by statute, but that statute requires the local ordinance to establish procedures for the approval and monitoring of development agreements. Such provisions are added in Section 2.5.23, Development Agreement.

E. Use Mixing in TOD Districts

1. Balance of Residential and Nonresidential Uses¹²⁶

Development constructed in the district after its establishment should not preclude a balance between residential uses and nonresidential uses approximating that envisioned by the comprehensive plan and the McCrimmon Transit Small Area Plan for the district as a whole, for that area identified as “Main Parcel” in the McCrimmon Transit Small Area Plan, and for that area identified as “South Parcel” in the McCrimmon Transit Small Area Plan.

2. Vertical Mixing of Uses¹²⁷

The vertical mixing of residential uses with nonresidential uses within a single project or building, with residential development on upper floors, is strongly encouraged—particularly on the “Main Parcel” identified on the McCrimmon Transit Small Area Plan. The horizontal mixing of stand-alone residential developments and adjacent stand-alone nonresidential or mixed-use developments in the district is allowed, provided the developments are well integrated in terms of complementary uses, access and circulation, and compatible design.

3. Nonresidential Uses at Street Level¹²⁸

The incorporation of high-activity nonresidential uses such as retail shops and restaurants should be located along a central spine linking the surrounding roadways with a central gathering area and transit station.

¹²⁶ This reflects plan objectives that TOD District development include a mix of residential and nonresidential uses. It does so by calling for new development not to have the effect of precluding the balance between residential and nonresidential uses suggested by the McCrimmon Transit Small Area Plan. That plan suggests that a majority of the land area in the Main Parcel and South Parcel be allocated for residential development, and suggests that residential development in the core area will kick in after establishment of retail and office development. Because so much of the likely TOD District lies within the AO-A District—where residential development is prohibited—land available in the TOD for residential development is very limited. Standards may be necessary to ensure that early nonresidential development does not use up that potential and preclude the desired mix of residential and nonresidential uses.

¹²⁷ This encourages the vertical use mixing most conducive to a high-activity, pedestrian-friendly streetscape, but acknowledges that horizontal use mixing can contribute to the desired district character.

¹²⁸ This encourages ground floor retail and restaurant uses in the TOD District because they contribute most to establishing a high-activity, pedestrian-friendly streetscape the Land Use Plan calls for close to the station.

Article 3: Zoning Districts

SECTION 3.1. GENERAL PROVISIONS

3.1.1. Establishment of Zoning Districts

This Ordinance establishes the base, planned development, and overlay zoning districts listed in Table 3.1.1, Zoning Districts Established, as well as conditional zoning districts paralleling each of the base zoning districts identified in Table 3.1.1.

3.1.2. Types of Zoning Districts

A. Base Zoning Districts

1. Base zoning districts are established initially by the Town Council's adoption of the Official Zoning Map and subsequently by approval of a General Rezoning (see Section 2.3.5). Such approval authorizes the full range of development allowed by the standards applicable to the base zoning district.
2. Development in a base zoning district is subject to predetermined standards set out or referenced for the district in Section 3.2 through Section 3.6.
3. For each base zoning district, regulations set out the district's purpose and the intensity and dimensional standards applicable in the district, and reference other Ordinance standards generally applicable to development in the district. Each base zoning district also includes a photo depicting a building form typical in the district and an illustration depicting how the district's dimensional standards apply to lots and typical building forms. The illustration is intended to illustrate the general character of the district; if a standard shown in the illustration is inconsistent with the table of intensity or dimensional standards, the standards in the table shall govern.

B. Conditional Zoning Districts

1. Conditional zoning districts (e.g., C-NAC) parallel each of the base zoning districts and are established through the Town Council's approval of a Conditional Rezoning (see Section 2.5.3), which incorporates district-specific plans and conditions agreed to by the owner(s) of the rezoned land.
2. Except as otherwise provided in Section 3.1.4, Development Incentives Option, development in a conditional zoning district is subject to the same standards applicable to the parallel base zoning district, as modified by the approved district-specific plans and conditions.

Table 3.1.1: Zoning Districts Established

BASE DISTRICTS	
Conservation Districts	
Park/Greenway/Open Space (PGO) (Sec. 3.2.2)	
Residential Districts	
Very Low Density Residential (VLDR) (Sec. 3.3.2)	
Low Density Residential (LDR) (Sec. 3.3.3)	
Medium Density Residential (MDR) (Sec. 3.3.4)	
High Density Residential (HDR) (Sec. 3.3.5)	
Activity Center Districts	
Neighborhood Activity Center (NAC) (Sec. 3.4.2)	
Business Activity Center (BAC) (Sec. 3.4.3)	
Community Activity Center (CAC) (Sec. 3.4.4)	
Regional Activity Center (RAC) (Sec. 3.4.5)	
Transit-Oriented Development (TOD) (Sec. 3.4.6)	
Town Center Districts	
Historic Crossroads Village (HCV) (Sec. 3.5.2)	
Main Street (MS) (Sec. 3.5.3)	
Town Center Commercial (TCC) (Sec. 3.5.4)	
Town Center Residential (TCR) (Sec. 3.5.5)	
Residential Transition (RT) (Sec. 3.5.6)	
Residential Neighborhood Preservation (RNP) (Sec. 3.5.7)	
Commercial and Industrial Districts	
Corridor Commercial (CC) (Sec. 3.6.2)	
Office and Institutional (OI) (Sec. 3.6.3)	
Industrial Management (IM) (Sec. 3.6.4)	
CONDITIONAL DISTRICTS	
One parallel to each Base District above (e.g., C-NAC)	
PLANNED DEVELOPMENT DISTRICTS	
Mixed-Use Planned Development (MUPD) (Sec. 3.7.2)	
OVERLAY DISTRICTS	
Airport Overlay-A (AO-A) (Sec. 3.8.2)	
Airport Overlay-B (AO-B) (Sec. 3.8.2)	
Floodplain Overlay (FO) (Sec. 3.8.3)	

C. Planned Development Zoning Districts

1. Planned development zoning districts are established by the Town Council's approval of a Planned Development Rezoning (see Section 2.5.3), which includes district-specific plans and standards set out in a Planned Development (PD) Plan/Agreement.
2. Development in a planned development zoning district is subject to the plans and standards set out or referenced in the approved PD Plan/Agreement.
3. Section 3.7, Planned Development Districts, describes the base purpose of planned development zoning districts and sets out base requirements applicable to all planned development zoning districts. For each type of planned development zoning district, it sets out the district's purpose, the intensity and dimensional standards to apply in the district or be addressed in the district's PD Plan/Agreement, and the development and environmental standards to be addressed in the district's PD Plan/Agreement and the means of modifying them (e.g., through an alternative landscaping plan).

D. Overlay Zoning Districts

1. Overlay zoning districts are established initially by the Town Council's adoption of the Official Zoning Map and subsequently by approval of a General Rezoning (see Section 2.5.3). They are superimposed over one or more underlying base, conditional, or planned development zoning districts.
2. Development in an overlay zoning district is subject to predetermined standards set out or referenced for the district in Section 3.8, Overlay Districts. Such standards supplement, modify, or supersede standards applicable by the underlying base, conditional, or planned development district.
3. Regulations for each overlay zoning district set out the district's purpose and the supplemental, modified, or superseding standards applicable in the district.

3.1.3. Relationships Between Standards for Overlay Districts and Other Districts

If the standards for an overlay district expressly conflict with those for an underlying base zoning district, conditional zoning district, planned development district, or another applicable overlay district, the more restrictive standards shall apply.

3.1.4. Development Incentives Option

A. Purpose

The purpose of this section is to provide development incentives for the provision of public benefits in conjunction with development. It does so by authorizing additional allowable uses and less restrictive intensity and dimensional standards for certain conditional zoning districts that provide one or more public benefit not otherwise required by this Ordinance. Such incentives include allowance of certain uses in addition to those allowed in the parallel base zoning district, and an increase in the maximum net density, maximum floor area ratio, maximum lot coverage, and maximum structure height. Such public benefits include: dedication of land or facilities to be used for public parks or greenways; off-site or regional stormwater management; off-site transportation improvements; and/or cultural centers, public plazas, public art, and other community amenities. The extent of public benefits provided is intended to be that necessary to balance and justify the extent of the proposed development incentives.

B. Conditional Rezoning Application and Review

1. If the applicant for a Conditional Rezoning proposes use of the development incentives authorized by this section, the Conditional Rezoning application shall specify the additional allowable uses and the less restrictive intensity and dimensional standards proposed to be applicable to district development (see subsection C below) and the compensating public benefits proposed to be provided (see subsection D below).

2. In reviewing the Conditional Rezoning application, Town staff, the Planning and Zoning Board, and the Town Council shall consider the extent to which the proposed public benefit(s) compensate for the additional allowable uses and the less restrictive intensity and dimensional standards proposed as part of the application.

C. Development Incentives

The additional uses that may be allowed in a conditional zoning district on provision of compensating public benefits are identified in the use tables in Article 4: Use Standards, with a “C” in the column for the parallel base district. The less restrictive intensity and dimensional standards that may be applied if a development incentive is proposed are identified in the table of intensity and dimensional standards set out in this article for the parallel base zoning district.

D. Compensating Public Benefits

One or more of the following benefits may be proposed as part of a Conditional Rezoning application proposing to use the development incentives authorized by this section—provided the benefit is in addition to what is otherwise required to meet the minimum standards of this Ordinance and other Town, County, State, or federal regulations.

1. Dedication of Land or Facilities or In-Lieu Fee Contribution

a. Parks and Greenways

The dedication of land, construction of facilities, or contribution of an in-lieu fee for public parks or greenways called for in Town plans.

b. Stormwater Management Facilities

The dedication of land, construction of facilities, or contribution of an in-lieu fee for stormwater management facilities supporting the Town’s Stormwater Program.

c. Transportation Facilities

The dedication of land, construction of facilities, or contribution of an in-lieu fee for off-site transportation facilities called for in the Comprehensive Plan.

d. Community Facilities

The dedication of land or construction of facilities for community facilities (e.g. cultural arts center, public plaza, and public art) called for in Town plans or supporting studies.

2. Rehabilitation of Historic Structures

The protection and/or rehabilitation of a historic structure or site identified on the Reference Sheet of Historic Structures (available in the Planning Department).

3. LEED Certification

The attainment of LEED (Leadership in Energy and Environmental Design) certification at the Silver level or higher for all nonresidential buildings.

4. Workforce Housing

The construction of workforce dwelling units, and/or contribution of funds for such construction, that is consistent with the goals of the Comprehensive Plan and workforce housing studies that have been conducted for the community.

SECTION 3.2. CONSERVATION DISTRICTS

3.2.1. General Purposes of Conservation Districts

The Conservation Districts established in this section are intended to:

- A.** Provide open space and recreation area to meet the physical and natural resource needs of the Town and its residents;
- B.** Enhance the Town's aesthetic appeal within its neighborhoods and along transportation corridors; and
- C.** Reduce stormwater runoff with increased pervious surfaces that allow water infiltration.

SECTION 3.3. RESIDENTIAL DISTRICTS

3.3.1. General Purposes of Residential Zoning Districts

The residential districts established in this section are intended to provide a comfortable, healthy, safe, and pleasant environment in which to live and recreate. More specifically, they are intended to:

- A.** Provide appropriately located lands for residential development that are consistent with the goals, objectives, and policies of the Comprehensive Plan and any functional plans and small area plans adopted by the Town.
- B.** Ensure adequate light, air, privacy, recreation areas, and open space for each dwelling, and protect residents from the negative effects of noise, incompatible population density, traffic congestion, flooding, and other significant adverse environmental impacts;
- C.** Protect residential areas from fires, explosions, toxic fumes and substances, and other public safety hazards;
- D.** Provide for residential housing choice, affordability, and diversity with varying housing densities, types, and designs, including accessory dwelling units;
- E.** Provide for safe and efficient vehicular access and circulation and promote bicycle-, pedestrian-, and transit-friendly neighborhoods;
- F.** Provide for public services and facilities needed to serve residential areas and accommodate public and semi-public land uses that complement residential development while protecting residential areas from incompatible nonresidential development;
- G.** Create neighborhoods and preserve existing community character while accommodating new infill development and redevelopment consistent with the Town's goals and objectives;
- H.** Preserve the unique character of the Town's traditional neighborhoods; and
- I.** Promote sustainable development in terms of energy efficiency and conservation, greenhouse gas reductions, food security, materials recycling, and similar sustainability goals.

SECTION 3.4. ACTIVITY CENTER DISTRICTS

3.4.1. General Purposes of Activity Center Districts

The activity center districts established in this section are intended to foster compact, mixed-use development patterns that provide people with the opportunity to live, work, recreate, and shop in a pedestrian-friendly environment. More specifically, they are intended to:

- A.** Provide strong connections between diverse uses to create a busier, safer, and more exciting environment for residents, employees, and visitors throughout the day, in evenings, and during weekends;
- B.** Encourage a complementary mix of residential, retail, office, employment-generating, and recreation uses in close proximity to each other;
- C.** Accommodate development intensities appropriate to the scale of the area served by the activity center (e.g., neighborhood, community, region);
- D.** Provide integrated pedestrian and bicycle access to afford safe and accessible foot and bike travel between the land uses; and
- E.** Facilitate efficient vehicular traffic flow by allowing only land uses developed with comprehensively planned access, egress, and internal circulation systems.

SECTION 3.5. TOWN CENTER DISTRICTS¹²⁹

3.5.1. General Purposes of Town Center Districts

The Town Center districts established in this section are intended to:

- A. Implement the vision established by the Comprehensive Plan and the Town Center Plan;
- B. Protect and enhance the historic character of the Historic Crossroads Village;
- C. Facilitate the creation of a new Main Street district in the Town Center that will serve as a gathering place for Morrisville residents;
- D. Allow for and encourage a broader mix of uses and housing types in the Town Center; and
- E. Encourage the expansion of the Town Center's existing network of parks, trails, and greenways as consistent with the Comprehensive Plan and the Town Center Plan.

¹²⁹ This section carries forward the regulations in Part E (Town Center Code) of the current Zoning Ordinance other than procedural provisions (addressed in Module 1) and use standards (which are carried forward in Article 4: Use Standards). A number of the development standards currently specific to one or more Town Center districts may be proposed to be applied town-wide in Article 5: Development Standards, to be drafted as part of Module 3. Where development standards in Article 5 are the same or similar to standards in this section, this section will be revised to delete such standards or to revise them to read as modifications of the generally applicable development standards in Article 5.

SECTION 3.6. COMMERCIAL AND INDUSTRIAL DISTRICTS

3.6.1. General Purposes of Commercial and Industrial Districts

The commercial and industrial districts established in this section are intended to provide a wide range of office, retail, service, institutional, industrial, and related uses to meet household and business needs, and more specifically to:

- A.** Provide appropriately located lands for the full range of commercial and industrial uses needed by the Town's residents, businesses, and workers, consistent with the goals, objectives, and policies of the Comprehensive Plan;
- B.** Strengthen the Town's economic base, and provide employment opportunities close to home for residents of the Town and surrounding communities;
- C.** Create suitable environments for various types of commercial and industrial uses, and protect them from the adverse effects of incompatible uses;
- D.** Create suitable environments for various types of mixed-use development, where business, office, retail, and residential uses are designed and integrated in compatible ways;
- E.** Minimize the impact of commercial and industrial development on residential uses; and
- F.** Promote sustainable development in terms of energy efficiency and conservation, greenhouse gas reductions, food security, materials recycling, and similar sustainability goals.

SECTION 3.7. PLANNED DEVELOPMENT DISTRICTS¹⁴⁰

3.7.1. General

A. General Purposes of Planned Development Districts

The Planned Development (PD) districts are established and intended to encourage innovative land planning and site design concepts that support a high quality of life and achieve a high quality of development, environmental sensitivity, energy efficiency, and other Town goals and objectives by:

1. Reducing or diminishing the inflexibility or uniform design that sometimes results from strict application of zoning and development standards designed primarily for individual lots;
2. Allowing greater freedom in selecting the means of providing access, open space, and design amenities;
3. Allowing greater freedom in providing a well-integrated mix of residential and nonresidential land uses in the same development, including a mix of housing types, lot sizes, and densities;
4. Allowing more efficient use of land, with smaller networks of streets and utilities, and thereby lowering development and housing costs; and
5. Promoting quality design and environmentally sensitive development that respects surrounding established land use character and respects and takes advantage of a site's natural and man-made features, such as trees, wetlands, floodplains, and historic features.

B. Classification of Planned Development Districts

Land shall be classified into a PD district only in accordance with the procedures and requirements set forth in Section 2.5.3, Rezoning, and this section.

C. Relationship to Existing Planned Development Districts

Lands designated PD District on **[insert effective date]** are subject to the standards and conditions included within the previously adopted master plans, development agreements, and other requirements related to their approval. These developments may proceed subject to their original approvals in accordance with Section 1.6, Transitional Provisions. If the PD district authorization expires, or a modification other than a minor modification of the district is proposed, the provisions in this Ordinance shall apply.

D. Organization of Planned Development Zoning District Regulations

Section 3.7.1.E, General Standards for All Planned Development Districts, sets out general standards applicable to all types of PD districts. The following sections set out, for each type of PD district, a purpose statement, a list of the types of intensity and dimensional standards to be applied as part of the PD Plan/Agreement, and references to applicable use, development, and environmental standards.

E. General Standards for All Planned Development Districts

Before approving a PD zoning district classification, the Town Council shall find that the application for the PD zoning district classification, as well as the PD Plan/Agreement included as part of the application, comply with the following standards:

¹⁴⁰ This section sets out general standards for PD districts, then sets out a purpose statement and identifies parameters for standards for a single PD district (Mixed Use Planned Development). It keeps this separate structure to facilitate the possible future addition of new PD districts.

1. PD Plan/Agreement¹⁴¹

The PD Plan/Agreement shall:

- a. Include a statement of planning objectives for the district;
- b. Identify the general location of individual development areas, identified by land use(s) and/or development density or intensity;
- c. Identify for the entire PD district and each development area the acreage, types and mix of land uses, number of residential units (by use type), nonresidential floor area (by use type), residential density, and nonresidential intensity;
- d. Identify the general location, amount, and type (whether designated for active or passive recreation) of open space;
- e. Identify the location of environmentally sensitive lands, wildlife habitat, and waterway corridors;
- f. Identify the on-site transportation circulation system, including the general location of all public streets, existing or projected transit corridors, and pedestrian and bicycle pathways, and how they will connect to existing and planned Town and regional systems;
- g. Include a Transportation Impact Analysis in accordance with Section 5.8.6.B;
- h. Identify the general location of on-site potable water and wastewater facilities, and how they will connect to existing and planned Town systems;
- i. Identify the general location of on-site storm drainage facilities, and how they will connect to existing and planned Town systems;
- j. Identify the general location of all other on-site public facilities serving the development, including but not limited to parks, schools, and facilities for fire protection, police protection, EMS, stormwater management, and solid waste management;
- k. Include any conditions related to the form and design of development;
- l. Include provisions addressing how transportation, potable water, wastewater, stormwater management, and other public facilities will be provided to accommodate the proposed development;
- m. Include provisions related to environmental protection and monitoring (e.g., restoration or mitigation measures, annual inspection reports); and
- n. Include any other provisions the Town Council determines are relevant and necessary to the development of the PD in accordance with applicable standards and regulations.

2. Consistency with Town Comprehensive Plan

The PD zoning district designation and the PD Plan/Agreement shall be generally consistent with the Comprehensive Plan.

3. Compatibility with Surrounding Areas

Development along the perimeter of a PD district shall be compatible with adjacent existing or approved development. Where there are issues of compatibility, the PD Plan/Agreement shall provide for transition areas at the edges of the PD district that provide for appropriate buffering and/or ensure a complementary character of uses. Determination of complementary character

¹⁴¹ Although similar to a Development Agreement (see Section 2.5.23), the PD Plan/Agreement is specific to Planned Development District, addresses a more defined scope of issues, and is somewhat less formal. For example, Development Agreements are most commonly initiated in response to a developer's concerns about development plans relative to available infrastructure, whereas PD Plan/Agreements address a wide range of issues in the general design of a proposed unified development.

shall be based on densities/intensities, lot size and dimensions, building height, building mass and scale, hours of operation, exterior lighting, and siting of service areas.

4. Development Phasing Plan

If development in the PD district is proposed to be phased, the PD Plan/Agreement shall include a development phasing plan that identifies the general sequence or phases in which the district is proposed to be developed, including how residential and nonresidential development will be timed, how infrastructure (public and private) and open space will be provided and timed, and how development will be coordinated with the Town's capital improvements program.

5. Conversion Schedule

The PD Plan/Agreement shall include a conversion schedule that identifies the extent to which one type of residential use may be converted to another type of residential use and one type of nonresidential use may be converted to another type of nonresidential use. Such conversions may occur if the number of projected trips per day for the PD district development, as identified in the TIA, does not increase.

6. On-Site Public Facilities

a. Design and Construction

The PD Plan/Agreement shall establish the responsibility of the developer/landowner to design and construct or install required and proposed on-site public facilities in compliance with applicable Town, State, and federal regulations.

b. Dedication

The PD Plan/Agreement shall establish the responsibility of the developer/landowner to dedicate to the public the rights-of-way and easements necessary for the construction or installation of required and proposed on-site public facilities in compliance with applicable Town, State, and federal regulations.

7. Uses

The principal, accessory, and temporary uses allowed in each type of PD district are identified in the use tables in Article 4: Use Standards. Allowed principal uses in a particular PD district shall be established in the PD Plan/Agreement, subject to conversion in accordance with a schedule incorporated in the PD Plan/Agreement in accordance with Section 3.7.1.E.5, Conversion Schedule. Allowed uses shall be consistent with Town plans and the purpose of the particular type of PD district, and subject to applicable use-specific standards in Article 4: Use Standards, and any additional limitations or requirements applicable to the particular type of PD district.

8. Densities/Intensities

The densities for residential development and the intensities for nonresidential development applicable in each development area of a PD district shall be as established in the PD Plan/Agreement, and shall be consistent with the Comprehensive Plan, other adopted special area and Town plans, and the purpose of the particular type of PD district.

9. Dimensional Standards

The dimensional standards applicable in each development area of a PD district shall be as established in the PD Plan/Agreement, and shall be consistent with the purpose of the particular type of PD district. The PD Plan/Agreement shall include at least the following types of dimensional standards, unless the PD Plan/Agreement expressly states otherwise:

- a.** Maximum gross density and/or maximum floor area ratio;
- b.** Minimum net lot area;

- c. Minimum lot width;
- d. Maximum lot coverage;
- e. Maximum structure height;
- f. Maximum individual building size;
- g. Minimum and maximum setbacks; and
- h. Minimum setbacks from abutting residential development or residential zoning districts.

10. Development Standards

All development in a PD district shall comply with the standards of Article 5: Development Standards, or any modifications of those standards established in the PD Plan/Agreement as consistent with Town plans.

11. Riparian Buffer and Stormwater Management Standards

All development in a PD district shall comply with the standards of Article 6: Riparian Buffers, and Article 7: Stormwater Management, that are in place at the time of Construction Plan application acceptance (see Section 2.5.8, Construction Plan Approval).

12. Modifications and Amendments to Approved PD Plan/Agreement

Minor modifications of an approved PD Plan/Agreement may occur in accordance with Section 2.5.3.C.7.c, Minor Modifications of Approved PD Plan/Agreement Allowed. Any other modification shall require an amendment of the PD Plan/Agreement in accordance with the procedures for its original approval.

3.7.2. Mixed Use Planned Development (MUPD) District

A. Purpose

The Mixed Use Planned Development District is intended to accommodate high-quality development incorporating a range of complementary and mutually supporting land uses, using innovative arrangements of uses, buildings, and open spaces throughout the development. District regulations are intended to provide substantial design flexibility and appropriate transitions to, and mitigation of potential adverse impacts on, adjacent developments.



B. Intensity and Dimensional Standards

Min. District Gross Area (acres)	5 [1]
Max. Gross Density (du/ac)	To be established in PD Plan/Agreement (see Section 3.7.1.E.1)
Max. Floor Area Ratio (FAR)	
Min. Net Lot Area (sf)	
Min. Lot Width (ft)	
Max. Lot Coverage (% of district area)	
Max. Structure Height (ft)	
Max. Individual Building Size (sf)	
Min. Setbacks (ft)	
Min. Setbacks from Abutting Residential Development or Zoning (ft)	

C. Use Standards

Uses allowed in the Mixed Use Planned Development District shall be established in the PD Plan/Agreement. Uses shall be consistent with the Comprehensive Plan, other Town-adopted plans, and the purpose of the MUPD district, and shall comply with the use-specific standards in Article 4: Use Standards.

At least 20 percent, but no more than 80 percent, of the total gross floor area within that part of the district located outside the Airport Overlay District shall be devoted to residential uses.

D. Development Standards

The development standards in Article 5: Development Standards, shall apply to all development in MUPD Districts, but some development standards may be modified as part of the PD Plan/Agreement as indicated below if consistent with the Comprehensive Plan, other Town-adopted plans, and the purpose of the MUPD District.

Standard	Means of Modifying	Standard	Means of Modifying
General Site Layout and Design (Sec. 5.2)	PD Plan/Agreement	Building Organization and Design (Sec. 5.9)	PD Plan/Agreement
Subdivision Blocks, Lots, and Reference Points (Sec. 5.3)	PD Plan/Agreement	Parking and Loading (Sec. 5.10)	Alternative Parking Plan
		Utilities and Services (Sec. 5.11)	PD Plan/Agreement
Tree Protection (Sec. 5.4)	Alternative Landscaping Plan	Landscaping (Sec. 5.12)	Alternative Landscaping Plan
		Screening (Sec. 5.13)	PD Plan/Agreement
Common Open Space and Public Recreation Area (Sec. 5.5)	Modifications Prohibited	Fences and Walls (Sec. 5.14)	PD Plan/Agreement
		Exterior Lighting (Sec. 5.15)	PD Plan/Agreement
Floodplain Management (Sec. 5.6)	Modifications Prohibited		
Perimeter and Streetyard Buffers (Sec. 5.7)	Alternative Landscaping Plan	Signage (Sec. 5.16)	PD Plan/Agreement
		Sustainable Development Practices (Sec. 5.17)	Modifications Prohibited
Access and Circulation (Sec. 5.8)	PD Plan Agreement		

E. Riparian and Stormwater Management Standards

The procedures and standards in Article 6: Riparian Buffers, and Article 7: Stormwater Management, shall apply to all development in MUPD Districts, and may not be modified, but the PD Plan/Agreement may designate the entire district or any part of the district, consistent with the phasing plan, as the site(s) for application of these procedures and standards.

Notes: sf = square feet; ft = feet; du = dwelling unit; ac = acre

[1] May be waived by the Town Council on finding that creative planning of a smaller site is necessary to address a physical development constraint, protect natural areas, or promote as community goal when more conventional development would result in more difficult or undesirable development.

SECTION 3.8. OVERLAY DISTRICTS

3.8.1. General

A. General Purpose of Overlay Districts

Overlay zoning districts are superimposed over portions of one or more underlying base, conditional, or planned development zoning districts with the intent of supplementing generally applicable development regulations with additional development regulations that address special area-specific conditions, features, or plans while maintaining the character and purposes of the underlying districts. Some overlay districts include standards that modify or supersede standards applied by the underlying district.

B. Classification of Overlay Districts

Land shall be classified or reclassified into an overlay zoning district only in accordance with the procedures and requirements set forth in Section 2.5.3, Rezoning, and this section.

3.8.2. Airport Overlay (AO) Districts

A. Purpose

The purpose of the Airport Overlay Districts is to promote the most appropriate use of land affected by airport activities associated with the Raleigh-Durham International Airport. More specifically, the districts are intended to ensure the safety and welfare of the community from danger from falling aircraft and the annoyance and potential adverse health impacts of aircraft noise, and to ensure that development within the districts are compatible with activities associated with air traffic and services associated with the airport. To achieve these purposes, district regulations are intended, to the extent possible, to limit land uses to specific industrial, commercial, agricultural, recreational, and other nonresidential uses that are not subject to high population concentrations; restrict the aboveground storage of materials that pose major safety hazards if subject to an airplane crash; limit land uses particularly sensitive to aircraft noise within the area subject to average day/night sound levels (DNL or Ldn) of 65 decibels (dB)¹⁴² or greater; limit land uses and development that pose potential obstructions to safe air traffic and effective air traffic control; and ensure that development near the airport is located, designed, constructed, and maintained in a manner that minimizes exposure to safety risks associated with the airport, mitigates noise impacts, and avoids impediments to safe and efficient airport operations.

B. Applicability

1. The regulations in this section apply to the Airport Overlay-A (AO-A) and Airport Overlay-B (AO-B) Districts.
2. The Airport Overlay-A (AO-A) District consists of that part of the area subject to an average day/night sound level (DNL) from aircraft noise of 65 dB or greater (as established by the Raleigh-Durham Airport Authority and shown on the Town of Morrisville RDU Contours Map) located east of Chapel Hill Road (NC54). The Airport Overlay-B (AO-B) District consists of that part of such area located west of Chapel Hill Road (NC54).

¹⁴² Airport noise regulations vary in the terms used to reference sound levels. The most common is "average day/night sound levels" (alternatively abbreviated as DNL or Ldn), whose unit of measurement is the decibel. References to sound levels in this Ordinance will refer to DNL.

C. Modifications of Otherwise Applicable Standards

1. Uses Prohibited in Airport Overlay-A (AO-A) District¹⁴³

Irrespective of the use standards applicable in the underlying base, conditional, or planned development district, or in any other applicable overlay district, certain uses shall be prohibited in the Airport Overlay-A (AO-A) District, as indicated in the use tables in Article 4: Use Standards.

2. Underground Storage of Hazardous Chemicals and Substances

In the Airport Overlay-A District or Airport Overlay-B District, permanent or long-term storage of significant quantities of highly explosive, flammable, toxic, corrosive, or otherwise hazardous liquids, gases, chemicals, or other hazardous substances shall be located underground to reduce the hazardous consequences from an airplane crash.

3. Structure Height¹⁴⁴

The height of any structure in the Airport Overlay-A District or Airport Overlay-B District shall not exceed that which constitutes an obstruction to air navigation, navigational aids, or navigational facilities under standards of the Federal Aviation Administration (FAA) in 14 CFR Part 77, Subpart C, as applied to the area around Raleigh-Durham International Airport, unless the FAA determines no substantial obstruction exists in accordance with 14 CFR Part 77, Subpart D. Documentation of compliance with this requirement may be required for any structure or structural alteration that extends more than 50 feet above ground level.

4. Outdoor Lighting¹⁴⁵

- a. Outdoor lighting in the Airport Overlay-A District or Airport Overlay-B District shall be shielded to minimize direct skyward glare from the light source and otherwise located and designed to avoid producing light emissions—whether direct or indirect (reflective) of such intensity and directed in such directions as to impair pilot visibility or otherwise interfere with the safe operation of overhead aircraft.
- b. Lighting of towers, tall buildings, and other potential obstructions to air navigation shall include warning lighting that complies with FAA standards in Advisory Circular 70/7460-1 (Obstruction Marking and Lighting).

5. Electronic Interference¹⁴⁶

No use, development, or activity in the Airport Overlay-A District or Airport Overlay-B District shall produce electronic emissions that interfere with navigation signals or radio communications between aircraft and landing control facilities or with aircraft navigational or communication equipment.

¹⁴³ Part B, Article III, Section 1.2.A (Subdistrict A, Prohibited Uses) of the current Zoning Ordinance lists a number of uses prohibited in Subdistrict A. Those uses, modified to correspond to the uses as listed in the use tables and to add municipal solid waste landfills (which attract substantial numbers of birds, posing a threat of interference with overhead aircraft) are shown as prohibited in Article 4's use tables.

¹⁴⁴ Part C, Article III, Section 1.7 (Documentation) of the current Zoning Ordinance prohibits any building permit for a structure whose height exceeds applicable restrictions of RDU and the FAA. RDU has no height restrictions applicable outside the airport property and in the Town's jurisdiction and the FAA does not actually apply any height restrictions. It only establishes notice requirements, complex standards for determining what constitutes an obstruction to air navigation or navigational aids or facilities, and a procedure whereby a person may use studies to show no substantial obstruction exists despite the standards. This subsection modifies the current wording to specifically prohibit structure heights that would qualify as an obstruction under FAA determination rules.

¹⁴⁵ This modifies the provisions in Part C, Article III, Section 1.3 (Lighting) to more specifically prohibit lighting that would constitute hazard to air navigation and specifically require compliance with FAA obstruction lighting guidelines.

¹⁴⁶ This is a new provision generally prohibiting electronic interface with safe navigation.

6. Sound Mitigation¹⁴⁷

- a. New construction, or substantial improvement, of buildings within the Airport Overlay-A District or Airport Overlay-B District shall be designed to limit interior noise from aircraft to an average day/night sound level (DNL) of 45 dB in:
 - (1) Any habitable room (e.g., excluding hallways, stairwells, closets, bathrooms) of a dwelling unit;
 - (2) Any guest or sleeping room of a congregate living facility, fraternity/sorority house, rooming house, bed and breakfast, or hotel/motel;
 - (3) Any noise-sensitive area (e.g., classrooms, assembly areas, libraries, offices, sleeping rooms) of noise-sensitive nonresidential structures such as day care centers, places of worship, public cultural facilities, schools, hospitals, and nursing homes.
- b. Applications for a Building Permit for any building subject to the standards in subsection a above shall include the written certification by a Professional Engineer or Licensed Architect experienced and qualified in the field of acoustical testing and engineering that the proposed new construction will comply with the applicable standards.

7. Avigation Easement¹⁴⁸

The developer of new development in the Airport Overlay-A District or Airport Overlay-B District shall grant an avigation easement to the Raleigh-Durham Airport Authority for the subject property where needed to ensure the safe approach and departure of aircraft to and from the Raleigh-Durham International Airport. A copy of the recorded avigation easement shall be provided to the Planning Director before issuance of any Certificate of Compliance/Occupancy for a building on the property.

3.8.3. Floodplain Overlay (FO) District¹⁴⁹

A. Findings and Purpose

1. The flood prone areas within the jurisdiction of the Town are subject to periodic inundation. The cumulative effect of obstructions in floodplains cause increases in flood heights and velocities and

¹⁴⁷ Part C, Article III, Section 1.5 (Soundproofing) of the current zoning Ordinance essentially delegates to RDU staff the determination of whether proposed soundproofing techniques are sufficient. The provision does not provide any guidance as to what is sufficient. Nor is it clear whether the Town can deny a permit for what RDU staff determines to be insufficient. We propose revising this subsection to set forth a specific standard for noise level reduction, which is target noise level used in the FAA's noise insulation grant program, and to apply it to those buildings, or parts of buildings, that the grant program has identified as needing additional noise insulation. The 45 dB level represents a 20-25 dB noise level reduction (NLR) in nearly all of the AO District, which is within the 65 -70 LDN contour.

¹⁴⁸ NOTE: This current provision raises some issues about the Town's authority to require avigation easements. North Carolina's Model Airport Zoning Act (N.C. Gen. Stat. § 63-30 *et seq.*) authorizes local governments to regulate land uses and structure and tree height so as to avoid obstructions and hazards to safe airport operations. It also authorizes local governments to acquire air rights to protect airport approaches, but does not expressly authorize requiring avigation easements. A number of communities across the nation require avigation easements for development near airports (e.g., Orlando, Colorado Springs, Spokane, and a number of jurisdictions in California). Recent court decisions by the Nevada Supreme Court (*McCarran Int'l Airport v. Sisolak*, 137 P.3d 1110 (Nev. 2006)) and Oregon's Land Use Board of Appeals (*Barnes v. City of Hillsboro* (Or. LUBA 2010)), however, have invalidated the conditioning of development approvals on the grant of avigation easements as unconstitutional takings. North Carolina courts have not ruled on this issue, and it is not clear whether the Nevada and Oregon court rulings would be adopted by North Carolina or federal courts.

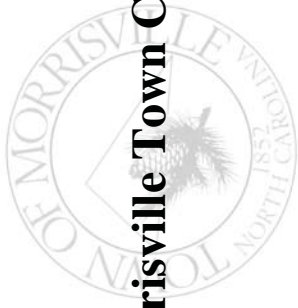
¹⁴⁹ This subsection carries forward those provisions in Chapter 26 (Flood Damage Prevention) of the Code of Ordinances pertaining to the purpose and establishment of areas subject to floodplain regulations as a new Floodplain Overlay District. Chapter 26 provisions pertaining to the procedure for floodplain permits is relocated to Section 2.5.9, Floodplain Development Permit. Chapter 26 standards for development in the FO District are set out in Section 5.6, Floodplain Management. Chapter 26 definitions are located in Section 11.5, Terms and Uses Defined.

the occupancy in flood prone areas of uses vulnerable to floods increase the likelihood of loss of life, property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which could adversely affect the public health, safety and general welfare.

2. The purpose of the Floodplain Overlay District is to minimize these risks and losses by provisions designed to:
 - a. Protect human life and health;
 - b. Minimize expenditure of public money for costly flood control projects;
 - c. Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
 - d. Minimize prolonged business losses and interruptions;
 - e. Minimize damage to public facilities and utilities (i.e. water and gas mains, electric, telephone, cable and sewer lines, streets and bridges) that are located in flood prone areas;
 - f. Help maintain a stable tax base by providing for the sound use and development of flood prone areas; and
 - g. Ensure that potential buyers are aware that property is in a Special Flood Hazard Area or Future Conditions Flood Hazard Area.

B. Applicability












1. The Floodplain Overlay (FO) District applies to all land within any Special Flood Hazard Area or a Future Conditions Flood Hazard Area within the corporate limits and extraterritorial jurisdiction of the Town of Morrisville. Special Flood Hazard Areas and Future Conditions Flood Hazard Areas shall be as determined under the Cooperating Technical State (CTS) agreement between the State of North Carolina and the Federal Emergency Management Agency (FEMA) in its Flood Insurance Study (FIS) dated [insert appropriate date] for Wake County and associated DFIRM panels, which are adopted by reference as part of this Ordinance. Future revisions to the FIS or DFIRM panels that do not change flood hazard data within the jurisdiction of Morrisville are also adopted by reference as part of this Ordinance.
2. Within the Floodplain Overlay (FO) District, no structure shall be located, extended, converted, or altered, and no development activity shall occur, in any way except after approval of a Floodplain Development Permit in accordance with 2.5.9, Floodplain Development Permit, and in full compliance with the provisions of Section 5.6, Floodplain Management.
3. The degree of flood protection required by the Floodplain Overlay District is considered reasonable for regulatory purposes and is based on scientific and engineering consideration. Larger floods can and will occur. Actual flood heights may be increased by manmade or natural causes. This section does not imply that land outside the Special Flood Hazard Areas and Future Conditions Flood Hazard Areas or uses permitted within such areas will be free from flooding or flood damages. This section shall not create liability on the part of the Town or by any Town officer or employee for any flood damages that result from reliance on Floodplain Overlay District regulations or any administrative decision lawfully made in accordance with such regulations.





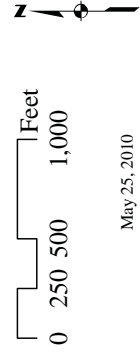
Morrisville Town Center

Legend

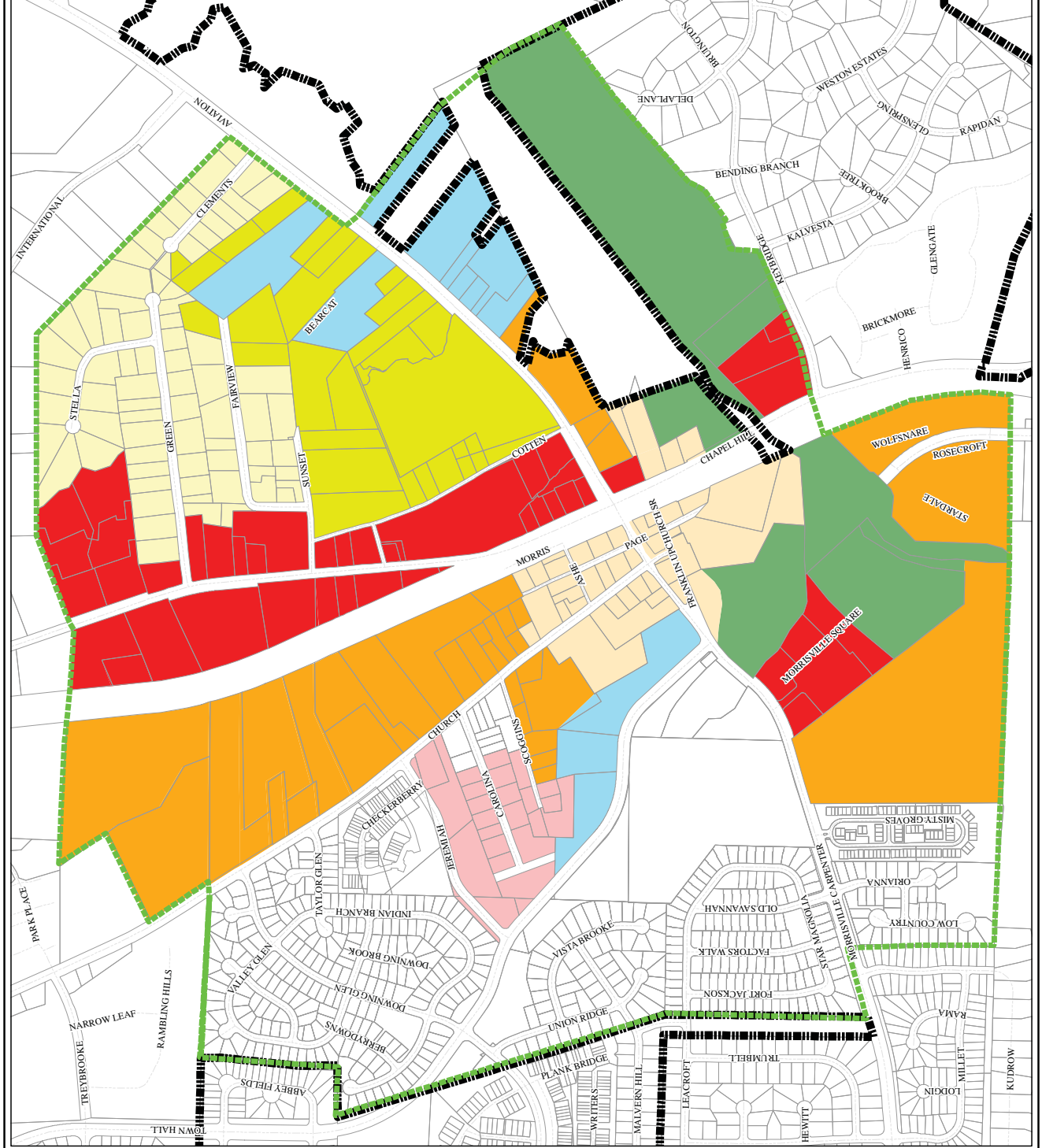
Town Center Code Districts

-  Agricultural District Town Center (AD-TC)
-  Conservation Buffer Town Center (CB-TC)
-  Corridor Commercial (CC)
-  Historic Crossroads Village (HCV)
-  Main Street (MS)
-  Office and Institutional Town Center (O&I-TC)
-  Residential Neighborhood Preservation (RNP)
-  Residential Transition (RT)
-  Town Center Residential (TCR)
-  Town Center Overlay (TCO) (available through rezoning)
-  No Change - Existing Zoning Applies

-  Town Center Boundary
-  Town ETJ Boundary



May 25, 2010



Appendix E

– Endangered Species Information

- Natural Heritage Element Occurrences in Wake County
- Natural Heritage Element Occurrences in Planning Area

TABLE E-1

Wake County Listed Species

Major Group	Scientific Name	Common Name	State Status	Federal Status	State Rank	County Status
Amphibian	<i>Ambystoma tigrinum</i>	Eastern Tiger Salamander	T		S2	Current
Amphibian	<i>Hemidactylium scutatum</i>	Four-toed Salamander	SC		S3	Current, Obscure
Amphibian	<i>Necturus lewisi</i>	Neuse River Waterdog	SC		S2	Current
Bird	<i>Peucaea aestivalis</i>	Bachman's Sparrow	SC	FSC	S3B,S2N	Current
Bird	<i>Haliaeetus leucocephalus</i>	Bald Eagle	T	BGPA	S3B,S3N	Current
Bird	<i>Picoides borealis</i>	Red-cockaded Woodpecker	E	E	S2	Historical
Bird	<i>Vireo gilvus</i>	Warbling Vireo	SR		S2B	Current
Butterfly	<i>Pontia protodice</i>	Checkered White	SR		S1S2	Current
Caddisfly	<i>Dibusa angata</i>	a caddisfly	SR		S2	Current
Crustacean	<i>Cambarus davidi</i>	Carolina Ladle Crayfish	SR		S2S3	Current
Crustacean	<i>Orconectes carolinensis</i>	North Carolina Spiny Crayfish	SC		S3	Current
Dragonfly or Damselfly	<i>Coryphaeschna ingens</i>	Regal Darner	SR		S2?	Current
Dragonfly or Damselfly	<i>Gomphus septima</i>	Septima's Clubtail	SR	FSC	S2	Current
Freshwater Bivalve	<i>Fusconaia masoni</i>	Atlantic Pigtoe	E	FSC	S1	Current
Freshwater Bivalve	<i>Strophitus undulatus</i>	Creeper	T		S2	Current
Freshwater Bivalve	<i>Alasmidonta heterodon</i>	Dwarf Wedgemussel	E	E	S1	Current
Freshwater Bivalve	<i>Lampsilis radiata</i>	Eastern Lampmussel	T		S1S2	Current
Freshwater Bivalve	<i>Lasmigona subviridis</i>	Green Floater	E	FSC	S1	Current
Freshwater Bivalve	<i>Villosa constricta</i>	Notched Rainbow	SC		S3	Current
Freshwater Bivalve	<i>Elliptio roanokensis</i>	Roanoke Slabshell	T		S1	Current
Freshwater Bivalve	<i>Alasmidonta undulata</i>	Triangle Floater	T		S2	Current
Freshwater Bivalve	<i>Elliptio lanceolata</i>	Yellow Lance	E	FSC	S1	Current
Freshwater Fish	<i>Noturus furiosus</i>	Carolina Madtom	T	FSC	S2	Historical
Freshwater Fish	<i>Lampetra aepyptera</i>	Least Brook Lamprey	T		S2	Current
Freshwater Fish	<i>Notropis volucellus</i>	Mimic Shiner	SR		S2	Historical
Mammal	<i>Myotis septentrionalis</i>	Northern Myotis	SR	PE	S3	Historical
Mammal	<i>Myotis austroriparius</i>	Southeastern Myotis	SC	FSC	S2	Historical

Major Group	Scientific Name	Common Name	State Status	Federal Status	State Rank	County Status
Mammal	<i>Condylura cristata</i> pop. 1	Star-nosed Mole - Coastal Plain population	SC		S2	Current
Moss	<i>Tortula plinthobia</i>	A Chain-teeth Moss	SR-O		S1?	Historical
Moss	<i>Archidium donnellii</i>	Donnell's Archidium	SR-O		S1	Current
Moss	<i>Campylopus oerstedianus</i>	Oersted's Campylopus	SR-D		S1	Historical
Moss	<i>Sphagnum subsecundum</i>	Orange Peatmoss	SR-P		S1	Historical
Moss	<i>Cleistocarpidium palustre</i>	Prairie Pleuridium	SR-D		S1	Current
Vascular Plant	<i>Dichanthelium</i> sp. 9	A Witch Grass	SR-L		S2	Historical
Vascular Plant	<i>Buchnera americana</i>	American Bluehearts	E		S1	Historical
Vascular Plant	<i>Thermopsis mollis</i>	Appalachian Golden-banner	SC-V		S2	Current, Historical
Vascular Plant	<i>Magnolia macrophylla</i>	Bigleaf Magnolia	T		S2	Current
Vascular Plant	<i>Lindera subcoriacea</i>	Bog Spicebush	SR-T	FSC	S2S3	Current
Vascular Plant	<i>Trifolium reflexum</i>	Buffalo Clover	T		S1S2	Current, Historical
Vascular Plant	<i>Acmispon helleri</i>	Carolina Birdfoot-trefoil	SC-V	FSC	S3	Current
Vascular Plant	<i>Cirsium carolinianum</i>	Carolina Thistle	E		S2	Historical
Vascular Plant	<i>Clematis catesbyana</i>	Coastal Virgin's-bower	SR-P		S2	Historical
Vascular Plant	<i>Cardamine douglassii</i>	Douglass's Bittercress	T		S2	Current
Vascular Plant	<i>Liatris squarrulosa</i>	Earle's Blazing-star	SR-P		S2	Current
Vascular Plant	<i>Matelea decipiens</i>	Glade Milkvine	SR-P		S3	Current, Historical
Vascular Plant	<i>Cyperus granitophilus</i>	Granite Flatsedge	T		S2	Current, Historical
Vascular Plant	<i>Pseudognaphalium helleri</i>	Heller's Rabbit-Tobacco	SR-P		S3	Current, Historical
Vascular Plant	<i>Paspalum fluitans</i>	Horsetail Crown Grass	SR-P		S1	Current
Vascular Plant	<i>Gillenia stipulata</i>	Indian Physic	T		S2	Current
Vascular Plant	<i>Carex reniformis</i>	Kidney Sedge	T		S1	Historical
Vascular Plant	<i>Fothergilla major</i>	Large Witch-alder	SR-T		S3	Current
Vascular Plant	<i>Ruellia humilis</i>	Low Wild-petunia	E		S1	Historical

Major Group	Scientific Name	Common Name	State Status	Federal Status	State Rank	County Status
Vascular Plant	<i>Rhus michauxii</i>	Michaux's Sumac	E	E	S2	Current, Historical
Vascular Plant	<i>Heteranthera multiflora</i>	Multiflowered Mud-plantain	SR-P		S1	Current
Vascular Plant	<i>Isoetes piedmontana</i>	Piedmont Quillwort	E		S2	Current
Vascular Plant	<i>Ruellia purshiana</i>	Pursh's Wild-petunia	SC-V		S2	Historical
Vascular Plant	<i>Carex tetanica</i>	Rigid Sedge	SR-P		S1	Historical
Vascular Plant	<i>Dichanthelium annulum</i>	Ringed Witch Grass	SR-P		S1	Historical
Vascular Plant	<i>Polygala senega</i>	Seneca Snakeroot	SR-D		S2	Current
Vascular Plant	<i>Portulaca smallii</i>	Small's Portulaca	T		S2	Current, Historical
Vascular Plant	<i>Scutellaria australis</i>	Southern Skullcap	E		S1	Historical
Vascular Plant	<i>Micranthes pensylvanica</i>	Swamp Saxifrage	E		S1	Current
Vascular Plant	<i>Monotropsis odorata</i>	Sweet Pinesap	SC-V	FSC	S3	Historical
Vascular Plant	<i>Scutellaria nervosa</i>	Veined Skullcap	E		S1	Historical
Vascular Plant	<i>Trillium pusillum</i> var. <i>virginianum</i>	Virginia Least Trillium	E	FSC	S1	Current
Vascular Plant	<i>Pycnanthemum virginianum</i>	Virginia Mountain-mint	SR-P		S1?	Current
Vascular Plant	<i>Tradescantia virginiana</i>	Virginia Spiderwort	T		S1	Current
Vascular Plant	<i>Didiplis diandra</i>	Water Purslane	SR-P		S1	Current, Historical
Vascular Plant	<i>Solidago radula</i>	Western Rough Goldenrod	E		S1	Historical
Vascular Plant	<i>Agastache nepetoides</i>	Yellow Giant-hyssop	SR-P		S1	Historical

Sources: NCNHP Database, 2014

TABLE E-2

Natural Heritage Element Occurrences near the Town of Morrisville Planning Area

Scientific Name	Common Name	County Status	State Status	Federal Status	Aquatic	Wetland
Dragonfly or Damselfly						
Coryphaeschna ingens	Regal Darner	Current	SR	-	Y	N
Vascular Plants						
Buchnera americana	American Bluehearts	Historical	E	-	N	Y
Porteranthus stipulatus	Indian Physic	Current	T	-	N	N
Dichanthelium annulum	Ringed Witch Grass	Historical	SR-P	-	N	N

State Status

E = Endangered

T = Threatened

SR, -P = Significantly Rare, Peripheral

A Natural Heritage Element Occurrence point represents the centroid of an area covered by a species or community and is therefore only as accurate as the data source that identified it. The NC Natural Heritage Program database assigns a radius, or "precision" value to each element occurrence of 500 feet, 1 mile, or 5 miles. The occurrences listed above were within at least 5 miles of the Planning Area.

Below is a description of the applicable status key codes, per NHP website (<http://www.ncnhp.org/web/nhp/gis-download>).

(E) Endangered - "Any species or higher taxon of plant whose continued existence as a viable component of the State's flora is determined to be in jeopardy" (GS 19B 106: 202.12).

(T) Threatened - "Any resident species of plant which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" (GS 19B 106:202.12).

(SR) Significantly Rare - Any species which has not been listed by the N.C. Wildlife Resources Commission as an Endangered, Threatened, or Special Concern species, but which exists in the state (or recently occurred in the state) in small numbers and has been determined by the N.C. Natural Heritage Program to need monitoring. Significantly Rare species include "peripheral" species, whereby North Carolina lies at the periphery of the species' range (such as Hermit Thrush), as well as species of historical occurrence with some likelihood of re-discovery in the state. Species considered extirpated in the state, with little likelihood of re-discovery, are given no N.C. Status (unless already listed by the N.C. Wildlife Resources Commission as E, T, or SC).

(SR-P) Significantly Rare - Peripheral - The species is at the periphery of its range in North Carolina. These species are generally more common somewhere else in their ranges, occurring in North Carolina peripherally to their main ranges, mostly in habitats which are unusual in North Carolina.

Appendix F

– Ordinances

- 1. Riparian Buffers (UDO 6.1-6.4, 6.8)**
- 2. Floodplain Protection (UDO 5.6, 11.5)**
 - Floodplain Overlay District (UDO 3.8)
 - Floodplain Development Permit (UDO 2.5.9)
- 3. Erosion & Sediment Control (see Appendix B)**
- 4. Stormwater Management and Riparian Buffers (UDO 7)**
 - Performance Guarantee (LDO 8.1)
- 5. Open Space Dedication (UDO 5.5)**
 - Parks/Greenways/Open Space Conservation District (UDO 3.2)
- 6. Other**
 - Tree Protection (UDO 5.4, 8.1)
 - Landscaping Requirements (UDO 5.12)
 - Connectivity (UDO 5.8)
 - Zoning Categories (See Appendix D)

1. Riparian Buffers (UDO 6.1-6.4, 6.8)

Article 6: Riparian Buffers

SECTION 6.1. PURPOSE⁴⁹⁰

The purpose of the standards in this section is to protect water quality in the Upper Neuse River Basin and the Jordan Lake watershed, including water supplies throughout the Neuse River Basin and Jordan Lake watershed. Specifically, it is intended to protect and preserve existing riparian buffers in accordance with State riparian buffer rules. Vegetative buffers adjacent to surface waters provide multiple environmental protection and resource management benefits. Forested buffers enhance and protect the natural ecology of stream systems, as well as water quality through bank stabilization, shading, and nutrient removal. They also help minimize flood damage in flood prone areas. Well-vegetated riparian buffers help remove nitrogen and prevent sediment and sediment-bound pollutants such as phosphorus from reaching the waters. The riparian buffer standards in this article are intended to achieve these important benefits.

SECTION 6.2. GENERAL

6.2.1. Authority⁴⁹¹

This article is enacted and administered pursuant to the Town's general authority to regulate development (see Section 1.1.2, Authority) and the local delegation or assignment of authority for the protection and maintenance of riparian buffers granted by the North Carolina Environmental Management Commission in accordance with 15A NCAC 2B .0241 (Neuse River Basin: Nutrient Sensitive Waters Management Strategy: Delegation of Authority for the Protection And Maintenance of Riparian Buffers) and 15A NCAC 02B .0267 (Jordan Water Supply Nutrient Strategy: Protection of Existing Riparian Buffers).

6.2.2. Applicability

A. General⁴⁹²

1. Except as otherwise provided in Section 6.2.2.B, Exemptions, this article applies to any development, as well as any other activity listed in Table 6.8, Uses and Activities Permitted in Riparian Buffers, that occurs within riparian buffers directly adjacent to surface waters in the Neuse River Basin and the Jordan watershed (as identified in accordance with Section 6.3, Riparian Buffers), as well as to any development or listed activity that occurs outside of such buffers and has hydrologic impacts in violation of the diffuse flow requirements set out in Section 6.7. No new clearing, grading, or development shall take place, nor shall any new building permits be issued, in violation of the standards in this article.
2. No development or activity subject to this article may occur within a required riparian buffer unless reviewed and approved in accordance with Section 6.5, Riparian Buffer Development Review.
3. Parties subject to this article shall abide by all State rules and laws regarding waters of the state—including, but not limited to, Rules 15A NCAC 2B .0230 and .0231, Rules 15A NCAC 2H .0500, 15A NCAC 2H .1300, and Sections 401 and 404 of the Federal Water Pollution Control Act.

⁴⁹⁰ This carries forward the purpose statement in Sec. 2 of the current Riparian Buffer Ordinance, modified to more clearly tie the benefits of riparian buffers to the riparian buffer regulations.

⁴⁹¹ This supplements the Town's general regulatory authority in Article 1 with references to State rules authorizing local delegation of authority to administer the Neuse River riparian buffer rules and requirements for local implementation of Jordan Lake riparian buffer rules.

⁴⁹² This adds a provision that incorporates and clarifies the general applicability provisions scattered about the current Riparian Buffer Ordinance.

B. Exemptions⁴⁹³

1. Existing and Ongoing Uses

- a. This article shall not apply to uses that are existing and on-going. Existing uses may include agriculture, buildings, industrial facilities, commercial areas, transportation facilities, maintained lawns, utility lines, and on-site sanitary sewage systems—any of which involve either specific, periodic management of vegetation or displacement of vegetation by structures or regular activity. An existing, on-going use is one meeting the following criteria:

(1) Neuse River Basin

A use in the Neuse River Basin is existing if it existed before July 22, 1997 (the effective date of the North Carolina Division of Water Quality's Neuse Rule).

(2) Jordan Lake Watershed

A use in the Jordan Lake watershed is existing only if one of the following occurred before April 26, 2011 (the date the Morrisville Town Council adopted the Riparian Buffer Protection Ordinance):

- (A) If subject to requirements for a 401 Certification/404 Permit, such certification and permit were issued for the use;
 - (B) If subject to a State permit or certification (e.g., for landfills, NPDES wastewater discharges, land application of residuals, and road construction activities), all such State permits and certifications were obtained for the use and construction of the permitted activity began or was under contract to begin;
 - (C) If reviewed through the Clean Water Act Section 404/National Environmental Policy Act Merger 101 Process,⁴⁹⁴ an agreement with the North Carolina Department of Environment and Natural Resources (NCDENR) on avoidance and minimization was reached; or
 - (D) If not subject to review through the Clean Water Act Section 404/National Environmental Policy Act Merger 101 Process, a Finding of No Significant Impact pursuant to the National Environmental Policy Act (NEPA) was issued for the use and the use was approved, in writing, by the Town.
- b. A change in of an existing, on-going use to another use is not exempt, though a mere change in ownership through purchase or inheritance does not constitute such a change in use.
- c. Only that portion of the riparian buffer occupied by the footprint of the existing and on-going use is exempt from this article.

⁴⁹³ This carries forward the existing use exemption in Sec. 7.C of the current Riparian Buffer Ordinance and the single-family exemption in Sec. 8.D of the current Ordinance (with modifications).

⁴⁹⁴ Published by the U.S. Army Corps of Engineers and Federal Highway Administration, 2003.

C. Existing Single-Family Detached Dwelling Lots⁴⁹⁵

This article shall not apply to activities associated with the development of single-family detached, duplex, and manufactured home dwellings on existing lots zoned for and otherwise intended to be used as building sites for single-family detached, duplex, or manufactured home dwellings. This exemption does not include subdivisions that create new lots for such dwellings, which shall be subject to this article.

6.2.3. Interpretation of Riparian Buffer Regulations⁴⁹⁶

When interpreting the meaning or application of the riparian buffer regulations in this article, the Planning Director shall consider the clarification memos and other information developed and maintained by the North Carolina Division of Water Quality.

6.2.4. Records⁴⁹⁷

The Town shall maintain on-site records for a minimum of five years, and shall furnish a copy of these records to the North Carolina Division of Water Quality within 30 days of receipt of a written request for them. Such records shall include the following:

- A.** A copy of all variance requests;
- B.** Findings of fact on all variance requests;
- C.** Results of all variance proceedings;
- D.** A record of complaints and action taken as a result of complaints;
- E.** Records for stream origin calls and stream ratings; and
- F.** Copies of all requests for authorization, records approving authorization, and Authorization Certificates.

SECTION 6.3. RIPARIAN BUFFERS AND ZONES⁴⁹⁸

6.3.1. Riparian Buffer

Riparian buffers subject to this section include all land (including wetlands) within 50 feet of, and directly adjacent to, all sides of surface waters in the Neuse River Basin and the Jordan Lake watershed. (Wetlands within a riparian buffer are also regulated pursuant to Rules 15A NCAC 2B .0230, and .0231,

⁴⁹⁵ Sec. 8.D of the current Riparian Buffer Ordinance states that riparian buffers cannot be located on “single-family residential lots,” a term not defined in the Ordinance. This apparently means that no riparian buffers are required on any such lots, whether existing or created through the subdivision process. Although the proposed open space standards in Article 6 give riparian buffers a high priority for inclusion in subdivision’s open space, there may still be some small subdivisions or subdivisions with extensive surface water coverage where riparian buffers would otherwise exist on proposed single-family lots. This provision modifies the current provision to limit the exemption to development of single-family detached, duplex, and manufactured home dwellings on existing lots zoned and intended for such dwellings. This allows the Town to better protect riparian buffers in residential subdivisions, possibly through establishment of conservation easements on lots if needed. By exempting development rather than the lot, it also avoids the need to determine when a lot is a single-family residential lot (which is certainly not clear outside Very Low and Low Density Residential districts), and facilitates the mapping of riparian buffers (i.e., avoids the need to exclude single-family residential lots).

⁴⁹⁶ This new provision references information posted on-line and otherwise maintained by NCDWQ, which has had years of experience itself, as well as knowledge accumulated from other local governments administering riparian buffer regulations. Such consideration should help facilitate Town administration of the riparian buffer regulations.

⁴⁹⁷ This adds a requirement found in both 15A NCAC 2B .0241 (for Neuse River riparian buffers) and 15A NCAC 02B .0267 (for Jordan Lake riparian buffers).

⁴⁹⁸ This carries forward, with a clarifying introductory subsection, provisions in Sec. 7.D of the current Riparian Buffer Ordinance that define Zones One and Two of a riparian buffer.

Rules 15A NCAC 2H .0500, 15A NCAC 2H .1300, and Sections 401 and 404 of the Federal Water Pollution Control Act.)

6.3.2. Riparian Buffer Zones

Riparian buffers shall consist of two zones that have a combined width of 50 feet:

A. Zone One

Zone One consists of a vegetated area that is undisturbed except for uses and activities allowed in accordance with Section 6.8, Uses and Activities Permitted in Riparian Buffers.

1. For intermittent and perennial streams, Zone One begins at the top of the bank and extends landward on both sides of the stream a distance of 30 feet, measured horizontally on a line perpendicular to a vertical line marking the top of the bank.
2. For ponds, lakes, and reservoirs located within natural drainageway, Zone One begins at the normal water level and extends landward on all sides of the water body a distance of 30 feet, measured horizontally on a line perpendicular to a vertical line marking the outer edge of the normal water level.

B. Zone Two

Zone Two consists of a stable, vegetated area that is undisturbed except for uses and activities allowed in accordance with Section 6.8, Uses and Activities Permitted in Riparian Buffers. Zone Two begins at the outer edge of Zone One and extends landward a distance of 20 feet, measured horizontally on a line perpendicular to a vertical line marking the outer edge of Zone One.

SECTION 6.4. IDENTIFICATION OF RIPARIAN BUFFERS⁴⁹⁹

6.4.1. Surface Waters with Riparian Buffers

A. General

Except as provided in subsection B below, riparian buffers subject to this section shall be required along all surface waters in the Neuse River Basin and the Jordan Lake watershed identified on designated maps (Section 6.4.2) or by on-site determinations (Section 6.4.3).

B. Exception

Riparian buffers shall not be required along mapped surface waters where an on-site determination in accordance with Section 6.4.3 shows that mapped surface water is:

1. A man-made pond or lake that is not part of a natural drainage way classified in accordance with 15A NCAC 2B .0100, including ponds and lakes created for animal watering, irrigation, or other agricultural uses (A pond or lake is part of a natural drainage way when it is fed by an intermittent or perennial stream or when it has a direct discharge point to an intermittent or perennial stream.);
2. An ephemeral stream;
3. Lacks on-the-ground evidence of a corresponding intermittent or perennial stream, lake, reservoir, or pond; or
4. A ditch or other man-made water conveyance other than a modified natural stream.

⁴⁹⁹ This carries forward and consolidates those parts of Sec. 7.A and 7B in the current Riparian Buffer Ordinance used to identify those water surfaces along which riparian buffers are required, including the maps used to identify them and corrections through on-site determinations..

6.4.2. Maps Used to Identify Surface Waters with Riparian Buffers

Only one of the following types of maps shall be used for purposes of identifying surface waters with riparian buffers subject to this section:

- A.** The most recent version of the soil survey map prepared by the Natural Resources Conservation Service of the United States Department of Agriculture.
- B.** The most recent version of the 1:24,000 scale (7.5 minute) quadrangle topographic maps prepared by the United States Geologic Survey (USGS).
- C.** A map approved by the Geographic Information Coordinating Council and the North Carolina Environmental Management Commission (Commission) following a 30-day public notice and opportunity for comment.

6.4.3. On-Site Determination of Surface Waters with Riparian Buffers

- A.** A landowner or other affected party (including the North Carolina Division of Water Quality) who believes the maps used to identify riparian buffers (see Section 6.4.2, Maps Used to Identify Surface Waters with Riparian Buffers) inaccurately depict the surface waters subject to these riparian buffer regulations may request the Town for an on-site determination of the presence, location, and extent (including the origin point) of such surface waters, or whether the mapped surface waters are excepted from riparian buffer regulations in accordance with Section 6.4.1.B, Exception.
 - 1.** The determination shall be conducted by a person who has successfully completed the Surface Water Identification Training Certification course, or other equivalent training curriculum approved by the North Carolina Division of Water Quality. The Town may accept the results of site assessments made by other parties who have successfully completed such training
 - 2.** If determining the origin of a stream, the determination shall use the latest version of the North Carolina Division of Water Quality's Identification Methods for the Origins of Intermittent and Perennial Streams.⁵⁰⁰
- B.** Any disputes over on-site determinations shall be referred in writing to the Director of the North Carolina Division of Water Quality and is subject to review as provided in Articles 3 and 4 of N.C.G.S 150B.

SECTION 6.5. RIPARIAN BUFFER DEVELOPMENT REVIEW⁵⁰¹

6.5.1. Applicability

- A.** Except as exempted in Section 6.2.2.B, Exemptions, Riparian Buffer Development Review is required before any development, or any other activity listed in Table 6.8, Uses and Activities Permitted in Riparian Buffers, may be conducted within a riparian buffer.
- B.** An application for Riparian Buffer Development Review may be submitted and reviewed concurrently with applications for Conceptual Master Plan Approval, Site Plan Approval, Construction Plan Approval, Floodplain Development Permit, Stormwater Management Permit, Administrative Adjustment, or Alternative Equivalent Compliance.

⁵⁰⁰ Available at: <http://portal.ncdenr.org/web/wq/swp/ws/401/waterresources/streamdeterminations>

NC_Stream_ID_Manual.pdf or from the NC Division of Water Quality - 401 Oversight Express Permitting Unit.

⁵⁰¹ This sets out the process for reviewing proposals for development or other activity in riparian buffers. It carries forward and consolidates the procedural provisions and decision-making standards found in Sec. 8.A and Sec. 9.A of the current Riparian Buffer Ordinance, reformatting them to relate to the standard review standards in Section 2.4 (and do all other review procedures except those for Stormwater Management Permits). They are also modified to clarify the relationship between finding of no practical alternatives and Authorization Certificates.

1. A request for a particular use that is expressly, or by inference, prohibited in the zoning district or the riparian buffer zone;
2. Hardships resulting from factors other than application of requirements of this Ordinance;
3. The fact that land or a structure may be utilized more profitably or be more marketable with a Variance; or
4. The citing of other nonconforming or conforming uses of land or structures in the same or other zoning districts or riparian buffers.

SECTION 6.7. DIFFUSE FLOW REQUIREMENTS⁵¹⁰

Diffuse flow of runoff shall be maintained in the riparian buffer by dispersing concentrated flow prior to its entry into the buffer and reestablishing vegetation as follows:

- A. Concentrated runoff from new ditches or man-made conveyances shall be converted to diffuse flow at non-erosive velocities before the runoff enters Zone Two of the riparian buffer;
- B. Periodic corrective action to restore diffuse flow shall be taken as necessary and shall be designed to impede the formation of erosion gullies; and
- C. No new stormwater conveyances are allowed through the buffers except for those specified in Table 6.8, Uses and Activities Permitted in Riparian Buffers, addressing stormwater management ponds, drainage ditches, roadside ditches, and stormwater conveyances.

SECTION 6.8. USES AND ACTIVITIES PERMITTED IN RIPARIAN BUFFERS⁵¹¹

Table 6.8 sets out potential new uses and activities permitted within a riparian buffer, or outside the buffer with impacts on the buffer, and categorizes them as “Exempt,” “Allowable,” or “Allowable with Mitigation.” All uses or activities not listed in the table shall be considered prohibited and may not occur within the riparian buffer, or outside the buffer if the use would impact the buffer, unless a Riparian Buffer Variance is granted pursuant to Section 6.6, Variances from Riparian Buffer Regulations.

Table 6.8: Uses and Activities Permitted in Riparian Buffers			
Use or Activity	Exempt [1]	Allowable [2]	Allowable with Mitigation [3]
Airport facilities that impact no more than 150 linear feet or 1/3 acre of riparian buffer		X	
Airport facilities that impact more than 150 linear feet or 1/3 acre of riparian buffer			X

⁵¹⁰ This carries forward provision is Sec. 7.E of the current Riparian Buffer Ordinance.

⁵¹¹ This carries forward the “table of uses” in Sec. 8.B of the current Riparian Buffer Ordinance, modified only to incorporate into the table’s use or activity column those currently footnoted requirements for FAA-compliant activities. (Other footnoted requirements for utilities were not incorporated into the table’s use or activity column because they apply to multiple activities.)

Table 6.8: Uses and Activities Permitted in Riparian Buffers

Use or Activity	Exempt [1]	Allowable [2]	Allowable with Mitigation [3]
Activities necessary to comply with FAA requirements (e.g. radar uses or landing strips), where: <ul style="list-style-type: none"> • No heavy equipment is used in Zone One; • Vegetation in undisturbed portions of the buffer is not compromised; • Felled trees are removed by chain; • No permanent felling of trees occurs in protected buffers or streams; • Stumps are removed only by grinding; • At the completion of the project the disturbed area is stabilized with native vegetation; and • Zones One and Two meet the requirements of Section 6.3, Riparian Buffers and Zones, and Section 6.7, Diffuse Flow Requirements. 	X		
Archaeological activities	X		
Bridges		X	
Dam maintenance activities that do not cause additional buffer disturbance beyond the footprint of the existing dam or those covered under the U.S. Army Corps of Engineers Nationwide Permit No. 3	X		
Dam maintenance activities that do cause additional buffer disturbance beyond the footprint of the existing dam or those not covered under the U.S. Army Corps of Engineers Nationwide Permit No.3		X	
Drainage ditches, roadside ditches, and stormwater conveyances through riparian buffers:			
<p>New stormwater flows to existing drainage ditches, roadside ditches, and stormwater conveyances provided flows do not alter or result in the need to alter the conveyance and are managed to minimize the sediment, nutrients and other pollution that convey to water bodies</p> <hr/> <p>Realignment of existing roadside drainage ditches retaining the design dimensions, provided that no additional travel lanes are added and the minimum required roadway typical section is used based on traffic and safety considerations</p>		X	
New or altered drainage ditches, roadside ditches and stormwater outfalls provided that a stormwater management facility is installed to control nutrients and attenuate flow before the conveyance discharges through the riparian buffer		X	
New drainage ditches, roadside ditches and stormwater conveyances applicable to linear projects that do not provide a stormwater management facility due to topography constraints provided that other practicable BMPs are employed			X
Drainage of a pond in a natural drainage way provided that a new riparian buffer that meets the requirements of this article is established adjacent to the new channel	X		
Driveway crossings of streams and other surface waters subject to this article:			
Driveway crossings on single family residential lots that disturb no more than 25 linear feet or 2,500 square feet of riparian buffer	X		
Driveway crossings on single family residential lots that disturb more than 25 linear feet or 2,500 square feet of riparian buffer		X	
Driveway crossings in a subdivision that cumulatively disturb no more than 150 linear feet or 1/3 acre of riparian buffer			X
Driveway crossing in a subdivision that cumulatively disturb more than 150 linear feet or 1/3 of an acre of riparian buffer			X
Driveway impacts other than crossing of a stream or other surface waters subject to this article			X
Fences where disturbance is minimized and installation does not result in removal of trees as defined in this Ordinance	X		

Article 6: Riparian Buffers

Section 6.8. Uses and Activities Permitted in Riparian Buffers

6.6.3. Riparian Buffer Variance Review Standards

Table 6.8: Uses and Activities Permitted in Riparian Buffers

Use or Activity	Exempt [1]	Allowable [2]	Allowable with Mitigation [3]
Fences where disturbance is minimized and installation results in removal of trees as defined in this Ordinance		X	
Fertilizer application: one-time application to establish vegetation	X		
Revegetation in Zone Two where diffuse flow and the health of existing vegetation in Zone One is not compromised and disturbed areas are stabilized until they are revegetated		X	
Greenway/hiking trails designed, constructed, and maintained to maximize nutrient removal and erosion protection, minimize adverse effects on aquatic life and habitat, and protect water quality to the maximum extent practical		X	
Historic preservation	X		
Maintenance access on modified natural streams via a grassed travel way on one side of the water body where less impacting alternatives are not practical, the width and specifications of the travel way are only that needed for equipment access and operation, and the travel way is located to maximize stream shading		X	
Mining activities covered by the Mining Act where new riparian buffers that meet the requirements of Section 6.3, Riparian Buffers and Zones, and Section 6.7, Diffuse Flow Requirements, are established adjacent to the relocated channels		X	
Mining activities not covered by the Mining Act OR where new riparian buffers that meet the requirements of Section 6.3, Riparian Buffers and Zones, and Section 6.7, Diffuse Flow Requirements are not established adjacent to the relocated channels			X
Wastewater or mining dewatering wells with approved NPDES permit		X	
Playground equipment on lots with single-family detached or manufactured home dwellings where installation and use does not result in removal of vegetation ⁵¹²	X		
Playground equipment installed on lands other than single-family lots or that requires removal of vegetation		X	
Protection of existing structures, facilities, and stream banks when this requires additional disturbance of the riparian buffer or the stream channel			X
Railroad impacts other than crossings of streams and other surface waters subject to this article			X
Railroad crossings of streams and other surface waters subject to this article:			
Railroad crossings that impact no more than 40 linear feet of riparian buffer		X	
Railroad crossings that impact more than 40 linear feet but no more than 150 linear feet or 1/3 acre of riparian buffer		X	
Railroad crossings that impact more than 150 linear feet or 1/3 acre of riparian buffer			X
Removal of previous fill or debris where diffuse flow is maintained and vegetation is restored		X	
Road impacts other than crossings of streams and other surface waters subject to this article			X
Road crossings of streams and other surface waters subject to this article:			
Road crossings that impact no more than 40 linear feet of riparian buffer		X	
Road crossings that impact more than 40 linear feet but no more than 150 linear feet or 1/3 acre of riparian buffer			X
Road crossings that impact more than 150 linear feet or 1/3 acre of riparian buffer			X

⁵¹² The current Riparian Buffer Ordinance's table refers to "single-family lots" (an undefined term). This modification assumes the current provision is intended to refer to lots containing single-family detached and manufactured home dwellings.

Table 6.8: Uses and Activities Permitted in Riparian Buffers

Use or Activity	Exempt [1]	Allowable [2]	Allowable with Mitigation [3]
Road relocation:			
Relocation of existing private access roads associated with public road projects that are necessary for public safety and impact no more than 2,500 square feet of riparian buffer		X	
Relocation of existing private access roads associated with public road projects that are necessary for public safety and impact more than 2,500 square feet of riparian buffer			X
Scientific studies and stream gauging	X		
Streambank or shoreline stabilization		X	
Temporary roads associated with culvert installation or bridge construction or replacement, where the disturbed area is restored to pre-construction topographic and hydrologic conditions immediately after construction is complete and replanted immediately with comparable vegetation—provided that: tree planting may occur during the dormant season; a one-time application of fertilizer may be used to establish vegetation; and the restored buffer shall comply with the restoration criteria in Section 6.9.5, Riparian Buffer Restoration or Enhancement, by the end of five years			X
Temporary sediment and erosion control devices for work within a stream channel that is authorized under Sections 401 and 404 of the Federal Water Pollution Control Act, where the disturbed area is restored to pre-construction topographic and hydrologic conditions immediately after construction is complete and replanted immediately with comparable vegetation—provided that: tree planting may occur during the dormant season; a one-time application of fertilizer may be used to establish vegetation; and the restored buffer shall comply with the restoration criteria in Section 6.9.5, Riparian Buffer Restoration or Enhancement, by the end of five years		X	
Temporary sediment and erosion control devices for work within a stream channel that is not authorized under Sections 401 and 404 of the Federal Water Pollution Control Act, where the disturbed area is restored to pre-construction topographic and hydrologic conditions immediately after construction is complete and replanted immediately with comparable vegetation—provided that: tree planting may occur during the dormant season; a one-time application of fertilizer may be used to establish vegetation; and the restored buffer shall comply with the restoration criteria in Section 6.9.5, Riparian Buffer Restoration or Enhancement, by the end of five years		X	
Utility line crossings of streams and other surface waters subject to this article:		X	
Above-ground elective line crossings that are perpendicular to the stream and disturb no more than 150 linear feet of riparian buffer [4][5][6]		X	
Above-ground elective line crossings that are perpendicular to the stream and disturb more than 150 linear feet of riparian buffer [4][5][6]		X	
Above-ground elective line crossings that are not perpendicular to the stream and impact Zone Two ⁴			X
Underground electric line crossings that are perpendicular to the stream and disturb no more than 40 linear feet of riparian buffer [4][6][7]		X	
Underground electric line crossings that are perpendicular to the stream and disturb more than 40 linear feet of riparian buffer [4][6][7]		X	
Underground electric line crossings that are not perpendicular to the stream and impact Zone Two [4]			X

Article 6: Riparian Buffers

Section 6.8. Uses and Activities Permitted in Riparian Buffers

6.6.3. Riparian Buffer Variance Review Standards

Table 6.8: Uses and Activities Permitted in Riparian Buffers

Use or Activity	Exempt [1]	Allowable [2]	Allowable with Mitigation [3]
Non-electric utility line crossings that are perpendicular to the stream and disturb no more than 40 linear feet of riparian buffer and have a maintenance corridor no more than 10 feet wide [4][6]		X	
Non-electric utility line crossings that are perpendicular to the stream and disturb no more than 40 linear feet of riparian buffer and have a maintenance corridor more than 10 feet wide [4][6]		X	
Non-electric utility line crossings that are perpendicular to the stream and disturb more than 40 linear feet but no more than 150 linear feet of riparian buffer and have a maintenance corridor no more than 10 feet wide [4][6]		X	
Non-electric utility line crossings that are perpendicular to the stream and disturb more than 40 linear feet but no more than 150 linear feet of riparian buffer and have a maintenance corridor more than 10 feet wide [4][6]			X
Non-electric utility line crossings that are perpendicular to the stream and disturb more than 150 linear feet of riparian buffer			X
Non-electric utility line crossings that are not perpendicular to the stream and impact Zone Two [6][7]			X
Vegetation management:			
Emergency fire control measures where topography is restored	X		
Mowing maintenance in Zone Two	X		
Planting vegetation to enhance the riparian buffer	X		
Pruning forest vegetation where the health and function of the forest vegetation is not compromised	X		
Removal of individual trees that are in danger of causing damage to dwellings, other structures, or human life, or are imminently endangering stability of the streambank	X		
Removal of individual trees that are dead, diseased, or damaged	X		
Removal of poison ivy	X		
Removal of invasive exotic vegetation as defined in <i>Exotic Plant Guidelines</i> ⁵¹³	X		
Water dependent structures as defined in 15A NCAC 02B .0202, where installation and use result in disturbance to riparian buffers		X	
Water supply reservoirs:			
New reservoirs where a riparian buffer that meets the requirements of Section 6.3, Riparian Buffers and Zones, and Section 6.7, Diffuse Flow Requirements, is established adjacent to the reservoir		X	
New reservoirs where a riparian buffer that meets the requirements of Section 6.3, Riparian Buffers and Zones, and Section 6.7, Diffuse Flow Requirements, is not established adjacent to the reservoir			X
Wetland, stream, and buffer restoration that results in impacts to the riparian buffers:			
Restoration that requires North Carolina Division of Water Quality approval for the use of a 401 Water Quality Certification		X	
Restoration that does not require North Carolina Division of Water Quality approval for the use of a 401 Water Quality Certification		X	
NOTES:			
[1] Uses and activities designated as "Exempt" must be designed, constructed, and maintained to minimize soil disturbance and provide the maximum water quality protection practicable, including construction, monitoring, and maintenance activities.			
[2] Uses and activities designated as "Allowable" are allowed only if no practical alternatives are available and upon approval			

⁵¹³ Smith, Cheri L. 1998. Dept. of Environment and Natural Resources. Division of Parks and Recreation. Raleigh, NC. Guideline #30

Table 6.8: Uses and Activities Permitted in Riparian Buffers

Use or Activity	Exempt [1]	Allowable [2]	Allowable with Mitigation [3]
<p>and issuance of an Authorization Certificate in accordance with Section 6.5, Riparian Buffer Development Review.</p> <p>[3] Uses and activities designated as "Allowable with Mitigation" are allowed only if no practical alternatives are available and on approval and issuance of an Authorization Certificate with a mitigation strategy in accordance with Section 6.5, Riparian Buffer Development Review, and Section 6.9, Mitigation.</p> <p>[4] Perpendicular crossings are those that intersect the surface water at an angle between 75 and 105 degrees.</p> <p>[5] Overhead electric lines crossing Zone One shall comply with all of the following best management practices, unless the Board of Adjustment finds no practical alternative exists to such compliance:</p> <ul style="list-style-type: none"> • A minimum zone of 10 feet wide immediately adjacent to the water body shall be managed such that only vegetation that poses a hazard or has the potential to grow tall enough to interfere with the line is removed. • Woody vegetation shall be cleared by hand. No land grubbing or grading is allowed. • Vegetative root systems shall be left intact to maintain the integrity of the soil. Stumps shall remain where trees are cut. • Riprap shall not be used unless it is necessary to stabilize a tower. • No fertilizer shall be used other than a one-time application to re-establish vegetation. • Construction activities shall minimize the removal of woody vegetation, the extent of the disturbed area, and the time in which areas remain in a disturbed state. • Active measures shall be taken after construction and during routine maintenance to ensure diffuse flow of stormwater through the buffer. • In wetlands, mats shall be utilized to minimize soil disturbance. <p>[6] Poles or other above-ground utility line infrastructure shall be installed within 10 feet of a water body unless the Board of Adjustment finds no practical alternative exists to such location.</p> <p>[7] Underground utility lines crossing Zone One shall comply with all of the following best management practices, unless the Board of Adjustment finds no practical alternative exists to such compliance:</p> <ul style="list-style-type: none"> • Woody vegetation shall be cleared by hand. No land grubbing or grading is allowed. • Vegetative root systems shall be left intact to maintain the integrity of the soil. Stumps shall remain, except in the trench where trees are cut. • Underground cables shall be installed by vibratory plow or trenching. • The trench shall be backfilled with the excavated soil material immediately following cable installation. • No fertilizer shall be used other than a one-time application to re-establish vegetation. • Construction activities shall minimize the removal of woody vegetation, the extent of the disturbed area, and the time in which areas remain in a disturbed state. • Measures shall be taken on completion of construction and during routine maintenance to ensure diffuse flow of stormwater through the buffer. 			

SECTION 6.9. MITIGATION⁵¹⁴

6.9.1. Applicability⁵¹⁵

This subsection applies where a Riparian Buffer Development Review application proposes a use or activity listed as "Allowable with Mitigation" in Table 6.8, Uses and Activities Permitted in Riparian Buffers, or where mitigation is proposed or required as a condition of approval for a Riparian Buffer Variance application. Any application for Riparian Buffer Development Review or a Riparian Buffer Variance that proposes mitigation shall include a written mitigation proposal that calculates the required area of

⁵¹⁴ NOTE: This carries forward the mitigation standards in Sec. 9.C of the current Riparian Buffer Ordinance. NCDQ has recently proposed and held public hearings on consolidated riparian buffer mitigation standards, and is currently receiving comments on the proposed standards. Those proposed standards expand a number of current provisions and allow additional options for meeting the standards. They also expand the formula for calculating the area of mitigation to include multipliers relating to the location of mitigation relative to that of the impacted area. This subsection is modified to incorporate those minor proposed changes that merely further explain or address obvious gaps in the current standards. This subsection does not incorporate the more substantive proposed changes, but will be revised later to do so if the proposed changes are adapted. The current provisions are reorganized to a small extent to make them clearer.

⁵¹⁵ This carries forward provisions in Sec. 9.C.1 of the current Riparian Buffer Ordinance except for the last provision, which makes no sense since it pertains only to State-administered programs.

2. Floodplain Protection (UDO 5.6, 11.5)

- Floodplain Overlay District (UDO 3.8)
- Floodplain Development Permit (UDO 2.5.9)

SECTION 5.6. FLOODPLAIN MANAGEMENT³¹⁶

5.6.1. Purpose

The purpose of this section is to set forth methods and provisions for minimizing the risks of flooding and flood damage in the Floodplain Overlay (FO) District. Specifically the standards in this section are intended to:

- A. Restrict or prohibit development that is dangerous to health, safety, and property due to water or erosion hazards, or that result in damaging increases in erosion or in flood heights or velocities;
- B. Require development vulnerable to floods, including facilities serving such development, to be protected against flood damage at the time of initial construction;
- C. Control the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel floodwaters;
- D. Control filling, grading, dredging, and other development that may increase flood damage; and
- E. Prevent or regulate the construction of flood barriers that will unnaturally divert floodwaters or which may increase flood hazards in other areas.

5.6.2. Required Certificates

A. Elevation Certificates

1. An Elevation Certificate (FEMA Form 81-31) is required before the actual start of any new construction. It shall be the duty of the applicant for a Floodplain Development Permit to submit to the Planning Director a certification of the elevation of the reference level, in relation to mean sea level. The Planning Director shall review the certificate data submitted. The permit holder shall correct deficiencies detected by such review before the application for a Floodplain Development Permit may be approved. Failure to submit the certification or make required corrections of it shall be cause to deny a Floodplain Development Permit.
2. An Elevation Certificate (FEMA Form 81-31) is required after the reference level is established. Within seven calendar days after establishment of the reference level elevation, it shall be the duty of the holder of a Floodplain Development Permit to submit to the Planning Director a certification of the elevation of the reference level, in relation to mean sea level. Any work done within the seven-day calendar period and before submittal of the certification shall be at the permit holder's risk. The Planning Director shall review the certificate data submitted. The permit holder shall correct deficiencies detected by such review immediately, and before proceeding further on the work being permitted. Failure to submit the certification or make required corrections shall be cause to issue a stop work order for the development.
3. A final as-built Elevation Certificate (FEMA Form 81-31) is required after construction is completed and before issuance of a Certificate of Compliance/Occupancy. It shall be the duty of the holder of a Floodplain Development Permit to submit to the Planning Director a certification of final as-built construction of the elevation of the reference level and all attendant utilities. The Planning Director shall review the certificate data submitted. The permit holder shall correct deficiencies detected by such review immediately, and before issuance of a Certificate of Compliance/Occupancy. In some instances, another certification may be required to certify corrected as-built construction. Failure to submit the certification or make required corrections shall be cause to withhold the issuance of a Certificate of Compliance/Occupancy.

³¹⁶ This carries forward the floodplain management standards in the current Flood Damage Prevention Ordinance (Ch. 26 of the Code of Ordinances, modified only to clarify wording. Those parts of Ch. 26 pertaining to the Floodplain Development Permit are located in Article 2: Administration. Those parts of Ch. 26 pertaining to the establishment of the area subject to these floodplain management standards are in the regulations for the Floodplain Overlay (FO) District, in Article 3: Zoning Districts.

B. Floodproofing Certificate

If nonresidential floodproofing is used to meet the regulatory flood protection elevation requirements, a Floodproofing Certificate (FEMA Form 81-65), with supporting data and an operational plan, is required before the actual start of any new construction. It shall be the duty of the applicant for a Floodplain Development Permit to submit to the Planning Director a certification of the floodproofed design elevation of the reference level and all attendant utilities, in relation to mean sea level. Floodproofing certification shall be prepared by or under the direct supervision of a licensed Professional Engineer or architect and certified by same. The Planning Director shall review the certificate data and plan. The applicant shall correct deficiencies detected by such review before the application for a Floodplain Development Permit may be approved. Failure to submit the certification or make required corrections shall be cause to deny a Floodplain Development Permit. Failure to construct in accordance with the certified design shall be cause to withhold the issuance of a Certificate of Compliance/Occupancy.

C. Foundation Certificate

If a manufactured home is placed within Zone AE or Zone X (Future) and the elevation of the chassis is more than 36 inches in height above grade, an engineered foundation certification is required in accordance with C above.

D. Watercourse Alteration Certification

If a watercourse is proposed to be altered or relocated, the applicant for a Floodplain Development Permit shall submit to the Planning Director a description of the extent of watercourse alteration or relocation, a licensed Professional Engineer's certified report on the effects of the proposed project on the flood-carrying capacity of the watercourse and the effects to properties located both upstream and downstream, and a map showing the location of the proposed watercourse alteration or relocation.

E. Certification Exemptions

The following structures, if located within Zone AE or Zone X (Future), are exempt from the elevation/floodproofing certification requirements specified in subsections A and B above:

1. Recreational vehicles meeting requirements of 5.6.5.F;
2. Temporary nonresidential structures meeting requirements of 5.6.5.G; and
3. Accessory structures meeting requirements of 5.6.5.H.

5.6.3. Determinations for Existing Buildings and Structures

For applications for building permits to improve buildings and structures, including alterations, movement, enlargement, replacement, repair, change of occupancy, additions, rehabilitations, renovations, substantial improvements, repairs of substantial damage, and any other improvement of or work on such buildings and structures, the Planning Director, in coordination with the Building Official, shall:

- A.** Estimate the market value, or require the applicant to obtain an appraisal of the market value prepared by a qualified independent appraiser, of the building or structure before the start of construction of the proposed work (in the case of repair, the market value of the building or structure shall be the market value before the damage occurred and before any repairs are made);
- B.** Compare the cost to perform the improvement, the cost to repair a damaged building to its pre-damaged condition, or the combined costs of improvements and repairs, if applicable, to the market value of the building or structure;
- C.** Determine and document whether the proposed work constitutes substantial improvement or repair of substantial damage; and

- D. Notify the applicant if it is determined that the work constitutes substantial improvement or repair of substantial damage and that compliance with the flood resistant construction requirements of the North Carolina Building Code and this Ordinance is required.

5.6.4. General Standards for All Special Flood Hazard Areas

In all areas of special flood hazard the following standards are required:

- A. All new construction and substantial improvements shall be designed (or modified) and adequately anchored to prevent flotation, collapse and lateral movement of the structure.
- B. All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage.
- C. All new construction and substantial improvements shall be constructed by methods and practices that minimize flood damages.
- D. Electrical, heating, ventilation, plumbing, air conditioning equipment, and other service facilities shall be designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding.
- E. All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of floodwaters into the system.
- F. New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of floodwaters into the systems and discharge from the systems into floodwaters.
- G. On-site waste disposal systems shall be located and constructed to avoid impairment to them or contamination from them during flooding.
- H. Any alteration, repair, reconstruction or improvements to a structure, which complies with the provisions of this article, shall meet the requirements of "new construction" as contained in this article.
- I. Nothing in this ordinance shall prevent the repair, reconstruction, or replacement of a building or structure existing on the effective date of this ordinance and located totally or partially within the floodway, non-encroachment area, or stream setback, provided there is no additional encroachment below the regulatory flood protection elevation in the floodway, non-encroachment area, or stream setback, and provided that such repair, reconstruction, or replacement meets all of the other requirements of this ordinance.
- J. New solid waste disposal facilities and sites, hazardous waste management facilities, salvage yards, and chemical storage facilities shall not be permitted. A structure or tank for chemical or fuel storage incidental to an allowed use or to the operation of a water treatment plant or wastewater treatment facility may be located in a Special Flood Hazard Area or Future Conditions Flood Hazard Area only if the structure or tank is either elevated or floodproofed to at least the regulatory flood protection elevation and certified according to Section 5.6.2, Required Certificates.
- K. All subdivision proposals and other development proposals shall be consistent with the need to minimize flood damage.
- L. All subdivision proposals and other development proposals shall have public utilities and facilities such as sewer, gas, electrical and water systems located and constructed to minimize flood damage.
- M. All subdivision proposals and other development proposals shall have adequate drainage provided to reduce exposure to flood hazards.
- N. All subdivision proposals and other development proposals shall have received all necessary permits from those governmental agencies for which approval is required by Federal or State law, including Section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334.

5.6.5. Standards for Special Flood Hazard Areas with Flood Elevation Data

In all Special Flood Hazard Areas where Base Flood Elevation (BFE) data has been provided, and in Future Conditions Flood Hazard Areas where Future Conditions Flood Elevations data has been provided, the following standards shall apply in addition to the standards in Section 5.6.4, General Standards for All Special Flood Hazard Areas:

A. Residential Construction

New construction and substantial improvement of any residential structure (including manufactured homes) shall have the reference level, including basement, elevated no lower than the regulatory flood protection elevation.

B. Nonresidential Construction

New construction and substantial improvement of any commercial, industrial, or other nonresidential structure shall have the reference level, including basement, elevated no lower than the regulatory flood protection elevation. Structures located in AE and X (future) zones may be floodproofed to the regulatory flood protection elevation in lieu of elevation, provided that a licensed Professional Engineer or architect certifies to the Planning Director that all areas of the structure, together with attendant utility and sanitary facilities, below the regulatory flood protection elevation are watertight with walls substantially impermeable to the passage of water, and use structural components having the capability of resisting hydrostatic and hydrodynamic loads and the effects of buoyancy. A licensed Professional Engineer or architect shall certify that the standards of this subsection are satisfied.

C. Manufactured Homes

1. New or replacement manufactured homes shall be elevated so that the reference level of the manufactured home is no lower than the regulatory flood protection elevation.
2. Manufactured homes shall be securely anchored to an adequately anchored foundation to resist flotation, collapse, and lateral movement, in accordance with an engineer's certification or the most current edition of the State of North Carolina Regulations for Manufactured Homes adopted by the Commissioner of Insurance pursuant to N.C. Gen. Stat. § 143-143.15. Additionally, when the elevation would be met by an elevation of the chassis 36 inches or less above the grade at the site, the chassis shall be supported by reinforced piers or engineered foundation. When the elevation of the chassis is above 36 inches in height, an engineering certification is required.
3. All enclosures below the lowest floor shall meet the requirements of subsection 4 below.
4. An evacuation plan must be developed for evacuation of all residents of all new, substantially improved or substantially damaged manufactured home parks or subdivisions located within flood prone areas. This plan shall be filed with and approved by the Planning Director and the local Emergency Management coordinator.

D. Elevated Buildings

Fully enclosed areas of new construction and substantially improve structures that are below the lowest floor:

1. Shall not be designed or used for human habitation, but shall only be used for parking of vehicles, building access, or limited storage of maintenance equipment used in connection with the premises. Access to the enclosed area shall be the minimum necessary to allow for parking of vehicles (garage door) or limited storage of maintenance equipment (standard exterior door), or entry to the living area (stairway or elevator). The interior portion of such enclosed area shall not be finished or partitioned into separate rooms, except to enclose storage areas;
2. Shall be constructed entirely of flood resistant materials below the regulatory flood protection elevation;

3. Shall include, in Zones AE and X (Future), flood openings to automatically equalize hydrostatic flood forces on walls by allowing for the entry and exit of floodwaters. To meet this requirement, the openings must either be certified by a licensed Professional Engineer or architect or meet or exceed the following minimum design criteria;
 - a. A minimum of two flood openings on different sides of each enclosed area subject to flooding;
 - b. The total net area of all flood openings must be at least one square inch for each square foot of enclosed area subject to flooding;
 - c. If a building has more than one enclosed area, each enclosed area must have flood openings to allow floodwaters to automatically enter and exit;
 - d. The bottom of all required flood openings shall be no higher than one foot above the adjacent grade;
 - e. Flood openings may be equipped with screens, louvers, or other coverings or devices, provided they permit the automatic flow of floodwaters in both directions; and
 - f. Enclosures made of flexible skirting are not considered enclosures for regulatory purposes, and, therefore, do not require flood openings. Masonry or wood underpinning, regardless of structural status, is considered an enclosure and requires flood openings as outlined above.

E. Additions/Improvements

1. Where additions and/or improvements to pre-FIRM structures, in combination with any interior modifications to the existing structure, do not constitute a substantial improvement, the addition and/or improvements shall be designed to minimize flood damages and shall not be any more nonconforming than the existing structure.
2. Where additions and/or improvements to pre-FIRM structures, in combination with any interior modifications to the existing structure, constitute a substantial improvement, both the existing structure and the addition and/or improvements shall comply with the standards for new construction.
3. Where additions to post-FIRM structures constitute a substantial improvement and involve no modifications to the existing structure other than a standard door in the common wall, only the addition is required to comply with the standards for new construction.
4. Where additions and/or improvements to post-FIRM structures, in combination with any interior modifications to the existing structure, do not constitute a substantial improvement, only the addition and/or improvements is required to comply with the standards for new construction.
5. Where additions and/or improvements to post-FIRM structures, in combination with any interior modifications to the existing structure, constitutes a substantial improvement, both the existing structure and the addition and/or improvements shall comply with the standards for new construction.
6. Where any combination of repair, reconstruction, rehabilitation, addition, or improvement of a building or structure takes place during a ten-year period and their cumulative cost equals or exceeds 50 percent of the market value of the structure before the improvement or repair is started, the improvement or repair must comply with the standards for new construction. For each building or structure, the ten-year period begins on the date of the first improvement or repair of that building or structure subsequent to the effective date of this Ordinance. If the structure has sustained substantial damage, any repairs are considered substantial improvement regardless of the actual repair work performed. The requirement does not, however, include either:
 - a. Any project for improvement of a building required to correct existing health, sanitary, or safety code violations identified by the Building Official and that are the minimum necessary to assume safe living conditions; or

I. Tanks

The following standards shall apply when gas and liquid storage tanks are placed within a Special Flood Hazard Area:

1. Underground Tanks

Underground tanks in flood hazard areas shall be anchored to prevent flotation, collapse or lateral movement resulting from hydrodynamic and hydrostatic loads during conditions of the design flood, including the effects of buoyancy assuming the tank is empty.

2. Elevated Above-Ground Tanks

Above-ground tanks in flood hazard areas shall be attached to and elevated to or above the design flood elevation on a supporting structure that is designed to prevent flotation, collapse, or lateral movement during conditions of the design flood. Tank-supporting structures shall meet the foundation requirements of the applicable flood hazard area.

3. Non-Elevated Above-Ground Tanks

Above-ground tanks that do not meet the elevation requirements of Section 5.6.5.B, Nonresidential Construction, shall be permitted in flood hazard areas provided the tanks are anchored or otherwise designed and constructed to prevent flotation, collapse, or lateral movement resulting from hydrodynamic and hydrostatic loads during conditions of the design flood, including the effects of buoyancy assuming the tank is empty and the effects of flood-borne debris.

4. Tank Inlets and Vents

Tank inlets, fill openings, outlets, and vents shall be:

- a. At or above the design flood elevation or fitted with covers designed to prevent the inflow of floodwater or outflow of the contents of the tanks during conditions of the design flood; and
- b. Anchored to prevent lateral movement resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy, during conditions of the design flood.

J. Other Development

Prior to the issuance of a Floodplain Development Permit for a temporary structure, the applicant shall submit to the Planning Director for review and written approval a plan for the removal of such structure(s) in the event of a hurricane, flash flood, or other type of flood warning notification. The plan shall include information demonstrating compliance with the following standards:

1. Fences in Regulated Floodways and NEAs

Fences that have the potential to block the passage of floodwaters, such as stockade fences and wire mesh fences, shall meet the limitations of Section 5.6.7, Standards for Floodways and Non-Encroachment Areas.

2. Retaining Walls, Sidewalks, and Driveways in Regulated Floodways and NEAs

Retaining walls, sidewalks, and driveways that involve the placement of fill in regulated floodways shall meet the limitations of Section 5.6.7, Standards for Floodways and Non-Encroachment Areas.

3. Roads and Watercourse Crossings in Regulated Floodways and NEAs

Roads and watercourse crossings—including roads, bridges, culverts, low-water crossings, and similar means for vehicles or pedestrians to travel from one side of a watercourse to the other side—that encroach into regulated floodways shall meet the limitations of Section 5.6.7, Standards for Floodways and Non-Encroachment Areas.

5.6.6. Standards for Floodplains Without Established Base Flood Elevations

In Special Flood Hazard Areas designated as Approximate Zone A, where no Base Flood Elevation (BFE) data has been provided by FEMA, the following standards shall apply in addition to the standards in 5.6.5, Standards for Special Flood Hazard Areas with Flood Elevation Data:

- A.** No encroachments, including fill, new construction, substantial improvements or new development shall be permitted within a distance of 20 feet each side from top of bank, or five times the width of the stream, whichever is greater, unless a licensed Professional Engineer provides certification, with supporting technical data, that such encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge.
- B.** The Base Flood Elevation (BFE) used in determining the regulatory flood protection elevation shall be determined based on one of the following criteria set in priority order:
 - 1.** If Base Flood Elevation (BFE) data is available from other sources, all new construction and substantial improvements within such areas shall also comply with all applicable provisions of this ordinance and shall be elevated or floodproofed in accordance with standards in 5.6.5, Standards for Special Flood Hazard Areas with Flood Elevation Data.
 - 2.** All subdivision, manufactured home park, and other development proposals shall provide Base Flood Elevation (BFE) data if development is greater than five acres or has more than 50 lots/manufactured home sites. Such Base Flood Elevation (BFE) data shall be adopted by reference to be utilized in implementing this Ordinance.
 - 3.** When Base Flood Elevation (BFE) data is not available from a federal, State, or other source, the reference level shall be elevated to or above the regulatory flood protection elevation.

5.6.7. Standards for Floodways and Non-Encroachment Areas

Areas designated as floodways or non-encroachment areas within the Special Flood Hazard Areas are extremely hazardous areas due to the velocity of floodwaters that have erosion potential and carry debris and potential projectiles. The following standards shall apply to all development within such areas in addition to the standards in 5.6.5, Standards for Special Flood Hazard Areas with Flood Elevation Data:

- A.** No encroachments—including fill, new construction, substantial improvements, and other development—shall be permitted unless it has been demonstrated that:
 - 1.** The proposed encroachment would not result in any increase in the flood levels during the occurrence of the base flood, based on hydrologic and hydraulic analyses performed in accordance with standard engineering practice and presented to the Planning Director before issuance of a Floodplain Development Permit, or
 - 2.** A Conditional Letter of Map Revision (CLOMR) has been approved by FEMA and a Letter of Map Revision (LOMR) is obtained upon completion of the proposed encroachment.
- B.** If subsection A above is satisfied, all development shall comply with all applicable flood hazard reduction standards in 5.6.3 through 5.6.6.
- C.** Manufactured homes may be permitted provided the following provisions are met:
 - 1.** The anchoring and the elevation standards of Section 5.6.5.C, Manufactured Homes; and
 - 2.** The no encroachment standard of subsection 1 above.

REGULATORY FLOOD PROTECTION ELEVATION

The elevation above mean sea level to which the reference level of all structures and other development located within Special Flood Hazard Areas and Future Conditions Flood Hazard Areas must be protected, as established in Section 5.6, Floodplain Management.

(a) In “Special Flood Hazard Areas” where Base Flood Elevations (BFEs) have been determined, this elevation shall be the BFE plus two feet of freeboard.

(b) In “Special Flood Hazard Areas” where no BFE has been established, this elevation shall be at least two feet above the highest adjacent grade.

(c) In Future Conditions Flood Hazard Areas this elevation shall be the Future Conditions Flood Elevation plus two feet of freeboard.

REMEDY A VIOLATION

For purposes of floodplain management, to bring the structure or other development into compliance with state or local floodplain management regulations, or, if this is not possible, to reduce the impacts of its noncompliance. Ways that impacts may be reduced including protecting the structure or other affected development from flood damages, implementing the enforcement provisions of this article or otherwise deterring future similar violations, or reducing federal financial exposure with regard to the structure or other development.

RESEARCH LABORATORY

A facility that is designed or equipped for basic or applied research of experimental study, testing, or analysis in the natural and medical sciences or engineering, including any educational activities associated with and accessory to such research.

RESTAURANT

An establishment where meals or prepared food, including beverages and confections, are served to customers. Accessory uses may include bars, banquet rooms, catering services, pick-up facilities for take-out orders, windows for walk-up service, outdoor seating, and where specifically allowed, drive-through service facilities. An establishment that sells both alcoholic beverages and food is classified as a bar or lounge if it derives no more than 30 percent of its gross revenue from the sale of food and nonalcoholic beverages consumed on the premises.

RETAIL STORE

A building, property, or activity, the principal use or purpose of which is the sale of goods, products, or materials directly to the consumer. This use includes, but is not limited to, clothing stores, appliance stores, bakeries, food stores, grocers, caterers, pharmacies, book stores, florists, furniture stores, hardware stores, and pet stores. This use does not include convenience stores, automobile service stations, service establishments, restaurants, or adult establishments.

REVEAL

A change in height of the primary plane that brings relief to an otherwise flat surface and increases its complexity.

REZONING, CONDITIONAL

See Section 2.5.3.

REZONING, GENERAL

See Section 2.5.3.

REZONING, PLANNED DEVELOPMENT

See Section 2.5.3.

SECTION 3.8. OVERLAY DISTRICTS

3.8.1. General

A. General Purpose of Overlay Districts

Overlay zoning districts are superimposed over portions of one or more underlying base, conditional, or planned development zoning districts with the intent of supplementing generally applicable development regulations with additional development regulations that address special area-specific conditions, features, or plans while maintaining the character and purposes of the underlying districts. Some overlay districts include standards that modify or supersede standards applied by the underlying district.

B. Classification of Overlay Districts

Land shall be classified or reclassified into an overlay zoning district only in accordance with the procedures and requirements set forth in Section 2.5.3, Rezoning, and this section.

3.8.2. Airport Overlay (AO) Districts

A. Purpose

The purpose of the Airport Overlay Districts is to promote the most appropriate use of land affected by airport activities associated with the Raleigh-Durham International Airport. More specifically, the districts are intended to ensure the safety and welfare of the community from danger from falling aircraft and the annoyance and potential adverse health impacts of aircraft noise, and to ensure that development within the districts are compatible with activities associated with air traffic and services associated with the airport. To achieve these purposes, district regulations are intended, to the extent possible, to limit land uses to specific industrial, commercial, agricultural, recreational, and other nonresidential uses that are not subject to high population concentrations; restrict the aboveground storage of materials that pose major safety hazards if subject to an airplane crash; limit land uses particularly sensitive to aircraft noise within the area subject to average day/night sound levels (DNL or Ldn) of 65 decibels (dB)¹⁴² or greater; limit land uses and development that pose potential obstructions to safe air traffic and effective air traffic control; and ensure that development near the airport is located, designed, constructed, and maintained in a manner that minimizes exposure to safety risks associated with the airport, mitigates noise impacts, and avoids impediments to safe and efficient airport operations.

B. Applicability

1. The regulations in this section apply to the Airport Overlay-A (AO-A) and Airport Overlay-B (AO-B) Districts.
2. The Airport Overlay-A (AO-A) District consists of that part of the area subject to an average day/night sound level (DNL) from aircraft noise of 65 dB or greater (as established by the Raleigh-Durham Airport Authority and shown on the Town of Morrisville RDU Contours Map) located east of Chapel Hill Road (NC54). The Airport Overlay-B (AO-B) District consists of that part of such area located west of Chapel Hill Road (NC54).

¹⁴² Airport noise regulations vary in the terms used to reference sound levels. The most common is "average day/night sound levels" (alternatively abbreviated as DNL or Ldn), whose unit of measurement is the decibel. References to sound levels in this Ordinance will refer to DNL.

C. Modifications of Otherwise Applicable Standards

1. Uses Prohibited in Airport Overlay-A (AO-A) District¹⁴³

Irrespective of the use standards applicable in the underlying base, conditional, or planned development district, or in any other applicable overlay district, certain uses shall be prohibited in the Airport Overlay-A (AO-A) District, as indicated in the use tables in Article 4: Use Standards.

2. Underground Storage of Hazardous Chemicals and Substances

In the Airport Overlay-A District or Airport Overlay-B District, permanent or long-term storage of significant quantities of highly explosive, flammable, toxic, corrosive, or otherwise hazardous liquids, gases, chemicals, or other hazardous substances shall be located underground to reduce the hazardous consequences from an airplane crash.

3. Structure Height¹⁴⁴

The height of any structure in the Airport Overlay-A District or Airport Overlay-B District shall not exceed that which constitutes an obstruction to air navigation, navigational aids, or navigational facilities under standards of the Federal Aviation Administration (FAA) in 14 CFR Part 77, Subpart C, as applied to the area around Raleigh-Durham International Airport, unless the FAA determines no substantial obstruction exists in accordance with 14 CFR Part 77, Subpart D. Documentation of compliance with this requirement may be required for any structure or structural alteration that extends more than 50 feet above ground level.

4. Outdoor Lighting¹⁴⁵

- a. Outdoor lighting in the Airport Overlay-A District or Airport Overlay-B District shall be shielded to minimize direct skyward glare from the light source and otherwise located and designed to avoid producing light emissions—whether direct or indirect (reflective) of such intensity and directed in such directions as to impair pilot visibility or otherwise interfere with the safe operation of overhead aircraft.
- b. Lighting of towers, tall buildings, and other potential obstructions to air navigation shall include warning lighting that complies with FAA standards in Advisory Circular 70/7460-1 (Obstruction Marking and Lighting).

5. Electronic Interference¹⁴⁶

No use, development, or activity in the Airport Overlay-A District or Airport Overlay-B District shall produce electronic emissions that interfere with navigation signals or radio communications between aircraft and landing control facilities or with aircraft navigational or communication equipment.

¹⁴³ Part B, Article III, Section 1.2.A (Subdistrict A, Prohibited Uses) of the current Zoning Ordinance lists a number of uses prohibited in Subdistrict A. Those uses, modified to correspond to the uses as listed in the use tables and to add municipal solid waste landfills (which attract substantial numbers of birds, posing a threat of interference with overhead aircraft) are shown as prohibited in Article 4's use tables.

¹⁴⁴ Part C, Article III, Section 1.7 (Documentation) of the current Zoning Ordinance prohibits any building permit for a structure whose height exceeds applicable restrictions of RDU and the FAA. RDU has no height restrictions applicable outside the airport property and in the Town's jurisdiction and the FAA does not actually apply any height restrictions. It only establishes notice requirements, complex standards for determining what constitutes an obstruction to air navigation or navigational aids or facilities, and a procedure whereby a person may use studies to show no substantial obstruction exists despite the standards. This subsection modifies the current wording to specifically prohibit structure heights that would qualify as an obstruction under FAA determination rules.

¹⁴⁵ This modifies the provisions in Part C, Article III, Section 1.3 (Lighting) to more specifically prohibit lighting that would constitute hazard to air navigation and specifically require compliance with FAA obstruction lighting guidelines.

¹⁴⁶ This is a new provision generally prohibiting electronic interface with safe navigation.

6. Sound Mitigation¹⁴⁷

- a. New construction, or substantial improvement, of buildings within the Airport Overlay-A District or Airport Overlay-B District shall be designed to limit interior noise from aircraft to an average day/night sound level (DNL) of 45 dB in:
 - (1) Any habitable room (e.g., excluding hallways, stairwells, closets, bathrooms) of a dwelling unit;
 - (2) Any guest or sleeping room of a congregate living facility, fraternity/sorority house, rooming house, bed and breakfast, or hotel/motel;
 - (3) Any noise-sensitive area (e.g., classrooms, assembly areas, libraries, offices, sleeping rooms) of noise-sensitive nonresidential structures such as day care centers, places of worship, public cultural facilities, schools, hospitals, and nursing homes.
- b. Applications for a Building Permit for any building subject to the standards in subsection a above shall include the written certification by a Professional Engineer or Licensed Architect experienced and qualified in the field of acoustical testing and engineering that the proposed new construction will comply with the applicable standards.

7. Avigation Easement¹⁴⁸

The developer of new development in the Airport Overlay-A District or Airport Overlay-B District shall grant an avigation easement to the Raleigh-Durham Airport Authority for the subject property where needed to ensure the safe approach and departure of aircraft to and from the Raleigh-Durham International Airport. A copy of the recorded avigation easement shall be provided to the Planning Director before issuance of any Certificate of Compliance/Occupancy for a building on the property.

3.8.3. Floodplain Overlay (FO) District¹⁴⁹

A. Findings and Purpose

1. The flood prone areas within the jurisdiction of the Town are subject to periodic inundation. The cumulative effect of obstructions in floodplains cause increases in flood heights and velocities and

¹⁴⁷ Part C, Article III, Section 1.5 (Soundproofing) of the current zoning Ordinance essentially delegates to RDU staff the determination of whether proposed soundproofing techniques are sufficient. The provision does not provide any guidance as to what is sufficient. Nor is it clear whether the Town can deny a permit for what RDU staff determines to be insufficient. We propose revising this subsection to set forth a specific standard for noise level reduction, which is target noise level used in the FAA's noise insulation grant program, and to apply it to those buildings, or parts of buildings, that the grant program has identified as needing additional noise insulation. The 45 dB level represents a 20-25 dB noise level reduction (NLR) in nearly all of the AO District, which is within the 65 -70 LDN contour.

¹⁴⁸ NOTE: This current provision raises some issues about the Town's authority to require avigation easements. North Carolina's Model Airport Zoning Act (N.C. Gen. Stat. § 63-30 *et seq.*) authorizes local governments to regulate land uses and structure and tree height so as to avoid obstructions and hazards to safe airport operations. It also authorizes local governments to acquire air rights to protect airport approaches, but does not expressly authorize requiring avigation easements. A number of communities across the nation require avigation easements for development near airports (e.g., Orlando, Colorado Springs, Spokane, and a number of jurisdictions in California). Recent court decisions by the Nevada Supreme Court (*McCarran Int'l Airport v. Sisolak*, 137 P.3d 1110 (Nev. 2006)) and Oregon's Land Use Board of Appeals (*Barnes v. City of Hillsboro* (Or. LUBA 2010)), however, have invalidated the conditioning of development approvals on the grant of avigation easements as unconstitutional takings. North Carolina courts have not ruled on this issue, and it is not clear whether the Nevada and Oregon court rulings would be adopted by North Carolina or federal courts.

¹⁴⁹ This subsection carries forward those provisions in Chapter 26 (Flood Damage Prevention) of the Code of Ordinances pertaining to the purpose and establishment of areas subject to floodplain regulations as a new Floodplain Overlay District. Chapter 26 provisions pertaining to the procedure for floodplain permits is relocated to Section 2.5.9, Floodplain Development Permit. Chapter 26 standards for development in the FO District are set out in Section 5.6, Floodplain Management. Chapter 26 definitions are located in Section 11.5, Terms and Uses Defined.

the occupancy in flood prone areas of uses vulnerable to floods increase the likelihood of loss of life, property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which could adversely affect the public health, safety and general welfare.

2. The purpose of the Floodplain Overlay District is to minimize these risks and losses by provisions designed to:
 - a. Protect human life and health;
 - b. Minimize expenditure of public money for costly flood control projects;
 - c. Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
 - d. Minimize prolonged business losses and interruptions;
 - e. Minimize damage to public facilities and utilities (i.e. water and gas mains, electric, telephone, cable and sewer lines, streets and bridges) that are located in flood prone areas;
 - f. Help maintain a stable tax base by providing for the sound use and development of flood prone areas; and
 - g. Ensure that potential buyers are aware that property is in a Special Flood Hazard Area or Future Conditions Flood Hazard Area.

B. Applicability

1. The Floodplain Overlay (FO) District applies to all land within any Special Flood Hazard Area or a Future Conditions Flood Hazard Area within the corporate limits and extraterritorial jurisdiction of the Town of Morrisville. Special Flood Hazard Areas and Future Conditions Flood Hazard Areas shall be as determined under the Cooperating Technical State (CTS) agreement between the State of North Carolina and the Federal Emergency Management Agency (FEMA) in its Flood Insurance Study (FIS) dated [insert appropriate date] for Wake County and associated DFIRM panels, which are adopted by reference as part of this Ordinance. Future revisions to the FIS or DFIRM panels that do not change flood hazard data within the jurisdiction of Morrisville are also adopted by reference as part of this Ordinance.
2. Within the Floodplain Overlay (FO) District, no structure shall be located, extended, converted, or altered, and no development activity shall occur, in any way except after approval of a Floodplain Development Permit in accordance with 2.5.9, Floodplain Development Permit, and in full compliance with the provisions of Section 5.6, Floodplain Management.
3. The degree of flood protection required by the Floodplain Overlay District is considered reasonable for regulatory purposes and is based on scientific and engineering consideration. Larger floods can and will occur. Actual flood heights may be increased by manmade or natural causes. This section does not imply that land outside the Special Flood Hazard Areas and Future Conditions Flood Hazard Areas or uses permitted within such areas will be free from flooding or flood damages. This section shall not create liability on the part of the Town or by any Town officer or employee for any flood damages that result from reliance on Floodplain Overlay District regulations or any administrative decision lawfully made in accordance with such regulations.

3. Complies with the Engineering Design and Construction Manual;
4. Complies with all other applicable Town ordinances and state and federal laws;
5. Complies with all requirements and conditions of approval of any prior development permits or approvals.

2.5.9. Floodplain Development Permit⁹⁶

A. Applicability

1. The procedure and standards in this subsection apply to the review of applications for a Floodplain Development Permit, which shall be required before commencement of any development activities within Floodplain Overlay (FO) districts.
2. An application for a Floodplain Development Permit may be submitted and reviewed concurrently with applications for Site Plan Approval, Construction Plan Approval, or Stormwater Management Permit, Administrative Adjustment, or Alternative Equivalent Compliance.

B. Floodplain Development Permit Procedure

Figure 2.5.9.B and the following subsections identify those steps in the standard review procedure (see Section 2.4) applicable to the review of a Floodplain Development Permit application and note any specific variations of, or additions to, those review steps.

1. Application Submittal and Acceptance

The application shall be submitted and accepted, and may be withdrawn, in accordance with Section 2.4.3, except that the application shall include certificates of reference level elevations and any proposed floodproofing. (See Section 5.6, Floodplain Management.)

2. Staff Review and Decision

The Planning Director shall review the application, allow revisions of the application, and decide the application in accordance with Section 2.4.4. The decision shall be one of the following:

- a. Approval of the application as submitted;
- b. Approval of the application subject to conditions; or
- c. Denial of the application.

3. Post-Decision Actions

The post-decision actions and limitations in Section 2.4.8 shall apply to the application except as follows:

a. Effect of Approval

A Floodplain Development Permit allows the approval of any concurrently-reviewed applications for Site Plan Approval, Construction Plan Approval, Stormwater Management Permit, Administrative Adjustment, or Alternative Equivalent Compliance for the same development. It also authorizes submittal of an

Floodplain Development Permit

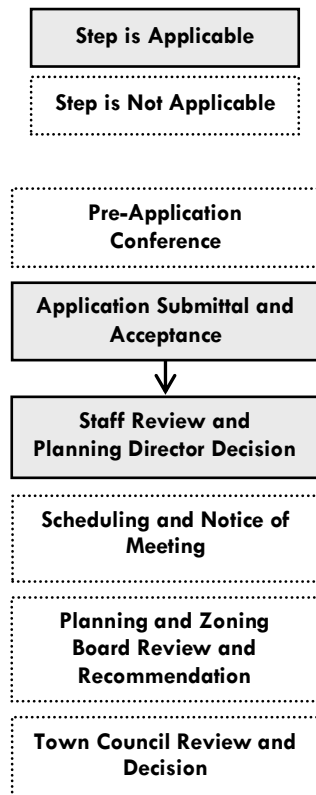


Figure 2.5.9.B

⁹⁶ This carries forward the floodplain development permit review procedures in Section 26-67 of the Flood Damage Prevention Ordinance in Chapter 26 of the Code of Ordinances, modifying them only to omit detailed submittal content requirements (which go into the Administrative Manual) and fit wording to the format used for other development review procedures.

application for Building Permit for construction of approved buildings and structures in the Floodplain Overlay (FO) district, construction of approved site improvements, approved alteration or relocation of watercourses, and other approved land disturbing activities in the FO district.

b. Expiration of Approval

A Floodplain Development Permit shall expire if an application for a Building Permit (or Certificate of Compliance/Occupancy, if a Building Permit is not required) for the approved development is not submitted within two years after the date of the Construction Plan Approval,

c. As-Built Elevation Certificate

Before a Certificate of Compliance/Occupancy may be approved for development subject to the Floodplain Development Permit, the applicant shall submit a final, “as-built” elevation certificate prepared by, or under the direct supervision of, a professional land surveyor or engineer to the Town Engineer for approval.

d. Inspections

Town staff and agents may inspect sites undergoing development authorized by a Floodplain Development Permit to determine whether development activities conform to approved plans and terms of the permit and comply with non-encroachment requirements.

C. Floodplain Development Permit Review Standards

An application for a Floodplain Development Permit shall be approved only if the Planning Director determines that the proposed development complies with all applicable standards in Section 5.6, Floodplain Management.

2.5.10. Riparian Buffer Development Review

See Section 6.5, Riparian Buffer Development Review.

2.5.11. Stormwater Management Permit

See Section 7.2, Administration and Procedures.

2.5.12. Sign Permit⁹⁷

A. Applicability

1. General

The procedure and standards in this subsection apply to the review of applications for a Sign Permit, which shall be required before the erection, installation, construction, alteration, or moving of any sign unless exempted from this Ordinance signage regulations in accordance with subsection 2 below, or from the permit requirements in accordance with subsection 3 below.

2. Signs Exempt from Regulation

Signs exempt from the signage regulations of this Ordinance are listed in Section 5.16.2.B, Exemptions.

⁹⁷ This subsection carries forward the sign permit procedures in Sections 2, 4, 5, and 8 of Article X of Part C of the current Zoning Ordinance except for the lists of signs exempt from regulations and signs exempt from Sign Permits, which are revised and listed in Section 5.16.2. The subsection otherwise modifies the current procedures only to provide that staff reviews and decides Sign Permit applications, to simplify wording, and to conform to the format used for other development application reviews.

3. Erosion & Sediment Control

See Appendix B – Wake County Programs

4. Stormwater Management and Riparian Buffers (UDO 7)

- Performance Guarantee (LDO 8.1)

Article 7: Stormwater Management

SECTION 7.1. GENERAL PROVISIONS

7.1.1. Findings

- A.** It is hereby determined that:
1. Development and redevelopment alter the hydrologic response of local watersheds and increases stormwater runoff rates and volumes, flooding, soil erosion, stream channel erosion, nonpoint and point source pollution, and sediment transport and deposition, as well as reducing groundwater recharge;
 2. These changes in stormwater runoff contribute to increased quantities of water-borne pollutants and alterations in hydrology that are harmful to public health and safety as well as to the natural environment; and
 3. These effects can be managed and minimized by applying proper design and well-planned controls to manage stormwater runoff from development and redevelopment sites.
- B.** It is further determined that the Federal Water Pollution Control Act of 1972 (“Clean Water Act”) and federal Phase II Stormwater Rules promulgated under it, as well as rules of the North Carolina Environmental Management Commission promulgated in response to federal Phase II requirements, compel certain urbanized areas, including this jurisdiction, to adopt minimum stormwater controls such as those included in this Ordinance.
- C.** Additionally, the North Carolina Environmental Management Commission has identified B. Everett Jordan reservoir, a water supply reservoir, as nutrient sensitive waters; has identified all or a portion of the reservoir as impaired waters under the federal Clean Water Act due to exceedances of the chlorophyll a standard; and has promulgated rules that have been amended and affirmed by the North Carolina General Assembly (the “Jordan Rules”) to reduce the average annual loads of nitrogen and phosphorus delivered to Jordan Reservoir from all point and nonpoint sources of these nutrients located within its watershed, including stormwater from new development in this jurisdiction;
- D.** Therefore, the Morrisville Town Council establishes this set of water quality and quantity regulations to meet the requirements of state and federal law regarding control of stormwater runoff and discharge for development and redevelopment.

7.1.2. Purpose

- A.** The purpose of this article is to protect, maintain and enhance the public health, safety, environment, and general welfare by establishing minimum requirements and procedures to control the adverse effects of: increased post-development stormwater runoff, nitrogen; phosphorus, and total suspended solids in stormwater runoff; nonpoint and point source pollution associated with new development and redevelopment; and illicit discharges into municipal stormwater systems. It has been determined that proper management of construction-related and post-development stormwater runoff will: minimize damage to public and private property and infrastructure; safeguard the public health, safety, and general welfare; and protect water and aquatic resources.
- B.** This article seeks to meet its general purpose through the following specific objectives and means:
1. Establishing decision-making processes for development and redevelopment that protects the integrity of watersheds and preserves the health of water resources;
 2. Requiring that new development and redevelopment maintain the pre-development hydrologic response in their post-development state for the applicable design storm to reduce flooding, streambank erosion, nonpoint and point source pollution, and increases in stream temperature, and to maintain the integrity of stream channels and aquatic habitats;

3. Establishing minimum post-development stormwater management standards and design criteria for the regulation and control of stormwater runoff quantity and quality;
4. Establishing design and review criteria for the construction, function, and use of structural stormwater best management practices (BMPs) that may be used to meet the minimum post-development stormwater management standards;
5. Encouraging the use of better management and site design practices, such as the use of vegetated conveyances for stormwater and the preservation of greenspace, riparian buffers, and other conservation areas to the maximum extent practicable;
6. Establishing provisions for the long-term responsibility for and maintenance of structural and nonstructural stormwater BMPs to ensure that they continue to function as designed, are maintained appropriately, and pose no threat to public safety;
7. Establishing administrative procedures for the submission, review, approval and disapproval of stormwater management plans, for the inspection of approved projects, and to assure appropriate long-term maintenance.
8. Controlling illicit discharges into the municipal separate stormwater system.

7.1.3. Authority

The Morrisville Town Council is authorized to adopt this article pursuant to North Carolina law, including but not limited to Article 14, Section 5 of the Constitution of North Carolina; North Carolina General Statutes Chapter 143-214.7 and rules promulgated by the Environmental Management Commission thereunder; Chapter 143-215.6A; Session Laws 2009-216, 2009-484; Chapter 153A-454; Chapter 160A, §§ 174, 185, 459.

7.1.4. Applicability and Jurisdiction

A. General

Beginning with and subsequent to its effective date, this article shall be applicable to all development and redevelopment—including, but not limited to, applications for Site Plan Approval, Subdivision Approval, Construction Plan Approval, and grading approval—unless exempt pursuant to this article.

B. Exemptions⁵²⁶

1. Single-family detached, duplex, and manufactured home dwellings and recreational development and redevelopment that cumulatively disturbs less than one acre and are not part of a larger common plan of development or sale are exempt from the provisions of this article.
2. Commercial, industrial, institutional, single-family attached and multifamily residential, or local government development and redevelopment that cumulatively disturbs less than one-half acre and are not part of a larger common plan of development or sale are exempt from the provisions of this article.
3. Development and redevelopment that disturbs less than the above thresholds are not exempt if such activities are part of a larger common plan of development or sale and the larger common plan exceeds the relevant threshold, even though multiple, separate, or distinct activities take place at different times on different schedules.
4. Development or redevelopment that is exempt from permit requirements of Section 404 of the federal Clean Water Act as specified in 40 CFR 232 (primarily, ongoing farming and forestry activities) is exempt from the provisions of this article.

⁵²⁶ This carries forward the exemptions in Sec. 105(B) of the current Stormwater Management Ordinance, modifying them only to replace the reference to “single family and duplex residential” in the first provision with the more specific “single-family detached, duplex, or manufactured home dwellings,” and adding “single-family attached” to the second provision.

C. No Development or Redevelopment until Compliance and Permit

No development or redevelopment shall occur except in compliance with the provisions of this article or unless exempted. No development or redevelopment for which a permit is required pursuant to this article shall occur except in compliance with the provisions, conditions, and limitations of the permit.

7.1.5. Map

- A.** The provisions of this article shall apply within the areas designated on the map titled "Stormwater Map of Morrisville, North Carolina" ("the Stormwater Map"), which is adopted simultaneously herewith. The Stormwater Map and all explanatory matter contained thereon accompanies and is hereby made a part of this Ordinance.
 - B.** The Stormwater Map shall be kept on file by the Stormwater Administrator and shall be dated to take into account changes in the land area covered by this Ordinance and the geographic location of all engineered stormwater controls permitted under this article. In the event of a dispute, the applicability of this article to a particular area of land or BMP shall be determined by reference to the North Carolina Statutes, the North Carolina Administrative Code, and local zoning and jurisdictional boundary ordinances.
-

7.1.6. Design Manual

A. Reference to Design Manual

- 1.** The Stormwater Administrator shall use the policy, criteria, and information, including technical specifications and standards, in the Design Manual as the basis for decisions about stormwater permits and about the design, implementation, and performance of engineered stormwater controls and other practices for compliance with this article.
- 2.** The Design Manual includes a list of acceptable stormwater treatment practices, including specific design criteria for each stormwater practice. Stormwater treatment practices that are designed, constructed, and maintained in accordance with these design and sizing criteria will be presumed to meet the minimum water quality performance standards of the Jordan Rules, Phase II and other applicable stormwater laws.

B. Relationship of Design Manual to Other Laws and Regulations

If the specifications or guidelines of the Design Manual are more restrictive or apply a higher standard than other laws or regulations, that fact shall not prevent application of the specifications or guidelines in the Design Manual.

C. Changes to Standards and Specifications

If the standards, specifications, guidelines, policies, criteria, or other information in the Design Manual are amended subsequent to the submittal of an application for approval pursuant to this article, but prior to approval, the new information shall control and shall be utilized in reviewing the application and in implementing this article with regard to the application.

D. Amendments to Design Manual

- 1.** The Design Manual may be updated and expanded from time to time, based on advancements in technology and engineering, improved knowledge of local conditions, or local monitoring or maintenance experience.
- 2.** Prior to amending or updating the Design Manual, proposed changes shall be generally publicized and made available for review, and an opportunity for comment by interested persons shall be provided.

SECTION 7.2. ADMINISTRATION AND PROCEDURES

7.2.1. Stormwater Administrator⁵²⁷

A. Designation

A Stormwater Administrator shall be designated by the Morrisville Town Engineer to administer and enforce this article.

B. Powers and Duties

In addition to the powers and duties that may be conferred by other provisions of this Ordinance and other laws, the Stormwater Administrator shall have the following powers and duties under this article:

1. To review and approve, approve with conditions, or disapprove applications for approval of plans pursuant to this article.
2. To make determinations and render interpretations of this article.
3. To establish application requirements and schedules for submittal and review of applications and appeals, to review and make recommendations to other Town staff and Town boards on applications for development or redevelopment approvals.⁵²⁸
4. To enforce the provisions of this article in accordance with its enforcement provisions.
5. To maintain records, maps, forms, and other official materials as relate to the adoption, amendment, enforcement, and administration of this article.
6. To provide expertise and technical assistance to the Town, on request.
7. To designate appropriate other person(s) who shall carry out the powers and duties of the Stormwater Administrator.
8. To take any other action necessary to administer the provisions of this article.

7.2.2. Review Procedures⁵²⁹

A. Stormwater Management Permit Required; Must Apply for Permit

A Stormwater Management Permit is required for all development and redevelopment unless exempt pursuant to this article. A Stormwater Management Permit may only be issued subsequent to a properly submitted and reviewed permit application, pursuant to this section.

B. Effect of Permit

1. A Stormwater Management Permit shall govern the design, installation, and construction of stormwater management and control practices on the site, including engineered stormwater controls and elements of site design for stormwater management other than engineered stormwater controls.
2. The Stormwater Management Permit is intended to provide a mechanism for the review, approval, and inspection of the approach to be used for the management and control of stormwater for the development or redevelopment site consistent with the requirements of this article, whether the approach consists of engineered stormwater controls or other techniques such as low-impact or low-density design. The permit does not continue in existence indefinitely after

⁵²⁷ This carries forward provisions in Sec. 201 of the current Stormwater Management Ordinance.

⁵²⁸ This replaces a reference to "the Town of Morrisville" with one to "other Town staff and Town boards."

⁵²⁹ This carries forward provisions in Sec. 202 of the current Stormwater Management Ordinance. Although many of the provisions are quite similar to the standard review procedures in Section 2.4, there are minor differences.

the completion of the project; rather, compliance after project construction is assured by the maintenance provisions of this article.

C. Authority to File Applications

All Stormwater Management Permit applications required pursuant to this article shall be submitted to the Stormwater Administrator by the landowner or the land owner's duly authorized agent.

D. Establishment of Application Requirements, Schedule, and Fees

1. Application Contents and Form

The Stormwater Administrator shall establish requirements for the content and form of all Stormwater Management Permit applications and shall amend and update those requirements from time to time. At a minimum, the Stormwater Management Permit application shall describe in detail how post-development stormwater runoff will be controlled and managed, the design of all stormwater facilities and practices, and how the proposed project will meet the requirements of this article.

2. Submission Schedule

The Stormwater Administrator shall establish a submission schedule for Stormwater Management Permit applications. The schedule shall establish deadlines by which complete applications must be submitted for the purpose of ensuring that there is adequate time to review applications, and that the various stages in the review process are accommodated.

3. Permit Review Fees

The Town Council shall establish Stormwater Management Permit review fees as well as policies regarding refund of any fees upon withdrawal of an application, and may amend and update the fees and policies from time to time.

4. Administrative Manual

For Stormwater Management Permit applications required under this Code, the Stormwater Administrator shall compile the application requirements, submission schedule, fee schedule, a copy of this article, and information on how and where to obtain the Design Manual in an Administrative Manual, which shall be made available to the public.

E. Submittal of Complete Application

1. Stormwater Management Permit applications shall be submitted to the Stormwater Administrator pursuant to the application submittal schedule, and in the form established by the Stormwater Administrator, along with the appropriate fee established pursuant to this section.
2. A Stormwater Management Permit application shall be considered as timely submitted only when it contains all elements of a complete application pursuant to this article, along with the appropriate fee. If the Stormwater Administrator finds that an application is incomplete, the applicant shall be notified of the deficient elements and shall be provided with an opportunity to submit a complete application. However, the submittal of an incomplete application shall not suffice to meet a deadline contained in the submission schedule established above.

F. Review

Within the timeframe specified in the submission schedule after a complete Stormwater Management Permit application is submitted, the Stormwater Administrator shall review the application and determine whether the application complies with the standards of this article.

1. Approval

If the Stormwater Administrator finds that the Stormwater Management Permit application complies with the standards of this article and this Ordinance, the Stormwater Administrator shall

approve the application. The Stormwater Administrator may impose conditions of approval as needed to ensure compliance with this article. The conditions shall be included as part of the approval.

2. Fails to Comply

If the Stormwater Administrator finds that the Stormwater Management Permit application fails to comply with the standards of this article, the Stormwater Administrator shall notify the applicant and shall indicate how the application fails to comply. The applicant shall have an opportunity to submit a revised application.

3. Revision and Subsequent Review

- a.** A complete revised Stormwater Management Permit application shall be reviewed by the Stormwater Administrator within the timeframe specified in the submission schedule after its resubmittal and shall be approved, approved with conditions or disapproved.
- b.** If a revised Stormwater Management Permit application is not re-submitted within six months from the date the applicant was notified, the application shall be considered withdrawn, and a new submittal for the same or substantially the same project shall be required along with the appropriate fee for a new submittal.
- c.** Two resubmittals of a revised Stormwater Management Permit application may be submitted without payment of an additional permit review fee. Any resubmittal after the second resubmittal shall be accompanied by an additional permit review fee, as established pursuant to this Ordinance.

7.2.3. Applications for Approval

A. Concept Plan and Consultation Meeting

1. Consultation Meeting

Before a Stormwater Management Permit application is deemed complete, the Stormwater Administrator or developer may request a consultation on a concept plan for the post-construction stormwater management system to be utilized in the proposed development project. This consultation meeting should take place at the time of the preliminary plan of subdivision or other early step in the development process. The purpose of this meeting is to discuss the stormwater management measures necessary for the proposed project, as well as to discuss and assess constraints, opportunities, and potential approaches to stormwater management designs before formal site design engineering is commenced. Local watershed plans, the comprehensive plan, and other relevant resource protection plans should be consulted in the discussion of the concept plan.

2. Concept Plan Contents

To accomplish this goal, the following information should be included in the concept plan, which should be submitted in advance of the meeting:

a. Existing Conditions/Proposed Site Plans

Existing conditions and proposed site layout sketch plans, which illustrate at a minimum: existing and proposed topography; perennial and intermittent streams; mapping of predominant soils from soil surveys (if available); stream and other buffers and features used in designing buffers and meeting any applicable buffer requirements; boundaries of existing predominant vegetation; proposed limits of clearing and grading; and location of existing and proposed roads, buildings, parking areas, and other impervious surfaces.

b. Natural Resources Inventory

A written or graphic inventory of natural resources at the site and surrounding area as it exists prior to the commencement of the project. This description should include a discussion of soil conditions, forest cover, geologic features, topography, wetlands, and native vegetative areas on the site, as well as the location and boundaries of other natural feature protection and conservation areas such as lakes, ponds, floodplains, stream buffers, and other setbacks (e.g., drinking water well setbacks, septic setbacks, etc.). Particular attention should be paid to environmentally sensitive features that provide particular opportunities or constraints for development and stormwater management.

c. Stormwater Management System Concept Plan

A written or graphic concept plan of the proposed post-development stormwater management system including: preliminary selection and location of proposed engineered stormwater controls; low-impact design elements; location of existing and proposed conveyance systems such as grass channels, swales, and storm drains; flow paths; location of floodplain/floodway limits; relationship of site to upstream and downstream properties and drainages; and preliminary location of any proposed stream channel modifications, such as bridge or culvert crossings.

B. Stormwater Management Permit Application⁵³⁰

1. The Stormwater Management Permit application shall detail how post-development stormwater runoff will be controlled and managed and how the proposed project will meet the requirements of this article, including Section 7.3, Standards. All such plans shall be prepared by a qualified licensed North Carolina Professional Engineer or registered surveyor, soil scientist, or landscape architect. The engineer, surveyor, soil scientist, or landscape architect shall perform services only in their area of competence, and shall verify that the design of all stormwater management facilities and practices meets the submittal requirements for complete applications, that the designs and plans are sufficient to comply with applicable standards and policies found in the Design Manual, and that the designs and plans ensure compliance with this article.
2. The submittal shall include all of the information required in the submittal checklist established by the Stormwater Administrator. Incomplete submittals shall be treated pursuant to Section 7.2.2.E, Submittal of Complete Application.

C. As-Built Plans and Final Approval

1. Upon completion of a project, and before a Certificate of Compliance/Occupancy shall be granted, the applicant shall certify that the completed project is in accordance with the approved stormwater management plans and designs, and shall submit actual “as built” plans for all stormwater management facilities or practices after final construction is completed.
2. The plans shall show the final design specifications for all stormwater management facilities and practices and the field location, size, depth, and planted vegetation of all measures, controls, and devices, as installed. The designer of the stormwater management measures and plans shall certify, under seal, that the as-built stormwater measures, controls, and devices are in compliance with the approved stormwater management plans and designs and with the requirements of this article. A final inspection and approval by the Stormwater Administrator shall occur before the release of any performance securities.

D. Other Permits

No Certificate of Compliance/Occupancy shall be issued by the Town Inspections Department without final as-built plans and a final inspection and approval by the Stormwater Administrator, except

⁵³⁰ The Stormwater Management Ordinance alternately refers to “stormwater permit” and “stormwater management permit.” To be consistent, this article refers to Stormwater Management Permit.

where multiple units are served by the stormwater practice or facilities, in which case the Inspections Department may elect to withhold a percentage of permits or Certificates of Compliance/Occupancy until as-built plans are submitted and final inspection and approval has occurred.

7.2.4. Approvals

A. Effect of Approval

Approval of a Stormwater Management Permit authorizes the applicant to go forward with only the specific plans and activities authorized in the permit. The approval shall not be construed to exempt the applicant from obtaining other applicable approvals from local, State, and federal authorities.

B. Time Limit/Expiration

1. An approved plan shall become null and void if the applicant fails to make substantial progress on the site within one year after the date of approval. The Stormwater Administrator may grant a single, one-year extension of this time limit, for good cause shown, upon receiving a written request from the applicant before the expiration of the approved plan.
2. In granting an extension, the Stormwater Administrator may require compliance with standards adopted since the original application was submitted unless there has been substantial reliance on the original permit and the change in standards would infringe the applicant's vested rights.

7.2.5. Stormwater Variances

- A. Any person may petition the Town for a variance granting permission to use the person's land in a manner otherwise prohibited by this article. For all proposed major and minor variances from the requirements of this article, the Board of Adjustments shall make findings of fact showing that:
 1. There are practical difficulties or unnecessary hardships that prevent compliance with the strict letter of the article;
 2. The variance is in harmony with the general purpose and intent of the local watershed protection regulations and preserves their spirit; and
 3. In granting the variance, the public safety and welfare have been assured and substantial justice has been done.
- B. In the case of a request for a minor variance, the Board of Adjustment may vary or modify any of the regulations or provisions of the article so that the spirit of the article shall be observed, public safety and welfare secured, and substantial justice done, and may impose reasonable and appropriate conditions and safeguards upon any variance it grants.
- C. The Board of Adjustment may attach conditions to the major or minor variance approval that support the purpose of the local watershed protection regulations. If the variance request qualifies as a major variance, and the Board of Adjustment decides in favor of granting the major variance, the Board shall then prepare a preliminary record of the hearing and submit it to the North Carolina Environmental Management Commission for review and approval. If the Commission approves the major variance or approves with conditions or stipulations added, then the Commission shall prepare a Commission decision which authorizes the Board of Adjustment to issue a final decision which would include any conditions or stipulations added by the Commission. If the Commission denies the major variance, then the Commission shall prepare a decision to be sent to the Board of Adjustment. The Board of Adjustment shall prepare a final decision denying the major variance.
- D. Appeals from the local government decision on a major or minor variance request are made on certiorari to the local Superior Court. Appeals from the Commission decision on a major variance request are made on judicial review to Superior Court.

- E. On request of the Stormwater Administrator, any person who petitions the Board of Adjustment for a variance under this section shall provide notice to the affected local governments of the variance request as required under the Jordan Rule, 15A NCAC 2B.0104(r). For purposes of this notice requirement, “affected local governments” means any local governments that withdraw water from Lake Jordan or its tributaries downstream of the site of the proposed variance. If the proposed variance is in a Water Supply Watershed area classified as WS II, WS III or WS IV, “affected local governments” also includes any other local governments in the same water supply watershed as the proposed variance. The notice shall provide a reasonable period for comments and shall direct the comments to be sent to the Stormwater Administrator. The person petitioning for the variance shall supply proof of notification in accordance with this section to the Stormwater Administrator.

7.2.6. Appeals

Any aggrieved person affected by any decision, order, requirement, or determination relating to the interpretation or application of this article made by the Stormwater Administrator, may file an appeal to the Board of Adjustment within 30 days. Applications for an Appeal shall be filed, reviewed, and decided in accordance with 2.5.22, Administrative Appeal, except that the Board of Adjustment shall make a final decision on an appeal of a decision relating to civil penalties for violations of this article within 90 days after the date the appeal application is accepted.

SECTION 7.3. STANDARDS

7.3.1. General Standards

All development and redevelopment to which this article applies shall comply with the standards of this section. The approval of the Stormwater Management Permit shall require an enforceable restriction on property usage that runs with the land, such as a recorded deed restriction or protective covenants, to ensure that future development and redevelopment maintains the site consistent with the approved project plans.

7.3.2. Nitrogen and Phosphorus Loading

- A. Nitrogen and phosphorus loads contributed by the proposed new development shall not exceed the following unit-area mass loading rates: 2.2 and 0.82 pounds per acre per year for nitrogen and phosphorus, respectively.
- B. Notwithstanding 15A NCAC 2B.104(q), redevelopment subject to this article that would replace or expand existing structures or improvements and would result in a net increase in built-upon area shall have the option of either meeting the loading standards identified in subsection A or meeting a loading rate that achieves the following nutrient loads compared to the existing development: 35 percent and five percent reduction for nitrogen and phosphorus, respectively.
- C. The developer shall determine the need for engineered stormwater controls to meet these loading rate targets by using the approved accounting tool.

7.3.3. Nitrogen and Phosphorus Standard Is Supplemental; TSS Removal

- A. The nitrogen and phosphorus loading standards in this article are supplemental to, not replacements for, stormwater standards otherwise required by federal, state, or local law, including without limitation any riparian buffer requirements applicable to the location of the development. This includes, without limitation, the riparian buffer protection requirements of 15A NCAC 2B.0267 and .0268.
- B. All stormwater systems used to meet these requirements shall be designed to have a minimum of 85 percent average annual removal for Total Suspended Solids (TSS).

7.3.4. Control and Treatment of Runoff Volume

- A.** Stormwater systems shall be designed to control and treat the runoff volume generated from all surfaces by one inch of rainfall. This treatment volume shall not exceed the maximum ponding depth and be drawn down pursuant to standards specific to each practice as provided in the Design Manual. Additionally, stormwater systems shall be designed to control and treat the runoff volume generated from all surfaces by an additional one-half inch of rainfall, which shall be drawn down pursuant to standards specific to each practice as provided in the Design Manual.
- B.** To ensure that the integrity and nutrient processing functions of receiving waters and associated riparian buffers are not compromised by erosive flows, stormwater flows from the development or redevelopment shall not contribute to degradation of waters of the State. At a minimum, the development or redevelopment shall not result in a net increase in peak flow leaving the site from pre-development conditions for the 1-year, 24-hour storm; 2-year, 24-hour storm; and 10-year, 24-hour storm events.

7.3.5. Partial Offset of Nutrient Control Requirements

- A.** Development subject to this article shall attain a maximum nitrogen loading rate on-site of six pounds per acre per year for single-family detached and duplex residential development and ten pounds per acre per year for other development, including multifamily residential, commercial, and industrial, and shall meet any requirements for engineered stormwater controls otherwise imposed by this article. A developer subject to this article may achieve the additional reductions in nitrogen and phosphorus loading required by this article by use of the following options: Purchasing offset credits from an approved private seller with a project located within the same eight-digit Hydrologic Unit Code (8-digit HUC) as the proposed development. Refer to the North Carolina Department of Environmental and Natural Resources (NCDENR) Division of Water Quality (DWQ) for approved mitigation banks with applicable and eligible credits to Morrisville.
- B.** Making offset payments to the NC Ecosystem Enhancement Program contingent upon acceptance of payments by that Program.
- C.** Making offset payments to the Town of Morrisville for equivalent nutrient credits at 80 percent of the rate calculated by the NC Ecosystem Enhancement Program.
- D.** A developer may propose other offset measures to the Town, including providing his or her own offsite offset.

7.3.6. Evaluation of Standards for Stormwater Control Measures

A. Evaluation According to Contents of Design Manual

All stormwater control measures, stormwater systems and stormwater treatment practices (also referred to as Best Management Practices, or BMPs) required under this article shall be evaluated by the Stormwater Administrator according to the policies, criteria, and information, including technical specifications and standards and the specific design criteria for each stormwater practice, in the Design Manual. The Stormwater Administrator shall determine whether proposed BMPs will be adequate to meet the requirements of this article.

B. Determination of Adequacy; Presumptions and Alternatives

Stormwater treatment practices that are designed, constructed, and maintained in accordance with the criteria and specifications in the Design Manual and the approved accounting tool will be presumed to meet the minimum water quality and quantity performance standards of this article. Whenever an applicant proposes to utilize a practice or practices not designed and constructed in accordance with the criteria and specifications in the Design Manual, the applicant shall have the burden of demonstrating that the practice(s) will satisfy the minimum water quality and quantity performance standards of this article. The Stormwater Administrator may require the applicant to provide the

documentation, calculations, and examples necessary for the Stormwater Administrator to determine whether such an affirmative showing is made.

7.3.7. Dedication of BMPs, Facilities, and Improvements

The Town may accept dedication of any existing or future stormwater management facility for maintenance, provided such facility meets all the requirements of this article and includes adequate and perpetual access and sufficient area, by easement or otherwise, for inspection and regular maintenance.

SECTION 7.4. MAINTENANCE

7.4.1. General Standards for Maintenance

A. Function of BMPs as Intended

The owner of each engineered stormwater control installed pursuant to this article shall maintain and operate it so as to preserve and continue its function in controlling stormwater quality and quantity at the degree or amount of function for which the engineered stormwater control was designed.

B. Annual Maintenance Inspection and Report

1. The person responsible for maintenance of any engineered stormwater control installed pursuant to this article shall submit to the Stormwater Administrator an inspection report from one of the following persons performing services only in their area of competence: a qualified licensed North Carolina Professional Engineer or registered surveyor, landscape architect, or person certified by the North Carolina Cooperative Extension Service for stormwater treatment practice inspection and maintenance. The inspection report shall contain all of the following:
 - a. The name and address of the land owner;
 - b. The recorded book and page number of the lot of each engineered stormwater control;
 - c. A statement that an inspection was made of all engineered stormwater controls;
 - d. The date the inspection was made;
 - e. A statement that all inspected engineered stormwater controls are performing properly and are in compliance with the terms and conditions of the approved maintenance agreement required by this article; and
 - f. The original signature and seal of the engineer, surveyor, or landscape architect.
2. All inspection reports shall be on forms supplied by the Stormwater Administrator. An original inspection report shall be provided to the Stormwater Administrator beginning one year from the date of as-built certification and each year thereafter on or before the date of the as-built certification.

7.4.2. Operation and Maintenance Agreement

A. In General

1. Prior to the conveyance or transfer of any lot or building site to be served by a engineered stormwater control pursuant to this article, and prior to issuance of any permit for development or redevelopment requiring a engineered stormwater control pursuant to this article, the applicant or owner of the site must execute an operation and maintenance agreement that shall be binding on all subsequent owners of the site, portions of the site, and lots or parcels served by the engineered stormwater control. Until the transference of all property, sites, or lots served by the engineered stormwater control, the original owner or applicant shall have primary responsibility for carrying out the provisions of the maintenance agreement.

2. The operation and maintenance agreement shall require the owner or owners to maintain, repair, and, if necessary, reconstruct the engineered stormwater control, and shall state the terms, conditions, and schedule of maintenance for the engineered stormwater control. In addition, it shall grant to the Town a right of entry in the event that the Stormwater Administrator has reason to believe it has become necessary to inspect, monitor, maintain, repair, or reconstruct the engineered stormwater control; however, in no case shall the right of entry, of itself, confer an obligation on the Town to assume responsibility for the engineered stormwater control.
3. The operation and maintenance agreement must be approved by the Stormwater Administrator prior to plan approval, and it shall be referenced on the final plat and shall be recorded with the Register of Deeds of the county in which the stormwater control is located upon final plat approval. A copy of the recorded maintenance agreement shall be given to the Stormwater Administrator within 14 days following its recordation.

B. Special Requirement for Homeowners' and Other Associations

For all engineered stormwater controls required pursuant to this article and that are to be or are owned and maintained by a homeowners' association, property owners' association, or similar entity, the required operation and maintenance agreement shall include all of the following provisions:

1. Acknowledgment that the association shall continuously operate and maintain the stormwater control and management facilities.
2. Establishment of an escrow account, which can be spent solely for sediment removal, structural, biological or vegetative replacement, major repair, or reconstruction of the engineered stormwater controls. If engineered stormwater controls are not performing adequately or as intended or are not properly maintained, the Town, in its sole discretion, may remedy the situation, and in such instances the Town shall be fully reimbursed from the escrow account. Escrowed funds may be spent by the association for sediment removal, structural, biological or vegetative replacement, major repair, and reconstruction of the engineered stormwater controls, provided that the Town shall first consent to the expenditure.
3. Both developer contribution and annual sinking funds shall fund the escrow account. Prior to plat recordation or issuance of construction permits, whichever shall first occur, the developer shall pay into the escrow account an amount equal to 15 percent of the initial construction cost of the engineered stormwater controls. Two-thirds of the total amount of sinking fund budget shall be deposited into the escrow account within the first five years and the full amount shall be deposited within ten years following initial construction of the engineered stormwater controls. Funds shall be deposited each year into the escrow account. A portion of the annual assessments of the association shall include an allocation into the escrow account. Any funds drawn down from the escrow account shall be replaced in accordance with the schedule of anticipated work used to create the sinking fund budget.
4. The percent of developer contribution and lengths of time to fund the escrow account may be varied by the Town depending on the design and materials of the stormwater control and management facility.
5. Granting to the Town a right of entry to inspect, monitor, maintain, repair, and reconstruct engineered stormwater controls.
6. Allowing the Town to recover from the association and its members any and all costs the Town expends to maintain or repair the engineered stormwater controls or to correct any operational deficiencies. Failure to pay the Town all of its expended costs, after 45 days written notice, shall constitute a breach of the agreement. In case of a deficiency, the Town shall thereafter be entitled to bring an action against the association and its members to pay, or foreclose upon the lien hereby authorized by the agreement against the property, or both. Interest, collection costs, and attorney fees shall be added to the recovery.

7. A statement that this agreement shall not obligate the Town to maintain or repair any engineered stormwater controls, and the Town shall not be liable to any person for the condition or operation of engineered stormwater controls.
8. A statement that this agreement shall not in any way diminish, limit, or restrict the right of the Town to enforce any of its ordinances as authorized by law.
9. A provision indemnifying and holding harmless the Town for any costs and injuries arising from or related to the engineered stormwater control, unless the Town has agreed in writing to assume the maintenance responsibility for the BMP and has accepted dedication of any and all rights necessary to carry out that maintenance.

7.4.3. Inspection Program

- A. Inspections and inspection programs by the Town may be conducted or established on any reasonable basis, including but not limited to routine inspections, random inspections, inspections based upon complaints or other notice of possible violations, and joint inspections with other agencies inspecting under environmental or safety laws. Inspections may include, but are not limited to: reviewing maintenance and repair records; sampling discharges, surface water, groundwater, and material or water in BMPs; and evaluating the condition of BMPs.
- B. If the owner or occupant of any property refuses to permit such inspection, the Stormwater Administrator shall proceed to obtain an administrative search warrant pursuant to N.C.G.S. 15-27.2 or its successor. No person shall obstruct, hamper or interfere with the Stormwater Administrator while carrying out his or her official duties.

7.4.4. Performance Security for Installation and Performance⁵³¹

A. Performance Security

The Town shall require the submittal of a performance security with cash escrow prior to issuance of a permit in order to ensure that the engineered stormwater controls are:

1. Installed by the permit holder as required by the approved stormwater management plan, and/or
2. Maintained by the owner as required by the operation and maintenance agreement.

B. Amount

1. Installation

The amount of an installation performance security shall be the total estimated construction cost of the BMPs approved under the permit.

2. Maintenance

The amount of a maintenance performance security shall be 30 percent of the total estimated construction cost of the BMPs approved under the permit, plus 50 percent.

C. Uses of Performance Security

1. Forfeiture Provisions

The performance security shall contain forfeiture provisions for failure, after proper notice, to complete work within the time specified, or to initiate or maintain any actions which may be

⁵³¹ This carries forward provisions in Sec. 404 of the current Stormwater Management Ordinance that are very similar to—but not the same as—the performance guarantee provisions in Article 8: Performance and Maintenance. The current stormwater regulations generally impose stricter requirements than the Design and Construction Ordinance, from which the performance guarantee standards in Article 8 are derived.

required of the applicant or owner in accordance with this article, approvals issued pursuant to this article, or an operation and maintenance agreement established pursuant to this article.

2. Default

Upon default of the owner to construct, maintain, repair and, if necessary, reconstruct any engineered stormwater control in accordance with the applicable permit or operation and maintenance agreement, the Stormwater Administrator shall obtain and use all or any portion of the security to make necessary improvements based on an engineering estimate. Such expenditure of funds shall only be made after requesting the owner to comply with the permit or maintenance agreement. In the event of a default triggering the use of installation performance security, the Town shall not return any of the unused deposited cash funds or other security, which shall be retained for maintenance.

3. Costs in Excess of Performance Security

If the Town takes action upon such failure by the applicant or owner, the Town may collect from the applicant or owner the difference between the amount of the reasonable cost of such action and the amount of the security held, in addition to any other penalties or damages due.

4. Refund

Within 60 days of the final approval, the installation performance security shall be refunded to the applicant or terminated, except any amount attributable to the cost (plus 50 percent) of landscaping installation and ongoing maintenance associated with the BMPs covered by the security. Any such landscaping shall be inspected one year after installation with replacement for compliance with the approved plans and specifications and, if in compliance, the portion of the financial security attributable to landscaping shall be released.

7.4.5. Notice to Owners

A. Deed Recordation and Indications on Plat

The applicable operations and maintenance agreement pertaining to every engineered stormwater control shall be referenced on the final plat and shall be recorded with the Register of Deeds of the county in which the stormwater control is located upon final plat approval. If no subdivision plat is recorded for the site, then the operations and maintenance agreement shall be recorded with the Register of Deeds of the appropriate county so as to appear in the chain of title of all subsequent purchasers under generally accepted searching principles.

B. Signage

Where appropriate in the determination of the Stormwater Administrator to assure compliance with this article, engineered stormwater controls shall be posted with a conspicuous sign stating who is responsible for required maintenance and annual inspection. The sign shall be maintained so as to remain visible and legible and comply with the standards in Section 5.16, Signage.

7.4.6. Records of Installation and Maintenance Activities

The owner of each engineered stormwater control shall keep records of inspections, maintenance, and repairs for at least five years from the date of creation of the record and shall submit the same upon reasonable request to the Stormwater Administrator.

7.4.7. Nuisance

The owner of each stormwater BMP, whether engineered stormwater control or non-engineered stormwater control, shall maintain it so as not to create or result in a nuisance condition.

7.4.8. Maintenance Easement

Every engineered stormwater control installed pursuant to this article shall be made accessible for adequate maintenance and repair by a maintenance easement. The easement shall be recorded and its terms shall specify who may make use of the easement and for what purposes.

SECTION 7.5. ENFORCEMENT AND VIOLATIONS⁵³²

7.5.1. General

A. Authority to Enforce

The provisions of this article shall be enforced by the Stormwater Administrator, his or her designee, or any authorized agent of the Town. Whenever this section refers to the Stormwater Administrator, it includes his or her designee as well as any authorized agent of the Town.

B. Violation Unlawful

Any failure to comply with an applicable requirement, prohibition, standard, or limitation imposed by this article, or the terms or conditions of any permit or other development approval or authorization granted pursuant to this ordinance, is unlawful and shall constitute a violation of this Ordinance.

C. Each Day a Separate Offense

Each day that a violation continues shall constitute a separate and distinct violation or offense.

D. Responsible Persons/Entities

1. Any person who erects, constructs, reconstructs, alters (whether actively or passively), or fails to erect, construct, reconstruct, alter, repair, or maintain any structure, BMP, engineered stormwater control, practice, or condition in violation of this article shall be subject to the remedies, penalties, and/or enforcement actions in accordance with this section. Persons subject to the remedies and penalties set forth herein may include any architect, engineer, builder, contractor, developer, agency, or any other person who participates in, assists, directs, creates, causes, or maintains a condition that results in or constitutes a violation of this article, or fails to take appropriate action so that a violation of this article results or persists; or an owner, any tenant or occupant, or any other person, who has control over, or responsibility for, the use or development of the property on which the violation occurs.
2. For the purposes of this article, responsible person(s) shall include, but not be limited to:

- a. **Person Maintaining Condition Resulting in or Constituting Violation**

An architect, engineer, builder, contractor, developer, agency, or any other person who participates in, assists, directs, creates, causes, or maintains a condition that constitutes a violation of this article, or fails to take appropriate action so that a violation of this article results or persists.

- b. **Person Responsible for Land or Use of Land**

The owner of the land on which the violation occurs, any tenant or occupant of the property, any person who is responsible for stormwater controls or practices pursuant to a private agreement or public document, or any person, who has control over, or responsibility for, the use or development of the property.

⁵³² This carries forward enforcement provisions from Sec. 5 of the current Stormwater Management Ordinance. They closely resemble the generally applicable enforcement provisions in Article 9: Enforcement, but with some largely procedural differences.

7.5.2. Remedies and Penalties

The remedies and penalties provided for violations of this article, whether civil or criminal, shall be cumulative and in addition to any other remedy provided by law, and may be exercised in any order.

A. Remedies

1. Withholding of Certificate of Compliance/Occupancy

The Stormwater Administrator or other authorized agent may refuse to issue a Certificate of Compliance/Occupancy for the building or other improvements constructed or being constructed on the site and served by the stormwater practices in question until the applicant or other responsible person has taken the remedial measures set forth in the notice of violation or has otherwise cured the violations described therein.

2. Disapproval of Subsequent Permits and Development Approvals

As long as a violation of this article continues and remains uncorrected, the Stormwater Administrator or other authorized agent may withhold, and the Town Council may disapprove, any request for permit or development approval or authorization provided for by this Ordinance and/or building regulations, as appropriate for the land on which the violation occurs.

3. Injunction, Abatements, etc.

The Stormwater Administrator, with the written authorization of the Town Manager, may institute an action in a court of competent jurisdiction for a mandatory or prohibitory injunction and order of abatement to correct a violation of this article. Any person violating this article shall be subject to the full range of equitable remedies provided in the General Statutes or at common law.

4. Correction as Public Health Nuisance, Costs as Lien, etc.

If the violation is deemed dangerous or prejudicial to the public health or public safety and is within the geographic limits prescribed by N.C.G.S § 160A-193, the Stormwater Administrator, with the written authorization of the Town Manager, may cause the violation to be corrected and the costs to be assessed as a lien against the property.

5. Stop Work Order

The Stormwater Administrator may issue a stop work order to the person(s) violating this article. The stop work order shall remain in effect until the person has taken the remedial measures set forth in the notice of violation or has otherwise cured the violation or violations described therein. The stop work order may be withdrawn or modified to enable the person to take the necessary remedial measures to cure such violation or violations.

B. Civil Penalties

The Stormwater Administrator may assess a civil penalty against any person who violates any provision of this article or of a permit or other requirement pursuant to this article. Civil penalties may be assessed up to the full amount of penalty authorized by N.C.G.S. 143-215.6A.

C. Criminal Penalties

Violation of this article may be enforced as a misdemeanor subject to the maximum fine permissible under North Carolina law.

7.5.3. Procedures

A. Initiation/Complaint

Whenever a violation of this article occurs, or is alleged to have occurred, any person may file a written complaint. Such complaint shall state fully the alleged violation and the basis thereof, and shall

be filed with the Stormwater Administrator, who shall record the complaint. The complaint shall be investigated promptly by the Stormwater Administrator.

B. Inspection

The Stormwater Administrator shall have the authority, upon presentation of proper credentials, to enter and inspect any land, building, structure, or premises to ensure compliance with this article.

C. Notice of Violation and Order to Correct

1. When the Stormwater Administrator finds that any building, structure, or land is in violation of this article, the Stormwater Administrator shall notify, in writing, the property owner or other person violating this article. The notification shall indicate the nature of the violation, contain the address or other description of the site upon which the violation is occurring, order the necessary action to abate the violation, and give a deadline for correcting the violation. If civil penalties are to be assessed, the notice of violation shall also contain a statement of the civil penalties to be assessed, the time of their accrual, and the time within which they must be paid or be subject to collection as a debt.
2. The Stormwater Administrator may deliver the notice of violation and correction order by any means authorized for the service of documents by Rule 4 of the North Carolina Rules of Civil Procedure.
3. If a violation is not corrected within a reasonable period of time, as provided in the notification, the Stormwater Administrator may take appropriate action under this article to correct and abate the violation and to ensure compliance with this article.

D. Extension of Time

A person who receives a notice of violation and correction order, or the owner of the land on which the violation occurs, may submit to the Stormwater Administrator a written request for an extension of time for correction of the violation. On determining that the request includes enough information to show that the violation cannot be corrected within the specified time limit for reasons beyond the control of the person requesting the extension, the Stormwater Administrator may extend the time limit as is reasonably necessary to allow timely correction of the violation, up to, but not exceeding 30 days. The Stormwater Administrator may grant 30-day extensions in addition to the foregoing extension if the violation cannot be corrected within the permitted time due to circumstances beyond the control of the person violating this article. The Stormwater Administrator may grant an extension only by written notice of extension. The notice of extension shall state the date prior to which correction must be made, after which the violator will be subject to the penalties described in the notice of violation and correction order.

E. Enforcement after Time to Correct

After the time has expired to correct a violation, including any extension(s) if authorized by the Stormwater Administrator, the Stormwater Administrator shall determine if the violation is corrected. The Stormwater Administrator may act to impose one or more of the remedies and penalties authorized by this article whether or not the violation has been corrected.

F. Emergency Enforcement

If delay in correcting a violation would seriously threaten the effective enforcement of this article or pose an immediate danger to the public health, safety, or welfare, then the Stormwater Administrator may order the immediate cessation of a violation. Any person so ordered shall cease any violation immediately. The Stormwater Administrator may seek immediate enforcement, without prior written notice, through any remedy or penalty authorized by this article.

SECTION 7.6. ILLICIT DISCHARGES AND CONNECTIONS

7.6.1. Illicit Discharges

- A.** No person shall cause or allow the discharge, emission, disposal, pouring, or pumping directly or indirectly to any stormwater conveyance, the waters of the State, or upon the land in manner and amount that the substance is likely to reach a stormwater conveyance or the waters of the State, any liquid, solid, gas, or other substance, other than stormwater; provided that non-stormwater discharges associated with the following activities are allowed and provided that they do not significantly impact water quality:
1. Water line flushing;
 2. Landscape irrigation;
 3. Diverted stream flows;
 4. Rising ground waters;
 5. Uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20));
 6. Uncontaminated pumped ground water;
 7. Discharges from potable water sources;
 8. Foundation drains;
 9. Air conditioning condensation;
 10. Irrigation water;
 11. Springs;
 12. Water from crawl space pumps;
 13. Footing drains;
 14. Lawn watering;
 15. Individual residential car washing;
 16. Flows from riparian habitats and wetlands;
 17. Dechlorinated swimming pool discharges;
 18. Street wash water; and
 19. Other non-stormwater discharges for which a valid NPDES discharge permit has been approved and issued by the State of North Carolina, and provided that any such discharges to the municipal separate storm sewer system shall be authorized by the Town.
- B.** Prohibited substances include but are not limited to: oil, anti-freeze, chemicals, animal waste, paints, garbage, and litter.

7.6.2. Illicit Connections

- A.** Connections to a stormwater conveyance or stormwater conveyance system that allow the discharge of non-stormwater, other than the exclusions described in subsection 7.6.1 above, are unlawful. Prohibited connections include, but are not limited to: floor drains, waste water from washing machines or sanitary sewers, wash water from commercial vehicle washing or steam cleaning, and waste water from septic systems.

- B.** Where such connections exist in violation of this section and said connections were made prior to the adoption of this provision or any other regulation prohibiting such connections, the property owner or the person using said connection shall remove the connection within one year following the effective date of this article. However, the one-year grace period shall not apply to connections which may result in the discharge of hazardous materials or other discharges which pose an immediate threat to health and safety, or are likely to result in immediate injury and harm to real or personal property, natural resources, wildlife, or habitat.
- C.** Where it is determined that said connection (a) may result in the discharge of hazardous materials or may pose an immediate threat to health and safety, or is likely to result in immediate injury and harm to real or personal property, natural resources, wildlife, or habitat, or (b) was made in violation of any applicable regulation or ordinance other than this section, the Stormwater Administrator shall designate the time within which the connection shall be removed. In setting the time limit for compliance, the Stormwater Administrator shall take into consideration:
 - 1.** The quantity and complexity of the work,
 - 2.** The consequences of delay,
 - 3.** The potential harm to the environment, to the public health, and to public and private property, and
 - 4.** The cost of remedying the damage.

7.6.3. Spills

- A.** Spills or leaks of polluting substances released, discharged to, or having the potential to released or discharged to the stormwater conveyance system, shall be contained, controlled, collected, and properly disposed. All affected areas shall be restored to their preexisting condition.
- B.** Persons in control of the polluting substances immediately prior to their release or discharge, and persons owning the property on which the substances were released or discharged, shall immediately notify the Fire Chief of the release or discharge, as well as making any required notifications under State and federal law. Notification shall not relieve any person of any expenses related to the restoration, loss, damage, or any other liability which may be incurred as a result of said spill or leak, nor shall such notification relieve any person from other liability which may be imposed by State or other law.

7.6.4. Nuisance

Illicit discharges and illicit connections which exist within the Town are hereby found, deemed, and declared to be dangerous or prejudiced to the public health or public safety and are found, deemed, and declared to be public nuisances. Such public nuisances shall be abated in accordance with the procedures set forth in Code of Ordinances, Chapter 18, Article III (Storm Drainage).

Article 8: Performance and Maintenance

SECTION 8.1. PERFORMANCE

8.1.1. Review for Compliance

Unless otherwise provided in this article or in Article 7: Stormwater Management, review for compliance with the standards of this article shall occur during review of an application for Major Subdivision Final Plat Approval (Section 2.5.6.B), Minor Subdivision Approval (Section 2.5.6.D) or Construction Plan Approval (Section 2.5.8), as appropriate.

8.1.2. Phasing of Development

The phasing of development is allowed as part of Conceptual Master Plan Approval (Section 2.5.4) or Site Plan Approval (Section 2.5.7) in accordance with the following standards.

A. Phasing Criteria

Phasing of approved development shall be in keeping with an approved phasing plan that shows phase boundaries and describes included development and improvements in accordance with the following criteria:

1. The numbering of phases shall be sequential and coincide with the order in which the different development phases are proposed to be constructed.
2. Each phase shall be designed to include all improvements and other aspects of development necessary to meet all requirements of this Code and other applicable regulations, either as a stand-alone development or in conjunction with completed and accepted phases of the same development.

B. Temporary Measures

A phasing plan may include installation of temporary measures as necessary to allow a particular phase to meet the phasing criteria in subsection A above, provided authorization of the temporary measures shall be valid for one year and be accompanied by the provision of a performance guarantee and a maintenance guarantee for the temporary measures in accordance with Section 8.1.3, Performance Guarantees, and 8.2.2, Maintenance Guarantees.

8.1.3. Performance Guarantees⁵³³

A. General

A performance guarantee in accordance with the standards in this section shall be required in the following circumstances:

1. To ensure completion of public infrastructure improvements (e.g., roadways, bike lanes, curb and gutter, sidewalks, bike paths, crosswalks, traffic signs and controls, street lights, fire lanes, bus shelters and other transit facilities, greenway paths—but not public improvements provided in accordance with Article 7: Stormwater Management) that are required as part of Construction Plan Approval, but are not installed before application for a Major Subdivision Final Plat, Minor Subdivision Plat, or Building Permit;

⁵³³ N.C.G.S. § 160A-372(c) expressly authorizes municipalities to require performance guarantees to ensure the successful completion of improvements required for subdivisions. N.C.G.S. § 160A-383 includes a more general authorization for zoning regulations to facilitate the efficient and adequate provision of public improvements. Performance guarantees have long been used in local subdivision regulations to ensure completion of required public improvements in subdivisions before lots are platted and developed, and are commonly used in local zoning regulations to ensure completion of required public improvements before served buildings are occupied, as well as to ensure completion of required buffers, screening, and other landscaping before associated buildings are occupied or within a defined time period after their occupancy.

2. To ensure the completion of plantings of replacement trees, buffer screening, and landscaping that are required as part of Construction Plan Approval, but are not installed before issuance of a Certificate of Compliance/Occupancy (in conjunction with the grant of an extension to the time limit for installation of required landscaping).

B. Term of Performance Guarantees

The term of a performance guarantee shall reflect any time limit for completing installation of required improvements that is included in approval of the Major Subdivision Final Plat, Building Permit, or Certificate of Compliance/Occupancy, as appropriate—but in any case, the term shall not exceed two years. The Planning Director or Town Engineer, as appropriate, may, for good cause shown and with approval of the provider of the guarantee, grant extensions of the term for up to a total extended period of one year.

C. Form of Performance Guarantee⁵³⁴

1. Where required, the owner or developer shall furnish at least ten percent of the amount of a performance guarantee in the form of a cash deposit with the Town.⁵³⁵ The remainder of the performance guarantee may be furnished in any of the following acceptable forms:
 - a. Cash deposit with the Town;
 - b. Certified check from a North Carolina lender based upon a cash deposit, in a form acceptable to the Town Attorney;
 - c. Irrevocable letter of credit from a North Carolina banking institution in a form acceptable to the Town Attorney; or
 - d. Surety bond from a North Carolina surety bonding company in a form acceptable to the Town Attorney.
2. The performance guarantee shall be conditioned on the performance of all work necessary to complete the installation of the required improvements within the term of the performance guarantee. Performance guarantees shall provide that in case of the owner's or developer's failure to complete the guaranteed improvements, the Town shall be able to immediately obtain the funds necessary to complete installation of the improvements.

D. Amount of Performance Guarantee

1. Performance guarantees for required improvements shall be in an amount equal to 150 percent of the estimated full cost of completing the installation of the required improvements within the term of the guarantee, including the costs of materials, labor, and project management.
2. Estimated costs for completing installation of required public infrastructure improvements shall be itemized by improvement type and certified by the owner's or developer's licensed Professional Engineer, and are subject to approval by the Town Engineer. Estimated costs for completing installation of required replacement trees, buffer screening, and landscaping shall be itemized and certified by the owner's or developer's registered landscape architect, and are subject to approval by the Planning Director.
3. If the guarantee is renewed, the Town Engineer or Planning Director, as appropriate, may require the amount of the performance guarantee be updated to reflect cost increases over time.
4. The amount of a performance guarantee may be waived or reduced by the Town Council where the improvements are being installed with federal funds or in other circumstances where similar third-party assurance of their completion exists.

⁵³⁴ N.C.G.S. § 160A-372(c) expressly requires municipal subdivision regulations requiring performance guarantees to allow a range of types of performance guarantees, "including, but not limited to, surety bonds or letters of credit."

⁵³⁵ This 10% cash deposit requirement is carried forward from Sec. 4.12.2 of the current Design and Construction Ordinance.

E. Release or Reduction of Performance Guarantees⁵³⁶

1. Requirements for Release or Reduction

The Town Engineer (for public infrastructure improvements) or Planning Director (for private site improvements, replacement trees, buffer screening, and landscaping) shall release or reduce a performance guarantee only after:

- a. The owner or developer has submitted to the Town Engineer or Planning Director, as appropriate, an application for a release or reduction of the performance guarantee that includes certification by the owner's or developer's engineer or landscape architect, as appropriate, that installation of the guaranteed improvements has been completed in accordance with approved plans and specifications;
- b. The Town Engineer or Planning Director, as appropriate, has performed a final inspection of the improvements for which a release or reduction is requested, and certified in writing that installation of the guaranteed improvements has been completed in accordance with approved plans and specifications;
- c. The owner or developer has reimbursed the Town for all costs associated with conducting any inspection that finds the guaranteed improvements for which a release or reduction is requested have not been installed in accordance with approved plans and specifications;
- d. The owner or developer has provided the Town Engineer or Planning Director, as appropriate, assurances that liens against guaranteed public infrastructure improvements will not be filed after their acceptance by the Town (e.g., through affidavits, releases, or waivers of liens from all contractors and subcontractors); and
- e. The owner or developer has provided the Town Engineer or Planning Director, as appropriate, any required maintenance guarantee for the same improvements (see Section 8.2.2, Maintenance Guarantees).

2. Limits on Reductions⁵³⁷

No performance guarantee for public infrastructure improvements shall be reduced to less than 30 percent of the full amount of the performance guarantee until all guaranteed public infrastructure improvements have been completed by the owner or developer. No performance guarantee for required private site improvements, replacement trees, buffer screening, and landscaping shall be reduced to less than 75 percent of the full amount of the performance guarantee, until all guaranteed private site improvements, replacement trees, buffer screening, and landscaping have been completed by the owner or developer.

F. Default and Forfeiture of Performance Guarantee

1. Notice of Failure to Install or Complete Improvements⁵³⁸

If the owner or developer fails to complete installation of the guaranteed improvements within the term of the performance guarantee (as may be extended), the Town Engineer (for public infrastructure improvements) or Planning Director (for private site improvements, replacement trees, buffer screening, and landscaping) shall give the owner or developer 30 days written notice of the default by certified mail.

⁵³⁶ This incorporates the release criteria scattered among various provisions in Sec. 14.1.2.2, adding the provision relating to the lack of liens.

⁵³⁷ This carries forward the current 30% limit on reductions in Sec. 14.1.2.3, as applied to public infrastructure improvements, but allows up to 75% reductions of guarantees for private improvements, replacement trees, buffer screening, and landscaping. This additional flexibility is intended to recognize the variable nature of such improvements.

⁵³⁸ This new subsection requires the Town to provide the owner/developer at least 30 days' notice of a default of the performance guarantee before using the surety funds to complete the defaulted work.

2. Town Completion of Improvements

After the 30-day notice period expires, the Town may draw on the security and use the funds to perform work necessary to complete installation of the guaranteed improvements. After completing such work, the Town shall provide a complete accounting of the expenditures to the owner or developer and, as applicable, refund all unused security deposited, without interest.

SECTION 8.2. MAINTENANCE

8.2.1. General Maintenance Requirement

When the standards and procedures of this Ordinance, or a development approval issued pursuant with this Ordinance, or conditions attached to any such approval require that any building or site feature be constructed or installed, the owner of the affected property shall be responsible for maintaining those building or site features in good repair, and for replacing them if they are damaged or destroyed or, in the case of living materials, if they die or are effectively destroyed after installation. In addition, property owners shall be responsible for each of the additional maintenance and replacement standards set forth in the various parts and sections of this article.

8.2.2. Maintenance Guarantees

A. General

A maintenance guarantee in accordance with the standards in this section is required in the following circumstances:

1. To ensure against defects in workmanship or materials in providing public infrastructure improvements (e.g., roadways, bike lanes, curb and gutter, sidewalks, bike paths, crosswalks, traffic signs and controls, street lights, fire lanes, bus shelters and other transit facilities, greenway paths—but not public improvements provided in accordance with Article 7: Stormwater Management) required as part of Construction Plan Approval (Section 2.5.8) or a Subdivision Approval (Section 2.5.6);
2. To ensure the survival and health of landscaping that is required in accordance with Section 5.7, Perimeter and Streetyard Buffers, Section 5.12, Landscaping, or Section 5.13, Screening, during an establishment period, and during a maintenance and monitoring period.

B. Term of Maintenance Guarantees

The term of a maintenance guarantee for public infrastructure improvements shall be one year from the date of acceptance. The term of a maintenance guarantee for landscaping shall be one year from the date the landscaping is installed. The term of a maintenance guarantee for replaced trees shall be three years from the date the trees are planted, provided that such term shall be extended for any guaranteed tree that is replaced during the original three-year term to cover three years after the date of replacement.

C. Form of Maintenance Guarantees

1. Where required, the owner or developer shall furnish a maintenance guarantee for the provision of required landscaping in any of the following acceptable forms:
 - a. Cash deposit with the Town;
 - b. Certified check from a North Carolina lender based upon a cash deposit, in a form acceptable to the Town Attorney;
 - c. Irrevocable letter of credit from a North Carolina banking institution in a form acceptable to the Town Attorney; or

- d. Surety bond from a North Carolina surety bonding company in a form acceptable to the Town Attorney.
2. A maintenance guarantee for public infrastructure improvements or landscaping shall be conditioned on the performance of all work necessary to maintain required public infrastructure improvements or landscaping during the term of the maintenance guarantee, including work needed to repair or replace infrastructure defects or replace plants that have died within the term of the maintenance guarantee.
3. A maintenance guarantee for a replacement tree shall be conditioned on the performance of all work necessary to transplant or plant replacement trees and maintain them during the term of the maintenance guarantee, including work needed to replace replacement trees that have died or been effectively destroyed during the term of the maintenance guarantee.
4. Maintenance guarantees shall provide that in case of the owner's or developer's failure to maintain and repair or replace the guaranteed public infrastructure improvements or landscaping—or to transplant or plant and maintain the guaranteed replacement trees—during the term of the maintenance guarantee, the Town shall be able to immediately obtain the funds necessary to make necessary repairs or replacements.

D. Amount of Maintenance Guarantees

1. Maintenance guarantees for public infrastructure improvements and landscaping shall be in an amount equal to at least 20 percent of the full actual cost, including the costs of materials and labor, of installing the required public infrastructure improvements or landscaping. The Town Engineer may require a greater amount on determining it is necessary to cover the costs of greater than usual damage or deterioration that might be expected to result from on-going construction activities in the development (e.g., damage to roadways from heavy vehicles involved in the construction of homes on remaining lots within a subdivision). Actual costs for installing required public infrastructure improvements shall be itemized by improvement type and certified by the owner's or developer's licensed Professional Engineer. Actual costs for installing required landscaping shall be itemized and certified by the owner's or developer's registered landscape architect.
2. Maintenance guarantees for tree replacement or corrective action for damaged trees shall be in an amount determined based on Guide for Plant Appraisal (Council of Tree and Landscape Appraisers), as amended.
3. The amount of a maintenance guarantee for required public infrastructure improvements or landscaping may be waived or reduced by the Town Council where alternative means of ensuring proper maintenance of the improvements or landscaping are used.

E. Release or Reduction of Maintenance Guarantees

1. The Planning Director or Town Engineer, as appropriate, shall release a maintenance guarantee for public infrastructure improvements or landscaping at the end of the term of the maintenance guarantee only after Town staff has performed an inspection of the guaranteed improvements or landscaping and certified in writing that they have been maintained in accordance with approved plans and specifications.
2. The Planning Director shall release a maintenance guarantee for tree replacement or corrective action for damaged trees at the end of the term of the maintenance guarantee only after Town staff has performed an inspection of the subject trees and has certified in writing that they were properly transplanted, planted, or corrected and have been maintained in a healthy state in accordance with approved plans and specifications.
3. Where the term of a maintenance guarantee for tree replacement has been extended to cover the replacement of trees that died or were effectively destroyed during the original term (see Section 8.2.2.B, Term of Maintenance Guarantees), the Planning Director may reduce the

guarantee by the percentage of the total number of guaranteed trees that survived the original term.

F. Default and Forfeiture of Maintenance Guarantee

1. Notice of Failure to Maintain Guaranteed Improvements, Landscaping, or Trees

If the owner or developer fails to maintain the guaranteed public infrastructure improvements, landscaping, or replacement trees during the term of the performance guarantee, the Planning Director or Town Engineer, as appropriate, shall give the owner or developer 30 days written notice of the default by certified mail.

2. Town Correction of Defects

After expiration of the 30-day notice period for failure to maintain guaranteed public infrastructure improvements or landscaping, the Town may draw on the security and use the funds to perform work necessary to ensure the guaranteed public infrastructure improvements or landscaping comply with approved plans and specifications. After completing such work, the Town shall provide a complete accounting of the expenditures to the owner or developer and, as applicable, refund all unused security deposited, without interest.

5. Open Space Dedication (UDO 5.5)

- Parks/Greenways/Open Space Conservation District (UDO 3.2)

C. Replacement Trees³⁰⁸

1. Location of Replacement Trees

Replacement trees shall be planted within the tree protection area or, where the tree protection area does not contain sufficient area, within any other part of the development site. The Planning Director may allow replacement trees to be planted as street trees in accordance with the standards in Section 5.12.6, Street Trees in the Transit-Oriented Development (TOD) and Main Street (MS) Districts.

2. Native Species Required

Replacement trees shall be species native to the Morrisville area (see the list of acceptable native plant species in the Administrative Manual).

3. Tree Type

- a. Removed shade trees shall be replaced with shade trees and removed understory trees shall be replaced with understory trees.
- b. Where more than 12 replacement trees are provided, they shall comprise at least four different species, including at least three deciduous species.

4. Guaranteed Establishment Period

The applicant shall guarantee the survival and health of all replacement trees during an establishment period of at least three years and guarantee any associated replacement costs in accordance with Section 8.2.2, Maintenance Guarantees. If the replacement trees do not survive the establishment period, the applicant shall purchase and install new replacement trees and guarantee their survival and health for a new three-year establishment period.

5.4.9. Credit Towards Other Standards

Tree protection areas, and trees and other vegetation within such areas, may be credited towards compliance with common open space, public recreation area, perimeter and streetyard buffer, and landscaping requirements to the extent they comply with applicable common open space and public recreation area standards (see Section 5.5, Common Open Space and Public Recreation Area, perimeter and streetyard buffer standards (see Section 5.7, Perimeter and Streetyard Buffers), or landscaping standards (see Section 5.12, Landscaping).³⁰⁹

SECTION 5.5. COMMON OPEN SPACE AND PUBLIC RECREATION AREA

5.5.1. Common Open Space

A. Purpose

The purpose of this section is to ensure that developments other than residential subdivisions include or contribute to the provision of common open space for the use and enjoyment of the development's occupants and users. Open space serves numerous purposes, including preservation and protection of natural areas and features, providing opportunities for passive and active recreation, enhancing management of stormwater runoff to protect water quality and reduce flooding, and mitigating the heat island effect of developed areas.

Many communities establish a government fund that can serve as the repository of penalties for violations of tree protection regulations as well payments in lieu of required tree replacement. If Morrisville wishes to establish and use such a fund, we recommend adding a subsection authorizing payments in lieu of providing some portion of required replacement trees.

³⁰⁹ This is intended to clarify that trees and vegetation within tree protection area can serve "double duty" in also meeting open space, buffer, and landscaping requirements.

B. Applicability³¹⁰

1. General

The standards in this section shall apply to all new development subject to Planned Development Rezoning (Section 2.5.3), Conceptual Master Plan Approval (Section 2.5.4), Special Use Permit (Section 2.5.5), Major Subdivision Preliminary Plat Approval (Section 2.5.6.B), Minor Subdivision Plat Approval (Section 2.5.6.D), Major Site Plan Approval (Section 2.5.7.B), or Minor Site Plan Approval (Section 2.5.7.C) unless such new development is expressly exempted in accordance with subsection 2 below.

2. Exemptions

The following development is exempt from the standards of this section:

- a. Development directly associated with a permitted agricultural use;
- b. Residential subdivisions (which are subject to public recreation area standards in Section 5.5.2, Public Recreation Area); and
- c. Development of a single-family detached, duplex, or manufactured home dwelling on an existing lot.

C. Required Open Space Area

1. Required Total Common Open Space Area³¹¹

A development shall provide the minimum area of common open space identified in Table 5.5.1.C.1, Required Total Common Open Space Area, based on the development's base zoning district and use classification.

COMMENTARY

As recommended in the Assessment Report (p. 25), this new section supplements the Subdivision Ordinance's recreation area dedication requirements for residential subdivisions with requirements that all new other development (nonresidential as well as residential development other than subdivisions) set aside a portion of the development site as private common open space. Such open space may serve a number of purposes, from preservation of natural resources to providing recreation opportunities to creating various amenities for development occupants and users. The section includes new standards requiring provision of common open space in most developments other than residential subdivisions. They are followed by more narrowly applied standards for dedication of recreation area in residential subdivisions. These carry forward regulations in Article VII of the current Subdivision Ordinance. The section concludes with common standards that authorize alternative compliance through off-site provision or a payment in lieu of on-site provision, and set out provisions for the ownership, management, and maintenance of required common open space and recreation area.

Table 5.5.1.C.1: Required Total Common Open Space Area

Use Classification	Minimum Total Common Open Space Area (as percentage of development site area)	
	Transit-Oriented Development (TOD) and Town Center Districts	All Other Districts
Residential Uses	10%	20%
Mixed-Uses	5%	15%
Institutional Uses	5%	10%
Commercial Uses	5%	10%
Industrial Uses	5%	5%

³¹⁰ This includes most new development, including all nonresidential subdivisions, but excludes residential subdivisions and individual lots developed for single-family detached, duplex, and manufactured home dwellings (which are exempt from Site Plan Approval) and agricultural uses.

³¹¹ NOTE: As recommended by the Assessment Report, this requires a minimum amount of common open space in terms of a percentage of development site area, which varies with the development use classification. It sets lower standards for the TOD District and Town Center districts to recognize the higher intensities and greater design flexibility needs of development in those districts. The percentages shown are relatively modest, and could be increased.




2. Allowable Common Open Space Areas

The features and areas identified in Table 5.5.1.C.2, Allowable Common Open Space Areas shall be credited towards compliance with the open space set-aside standards of this section. They are listed generally in the order of priority.

Table 5.5.1.C.2: Allowable Common Open Space Areas

Area Counted as Common Open Space	Description	Design and Maintenance Requirements
Natural Resource and Hazard Areas		
	<p>Natural water features (including lakes, ponds, rivers, streams, rivers, wetlands, drainageways), riparian buffers, flood hazard areas, existing tree canopy and specimen trees, steep slopes, and important wildlife habitat areas, including such areas used for required public recreation area</p>	<ul style="list-style-type: none"> • Preservation of any existing natural resource and hazard areas shall have highest priority for locating open space. • Maintenance is limited to the minimum removal and avoidance of hazards, nuisances, or unhealthy conditions. • See tree protection standards (Section 5.4).
Active Recreational Areas		
	<p>Land occupied by areas and facilities used for active recreational purposes, such as pools, playgrounds, tennis courts, jogging trails, ball fields, and clubhouses, including required public recreation area</p>	<ul style="list-style-type: none"> • Land shall be compact and contiguous unless used to link or continue an existing or planned open space resource. • Areas shall have at least one direct access to a building or to a street, bikeway, or walkway accessible to the public or the development's occupants and users.
Stormwater Management Devices		
	<p>Up to 75 percent of land area occupied by stormwater management devices (including retention and detention ponds and other bioretention devices), when such features are treated as an open space site amenity</p>	<ul style="list-style-type: none"> • To qualify, stormwater management devices shall support passive recreation uses by providing access and pedestrian elements such as paths and benches.
Formal Plantings and Gardens		
	<p>Formally planned and regularly maintained open areas that provide passive recreation opportunities, including arranged plantings, gardens, gazebos, and similar structures, as well as roof gardens</p>	<ul style="list-style-type: none"> • Formal plantings and gardens shall have at least one direct access to a building, or to street, bikeway, or walkway accessible to the public or the development's occupants and users. • Such features shall be oriented to surrounding development.

Table 5.5.1.C.2: Allowable Common Open Space Areas

Area Counted as Common Open Space	Description	Design and Maintenance Requirements
Squares, Forecourts, Plazas, and Outdoor Dining Areas		
	<p>Squares, forecourts, plazas, and outdoor dining areas that provide gathering places or active and passive recreational opportunities</p>	<ul style="list-style-type: none"> • Squares, forecourts, plazas, and outdoor dining areas shall be at least 200 square feet, but no more than one acre, in area. • Such features shall have at least one direct access to a principal building, or to a street, bikeway, or walkway accessible to the public or the development's occupants and users. • Surrounding principal buildings shall be oriented toward the square, forecourt, plaza, or outdoor dining area where possible.
Public Access Easements		
	<p>Public access easements that are available for passive recreational activities such as walking, running, and biking</p>	<ul style="list-style-type: none"> • Such public access easements shall include at least one direct and signed access from a street, bikeway, or walkway accessible to the public or the development's occupants and users.
Required Buffer and Landscape Areas		
	<p>All areas occupied by required perimeter and streetyard buffers, and landscaping, except landscaped area within parking lots</p>	<ul style="list-style-type: none"> • See perimeter and streetyard buffer standards (Section 5.6) and landscaping standards (Section 5.12).

3. Areas Not Allowable as Required Common Open Space

The following areas shall not be allowed as required common open space:

- a. Private yards not subject to an open space or conservation easement;
- b. Street rights-of-way or private access easements, including sidewalks located within those rights-of-way or easements;
- c. Open parking areas and driveways;
- d. Land covered by structures, unless designated for active recreational uses;
- e. Designated outdoor storage areas; and
- f. Stormwater ponds not located and designed as a site amenity (e.g., with low fencing, vegetative landscaping, gentle slopes, fountain or other visible water circulation device, and pedestrian access or seating).

D. Design Standards for Common Open Space³¹²

Areas used as a required common open space shall meet the following design standards:

1. To the maximum extent practicable, required common open space shall be located and configured to include, protect, or enhance as many of the allowable types of common open space shown in Table 5.5.1.C.2, Allowable Common Open Space Areas as possible, with a priority generally reflecting the order in which the types are listed in the table.
2. Required common open space areas shall be compact and contiguous unless a different configuration is needed to continue an existing trail or accommodate preservation of natural features.
3. Required common open space shall be located to be readily accessible and useable by occupants and users of the development. Where possible, a portion of the open space should provide focal points for the development through prominent placement or easy visual access from streets.
4. If the development site is adjacent to existing or planned parks, greenways, or other public open space, required common open space shall, to the maximum extent practicable, be located to adjoin, extend, and enlarge the park, greenway, or other public open space.
5. If the development contains, or adjoins an existing or planned transit station, required common open space shall, to the maximum extent practicable, adjoin the transit station site or be integrated with the transit station or other open space adjoining the transit station in accordance with any Town-adopted plans for the transit station area. Such required common open space shall be furnished with at least three of the following types of community amenities:
 - a. Benches or seating areas;
 - b. Raised landscape planters;
 - c. Shade structures;
 - d. Public art (e.g., sculptures, murals, water elements, carvings, frescos, mosaics, mobiles);
 - e. A courtyard;
 - f. Decorative shelters for transit riders (as approved by the Town); or
 - g. Similar community amenities approved by the Town.

E. Development Within Required Common Open Space Areas³¹³

1. Development within required common open space areas shall be limited to that appropriate to the purposes of the type(s) of common open space (see Table 5.5.1.C.2, Allowable Common Open Space Areas).
2. Where appropriate to the type of common open space, such development may include, but is not limited to:
 - a. Walking, jogging, and biking paths or trails;
 - b. Benches or other seating areas;
 - c. Tables, shelters, grills, and other picnicking facilities;
 - d. Docks and other facilities for fishing;
 - e. Environmental education guides and exhibits;

³¹² These standards are intended to ensure that required common open space is located and configured to be accessible and useable by development occupants and users. .

³¹³ This establishes a general requirement that only development appropriate to the approved type of open space area is allowed, and identifies examples of the limited forms of development that might be allowed in the various types of open space.

- f. Gazebos and other decorative structures;
- g. Fountains or other water features;
- h. Tot lots and play structures for children;
- i. Gardens or seasonal planting areas;
- j. Swimming pools, athletic fields and courts, and associated clubhouses.

F. Ownership, Management, and Maintenance of Common Open Space³¹⁴

1. Required common open space area shall be managed and maintained as permanent open space through one or more of the following options:
 - a. Open space may be held in common ownership by the owner(s) of the development, who will be responsible for managing and maintaining the land for its intended open space purposes.
 - b. Open space areas may be conveyed to a property owners' or homeowners' association that holds the land in common ownership and will be responsible for managing and maintaining the land for its intended open space purposes.
 - c. Open space areas may be conveyed to a third-party beneficiary such as an environmental or civic organization that is organized for, capable of, and willing to accept responsibility for managing and maintaining the land for its intended open space purposes.
 - d. Open space areas may be dedicated to the public and conveyed to the Town or other public agency that is organized for, capable of, and willing to accept responsibility for managing and maintaining the land for its intended open space purposes.
2. Easements may be established on those parts of individually-owned lots including open space areas that require the areas to be managed consistent with their intended open space purposes and prohibit any inconsistent future development. Any options involving private ownership of required common open space area shall include association by-laws, deed restrictions, covenants, or other legal instruments that ensure continued use of the land for its intended open space purposes and provide for the continued and effective management, operation, and maintenance of the land and facilities. Such instruments shall be approved by the Town as sufficient to comply with this standard before or conjunction with approval of any subdivision plat for the development, or any Construction Plan Approval for the development (if no Subdivision Approval is required).
3. Responsibility for managing and maintaining common open space areas lies with the owner of the land comprising the areas. Failure to maintain common open space areas in accordance with the approved development shall be a violation of this Ordinance. Identification of who bears responsibility for managing and maintaining common open space areas shall be shown on any recorded subdivision plat for the development or any approved Construction Plan for the development (if no Subdivision Approval is required).

³¹⁴ This subsection is intended to ensure that required common open space will be continually managed and maintained as permanent open space that serves the purpose for which they are approved. The principal options allowed include ownership and management by a property owners' or homeowners' association, by an outside organization existing for the specific open space purpose, the Town, or other public agency. An additional option is through easements (e.g., conservation easements) covering private individual lots. For all the private ownership/management options, it is important to require Town approval of related legal instruments, to ensure the open space will be appropriately managed. Although we do not recommend specifying the appropriate contents of such instruments in the Ordinance, the Town should consider things such as whether a property owners' or homeowners' association's by-laws establish a fund for open space maintenance and authorize assessments of owners where necessary to supplement the maintenance fund.

5.5.2. Public Recreation Area

A. Purpose

The purpose of this section is to ensure that new residential subdivisions include or contribute to the provision of public recreation area sufficient to meet the passive and active recreation needs of residents of the subdivision, as well of the surrounding neighborhood.

B. Applicability

The standards in this section shall apply to all new residential subdivisions subject to Major Subdivision Preliminary Plat Approval (Section 2.5.6.C) or Minor Subdivision Plat Approval (Section 2.5.6.D).

C. Required Public Recreation Area

Any subdivisions proposing to create lots designed and intended to serve as building sites for single-family detached, duplex, manufactured home, single-family attached, or multifamily dwellings shall dedicate a portion of the subdivision site as public recreation area. The amount of land required to be dedicated shall equal $1/35$ of an acre times the number of dwelling units proposed to be accommodated by subdivision lots (for subdivisions creating lots for single-family detached, manufactured home, or single-family attached dwellings, this will equal the number of such lots; for subdivisions creating lots for duplex dwellings, this will equal twice the number of lots; for subdivisions creating lots for multifamily dwellings, this will equal the number of dwelling units proposed on the lots).

D. Design Standards for Required Public Recreation Area

Areas used as a required public recreation area shall meet the following design standards:

1. Required public recreation area shall be compact and contiguous, forming a single area, unless multiple public recreation areas or a different configuration is needed to continue an existing trail or accommodate preservation of natural features.
2. The size and shape of required public recreation area shall be sufficient to accommodate active recreation activities appropriate to the recreational needs of subdivision residents (e.g., public recreation area should be sufficiently large and rectangular to accommodate soccer or softball fields, tennis courts, swimming pools, etc.).
3. Required public recreation area shall be located to be readily accessible and useable by occupants and users of the development.
4. Required public recreation area shall have at least 50 feet of frontage on a public street or a public access easement at least 30 feet wide.
5. No land dedicated as active public recreation area shall be located on slopes exceeding five percent.
6. No more than 25 percent of land dedicated as active public recreation area shall be located within a Floodplain Overlay District.
7. If the development site is adjacent to existing or planned parks, greenways, or other public open space, required public recreation area shall, to the maximum extent practicable, be located to adjoin, extend, and enlarge the park, greenway, or other public open space.

E. Dedicated Recreation Area to be Shown on Recorded Plat

Dedicated recreation area shall be shown on the recorded Major Subdivision Final Plat or Minor Subdivision Plat, as appropriate.

F. Conveyance of Dedicated Recreation Area

1. Required public recreation area shall be dedicated to the public and conveyed to the Town or other public agency that is organized for, capable of, and willing to accept responsibility for

managing and maintaining the land for its intended open space purposes. The Town may sell or otherwise convey any public recreation area conveyed to the Town if the Town Council determines that development of the land for park and recreation purposes is no longer feasible or consistent with Town-adopted parks and recreation plans. Any proceeds from such transactions shall be deposited into the Town fund referenced in Section 5.5.3.B.5 below.

5.5.3. Alternative Options for Meeting Common Open Space and Public Recreation Area Requirements

A. Off-Site Provision

1. In lieu of providing required common open space area or public recreation area on a development site in accordance with Section 5.5.1 or Section 5.5.2, the developer may, with the approval of the Town Council in accordance with the criteria in subsection 4 below, provide all or some of required common open space or public recreation area on land outside the development site. No development application proposing off-site provision of required common open space or public recreation area shall be approved unless and until the Town Council approves such proposal (even where the application would normally be decided by Town staff or another board).
2. Where off-site provision of required common open space or public recreation area is proposed, the application shall include a map showing the location, boundaries, and topography of the site, as well as any additional information necessary to ascertain the site's suitability as common open space or public recreation area, as appropriate.
3. Any approved off-site common open space shall be shown as reserved or dedicated open space on a plat of the property containing the common open space, and any approved off-site public recreation area shall be shown as dedicated recreation area on a plat of the property containing the public recreation area. The plat shall be recorded with the Register of Deeds for the county in which the dedicated land is located.
4. The Town Council's decision on whether to approve off-site provision of required common open space or public recreation area shall be based on the following criteria:
 - a. Whether the proposed off-site common open space or public recreation area would meet the design standards for required common open space (Section 5.5.1.D) or public recreation area (Section 5.5.2.D), as appropriate;
 - b. Whether the proposed off-site common open space or public recreation area is located sufficiently close to the development site to meet the open space or recreation needs, as appropriate, of the occupants and users of the development; and
 - c. Whether the proposed off-site common open space or public recreation area would contribute more to meeting the open space or recreation needs, as appropriate, of the occupants and users of the development than on-site provision of the common open space or public recreation area or the Town's use of in-lieu payments to acquire and develop parks, greenways, and other open space areas in the vicinity of the development.

B. Payment in Lieu of Providing Required Common Open Space or Public Recreation Area³¹⁵

1. In lieu of providing required common open space area or public recreation area on a development site in accordance with Section 5.5.1 or Section 5.5.2, the developer may, with the approval of the Town Council (for Major Subdivision Preliminary Plat Approval) or Planning

³¹⁵ This subsection provides an in-lieu payment option similar to that provided by current Subdivision Ordinance provisions authorizing payments in lieu of the required dedication of recreation area.

Article 5: Development Standards

Section 5.5. Common Open Space and Public Recreation Area

5.5.3. Alternative Options for Meeting Common Open Space and Public Recreation Area Requirements

Director (for Minor Subdivision Plat Approval), make a payment to the Town in lieu of providing all or a portion of the required common open space or public recreation area.

2. The amount of such in-lieu payment shall be the product of the number of acres of required common open space area or public recreation area, as appropriate, that is proposed and approved for the in-lieu payment option multiplied by the pre-development fair market value per acre of land making up the development site. The development application shall include an appraisal or other documentation acceptable to the Town as showing the development site's predevelopment fair market value.
3. If the Town disagrees with the pre-development fair market value submitted by the applicant, such value shall be determined by a special appraisal committee made up of one professional appraiser appointed by the applicant, one professional appraiser appointed by the Town Manager, and one professional appraiser appointed by the initial two committee members. The committee shall view the site, hear the contentions of both the applicant and the Town, reach a conclusion by majority vote, and submit a written certification of its conclusion to the applicant and Town Manager within 30 days after the final member of the committee is appointed. The costs of the committee shall be borne by the applicant.
4. The developer shall make the in-lieu payment before issuance recordation of any subdivision plat for the development or issuance of any Building Permit for the development (if no Subdivision Approval is required)—provided, however, that the payments may be phased in accordance with an approved phasing plan for the development.
5. The Town shall deposit any in-lieu payment into a special Town fund that shall be used only for the acquisition or development of parks, greenways, and other open space areas that will serve occupants and users of the development. Such areas may also serve other developments in the immediate area.
6. The decision on whether to approve a payment in lieu of providing required common open space or public recreation area shall be based on the following criteria:
 - a. Whether the on-site provision, or any proposed off-site provision, of required common open space or recreation could be used to establish, expand, or extend an existing or planned public park, greenway, or other open space area identified in parks and recreation plans or other plans adopted by the Town;
 - b. The extent to which the size, shape, topography, geology, soils, and public accessibility of the development site makes it impractical to provide required common open space or public recreation area that complies with Section 5.5.1.D, Design Standards for Common Open Space, or Section 5.5.2.D, Design Standards for Required Public Recreation Area, as appropriate;
 - c. Whether the in-lieu payment option provides the additional design flexibility needed to accommodate allowable higher-intensity development in the Transit-Oriented Development (TOD) District, or allowable higher-intensity development on substantially constrained sites elsewhere in the town; and
 - d. Whether the Town's use of an in-lieu payment to help acquire and develop parks, greenways, and other open space areas would better meet the open space and recreational needs of occupants and users of the development than on-site provision, or any proposed off-site provision, of the required common open space or public recreation area, as appropriate.

SECTION 3.2. CONSERVATION DISTRICTS

3.2.1. General Purposes of Conservation Districts

The Conservation Districts established in this section are intended to:

- A.** Provide open space and recreation area to meet the physical and natural resource needs of the Town and its residents;
- B.** Enhance the Town's aesthetic appeal within its neighborhoods and along transportation corridors; and
- C.** Reduce stormwater runoff with increased pervious surfaces that allow water infiltration.

6. *Other*

- Tree Protection (UDO 5.4, 8.1)
- Landscaping Requirements (UDO 5.2)
- Connectivity (UDO 5.8)
- Zoning Categories (See Appendix D)

coordinates. The station or monument shall be located on the Final Plat to an accuracy of 1:15,000 with a statement identifying the station or monument. If such a monument or station is not available, the tie shall be made to some permanent and readily recognizable landmark or identifiable point, physical object, or structure.

D. Subdivision Survey Accuracy

1. Angular error of closure shall not exceed 20 seconds times the square root of the number of angles turned.
2. Linear error of closure shall not exceed one foot per 10,000 feet of perimeter of the lot of land (1:10,000), except for commercial and industrial subdivisions, where linear error closure shall not exceed one foot per fifteen thousand 15,000 feet of perimeter (1:15,000).

SECTION 5.4. TREE PROTECTION

5.4.1. Purpose

The purpose of this section is to establish minimum standards to ensure that development and land-disturbing activities do not result in the unnecessary removal or damage of tree canopy and mature trees that contribute to the character and quality of life in Morrisville by:

- A. Preserving and enhancing the visual and aesthetic qualities of the Town;
- B. Reducing glare, dust, heat, and noise;
- C. Maintaining and enhancing property values;
- D. Increasing slope stability and controlling erosion and sedimentation;
- E. Reducing stormwater runoff into waterways and preserving and enhancing water quality;
- F. Preserving and enhancing air quality;
- G. Conserving wildlife habitat; and
- H. Conserving energy by moderating temperatures and reducing heating and cooling demands.

COMMENTARY

The Land Use Plan calls for creation of a tree protection ordinance to protect trees during development and limit the heat island effect of urban development patterns. Part C, Article IX (Landscape Ordinance) of the current Zoning Ordinance includes minimal standards for protecting existing trees. This proposed new section expands those standards to require retention of a percentage of existing tree canopy and/or preserve specific specimen or heritage trees.

5.4.2. Applicability

A. General

The standards in this section shall apply to any removal of a specimen tree and to all new development subject to Planned Development Rezoning (Section 2.5.3), Conceptual Master Plan Approval (Section 2.5.4), Special Use Permit (Section 2.5.5), Major Subdivision Preliminary Plat Approval (Section 2.5.6.B), Minor Subdivision Plat Approval (Section 2.5.6.D), Major Site Plan Approval (Section 2.5.7.B), or Minor Site Plan Approval (Section 2.5.7.C), unless such specimen tree removal or new development is expressly exempted in accordance with subsection B below.

B. Exemptions

The following activities are exempt from the standards of this section:

1. The removal of trees other than specimen trees where associated with an existing single-family detached, duplex, or manufactured home dwelling use on an existing lot.
2. The removal of dead or naturally-fallen trees;

3. The removal of trees that pose an imminent threat of falling onto an existing structure, are so close to an existing structure as to endanger the stability of the structure, or otherwise create on-going safety problems for existing development;
4. The removal of diseased trees posing a threat to adjacent trees;
5. The removal of invasive species of trees, provided the removal results in the complete removal of the trees (including roots);
6. The selective and limited removal of trees or vegetation necessary to obtain clear visibility within intersection sight distance areas;
7. The removal of trees that the Town Engineer determines to be a hazard to traffic or to interfere with the provision of utility lines or public services;
8. The removal of trees as necessary for rescue in an emergency or for clean-up following a natural disaster;
9. The removal of trees in Airport Overlay Districts that the Planning Director, after consultation with staff of the Raleigh-Durham Airport Authority, determines to be an obstruction to air navigation to and from the Raleigh-Durham International Airport;
10. The removal or replacement of trees outside of an approved tree protection area, when associated with an expansion of the building footprint or parking area of an existing nonresidential development by ten percent or less from that originally approved for the development; and
11. Tree removal associated with normal forestry activity that is conducted on land taxed on the basis of its present-use value as forestland pursuant to N.C.G.S. ch. 105, art. 12, or in accordance with a forest management plan prepared or approved by a forester registered in accordance with N.C.G.S. ch. 89B—subject to the limitations on subsequent development in subsection C below.

C. Limitations on Development Proposals Subsequent to Exempt Forestry Activity²⁹⁴

Clear-cutting of a site to circumvent the requirements of this section is prohibited. If the forestry exemption in subsection B.11 above is used to remove all or substantially all of the trees that would have been protected by this section pursuant to an application for Planned Development Rezoning (Section 2.5.3), Conceptual Master Plan Approval (Section 2.5.4), Special Use Permit (Section 2.5.5), Major Subdivision Preliminary Plat Approval (Section 2.5.6.B), Minor Subdivision Plat Approval (Section 2.5.6.D), Major Site Plan Approval (Section 2.5.7.B), or Minor Site Plan Approval (Section 2.5.7.C), no such application shall be accepted for development of the land for a period of three years after completion of the forestry activity, or for a period of five years after completion of the forestry activity if the tree removal constituted a willful violation of this section.

5.4.3. Tree Survey

A. Purpose

The purpose of the tree survey is to clearly demonstrate the location and area of existing tree canopy coverage for stands of trees on a development site as well as the location and size of individual specimen trees on the site.

²⁹⁴ This limitation is expressly authorized by N.C.G.S. § 160A-458.5(c). It is intended to discourage persons from using the statutory exemption of forestry activities from zoning regulation as a means to clear-cut a site in preparation for development and avoid tree protection regulations that would have applied to the development proposal.

B. Required

A tree survey shall be prepared and submitted as part of any application for development subject to this section except for development of a single-family detached, duplex, or manufactured home dwelling on an existing lot.

C. Contents

The inventory shall include:

1. The latest available aerial photograph of the development site;
2. A plan depicting:
 - a. The location, area, predominant species, general health, estimated tree number, and average DBH of stands of trees;
 - b. The location, species, general health, and DBH (diameter at breast height) of all individual specimen trees on the site;
 - c. Known dead or diseased trees, where practical; and
 - d. The percentage of the development site area (excluding proposed street rights-of-way, existing utility easements, and natural water surface areas) that is covered by existing tree canopy.

5.4.4. Tree Canopy Retention²⁹⁵

A. Minimum Percentage

1. Applicability

Except as exempted by subsection 2 below, or otherwise allowed and mitigated in accordance with Section 5.4.8, Mitigation for Tree Removal, existing tree canopy cover on a development site outside the Transit-Oriented Development (TOD) or Main Street (MS) District shall be retained and protected in accordance with Table 5.4.4.A, Existing Tree Canopy Retention Standards, based on the proposed type of development. The table represents a sliding scale in which minimum percentage of existing tree canopy that must be retained varies inversely with the percentage of existing tree canopy. Where the existing tree canopy cover falls between two percentage points shown on the table, the minimum required tree canopy retention shall be prorated between the corresponding percentage points for minimum required tree canopy retention. (See example in the table.)

2. Exemptions

The following development is exempt from the requirements of this subsection:

- a. Development exempt from the standards of this section by Section 5.4.2.B, Exemptions;
- b. Development of a single-family detached, duplex, or manufactured home dwelling on an existing lot.

²⁹⁵ As recommended in the Assessment Report (p. 24), this subsection requires a percentage of a development site's existing tree canopy cover to be retained, based on the type of development. The formulas reflect the approach that the sparser the existing tree canopy, the more of what there is should be retained. Differentiating residential from nonresidential and mixed-use development reflects the greater lot coverage typical of nonresidential and mixed-use development.

Table 5.4.4.A: Existing Tree Canopy Retention Standards		
Existing Tree Canopy Cover ¹	Minimum Percentage of Existing Tree Canopy Cover to be Retained	
	Single-Family Attached and Multifamily Development	Nonresidential and Mixed Use Development
100%	19%	7%
80%	24%	9.5%
60%	29%	12%
40%	34%	14.5%
20%	39%	17%
0%	44%	19.5%

NOTES:
 1. Existing tree canopy cover is the percentage of a development site (excluding proposed street rights-of-way, existing utility easements, and natural water surface areas) that is covered by existing tree canopy before development or land disturbing activity.

ILLUSTRATIVE EXAMPLE: The tree survey establishes that 65% of a 100,000-square-foot multifamily development site is covered by existing tree canopy. Because 65% represents 25% of the difference between 60% and 80%, the minimum required tree canopy retention for the site is 25% of the difference between the requirements for 60% tree cover (29%) and 80% tree cover (24%), or 27.75% of the existing canopy tree cover. This equates to 18.04 % of the total development site. ($65\% \times 27.75\% = 18.04\%$), yielding a tree protection area of approximately 18,038 square feet.

B. Priority Retention Areas²⁹⁶

Priority area for retention of existing tree canopy cover shall include the following, listed in priority order:

1. Existing tree canopy area containing specimen trees and their associated root zones;
2. Existing tree canopy area located in riparian buffers, wetlands, or wetland protection areas;
3. Existing tree canopy area containing stands of mature deciduous trees;
4. Existing tree canopy area with natural grades of 15 percent or more;
5. Existing tree canopy area containing trees and other vegetation needed for required perimeter and streetyard buffers and landscaping; and
6. Existing tree canopy that is a part of wildlife habitat and other sensitive natural areas.

²⁹⁶ This prioritizes existing tree canopy cover that should be retained.

5.4.5. Specimen Tree Preservation²⁹⁷

Removal of specimen trees, as defined in Section 11.5, Terms and Uses Defined, is prohibited unless such removal is exempted by Section 5.4.2.B, Exemptions, or is otherwise allowed and mitigated in accordance with Section 5.4.8, Mitigation for Tree Removal.

5.4.6. Tree Protection Plan and Tree Protection Areas

- A. All applications subject to this section except for development of a single-family detached, duplex, or manufactured home dwelling on an existing lot shall include a tree protection plan prepared by an ISA-certified arborist, registered landscape architect, or registered forester that designates boundaries of one or more tree protection areas and shows grading and other major development activities proposed adjacent to the tree protection area(s).²⁹⁸
 - B. The tree protection area(s) shall include land within the drip lines for all individual trees and stands of trees proposed to be retained and protected in accordance with Section 5.4.4, Tree Canopy Retention, and 5.4.5, Specimen Tree Preservation, as well as for any replacement trees proposed to be provided in accordance with Section 5.4.8.C, Replacement Trees. The tree protection plan shall also depict the location and details of protective fencing, marking, and signage to be provided in accordance with Section 5.4.7.B, Protective Fencing and Signage.
 - C. Tree protection areas shall be located within required common open space or public recreation areas, where they are maintained so as to protect the included trees in accordance with Section 5.5.1.F, Ownership, Management, and Maintenance of Common Open Space. For subdivision developments, tree protection areas shall not be located within individual lots, and the recorded subdivision plat shall include a note prohibiting disturbance of the tree protection area during development of the subdivision except as authorized by this section.²⁹⁹
-

5.4.7. Tree Protection During Development Activity

A. Responsibility

During any development activity (including demolition activity), the property owner or developer shall be responsible for protecting existing or replacement trees within a tree protection area.

B. Protective Fencing and Signage³⁰⁰

1. Protective Fencing

Continuous fencing consisting of a bright orange plastic mesh at least four feet high shall be provided along the boundaries of tree protection areas, no closer than one linear foot outside of the drip lines of trees within the area. The Planning Director shall consider existing site conditions and the species and size of the trees to be protected in determining the exact location of tree protective fencing, and may require the fencing to be extended to include the critical root zones of trees.

(See Figure 5.4.7.B.1: Tree Protection Fencing and Signage.)

²⁹⁷ As recommended in the Assessment Report, this is the basic requirement for preservation of specimen trees.

²⁹⁸ Showing proposed adjacent development activities is intended to prompt consideration of whether and how those activities might impact the tree protection area—e.g., prevent steep grades that might cause increased erosion and sedimentation in the tree protection area.

²⁹⁹ This ensures that tree protection areas are included within common open space areas, which are subject to instruments ensuring their maintenance as tree protection areas. If tree protection areas were located within individual subdivision lots, their continued protection would require continual monitoring and enforcement of a series of restrictive covenants or conservation easements—an administrative burden most jurisdictions are reluctant to shoulder.

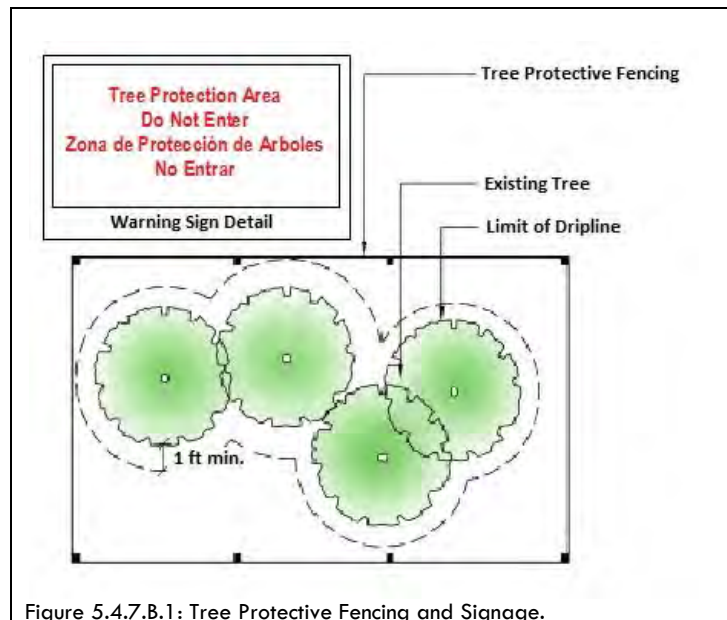
³⁰⁰ This requires protective fencing around tree protection areas and specifies where the fencing must be located (with authority to extend it to protect critical root zones) and how long it is to remain in place.

2. Warning Signage

Warning signs shall be installed along any required tree protective fencing at points no more than 150 feet apart. The signs shall be clearly visible from all sides of the outside of the fenced-in area. The size of each sign must be a minimum of two feet by two feet. The sign message shall, in both English and Spanish, identify the fenced or marked area as a tree protection area and direct construction workers not to encroach into the area (e.g., “Tree Protection Area: Do Not Enter”).

3. Duration of Protective Fencing or Signage³⁰¹

Required protective fencing and signage shall be erected before any grading or other development activity begins and shall be maintained until issuance of a Certificate of Compliance/Occupancy following completion of all development in the immediate area of the fencing or signage.



C. Tree Protection Area Limitations and Requirements³⁰²

Except where authorized by the tree protection plan, encroachments into a tree protection area may occur only when no other alternative exists, and shall comply with landscaping best management practices and the following limitations and requirements:

1. Construction Activity, Equipment, or Materials Storage

No development activity—including grade changes, the operation or parking of heavy equipment, or the washing down of concrete or cement handling equipment, or the storage of fuel, chemicals, materials, supplies, or construction waste and debris—shall be allowed within the tree protection area.

2. Clearing of Vegetation

Any clearing of vegetation within the tree protection area shall be only by hand.

3. Use of Retaining Walls and Drywells

Retaining walls and drywells may be used to protect trees to be preserved from severe grade changes if venting adequate to allow air and water to reach tree roots is provided through any fill.

4. Impervious Surface

No impervious surface (including, but not limited to, paving or buildings) may be located within a tree protection area.

³⁰¹ This clarifies that protective fencing and marking must remain in place until the development is fully completed.

³⁰² This expands the prohibition on “construction site activities” in Town staff’s draft tree protection ordinance to address other potential construction-related encroachments into a tree protection area.

5. Fences and Walls

Installation of fences and walls shall take into consideration the root systems of existing trees. Post-holes and trenches close to trees shall be dug by hand and adjusted as necessary to avoid damage to major roots. Continuous footers for masonry walls shall end at the point where major large roots are encountered and these roots bridged.

5.4.8. Mitigation for Tree Removal or Damage

A. Removal Pursuant to Waiver of Requirements³⁰³

1. General

On determining that features of a development site make it unfeasible to meet the minimum existing tree canopy retention standard in Section 5.4.4, Tree Canopy Retention, or the specimen tree preservation requirement in Section 5.4.5, Specimen Tree Preservation, the Planning Director may waive or partially waive such standard or requirement and allow removal of trees in accordance with this section.

2. Criteria for Waiver³⁰⁴

Before the Planning Director may waive or partially waive the minimum existing tree canopy retention standard or the specimen tree preservation requirement, the applicant shall clearly demonstrate that compliance with the standard or requirement would necessarily preclude reasonable development of the site in accordance with the provisions of this Ordinance and of other Town, State, and federal regulations. Factors that may be considered include, but are not limited to, the following:

- a. The extent to which the size and features of the development site (e.g., floodplains, riparian buffers along water bodies and watercourses, steep slopes, and existing utility lines and easements) pose constraints on the developability of areas not covered by existing tree canopy;
- b. The feasibility of relocating, resizing, or reconfiguring building footprints, parking areas, utility lines, or other development features to accommodate compliance with the canopy tree retention standard and specimen tree preservation requirement as well as other applicable regulations; and
- c. The opportunity and feasibility of using the Administrative Adjustment procedure (Section 2.5.19), the Alternative Equivalent Compliance procedure (Section 2.5.20), an alternative parking plan (Section 5.10.9), or an alternative landscaping plan (Section 5.12.7) to provide

³⁰³ This recognizes that removal of existing trees may be unavoidable to allow reasonable development of property, but conditions any waiver on there being no alternative and the removal being compensated with replacement trees.

³⁰⁴ Section 4 of the tree protection regulations drafted by Town staff allows removal of tree canopy if compliance with retention standards precludes development of at least 50% of allowable floor area. This subsection replaces the 50% criterion with a reasonable development criterion, to provide more flexibility in case 50% of allowable floor area still does not constitute a reasonable use of a property.

The staff draft regulations list several considerations related to potential constraints on site development (location of natural site features and major transmission lines, land needed for site access and required parking). It also calls for consideration of "environmental and aesthetic benefits to the community," which it describes as the net contribution to maintaining or improving water quality, air quality, natural ecosystem function, and the quality and extent of the site's vegetative appearance. This subsection is modified to clarify the apparent intent that removal of tree canopy (or specimen trees) otherwise required to be retained is justified only if there is no feasible alternative to meeting the requirement and attaining reasonable development of the site. It modifies the factors to be considered to reference the potential conflict between meeting tree protection requirements and meeting other development requirements and potential use of the UDO's flexibility provisions to avoid such conflicts. It does not carry forward the "environmental and aesthetic benefits" consideration because they don't relate to constraints posed by having to comply with tree retention and replacement requirements. We recognize such considerations as appropriate to review of alternative or compensating design, which this UDO addresses in Module 1's Alternative Equivalent Compliance procedure and this Module's proposed alternative landscaping plan provisions (Section 5.12.7).

the flexibility needed to accommodate compliance with the canopy tree retention standard and specimen tree preservation requirement as well as other applicable regulations.

3. Replacement Trees Required

- a.** Each existing non-specimen tree with a DBH of ten inches or more that is removed pursuant to a waiver or partial waiver of the minimum existing tree canopy retention standard shall be replaced with one or more trees with a minimum caliper of two inches each and a cumulative caliper equal to or greater than one and on-half times the DBH of the removed tree.³⁰⁵
- b.** Each existing specimen tree that is removed pursuant to a waiver or partial waiver of the specimen tree preservation requirement shall be replaced with one or more specimen trees with a minimum caliper of five inches each and a cumulative caliper equal to or greater than two times the DBH of the removed tree.³⁰⁶
- c.** Required replacement tree(s) shall be planted and maintained in accordance with the planting standards in Section 5.12.3, General Landscaping Standards, and shall comply with the standards in subsection C below.

B. Tree Damage During Development³⁰⁷

- 1.** If a specimen tree or other existing tree to be preserved under the tree protection plan is damaged during development of the development site, an ISA-certified arborist or registered forester retained by the Town, at the expense of the applicant, shall assess the damage and provide a written report to the Planning Director that documents the following:
 - a.** Severity of the tree damage;
 - b.** Determination on whether corrective measures can be taken to save the tree or whether the tree has been damaged beyond repair; and
 - c.** Any corrective measures recommended to ensure the tree's survival (e.g., pruning damage to tree canopy, root pruning, fertilization, soil enhancements for damage to tree roots, and application of irrigation to compensate for root loss).
- 2.** If the ISA-certified arborist or registered forester determines that the tree can survive with corrective measures, the applicant shall promptly have recommended corrective actions undertaken by an ISA-certified arborist.
- 3.** If the ISA-certified arborist or registered forester determines that a tree has been damaged beyond repair, the tree shall be replaced with one or more trees that shall comply with the standards in subsection C below and the following standards:
 - a.** Each non-specimen tree damaged beyond repair shall be replaced with one or more trees with a minimum caliper of two inches each and a cumulative caliper equal to or greater than one and on-half times the DBH of the removed tree.
 - b.** Each specimen tree damaged beyond repair shall be replaced with one or more specimen trees with a minimum caliper of five inches each and a cumulative caliper equal to or greater than two times the DBH of the removed tree.

³⁰⁵ The tree survey requires an estimate of the number of trees in a stand of trees and the proposed size threshold should make it relatively easy to identify the number of removed trees. The proposed replacement tree standards require full replacement in terms of total DBH, but recognizing that nurseries generally stock only smaller young trees, allow one mature removed tree to be replaced with multiple young trees of a set minimum size.

³⁰⁶ As further incentive for developers to explore all alternatives before removing a specimen tree, this provision doubles the general replacement tree requirement and substantially increases the minimum size of replacement tree required.

³⁰⁷ This carries forward the tree damage provisions in Section 8.2 and part of Section 8.3 of the Town staff's draft tree protection regulations.

C. Replacement Trees³⁰⁸

1. Location of Replacement Trees

Replacement trees shall be planted within the tree protection area or, where the tree protection area does not contain sufficient area, within any other part of the development site. The Planning Director may allow replacement trees to be planted as street trees in accordance with the standards in Section 5.12.6, Street Trees in the Transit-Oriented Development (TOD) and Main Street (MS) Districts.

2. Native Species Required

Replacement trees shall be species native to the Morrisville area (see the list of acceptable native plant species in the Administrative Manual).

3. Tree Type

- a. Removed shade trees shall be replaced with shade trees and removed understory trees shall be replaced with understory trees.
- b. Where more than 12 replacement trees are provided, they shall comprise at least four different species, including at least three deciduous species.

4. Guaranteed Establishment Period

The applicant shall guarantee the survival and health of all replacement trees during an establishment period of at least three years and guarantee any associated replacement costs in accordance with Section 8.2.2, Maintenance Guarantees. If the replacement trees do not survive the establishment period, the applicant shall purchase and install new replacement trees and guarantee their survival and health for a new three-year establishment period.

5.4.9. Credit Towards Other Standards

Tree protection areas, and trees and other vegetation within such areas, may be credited towards compliance with common open space, public recreation area, perimeter and streetyard buffer, and landscaping requirements to the extent they comply with applicable common open space and public recreation area standards (see Section 5.5, Common Open Space and Public Recreation Area, perimeter and streetyard buffer standards (see Section 5.7, Perimeter and Streetyard Buffers), or landscaping standards (see Section 5.12, Landscaping).³⁰⁹

SECTION 5.5. COMMON OPEN SPACE AND PUBLIC RECREATION AREA

5.5.1. Common Open Space

A. Purpose

The purpose of this section is to ensure that developments other than residential subdivisions include or contribute to the provision of common open space for the use and enjoyment of the development's occupants and users. Open space serves numerous purposes, including preservation and protection of natural areas and features, providing opportunities for passive and active recreation, enhancing management of stormwater runoff to protect water quality and reduce flooding, and mitigating the heat island effect of developed areas.

Many communities establish a government fund that can serve as the repository of penalties for violations of tree protection regulations as well payments in lieu of required tree replacement. If Morrisville wishes to establish and use such a fund, we recommend adding a subsection authorizing payments in lieu of providing some portion of required replacement trees.

³⁰⁹ This is intended to clarify that trees and vegetation within tree protection area can serve "double duty" in also meeting open space, buffer, and landscaping requirements.

Article 8: Performance and Maintenance

SECTION 8.1. PERFORMANCE

8.1.1. Review for Compliance

Unless otherwise provided in this article or in Article 7: Stormwater Management, review for compliance with the standards of this article shall occur during review of an application for Major Subdivision Final Plat Approval (Section 2.5.6.B), Minor Subdivision Approval (Section 2.5.6.D) or Construction Plan Approval (Section 2.5.8), as appropriate.

8.1.2. Phasing of Development

The phasing of development is allowed as part of Conceptual Master Plan Approval (Section 2.5.4) or Site Plan Approval (Section 2.5.7) in accordance with the following standards.

A. Phasing Criteria

Phasing of approved development shall be in keeping with an approved phasing plan that shows phase boundaries and describes included development and improvements in accordance with the following criteria:

1. The numbering of phases shall be sequential and coincide with the order in which the different development phases are proposed to be constructed.
2. Each phase shall be designed to include all improvements and other aspects of development necessary to meet all requirements of this Code and other applicable regulations, either as a stand-alone development or in conjunction with completed and accepted phases of the same development.

B. Temporary Measures

A phasing plan may include installation of temporary measures as necessary to allow a particular phase to meet the phasing criteria in subsection A above, provided authorization of the temporary measures shall be valid for one year and be accompanied by the provision of a performance guarantee and a maintenance guarantee for the temporary measures in accordance with Section 8.1.3, Performance Guarantees, and 8.2.2, Maintenance Guarantees.

8.1.3. Performance Guarantees⁵³³

A. General

A performance guarantee in accordance with the standards in this section shall be required in the following circumstances:

1. To ensure completion of public infrastructure improvements (e.g., roadways, bike lanes, curb and gutter, sidewalks, bike paths, crosswalks, traffic signs and controls, street lights, fire lanes, bus shelters and other transit facilities, greenway paths—but not public improvements provided in accordance with Article 7: Stormwater Management) that are required as part of Construction Plan Approval, but are not installed before application for a Major Subdivision Final Plat, Minor Subdivision Plat, or Building Permit;

⁵³³ N.C.G.S. § 160A-372(c) expressly authorizes municipalities to require performance guarantees to ensure the successful completion of improvements required for subdivisions. N.C.G.S. § 160A-383 includes a more general authorization for zoning regulations to facilitate the efficient and adequate provision of public improvements. Performance guarantees have long been used in local subdivision regulations to ensure completion of required public improvements in subdivisions before lots are platted and developed, and are commonly used in local zoning regulations to ensure completion of required public improvements before served buildings are occupied, as well as to ensure completion of required buffers, screening, and other landscaping before associated buildings are occupied or within a defined time period after their occupancy.

2. To ensure the completion of plantings of replacement trees, buffer screening, and landscaping that are required as part of Construction Plan Approval, but are not installed before issuance of a Certificate of Compliance/Occupancy (in conjunction with the grant of an extension to the time limit for installation of required landscaping).

B. Term of Performance Guarantees

The term of a performance guarantee shall reflect any time limit for completing installation of required improvements that is included in approval of the Major Subdivision Final Plat, Building Permit, or Certificate of Compliance/Occupancy, as appropriate—but in any case, the term shall not exceed two years. The Planning Director or Town Engineer, as appropriate, may, for good cause shown and with approval of the provider of the guarantee, grant extensions of the term for up to a total extended period of one year.

C. Form of Performance Guarantee⁵³⁴

1. Where required, the owner or developer shall furnish at least ten percent of the amount of a performance guarantee in the form of a cash deposit with the Town.⁵³⁵ The remainder of the performance guarantee may be furnished in any of the following acceptable forms:
 - a. Cash deposit with the Town;
 - b. Certified check from a North Carolina lender based upon a cash deposit, in a form acceptable to the Town Attorney;
 - c. Irrevocable letter of credit from a North Carolina banking institution in a form acceptable to the Town Attorney; or
 - d. Surety bond from a North Carolina surety bonding company in a form acceptable to the Town Attorney.
2. The performance guarantee shall be conditioned on the performance of all work necessary to complete the installation of the required improvements within the term of the performance guarantee. Performance guarantees shall provide that in case of the owner's or developer's failure to complete the guaranteed improvements, the Town shall be able to immediately obtain the funds necessary to complete installation of the improvements.

D. Amount of Performance Guarantee

1. Performance guarantees for required improvements shall be in an amount equal to 150 percent of the estimated full cost of completing the installation of the required improvements within the term of the guarantee, including the costs of materials, labor, and project management.
2. Estimated costs for completing installation of required public infrastructure improvements shall be itemized by improvement type and certified by the owner's or developer's licensed Professional Engineer, and are subject to approval by the Town Engineer. Estimated costs for completing installation of required replacement trees, buffer screening, and landscaping shall be itemized and certified by the owner's or developer's registered landscape architect, and are subject to approval by the Planning Director.
3. If the guarantee is renewed, the Town Engineer or Planning Director, as appropriate, may require the amount of the performance guarantee be updated to reflect cost increases over time.
4. The amount of a performance guarantee may be waived or reduced by the Town Council where the improvements are being installed with federal funds or in other circumstances where similar third-party assurance of their completion exists.

⁵³⁴ N.C.G.S. § 160A-372(c) expressly requires municipal subdivision regulations requiring performance guarantees to allow a range of types of performance guarantees, "including, but not limited to, surety bonds or letters of credit."

⁵³⁵ This 10% cash deposit requirement is carried forward from Sec. 4.12.2 of the current Design and Construction Ordinance.

E. Release or Reduction of Performance Guarantees⁵³⁶

1. Requirements for Release or Reduction

The Town Engineer (for public infrastructure improvements) or Planning Director (for private site improvements, replacement trees, buffer screening, and landscaping) shall release or reduce a performance guarantee only after:

- a. The owner or developer has submitted to the Town Engineer or Planning Director, as appropriate, an application for a release or reduction of the performance guarantee that includes certification by the owner's or developer's engineer or landscape architect, as appropriate, that installation of the guaranteed improvements has been completed in accordance with approved plans and specifications;
- b. The Town Engineer or Planning Director, as appropriate, has performed a final inspection of the improvements for which a release or reduction is requested, and certified in writing that installation of the guaranteed improvements has been completed in accordance with approved plans and specifications;
- c. The owner or developer has reimbursed the Town for all costs associated with conducting any inspection that finds the guaranteed improvements for which a release or reduction is requested have not been installed in accordance with approved plans and specifications;
- d. The owner or developer has provided the Town Engineer or Planning Director, as appropriate, assurances that liens against guaranteed public infrastructure improvements will not be filed after their acceptance by the Town (e.g., through affidavits, releases, or waivers of liens from all contractors and subcontractors); and
- e. The owner or developer has provided the Town Engineer or Planning Director, as appropriate, any required maintenance guarantee for the same improvements (see Section 8.2.2, Maintenance Guarantees).

2. Limits on Reductions⁵³⁷

No performance guarantee for public infrastructure improvements shall be reduced to less than 30 percent of the full amount of the performance guarantee until all guaranteed public infrastructure improvements have been completed by the owner or developer. No performance guarantee for required private site improvements, replacement trees, buffer screening, and landscaping shall be reduced to less than 75 percent of the full amount of the performance guarantee, until all guaranteed private site improvements, replacement trees, buffer screening, and landscaping have been completed by the owner or developer.

F. Default and Forfeiture of Performance Guarantee

1. Notice of Failure to Install or Complete Improvements⁵³⁸

If the owner or developer fails to complete installation of the guaranteed improvements within the term of the performance guarantee (as may be extended), the Town Engineer (for public infrastructure improvements) or Planning Director (for private site improvements, replacement trees, buffer screening, and landscaping) shall give the owner or developer 30 days written notice of the default by certified mail.

⁵³⁶ This incorporates the release criteria scattered among various provisions in Sec. 14.1.2.2, adding the provision relating to the lack of liens.

⁵³⁷ This carries forward the current 30% limit on reductions in Sec. 14.1.2.3, as applied to public infrastructure improvements, but allows up to 75% reductions of guarantees for private improvements, replacement trees, buffer screening, and landscaping. This additional flexibility is intended to recognize the variable nature of such improvements.

⁵³⁸ This new subsection requires the Town to provide the owner/developer at least 30 days' notice of a default of the performance guarantee before using the surety funds to complete the defaulted work.

2. Town Completion of Improvements

After the 30-day notice period expires, the Town may draw on the security and use the funds to perform work necessary to complete installation of the guaranteed improvements. After completing such work, the Town shall provide a complete accounting of the expenditures to the owner or developer and, as applicable, refund all unused security deposited, without interest.

SECTION 8.2. MAINTENANCE

8.2.1. General Maintenance Requirement

When the standards and procedures of this Ordinance, or a development approval issued pursuant with this Ordinance, or conditions attached to any such approval require that any building or site feature be constructed or installed, the owner of the affected property shall be responsible for maintaining those building or site features in good repair, and for replacing them if they are damaged or destroyed or, in the case of living materials, if they die or are effectively destroyed after installation. In addition, property owners shall be responsible for each of the additional maintenance and replacement standards set forth in the various parts and sections of this article.

8.2.2. Maintenance Guarantees

A. General

A maintenance guarantee in accordance with the standards in this section is required in the following circumstances:

1. To ensure against defects in workmanship or materials in providing public infrastructure improvements (e.g., roadways, bike lanes, curb and gutter, sidewalks, bike paths, crosswalks, traffic signs and controls, street lights, fire lanes, bus shelters and other transit facilities, greenway paths—but not public improvements provided in accordance with Article 7: Stormwater Management) required as part of Construction Plan Approval (Section 2.5.8) or a Subdivision Approval (Section 2.5.6);
2. To ensure the survival and health of landscaping that is required in accordance with Section 5.7, Perimeter and Streetyard Buffers, Section 5.12, Landscaping, or Section 5.13, Screening, during an establishment period, and during a maintenance and monitoring period.

B. Term of Maintenance Guarantees

The term of a maintenance guarantee for public infrastructure improvements shall be one year from the date of acceptance. The term of a maintenance guarantee for landscaping shall be one year from the date the landscaping is installed. The term of a maintenance guarantee for replaced trees shall be three years from the date the trees are planted, provided that such term shall be extended for any guaranteed tree that is replaced during the original three-year term to cover three years after the date of replacement.

C. Form of Maintenance Guarantees

1. Where required, the owner or developer shall furnish a maintenance guarantee for the provision of required landscaping in any of the following acceptable forms:
 - a. Cash deposit with the Town;
 - b. Certified check from a North Carolina lender based upon a cash deposit, in a form acceptable to the Town Attorney;
 - c. Irrevocable letter of credit from a North Carolina banking institution in a form acceptable to the Town Attorney; or

- d. Surety bond from a North Carolina surety bonding company in a form acceptable to the Town Attorney.
2. A maintenance guarantee for public infrastructure improvements or landscaping shall be conditioned on the performance of all work necessary to maintain required public infrastructure improvements or landscaping during the term of the maintenance guarantee, including work needed to repair or replace infrastructure defects or replace plants that have died within the term of the maintenance guarantee.
3. A maintenance guarantee for a replacement tree shall be conditioned on the performance of all work necessary to transplant or plant replacement trees and maintain them during the term of the maintenance guarantee, including work needed to replace replacement trees that have died or been effectively destroyed during the term of the maintenance guarantee.
4. Maintenance guarantees shall provide that in case of the owner's or developer's failure to maintain and repair or replace the guaranteed public infrastructure improvements or landscaping—or to transplant or plant and maintain the guaranteed replacement trees—during the term of the maintenance guarantee, the Town shall be able to immediately obtain the funds necessary to make necessary repairs or replacements.

D. Amount of Maintenance Guarantees

1. Maintenance guarantees for public infrastructure improvements and landscaping shall be in an amount equal to at least 20 percent of the full actual cost, including the costs of materials and labor, of installing the required public infrastructure improvements or landscaping. The Town Engineer may require a greater amount on determining it is necessary to cover the costs of greater than usual damage or deterioration that might be expected to result from on-going construction activities in the development (e.g., damage to roadways from heavy vehicles involved in the construction of homes on remaining lots within a subdivision). Actual costs for installing required public infrastructure improvements shall be itemized by improvement type and certified by the owner's or developer's licensed Professional Engineer. Actual costs for installing required landscaping shall be itemized and certified by the owner's or developer's registered landscape architect.
2. Maintenance guarantees for tree replacement or corrective action for damaged trees shall be in an amount determined based on Guide for Plant Appraisal (Council of Tree and Landscape Appraisers), as amended.
3. The amount of a maintenance guarantee for required public infrastructure improvements or landscaping may be waived or reduced by the Town Council where alternative means of ensuring proper maintenance of the improvements or landscaping are used.

E. Release or Reduction of Maintenance Guarantees

1. The Planning Director or Town Engineer, as appropriate, shall release a maintenance guarantee for public infrastructure improvements or landscaping at the end of the term of the maintenance guarantee only after Town staff has performed an inspection of the guaranteed improvements or landscaping and certified in writing that they have been maintained in accordance with approved plans and specifications.
2. The Planning Director shall release a maintenance guarantee for tree replacement or corrective action for damaged trees at the end of the term of the maintenance guarantee only after Town staff has performed an inspection of the subject trees and has certified in writing that they were properly transplanted, planted, or corrected and have been maintained in a healthy state in accordance with approved plans and specifications.
3. Where the term of a maintenance guarantee for tree replacement has been extended to cover the replacement of trees that died or were effectively destroyed during the original term (see Section 8.2.2.B, Term of Maintenance Guarantees), the Planning Director may reduce the

guarantee by the percentage of the total number of guaranteed trees that survived the original term.

F. Default and Forfeiture of Maintenance Guarantee

1. Notice of Failure to Maintain Guaranteed Improvements, Landscaping, or Trees

If the owner or developer fails to maintain the guaranteed public infrastructure improvements, landscaping, or replacement trees during the term of the performance guarantee, the Planning Director or Town Engineer, as appropriate, shall give the owner or developer 30 days written notice of the default by certified mail.

2. Town Correction of Defects

After expiration of the 30-day notice period for failure to maintain guaranteed public infrastructure improvements or landscaping, the Town may draw on the security and use the funds to perform work necessary to ensure the guaranteed public infrastructure improvements or landscaping comply with approved plans and specifications. After completing such work, the Town shall provide a complete accounting of the expenditures to the owner or developer and, as applicable, refund all unused security deposited, without interest.

annexation of an area that includes the development site before submitting any further applications for development of the site.

5.11.3. Utility Easements

- A. Developments shall provide utility easements to the appropriate utility service provider as necessary to accommodate the installation and maintenance of utility lines and facilities that are not proposed within street rights-of-way or access easements. The width and location of easements shall be as required by the utility service provider, but generally shall be at least 20 feet wide and centered along or adjacent to lot lines to the greatest extent practicable.
- B. Development within utility easements shall comply with the standards and restrictions of the appropriate utility service provider(s).

5.11.4. Solid Waste Removal⁴¹⁵

A. Purpose

The purpose of this section is to minimize the impact that noise associated with the removal of solid waste may have on adjacent residential development.

B. Hours of Collection

Solid waste shall not be collected from exterior commercial containers located within a residential development or within 500 feet of a residential dwelling between the hours of 9:00 PM and 7:00 AM. Notice of this limitation shall be posted on the gate screening the container.

SECTION 5.12. LANDSCAPING

5.12.1. Purpose

It is the purpose of this section to establish minimum standards for the development, installation, and maintenance of landscaping that protects and enhances property values, the environment, and aesthetic qualities in the Town, and otherwise promotes the public health, safety and general welfare. The standards are specifically intended to ensure and promote the planting and maintenance of trees, shrubs, ground cover, and other landscaping that will:

COMMENTARY

This section consolidates, modifies, and expands the various landscaping standards located in Part C, Art. IX (Landscape Ordinance) of the current Zoning Ordinance as well as the landscaping standards for parking lots in Part C, Art. XII (Off-Street Parking and Loading), and landscaping standards for Town Center parking lots in Part E, Art. III (General Development Standards).

- A. Mitigate against erosion and sedimentation by stabilizing the soils through root systems that hold and consolidate soil and other loose earthen materials;
- B. Reduce stormwater runoff and associated costs by intercepting, dispersing, and absorbing rainfall and slowing down surface flow;
- C. Reduce water pollution by filtering pollutants from stormwater runoff;
- D. Conserve water supplies by allowing more rainfall to stay in the water table and minimizing water use for landscaping maintenance;
- E. Moderate urban heat island effects by shading buildings and paved surfaces and lowering ambient temperatures through transpiration;

⁴¹⁵ This carries forward provisions in Part E (Town Center Code), Art. III (General Development Standards), Sec. 5.4 of the current Zoning Ordinance.

- F. Improve air quality by removing carbon dioxide and pollutant gases from the air and producing oxygen that helps dilute air pollutant concentrations;
- G. Restore soils and land denuded as a result of construction or grading;
- H. Maintain the continued vitality of natural habitats for the propagation and protection of wildlife, birds, game, and fish and other aquatic life;
- I. Limit glare created by exterior lighting;
- J. Provide a sense of privacy from neighbors and the street;
- K. Provide human scale to urban environments by breaking up the visual impact of structures and parking lots;
- L. Help differentiate streets and other areas of the public realm from private lands;
- M. Stimulate economic development by increasing the Town's attractiveness and quality of life to shoppers and employers;
- N. Safeguard and enhance property values and protect public and private investments; and
- O. Protect Town residents and visitors from personal injury and property damage, and avoid interruption of electrical and other utility services.

5.12.2. Applicability⁴¹⁶

A. New Development⁴¹⁷

Except where expressly provided otherwise in this Ordinance, the landscaping requirements in this section shall apply to all new development in the Town other than temporary uses and structures.

B. Existing Development

Except where expressly provided otherwise in this Ordinance, the landscaping requirements in this section shall apply to existing development in accordance with the following.

1. Change in Use⁴¹⁸

Any change in use that requires Site Plan Approval (Section 2.5.7) shall be subject to these landscaping standards to the maximum extent practicable.

2. Expansion⁴¹⁹

Except as otherwise provided in subsection 3 below, if an existing structure or use is expanded or enlarged (in terms of the number of dwelling units, floor area, number of employees, seating capacity, or other size unit), additional landscaping shall be provided in accordance with the requirements of this section to serve the expanded or enlarged part of the structure or use.

⁴¹⁶ Part C, Art. IX of the current Zoning Ordinance is not clear about what development activities current landscaping regulations apply to. This subsection is intended to clarify what developments are subject to landscaping standards.

⁴¹⁷ This expands the current Sec. 2.2's exemption of temporary/seasonal events to include other temporary uses and structures.

⁴¹⁸ The current Sec. 2.2 exempts improvements not constituting a change in the Building Code's occupancy classifications, which include Assembly, Business, Educational, Factory Industrial, Hazardous, Institutional, Mercantile, Residential, Storage, and Utility. While those classifications may have significance in respect to building design, they have no obvious relationship to the need for landscaping. For the sake of consistency and ease of administration, we propose instead that the Ordinance exempt those changes in use that are also proposed to be exempt from Site Plan Approval—i.e., mere changes in use that do not involve or require other development (such as expanded structures or additional parking).

⁴¹⁹ This clarifies that application of landscaping requirements to expansions of existing development is limited to the expanded part of the development.

3. Upgrading of Landscaping Nonconformities⁴²⁰

Where existing development is nonconforming in terms of compliance with this section's standards for off-street parking and loading, such development is subject to the limitations and upgrading requirements in Section 9.7, Nonconforming Site Features.

C. Landscape Plan Required

A landscape plan shall be included as part of any application for Major Subdivision Preliminary Plat Approval (Section 2.5.6.B), Minor Subdivision Plat Approval (Section 2.5.6.D), Major Site Plan Approval (Section 2.5.7.B), or Minor Site Plan Approval (Section 2.5.7.C) or Construction Plan Approval (Section 2.5.8) for development subject to the standards in this section. Landscape plans shall be prepared in accordance with the requirements of the Administrative Manual.

D. Allowed Deviation of Standards

Deviations from the landscaping standards in this section may be authorized in Section 2.5.19, Administrative Adjustment, Section 2.5.20, Alternative Equivalent Compliance, or Section 5.12.7, Alternative Landscape Plan.

5.12.3. General Landscaping Standards

A. New Planting Standards⁴²¹

1. Required vegetation shall be planted in accordance with American Standards of Nursery Stock guidelines.

2. At the time of planting, vegetation included as part of required landscaping shall comply with the following size standards:

a. Shade trees shall have a caliper of at least three and one-half inches and be at least 14 feet in height above ground level. They shall be capable of attaining a height of at least 35 feet and a crown diameter of at least 30 feet at maturity.

b. Understory trees shall have a caliper of at least two inches and shall be at least eight feet in height above ground level.⁴²²

c. Shrubs shall be upright in nature and at least 24 inches in height above ground level. They shall be capable of attaining a height of at least 30 inches within three years after planting.

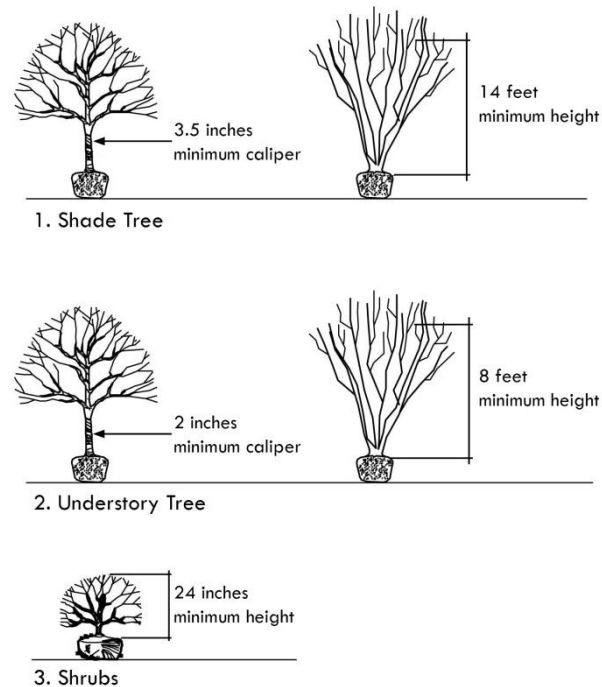


Figure 5.12.3.A: Minimum new planting standards. [to be revised to match text]

They shall be capable of attaining a height of at least 30 inches within three years after planting.

⁴²⁰ This recognizes that landscaping nonconformities (generally the lack of currently required landscaping) may be required to be upgraded towards conformity where substantial expansion or remodeling of principal structures is proposed.

⁴²¹ The tree size standards are carried forward from the standards for interior vehicle use areas in Part C. Art. IX, Sec. 7.3 of the current Zoning Ordinance. The shrub standards are carried forward from the minimum height standard for street yard planting next to vehicle use areas (Part C, Art. IX, Sec. 7.2.G).

⁴²² This adds a minimum height requirement to the current minimum caliper requirement.

3. All landscape plant materials shall be of standard quality or better, true to name and type of species or variety.
4. The use of drought-tolerant vegetation native to the Morrisville area is strongly encouraged (see the list of acceptable native plant species in the Administrative Manual).
5. Required landscaping areas shall be protected from vehicular damage by the installation of curbing, wheel stops, or extra width in the landscaping strip.⁴²³

B. Existing Vegetation⁴²⁴

The use of existing healthy, well-formed canopy trees, understory trees, evergreen trees, and shrubs shall be maximized wherever practical to comply with these landscaping standards. The use of existing vegetation shall be credited towards meeting tree protection standards (Section 5.4), perimeter and streetyard buffer standards (Section 5.6) and the landscaping standards in this section provided the vegetation meets those standards, is protected before and during development of the site in accordance with Section 5.4.7, Tree Protection During Development Activity, and is maintained thereafter in a healthy growing condition.

C. Stabilization⁴²⁵

All required landscape planting areas shall be stabilized and maintained with turf, ground covers, or other approved materials to prevent soil erosion and allow rainwater infiltration.

D. Easements⁴²⁶

Nothing except ground cover shall be planted or installed within any underground or overhead utility, drainage or gas easement, or within three feet of a fire protection system, except in accordance with the consent, standards, or guidelines of the utility provider, easement holder, or the Town, as appropriate.

E. Berms⁴²⁷

All berms shall comply with the following standards:

1. Berms shall be at least one and one-half feet high, with side slopes not exceeding a ratio of three horizontal feet to one vertical foot, and with a crown at least two feet wide.
2. Berms proposed to be placed along street rights-of-way shall be designed and constructed to provide adequate sight distances at intersections and shall not impair safe operation of vehicles.
3. In no case shall berms be located or designed so they damage the roots or trunks of existing healthy vegetation designated to be preserved.
4. Berms shall not be located or designed so as to block or divert a natural drainage flow on to or off of any other land.

F. Time for Installation of Required Landscaping

1. Installation Before Certificate of Compliance/Occupancy⁴²⁸

All required landscaping (including ground cover) shall be installed in accordance with the required planting standards set forth in this section prior to issuance of a Certificate of

⁴²³ This carries forward the standard in Part C, Art. IX, Sec. 4.5.B.

⁴²⁴ This expands a general requirement that existing vegetation be retained within buffers (Part C, Art. IX, Sec. 4.2).

⁴²⁵ This slightly expands the standard in Part C, Art. IX, Sec. 4.5.C.

⁴²⁶ This simplifies the standards in Part C, Art. IX, Sec. 4.7 and avoids the need to amend the standard if Cary should revise its standards for plantings in water and sewer easements.

⁴²⁷ This incorporates the dimensional standards in Part C, Art. IX, Sec. 7.2.E of the current Zoning Ordinance, adding standards relating to sight distance obstructions and relationship to existing vegetation to be preserved.

⁴²⁸ This reiterates the general rule that required landscaping (as well as all other element of a development) must be completed before issuance of a Certificate of Compliance/Occupancy.

Compliance/Occupancy unless the Planning Director allows delayed installation in accordance with subsection 2 below.

2. Allowance of Deferred Installation⁴²⁹

- a. The Planning Director may, for good cause shown, allow installation of required landscaping to be deferred until after issuance of a Certificate of Compliance/Occupancy. Circumstances that may warrant an extension include, but are not limited to, the following:
 - (1) Unusual environmental conditions, such as drought, hurricanes, or over-saturated soil;
 - (2) The inappropriateness of the current season for planting the approved plant species; or
 - (3) Utility work occurring in a proposed landscaped area that is incomplete or delayed.
- b. Any allowance of deferred installation shall be conditioned on the required landscaping being installed as soon as practicable after the circumstances warranting deferral cease to exist, but no later than six months after such time, and the provision of a performance guarantee ensuring such installation in accordance with Section 8.1.3, Performance Guarantees.

G. Maintenance of Required Landscaping⁴³⁰

- 1. The owner shall be responsible for maintaining, in perpetuity, all required landscape areas and landscaping materials (including berms, walls, and fences as well as vegetation) in accordance with the approved landscape plan or alternative landscape plan and the standards of this section.
- 2. Required vegetation shall be maintained in a healthy condition and landscape areas shall be kept in an orderly appearance, free from refuse and debris.
- 3. All required vegetation shall be maintained in their characteristic natural shape and shall not be severely pruned or sheared. Trees shall not be topped or shaped as shrubs. Vegetation that has been severely pruned, sheared, topped, or shaped shall be considered damaged and shall be replaced with healthy comparable plant material.
- 4. Actions shall be taken to protect required landscaping materials from unnecessary damage during all facility and site maintenance operations.
- 5. Landscaping materials shall be maintained in a way that does not obstruct sight visibility within intersection sight distance areas (see Section 5.8.6.F, Intersection Sight Distance Areas), obstruct traffic signs or devices, or interfere with the use of bikeways and walkways.
- 6. Landscaping shall comply with Building Code restrictions on placing or storing combustible materials near buildings.
- 7. If landscaping materials used to meet the requirements of this section die, are seriously damaged, or are removed, they shall be replaced with comparable landscaping materials meeting the standards of this section within the next six months—or within the next year if the death, damage, or removal of the landscaping materials was due to an unusual weather occurrence or other act of nature (e.g., tornado, hurricane). In determining the extent of replacement required, the

⁴²⁹ Part C, Art. IX, Sec. 4.3 of the current Zoning Ordinance authorizes the Planning Director to allow deferral of required landscape planting for up to three months after issuance of a temporary Certificate of Occupancy “where conditions do not permit immediate planting,” provided a certified check or letter of credit guaranteeing the planting is provided. The section goes on to describe the required amount, procedure, and ramifications of such a guarantee. This subsection replaces that with standards that provide examples of circumstances warranting deferral, are more flexible about the length of deferral (which in many cases, should be until the next growing season), and referencing the performance guarantee regulations in Article 8: Performance and Maintenance.

⁴³⁰ This expands those provisions in Part C, Art. IX, Sec. 4.5 (Maintenance of Landscaping) that actually apply to landscaping maintenance, expanding them to require maintenance to avoid sight triangle obstructions

Planning Director shall consider the type and location of the required landscaping materials as well as the propensity for natural re-vegetation.⁴³¹

8. All initial and replacement landscaping shall be subject to a two-year performance guarantee that ensures proper maintenance and replacement, in accordance with Section 8.1.3, Performance Guarantees.⁴³²

H. Alteration of Required Landscaping⁴³³

Landscaping may be altered through replacement or relocation by a maximum of ten percent over the life of the development without submittal of a revised landscape plan provided that the overall landscaping remains in compliance with this section. A revised plan shall not be required for plantings that exceed the requirements of this section.

5.12.4. Vehicle Use Area Landscaping

A. Applicability

Except for driveways serving as off-street vehicle parking areas for single-family detached, duplex, manufactured home, and single-family attached dwellings, the vehicle use areas of developments shall include landscaping both within the interior of the vehicle use area (interior landscaping) and around its perimeter (perimeter landscaping) as a means of mitigating the vehicle use area's microclimate and visual impacts.

B. General

1. To the maximum extent practicable, required landscaped planting areas and shade trees shall be distributed and sited within and around the vehicle use area so as to maximize shading of pavement and pedestrian routes through the parking area. Part of every parking space shall be located within 50 feet from the trunk of a shade tree.⁴³⁴
2. Perimeter landscaping and interior landscaping shall be sited and designed for stormwater management purposes to the maximum extent practicable, as long as they comply with these vehicle use area landscaping standards.⁴³⁵
3. Perimeter landscaping and interior landscaping may include non-landscaping features such as walkways, light or utility poles, utility lines, and fire hydrants, provided the minimum landscaping width and planting standards for vehicle use areas are met.⁴³⁶

C. Perimeter Landscaping⁴³⁷

Where a vehicle use area is within 50 feet of and visible from a street, other development (except another vehicle use area), or vacant property, perimeter landscaping shall be provided and maintained within the strip of land between the vehicle use area and the adjacent street right-of-way or easement or property line in accordance with the following standards, except where such strip is

⁴³¹ The last sentence is added to this carried forward standard to provide some flexibility.

⁴³² This is a new standard requiring the posting of a maintenance guarantee to ensure the survival of required plantings for at least two years.

⁴³³ This new standard is intended to provide flexibility to accommodate minor alterations in required landscaping.

⁴³⁴ This carries forward the 50-foot requirement in Part C, Art. IX, Sec. 7.3 of the current Zoning Ordinance as a minimum for maximizing shading (to recognize the significant energy conservation and pedestrian comfort benefits from maximizing the shading of parking lots).

⁴³⁵ This new standard recognizes that parking lots can and should be designed to buffer, storage, and infiltrate stormwater runoff.

⁴³⁶ This recognizes that landscaping areas within and around vehicle use areas may include non-landscaping features, but not at the expense of required landscaping.

⁴³⁷ Part C, Art. IX, Sec. 7, Part C, Art. XII, Sec. 6.4, and Part E. Art. II, Sec. 5.1.C of the current Zoning Ordinance each requires landscaping that screens parking lots adjacent to or visible from streets. This subsection combines the adjacency and visual triggers to applicability and expands them to also require screening from adjacent developments and vacant properties.

crossed by an authorized vehicular or pedestrian accessway or utility easement. (See Figure 5.12.4.C: Perimeter Landscaping.)

1. Location and Configuration

Perimeter landscaping shall be located on the same property as the vehicle use area and placed to assure visibility and safety of pedestrians within the vehicle use area.

2. Composition⁴³⁸

Perimeter landscaping shall be comprised of any combination of trees, evergreen shrubs, berms, walls, and fences that form a continuous screen along the perimeter of the vehicle use area that will be at least 75 percent opaque within one year and at least 30 inches above ground level at the time of installation, subject to the following standards:

- a. Screening within a perimeter landscaping strip between a vehicle use area and a street shall be designed to screen the headlights of vehicles in the vehicle use area yet allow security surveillance of vehicle use areas from the adjacent street. Ways to achieve this include, but are not limited to, limiting the height of the largely opaque screening to three feet or using landscape features above a height of three feet that are at least 75 percent transparent (e.g., see-through metal railing or a trellis).
- b. Screening within a perimeter landscaping strip between a vehicle use area and a street shall allow compliance with all applicable sight distance and intersection sight distance area standards in the Engineering and Design and Construction Manual.
- c. The perimeter landscaping strip between a vehicle use area and a street shall not be located within any future street right-of-way whose boundary is delineated or otherwise established by the comprehensive plan.⁴³⁹
- d. The perimeter landscaping strip shall be located on the same property as the vehicle use area.
- e. Any planted trees or shrubs shall comply with the standards in Section 5.12.3.A, New Planting Standards.
- f. Any wall or fence shall comply with the standards in Section 5.14, Fences and Walls.⁴⁴⁰

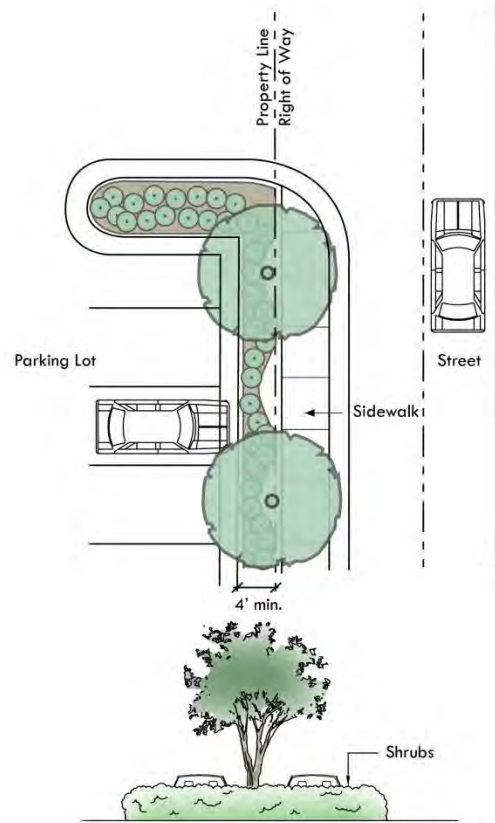


Figure 5.12.4.C: Perimeter Landscaping.

⁴³⁸ The current vehicle use area screening standards do not specify how opaque the screening must be; the general parking lot screening standards require at least 90% opacity; and the Town Center parking lot screening standards require at least 75% opacity. We propose using the 75% standard.

⁴³⁹ This new standard is intended to ensure perimeter landscaping strips are not destroyed by a planned future road widening.

⁴⁴⁰ This references new fence and wall standards in 0.

- g. Ground cover or turf shall be planted in all areas not covered by trees, shrubs, or walls.⁴⁴¹

3. Width⁴⁴²

The perimeter landscaping strip shall be the minimum width necessary to adequately accommodate the proposed plantings and other screening materials and avoid damage to such materials by vehicles within the vehicle use area. In no instance shall the strip be less than four feet wide.

4. Credit Towards Perimeter and Streetyard Buffer Standards

Perimeter landscaping associated with a vehicle use area may be credited towards compliance with perimeter and streetyard buffer standards to the extent landscaping within the strips complies with applicable buffer standards (see Section 5.7, Perimeter and Streetyard Buffers).

D. Interior Landscaping Standards⁴⁴³

Vehicle use areas except those containing 15 or fewer vehicle parking spaces shall provide and maintain landscaped islands within the interior of the vehicle use area in accordance with the following standards. These standards shall not apply to parking structures or vehicle display areas.

1. General

- a. For each 2,000 square feet of area within a vehicle use area, at least one shade tree and ten shrubs meeting the standards in Section 5.12.3.A, New Planting Standards, shall be provided. Up to 25 percent of the shrubs may be deciduous.⁴⁴⁴
- b. Understory trees may be substituted for shade trees in areas beneath or immediately adjacent to overhead utilities or exterior lighting fixtures.⁴⁴⁵
- c. Those parts of planting islands not containing required shade trees shall be landscaped with other trees, shrubs, or ground cover.⁴⁴⁶

2. Planting Islands within Parking Bays

- a. A planting island shall be provided at each end of every row of parking spaces. Where a row of parking spaces contains more than 20 parking spaces, additional planting islands shall be provided at a spacing no greater than one island at the end of every 20 contiguous parking spaces.
- b. A planting island at the end of single loaded parking bays shall be at least 175 square feet in area. A planting island at the end of double-loaded bays shall be at least 350 square feet in area.
- c. Each planting island shall be at least ten feet wide. If the planting islands at the ends of parking bays include a connecting walkway in accordance with Section 5.10.6.C, Large Parking Lots, they shall be at least 15 feet wide and designed to maximize shading of the walkway and minimize disturbance of vegetation by pedestrians.
- d. Each planting island shall contain at least one shade tree.⁴⁴⁷

⁴⁴¹ This new standard sets a minimum width for perimeter landscaping strips.

⁴⁴² This new standard is intended to ensure the minimum width needed to accommodate the requisite screening.

⁴⁴³ Part C, Art. IX, Sec. 7.3 of the current Zoning Ordinance requires 1 shade tree and 10 shrubs per 2,000 sf of VUA, requires all parking spaces to be located within 50 ft from a shade tree, and requires landscaped island at the ends of parking bays or spaced no more than 20 parking spaces apart within a parking or between parking bays. This subsection requires carries forward the standards in that section.

⁴⁴⁴ This carries forward the shade tree and shrub ratios in Part C, Art. IX, Sec. 7.3 of the current Zoning Ordinance, referencing the general new planting standards that contain the planting size standards in that section.

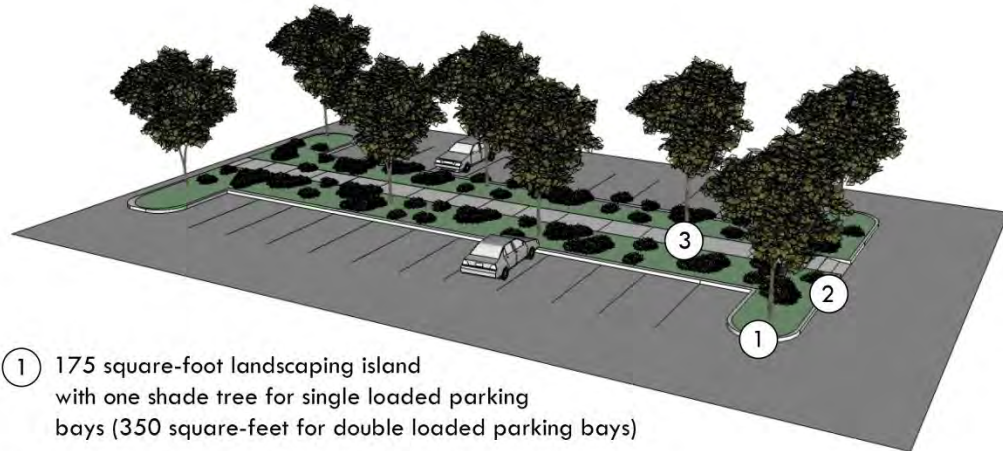
⁴⁴⁵ This new section recognizes that large trees are not appropriate immediately adjacent to overhead electric lines or light poles.

⁴⁴⁶ This new standard is intended to preclude the paving or graveling over of landscaped islands.

⁴⁴⁷ This new standard is intended to ensure shade trees are distributed throughout the parking lot.

3. Planting Islands Between Parking Bays

- a. A planting island at least ten feet wide shall be provided between at least every three parallel parking bays. If the planting island includes a walkway in accordance with Section 5.10.6.C, Large Parking Lots, it shall be at least 15 feet wide and designed to maximize shading of the walkway and minimize disturbance of vegetation by pedestrians.
- b. The planting island shall include shade trees spaced no more than 40 feet apart.⁴⁴⁸



- ① 175 square-foot landscaping island with one shade tree for single loaded parking bays (350 square-feet for double loaded parking bays)
- ② One shade tree and 10 shrubs per 2,000 sf of VUA
- ③ Planting islands at least 10 ft wide (15 ft where sidewalk included)

Figure 5.12.4: Vehicle use area configuration. [to be revised to match text]

5.12.5. Foundation Plantings⁴⁴⁹

A. Purpose and Intent

Foundation plantings are intended to soften the visual impact of building foundations and provide for the even dispersal of shrubs along building facades facing streets. They consist of evergreen and deciduous shrubs planted around a building's foundation to help soften its appearance.

B. Applicability

1. All new development shall plant evergreen or deciduous shrubs along any building foundation that faces:
 - a. A street; or
 - b. A parking lot or driveway, unless separated from the building by only a paved walkway.

⁴⁴⁸ This new standard is intended to ensure shade trees are distributed throughout the parking lot.

⁴⁴⁹ Part C, Art. IX, Sec. 6.5 of the current Zoning Ordinance requires all development to provide foundation plantings. For nonresidential and multifamily buildings, plantings are required along all foundations. Nonresidential and multifamily development is also required to provide plantings between buildings and sidewalks and between buildings and parking lots and driveways. For single-family detached, duplex, manufactured home, and single-family attached dwellings, plantings are required along foundations adjacent to a street. The section includes no description of the type of plant material required. This carries forward the current foundation planting requirements, but modifies them to apply only to the foundations facing a street or a parking lot or driveway without an intervening walkway. This subsection also specifies required plantings as shrubs, and adds standards for where plantings are required and maximum spacing of shrubs.

2. This requirement shall not apply to a building foundation constructed along or within one foot of the street right-of-way boundary, or along those parts of a building facade containing building entrances, driveways into garages or carports, or loading docks.

C. Foundation Planting Standards

1. Required shrubs shall be planted within five feet of the building foundation, or of any patio, terrace, or courtyard extending from the foundation.
2. Required shrubs shall maintain a maximum on-center spacing of six feet, and be evenly-distributed along foundation walls.
3. Required shrubs may be planted in the ground, within planters, or in decorative pots. (See Figure 5.12.5: Foundation plantings.)

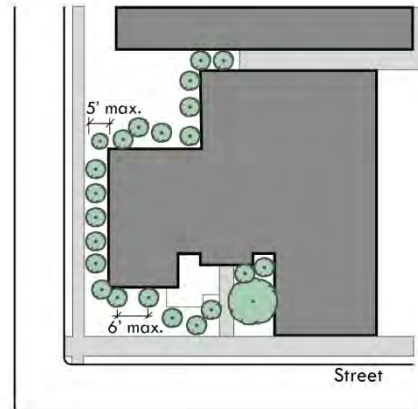


Figure 5.12.5: Foundation plantings.

5.12.6. Street Trees in the Transit-Oriented Development (TOD) and Main Street (MS) Districts⁴⁵⁰

A. Purpose⁴⁵¹

Street trees are intended to enhance the aesthetic and environmental benefits of the Town's urban streetscape environment by serving as a unifying element for urban street corridors, enhancing the appearance and livability of the Transit-Oriented Development (TOD) and Main Street (MS) Districts, and providing shading of streets and sidewalks.

B. Applicability⁴⁵²

Within the Transit-Oriented Development (TOD) District and the Main Street (MS) District, all new development shall provide street trees along the development's frontage with any public street, including alleys serving residential development.

C. Location⁴⁵³

Street trees shall be provided within a planting strip in the street right-of-way that is located between the roadway and the property line and is at least six feet wide. Where such a planting strip does not exist or is impractical to provide, the Planning Director and Town Engineer may allow street trees to be provided within tree pits that are at least 25 square feet in area and located adjacent to the back of the curb, or within an adjoining streetyard buffer or vehicle use area's perimeter landscaping strip on the development site.

D. Configuration

1. Street trees shall be shade trees of species and varieties appropriate to the intended functions of street trees and their location next to roadways and sidewalks. (See the list of appropriate street tree species and varieties listed in the administrative manual.)⁴⁵⁴

⁴⁵⁰ The current Zoning Ordinance requires street trees only in the Town Center Main Street district (Part E. Art. IV, Sec. 3.3.C(iii)). This subsection carries forward those street tree standards with some modifications and additions.

⁴⁵¹ This new subsection states the purpose served by requiring street trees.

⁴⁵² This carries forward the current applicability of street tree requirements to the Main Street District and expands it to the TOD District.

⁴⁵³ This carries forward the current planting strip standards and adds provisions allowing alternative locations where a planting strip does not exist or is impractical to provide.

2. Along a development's frontage with a pedestrian "Main Street," one street tree shall be provided for every 30 feet of frontage, or major fraction thereof, and the street trees shall be spaced between 25 and 35 feet apart.⁴⁵⁵
3. Along a development's frontage with any other street, one street tree shall be provided for every 50 feet of frontage, or major fraction thereof, and the street trees shall be spaced between 40 and 60 feet apart.⁴⁵⁶
4. Where possible, small and medium trees shall be planted between large trees to accommodate the canopy growth of large trees over time.⁴⁵⁷
5. Where necessary to accommodate utility lines, planned street widening, and streetscape improvements, the Planning Director may allow variations in the spacing or location of required street trees or allow understory trees be substituted for required street trees.⁴⁵⁸

5.12.7. Alternative Landscape Plan⁴⁵⁹

A. General

The Planning Director may approve an alternative landscape plan where a deviation from this the standards in Section 5.7, Perimeter and Streetyard Buffers, or this Section 5.12, is justified because of site or development conditions that make strict compliance with such standards impossible or impractical. The alternative landscape plan shall indicate how the proposed deviations are justified by site or development conditions and illustrate how compliance with the standard(s) from which a deviation is sought can be achieved to the maximum extent practicable. Conditions justifying approval of an alternative landscape plan may include:

1. Natural conditions, such as watercourses, natural rock formations, or topography;
2. The likelihood that landscaping material would be ineffective at maturity due to topography, placement, or other existing site conditions;
3. Lot size or configuration;
4. Infill development or redevelopment on small lots;
5. The presence of existing utility or other easements;
6. The potential for interference with public safety; and
7. Other situations where strict adherence to the buffer or landscaping standards in this Ordinance are determined impractical by the Planning Director.

B. Submittal and Review

An applicant may submit an alternative landscape plan as part of an application for Conceptual Master Plan Approval, Major Subdivision Preliminary Plat Approval, Minor Subdivision Plat Approval,

⁴⁵⁴ To provide some flexibility, this replaces the current requirement that trees be selected from the Street E Streetscape Design Guidelines to a performance standard that references a list of appropriate trees in the administrative manual.

⁴⁵⁵ This reflects the current requirement that street trees along the "Main Street" be spaced 30 feet apart, but breaks the requirement into ratio and spacing range standards to provide some flexibility.

⁴⁵⁶ The current standards do not include any spacing standard for street trees along streets other than the "Main Street." This adds suggested ratio and spacing range standards that are more lenient than those for the "Main Street" frontage.

⁴⁵⁷ This new subsection recognizes that as street trees grow, expansion of their canopies will be hindered unless allowed to overlap.

⁴⁵⁸ This new subsection provides the flexibility to accommodate overhead utility lines and streetscape improvements.

⁴⁵⁹ This is a new subsection intended to provide flexibility in those cases strict adherence to the perimeter buffer or landscaping standards is impractical. It specifies several common circumstances where flexibility is frequently warranted—including accommodation of underground utilities or easements/rights-of-way, protection of natural resources, small site size, or landscaping nonconformities.

Site Plan Approval, or Construction Plan Approval, as appropriate. The Planning Director may approve an alternative landscape plan if it meets the purpose and intent of the perimeter and streetyard buffer standards in Section 5.6 or the landscaping standards in this Section 5.12, as appropriate. Additional review fees are assessed to cover the Town's additional costs in reviewing alternative landscape plans

C. Allowable Deviations

Allowable deviations from the perimeter standards in Section 5.6 and the landscaping standards in this Section 5.12 include, but are not limited to, the following:

1. Reduced Planting Rates due to Existing Public Facilities

An adjustment to planting locations or reduction of up to 20 percent in the total number of required trees or shrubs may be allowed when underground connections to public facilities or public utilities, or public easements or rights-of-way, are located upon or in close proximity to the parcel.

2. Reduction in Standards due to Nature of Parcel

A reduction in the count or spacing standards by up to 20 percent may be allowed when desirable in terms of enhanced protection of existing natural resources, greater consistency with the goals of the comprehensive plan, or a site design that exceeds the quality of what would otherwise result under a strict application of the standards in this Ordinance.

3. Reduction in Standards due to Site Size

A reduction in the count, configuration, or location of required landscaping materials may be allowed in cases where a lot is nonconforming in terms of dimensional requirements or setbacks, or in cases of redevelopment on existing small lots, is not capable of supporting the minimum amount of landscaping material required.

4. Upgrading of Nonconforming Landscaping

An adjustment to planting locations or spacing may be allowed in conjunction with an upgrading of nonconforming buffer or landscaping in accordance with Section 9.7, Nonconforming Site Features.

SECTION 5.13. SCREENING

5.13.1. Screening of Exterior Mechanical Equipment⁴⁶⁰

A. Applicability⁴⁶¹

1. Except for single-family detached, duplex, and manufactured dwellings, all new development shall

COMMENTARY

This section carries forward and consolidates current requirements and standards for screening of exterior mechanical equipment, loading and service areas, and dumpsters and similar containers. It modifies those standards to allow alternative means of screening.

⁴⁶⁰ This carries forward the screening standards for roof-top mechanical equipment in Part C, Art. XIV, Sec. 3.1, 3.3.A(i), and 4.1 of the current Zoning Ordinance, with the modifications noted in subsequent footnotes.

⁴⁶¹ The current standards require all nonresidential development except industrial uses to screen rooftop equipment and require all nonresidential development (including industrial uses) to screen "utility equipment." In the Assessment Report (pp. 26, 40, and 53), we note the Land Use Plan's emphasis on encouraging higher quality development and recommend that these screening standards be generally applicable. This subsection expands the current standards to apply them to all new development except single-family, duplex, and manufactured home dwellings. But in recognition that industrial uses (and agricultural uses) involve relatively few visitors, it limits the requirement to screen equipment from on-site walkways to single-family, multifamily, institutional, commercial, and mixed-use developments (i.e., all nonresidential uses except industrial uses). The current Zoning Ordinance does not define mechanical equipment or utility equipment. To clarify what must be screened, this subsection lists out examples of what is typically considered exterior mechanical equipment subject to screening.

adjoining properties establishing an alternative arrangement to share responsibility for providing a buffer in full accordance with the standards of this section.³²¹

5.7.6. Development within Required Buffers

- A.** The required buffer shall not contain any development, impervious surfaces, or site features (except fences or walls) that do not function to meet the standards of this section, unless otherwise permitted or required in this Ordinance.
- B.** Walkways, trails, and other elements associated with passive recreation, as well as overhead and underground utility lines and low-impact stormwater management facilities, may be located within a required buffer if;
1. All required landscaping is provided;
 2. The element, line, or facility crosses the buffer as close to a right angle as practicable; and
 3. The Planning Director and Town Engineer determine that installation or maintenance of such element, line, or facility will minimize impacts on to required vegetation to the maximum extent practicable.

5.7.7. Alternative Configuration

The Planning Director may approve an alternative buffer location, width, or planting configuration through submittal of an alternative landscape plan (Section 5.12.7, Alternative Landscape Plan).

5.7.8. Credit Towards Other Required Landscaping³²²

Required buffers, and the trees and other vegetation within such buffers, may be credited towards compliance with tree protection, common open space and public recreation area, landscaping, and screening requirements to the extent they comply with applicable standards in Section 5.4, Tree Protection, Section 5.5, Common Open Space and Public Recreation Area, Section 5.12, Landscaping, and Section 5.13, Screening.

SECTION 5.8. ACCESS AND CIRCULATION

5.8.1. Purpose

The purpose of this section is to ensure that development is served by a coordinated, multimodal transportation system that, to the extent practicable, permits the safe and efficient movement of motor vehicles, emergency vehicles, transit, bicyclists, and pedestrians within the development and between the development and external transportation systems, neighboring development, and local destination points such as places of employment, schools, parks, and shopping areas. Such a multimodal transportation system is intended to:

- A.** Provide transportation options;
- B.** Increase the effectiveness of local service delivery;

COMMENTARY

This section generally carries forward the access, connectivity, and street and sidewalk design standards in Chapter 5 (Streets) of the Design and Construction Ordinance, with the following modifications:

- Define the level of access required
- Strengthen connectivity and cross-access standards
- Strengthen and expand access management standards
- Expand bicycle and pedestrian access and circulation requirements in accordance with Transportation Plan recommendations
- Allow cul-de-sacs only as an exception
- Incorporate the street, bicycle, and walkway design standards and transit facility standards recommended in the Transportation Plan

³²¹ Morrisville's current buffer regulations require a proposed development to provide a buffer if existing development has already provided one. This provision is intended to avoid unnecessary double buffers by allowing the adjoining property owner to share buffer responsibility 50/50, or to mutually agree to an alternative sharing arrangement.

³²² This is intended to clarify that buffers and vegetation within buffers can serve double duty in also meeting requirements for tree protection, common open space and public recreation area, landscaping, and screening.

- C. Reduce emergency response times;
 - D. Promote healthy walking and bicycling;
 - E. Facilitate use of public transportation;
 - F. Contribute to the attractiveness of the development and community, connect neighborhoods and increase opportunities for interaction between neighbors;
 - G. Reduce vehicle miles of travel and travel times and greenhouse gas emissions;
 - H. Improve air quality, minimize congestion and traffic conflicts; and
 - I. Preserve the safety and capacity of community transportation systems.
-

5.8.2. Applicability

Except as otherwise provided in this Ordinance, the standards in this section shall apply to all development.

5.8.3. Consistency with Plans

The design and construction of access and circulation systems associated with a development shall be consistent with the transportation goals, objectives, and actions in the comprehensive plan, and other Town-adopted plans addressing transportation.

5.8.4. Multimodal Transportation System³²³

Access and circulation systems associated with a development shall provide for multiple travel modes (vehicular, transit, bicycle, and pedestrian), as appropriate to the development's size, character, and relationship to existing and planned community transportation systems. Vehicular, transit, bicycle, and pedestrian access and circulation systems shall be coordinated and integrated as necessary to offer the development's occupants and visitors improved transportation choices while enhancing safe and efficient mobility throughout the development and the community.

5.8.5. Developer Responsibility for Access and Circulation Improvements³²⁴

A. On-Site

1. If a street is proposed within a development site, the developer shall provide roadway, bikeway, sidewalk, and other access and circulation improvements in accordance with the standards in this section, and shall dedicate any required rights-of-way or easements.
2. If a development site includes the proposed corridor of a street designated on an adopted plan, the development shall incorporate provision of the street into the design of the development, and shall dedicate right-of-way that meets the right-of-way width standards for the street. If a transportation impact analysis shows that the development itself is expected to generate sufficient traffic to warrant design of the street as a major or minor thoroughfare (see Section 5.8.6.B, Transportation Impact Analysis), the developer shall be responsible for constructing the street (including any bikeway, sidewalk, and other associated access and circulation improvements) in accordance with this section's standards for a major or minor thoroughfare, as appropriate; otherwise, the developer shall be responsible for constructing the street (including

³²³ This emphasizes multimodal issues in consideration of access and circulation.

³²⁴ This is intended to clarify when the Town may require a developer to construct public street improvements, reflecting limitations defined by the courts.

any bikeway, sidewalk, and other associated access and circulation improvements) to meet at least those standards required by this section for a collector street.³²⁵

B. Off-Site

If a development site fronts on and obtains vehicular access from an existing street, the developer shall be required to dedicate additional right-of-way along the street frontage or in the vicinity of the development and to provide roadway, bikeway, sidewalk, and other access and circulation improvements within the street right-of-way that are reasonably necessary to ensure the safe, convenient, efficient, and orderly accommodation of vehicular and pedestrian traffic demands and impacts generated by the proposed development. Such improvements may include, but are not limited to, turn lanes, deceleration and acceleration lanes, widening or paving of substandard roadways, medians, bikeways, sidewalks, sidewalk ramps and crossings, street lights, bus shelters, and the relocation or improvement of utility lines and facilities needed to accommodate street improvements. The extent of required dedications and improvements related to the abutting street shall be roughly proportional to the traffic demands and impacts generated to and along that street by the proposed development.

5.8.6. Vehicular Access and Circulation

A. Circulation Plan

1. Applications for Major Subdivision Preliminary Plat Approval (Section 2.5.6.B), Major Site Plan Approval (Section 2.5.7.B), or Minor Site Plan Approval (Section 2.5.7.C) shall include a circulation plan that addresses street connectivity, emergency and service vehicle access, parking movements, accommodation of loading operations, turning radii, traffic calming measures where future “cut-through” traffic is likely, and similar issues.
2. The Planning Director may waive the requirement for a circulation plan on determining that a proposed development is expected to have no impact on circulation or proposes no change in existing circulation patterns. This provision shall not be construed to exempt development that includes additional parking, driveways, or substantial modifications to the existing pedestrian network.

B. Transportation Impact Analysis³²⁶

1. Purpose

The Transportation Impact Analysis (TIA) is a part of the overall development review process conducted by the Town of Morrisville to safeguard the safety, health, and well-being of its citizens. The TIA is intended to:

- a. Assess the impact of a proposed development on the roadway capacity, public transportation, bicycle, and pedestrian transportation systems;
- b. Help mitigate potential effects of a proposed development on the transportation system; and
- c. Identify solutions to potential problems and recommend improvements to be incorporated as required conditions to a proposed development.

³²⁵ Court decisions generally limit the public improvements that can be required of a development to those needed to address impacts created by the development. This provision is intended to reflect such a limit by requiring a proposed development to accommodate and provide right-of-way for any planned thoroughfare through the development site, but limiting required road construction within such right-of-way to one meeting collector street standards instead of full thoroughfare standards (unless the development by itself is large or intense enough to generate traffic levels justifying a thoroughfare).

³²⁶ This replaces the traffic impact study standards in Part C, Art. VIII of the current Zoning Ordinance with the revised transportation impact analysis standards prepared for and currently pending approval by the Town, modified only to replace a few instances of awkward phrases and phrasing, and to refer to the comprehensive plan. It will be revised further as necessary to correspond to the adopted version of the TIA standards.

Table 5.8.6.C: Town Vehicular Accessway Classifications

Accessway Classification and Description	Number of Lanes [1]	Daily Traffic Volume	Access Control	Land Use Service	Posted Speed
Minor Thoroughfares —Accessways that primarily function to provide travel mobility among the Town’s major activity centers by connecting local streets, collector streets, and other minor thoroughfares with major thoroughfares. They generally handle moderate vehicular travel speeds and traffic volumes, and may provide some direct driveway access to abutting development, particularly in commercial and industrial areas, but to a degree and in a way that minimizes interference with through movements along the minor thoroughfare.	2-5	5,000 – 40,000	Fair	Moderate	35-45 mph
Major Thoroughfares —Accessways that primarily function to channel intercity vehicular traffic to and through the Town and to provide travel mobility among the Town’s major activity centers by connecting minor thoroughfares with each other and with collector streets. They handle moderate to high travel speeds and traffic volumes over relatively long distances, and provide limited direct driveway access to abutting development.	2-7	≥ 20,000	Moderate	Low	45-55 mph
Freeways —Specialized accessways that function solely to channel intercity vehicular traffic to and through the Town and to connect major thoroughfares. They consist of multi-lane divided highways that handle high traffic volumes at very high travel speeds, and limit access to grade-separated interchanges.	4 or more	≥ 40,000	High	None	≥ 50 mph
NOTES: [1] Can include center turn lanes, but does not include acceleration and deceleration lanes.					

D. Vehicular Connectivity

1. Purpose

The purpose of the following vehicular connectivity standards is to enhance safe and convenient mobility within and between developments that helps integrate and connect neighborhoods, allow people to conveniently access activity centers without compromising the capacity of the Town’s streets to accommodate through traffic, improve opportunities for comprehensive and convenient transit service, enhance efficient provision of public services, improve the speed and effectiveness with which emergency services and police and fire protection can be provided to Town residents and properties, and implement other connectivity objectives and policies in the comprehensive plan.

2. Required Vehicular Access and Circulation³²⁹

- a. A development shall be served by an internal system of vehicular accessways (including alleys, fire lanes, and parking lot lanes) that permits safe, convenient, efficient, and orderly movement of vehicles among origin and destination points within the development in accordance with the following standards for the type of vehicle:
 - (1) Firefighting and other emergency vehicles shall be provided access to points within 150 feet of all portions of buildings and facilities, or such smaller distance required in accordance with requirements for fire apparatus access roads in the Fire Prevention Code.

³²⁹ This provides general performance-based standards for the required level of vehicular access based on the type of vehicle. The 150-foot standard for emergency vehicles is based on the distance specified for fire apparatus access roads by the Fire Prevention Code. That for garbage trucks is based on convenient walking distance.

- (2) Public transit and school buses shall be provided access to designated or planned bus stops and shelters.
 - (3) Garbage trucks shall be provided access to bulk refuse containers and to points within 150 feet of individual refuse receptacle storage/collection sites.
 - (4) Large delivery trucks shall be provided access to off-street loading spaces.
 - (5) Small delivery trucks, service vehicles, and passenger motor vehicles shall be provided access to points within 100 feet of a single-family detached, duplex, or manufactured home dwelling, and to the off-street parking spaces serving any other development.
- b. The development's internal system of vehicular accessways shall also permit safe, convenient, efficient, and orderly movement of vehicles between the development's internal origin and destination points and the external roadway system and adjacent transit stations.

3. Required Multiple Means of Vehicular Access³³⁰

- a. A residential or mixed-use development shall provide each building or facility at least two separate means of vehicular access meeting Fire Code requirements for fire apparatus access roads if the development includes:
- (1) More than 30 single-family detached, duplex, or manufactured home dwellings, or subdivision lots designed to contain more than 30 such dwellings; or
 - (2) More than 60 single-family attached or multifamily dwelling units.
- b. A nonresidential or mixed-use development shall provide at least two separate means of vehicular access to each building or facility that has a height exceeding 30 feet or three stories or has a gross floor area exceeding 62,000 square feet.
- c. Where two means of vehicular access are required, the distance between the points where such access enters the development site shall be at least ½ the maximum overall diagonal dimension of the development site.
- d. The required two means of vehicular access shall be provided before issuance of a Building Permit authorizing the 31st single-family detached, duplex, or manufactured home dwelling, or the 61st single-family attached or multifamily dwelling unit.
- e. The Planning Director, after consulting with the Fire Chief, may waive these requirements on determining provision of a second access is impractical due to topography, natural features, cultural resources, or the configuration of adjacent developments and/or the dwellings, buildings, or facilities are equipped with an approved automatic sprinkler system.

4. Public Street Connectivity³³¹

- a. The vehicular access and circulation for a development shall incorporate the continuation and connection of public street roadways and associated rights-of-way that have been extended or connected to the boundary of the development site from existing or approved adjoining developments.³³²

³³⁰ This modifies requirements in Sec. 5.2.3 of the current Design and Construction Ordinance to extend them to nonresidential buildings and to make them more consistent with the Fire Code standard on which they are based. Although having multiple means of vehicular access is important to ensuring effective fire-fighting, it is also important to ensuring access by other emergency services as well as safe, convenient, and efficient access for a development's occupants and visitors.

³³¹ This carries forward and expands street extension provisions in Sec. 5.2.5 of the current Design and Construction Ordinance. It simplifies the basic requirement, adds a minimum access point threshold and a minimum interval requirement (applicable to large sites), adds a provision authorizing temporary turnarounds, adds a waiver provision for when an extension is not practical or desirable, and adds a signage requirement intended to forestall false expectations that street to be extended is a dead-end street. An illustration showing application of these standards is also included.

³³² This requires streets stubbed to a proposed development site be extended into the proposed development.

- b. The vehicular access and circulation for a development shall provide for the extension or connection of proposed internal public street roadways and associated rights-of-way to those boundaries of the development site that adjoin potentially developable or redevelopable property whenever such extensions or connections are or may be necessary to ensure that the development site or the adjoining property will have:
 - (1) At least two vehicular access points to and from an external through street system, plus one additional vehicular access point for each additional 2,000 vehicles per day, or fraction thereof, expected to be generated by the proposed development or by the maximum allowable development of the adjoining property;
 - (2) Convenient and efficient access by vehicles needed to provide police, fire, and emergency services; and
 - (3) Convenient and efficient access by vehicles needed to provide other public services.³³³
- c. Roadway extensions and connections to adjoining properties shall be spaced at intervals along each principal boundary direction (north, south, east, west) that do not exceed the maximum block length established in Section 5.3.1, Blocks.
- d. An extension or connection of a public street roadway and right-of-way to an adjoining property shall also include the extension or connection of associated bikeways or sidewalks.
- e. The Planning Director may require the provision of a temporary turnaround at the end of a roadway extension on determining that the turnaround is needed to facilitate traffic flow or accommodate emergency vehicles pending the roadway's connection to other roadways.
- f. The Planning Director may waive or modify the requirements or standards for extension or connection of a public roadway from or to adjoining property on determining that such extension is impractical or undesirable because it would:
 - (1) Require crossing a significant physical barrier or environmentally sensitive area (e.g., railroads, watercourses, floodplains, wetlands, steep slopes);
 - (2) Require the extension or connection of a proposed internal public street to an adjoining property with existing development whose design makes it unlikely that the street will ever be part of a network of public streets (e.g., the adjoining existing development has no public streets, or there are no 'stubbed-out' street rights of way or open corridors between the proposed development site and public streets in the adjoining development to accommodate a current or future extension or connection);
 - (3) Require the extension or connection of a proposed internal public street to an adjoining property owned by a government or public utility to which vehicular access is restricted, or other property to which vehicular access is restricted by a conservation easement; or
 - (4) Require the extension or connection of a proposed internal public street to an adjoining property that is developed or zoned for a use whose level and type of generated traffic would be incompatible with the proposed development—provided, however, that residential, institutional, and commercial uses shall generally be deemed compatible.
- g. Where a roadway is extended to, but not yet onto, adjoining land, a sign shall be installed at the terminus of the roadway that informs neighboring property owners that the roadway is intended to be extended in the future (e.g., "STREET MAY BE EXTENDED BY AUTHORITY OF THE TOWN OF MORRISVILLE"). Notation of that intent shall also be included on the Major Subdivision Preliminary Plat or Minor Subdivision Plat (see Section 2.5.6), Major Site Plan or Minor Site Plan (see Section 2.5.7), and Construction Plan (see Section 2.5.8), as appropriate.

³³³ This provides a general requirement requiring proposed streets in a development to be stubbed to adjoining undeveloped or underdeveloped properties where needed to ensure convenient neighborhood traffic circulation, access by police, fire, and public service vehicles, or efficient provision of utilities.

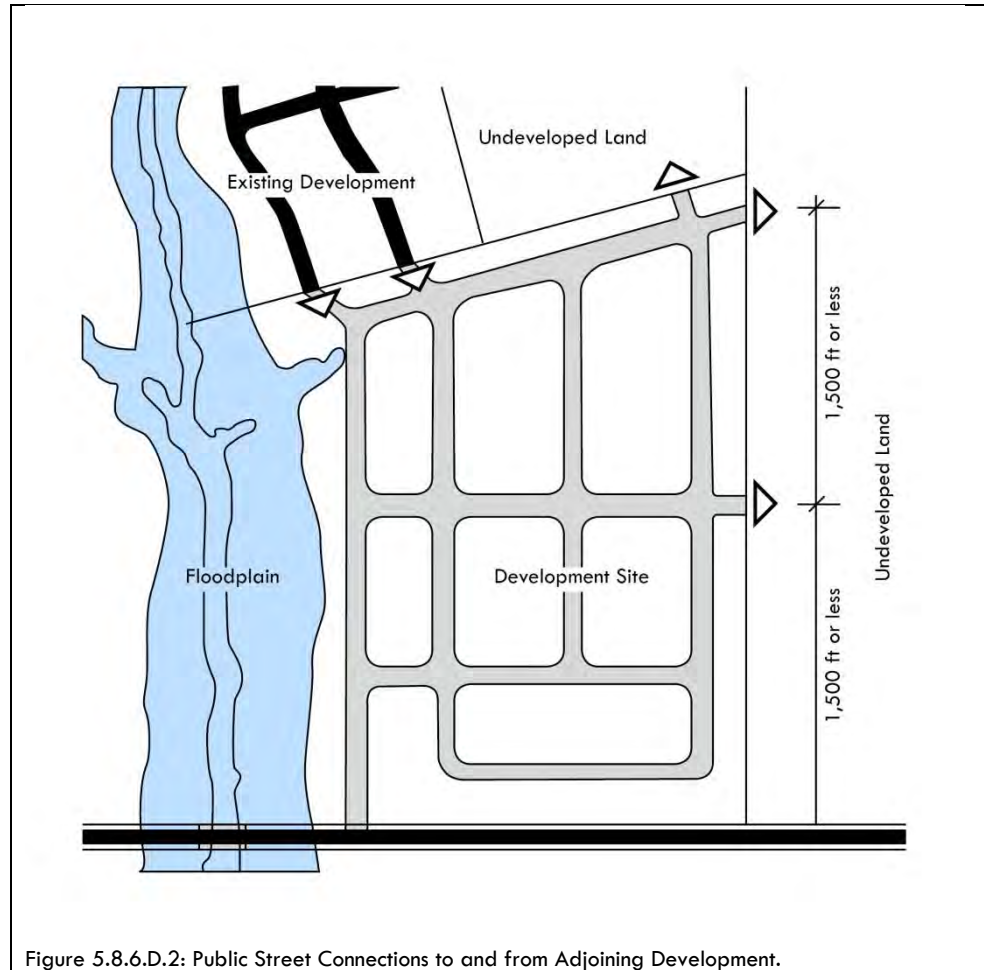


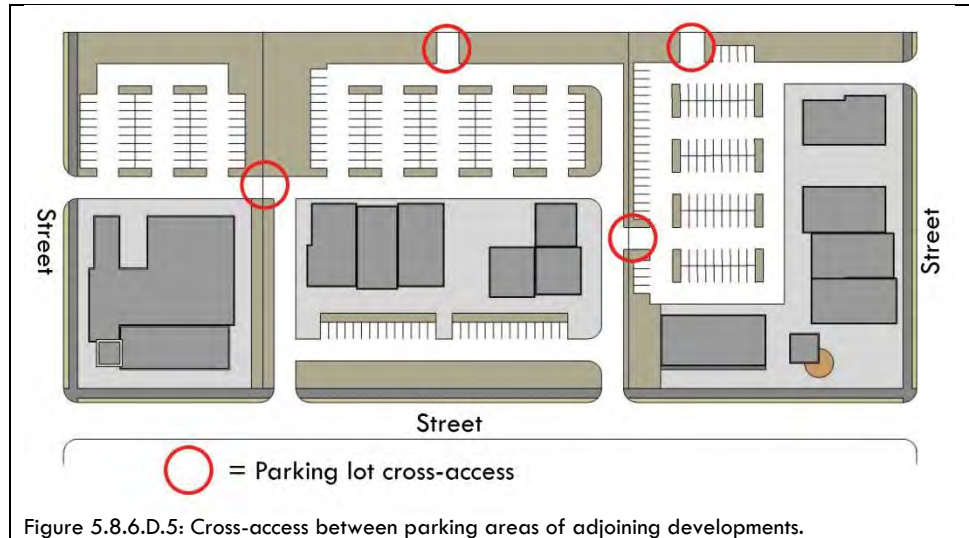
Figure 5.8.6.D.2: Public Street Connections to and from Adjoining Development.

5. Cross Access Between Adjoining Development³³⁴

To facilitate vehicular access between adjoining developments, encourage shared parking, and minimize access points along streets, new single-family attached, multifamily, nonresidential, and mixed-use development or redevelopment shall comply with the following standards:

- a. The internal vehicular circulation system shall be designed to allow for vehicular cross-access between the development's common vehicle use areas and common vehicle use areas in an adjoining single-family attached, multifamily, nonresidential, or mixed-use development, or to the boundary of adjoining vacant land zoned to allow single-family attached, multifamily, nonresidential or mixed-use development. (See Figure 5.8.6.D.5: Cross-access between parking areas of adjoining developments.)

³³⁴ Sec. 5.2.6 of the current Design and Construction Ordinance requires that efforts be made to provide cross-access between adjacent nonresidential developments. We propose strengthening this cross access requirement and applying it to multifamily, single-family attached, and mixed-use development as well as nonresidential development. This subsection adds authorization for a waiver of the cross access requirement where a cross access would be physically impracticable, undesirable, or unsafe.



- b. Required vehicular cross access between the adjoining lots shall be provided through the use of a frontage or service street (if the lots front on a major thoroughfare right-of-way), a single two-way driveway or drive aisle, or two one-way driveways or aisles that are sufficiently wide to accommodate traffic by automobiles, service vehicles, loading vehicles, and emergency vehicles.
- c. The Planning Director, in conjunction with the Town Engineer, may waive or modify the requirement for vehicular cross access on determining that such cross access is impractical or undesirable because it would require crossing a significant physical barrier or environmentally sensitive area (e.g., railroad, watercourse, floodplain, wetlands, steep slopes), or would create unsafe conditions.
- d. Easements allowing cross access to and from properties served by a vehicular cross-access, along with agreements defining maintenance responsibilities of property owners, shall be recorded with the Register of Deeds for the county in which the properties are located before issuance of a Building Permit for the development.

E. Vehicular Access Management³³⁵

1. Purpose

The purpose of the access management standards in this subsection is to control vehicular access to developments from adjacent streets in a way that preserves the safe and efficient flow of the traffic on the streets while providing property owners a right to reasonable access to a general system of streets and highways. Specifically, the standards are intended to limit the number of traffic conflicts, separate basic conflict areas, separate turning volumes from through movements, and maintain progressive speeds along thoroughfares.

2. Driveway Intersections

a. Limitation on Direct Driveway Access Along Thoroughfares

Direct driveway access to a development's principal origin or destination points (including individual lots in a subdivision) may be provided directly from a major or minor thoroughfare only if:

- (1) No alternative direct vehicular access from a lower-classified accessway (e.g., collector street, local street, alley, or driveway) is available or feasible to provide;³³⁶

³³⁵ This carries forward the driveway access limits in Sec. 5.3.4 of the current Design and Construction Ordinance, with modifications as noted in the following footnotes.

2. Design and Layout

Required stacking spaces are subject to the following design and layout standards:

- a. Stacking spaces shall be a minimum of ten feet wide and 20 feet long.
- b. Stacking spaces shall not impede onsite or offsite vehicular traffic movements or movements into or out of off-street parking spaces.
- c. Stacking spaces shall not impede onsite or offsite bicycle or pedestrian traffic movements.
- d. Stacking spaces shall be separated from other internal driveways by raised medians that are at least four feet wide if deemed necessary for traffic movement and safety by the Planning Director.

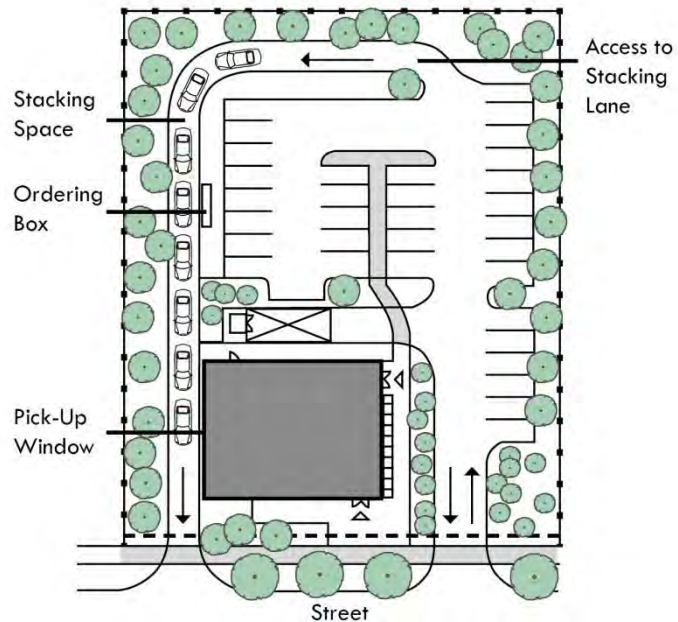


Figure 5.8.6.l.1: Stacking spaces for a drive-through restaurant.

5.8.7. Bicycle Access and Circulation

A. Required Bicycle Access³⁴²

1. All new development except individual lot development of a single-family detached, duplex, or manufactured home dwelling shall be served by an internal bicycle circulation system (including shared roadway lanes, widened outside roadway lanes, bike lanes, shoulders, and/or separate bike paths) that permits safe, convenient, efficient, and orderly movement of bicyclists among the following origin and destination points within the development.
 - a. Bicycle parking facilities or areas near the primary entrance(s) of principal buildings (or the buildable area of lots, for subdivisions);
 - b. Any designated or planned bus stops and shelters; and
 - c. Recreation facilities and other common use area and amenities.
2. The development's internal bicycle circulation system shall also permit safe, convenient, efficient, and orderly movement of vehicles between the development's internal origin and destination points and adjoining parts of an existing or planned external, community-wide bicycle circulation system as well as any adjoining transit stations, bus stops and shelters, public parks, greenways, schools, community centers, and shopping areas.

³⁴² This new subsection establishes general performance standards for bicycle access and circulation.

B. Bike Lanes Required³⁴³

1. All new development except individual lot development of a single-family detached, duplex, or manufactured home dwelling (i.e., including subdivisions for such dwellings) shall provide bike lanes within the development site and along the entire frontage of the development site with an existing street where bike lanes are called for by the comprehensive plan or other Town-adopted plans addressing transportation (unless an existing bike lane meeting Town standards is already in place).
2. Such bike lane shall be provided within the right-of-way of the street unless the Planning Director determines that location within the right-of-way is not practicable or preferable—in which case, the bike path may be provided on the development site, within a dedicated widening of the right-of-way or a dedicated public easement running parallel and adjacent to the thoroughfare or collector street.

C. Bicycle Connectivity³⁴⁴

1. Bikeway Connections to/from Adjoining Development and Developable Land

- a. Where a public street is extended to or from a development's boundary in accordance with Section 5.8.6.D.4, Public Street Connectivity, such extension shall include the extension of any bike lanes within the right-of-way of the street.
- b. The pedestrian access and circulation system for a development shall incorporate the continuation and connection of public bike paths and associated rights-of-way or easements that have been extended or connected to the boundary of the development site from existing or approved adjoining developments.
- c. The pedestrian access and circulation system for a development shall provide for the extension or connection of proposed internal public bike paths and associated rights-of-way or easements to those boundaries of the development site that adjoin potentially developable or redevelopable land.
- d. The Planning Director may waive or modify the requirements or standards for extension of a public bikeway from or to adjoining property on determining that such extension is impractical or undesirable because it would:
 - (1) Require crossing a significant physical barrier or environmentally sensitive area (e.g., railroads, watercourses, floodplains, wetlands); or
 - (2) Require the extension or connection of a proposed public bike path to an adjoining existing development whose design makes it unlikely that the bike path will ever be part of a network of public bikeways (e.g., the adjoining existing development has no bike paths or there are no open corridors between the proposed development site and public bikeways in the adjoining development to accommodate a current or future extension or connection).

2. Cross Access Between Adjoining Development

To facilitate vehicular access between adjoining developments, new single-family attached, multifamily, nonresidential, and mixed-use development or redevelopment shall comply with the following standards.

- a. Any internal bicycle circulation system shall be designed to allow for bicycle cross access between it and any internal bicycle circulation system in an adjoining single-family attached, multifamily, nonresidential, and mixed-use development, or to the boundary of adjoining

³⁴³ This new provision reflects the Transportation Plan's recommendation that bike lanes be provided on both sides of major roads (p. 32). The second provision is added to recognize situations where there may be insufficient right-of-way for a bike lane.

³⁴⁴ This new subsection mirrors the connectivity and cross-access standards for vehicles.

vacant land that is zoned to allow such single-family attached, multifamily, nonresidential, and mixed-use development.

- b. The Planning Director, in conjunction with the Town Engineer, may waive or modify the requirement for bicycle cross access on determining that such cross access is impractical or undesirable because it would require crossing a significant physical barrier or environmentally sensitive area (e.g., railroad, watercourse, floodplain, wetlands), or would create unsafe conditions..
- c. Easements allowing cross-access to and from properties served by a bicycle cross-access, along with agreements defining maintenance responsibilities of property owners, shall be recorded with the Register of Deeds for the county in which the properties are located before issuance of a Building Permit for the development.

D. Bikeway Design Standards

All bike lanes and bike paths shall be designed and constructed in accordance with standards in the Engineering Design and Construction Manual.

5.8.8. Pedestrian Access and Circulation

A. Required Pedestrian Access³⁴⁵

1. General Pedestrian Access

- a. All new development except an individual single-family detached, duplex, or manufactured home dwelling on an existing lot shall be served by a system of pedestrian walkways (including sidewalks, pedestrian paths, and/or trails) that permits safe, convenient, efficient, and orderly movement of pedestrians among the following origin and destination points within the development:
 - (1) The primary entrance(s) of principal buildings (or the buildable area of lots, for subdivisions);
 - (2) Off-street parking bays (including any parking serving on-site transit stations or facilities);
 - (3) Any designated or planned bus stops and shelters; and
 - (4) Recreation facilities and other common use area and amenities.
- b. The development internal pedestrian circulation system shall also provide safe, convenient, efficient, and orderly movement of pedestrians between the development's internal pedestrian origin and destination points and adjoining parts of an existing or planned external, community-wide pedestrian circulation system as well as any adjoining transit stations, bus stops and shelters, public parks, greenways, schools, community centers, and shopping areas.

2. Sidewalks Required³⁴⁶

- a. All new single-family attached, multifamily, nonresidential, and mixed-use developments shall install sidewalks along both sides of roadways proposed within the development site and along the entire frontage of the development site with an existing street (unless an existing sidewalk meeting Town standards is already in place).
- b. Such sidewalks shall be provided within the right-of-way of the street unless the Planning Director determines that location within the right-of-way is not practicable—in which case, the

³⁴⁵ This subsection expands the general provision in Part C, Art. XIV, Sec. 3.7.A, 4.9.A, and 5.9.A requiring nonresidential development to have sidewalks between streets, parking areas, and buildings to provide safe, direct, and convenient access.

³⁴⁶ This carries forward the sidewalk requirements in Sec. 5.4.2.4 of the current Design and Construction Ordinance. It adds the provisions allowing flexibility if the right-of-way is insufficient to provide a sidewalk and referencing adopted pedestrian plans.

sidewalk may be provided on the development site, within a dedicated widening of the right-of-way or a dedicated public easement and running parallel and adjacent to the street.

- c. The Planning Director may require additional sidewalks where warranted by the safety and welfare of the general public—including, but not limited to:
 - (1) Along one side of all driveway entrances to residential and nonresidential parking lots;
 - (2) In nonresidential parking lots to maximize pedestrian travel to and from each business; and
 - (3) In parking lots in accordance with Section 5.10.6.E, Pedestrian Walkways through Large Vehicle Parking Areas.
- d. Additional sidewalks or pedestrian walkways may be required where called for by the comprehensive plan.

B. Greenway Paths Required³⁴⁷

All new development except individual lot development of a single-family detached, duplex, or manufactured home dwelling shall incorporate into its required open space any greenway path or multi-use path called for across the development site by the Parks and Recreation Master Plan. Such incorporation shall include installation of the path and recording of an associated pedestrian access easement, if applicable.

C. Pedestrian Connectivity³⁴⁸

1. Walkway Connections to/from Adjoining Development and Developable Land

- a. Where a public street is extended to or from a development site's boundary in accordance with Section 5.8.6.D.4, Public Street Connectivity, such extension shall include the extension of any sidewalks within the right-of-way of the street.
- b. The pedestrian access and circulation system for a development shall incorporate the continuation and connection of public walkways and associated rights-of-way or easements that have been extended or connected to the boundary of the development site from existing or approved adjoining developments.
- c. The pedestrian access and circulation system for a development also shall provide for the extension or connection of proposed internal public walkways and associated rights-of-way or easements to those boundaries of the development site that adjoin potentially developable or redevelopable land.
- d. The Planning Director may waive or modify the requirements or standards for extension of a public walkway from or to adjoining property on determining that such extension is impractical or undesirable because it would:
 - (1) Require crossing a significant physical barrier or environmentally sensitive area (e.g., railroads, watercourses, floodplains, wetlands); or
 - (2) Require the extension or connection of a proposed public walkway to an adjoining existing development whose design makes it unlikely that the walkway will ever be part of a network of public walkways (e.g., the adjoining existing development has no public walkways or there are no open corridors between the proposed development site and public walkways in the adjoining development to accommodate a current or future extension or connection).

³⁴⁷ This carries forward the requirement in Sec. 5.4.2.5.a of the current Design and Construction Ordinance.

³⁴⁸ This new subsection mirrors the connectivity and cross-access standards for vehicles and bicycles. It carries forward the mid-block pedestrian crosswalk requirement in Art. VII, Sec. 3.4 of the current Subdivision Ordinance, adding the cut-through standard.

2. Pedestrian Cut-Throughs

- a. On determining that such connection is necessary to provide convenient pedestrian access within a development or to adjacent schools, transit facilities, recreation facilities, or commercial developments, the Planning Director may require pedestrian walkways to be provided between the ends of cul-de-sacs and the nearest existing or proposed public walkway (e.g., sidewalk, pedestrian path, or trail). (See Figure 5.8.8.C.2: Pedestrian cut-through at end of cul-de-sac.)
- b. On determining that such connection is necessary to provide convenient pedestrian access within a development or to adjacent schools, transit stations, recreation facilities, or commercial developments, the Planning Director may require a pedestrian walkway to be provided through approximately the centers of blocks more than 900 feet long. Within the Transit-Oriented Development (TOD), pedestrian cut-throughs may be required at least every 200 feet of block length.
- c. These pedestrian cut-through walkways shall be located within a right-of-way or a public access easement within common open space. The right-of-way or easement shall be at least 20 feet wide.

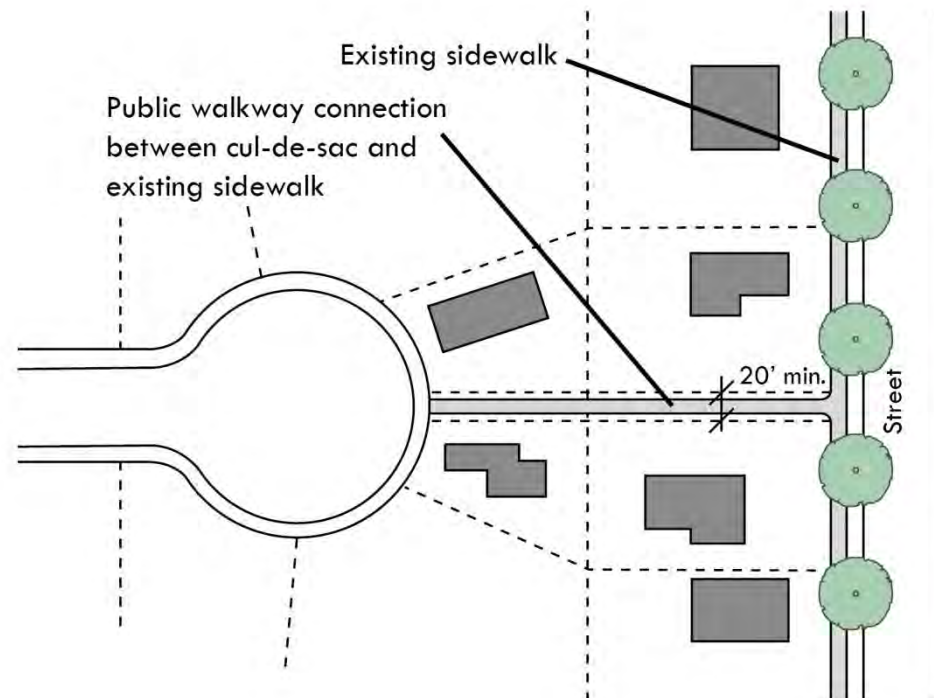


Figure 5.8.8.C.2: Pedestrian cut-through at end of cul-de-sac.

3. Cross Access Between Adjoining Development

To facilitate pedestrian access between adjoining developments, new single-family attached, multifamily, nonresidential, and mixed-use development shall comply with the following standards:

- a. The internal pedestrian circulation system shall be designed to allow for pedestrian walkway cross-access between the development's buildings and parking areas and those in an adjoining single-family attached, multifamily, nonresidential, and mixed-use development, or

to the boundary of adjoining vacant land zoned to allow single-family attached, multifamily, nonresidential, and mixed-use development.

- b. The Planning Director, in conjunction with the Town Engineer, may waive or modify the requirement for pedestrian cross-access on determining that such cross-access is impractical or undesirable due to the presence of topographic conditions, natural features, or safety factors.
- c. Easements allowing cross-access to and from properties served by a pedestrian cross-access, along with agreements defining maintenance responsibilities of property owners, shall be recorded with the Register of Deeds for the county in which the properties are located before issuance of a Building Permit for the development.

D. Walkway Design Standards

All sidewalks, internal walkways, and greenway/multi-use paths shall be designed and constructed in accordance with standards in the Engineering Design and Construction Manual.

SECTION 5.9. BUILDING ORGANIZATION AND DESIGN

5.9.1. Applicability

Except as otherwise provided in this section, the standards in this section apply to all new development except single-family detached, duplex, manufactured home, and single-family attached dwellings. Standards in Section 5.9.3, Exterior Facade Materials, Section 5.9.6, Building Organization and Design Standards for the Transit-Oriented Development (TOD) District, Section 5.9.7, Building Organization and Design Standards for Town Center Development, apply to single-family detached, duplex, and single-family attached dwellings.

COMMENTARY

Art. XIV repeats virtually the same standards at least five times (for nonresidential buildings in general, for office buildings over 2 stories, for other office buildings, for industrial buildings adjoining community facilities, and for other industrial buildings—with only relatively minor variations for some of these building types. This section consolidates these into a single set of general design standards—except the standards addressing the screening of equipment, containers, and service areas, which are relocated to Section 5.10, Screening. Also, in accordance with the Assessment Report (p. 26), these building organization and design standards are also applied to multifamily and mixed-use developments. At the request of Town staff, they are not applied to single-family attached developments. Variations of the general standards applicable in the Town Center districts are added at the end of the section.

5.9.2. Four-Sided Design

Although the front facade of a building is expected to be the primary focal point in terms of level of architectural character and features, all sides of a building shall incorporate architectural detailing (e.g., windows, doors, accent materials, porches, and other features) that complements the front facade and provides visual interest. Blank walls void of architectural detailing are prohibited.

5.9.3. Exterior Facade Materials

Materials used for net facades, cornices, and architectural accents on buildings shall comply with the standards in Table 5.9.2, Exterior Facade Materials. Within the Main Street (MS) and Historic Crossroads Village (HCV) Districts, the standards in the table apply to all development.

Appendix G

– Master Plan Excerpts

1. Transportation

- Transportation Master Plan - Proposed Roads
- Transportation Master Plan - Public Transit Recommendations
- Transportation Master Plan - Pedestrian & Bicycle Facilities Recommendations

2. Open Space

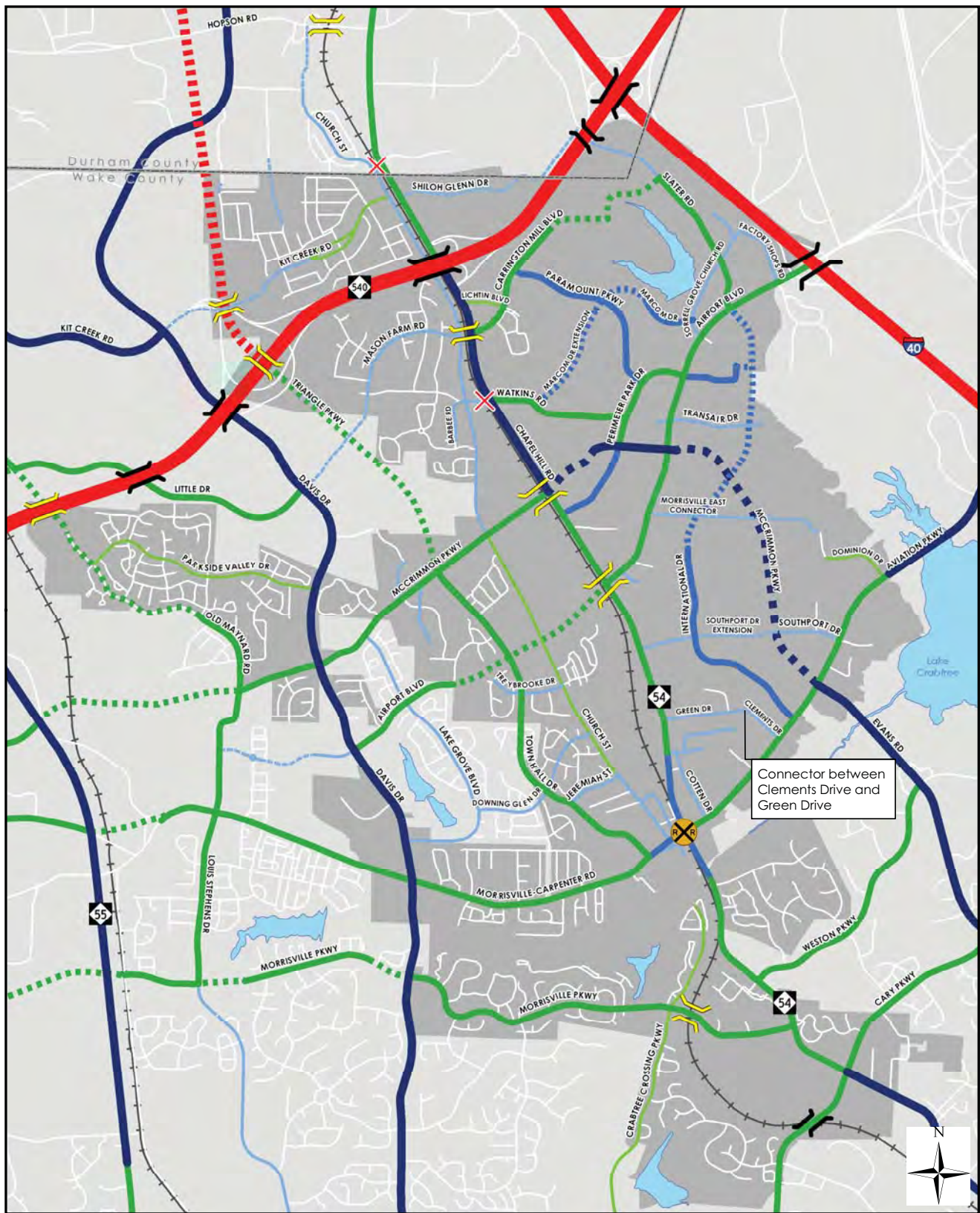
- Parks and Recreation Master Plan Map

3. Other Infrastructure

- Wastewater Collection System Existing Infrastructure
- Wastewater Collection System Proposed Infrastructure
- Water Distribution System Existing Infrastructure
- Water Distribution System Proposed Infrastructure
- Town Center Plan Historic Crossroads Area

1. Transportation

- Transportation Master Plan – Proposed Roads
- Transportation Master Plan - Public Transit Recommendations
- Transportation Master Plan - Pedestrian & Bicycle Facilities Recommendations



Connector between
Clements Drive and
Green Drive

Future Roadways

County Boundary	Morrisville Future Roadway Type	Four-Lane Boulevard
Lakes	Two-Lane Roadway	New Four-Lane Boulevard
Railroad	New Two-Lane Roadway	Six-Lane Boulevard
Roads	Two-Lane Boulevard	New Six-Lane Boulevard
At-grade RR Crossing	New Two-Lane Boulevard	Expressway
At-grade RR Crossing to be Closed	Four-Lane Roadway	New Expressway
Existing Grade Separation	New Four-Lane Roadway	
Planned Grade Separation		

Roadway = No median
Boulevard = Roadway with planted median

Morrisville Transportation Plan
 2009

0 0.125 0.25 0.5 0.75 1 Miles

Updated March 24, 2009

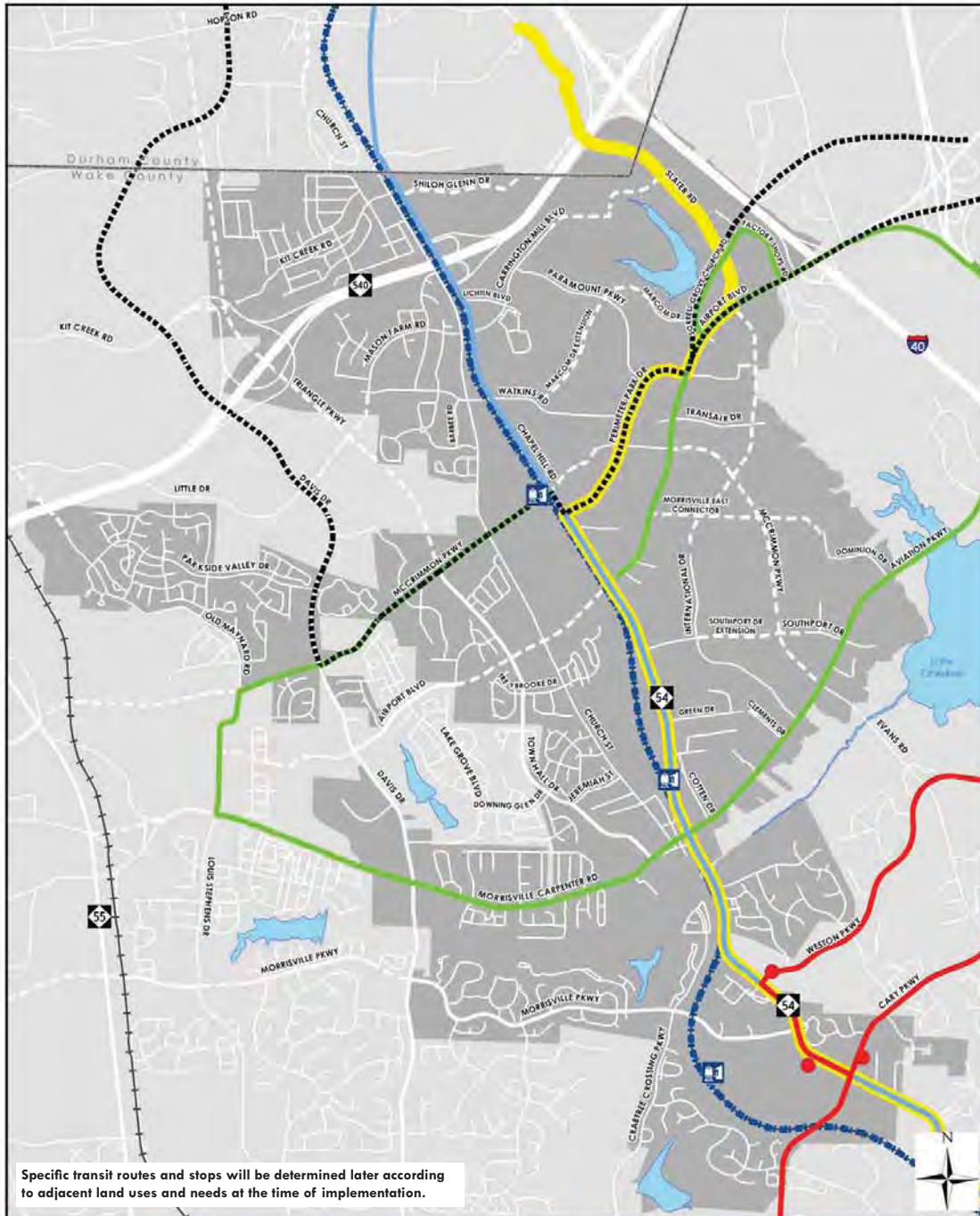
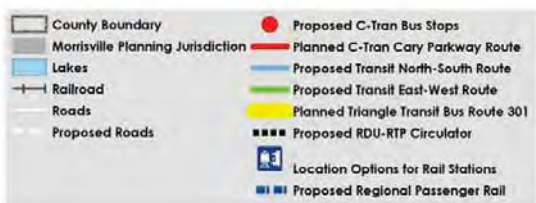
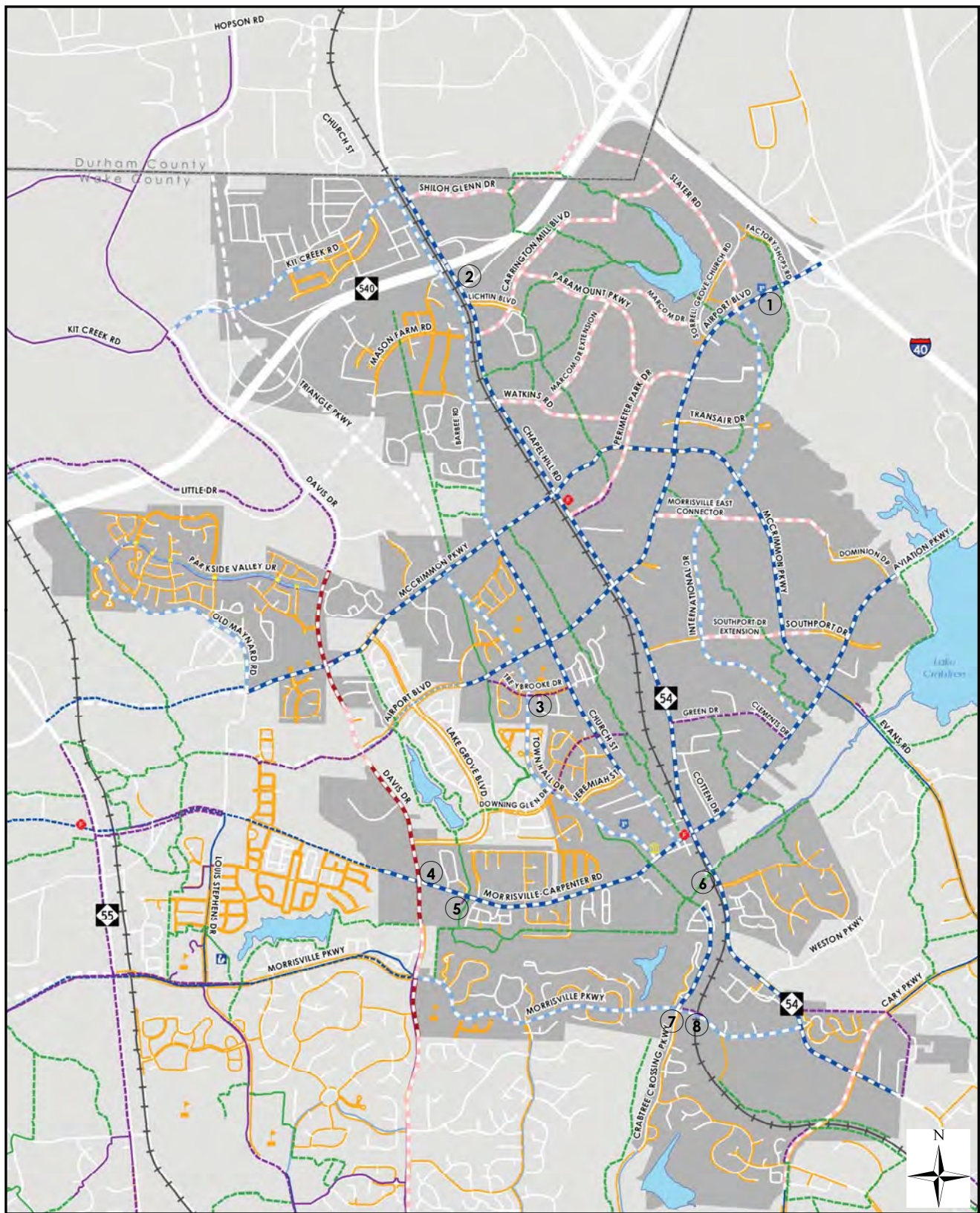


Figure 5.12 Public Transportation Recommendations





Recommended Bicycle/Pedestrian Facilities

<ul style="list-style-type: none"> Town Hall Library Police Station Fire Station Schools County Boundary Morrisville Planning Jurisdiction Lakes Railroad Roads Proposed Roads 	<p>Existing Bike/Ped Facilities</p> <ul style="list-style-type: none"> Crosswalk, high visibility Sidewalk Greenway Multi-use Path Bike Lane Wide Outside Lane 	<p>Recommended Facilities</p> <ul style="list-style-type: none"> Sidewalk Greenway Multi-use Path Bike Lane Wide Outside Lane Bike Lane + Multi-Use Path Bike Lane + Sidewalk Wide Outside Lane + Multi-Use Path Wide Outside Lane + Sidewalk
--	---	--

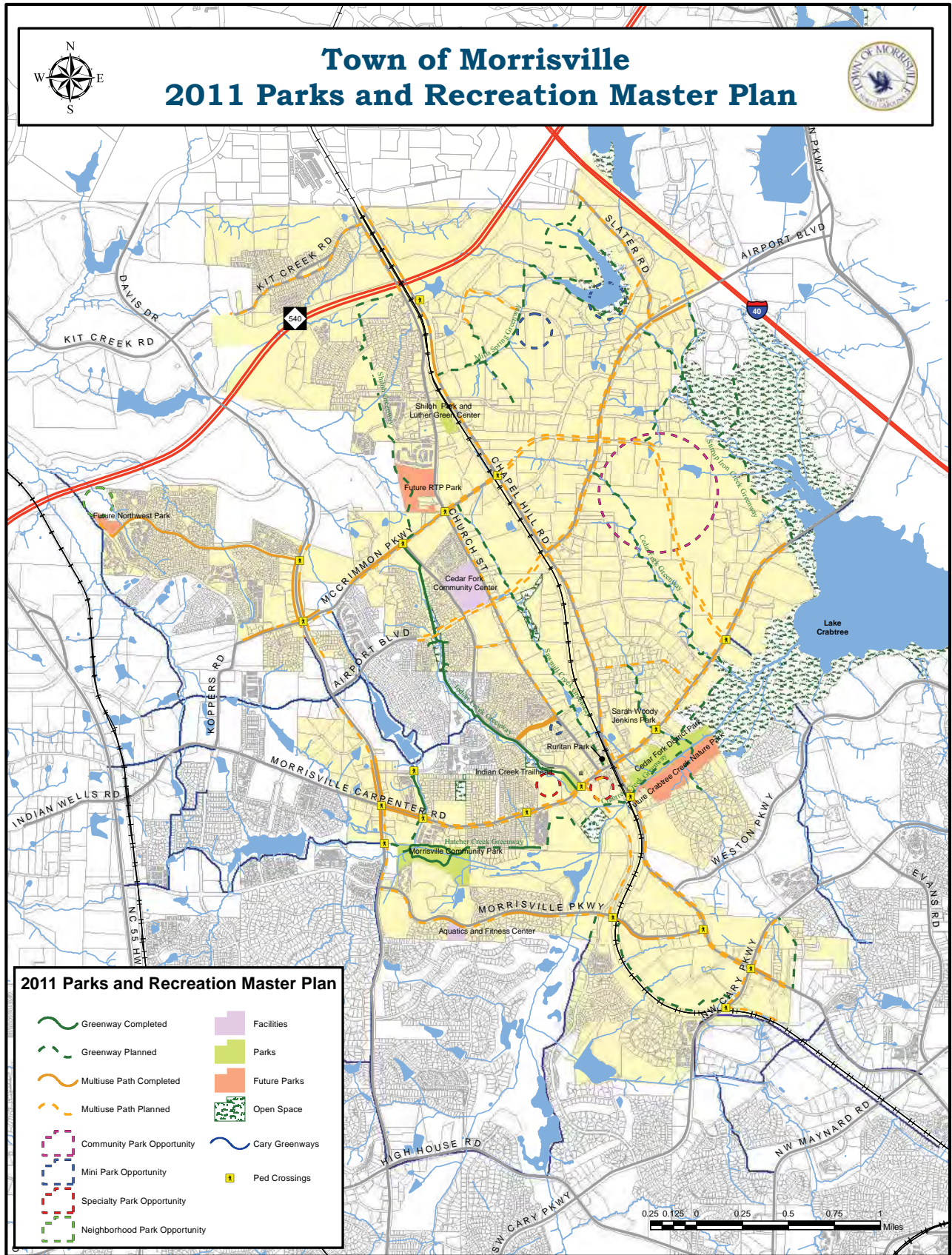
Morrisville Transportation Plan
2009

0 0.125 0.25 0.5 0.75 1 Miles

Updated March 24, 2009

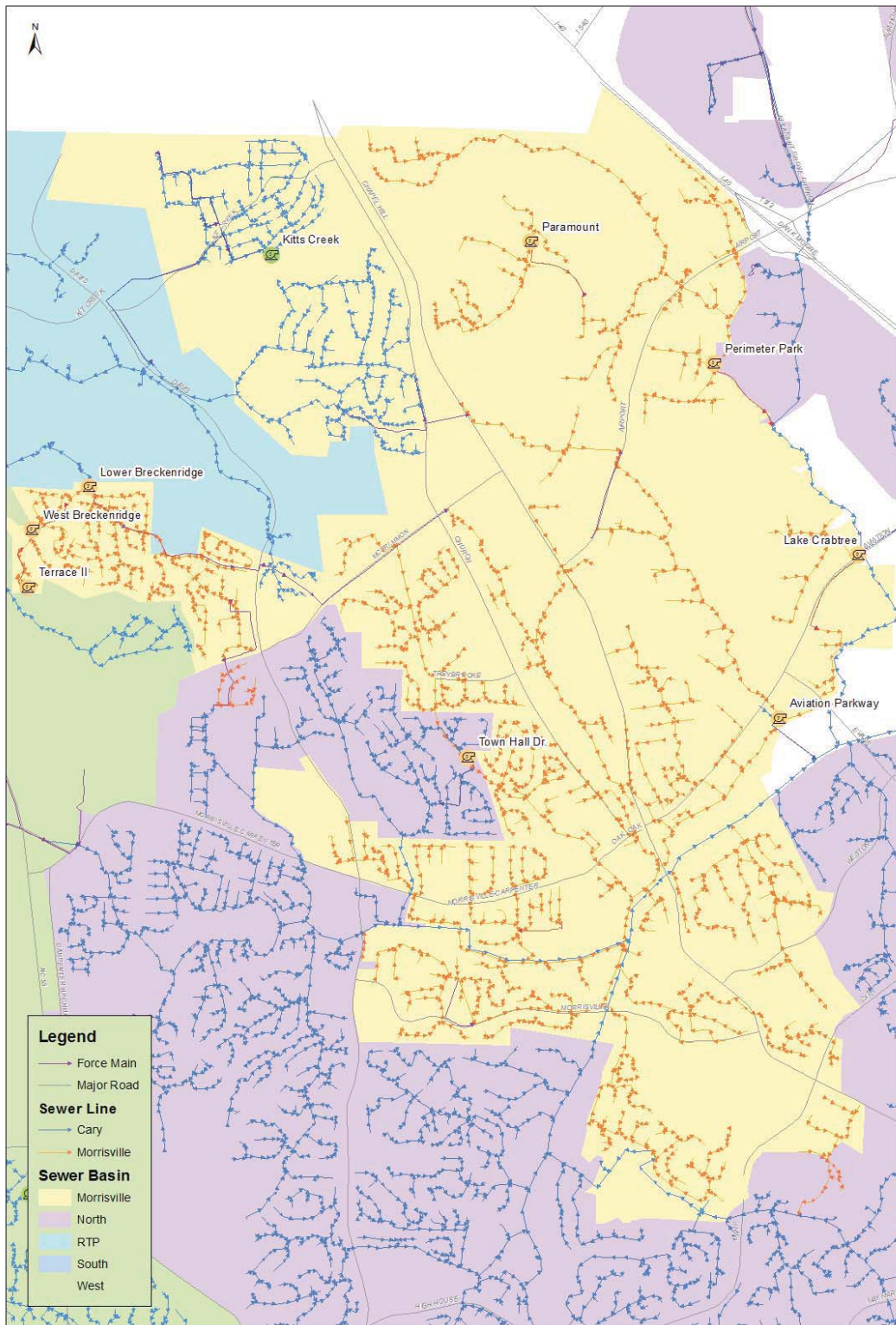
2. Open Space

- Parks and Recreation Master Plan Map



3. Other Infrastructure

- Wastewater Collection System Existing Infrastructure
- Wastewater Collection System Proposed Infrastructure
- Water Distribution System Existing Infrastructure
- Water Distribution System Proposed Infrastructure
- Town Center Plan Historic Crossroads Area



NOT TO SCALE

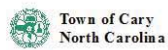
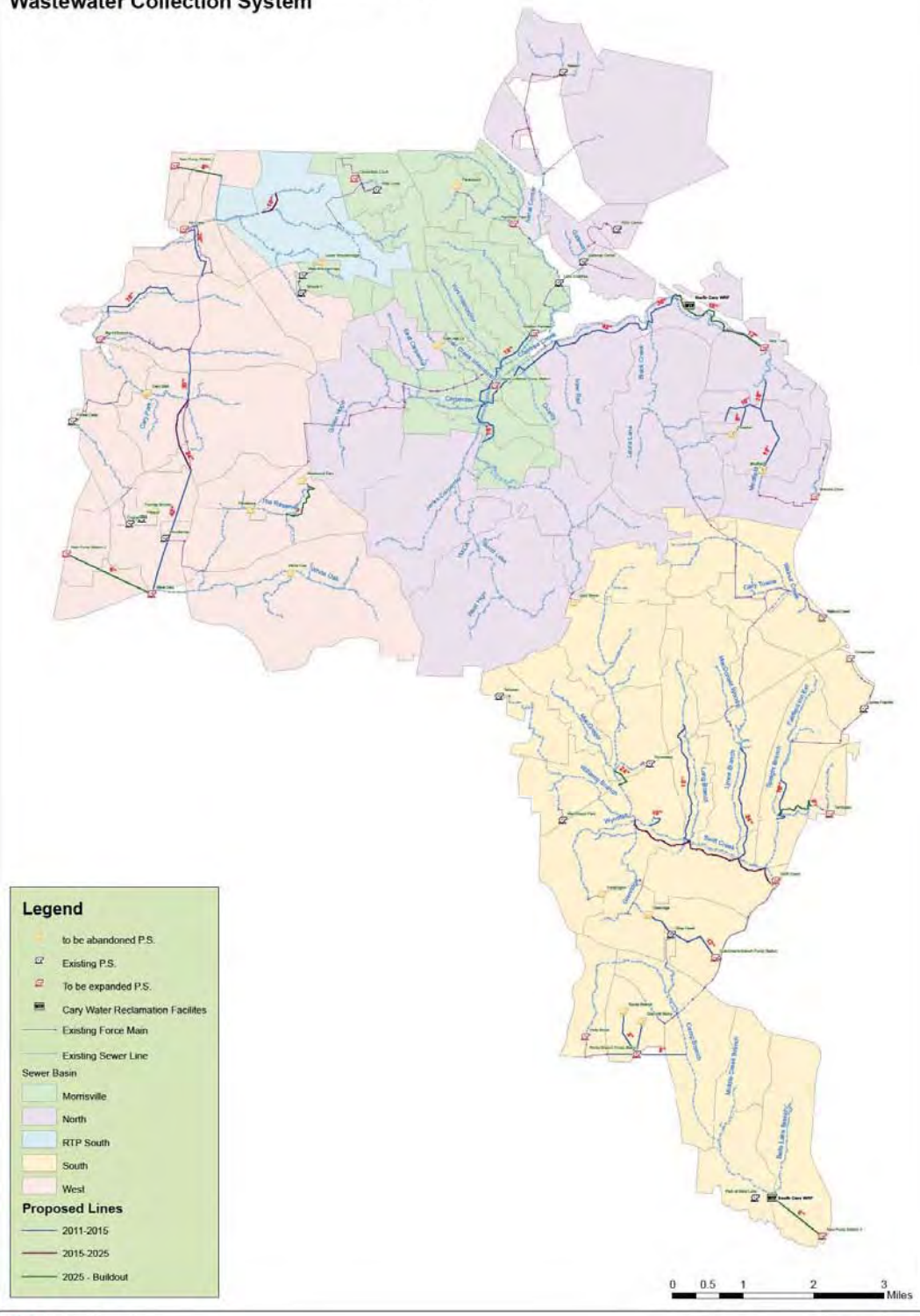


Figure 2-3: Illustration of Morrisville-Owned Sewer System Prior to the Merger



**Figure 6-5
Future Improvements for the Town of Cary
Wastewater Collection System**



Town of Cary
North Carolina

HAZEN AND SAWYER
Environmental Engineers & Scientists

Figure 6-5: Recommended Capital Improvement Projects from 2010 to Build-out

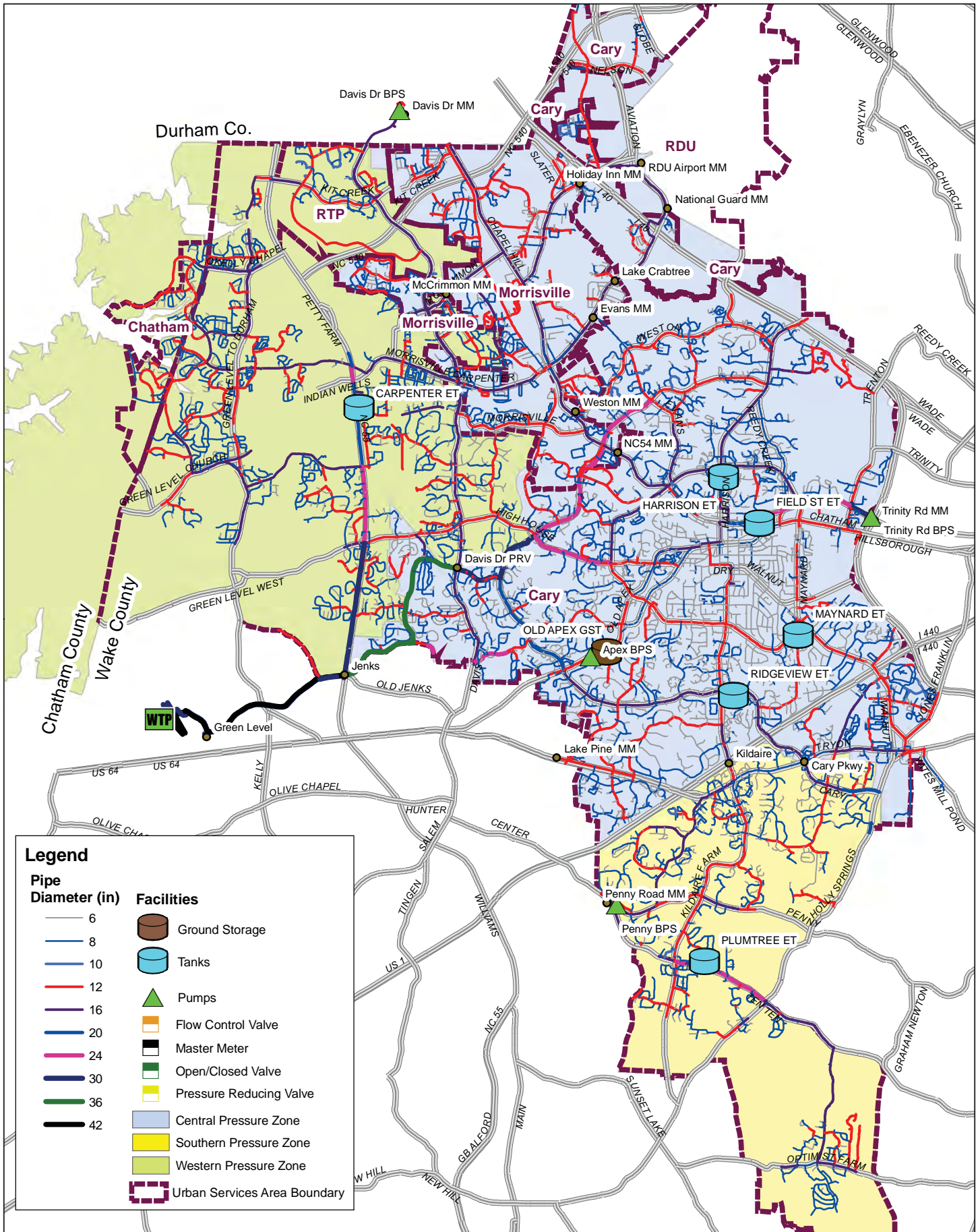
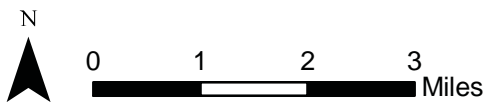
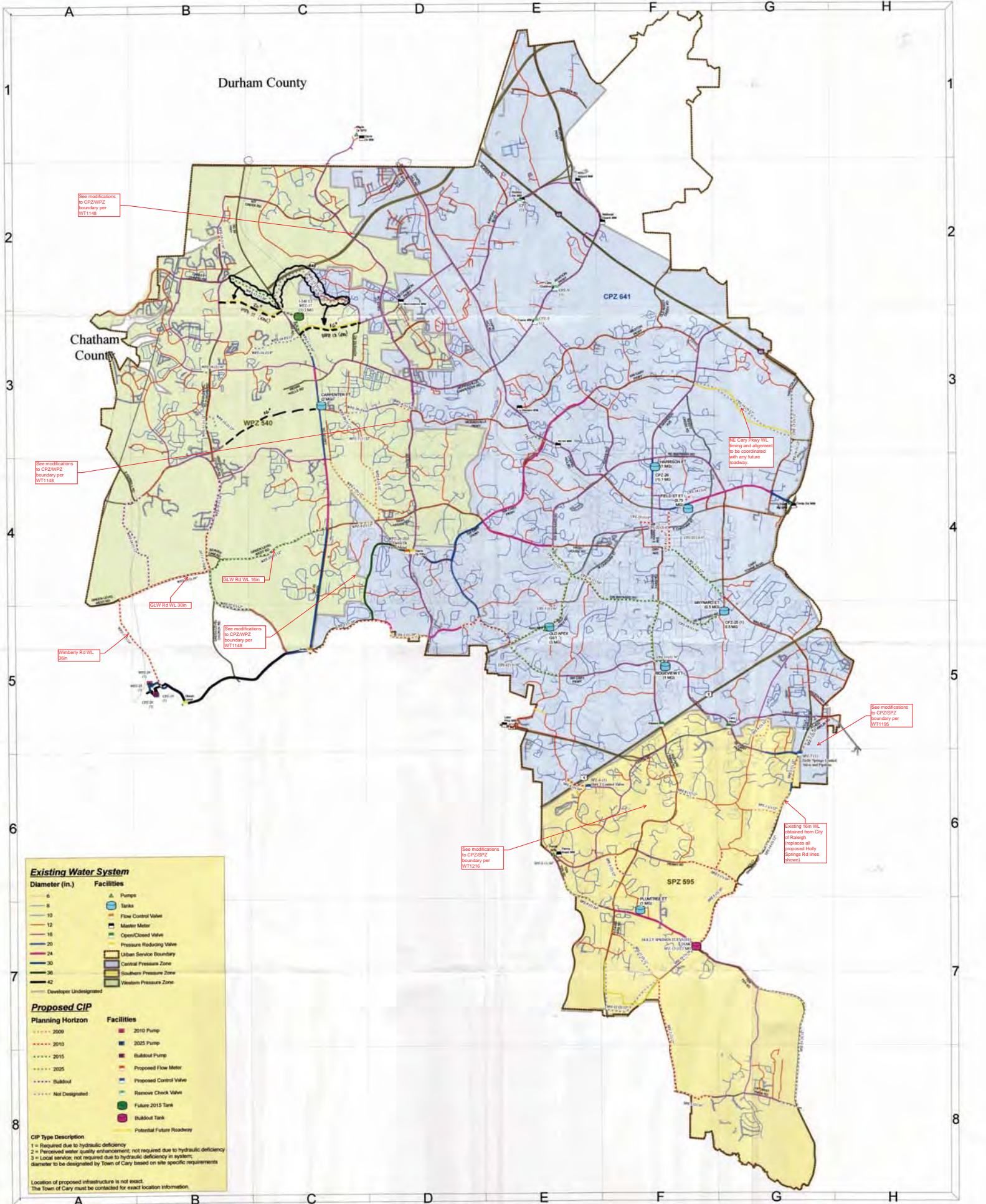


FIGURE 3-1
Town of Cary Distribution System





Existing Water System

Diameter (in.)	Facilities
6	Pumps
8	Tanks
10	Flow Control Valve
12	Master Meter
16	Open/Closed Valve
20	Pressure Reducing Valve
24	Urban Service Boundary
30	Control Pressure Zone
36	Southern Pressure Zone
42	Western Pressure Zone
	Developer Undesignated

Proposed CIP

Planning Horizon	Facilities
2009	2010 Pump
2010	2025 Pump
2015	Buildout Pump
2025	Proposed Flow Meter
Buildout	Proposed Control Valve
Not Designated	Remove Check Valve
	Future 2015 Tank
	Buildout Tank
	Potential Future Roadway

CIP Type Description

1 = Required due to hydraulic deficiency
 2 = Perceived water quality enhancement; not required due to hydraulic deficiency
 3 = Local service; not required due to hydraulic deficiency in system; diameter to be designated by Town of Cary based on site specific requirements

Location of proposed infrastructure is not exact. The Town of Cary must be contacted for exact location information.

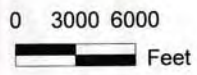
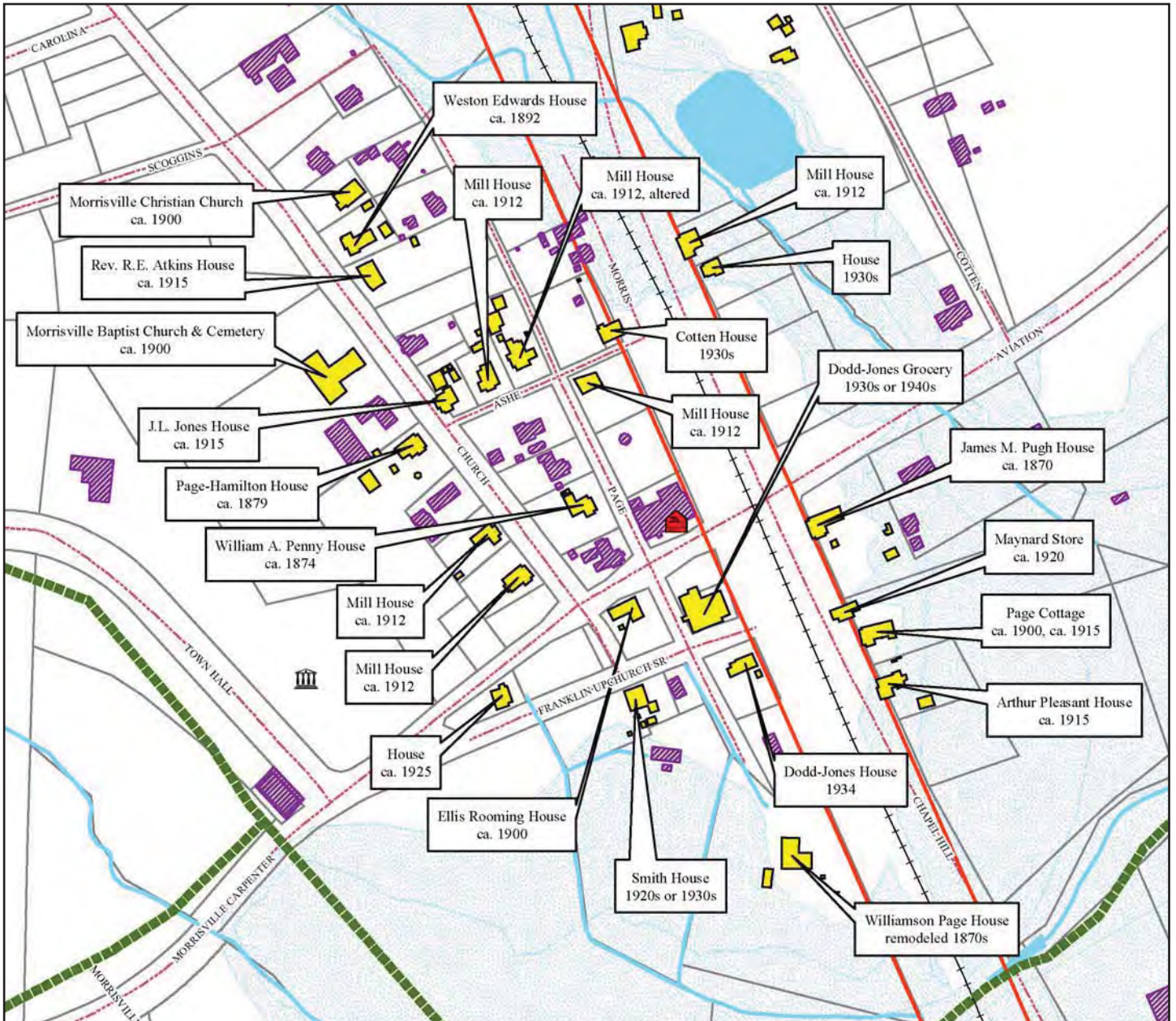



FIGURE 6-7
 Town of Cary Water System Recommended CIP Projects
CH2MHILL

Map 4: Historic Crossroads Area
















Town of Morrisville
Town Center Plan

Historic Properties Map

Legend

	Proposed Greenway Trails		Rail Line
	Fire Station		NCRR Right of Way
	Town Hall		Pond
	Building Footprints		Stream
	Historic Properties		Flood Hazards



November 2006

This map was prepared with the full cooperation of the Planning Department of the Town of Morrisville, North Carolina. It is intended to provide a general overview of the historic properties in the Town of Morrisville. It is not intended to be used as a legal document. The Town of Morrisville is not responsible for any errors or omissions in this map. The Town of Morrisville is not responsible for any damages or liabilities arising from the use of this map. The Town of Morrisville is not responsible for any claims or damages arising from the use of this map. The Town of Morrisville is not responsible for any claims or damages arising from the use of this map.

