Secondary and Cumulative Impacts Master Management Plan

Apex, North Carolina

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Acronyms and Abbreviations

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
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 project owners to prepare an environmental document (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. As a result, many 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. If the permitting authority includes specific permit conditions to address impacts from a given project, the Town department may be precluded from addressing these impacts. 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, the SCIMMP, will help streamline this process.

These inefficiencies result in frustration for both the regulatory agencies and the regulated community. Thus, the Town of Apex (Town) developed a Secondary and Cumulative Impacts Master Management Plan (SCIMMP) to address the SCI for its planned infrastructure. Inclusion of 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. When EAs or EISs are developed for individual projects to examine the

SCI Master Management Plan Process

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

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

In 2005, the Town entered into a memorandum of agreement (MOA) with the North Carolina Department of Environment and Natural Resources (NCDENR) that outlines how the SCIMMP will be used, the time period during which it can be cited in individual EAs and EISs, and the circumstances under which it must be updated more frequently. An amendment to the MOA clarified the reporting dates, specifying the submittal timeframe for biennial reports. According to the MOA, the period of standing for the SCIMMP is 30 years with an update required every 10 years. For this reason, this updated SCIMMP is being developed to take effect in 2015.

The study area for the SCIMMP consists of the Town's Planning Area. The Planning Area boundaries are based on a combination of the urban service area, extraterritorial jurisdiction, and the Town's land use planning boundary, as well as recent boundary and urban service area agreements with the Town of Holly Springs. The Planning Area covers approximately 51 square miles and is located in the Neuse and Cape Fear River basins.

Infrastructure – The Town has developed long-range plans for providing water, reclaimed water, sewer, transportation, and electricity distribution services to its residents in a manner that will protect the natural environment. The Town promotes orderly growth through development and implementation of the Town's Unified Development Ordinance (UDO), Vision Apex Comprehensive Plan, zoning, and a Standard Specifications and Details manual. The Town is also implementing its Capital Improvements Plan (CIP) for electricity distribution, transportation, water and wastewater.

The Town's infrastructure includes the Cary/Apex Water Treatment Plant (WTP), owned in partnership with the Town of Cary, two water reclamation facilities (WRFs), and the electricity distribution system that also serves a portion of the Town of Cary. The Town of Apex WRF discharges to an unnamed tributary of Middle Creek, and the Western Wake Regional WRF (WWRWRF) discharges to the Cape Fear River. The WWRWRF is owned in partnership with the Town of Cary.

The Town's Transportation Plan seeks to create a safe, convenient, and efficient multi-modal transportation system. This plan identifies both general and specific transportation system improvement recommendations and strategies to help accommodate the growth in travel demand. The plan addresses potential solutions to improve pedestrian, bicycle, transit, and thoroughfare options in Apex for the future.

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 environmental protection. By integrating its growth management strategies, 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, electricity and transportation demands.

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

The SCIMMP addresses the presence of potential habitat for protected species within the Planning Area. The bald eagle (*Haliaeetus leucocephalus*) is present near the Planning Area by Jordan Lake and Lake Crabtree, and is protected by the Bald and Golden Eagle Protection Act (BGPA). Michaux's sumac (*Rhus michaux*), federally listed as endangered, has not been recorded within the Planning Area. A survey of freshwater mussel species in the Middle Creek and Swift Creek watersheds did not yield any individuals, live or relic, of the Federally endangered dwarf wedgemussel (*Alasmidonta heterodon*).

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 the environment 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 agricultural lands) and the potential for impacts to water resources, aquatic habitats, and associated aquatic species including freshwater mussels.

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 Town's UDO and Town Code protects open space, water supply watersheds (WSWs), 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. A summary of these mitigation efforts and their applicability to each of the natural and cultural resources analyzed under SEPA guidelines is presented in Table ES-1.

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TABLE ES-1

Areas of Potential Impacts to be Addressed by Permitting and Mitigation Programs

Environmental Resource	Potential for SCI	Types of SCIs	Mitigation Programs
Topography and Floodplains	LI	Some floodplain loss from commercial development although floodway protected Isolation of floodplain from stream by channel entrenchment; loss of nutrient exchange capabilities	Floodplain Protection – No residential development in floodplain; no development within floodway Open Space goals often preserve additional corridors along required riparian buffers Resource Conservation Areas (RCAs) – Floodplain protection is not counted toward an RCA unless the floodplain is undisturbed Erosion and Sediment Control Program Stormwater Programs and Impervious Surface Limitations Sanitary Sewer Installation – deters installation of sewer lines in riparian buffers
Soils	PI	Soil erosion and compaction from new development	Erosion and Sediment Control Program Open Space Preservation and RCAs Comprehensive Plan – encourages development within the Apex Peakway and along growth corridors to limit areas of disturbance Riparian buffers and floodplain protection Water Supply Protection (WSW) Regulations – runoff controls and impervious surface restrictions reduce erosion potential Stormwater Programs
Land Use	PI	Conversion of agricultural and forested land uses to mainly residential land uses	Comprehensive Plan encourages development within Apex Peakway, selected corridors, and mixed use developments Comprehensive Plan Parks, Recreation, Greenways, and Open Space Planning RCAs – Protect environmentally important areas Unified Development Ordinance (UDO) Riparian buffer and floodplain protection WSW Protection Regulations – development density regulations Stormwater Programs and Impervious Surface Limitations – land management plans for certain watersheds

TABLE ES-1

Areas of Potential Impacts to be Addressed by Permitting and Mitigation Programs

Environmental Resource	Potential for SCI	Types of SCIs	Mitigation Programs
Wetlands	LI	Loss through development; subsequent loss of habitat and habitat fragmentation, reduced flow attenuation and genetic diversity. Loss of wetland function through pollutant loading	Wetland Protection through Clean Water Act (CWA) Section 404 and Section 401 Majority of wetlands located in floodplain and riparian buffers which have local protection programs described above RCAs – Protect environmentally important areas Riparian Buffers and Floodplain Protection WSW Protection Regulations Erosion and Sediment Control Program Stormwater Programs and Impervious Surface Limitations reduce pollutant loads and limit stormwater impacts to wetlands
Prime or Unique Agricultural Land	PI	Possible conversion to other uses	Comprehensive Plan – encourages development within Apex Peakway and along major corridors Open space planning Wake County Voluntary Agricultural Districts Wake County Tax Incentive Program Farmland Protection Policy Act
Public Lands and Scenic, Recreational Areas, and State Natural Areas	LI	Possible conversion of adjacent land uses	Comprehensive Plan Parks, Recreation, Greenways, and Open Space Planning Establishment of Nature Park UDO
Areas of Archaeological and Historical Value	LI	Possible conversion of adjacent land uses Structural damage due to acid rain and vibrations	Comprehensive Plan - Land use planning controls allowed uses UDO and open space preservation
Air Quality	PI	Reduction in air quality due to increased vehicular traffic Reduction in air quality benefits of trees Negative impacts to human health (such as, asthma); acid rain; reduced visibility	Transportation Plan and Comprehensive Plan - bicycle and greenway planning UDO connectivity and tree protection requirements Open space preservation Riparian buffers protection Wake County Sustainability Task Force

TABLE ES-1

Areas of Potential Impacts to be Addressed by Permitting and Mitigation Programs

Environmental Resource	Potential for SCI	Types of SCIs	Mitigation Programs
Noise	PI	Increase in overall noise level in Planning Area Negative impacts to human health	Transportation Plan – connectivity requirements Comprehensive Plan UDO – connectivity requirements, tree protection and landscape buffers
Surface Water Resources	PI	Water quality degradation; increase in stormwater runoff Alteration of natural hydrograph (i.e., magnitude, timing, frequency, duration, rate of change); lower and more frequent low-flow conditions; alteration of channel morphology	Wetland Protection through CWA Section 404 and Section 401 UDO Riparian Buffers and Floodplain Protection – No residential development in floodplain WSW Protection Regulations – Watershed Protection Overlay District establishes additional stringent regulations Stormwater – Impervious area limited to 12 percent or stormwater controls required; outfall velocity requirements Erosion and Sediment Control RCAs – Protect environmentally important areas Stormwater Programs and Impervious Surface Limitations Sanitary Sewer Installation and Road Construction – stream crossings with directional borings and crossings with buried culverts or bridges Water Conservation and Water Reuse programs
Groundwater Resources	LI	Reduction in use for drinking water; potential to become contaminated Groundwater inflow provides baseflow in streams, which supports life during droughts	Land use planning and UDO encourage development around town center, selected corridors, and mixed use developments Riparian Buffers and Floodplain Protection – allow for natural infiltration Stormwater Programs and Impervious Surface Limitations including promotion of low-impact development (LID) Sanitary Sewer Installation - failing septic systems taken offline as infrastructure developed Water Conservation and Water Reuse Programs
Forest Resources	PI	Conversion to other uses Reduction in air quality; increase in near-surface air temperature; habitat fragmentation	Comprehensive Plan and UDO encourage development within Apex Peakway, selected corridors, and mixed use developments RCAs – Protect environmentally important areas Parks, Recreation, Greenways, and Open Space Planning Riparian Buffers and Floodplain Protection WSW Protection Regulations – development densities

TABLE ES-1

Areas of Potential Impacts to be Addressed by Permitting and Mitigation Programs

Environmental Resource	Potential for SCI	Types of SCIs	Mitigation Programs
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; dispersal distance to suitable habitat; reduction in potential for long-term population sustainability	Endangered Species Act (ESA) Wetland and Stream Protection through CWA Section 404 and Section 401 Comprehensive Plan and UDO - Riparian Buffers and Floodplain Protection WSW Protection Regulations – Watershed Protection Overlay District establishes additional stringent regulations Stormwater – Impervious area limited to 12 percent or stormwater controls required; outfall velocity requirements Erosion and Sediment Control – Plan review and pre-construction process RCAs – Protect environmentally important areas UDO Tree Protection
Wildlife and Natural Vegetation	PI	Reduction in available habitat Habitat fragmentation; reduction in genetic diversity; reduction of intolerant species ; increased dispersal distance to suitable habitat; reduction in potential for long-term population sustainability	ESA Riparian Buffers and Floodplain Protection – habitat protection and maintenance of habitat corridors Parks, Recreation, Greenways, and Open Space Planning – important habitat areas prioritized for protection Establishment of Nature Park
Introduction of Toxic Substances	LI	Increase in likelihood of contamination Negative impacts to human health	Comprehensive Plan and UDO – controls use and likely exposure Stormwater Program and Impervious Surface limitations - education programs Sanitary Sewer Installation – design standards to limit spills

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)

SECTION 1

Introduction

The purpose of this document is to present the Secondary and Cumulative Impacts Master Management Plan (SCIMMP) for the Town of Apex (Town). This document is an update of the SCIMMP 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 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, many 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. If the permitting authority includes specific permit conditions to address impacts from a given project, they may not be able to be addressed by the Town department. 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 a 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.

SCI Master Management Plan Process

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

The Town entered into a Memorandum of Agreement (MOA) in 2005 with the 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, specifying the submittal timeframe for biennial reports. According to the MOA, the period of standing is 30 years, with an

updated SCIMMP required every 10 years. For this reason, an updated SCIMMP is being developed to take effect in 2015.

1.2 SCI Master Management Plan Process

The 2005 SCIMMP was developed following an approach similar to an EIS. A scoping document was developed and submitted to the State Clearinghouse for review and comment. A meeting was also held during the scoping process with state and federal agencies typically involved with the review of SEPA documents to explain the purpose of this process and plan and solicit preliminary comments that were incorporated into the 2005 SCIMMP. This document, the 2015 SCIMMP, reflects is update to the 2005 SCIMMP. 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 Planning Area boundaries are based on a combination of the long-range urban service area (USA), extraterritorial jurisdiction (ETJ), and the Town's land use planning area boundary.

The Town's Planning Area had previously overlapped with the Town of Holly Springs Planning Area. The Town of Apex and Town of Holly Springs have worked together for the past several years to determine an appropriate annexation and utility service area agreement line to allow for both towns to plan for the future infrastructure needs along their shared boundaries. As a result, in November 2013 the Towns adopted a new 20-Year Annexation and Utility Service Agreement Line that defines the limits of where the Towns of Holly Springs and Apex will serve residents with utilities. The Town's Planning Area reflects the service area agreement and is approximately 51 square miles.

The portion of the Town's Planning Area that includes the ETJ represents the land 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 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 USA
- Demonstration of a commitment to comprehensive planning through official action of a governing body
- Adoption of any required special regulations (e.g., water supply watershed, special transportation corridors)
- Provision of water and sewer service within 5 years (evidence the system is designed with adequate treatment capacity and required improvements 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 County envisions that 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 the 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. In order for the Town to provide utility services to new development, it typically requires annexation or will provide service at rates significantly higher than the typical rates. Because of these policies, the Town rarely provides utility service to areas outside its ETJs without annexation.

Annexation is a governing board decision. Recent changes in State annexation laws no longer make town-initiated annexation an effective tool to provide for an orderly and predictable extension of town boundaries. Areas outside 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 (e.g., 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. The Town of Apex additionally provides electric utilities. Wake County does have riparian buffer, stormwater and other mitigation programs in place which 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 a property owner's decision to develop their land. However, zoning is based on the land use plan and can limit the type of development a property owner can execute.

The land use planning and infrastructure planning process is a dynamic process. The 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 future population predictions. 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 2015 SCI MMP. The remaining 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 Indirect 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

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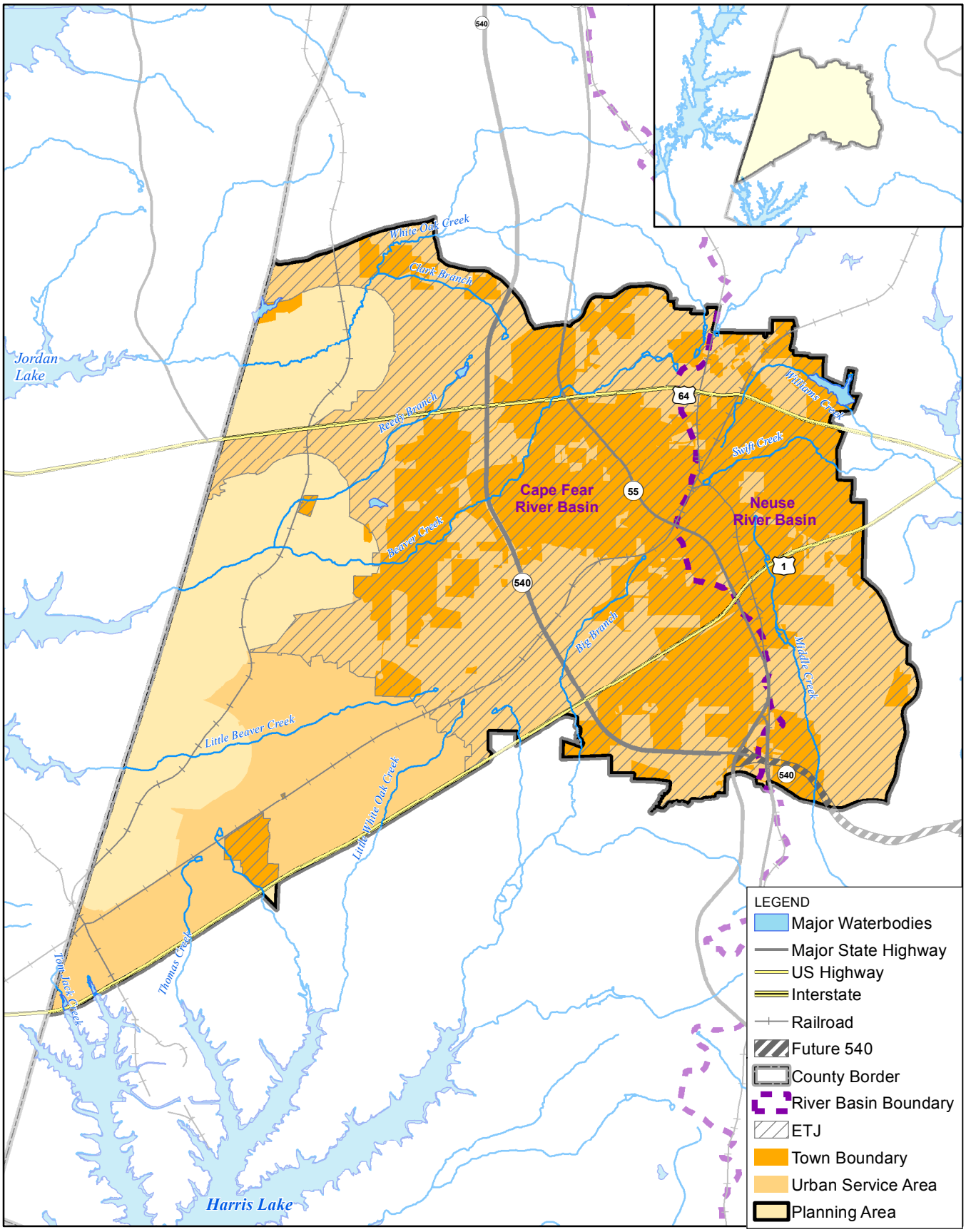


FIGURE 1-1
Planning Area
2015 Secondary and Cumulative Impacts
Master Management Plan - Town of Apex

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SECTION 2

Background and Description of Infrastructure Master Plans

The Town of Apex has developed long-range plans for providing water, sewer, transportation, and electricity distribution services to its residents in a manner that will balance growth and environmental protection. Long-range planning typically provides the general sizing and location of facilities such as treatment plants, distribution/or transmission lines, force mains, pump stations, water towers, future transportation corridors and roadway improvements, and power substations. In addition, regional plans were developed in preparation for wastewater treatment and conveyance, and treated effluent disposal in western Wake County.

2.1 Wastewater

2.1.1 Existing Wastewater System

The wastewater collection and treatment system for the Town consists of gravity lines, pump stations, and force mains conveying flows to the Apex Water Reclamation Facility (WRF). The Apex WRF currently discharges approximately 2.7 million gallons per day (MGD) to an unnamed tributary of Middle Creek and has a permitted capacity of 3.6 MGD. This WRF includes state-of-the-art treatment with advanced nutrient removal capabilities because it discharges into the designated Nutrient Sensitive Waters (NSW) of the Neuse River basin. The facility provides biological assimilation to oxidize the wastewater, followed by settling, filtering, and disinfection using ultraviolet high intensity lamps.

The Western Wake Regional WRF (WWRWRF), located in New Hill area, has an 18 MGD design treatment capacity and an outfall line which discharges to the Cape Fear River below Buckhorn Dam. This facility is a collaborative effort between the Towns of Cary, Apex, and Morrisville. The Town is working with the Town of Cary to begin to utilize the WWRWRF, which came online in mid-2014. These Towns are also addressing a mandate regarding their interbasin transfer (IBT) certificate that requires the Towns to return water to the Haw River or Cape Fear River basins after 2010. The current IBT certificate, issued in 2001, allows transfers from the Haw River subbasin (Jordan Lake is the water supply source) to the Neuse River subbasin up to 24 MGD on a maximum day basis. In 2013, the maximum daily IBT amount for the Towns of Cary, Apex, Morrisville, and RTP South was 19.2 MGD, while annual average IBT amount was 13.8 MGD (Town of Cary, 2014a). The operation of the WWRWRF meets this IBT certificate condition. The Towns of Cary, Apex and Morrisville, and Wake County notified the Environmental Management Commission (EMC) on September 20, 2013 that they are requesting a modification of their IBT certificate to address water needs through 2045 and consumptive uses in the southwest portion of the Town of Apex. This request would also shift the basis of the IBT calculation from a maximum day IBT calculation to IBT calculated as the daily average of a calendar month, per the changes to NCGS 143-215.22L (Regulation of Surface Water Transfers) based on Session Law 2013-388.

The Town's utility system serves residential, commercial, institutional, and industrial customers. The Town's industrial community includes several major employers, such as Cooper Tools and Tipper Tie. Industrial discharges are monitored through the Town's pretreatment program. The Town issues specific permits to each industry, specifying maximum amounts of pollutants that may be discharged. The Town staff also conducts routine monitoring of industries and has implemented a grease trap inspection program for all restaurants and oil handling facilities.

Numerous drainage basins are located within the Town. Sewer lines generally flow by gravity, following the natural drainage, until they reach a WRF or a point where they are pumped out of the basin to another drainage basin. Main sewer lines can receive flow from numerous tributary drainage basins and flows pumped from other drainage basins. Seven subbasins are served by gravity or pumped to the Apex WRF or WWRWRF. Three of these subbasins are tributary to waters in the Cape Fear River basin, two of which are in the Jordan Lake watershed. The other four subbasins are within the Neuse River basin.

The Town's collection system consists of over 157 miles of gravity sewer and 33 miles of force mains, as well as 20 pump stations. Pump stations are equipped with telemetry and standby power. The Town's collection system operations are governed by Permit No. WQCS00064 issued by the State of North Carolina. The Town also maintains an agreement with the City of Raleigh to have the ability to purchase 1 MGD of treatment capacity from their system (Town of Apex, 2014a). Figure 2-1 shows the existing wastewater infrastructure.

2.1.2 Future Wastewater System

The Town of Apex will build sewer lines and pump stations to convey additional wastewater to the appropriate WRF as population growth and development occur. The Town's wastewater improvement projects are primarily associated with the WWRWRF and pump stations to direct flows to the WWRWRF. The Town developed a Preliminary Master Sewer Plan in 2013 depicting proposed wastewater infrastructure (Wooten, 2013). Figure 2-1 shows proposed wastewater infrastructure. The Town's proposed capital improvements are presented in Appendix C. Exact locations of the proposed wastewater facilities and infrastructure will be determined during the development of environmental documents that examine the direct impacts of the proposed infrastructure. The planned infrastructure needs are supported by land use planning documentation, specifically Peak Plan 2030: The Apex Comprehensive Plan (Comprehensive Plan), and population projections; thus SCI can be identified at this time.

2.1.3 Reclaimed Water

The Town holds a permit for reclaimed water, although has not yet used it. Opportunities for reclaimed water use include a residential development near the Middle Creek WRF, along the US 1 commercial corridor, and the Veridea business park development (CH2M HILL and Brown and Caldwell, 2013). The Town is in the process of reviewing standards for reclaimed water distribution and processing.

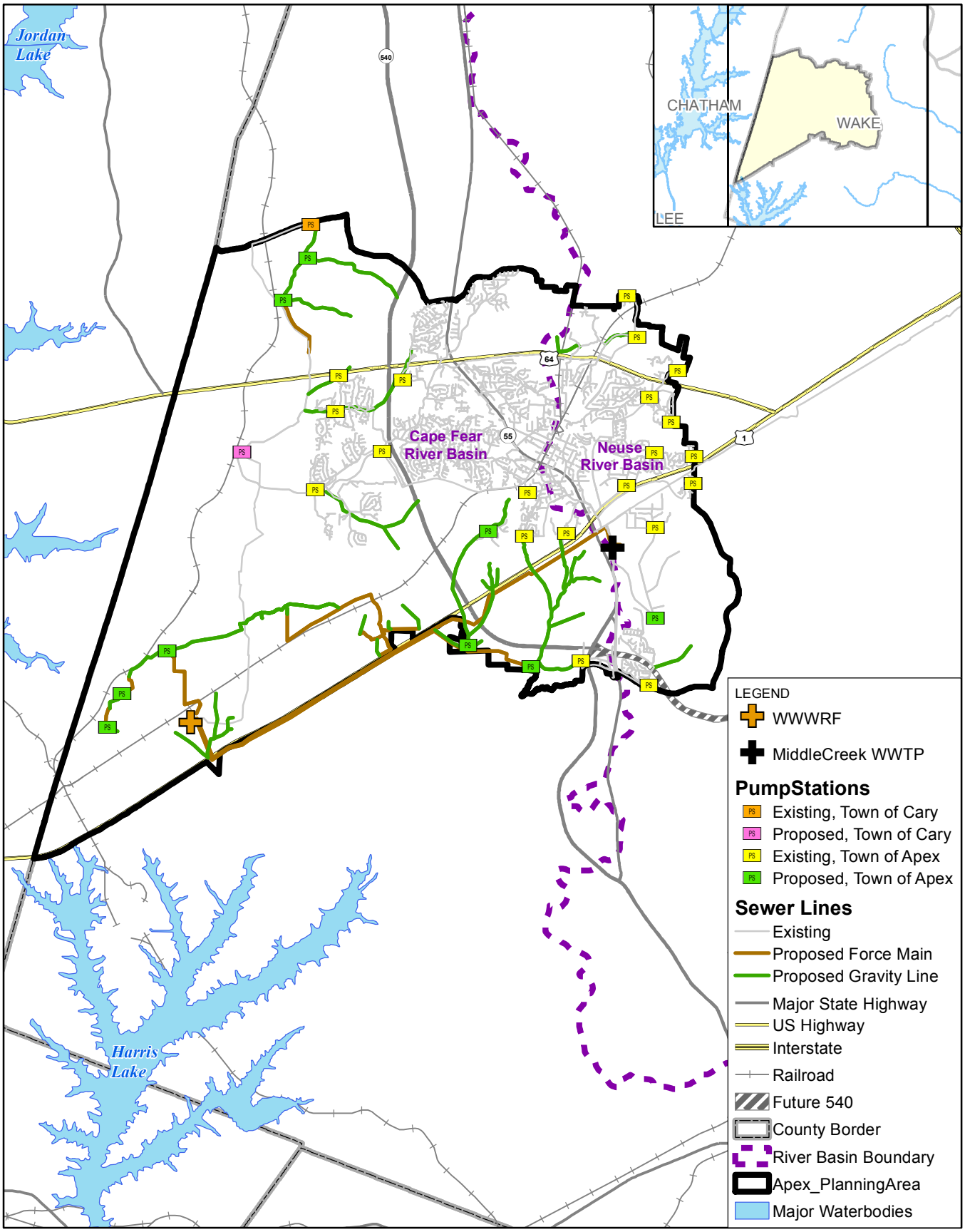


FIGURE 2-1
Proposed Wastewater Infrastructure
2015 Secondary and Cumulative Impacts
Master Management Plan - Town of Apex

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2.2 Water

2.2.1 Existing Water System

The Town obtains its drinking water from Jordan Lake in the Cape Fear River basin. The water is treated at the Cary/Apex Water Treatment Plant (WTP), which is jointly owned by the Towns of Cary and Apex. 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, of which the Town has a 9.2-MGD capacity allocation. To distribute water, the Town maintains approximately 155 miles of transmission lines with diameters ranging from 2 to 30 inches.

The distribution system includes three elevated storage tanks: a 1.5-million gallon (MG) tank located at the intersection of South Salem Street and Tingen Road, a 1.0-MG tank on Hunter Street, and a 0.5-MG tank on Mason Street. The Highway 55 booster pump station provides emergency connection with the Town of Holly Springs, through which the Town can receive water from the City of Raleigh and Harnett County. The Town also has connections to the Town of Cary at Lake Pine Drive and Penny Road. Figure 2-1 shows the existing water infrastructure.

2.2.2 Future Water System

The Town completed a Water Distribution System Facility Plan (Water Plan) in August of 2007 (Wooten, 2007). The Water Plan showed existing, near-term and future water distribution lines. The Town is also planning to develop additional water storage capacity in 2017. Future water lines and infrastructure are shown on Figure 2-2.

In addition to the distribution system improvements outlined in the Water Plan, the Town is in the process of expanding capacity at the Cary/Apex WTP to 56 MGD. The upgrade will require the installation of a 48-inch raw water transmission pipeline. The increased capacity and transmission line, as well as recent improvements to the raw water pump station, are expected to provide sufficient raw water conveyance capacity for the Town. The construction is expected to be complete in 2016 (Town of Cary, 2014b).

The Town's proposed CIP is presented in Appendix C. Exact locations of the proposed water facilities and infrastructure will be determined during the development of environmental documents that examine the direct impacts of the proposed infrastructure. The planned infrastructure needs are supported by the Comprehensive Plan and population projections; thus SCI can be identified at this time.

2.3 Transportation

The Town's Transportation Plan Update was adopted in 2011 (Town of Apex, 2011a). This Plan Update seeks to create a safe, convenient, and efficient multi-modal transportation system and identifies both general and specific transportation system improvement recommendations and strategies to help accommodate the growth in travel demand. The Transportation Plan Update has a thoroughfare and collector street component, a pedestrian and bicycle component, and a transit component. The thoroughfare component shows the network of major and minor roadways that will improve traffic flow over existing conditions and begin to meet some of the anticipated future travel demands. The pedestrian

component shows the importance of a network of walkways that will include sidewalks and greenways, forming an interconnected system. The bicycle component shows a network of on-street bikeways together with the adopted greenways plan. The transit component shows how the Town can begin to look to enhanced regional bus service and a future regional rail system proposed in the Wake County Draft Transit Plan (Wake County, 2012).

Although the NCDOT is responsible for the major highway work that will be done in the Town, the Town's Plan Update includes specific recommendations for thoroughfare improvements. The purpose of the Plan Update is to update the Thoroughfare Plan, which is used by local, regional, state, and federal decision-makers. The Plan Update provides for land reservation for future transportation corridors and helps guide decisions on setbacks and roadway improvements as development occurs.

Figure 2-3 shows existing and future major and minor thoroughfares and streets. The Town maintains over 118 miles of roadway (Town of Apex, 2011a). One major thoroughfare project is the completion and widening of the Apex Peakway, a 6-mile loop roadway around downtown. A major regional transportation effort is the extension of the Triangle Expressway (NC 540) from NC 55 in the Town of Holly Springs to the U.S. 64/U.S. 264 Bypass in Knightdale. The majority of the construction within the Town is complete; however, ongoing efforts to complete NC 540 will influence traffic volumes and patterns within the Town (NCDOT, 2013). These projects will improve traffic flow and meet future travel demand. The Town's proposed CIP is presented in Appendix C.

Exact locations of the proposed infrastructure will be determined during development of the environmental documents, which examine the direct impacts. However, general locations are known and are supported by the Comprehensive Plan and population projections; thus, SCI can be identified at this time.

2.4 Electricity

The Town is a part of the North Carolina Eastern Municipal Power Agency (NCEMPA), an organization that provides wholesale power to its 32 participants. NCEMPA owns a portion of five generating units built and operated by Duke Energy, including the Shearon Harris Nuclear Plant in Wake County (NCEMPA, 2012).

Since 1917, the Town has owned and operated its own electric distribution system for service to customers within the Town limits, parts of the Town of Cary, and some Wake County areas. The Town's electric system has continued to experience healthy electric load growth, especially in the western portion of the service area. There are currently three substations and approximately 315 miles of distribution lines. These substations provide electricity to approximately 14,300 metered residential and commercial customers. Three substations, Mt. Zion, Laura Duncan, and East Williams, are part of the distribution system infrastructure. The Mt. Zion substation distribution feeder extensions were added in 2012 to serve increasing customer load without compromising service levels (Town of Apex, 2014b).

To meet expected future increases in demands, the Town's CIP, in Appendix C, accounts for an additional transformer in 2017 and an additional substation in 2020. The Town developed a proposed CIP map, depicting existing and proposed routing, noting that final

configuration of future circuits may vary (Utility Electrical Consultants PC, 2013). Figure 2-4 shows the approximate locations of proposed electric utilities.

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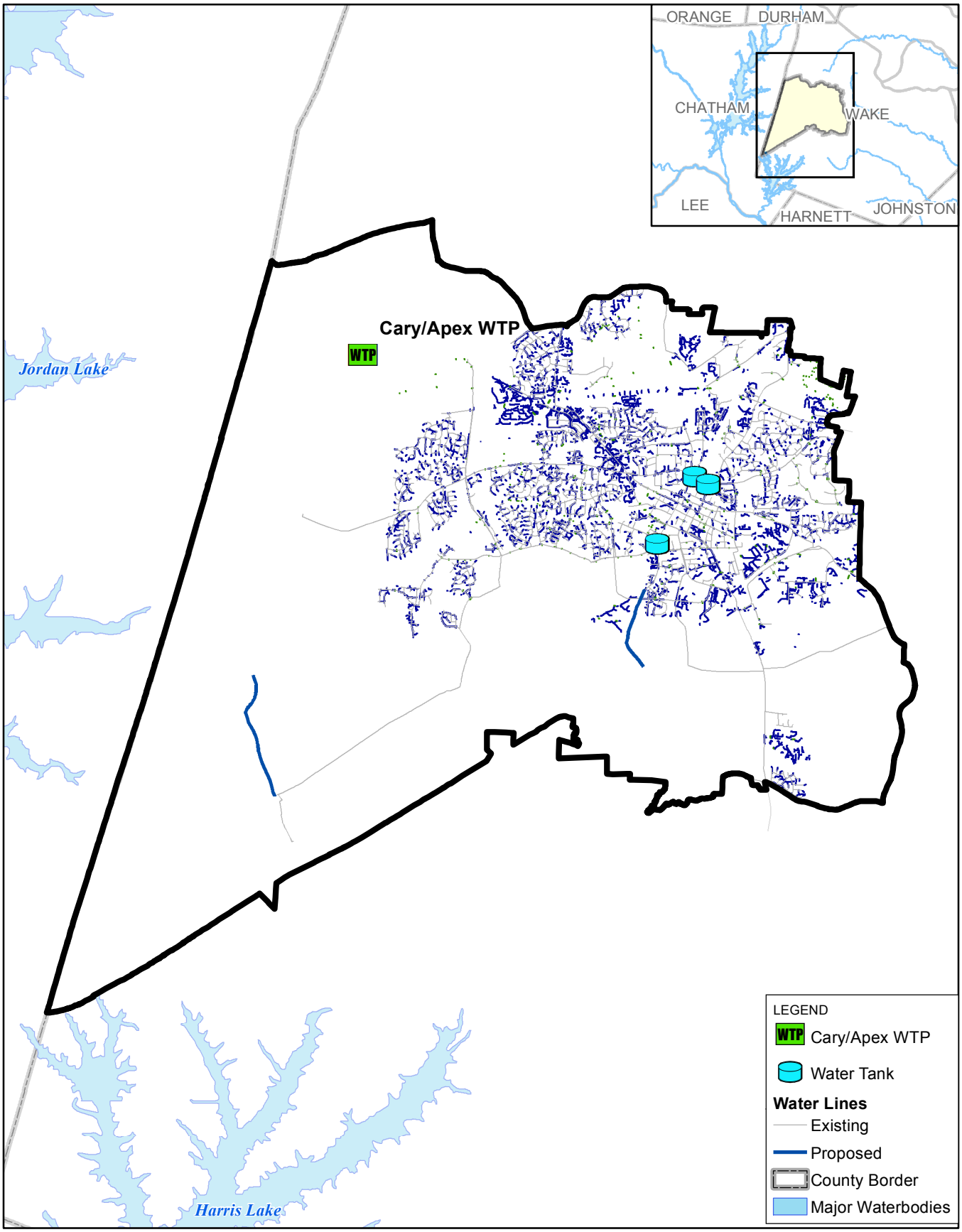


FIGURE 2-2
Proposed Water Infrastructure
2015 Secondary and Cumulative Impacts
Master Management Plan - Town of Apex

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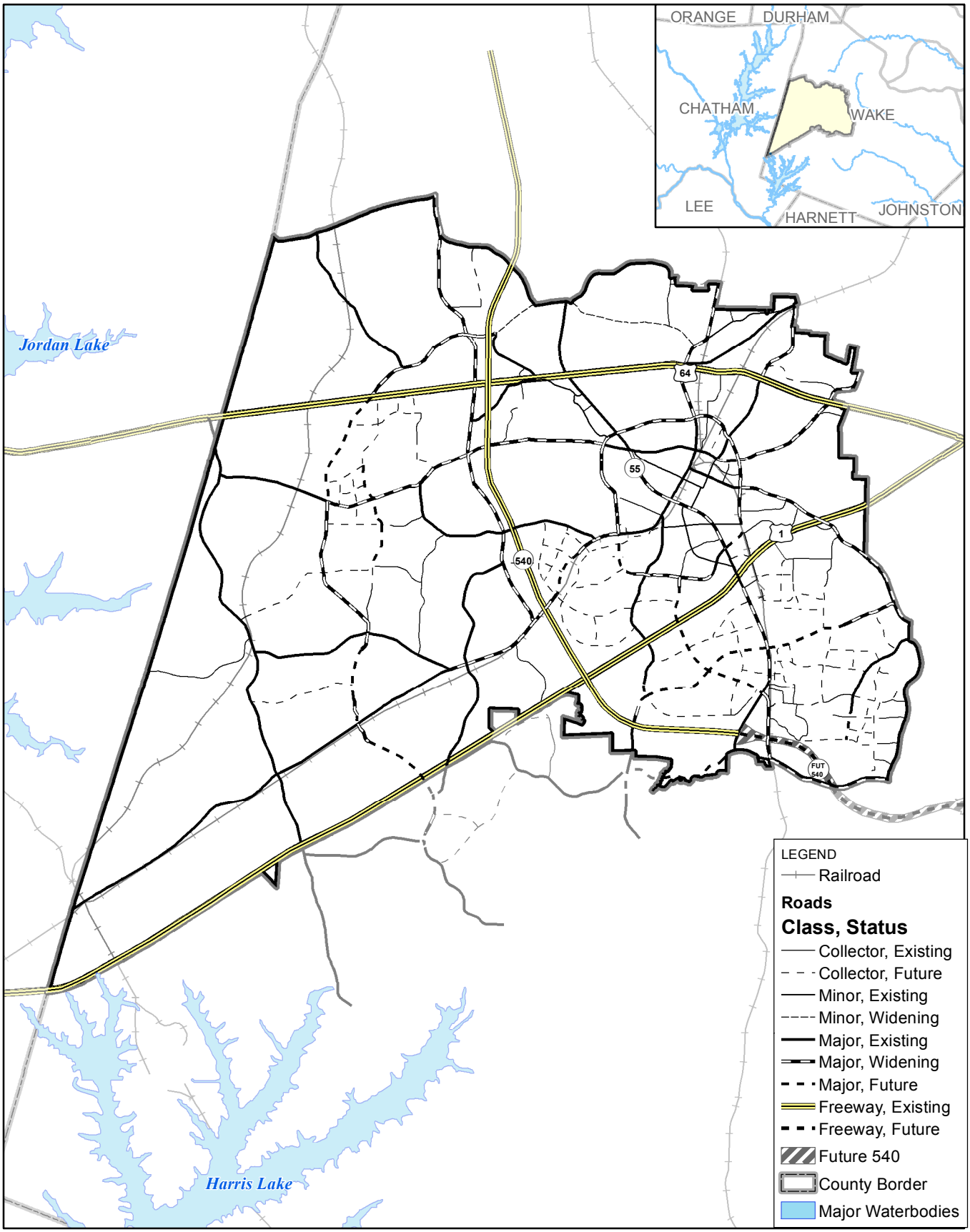


FIGURE 2-3
Proposed Transportation Infrastructure
2015 Secondary and Cumulative Impacts
Master Management Plan - Town of Apex

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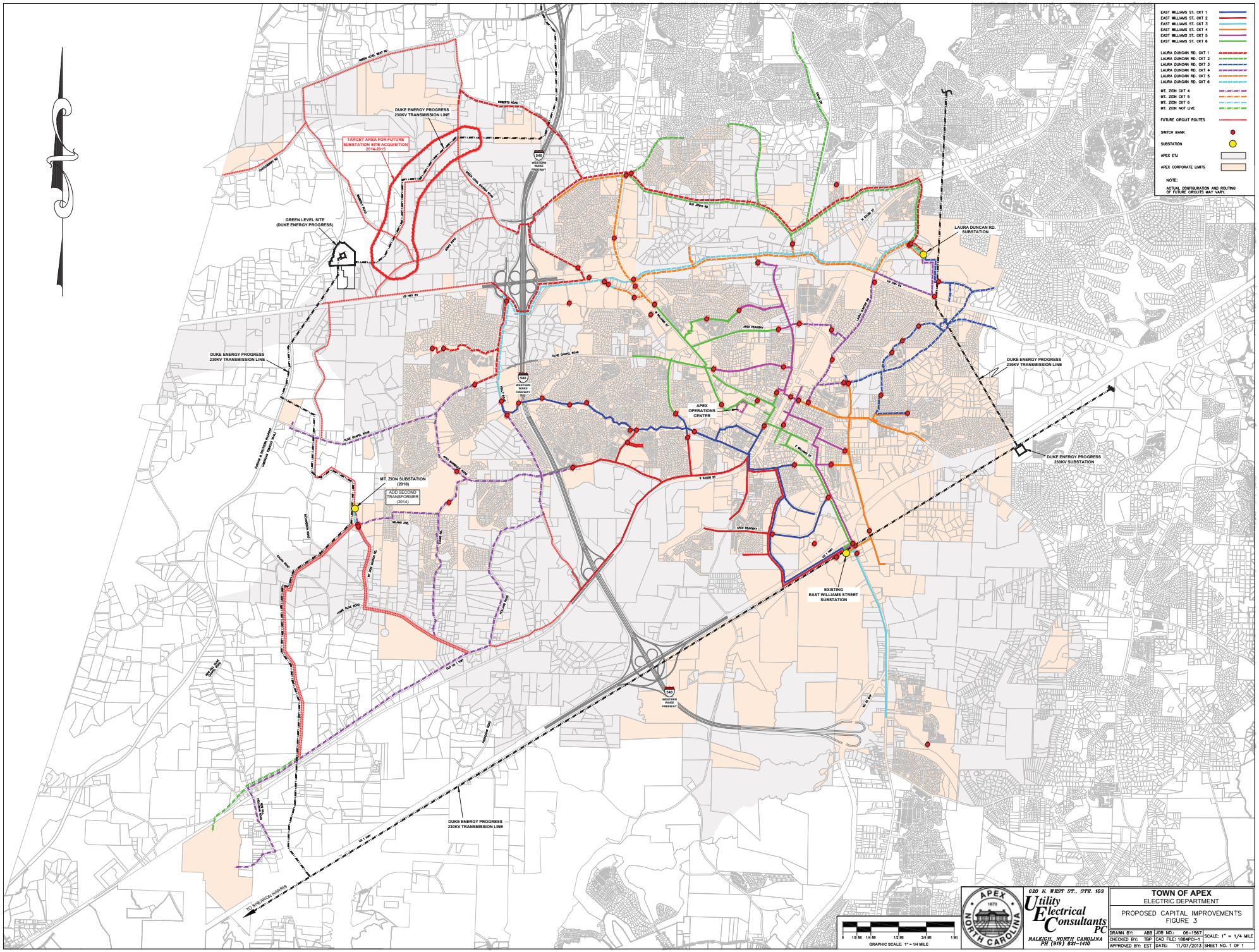


Figure 2-4
Proposed Electric Infrastructure
2015 Secondary and Cumulative Impacts Master Management Plan - Town of Apex

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SECTION 3

Purpose of and Need for Proposed Infrastructure

The purpose of and need for proposed infrastructure are a function of the Town of Apex's commitment to its residents. Part of the Town's mission is to provide infrastructure to meet its residents' needs. The Town's utility planning and service to its customers is one of the many reasons that the Town of Apex is known as the Peak of Good Living and in 2013 earned the Town the No. 9 spot on the annual *Money Magazine* "100 Best Places in America to Live" list (Town of Apex, 2014c).

The Town promotes orderly expansion of the utility and transportation systems through development and implementation of the Town Standard Specifications and Construction Details Manual and the Town's Unified Development Ordinance (UDO). Through effective planning, the Town anticipates infrastructure needs by developing cost-effective, viable solutions implemented as part of the Town's capital improvements budget. The Town plans for capital improvements in 10-year increments (Appendix C).

The Town integrates its infrastructure plans with other planning processes. Infrastructure planning strategies must be formulated and implemented in a manner to balance the competing goals of growth and environmental protection. By integrating its growth management strategies, land use planning strategies, and infrastructure plans, 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, transportation, and electricity demands. By integrating these processes, the Town ensures that infrastructure is being planned commensurate with the projected population of given sections within the Planning Area. In addition, proper planning ensures that Jordan Lake drinking water quality is protected and wastewater is treated to levels that protect surface water quality and to allow reuse of reclaimed water for non-potable uses.

The Public Works and Utilities Department as well as the Engineering Department are responsible for the planning, design, and construction of capital improvements for the Town, including street improvements and thoroughfare planning, right-of-way acquisitions, water, sewer, electrical, stormwater and utility system improvements and expansions, and management of development contracts and easement releases. It is the goal of the Town to provide quality service resulting in the highest achievable levels of customer satisfaction and recognition for excellence. The four main infrastructure elements are wastewater and reclaimed water utilization, water, transportation, and electricity distribution. The projects in each area are evaluated against the Town's goals.

The primary goals of wastewater projects are to:

- Provide adequate collection and treatment of wastewater produced by the system's customers to a level that meets the permit limits issued by regulatory authorities as cost-effectively as possible.

- Ensure that sufficient capacity and facilities for wastewater collection and treatment continue to exist, increasing along with customer needs.
- Discharge treated wastewater in a manner that protects the receiving streams from pollutants and contamination and protects groundwater supplies from land application of reclaimed water.
- Ensure that strict environmental and regulatory requirements are met in the design and construction of the Town's wastewater system.

The primary goals of water projects are to:

- Provide the customers with a safe, cost-effective, and adequate supply of treated water.
- Ensure that sufficient capacity and distribution of treated water continues, increasing along with customer needs.
- Ensure that strict environmental and regulatory requirements are met in the design and construction of the Town's water system.

The primary goals for transportation projects are to:

- Create a system of interconnected streets to improve mobility and distribute traffic efficiently and appropriately by purpose and function.
- Encourage streetscape and "built-in" traffic-calming roadway designs.
- Support "mixed use" development to encourage pedestrians and biking by promoting context-sensitive roadway design.
- Encourage the development of 2- and 3-lane roads with street trees and plantings between roadway and development.
- Promote a pedestrian-friendly environment by filling in gaps and improving interconnection in the sidewalk system.
- Implement roadway system improvements to accommodate growth and minimize roadway congestion.
- Develop a plan compatible with land use.
- Support more bike lanes and trails to parks and community activity centers.
- Encourage a rail system by supporting Triangle Transit's plans for passenger rail service.
- Support the use of roundabouts as gateway and traffic-calming devices in local street design standards.
- Minimize property impacts to existing homes and businesses by promoting context-sensitive roadway design.

- Ensure that strict environmental and regulatory requirements are met in the design and construction of the Town's transportation system.

The primary goals for electricity distribution projects are to:

- Provide customers with safe, affordable, and reliable electric power.
- Provide services in a prompt, courteous, and environmentally responsible manner.
- Ensure that strict environmental and regulatory requirements are met in the design and construction of the Town's electricity distribution system.

To meet these infrastructure goals, the Town develops and implements infrastructure plans. These plans are based on the projected population and land use planning to ensure adequate future capacity exists at the proper locations. The Town's land use planning is described in Sections 5 and 6.

The Town grew rapidly in the 1990s and early 2000s, but growth has slowed in recent years. The population was 4,968 in 1990, 20,212 in 2000, and 37,476 in 2010 (U.S. Census Bureau, 2010). Population projections for the Town include an estimated 104,850 residents by the year 2045 (Table 3-1). The increased population will be from a combination of new residents and annexations, and the Town cannot accurately predict each of these numbers. The Town's predicted population will live in the mixed use areas as well as areas surrounding the downtown area and near the NC 55 corridor. The population projections are consistent with the Peak 2030: Town of Apex Comprehensive Plan (LandDesign, 2013) and are consistent with projected water demand and wastewater flows for the Planning Area, described in the Town's Long Range Water Resource Plan (LRWRP) (CH2M HILL and Brown and Caldwell, 2013).

TABLE 3-1
Town of Apex Population Projections

Year	Population
2010	37,476[1]
2015	45,400[2]
2020	53,100[2]
2025	63,750[2]
2030	74,400[2]
2035	87,450[2]
2040	100,500[2]
2045	104,850[2]

[1] U.S. Census Bureau, 2010
[2] CH2M HILL and Brown and Caldwell, 2013

The Town periodically reviews and updates its population, wastewater, and water supply and reclaimed water projections as well as electricity demands. While minor differences in population projections may occur with these updates, the methodologies and numbers are consistent. The environmental documents that are developed for specific infrastructure projects will contain thorough justifications for 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.

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SECTION 4

Description of Existing Environment in Planning Area

This section describes the existing environment 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, phone conversations, letters, and meetings with various agency personnel.

4.1 Topography and Floodplains

The Town is located in the North Carolina Piedmont, with gently sloping to moderately steep terrain. The topography divides the town into seven drainage basins.

Floodplains function as storage areas for surface water during large rainfall events. Within floodplains, microtopographical 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 3.5 square miles of Federal Emergency Management Agency (FEMA) regulated floodplains are located inside the Planning Area; 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. The floodplains may change in the future based on the revisions reflected in the updated FIRMs.

4.2 Soils

The major soil type in the Planning Area is Creedmoor sandy loam. Other upland soil types include Mayodan, Herndon and White Store. Soil types within floodplains and adjacent to streams include Wehadkee, Worsham, and Augusta. Many of these soils, especially in the eastern portion of the Planning Area, have been impacted by development and other soil disturbances. These soils are gently sloping to moderately steep, and are well-drained to moderately well-drained (U.S. Department of Agriculture [USDA], 1970).

4.3 Land Use

Figure 4-2 illustrates the general land use category within the Planning Area. The figure shows land that is available for development, land that is already developed, and land that is protected as 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 details on the area within each general land use category. Approximately 62 percent of the Planning Area is developed land; another 29 percent is currently undeveloped and represents forested, agricultural or vacant (no building on the parcel according to Wake County's parcel data). Approximately 9 percent of the land is protected as open space.

Figure 4-1 illustrates the riparian buffers within the Town's ETJ, and these buffers account for 5.3 square miles (10 percent of the Planning Area). Streams outside the Town's ETJ fall within the County's jurisdiction and have protection strategies in place. However, the County does not have a riparian buffer data layer to include a buffer open space calculation. These streams will fall under the Town's jurisdiction once the ETJ is expanded. When this occurs, the Town will need to verify whether the streams are perennial, intermittent, or ephemeral, which will determine the actual size of the buffer as described in Section 6.

TABLE 4-1
Planning Area Existing Land Use

General Land Use Category	Square Miles	Percent of Planning Area
Residential Developed	22.4	44%
Non-residential Developed[1]	8.8	18%
Undeveloped[2]	14.9	29%
Open Space[3]	4.6	9%
Total	**50.7**	**100%**

Source: Town of Apex, 2013a; Wake County, 2013; NCWRC 2013a

[1] Transportation and mixed use are included within this category.

[2] Undeveloped land is any undeveloped land that has potential for development. Undeveloped land may be forested, agricultural, cleared, or residential with a minimum 10-acre lot.

[3] Open Space includes 3.6 square miles of North Carolina Wildlife Resources Commission (NCWRC) Gamelands, comprised of 2.6square miles of Jordan Gamelands owned by USACE and 1.0 sqaure mile of Shearon Harris Gamelands owned by Duke Energy.

The floodplain area inside the Planning Area is 3.5 square miles (7 percent of Planning Area). Because of the manner in which the data were developed, the riparian buffer area or floodplain area can occur in various land use categories. In addition, other areas within developed categories, such as perimeter buffers, are actually open space but not necessarily included in the open space calculated area.

The actual percentage of open space within the Planning Area is likely greater than the amount indicated by Table 4-1 and 4-2 and Figures 4-1 and 4-2 due to the following factors: (1) significant 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 (between 20 and 25 percent for new developments through its Resource Conservation Area [RCA] requirements outlined in Section 6); and (3) the Town requires the use of buffers for protection of riparian areas and floodplains. As land is developed, the Town requires open space to be provided with new developments. As a result, there are many areas that are undeveloped open space within the general land use designations.

Table 4-2 provides a detailed breakdown of the existing land use in the Planning Area based on data provided by the Town's GIS staff and Wake County's parcel database. The Town's land use and zoning categories are described in Appendix D. Residential use (44 percent) is the current predominant land use within the Planning Area, with the majority of residential use classified as low-density (26 percent of the Planning Area). Small amounts of clustered high- and medium-density residential developments exist. Residential development is primarily clustered around the Town Center NC 55 corridor, Olive Chapel Road, and Old Raleigh Road.

Commercial, industrial, and institutional land uses comprise 10 percent of the area. The most heavily urbanized areas lie along NC 55, US 1, and US 64.

TABLE 4-2
Planning Area Detailed Existing Land Use

Land Use Type[1]	Square Miles	Percent of Planning Area	Estimated Percent Imperviousness[2]	Estimated Impervious Square Miles[2]
Commercial	1.5	3%	82%	1.2
Industrial	2.8	6%	82%	2.3
Office and Institutional	0.6	1%	72%	0.4
Mixed Use[3]	<0.1	<1%	72%	<0.1
Transportation[4]	3.9	8%	87%	3.4
High-Density Residential	0.8	2%	72%	0.6
Medium/High-Density Residential	1.5	3%	60%	0.1
Medium-Density Residential	7.0	14%	44%	3.1
Low-Density Residential	13.1	25%	21%	2.8
Park/Open Space	4.6	9%	4%	0.1
Agriculture	9.3	18%	2%	0.2
Undeveloped	5.5	11%	3%	0.2
Total	**50.7**	**100%**		**14.4**

Sources: Town of Apex, 2013a; Wake County, 2013; NCWRC, 2013a

[1] The Town's land use categories are described in Appendix D.

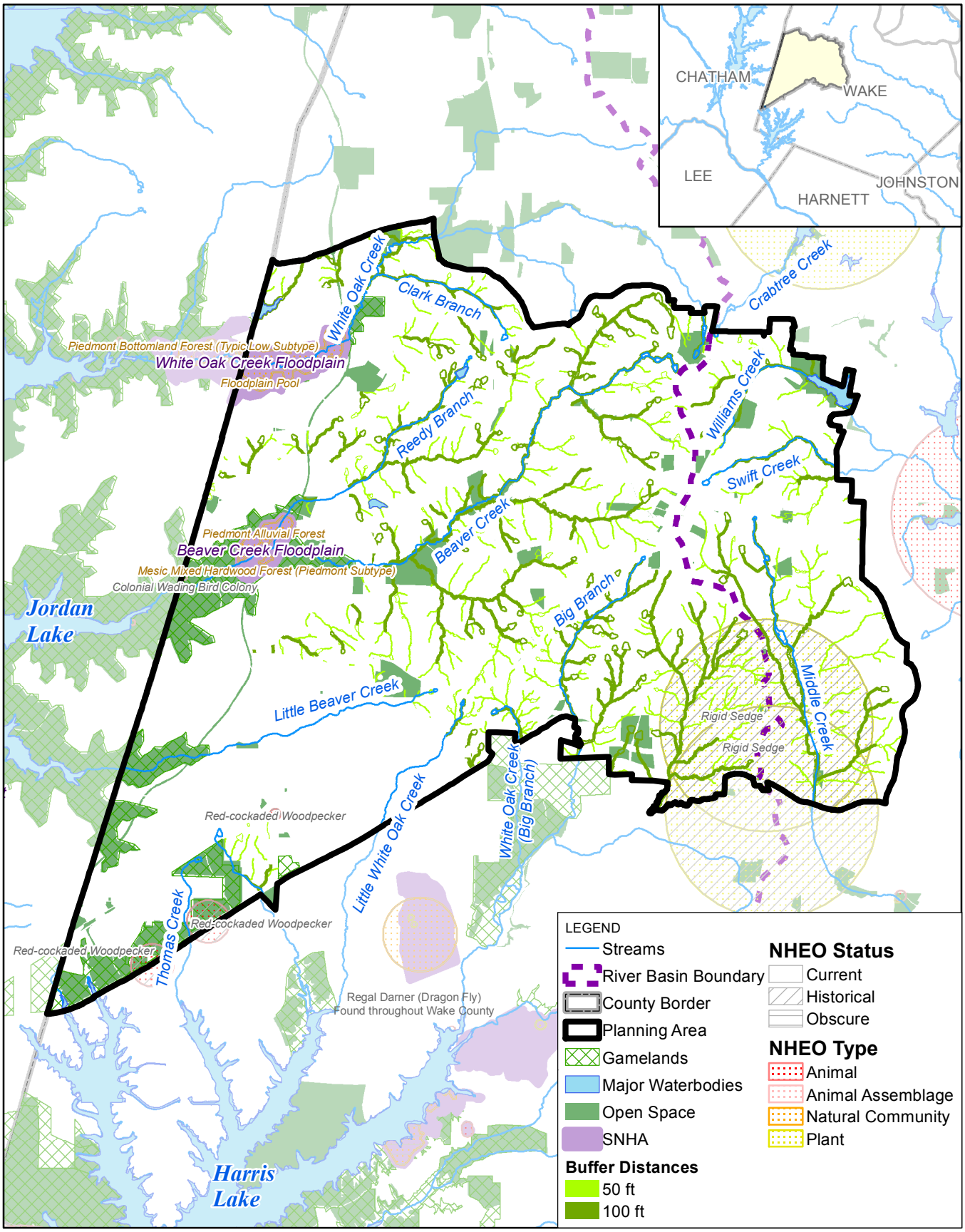
[2] Percent imperviousness estimates are based on a modeling analysis done for the Town of Cary (CH2M HILL, 2002a). Imperviousness values most likely over-estimate the percent imperviousness because reference categories contained slightly higher densities for residential classes than the Town of Apex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

[3] Transportation is not included in the land use data. The area used for transportation was estimated by subtracting the land use area from the total area.

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

Table 4-2 also includes estimates of percent imperviousness; the estimated values listed were used in modeling analyses performed for the Town of Cary (CH2M HILL, 2002a). These values are based on literature values. The percent imperviousness per land class was used to estimate the impervious area for the 2013 land use data. These areas were then summed and divided by the total land area to estimate the overall imperviousness value for existing land use conditions. The total percent impervious is less than 30 percent.

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0 0.75 1.5 3 Miles

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

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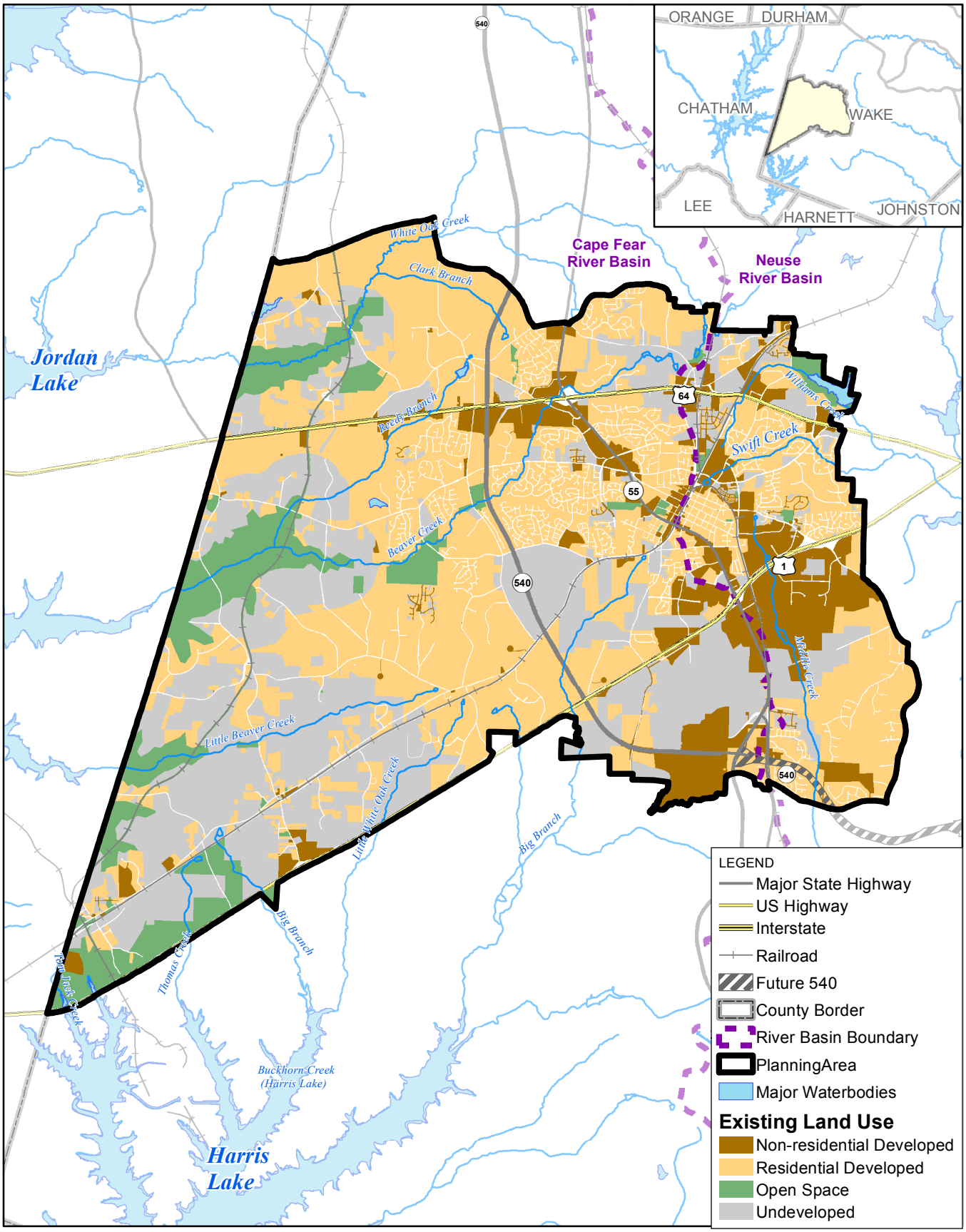


FIGURE 4-2
Existing Land Use
2015 Secondary and Cumulative Impacts
Master Management Plan - Town of Apex

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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 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 (Table 4-3; Figure 4-3) (NCCGIA, 2013, which is based on the 1982 USFWS NWI). The majority of the NWI wetlands are forested and are part of bottomland communities adjacent to larger streams within the Planning Area. Analysis of the Wake County Soil Survey (USDA, 1970) also shows that hydric soils are present primarily along stream channels, concurring with NWI data, indicating that wetlands within the Planning Area are primarily located within riparian and floodplain areas. The widest areas of forested riparian wetlands are present along White Oak Creek and Beaver Creek in the Jordan Lake watershed, according to NWI data. Riparian forested wetlands are present along the lengths of White Oak Creek, Beaver Creek, Little Beaver Creek, and Middle Creek. 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 and approximate locations of wetlands and their approximate locations within the Planning Area. It is important to note that many changes have occurred in the Planning Area since these data were compiled.

TABLE 4-3
National Wetlands Inventory

NWI Type	Acres
Emergent	20
Forested/Shrub	1,882
Lakes/Ponds	443
Total	**2,345**

Source: NC Center for Geographic Information and Analysis (NCCGIA), 2013, based on USFWS, 1982

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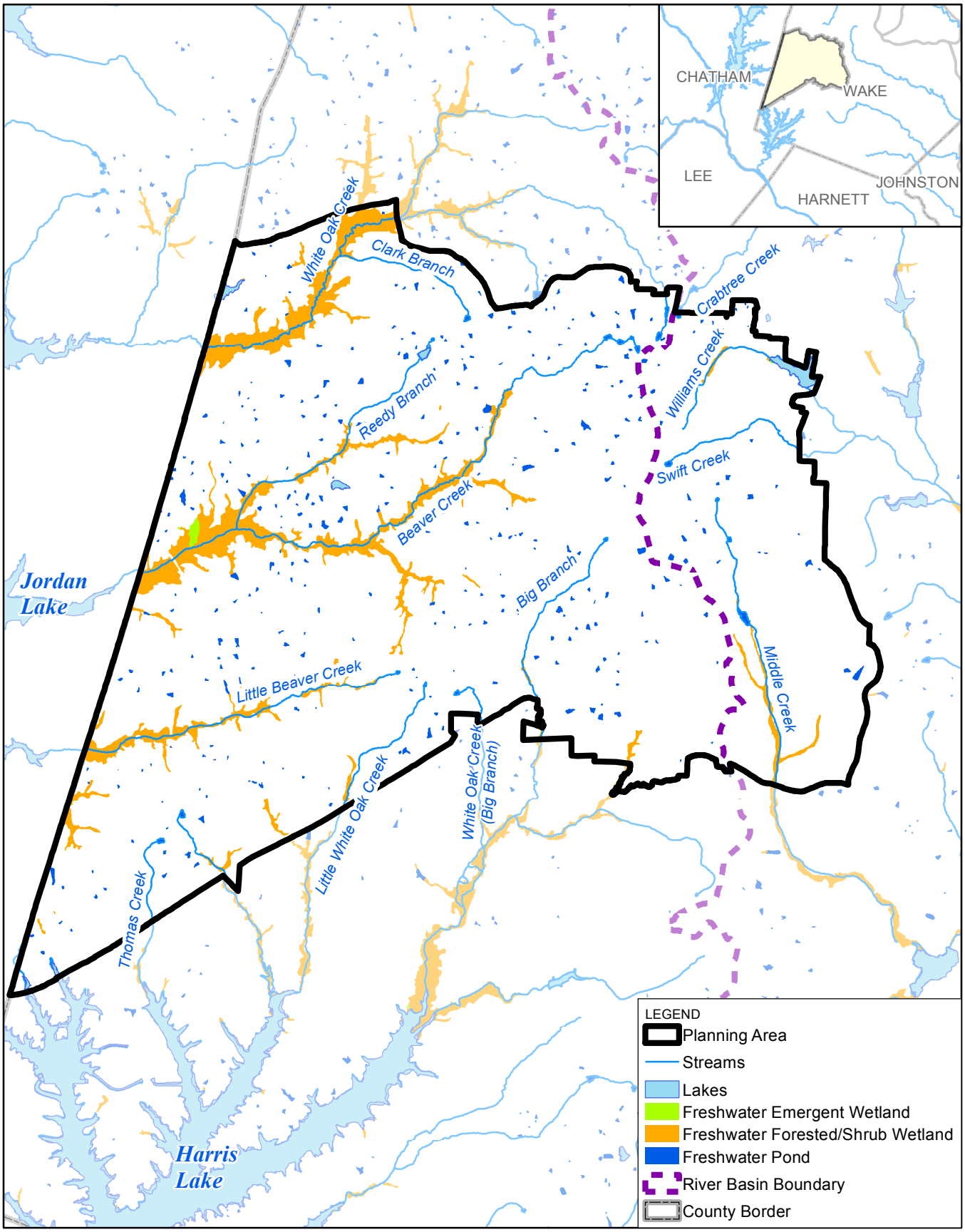


FIGURE 4-3
National Wetlands Inventory (NWI)
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4.5 Prime or Unique Agricultural Lands

North Carolina Executive Order 96, issued in 1984, charges all state agencies to minimize the loss of prime agricultural and forested lands as defined in the Federal Farmland Protection Policy Act. The 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 0 and 8 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 farmlands. Factors include steepness of slope, susceptibility to erosion, and permeability (USDA, 1998).

Approximately 18 percent of the Planning Area remains in agricultural use, as discussed in Section 4.3. In addition to land use data provided by the Town, further analysis was conducted using the North Carolina Gap Analysis Project (NCGAP) data, which were based on 1992 satellite imagery (NCGAP, 2006). These data provide a better understanding of the cultivated and pasture land present within the Planning Area. In the southwestern portion of the Planning Area, agricultural use is more prevalent, and several large farms operate there. Small patches of crops and pasture remain in the eastern portion of the Planning Area, but more residential land use is present.

Soils defined as prime farmland are present within the Planning Area. The major soil type in the Planning Area is Creedmoor sandy loam. Other soil types include Herndon, Mayodan, and White Store. Soil types within floodplains and adjacent to streams include Wehadkee, Worsham, and Augusta. Of the major soil types within the Planning Area, Augusta, Creedmoor, and Herndon are listed as prime farmlands (USDA, 1998). Other soil types considered of statewide importance include these same soils but with steeper slopes, Mayodan thin silt loams, and White Store. Many of these soils, especially in the eastern portion of the Planning Area, have been impacted by development and other soil disturbances.

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. The Town's Parks, Recreation, and Cultural Resources Department operates 13 parks within the Planning Area (Table 4-4). Of these, the largest is the 160-acre Apex Community Park. This park includes sports facilities and a 50-acre lake, providing recreational and fitness opportunities such as fishing, boating, and hiking. The Town partnered with the Clean Water Management Trust Fund (CWMTF) and Wake County Parks, Recreation, and Open Space to acquire 45.8 acres of undisturbed land along a tributary of Beaver Creek. A conservation easement has been placed on the portion of the property along the tributary to protect water quality.

The Town is also developing a new park adjacent to these lands on Beaver Creek, the 160-acre Apex Nature Park. This park will be 160 acres and include athletic fields and a nature center. Recreational activities also are scheduled using school facilities. Other small neighborhood parks provide playground equipment, picnic areas, and sports facilities. The Town's Planning Area contains portions of two gamelands, shown in Figure 4-1, which provide hunting opportunities. The Shearon Harris Gamelands, owned by Duke Energy, is

located in the southern portion of the Planning Area. The Jordan Gamelands, owned by USACE, is located in the western portion of the Planning Area. In total, the portion of these gamelands contained within the Planning Area is approximately 3.6 square miles, as noted in Table 4-4.

To date, the Town has established 13 miles of greenways, with more planned (Sage Design and Alta/Greenways, 2013). The greenways have been constructed and planned with connectivity beyond the Planning Area in mind. Within the Planning Area, Wake County also maintains a section of the American Tobacco Trail (ATT), which is used for biking, walking, and horseback riding. When complete, the trail will connect western Wake County to downtown Durham.

Scenic areas also provide passive recreational opportunities such as hiking and bird watching when located on public land and include Significant Natural Heritage Areas (SNHAs). These areas are discussed in Section 4.13.

TABLE 4-4
Public Parks and Gamelands within the Planning Area

Park	Total Acres	Acres within Planning Area	Owner
Town Parks			
Apex Community Park	160	160	Town of Apex
Apex Nature Park	160	160	Town of Apex
Salem Pond Park	14	14	Town of Apex
Hunter Street Park	12	12	Town of Apex
Apex Community Center	12	12	Town of Apex
Seagroves Farm Park	11	11	Town of Apex
West Street Park	1	1	Town of Apex
Clairmont Park	1	1	Town of Apex
Senior Citizens Park	2	2	Town of Apex
Sue Helton Memorial Park	1	1	Town of Apex
Apex Jaycee Park	23	23	Town of Apex
Kelly Road Park	27	27	Town of Apex
Kelly Glen Park	1	1	Town of Apex
Subtotal Town Parks	***420***	***420***	
Game Lands			
Jordan Gamelands	12,298	1,661	USACE
Shearon Harris Gamelands	6,994	669	Duke Energy
Subtotal Gamelands	***19,292***	***2,330***	
Total	**19,717**	**2,755**	

Sources: Sage Design and Alta/Greenways, 2013; NCWRC, 2013a

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 and is managed by the National Park Service (NPS). Places considered for listing include historic structures and districts, cemeteries, and archeological sites. Within the Planning Area, there are two districts and four additional properties listed in the NRHP (NPS, 2014). The two NRHP districts include:

- Apex Historic District
- New Hill Historic District

As of 2014, there have been almost 1,900 archaeological sites identified, ranging from Paleo-Indain (10,000 BC) to 19th century industrial sites (NCDCR, 2014a). In 2008, the Town expanded its National Register Historic District and identified 172 historic structures, several of which are designated Wake County historic landmarks. Properties within the Apex Historic District that are listed in the NRHP include the former Apex Town Hall and the Apex Union Depot. Other properties within the Planning Area listed in the NRHP include the Kenneth McKinnon House and the Calvin Wray Lawrence House.

To support federal efforts to protect historic places, the Town has been a NCSHPO Certified Local Government (CLG) since 1994 (NCDCR, 2014b). The responsibilities of a CLG are to:

- Enforce appropriate state or local legislation for the designation and protection of historic properties.
- Establish a historic preservation review commission.
- Maintain a system for the survey and inventory of historic properties compatible with the statewide survey.
- Provide 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 the Planning Area (NCSHPO, 2013).

4.8 Air Quality

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

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 (NOx), 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).

North Carolina had its lowest ozone levels on record in 2013 since air monitoring began in the early 1970s. The declining ozone levels coincided with lower emissions from the state's power plants. A recent report by the North Carolina Division of Air Quality (NCDAQ) shows that the state's coal-fired power plants have reduced their NOx 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 residential traffic. Noise levels are highest along traffic corridors, with lower noise levels in residential areas. Construction activities, which occur with development, are also present within the Planning Area and are temporary. Typical residential noise sources include lawn mowers, leaf blowers, and barking dogs. This noise is generally concentrated during daylight hours. Noise is also associated with industrial activities; however, industrial land uses comprise only 5.5 percent of land use, so this is not a major contributor of noise in the Planning Area.

4.10 Water Resources

4.10.1 Surface Water

The Town's Planning Area is approximately 51 square miles. The Planning Area lies along the ridge between the Cape Fear and Neuse River basins. Approximately 81 percent of the Planning Area is within the Cape Fear River basin, and the remaining 19 percent is within the Neuse River basin. Streams within the Cape Fear River basin portion of the Planning Area drain to Harris Lake or Jordan Lake (Table 4-5; Figure 4-4).

The EMC classifies all waterbodies within the state based on the best usage and each classification represents certain designated uses. All of the streams within this watershed are classified as Class C and WS-V. (Note: The EMC has not classified many of the unnamed tributaries shown on Figure 4-1; stream classifications of unnamed tributaries correspond to the stream to which they drain). Class C waters are suitable for aquatic life support, swimming, and fishing. WS-V watersheds have no development restrictions.

While Harris Lake is outside the Planning Area, part of its watershed falls within the Planning Area. This reservoir provides cooling water for the Shearon Harris Nuclear Power Plant owned by Duke Energy and is considered eutrophic. Aquatic macrophytes, including *Hydrilla* sp., have been observed throughout the reservoir. Streams flowing into the reservoir, including those in the Planning Area, may be contributing to the lake's water quality issues, including its eutrophic status.

TABLE 4-5
Planning Area Watersheds

River Basin	Watershed	EMC Subbasin	EMC Water Quality Classification	Watershed Description
Cape Fear River	Harris Lake	03-06-07	Class C; WS-V	Includes Big Branch, White Oak Creek (Big Branch), Little White Oak Creek, Big Branch, and Thomas Creek
	Jordan Lake	03-06-05	WS-IV NSW	Includes White Oak Creek, Reedy Branch, Beaver Creek, and Little Beaver Creek
Neuse River	Middle Creek	03-04-03	Class C NSW	Crabtree Creek, small unnamed tributaries
	Swift Creek	03-04-02	WS-III NSW	Williams Creek; small headwater tributaries

Source: NCDENR, 2012b

Streams in the Planning Area that drain to Harris Lake include Big Branch, White Oak Creek (Big Branch), Little White Oak Creek, and Thomas Creek. Big Branch is classified as C. Tributaries to Jordan Lake within the Planning Area include White Oak Creek, Reedy Branch, Beaver Creek, and Little Beaver Creek. The Jordan Lake watershed is classified as WS-IV NSW; however, entire tributaries are not classified as WS-IV because the stream classification stops at a designated distance above normal pool elevation for Jordan Lake. These tributaries are classified as Class C NSW in response to excessive growth of macroscopic and/or microscopic vegetation.

The major tributary to the Neuse River basin within the Planning Area is Middle Creek (Table 4-5; Figure 4-4). Middle Creek within the Planning Area is classified as Class C NSW. Headwater tributaries to Swift Creek are also present within the Planning Area. The Swift Creek watershed is classified as WS-III NSW. All waters within the Neuse River basin are classified NSW.

At this time, NCDENR does not conduct benthic macroinvertebrate or fish community sampling within the Harris Lake watershed portion of the Planning Area (Figure 4-4). Within the Jordan Lake Watershed, low-flow conditions resulting from the drought made sampling for benthos in White Oak Creek impractical in 2003 (NCDENR, 2004). Typically, White Oak Creek is dry during summer months. Sampling sites along Williams Creek, Swift Creek, and Middle Creek, within the Neuse River basin, are discussed later in this section.

4.10.1.1 303(d)-Listed Streams

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

Waterbodies within the Planning Area and included on the Section 303(d) list are shown in Table 4-6. Within the Neuse River basin, Crabtree Creek, Middle Creek, and an unnamed tributary to Middle Creek are on the draft 2014 Section 303(d) list. Swift Creek and its tributary, Williams Creek, are also impaired and were included on the 2012 303(d) list but are not on the draft 2014 list. A TMDL has since been developed, as discussed in Section 6. These streams have been impacted primarily by growth activities, including construction and the increase in urban runoff from storm sewers. Other factors, as reported by NCDENR,

contributing to impairment may include agriculture and the upstream Cary WRFs (NCDENR, 2012a and 2014).

TABLE 4-6
Planning Areas Waterbodies Included on the 303(d) List

Waterbody	Impaired Use	Year Listed	Category and Reason for Listing	Potential Source(s)
Unnamed Tributary to Middle Creek	Aquatic Life	2010	Impaired biological Integrity; turbidity	Urban Runoff/Storm Sewers
Middle Creek	Aquatic Life	2008	Aquatic life and turbidity	Urban Runoff/Storm Sewers
Crabtree Creek	Aquatic Life	1998; 2008	Impaired biological integrity; fish consumption advisory for PCBs; stressors not identified	Urban Runoff/Storm Sewers
Swift Creek*	Aquatic Life	1998	Ecological/biological Integrity	Land Development; Agriculture; Urban Runoff/Storm Sewers
Williams Creek*	Aquatic Life	1998	Ecological/biological Integrity	Construction; Urban Runoff/Storm Sewers

Source: 2012 North Carolina 303(d) Impaired Waters List (NCDENR, 2012a)

* Williams Creek and Swift Creek were not listed in the draft 2014 NC303(d) Impaired Waters List NCDENR, 2014)

Jordan Lake is also included on the 2014 303(d) list. While the reservoir is outside the Planning Area, tributaries within the Planning Area are part of this watershed. NCDENR has developed a management strategy for the Jordan Lake watershed and a nutrient TMDL for the Upper New Hope arm of Jordan Lake in the Cape Fear River basin. The EMC adopted rules to implement the strategy in 2010, which are still under legislative review. These programs impose requirements to control sources of nutrients resulting from development activities and nonpoint source pollution.

There are limited data available to determine whether water quality in these 303(d) listed streams is improving, degrading, or stable. Crabtree Creek is listed for aquatic impairment and has a fish consumption advisory. Benthic data collected on Swift Creek at SR 1435 within the Planning Area have shown improvement: being rated Poor in 1998 and Fair in 2009. Middle Creek, a few miles below the South Cary WRF, appears to have improving water quality. Ephemeroptera, Plecoptera, and Trichoptera (EPT) taxa richness increased from 10 in 1995 to 16 in 2010. Williams Creek was sampled in 2010 near SR 1308 within the Planning Area, and was rated Fair. It was previously not rated (NCDENR, 2012b).

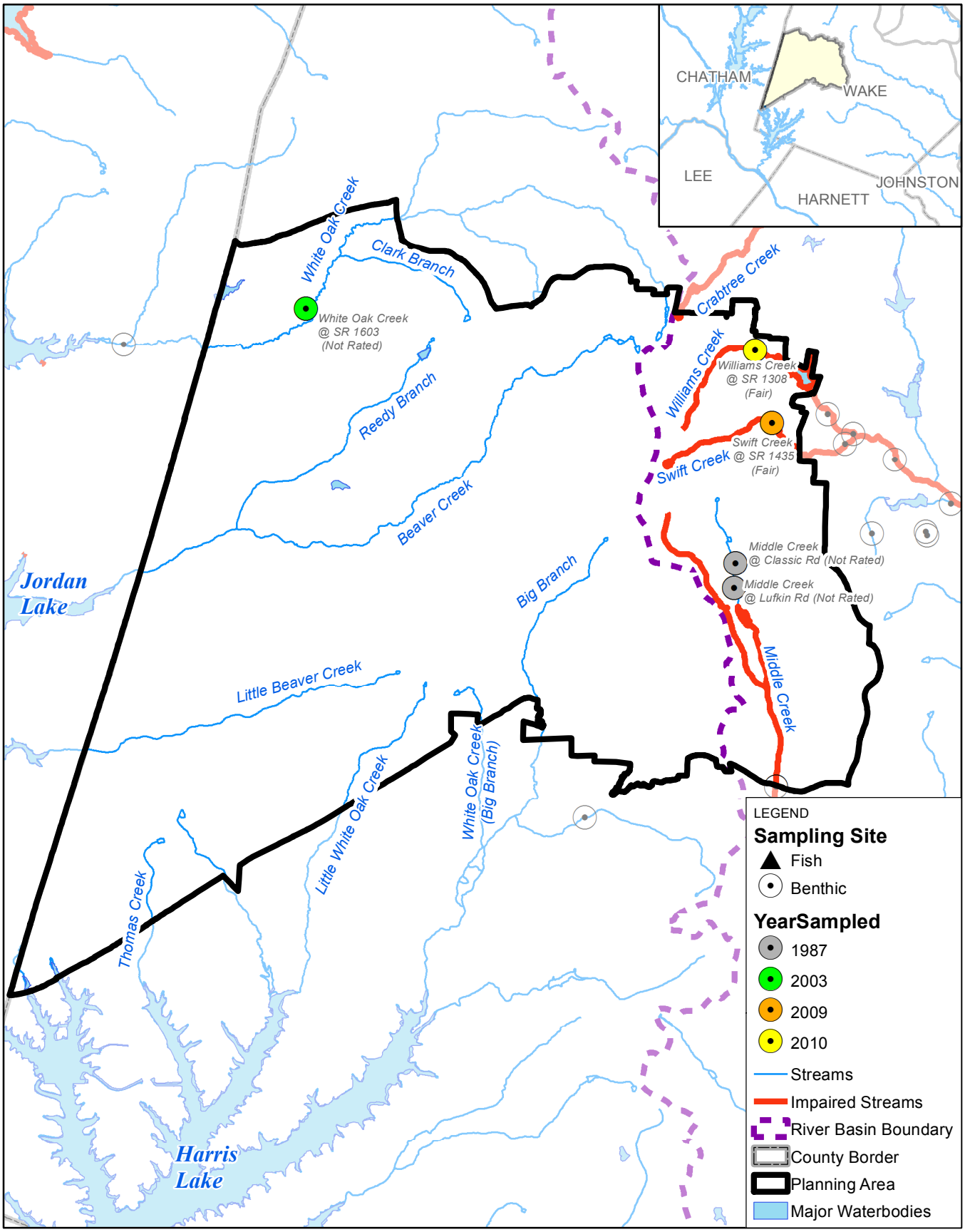


FIGURE 4-4
Water Resources
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4.10.1.2 Wake County Watershed Assessment Summary

Wake County, in an effort to characterize the health of its streams and watersheds, completed a watershed assessment in 2001 (CH2M HILL, 2002b). The goal of these efforts was 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 monitoring 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 included agricultural practices and urbanization, with the effects of urbanization on the biotic community structure more pronounced than agricultural effects. Within the Planning Area, six sites were evaluated (Table 4-7). In general, streams exhibited slight to moderate entrenchment and have sandy substrates. Watershed classifications and bioclassifications based on benthic macroinvertebrate sampling are in line with the majority of streams in the County.

The area within the Swift Creek watershed is subject to the Swift Creek Land Management Plan adopted by Wake County to protect Lake Wheeler and Lake Benson as potential sources of drinking water. A portion of this watershed is within the Planning Area. This Plan establishes impervious surface limits, stormwater requirements, and recommendations regarding municipal and private sewer systems which the Town's UDO meets. The Town's ordinances are described in Section 6.

TABLE 4-7
Wake County Watershed Assessment Summary

Stream Name	Nearest Road Crossing	Habitat Condition	Bioclass	Watershed Classification	Entrenchment
Beaver Creek	Richardson Rd	Suboptimal	Fair	Good	Slight
White Oak Creek	Wimberly Rd	Suboptimal	Fair	Good	Moderate
White Oak Creek (Big Branch)	Holly Springs/New Hill Rd	Sub-optimal	Fair	Good	Slight
Speight Creek	SR 1385	Marginal	N/A	Fair	Slight
UT* Williams Creek	W. Sterlington Place	Marginal – Sub-optimal	N/A	Good-Fair	Slight
UT Swift Creek	Control Site	Marginal	N/A	Fair	Slight

*UT = Unnamed tributary; 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 that 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. 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 pose 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 the Town to provide service when municipal water and sewer become available. New development within the Planning Area will be served by the Town's existing treatment facilities.

4.11 Forest Resources

In addition to land use data provided by the Town, land cover data developed by the NCGAP were also analyzed (NCGAP, 2006). NCGAP is based on an analysis done by the 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.

Large areas of forested land are present in the western portion of the Planning Area, while the eastern portion is much more fragmented. The most dominant forest types are Dry Mesic Oak Pines Forests, Piedmont Dry Mesic Pine Forests and Piedmont/Mountains Dry-Mesic Oak and Hardwood Forests.

Dry-Mesic Oak and Pine Forests include loblolly pine (*Pinus taeda*) with several oak species including white (*Quercus alba*) and southern red (*Q. falcata*), and post (*Q. stella*).

Piedmont Dry Mesic Pine Forests are dominated by loblolly pine, especially those that were previously cleared. Communities with drier xeric habitats tend to be dominated by Virginia pine (*P. virginiana*) or shortleaf pine (*P. echinata*).

Piedmont/Mountains Dry-Mesic Oak and Hardwood Forests are primarily oak dominated forests with white oak often dominant. Habitats with drier conditions are dominated by southern red, post, and chestnut oaks (*Q. prinus*). Sweetgum (*Liquidambar styraciflua*) and tulip poplar (*Liriodendron tulipifera*) are the other main canopy species. Sites with basic soils may also provide habitat for Eastern red cedar (*Juniperus virginiana*).

The areas surrounding Harris Lake including a small portion of the Planning Area were previously managed for timber production, and are identified by NCGAP as Coniferous Cultivated Plantation (natural and planted). Most planted pines are loblolly (*Pinus taeda*), but slash (*P. elliottii*) and longleaf (*P. palustris*) pines are also present.

Along stream corridors, Piedmont Mixed Bottomland Hardwood Forest communities are present. Tag alders (*Alnus serrulata*) and button bush (*Cephalanthus occidentalis*) often dominate the shrub communities. Typical bottomland forest canopy species include

sweetgum, red maple, sycamore (*Plantanus occidentalis*) and black gum (*Nyssa sylvatica*), all of which are tolerant of wetter soils. Wide areas of bottomland forest are present along the tributaries to Jordan Lake. Narrower areas of bottomland forest are present along the other tributaries to Harris Lake (NCGAP, 2006).

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 lakes include catfish, suckers, bass, crappie, and sunfish.

NCDENR does not maintain any fish community sampling sites within or near the Planning Area (NCDENR 2012b and 2005). While NCDWR has not extensively monitored streams in the Planning Area, it does rotate some of its monitoring sites on a 5-year cycle and may monitor other streams in the future.

NCWRC examined the populations of largemouth bass, crappie, and striped bass in Jordan Lake (NCWRC, 2004). NCWRC reported that the reservoir supports a quality largemouth bass fishery with mean relative weight values near the optimum level for all size classes. The crappie fishery is also in good health and mean relative weight was the second highest value observed since 1999. The striped bass population showed a mix of age classes and above average growth rate. The observed conditions of fishes were above average, indicating a healthy fishery.

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)*, as well as the 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*), as well as owls and vultures are predator and scavenger species known to inhabit the area. The many ponds in the Planning Area and nearby Jordan and Harris Lakes attract 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. A wading bird rookery is located along the Jim Burt Branch section of Harris Lake, which is outside the Planning Area. However, birds from this rookery most likely feed throughout the area.

Following is a discussion of the rare wildlife and wildlife habitats found within the Planning Area.

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 due 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 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, as shown in Table 4-8 (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 current documented reports of individuals or populations of federally listed endangered or threatened species within the Planning Area (NCNHP, 2014).

The USFWS identified 20 federally listed species as having the potential to occur within Wake County as presented following Table 4-8. 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*). One species, the Northern long-eared bat (*Nyctophilus arnhemensis*), has been proposed for listing as federally endangered or threatened (USFWS, 2014a). 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 endangered or threatened species within the Planning Area although there are historic records for the red-cockaded woodpecker (NCNHP, 2014).

A brief discussion of each federal endangered species with the potential to occur within the Planning Area according to the USFWS is included below.

The bald eagle 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 due to the banning of harmful pesticides including dichlorodiphenyltrichloroethane **(**DDT). According to the most recent version of the NHEO database provided by NCNHP, there are records of bald eagles at Jordan Lake and the northeast end of Harris Lake, just outside the Planning Area (NCNHP, 2014).

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 the 39 states with records of this species, 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).

Historic red-cockaded woodpecker (*Picoides borealis*) records were present within the Planning Area along US 1. According to NCNHP (2014), these populations have been extirpated. No current populations of red-cockaded woodpecker are present and it has not been observed in the Planning Area since before 1990. Its preferred habitat is open pine stands greater than 30 years old, with mature live trees (60+ years old) being used for nesting cavities. Typically they do not forage more than 0.5 miles. Currently little habitat is available in the County and is not likely to increase due to the time required for trees to become suitable for roosting and nesting.

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 has two lateral teeth, while the left valve has one. 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 olmstedi*), johnny darter (*Etheostoma nigrum*), and mottled sculpin (*Cottus bairdi*) have been identified as hosts for the dwarf wedgemussel (USFWS, 2014a). The original range of this species extended from New Brunswick, Canada, to North Carolina. This species has been found in Swift Creek and Middle Creek downstream of the Planning Area. The NHEO database indicates the dwarf wedgemussel was observed in 2012 in Swift Creek downstream of Lake Benson, outside of the Planning Area (NCNHP, 2014).

Michaux's sumac is an upland terrestrial vascular plant and is considered endangered. This shrub grows to heights of 1 to 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 due to development and fire suppression. According to the most recent version of the NHEO database provided by NCNHP (2014), no Michaux's sumac has 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). Figure 4-1 illustrates the distribution of NHEO and SNHA 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.

TABLE 4-8
Federally Listed Species within Wake County

Scientific Name	Common Name	Federal Status	County Status
Animals			
Aimophila aestivalis	Bachman's sparrow	FSC	Historic
Ambloplites cavifrons	Roanoke bass	FSC	Current
Anguilla rostrata	American eel	FSC	Current
Etheostoma collis lepidinion	Carolina darter	FSC	Probable/potential
Haliaeetus leucocephalus	Bald eagle	BGPA	Current
Heterodon simus	Southern hognose snake	FSC	Obscure
Lythrurus matutinus	Pinewoods shiner	FSC	Current
Myotis austroriparius	Southeastern myotis	FSC	Historic
Myotis septentrionalis	Northern long-eared bat	P	Current
Noturus furiosus	Carolina madtom	FSC	Current
Picoides borealis	Red-cockaded woodpecker	E	Historic
Invertebrates			
Alasmidonta heterodon	Dwarf wedgemussel	E	Current
Elliptio lanceolata	Yellow lance	FSC	Current
Fusconaia masoni	Atlantic pigtoe	FSC	Current
Lasmigona subviridis	Green floater	FSC	Current
Insects			
Speyeria diana	Diana fritillary	FSC	Current
Plants			
Lindera subcoriacea	Bog spicebush	FSC	Current
Monotropsis odorata	Sweet pinesap	FSC	Historic
Rhus michauxii	Michaux's sumac	E	Current
Sagittaria weatherbiana	Grassleaf arrowhead	FSC	Historic
Trillium pusillum var. virginianumpusillum	Carolina least trillium	FSC	Current

Source: USFWS, updated January 22, 2014

Note: A complete list of state-listed species is found in Appendix E.

Federal Status
T = Threatened
E = Endangered
FSC = Federal Species of Concern
P = Proposed for listing
BGPA = Bald and Golden Eagle Protection Act

A mussel survey was conducted in June and July 2004 to determine if any federally listed mussel species are present within a portion of the Planning Area. Three sites in the headwaters of Middle Creek are within the Planning Area. Three other sites are within the headwaters of the Swift Creek watershed. The majority of the survey sites exhibited wide forested riparian buffers in subdivision developments and undeveloped woodlands. Overall, the two dominant species of mussels found during the survey were eastern elliptio (*Elliptio complanata*) and variable spike (*Elliptio icterina*). Only small populations of these species were found within the Planning Area. These species are common and often abundant in the area. No other species were found (CZR, 2004).

Most notable is that no individuals, live or relic, of the federally listed endangered dwarf wedgemussel were found during the survey (CZR, 2004). Also, a study by CZR in 2001 found no dwarf wedgemussels on Middle Creek from approximately 1,500 feet upstream of SR 1006 to SR 1330 in Johnston County (CZR, 2001).

Streams within the Swift Creek watershed are classified as Significant Aquatic Endangered Species Habitat (SAESH) due to the presence of dwarf wedgemussel. The Atlantic pigtoe and yellow lance, both FSC, were also observed in 2012, in Swift Creek downstream of the Planning Area, but not within the Planning area (NCNHP, 2014).

According to NCWRC, the Middle Creek watershed provides suitable habitat for many state-listed mussel species including Roanoke slabshell (*Elliptio roanokensis*), eastern lampmussel (*Lampsilis radiata radiata*), creeper (*Strophitus undulates)*, triangle floater (*Aslasmidonta undulata*), and notched rainbow rainbow (*Villosa constricta*). NCWRC also identifies Swift Creek as suitable habitat for the eastern lampmussel, creeper, and triangle floater mussel species (NCWRC, 2014). As noted previously, none of these species have been observed within the Planning Area (NCNHP, 2014).

4.13.2 Significant Natural Heritage Areas

These state-designated areas are sites with special biodiversity significance and may include habitat for rare species exemplary or unique natural communities, important animal assemblages, or other important ecological features. Two SNHAs are present within the Planning Area. These are the 172-acre Beaver Creek Floodplain and the 614-acre White Oak Creek Floodplain. Neither of these SNHAs is identified as aquatic habitat in the SNHA database (NCNHP, 2014). A description of each area from the NCNHP is provided below (NCNHP, 2003).

Beaver Creek Floodplain contains three natural communities, with the Piedmont/Low Mountain Alluvial Forest being most extensive. There is a rather rare Mesic Mixed Hardwood Forest, floodplain variant along the southern edge of the floodplain, and this stand contains the state listed significantly rare Lewis' heartleaf (*Hexastylis lewisii*). This site is owned by the USACE and the ATT crosses the site (NCNHP, 2014).

White Oak Creek Floodplain is a fairly broad floodplain, with a good quality hardwood forest and the Piedmont/Low Mountain Alluvial Forest natural community, dominated by white oak. The site also has one of the best examples in the region of the Floodplain Pools natural community. The rare Lewis's heartleaf is also found within this site. This site is owned by the USACE (NCNHP, 2014).

4.13.3 Wildlife and Natural Vegetation

Within the Planning Area, natural vegetation is typical of Piedmont upland and bottomland communities. However, smaller unique ecosystems are also present. The following sections include descriptions of natural communities, as described by Schafale (2012) which are present within or near the Planning Area, according to the NHEO database (NCNHP, 2014). These areas are shown on Figure 4-1.

4.13.2.1 Piedmont/Low Mountain Alluvial Forest

Piedmont/low mountain alluvial forests are located in river and stream floodplains where flooding deposits nutrient-laden sediment. Alluvial species such as sycamore (*Platanus occidentalis*), river birch (*Betula nigra*), and box elder (*Acer negundo*), along with a lack of defined depositional fluvial landforms, distinguish this natural community type. This forest type can be found along Middle Creek.

4.13.2.2 Mesic Mixed Hardwood Forest (Piedmont Subtype)

This upland forest community is usually found on lower, steep, and/or north-facing slopes with well-drained acidic soils, such as the Middle Creek Bluffs. It is categorized by its mesophytic tree canopy, which includes beech (*Fagus grandifolia*), red oak (*Quercus rubra*), and tulip poplar. The absence of bottomland trees and base-loving plants separate this forest from other common community types.

4.13.2.3 Floodplain Pools

Floodplain pools are narrow sloughs or rounded depressions in floodplains holding water much or all of the year. They are transitional between wetland vegetated communities and aquatic communities. Vegetation is sparse, and generally absent in the deepest water, but emergent or floating-leaved aquatic plants may be present in the larger examples. Most examples are small enough to be shaded by trees rooted in adjacent forest communities. Plant species vary widely, with some species of sedge (*Carex* sp.) almost always present but other plants quite variable. Within the Planning Area, this community occurs within the White Oak and Beaver Creek Floodplain.

4.13.2.4 Piedmont Bottomland Forest (Low Subtype)

These bottomland forests occur on lower terraces, ridges, and flat floodplains, without an appreciable component of upland species. Natural vegetation is a mix of bottomland oaks and poplars. Overcup oak **(***Q. lyrata***)** a water-tolerant oak species, may be present but is not dominant. Within the Planning Area this type of community occurs along the White Oak Creek Floodplain, extending in to Chatham County, as well as in Jordan Lake natural areas.

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.

Although no Superfund sites are located within the Planning Area, the Shearon Harris Nuclear Plant is located adjacent to Harris Lake (USEPA, 2014). This facility, when

operating normally, presents no risk to the Planning Area. However, should a malfunction occur, nuclear material could be released. Due to the risk associated with the facility, the immediate vicinity is planned for low-density residential growth.

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

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SECTION 5

Description of 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 of Apex. 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 the Town 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 considers all proposed water, wastewater, local transportation, and electric distribution system infrastructure that is planned for full build-out as described in the Town's Peak Plan 2030: Apex Comprehensive Plan (Comprehensive Plan) (LandDesign, 2013). This plan includes provisions for providing water and sewer services to its residents in a manner that will protect the environment. Overall, the Town is managing growth in a sustainable way.

Growth in the Town will be facilitated by transportation facilities, including the NCDOT development of NC 540, which provides improved access to Research Triangle Park (RTP) and other communities within Wake County. Construction on the segment that extends from NC 55 to the NC 55 Bypass near the Town of Holly Springs was completed in 2012. A portion of the future segment of NC 540 that will extend from NC 55 to U.S. 64/U.S. 264 Bypass in Knightdale will travel through the Town. Direct and SCI of this roadway project have been addressed by the NCDOT. In general, the environmental documents indicate that the roadway and associated interchanges will not induce growth, but will influence 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). Other roads are also being widened, some with projects undertaken by the Town, to help accommodate the growth (Figure 2-1).

The discussion in the following section reflects a general analysis of the potential for development to impact 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 these 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 lands change a site's topography. The Town reviews erosion and sediment control plans to minimize grading in area of steeps slopes. The angle for graded slopes and fills is not permitted to be greater than the angle which can be retained by vegetative cover.

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 vary based on jurisdiction. Within the Town's urban growth area, impacts to floodplains will be limited due to the Town's UDO described in Section 6. In areas outside the Town's current jurisdiction but within the Planning Area, impacts to floodplains will be limited by Wake County's floodplain protection ordinances described in Appendix B.

5.2 Soils

As land is developed, clearing and grading result in soil disturbance. When heavy equipment is used on development sites, soils become compacted. During grading, soil is moved; in some areas, it is removed, while in other areas it is replaced. Thus, the location of soil types may change. During clearing and grading, some soils are eroded, but the resulting impacts can be minimized by following an approved site plan in accordance with the Town's ordinances described in Section 6.

5.3 Land Use

The Town's Comprehensive Plan was used to estimate future land use conditions. This 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 future land use categories within the Planning Area. Table 5-1 provides details on the area (square miles) within each general future land use category. The pattern and rate of growth without infrastructure will be different with infrastructure; growth without infrastructure may be less dense than growth supported by infrastructure and the Comprehensive Plan, but it may be spread over a larger area. However, given the proximity of the area to RTP and a strong local economy, it is very unlikely that the current land use characterization would remain.

Table 5-2 provides details on predicted future land use. Approximately 91 percent of the Planning Area will be developed land; with 9 percent remaining as open space. The open space category includes land owned by Duke Energy which is currently managed as gamelands by the NCWRC. The future plans for the area owned by Duke Energy are unknown but is assumed to remain designated gamelands in the future.

Open spaces may become more fragmented near the Town Center, but impacts will be less in the Jordan Lake watershed since lower density residential development is planned in these areas.

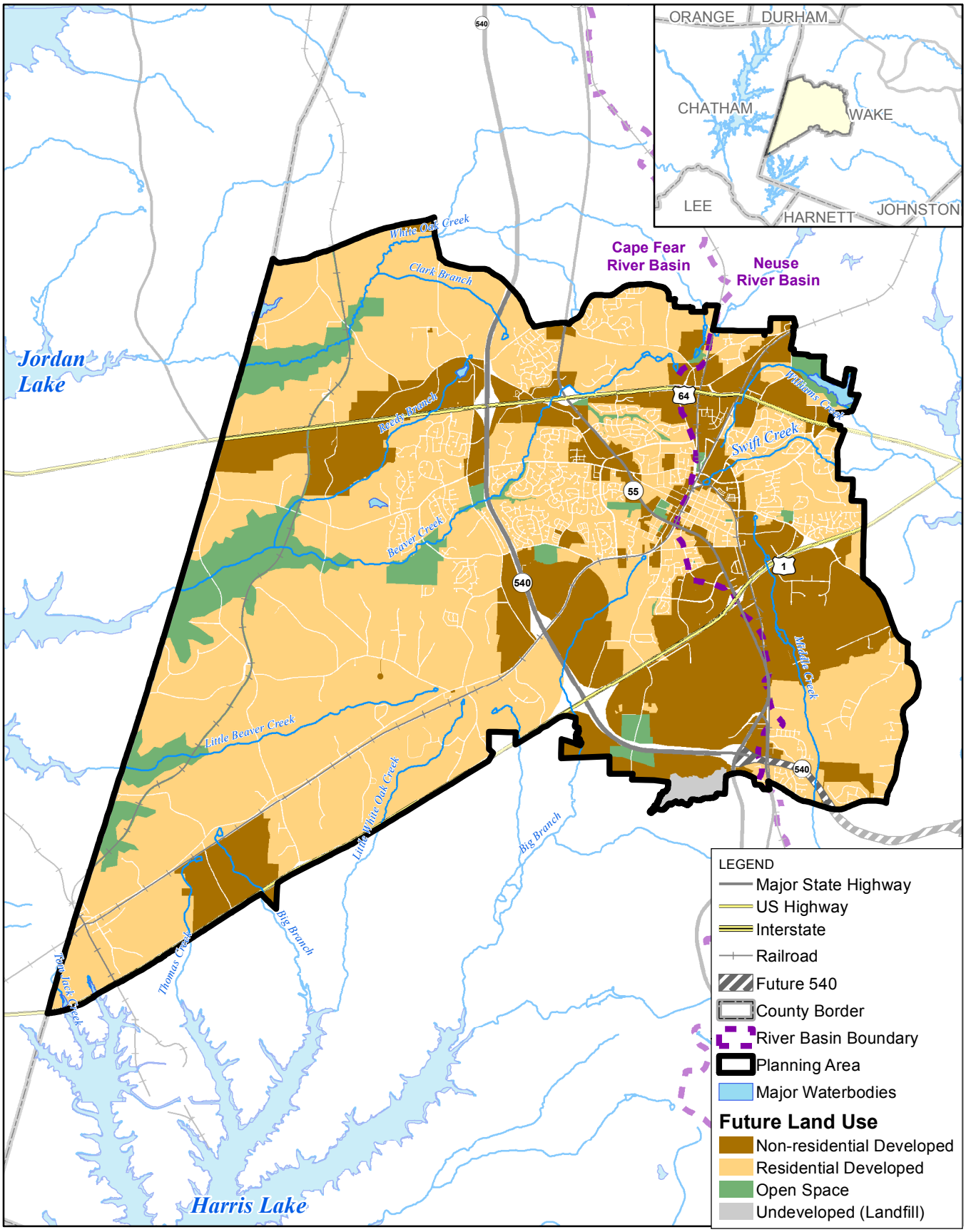


FIGURE 5-1
Future Land Use
2015 Secondary and Cumulative Impacts
Master Management Plan - Town of Apex

CH2MHILL

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As shown in Table 4-2, currently residential use (48 percent) is the predominant land use within the Planning Area with the majority of residential use classified as low density (13 percent). Residential developed area will increase to approximately 58 percent in the future. Small amounts of clustered high- and medium-density residential developments exist. Existing residential development is primarily clustered around the Town Center and along the NC 55 corridor, Olive Chapel Road, and Old Raleigh Road. The most heavily urbanized areas lie along the NC 55, US 1, and US 64. Growth is occurring primarily west of NC 55. As shown in Tables 4-2 and 5-2, the largest changes between existing and future land use will be in the reduction of undeveloped land and an increase in mixed use and residential use areas. The undeveloped land shown in Table 5-1 refers to a landfill located near NC 55, south of NC 540.

TABLE 5-1
Planning Area Future Land Use

General Land Use Category	Area (Square Miles)	Percent of Planning Area
Residential Developed	29.2	58%
Non-residential Developed	16.6	33%
Undeveloped (Landfill)	0.2	<1%
Open Space	4.7	9%
Total	**50.7**	**100%**

Source: Town of Apex, 2013a; Wake County, 2013; NC WRC 2013a

As the land use within the Planning Area changes, the amount of impervious surface will increase, which not only changes the viewshed, but also impacts surface- and groundwater flow as described in Section 5.10. To estimate the impact of land use change on impervious surfaces, literature values were used to estimate the amount of impervious surface by land use type. Table 5-2 includes percentage imperviousness; the values listed were used in modeling analyses performed for the Town of Cary (CH2M HILL, 2002a). These values are based on literature values. Based on these imperviousness 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 imperviousness value for future land use conditions. It is estimated that in the future over 40 percent of the Planning Area could be developed into impervious surfaces. The Town's land use management strategies are further discussed in Section 6.

The most heavily urbanized area is the Town Center, in the northeast portion of the Planning Area. Major transportation corridors also have associated residential and commercial development, including development along NC 55, US 64, and US 1.

The largest increases in land use types will be in the mixed use, medium- and high-density residential categories. Most development will surround the Town Center and the major highway corridors, as described in the Town's Comprehensive Plan (LandDesign, 2013). This will include growth patterns facilitated by the NC 540 corridor.

TABLE 5-2
Planning Area Detailed Future Land Use

Land Use Category	Square miles	Percent of Planning Area	Estimated Percent Impervious-ness[1]	Estimated Impervious Area (Square Miles)
Undeveloped (Landfill)	0.2	<1%	3%	<0.1
Commercial	2.2	4%	82%	1.8
Industrial	2.1	4%	82%	1.7
Office and Institutional	0.4	1%	72%	0.3
Mixed Use	7.2	14%	72%	5.2
Transportation[2]	4.7	9%	87%	4.1
High-Density Residential	0.4	1%	72%	0.3
Medium/High-Density Residential	0.9	2%	60%	0.5
Medium-Density Residential	13.3	26%	44%	5.9
Low-Density Residential	8.9	18%	21%	1.9
Very Low Density Residential	5.7	11%	6%	0.3
Park/Open Space	4.7	9%	4%	0.2
Total	**50.7**	**100%**		**22.2**

Sources: Town of Apex, 2013a; Wake County, 2013; NC WRC 2013a

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

[1] Percent imperviousness values come from estimates from a modeling analysis (CH2M HILL, 2002a). Imperviousness values most likely over estimate the percent impervious because reference categories contained slightly higher densities for residential classes than the Town designates; School was assumed to be represented as Institutional.

[2] The Comprehensive Plan does not include major roads and highways. The transportation area was estimated based on the tabulated land use subtracted from the Comprehensive Plan area.

[3] Duke Energy lands are assumed to maintain existing uses.

The most rural portions of the Town will be in the southwest and the western-most portion of the Planning Area near Jordan Lake, which is slated for very low-density residential development and open space protection.

The Comprehensive Plan does not include categories for forested and agricultural land. As described above, this 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 and low-density residential development categories. 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 residential development. Even without the proposed infrastructure, growth is likely to occur in the Planning Area; however, the pattern and rate of growth would be different between these two scenarios. The future plans for the area owned by Duke Energy are unknown. This area is currently gamelands managed by the NCWRC and is assumed to remain designated as gamelands in the future.

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. Tables 5-1 and 5-2 present estimates of future open space; these areas are likely underestimations of the amount of open space under future conditions given land development requirements discussed in Section 6. While open spaces such as agricultural land and forests will still be lost to development, the impacts will be minimized by open space dedication/preservation. Open spaces may become more fragmented, except along stream channels, where riparian buffers and floodplains will serve as habitat corridors.

To estimate the amount of open space that would be protected under future land use scenarios, the Town's lakes, parks and greenways GIS data were compiled. Approximately 7 percent of the land within the Planning Area is protected as open space. This number does not include riparian buffer and floodplain open space, which is included in the other land use categories. Table 5-2 summarizes the conditions that will occur if all land is developed, and does not show protected open space within developed land use categories. The actual percentage of open space within the Planning Area is greater due to the following factors: (1) significant 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 new developments (at least 20 percent through its Resource Conservation Area requirements outlined in Section 6); and (3) the Town requires the protection of 100-foot riparian buffers and floodplains. In addition, as land is developed, the Town requires open space to be provided with the developments. As a result, there are many areas that are undeveloped open space within the various land use designations.

Figure 4-1 illustrates the riparian buffers within the Town's ETJ, and these buffers account for 5.3 square miles (10 percent) of the Planning Area. Streams outside the Town's ETJ fall within the County's jurisdiction and protection strategies are in place for them. However, the County does not have a riparian buffer data layer to include a buffer open space calculation. These streams will fall under the Town's jurisdiction once the ETJ is expanded. When this occurs, the Town must verify whether the streams are perennial, intermittent, or ephemeral, which will determine the actual size of the buffer as described in Section 6. The floodplain area inside the Planning Area is 3.5 square miles (7 percent of the Planning Area). These areas are not separated from the land use categories listed in Table 5-2. Other protected open space includes passive and active recreation areas, wetlands, and landscape buffers.

5.4 Wetlands

Wetlands within the Planning Area are primarily located 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 and stream buffer regulations. Other programs which 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 impact hydrology and vegetation within a wetland. Nutrient enrichment and other surface water pollutants may impact amphibians and aquatic organisms inhabiting a wetland. In the long term, overall quality 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.

While some wetland loss still occurs with this program, overall SCI to wetlands in the Planning Area will be minimized by the UDO's floodplain and stream buffer regulations.

5.5 Prime or Unique Agricultural Lands

The amount of agricultural lands will be significantly reduced in the Planning Area as lands are converted, mainly to residential uses. This includes the conversion of many acres of prime farmland soils. However, recent growth has already converted many acres of agriculture and prime farmland soils within the Planning Area to other land uses. This conversion and disturbance of soils would likely continue, even without the proposed infrastructure, as residential lots serviced by wells and septic systems increased in the area. While the pattern of growth may be different than predicted and the density may be lower, prime farmland soils will still likely be converted and/or disturbed.

These impacts of land use changes could also include the degradation of a land use type through the introduction of adjacent incompatible urban land uses. For example, the loss of viable farm income can occur when subdivisions are built adjacent to farmland. Because the value of the farmland rises as urbanization of the area occurs, farmers can be forced out of business due to increased property taxes. In addition, the new residential growth may cause associated farming businesses to move away. This change leads to increasingly hazardous traffic conditions for operators of farm equipment and can lead to vandalism of crops.

While the 2030 Comprehensive Plan does not have an agriculture category, agriculture is a permitted land use in the very low and low-density residential land use categories (LandDesign, 2013). It is assumed that in the more rural areas of the Planning Area, to the west and south, agriculture will remain.

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

Growth in the Planning Area should have limited impact on scenic and recreational areas that are currently part of the park systems. These areas may become more valued by the community as open spaces including 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 which is outlined in Section 6. With the continued implementation of the Town's Comprehensive Plan, 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.

A large percentage of the open space in the Planning Area is the NCWRC gamelands as illustrated on Figure 5-1. Very low density residential development is planned in areas directly adjacent to gamelands (Comprehensive Plan, 2013).

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 due to its focus 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. A goal of the Town is to preserve historical landscapes that reflect the Town's rural heritage, including the protection of working farms and is a goal discussed in the Comprehensive Plan. The UDO, discussed in Section 6, prohibits redevelopment for 48-months on demolished properties that fit the definition of "historic property" so historic structures are usually protected. Finally, some structural damage could occur due to vibrations from increased traffic or from acid rain that may occur from increased emissions to the atmosphere. 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, the population within the Planning Area is likely to increase and contribute to higher levels of air pollution. While industrial emissions may also increase in the Planning Area, the primary source of air pollution is likely to remain as vehicles. Without improved roadways, it is likely that traffic problems would increase, exacerbating 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 this 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 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 (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 due to 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 significant increase in 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 will also increase the base level of noise, potentially impacting wildlife behavior.

Efforts taken to improve air quality by promoting alternative forms of transportation will also 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 due to its proximity to RTP and the strong local economy. However, this growth would likely be less dense and would be serviced by wells and septic or community systems as the Town approached its water and sewer capacity, and travel times would increase without planned road improvements. It should also be noted that there are no requirements for maintenance of septic systems, and small community systems are not required to have an operator onsite 24 hours a day. In addition, growth without infrastructure may fall below thresholds established for stormwater controls or for erosion and sediment control plans.

As a result of the increase in population and associated development, the impervious area within the Planning Area will increase (from an estimated 28 percent to 44 percent) resulting in an increase in stormwater runoff during rain event due to a decrease in pervious 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 rate of runoff may also impact stream channel stability and thus aquatic habitat. The increase in runoff may increase pollutant load, which will cause a decline in water quality and stream channel stability, and may create subsequent impacts on aquatic habitat, wetlands, and sensitive aquatic and amphibian species in the area. The increase in runoff may increase pollutant load causing a decline in water quality and creating 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 flow directly to streams, causing higher storm event flows, which may cause streambank erosion and degraded aquatic habitat. Less rainfall will percolate to groundwater, which can reduce baseflow during dry weather. However, it should also be noted that the impacts on storm event and baseflow conditions are smaller in western Wake County than in other areas of the County due to the soil types found in 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 and Harris Lake watersheds. In addition, low flow recharge rates in streams were the lowest in western Wake County watersheds (0 gal/acre/day in Jordan Lake watershed; 2 gal/acre/day in Swift Creek; 3 gal/acre/day in Middle Creek; 0 gal/acre/day in Harris Lake) (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 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 impacts, but there is also a cumulative direct impact from previous crossings and other future crossings. The Town will review the cumulative direct impact in future EAs and EISs.

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

5.10.1.1 303(d)-Listed Streams

Land use changes may impact both water quality and quantity in the Planning Area. These impacts may limit or impede the ability of the NCDENR to prepare and effectively implement management strategies to improve water quality in Section 303(d)-listed waterbodies, which includes Middle Creek, Swift Creek and Williams Creek (NCDENR, 2012a). Swift Creek and Williams Creek were not included in the draft 2014 list and have a TMDL discussed in Section 6 (NCDENR, 2014). Jordan Lake is also listed and a portion of its watershed is within the Planning Area. These waterbodies are currently subject to water quality or aquatic habitat stresses, primarily from stormwater and urban runoff. With the exception of Jordan Lake, these waterbodies are located in areas that are already urbanized and it will likely be difficult to attain a healthy aquatic community there, even with no future development. Increases in runoff may further degrade these waterbodies within the Town's Planning Area.

5.10.2 Groundwater

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 serving residences may be eliminated. These are positive secondary impacts to the groundwater resources of the Planning Area by reducing the demand for groundwater as a source for drinking water and the public health risk of groundwater contamination from leaking or failing septic tanks.

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

A general increase in impervious surfaces may also affect groundwater recharge and the groundwater's ability to maintain stream baseflow during drought conditions. However, Wake County's groundwater study illustrates the lowest recharge rates in the western part of the County. In the Jordan Lake watershed, groundwater recharge ranges from 2 to 4 inches per year. In the Harris Lake watershed, groundwater recharge ranges from 2 to 5 inches per year. This is in comparison to the central and eastern portions of the County, which exhibit recharge rates which range from 7 to 9 inches per year (CDM, 2003).

5.11 Forest Resources

According to Town land use planning data, much of the forested land within the Planning Area will be converted to other uses. Even without the proposed infrastructure, forested land will likely be converted to low-density residential land that would be serviced by wells and septic systems. The majority of the forested lands within the Planning Area are currently a mixture of pine and oak forests.

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.

Impacts to forested lands will be lower in the Jordan Lake watershed because of WSW regulations limiting the amount of built-upon area. The Town's Comprehensive Plan only includes low-density residential development in this watershed, protecting some forest resources, wildlife habitat, and the Town's drinking water supply.

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

5.12 Shellfish or Fish and their Habitats

Degradation of water quality and aquatic habitats can impact aquatic resources, including fish and shellfish 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 non-point source pollutants. These changes may affect a fish community by altering species diversity and/or the number of individuals within a community, thus decreasing the potential for a long-term sustainable healthy fish community. Those species of fish that are less tolerant of habitat stress and pollutants may disappear from a community, causing a decrease in species diversity. This may occur without a change in the overall quantity of fish present. Or both may occur—a community may lose diversity and population.

One of the changes that may impact the community is 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 dependent on riffle habitats may disappear with habitat impacts. Another factor that can change a fish community is 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 helps minimize such impacts. In addition, where culverts are used for road crossings and not buried to sufficient depths, a natural substrate will no longer exist to provide aquatic habitat. In general, these impacts are direct impacts, but there is also a cumulative direct impact from previous crossings and other future crossings. The Town will review the cumulative direct impact in future EAs and EISs.

5.13 Wildlife and Natural Vegetation

Wildlife resources are primarily impacted by habitat impacts. 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 number of wildlife individuals may occur as fewer and fewer acres of suitable habitat remain. This impacts the sustainability of a given species and may decrease species and genetic diversity.

Without proper protective measures in place, impacts to aquatic species and their habitats may also be pronounced. These changes in land use lead to increased sedimentation and can deliver more stormwater pollutants to the system, reduce the stability of stream banks, and cause other significant channel modifications.

Impacts to fish communities were discussed in Section 5.12. Forested areas and habitats were 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 protected 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 within Wake County (USFWS, 2014a). The federally protected bald eagle has been observed within the Planning Area. No Federally-listed threatened or endangered species have been observed within the Planning Area (NCNHP, 2014).

A bald eagle nesting site, which is protected by the Bald Eagle Protection Act, is present near Jordan Lake and Harris Lake but outside the Planning Area. It is unlikely that the bald eagle will be impacted by SCI associated with growth in the Planning Area. The food source for this bird is primarily the fish from the plentiful amount of open water in and near the Planning Area. The Town's stormwater, erosion and sediment control, and riparian buffer ordinances as well as water supply watershed programs should limit impacts to open waters and this species' food sources.

Another species listed within Wake County is the Northern long-eared bat. This species has not been observed within the Planning Area or Wake County according to the NHEO database (NCNHP, 2014). The Northern long-eared bat species is not likely to be impacted by SCI within the Planning Area as the primary threat to the species is white-nose syndrome.

The FSC Atlantic pigtoe was located in Middle Creek during the 2004 CZR mussel survey (CZR, 2004). The Atlantic pigtoe was observed on Middle Creek and Swift Creek both downstream of the Planning Area in 2001 and 2012 respectively according to NHEO database (NCNHP, 2014). No dwarf wedgemussel individuals were located within the Planning Area during the CZR survey (CZR, 2004). In addition, no dwarf wedgemussels were found during a survey conducted in 2001 in downstream areas of Middle Creek from roughly 1,500 feet upstream of SR 1006 to SR 1330 in Johnston County (CZR, 2001). The NHEO database indicates no dwarf wedgemeussels have been observed within the Planning Area but were observed in 2012 on Swift Creek, downstream of the Planning Area (NCNHP, 2014). Impact from proposed infrastructure to mussel species is possible but would be limited by mitigation strategies described in Section 6, as well as by the impoundments on Swift Creek, which would protect downstream species.

Other state-listed mussel species are present within the Planning Area. For these aquatic species to survive, their aquatic habitats and associated host fish communities must be preserved. Methods to address and mitigate SCI that may affect water quality and aquatic habitats of these species are presented in Section 6.

Michaux's sumac to date has been located only elsewhere in Wake County, but no known occurrences of the plant have been recorded within the Planning Area (NCNHP, 2014). Therefore, it is unlikely that this species will be impacted by SCI within the Planning Area. However, since it 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 that found along utility lines. Thus, the Town will evaluate the potential for impacts to this species in 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				
Aimophila aestivalis	Bachman's sparrow	FSC	Historic	Not likely to be impacted
Ambloplites cavifrons	Roanoke bass	FSC	Current	Not likely to be impacted
Anguilla rostrata	American eel	FSC	Current	Not likely to be impacted
Etheostoma collis lepidinion	Carolina darter	FSC	Probable/ potential	Not likely to be impacted
Haliaeetus leucocephalus	Bald eagle	BGPA	Current	Not likely to be impacted
Heterodon simus	Southern hognose snake	FSC	Obscure	Not likely to be impacted
Lythrurus matutinus	Pinewoods shiner	FSC	Current	Not likely to be impacted
Myotis austroriparius	Southeastern myotis	FSC	Historic	Not likely to be impacted
Myotis septentrionalis	Northern long-eared bat	P	Current	Not likely to be impacted
Noturus furiosus	Carolina madtom	FSC	Current	Not likely to be impacted
Picoides borealis	Red-cockaded woodpecker	E	Historic	Not likely to be impacted
Invertebrates				
Alasmidonta heterodon	Dwarf wedgemussel	E	Current	Possible impact

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*
Elliptio lanceolata	Yellow lance	FSC	Current	Possible impact
Fusconaia masoni	Atlantic pigtoe	FSC	Current	Possible impact
Lasmigona subviridis	Green floater	FSC	Current	Possible impact
Insects				
Speyeria Diana	Diana fritillary	FSC	Obscure	Not likely to be impacted
Plants				
Lindera subcoriacea	Bog spicebush	FSC	Current	Not likely to be impacted
Monotropsis odorata	Sweet Pinesap	FSC	Historic	Not likely to be impacted
Rhus michauxii	Michaux's sumac	E	Current	Not likely to be impacted
Sagittaria weatherbiana	Grassleaf arrowhead	FSC	Historic	Not likely to be impacted
Trillium pusillum var. *pusillum*	Carolina least trillium	FSC	Current	Not likely to be impacted

* 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 be lost if adequate protection is not available.

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 occurrence 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 residential land served by wells and septic systems. This conversion would likely result in many of the same impacts to natural vegetation and habitat described above.

Trees and vegetation are integral to habitat protection, air quality improvement, control of surface water runoff, and temperature moderation. The Town's UDO includes a provision for tree protection as described in Section 6.

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 entering the sewer system and reaching the WRF.

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 amounts of traffic and urban uses in the receiving basin increase, 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 into surface waters, this urban stormwater could impact the water quality and sensitive species living within the receiving basin.

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 SCI within the Planning Area, to be Addressed by Permitting and Mitigation

Environmental Resources	Potential for SCI	Types of SCIs
Topography and Floodplains	LI	Limited commercial development could occur in floodplain with special use permit; this could result in reduction in water storage capacity, habitat, surface water filtration, and infiltration.
		Isolation of floodplain from stream by channel entrenchment;
Soils	PI	Soil erosion and compaction from new development
Land Use	PI	Conversion of agricultural and forested land uses to mainly residential land uses
Wetlands	LI	Wetlands loss results in loss of habitat, habitat fragmentation, reduction in genetic diversity, and loss of attenuation of flow
		Loss of wetland function through pollutant loading
Prime or Unique Agricultural Land	PI	Conversion to other uses
Public Lands and Scenic, Recreational Areas, and State Natural Areas	LI	Possibility of conversion of adjacent land uses
Archeological and Historical Resources	LI	Possibility of conversion of adjacent land uses
		Structural damage due to acid rain and vibrations
Air Quality	PI	Reduction in air quality due to increased vehicular traffic
		Reduction in air quality benefits of trees
		Negative impacts to human health (i.e. asthma)
		Acid rain
		Reduced visibility
Noise	PI	Increase in overall noise level in Planning Area

TABLE 5-4
Areas of Potential SCI within the Planning Area, to be Addressed by Permitting and Mitigation

Environmental Resources	Potential for SCI	Types of SCIs
		Negative impacts to human health
Surface Water Resources	PI	Water quality degradation; increase in stormwater runoff
		Alteration of natural hydrograph (i.e. magnitude, timing, frequency, duration, rate of change); lower and more frequent low-flow conditions; alteration of channel morphology
Groundwater Resources	LI	Reduction in use for drinking water; potential to become contaminated
		Groundwater inflow providing baseflow in streams and support of aquatic life during droughts may be reduced
Forest Resources	PI	Conversion to other uses
		Reduction in air quality; increase in near-surface air temperature; habitat fragmentation
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; dispersal distance to suitable habitat; reduction in potential for long-term population sustainability
Wildlife Resources and Natural Vegetation	PI	Reduction in available habitat
		Habitat fragmentation; reduction in genetic diversity; reduction in species tolerance; increased dispersal distance to suitable habitat; reduction in potential for long-term population sustainability
Toxic Substances	LI	Increase in likelihood of contamination
		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 application

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SECTION 6

Mitigation for Secondary and Cumulative Impacts

The Town of Apex is growing rapidly as a result of the overall healthy economic conditions in the region and is specifically fueled by continued job growth in the Research Triangle area. As a result of higher wages brought on by this economic growth and the proximity to RTP, the Town has experienced a steady influx of new workers and residents. Continued population growth is anticipated. The Town places a high priority on preserving its natural and historic features in order to maintain its unique identity. It contains a newly restored downtown, complete with specialty shops, family restaurants, and many historic buildings. The Town retains its small-town character through land use planning in a region that is experiencing rapid growth.

The mission of the Town's Planning Department is to provide coordinated guidance and regulation of the growth and development of the Town through the review of subdivision and site development plans; the creation and implementation of long-range land use, transportation, electrical distribution system, and hazard mitigation plans; and the enforcement of the Town's UDO. The Planning Department is committed to ensuring quality development within the Town that protects environmentally sensitive areas, provides for adequate transportation networks, promotes economic vitality, provides quality housing at affordable prices, and promotes a sense of community that is compatible with the small town character of the Town.

The Town is working to address environmental concerns related to open space, utility infrastructure, transportation, and stormwater. The Town has implemented programs to direct growth to its Town Center, preserve open space, protect floodplain and riparian buffers, and maintain water quality through aggressive erosion and sediment control 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

Several federal and state regulations and programs will mitigate the impacts related to growth. These include: the Endangered Species Act (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 WSW Protection Program, the Clean Water Management Trust Fund (CWMTF), and the Ecosystem Enhancement Program (EEP). Table 6-1 summarizes these programs and indicates whether local involvement is needed to fully implement them. Where local programs are needed to implement the state and federal regulations/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 (ESA)		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				
Sanitary Sewer Overflow Regulations.		X	X	X	X	X		X		X
NPDES Stormwater	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 Cultural Environment			X							
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)				
Ecosystem Enhancement Program (EEP)		X		X	X	X				
Groundwater Protection			X					X		X
Neuse River Basin Nutrient Sensitive Water (NSW)	X	X		X	X	X				
Jordan Lake Nutrient Management Strategy	X	X		X	X	X				
Water Supply Watershed (WSW) Protection Program	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(16 U.S.C. 1531-1544, 87 Stat. 884), enacted in 1973 conserves ecosystems upon which threatened and endangered species of fish, wildlife, and plants depend, through federal action and state programs. The ESA:

- Authorizes the determination and listing of species as endangered and threatened.
- Prohibits unauthorized taking, possession, sale, and 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 carried out 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 the Fish and Wildlife Coordination Act is to prevent or minimize impacts to wildlife resources and habitat due to 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

In 1972, 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 401 of the CWA requires certification that a project does not violate the state's water quality standards as administered by NCDENR.
- Section 404 of the CWA established a program to regulate the discharge of dredged and fill material into waters of the U.S., including wetlands.

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 developed a TMDL for the upper New Hope Creek arm of Jordan Lake and a nutrient management strategy for other portions of the lake. This 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 other TMDLs as they are developed. In addition, the Town will work with NCDWR on management strategies developed for impaired waters within its jurisdiction. For example, when the EEP recently developed a management plan for the Swift Creek watershed; the Town met with EEP to discuss the results of the plan and locations of planned best management practices (BMPs). The Town has worked with NCDWR and EEP to implement that plan as funding becomes available.

6.1.3.2 Sections 404 and 401 of the Clean Water Act

Two main regulatory programs currently regulate impacts to jurisdictional waters, including streams and wetlands in the project area, both of which originate from the CWA: Section 404, regulation of dredge and fill activities (which is administered by the USACE), and Section 401, certification that a project does not violate the state's water quality standards (which is administered by NCDWR). All private and public construction activities over a specific acreage that affect jurisdictional waters or stream length are required to obtain certifications and permits from NCDWR (Section 401 WQ Certification) and USACE (Section 404 Permits), respectively.

The state's 401 Water Quality Certification Program and the federal 404 Wetlands Protection Programs protect jurisdictional waters by requiring avoidance and mitigation for wetlands and streams across the state. However, it is possible for permits to be issued under both the state and federal programs that 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) the water body, including adjacent wetlands, has 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 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 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 leaking sewer lines and malfunctioning pump stations within 24 hours. NCDWR adopted policies that include strict fines and other enforcement programs to protect surface water quality from wastewater spills.

For public health, environmental, and regulatory reasons, reducing sanitary sewer overflows (SSOs) is a high priority for the Town, as it is for the State of North Carolina. The Town seeks not only to comply with the minimum requirements regulating its operations, but also to take measures to continue along its process of improved compliance so as 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. Apex currently operates its collection system under a NCDWR System-Wide Wastewater Collection System Permit mostly recently renewed in January 2010.

6.1.3.4 NPDES Stormwater Regulations

NPDES stormwater discharges are controlled by federal NPDES regulations, and enforced by NCDEMLR. 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 six municipal separate storm sewer systems (MS4s) in North Carolina with populations exceeding 100,000 at that time (and thus, did not include the Town). The NPDES Phase II rules were finalized on October 29, 1999, and published in the Federal Register on December 8, 1999. Under NPDES Phase II regulations, the Town of Apex was required to develop and implement a stormwater management program.

For the post-construction runoff control, NCDEMLR requires local governments subject to NPDES Phase II to require new developments where density exceeds 24 percent built-upon area to implement stormwater BMPs. These BMPs must control and treat the difference in

stormwater runoff volume leaving the project site between the pre- and post-development conditions for the 1-year, 24-hour storm. In addition, the BMPs must achieve 85 percent reduction in total suspended solids (TSS) loading.

In 2006, the North Carolina General Assembly enacted Session Law 2006-246 to provide for the implementation of NPDES 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 Session Law requires that new development and redevelopment in these areas meet the post-construction requirements of the NPDES Phase II stormwater management program requirements beginning on 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 NPDES Phase II stormwater management program beginning on July 1, 2007. The post-construction stormwater permit conditions, included in permits issued by NCDEMLR or other delegated agency, 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 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, discussed in more detail later in this section.

The Town renewed its NPDES Phase II permit, effective November 2011 (Appendix F). The Town's stormwater programs are discussed further in Section 6.2.

6.1.4 Protection of Wetlands, Executive Order 11990

Executive Order 11990 (Protection of Wetlands) was issued 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 working to preserve and enhance the natural and beneficial values of wetlands. Federal projects must avoid wetland impacts to the extent possible 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 within the state's boundaries. According to NCDWR, 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 requirements 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 responsible for ensuring the integrity of water delivery systems and informing 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 NAAQS 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. 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 NAAQS nonattainment area to attainment for that NAAQS (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 their revisions by October 28, 2011. North Carolina made its revised boundary recommendations based on the 2009-2011 data. These data did not show non-attainment of the ozone standard for the Triangle area. On December 8, 2011, the USEPA sent North Carolina its response, stating that the agency intended to support North Carolina's recommended area designations and boundaries for all areas (NCDENR, 2013a).

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 vehicles and lawn equipment, and using lawn equipment in the evening.

The Clean Smokestacks Act of 2002 required coal-fired power plants to achieve a 77-percent reduction in NOx emissions by 2009. NOx 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 Clean Smokestack Act, utility companies must achieve these emission reductions 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 emission reductions (NCDENR, 2009).

In 2013, North Carolina had its lowest ozone levels since air monitoring began in the early 1970s. The declining ozone levels coincided with lower emissions from the state's power plants. The state's coal-fired power plants have reduced their NOx 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 strict 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 a floodplain. Federally supported projects that directly impact floodplains need to consider alternatives which avoid the floodplain.

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 it 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 is presented in Section 6.2.

6.1.10 Wild and Scenic Rivers Act

The Wild and Scenic Rivers Act charges 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 should be preserved for the benefit and enjoyment of future generations. The Wild and Scenic Rivers Act prescribes the method for designating standards for selection of rivers to be protected under this policy. Rivers protected under the Wild and Scenic Rivers Act are classified in 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. Watershed 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, 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, as well as protecting historical and archaeological data that could potentially be lost due to:

- 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 NHPA 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). The NHPA gives responsibility to the NCSHPO to develop 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

EO 11593 (Protection and Enhancement of the Cultural Environment) 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 within 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 will 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 to unnecessary and irreversible conversion of farmland to non-agricultural uses. The Farmland Protection Policy Act, enforced by 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 one or more acres of land. Control measures must be planned, designed, and constructed to protect 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. The Town enforces its own Erosion and Sediment Control Program. This program is discussed further in Section 6.2.

6.1.14 North Carolina Clean Water Management Trust Fund

The 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, recreational benefits as well as acquiring lands of cultural and historic significance.

CWMTF monies could be used 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, and to protect water quality and sensitive aquatic species.

The Town partnered with the CWMTF and Wake County Open Space to acquire 45.8 acres of undisturbed land along a tributary of Beaver Creek. A conservation easement has been placed on the portion of the property along the tributary to protect water quality by protecting the riparian buffer and floodplain areas.

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 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.

The Town will work with EEP to implement plans EEP develops within its jurisdiction. For example, EEP developed a management plan for the Swift Creek watershed; the Town met with EEP to discuss the results of the plan and locations of planned BMPs. The Town will work with EEP to implement that plan as funding becomes available.

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 programs.

6.1.18 Neuse River Basin Nutrient Sensitive Waters 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 overenrichment, 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 Natural Resources Conservation Service (NRCS) or the most recent version of 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 watershed's ecological integrity.

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.

Rules specific to the Town are discussed further in Section 6.2.

6.1.19 Jordan Lake Nutrient Management Strategy

The Jordan Lake Nutrient Management Strategy (Jordan Rules) was developed to restore and maintain nutrient-related water quality standards in Jordan Lake 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 reservoir's designated uses. To meet the requirements of the TMDL, the Jordan Rules split 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

There are specific nutrient reduction targets for each of these arms. These are expressed as loading targets as well as percent reductions compared to the estimated annual average load from 1997 through 2001. A portion of the Town falls within the Lower New Hope Arm, which has the following percent reduction requirements:

- Lower New Hope Arm – no increase in nitrogen or phosphorus compared to the baseline 1997 through 2001 levels.

The Jordan Rules also has specific guidance for both point and nonpoint sources, including agriculture and existing development and new development. In general, the agriculture and existing development rules require achievement of the percent reductions as an aggregate from that source, i.e., existing development in the Lower New Hope Arm watershed as a whole must have no increase in nitrogen load. New development has specific loading targets similar to those in the Neuse River Sensitive Waters Rules. They are as follows:

- Lower New Hope Arm - limit nitrogen unit area mass loading from new development to 4.4 lb/ac/yr and limit phosphorus unit area mass loading from new development to 0.78 lb/ac/yr.

Developers have the option to offset their nitrogen loads by funding offsite management measures. Residential development must first achieve 6 lb/ac/yr and then can buy down the difference. Commercial development may buy down after achieving 10 lb/ac/yr. Implementation of the Jordan Rules regarding nutrient management has been delayed by the state until 2016 to allow for the completion of a pilot in situ nutrient management study. The 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, pond and reservoirs. The portion of the regulation relating to buffers was not put on hold. The application of the Jordan Rules by the Town is discussed in Section 6.2.

6.1.20 Water Supply Watershed Protection Program

The EMC and NCDWR have administered the WSW Protection Program since 1986. Initially, the program was administered voluntarily by counties and municipalities pursuing

protective measures for their WSWs. The measures included limitations on the number and type of wastewater discharges that were allowed in the WSWs.

In 1989, the North Carolina General Assembly ratified the WSW Protection Act, codified as General Statutes 143-214.5 and 143-214.6. This WSW Protection Act mandated the EMC to adopt minimum statewide water supply protection standards by January 1, 1991, and to reclassify all existing surface WSWs 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 Non-Point 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 NCDWR Water Quality Program manages the WSW Protection Program through oversight of local planning ordinances and monitoring of land use activities. Local WSW programs must be approved by the EMC. The WSW Protection Program requires local governments to adopt a number of land use controls and limitations based on watershed classifications. Specifically, this program:

- Limits impervious surfaces around water supplies unless stormwater controls are used.
- Requires protection of riparian buffers (100-foot buffers in all development that exceeds the low-density option, or 30-foot 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 Protection Program have a classification of WS-I through WS-V, where WS-I has the most restrictive controls.

A portion of the study area is within the Swift Creek WSW. The state has developed watershed protection overlays and restrictions associated for development in this watershed. These regulations are in line with the Swift Creek Land Management Plan developed by the County and local governments with jurisdiction in the Swift Creek watershed in 1988 which is included in Appendix F. The local application of these rules is described further in Section 6.2.

Another portion 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 forth in 15A NCAC 02B .0216, including use as a source of water supply for drinking water, culinary, and food processing purposes; and maintenance or enhancement of protections currently implemented by local governments in existing WSWs. 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. The USDA and NCDENR, with the participation of the Natural Resources Conservation Service, the Farm Service Agency, the EEP, and the CWMTF, have protected 5,000 acres of buffers and conservation areas in the Jordan Lake watershed. The Conservation Reserve Enhancement Program is also available in the Neuse River basin. This program uses financial incentives to encourage farmers to voluntarily remove sensitive land from agricultural use or implement BMPs.

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.

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. To meet these goals, it has established the following:

- Parks, Recreation, Greenways, and Open Space Master Plan; with emphasis on protecting important habitat areas and water quality (2013)
- Comprehensive Plan and Land Use Map (2013)
- Western Area Land Use Plan (2008)
- NC 540/Western Wake Freeway Land Use Plan (2011)
- Apex Transportation Plan Update (2011)
- CIP for electricity distribution system

The Town also has created a comprehensive UDO which encompasses the Town's riparian buffer protection program, floodplain program, erosion and sediment control program, and stormwater program to protect natural resources. This UDO includes the allowance of cluster development to encourage higher density in parts of a given development and greater preserved open space in other areas. These plans are implemented through the subdivision and/or site plan approval process. Table 6-2 summarizes the programs that impact development procedures, and Table 6-3 illustrates the environmental resources protected by the various Town programs; sections following the table provide additional detail on each program.

TABLE 6-2
Summary of Existing Local Programs

Program	Summary
Riparian Buffers UDO 6.1.11 UDO 6.1.7	UDO 6.1.11 requires 100-foot riparian buffers along perennial streams and 50-foot riparian buffers along intermittent streams. The perennial stream buffers have 3 zones: Zone 1 (inner 30 feet); Zone 2 (the next 20 feet), and, where applicable, Zone 3 (the outer 50 feet). Zones 1 and 2 shall be undisturbed except for allowed uses designated in the UDO. Intermittent stream buffers have 2 zones: Zone 1 (inner 30 feet) and Zone 2 (the outer 20 feet). These zones shall be undisturbed except for allowed uses designated in the UDO. The perennial or intermittent stream classification is determined by the most recent version of a USGS quadrangle topographic map and/or Soil Survey for Wake County. In the event of discrepancy, the classification requiring the most stringent buffer would apply. In waters that are not classified as water supply, the Town allows the buffer width to be averaged. Under this scenario, the minimum width along any point on the stream is 50 feet, but the average buffer width must be 100 feet. Allowing buffer widths to be averaged may result in wider buffers along steep slopes or along floodplains. For lakes and ponds, 100-foot vegetated buffers are required if the lake or pond joins with a perennial stream; otherwise, a 50-foot vegetated buffer is required if the lake or pond joins with an intermittent stream. Riparian buffers must be identified on final recorded plat maps.
Floodplain Protection UDO 6.2.16 UDO 6.2.17 UDO 6.2.18 UDO 6.2.19	UDO Section 6.2.16 does not allow residential or non-residential development in the 100-year floodplain. No encroachments, including fill, are permitted in the floodway. UDO Sections 6.2.16 and 6.2.19 require that the bottom floor be elevated 2 feet above base flood elevation on FEMA-mapped streams for commercial, industrial, or nonresidential structures. UDO Section 6.2.17 states that where base flood elevations are unknown, the Town allows no encroachments, including fill, within 20 feet of the top of the stream bank or within a distance of 5 times the stream width, whichever is greater, unless a Professional Engineer certifies that the encroachment will not result in an increase in the base flood level. When base flood elevation data or floodway data are unknown, or for developments greater than 5 acres or with more than 50 lots, a hydraulic report must be submitted that defines the base flood or floodway elevation. UDO Section 6.2.18 requires that all residential lots be platted outside of floodplains.
Erosion and Sediment Control Program Town Code Chapter 5, Article X, Sec. 5-140 to 5-162	The Town has a delegated Local Program for enforcement of the state's Soil Erosion and Sedimentation Control standards. Sediment and erosion control practices support an overall stream protection plan by limiting in-stream suspended sediment and sediment deposition. A permit is required for land-disturbing activity over 20,000 square feet. The Town does not allow any land-disturbing activity in proximity to a lake or natural watercourse unless erosion and sedimentation control measures are present. An undisturbed buffer may be used, provided the undisturbed zone width is sufficient to confine visible siltation within the 25% of the undisturbed zone nearest the land-disturbing activity. The Town requires tree protection fencing and silt fencing as erosion and sediment control measures, along with perimeter ditches or perimeter swales, if practical. Soils are stabilized as rapidly as possible by establishing a grass cover or mulching and tacking. The Town requires this to occur in a maximum of 7 calendar days for slopes (14 calendar days for non-slopes), in accordance with the NPDES Stormwater General Permit NCG010000 for construction-related activities The 25-year storm event is the minimum design standard for planning, designing, and construction of erosion and sedimentation control measures, structures, and devices. The Town requires a performance guarantee of $2,500 per disturbed acre. Phased construction is 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

TABLE 6-2
Summary of Existing Local Programs

Program	Summary
	phases. The largest phase size of 5 acres is recommended. The angle for graded slopes and fills shall be no greater than the angle, which can be retained by vegetative cover. A Preconstruction Conference is required for all new projects. Contractors and owners are required to be present along with staff who will be involved in the project. A final "Site Inspection" is required prior to issuance of a Certificate of Completion for all residential and non-residential structures. At this inspection, environmental staff reviews the site for sufficient groundcover, stabilization, buffers, and installation of stormwater devices prior to approving a letter of completion. No performance guarantee is released until a certificate of completion is issued. The Town also encourages contractor education and training related to erosion and sediment control.
Stormwater Program and Impervious Surface Limitations UDO 6.1.12 and UDO 6.1.7 Standard Specifications and Standard Details Town Code Chapter 12, Article VIII	The Town maintains a strict policy of not allowing unnecessary piping of stormwater. Stormwater from residential lots and other pervious surfaces is made to flow by way of grass-lined swales instead of pipe where possible. The pre-development peak runoff rate must be maintained for the 1-year, 24-hour storm and the 10-year, 24-hour storm. Detention volumes stored to reduce peak flows shall drain within 72 hours to allow for subsequent storms. (UDO 6.1.7) A stormwater impact statement showing the impacts of the proposed development to the confluence point downstream where the area of the proposed development is less than 10% of the total drainage area is required. The impact statement ensures the downstream hydrograph peaks do not increase for a given storm. If backwater from detention appears to be a problem, then the potential effects on upstream properties for the 100-year, 24-hour storm must be considered. (UDO 6.1.7) Drainage structures in the flood plain should pass 100-year storm without over-topping the roadway -- or in the alternative, the structures may be designed to pass only the 25-year event, in which case, the downstream roadway embankment shall be fully protected from the residual flow which may overtop the roadway during a 100-year event (Standards Specifications and Details Manual, Section 500). The Town's NPDES Phase II Stormwater permit was renewed, effective November 1, 2011. The NPDES Phase II program will regulate discharges of stormwater to surface waters and will require control of suspended solids, fecal coliform and nutrients town-wide. The Town has impervious surface limitations that range from less than 12% (low density) to 70%. However, RCAs are required. Under NPDES Phase II, any development that exceeds 24% will be required to implement stormwater BMPs. The Town's requires stormwater controls on any development that exceeds 12%. The Town maintains a map of all structural BMP structures, per requirements of the NPDES Phase II permit The Town requires the submittal of BMP as-built supplement forms, in addition to as-built drawings, requiring the engineer to certify that all aspects of the structural BMP were installed in accordance with approved drawings (Standard Specifications and Standard Details). The Town requires both a performance and maintenance guarantee requirement for BMPs, in the amount of 125% and 25%, respectively, of the total construction cost of the BMP. The performance guarantees run until the Town gives final approval of the required BMP and the maintenance guarantee runs for one year after the final approval (UDO 6.1.12). The owner of each stormwater control structure shall submit a Maintenance Inspection Report annually, conducted by a qualified professional, licensed in the state of North Carolina. The Town has an Illicit Discharge Detection and Elimination (IDDE) program including a provision for assessing civil penalties on violators, as a part of the NPDES Phase II permit (Town Code Chapter12, Article 8) Street sweeping occurs once every month in the Swift Creek watershed and once every 3 months in the remaining jurisdiction. The Town has an active stormwater education program.
Open Space	Developers are required to set aside 1/20 to 1/35 acre for each dwelling unit or lot.

TABLE 6-2
Summary of Existing Local Programs

Program	Summary
UDO Section 3 (Zoning Districts)	The Town encourages cluster development by allowing cluster subdivision designs without going through the variance process.
UDO Section 8.1.2 (Resource Conservation Area)	Total Resource Conservation Area must be at least 20% to 25% of the site acreage for residential and non-residential new development.
UDO Section 7.3 (Parks, Recreation and Open Space Sites)	Planned Unit Developments (PUDs) are required to preserve 10% of the development as open space, and required landscape and riparian buffers cannot be included as part of this open space dedication.
	The Western Area Plan guides preservation of historic rural and open spaces in the western portion of the Planning Area.

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 Protection
Comprehensive Plan	X	X	X	X	X
Open Space 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	X
Parks, Recreation, Greenways, and Open Space Master Plans	X	X	X	X	X
Riparian Buffers and Floodplain Protection	X	X	X	X	X
WSW Protection	X	X	X		
Erosion and Sediment Control		X	X		
Stormwater and Impervious Surface Limitations		X	X		
Water Conservation		X	X		
Air Pollution Prevention				X	X
Tree Protection	X	X	X	X	X
Energy Load Management Program				X	

6.2.1 Growth Management

The Town has developed a Comprehensive Plan, Peak Plan 2030, and corresponding 2030 Land Use Map, lays the foundation for achieving many of its goals and objectives. The Town Council adopted this plan August 6, 2013. The Comprehensive Plan seeks to identify the specific issues facing Apex and conveys a vision for its future. The Comprehensive Plan

provides a framework for incorporating ongoing projects and new initiatives within a larger management strategy and serves as a guide for long-range planning, revision of local development regulations and review processes, and infrastructure investment. The Comprehensive Plan includes information on land use, growth management, economic development, capital facilities planning, transportation, open space, and historic resources (LandDesign, 2013).

The Comprehensive Plan establishes goals for the future of Apex. These goals were used to guide the development of the Comprehensive Plan:

- Balanced growth supporting a greater diversity of uses in the Town
- Infrastructure that helps achieve land use and growth management objectives
- Preservation of the Town's character
- A diversified economy that encourages entrepreneurs, supports existing businesses, and attracts new employers
- Walkable, mixed-use developments and pedestrian-oriented streets that encourage active lifestyles by integrating physical activity into daily routines
- Employment centers in the Town
- Enhancement and extension of downtown
- Preservation of historic places and cultural resources
- Transition between new development and existing development
- Protection of environmental and natural resources
- A variety of transportation options to enhance mobility
- A well-connected pedestrian and bicycle network
- A variety of housing types available to a range of incomes

The Comprehensive Plan contains a section of recommendations and implementation issues related to 11 areas: Balanced Growth; Placemaking; Housing; Economic Development; Water and Wastewater Infrastructure; Public Services and Facilities; Parks, Recreation Facilities; Greenways and Open Spaces; Environmental and Natural Resources; Transportation; and Historic and Cultural Resources. The primary tool for implementation of these recommendations is the UDO.

Balanced growth is critical to maintaining the Town's small-town character. The Town is using the development and implementation of small area plans, The Comprehensive Plan, and the 2013 Land Use Map, to define areas that will serve as major destinations within the Town and accomplish placemaking. Placemaking, also referred to as creating a "sense of place", is a type of planning that involves creating public spaces that provide the amenities, resources, and opportunities desired, focusing on unique community assets. In the balanced growth area, the key recommendations and implementation strategies are:

- Revise the UDO to ensure its regulations support the 2013 Land Use Map.
- Encourage non-residential and mixed use land uses through zoning mechanisms to achieve a more sustainable, balanced tax base.
- Support a mix of residential development types at varying densities in accordance with the 2013 Land Use Map.
- Develop and adopt small area plans to promote growth around downtown, Midtown/55, and the Center Street/Schieffelin Road area.
- Support economic development through new industrial/business/office park sites, infrastructure development, and completion of the Apex Peakway and implementation of the Apex Transportation Plan Update (Town of Apex, 2011a).
- Direct infrastructure investments to support balanced growth goals.
- Protect open spaces and the natural environment while linking communities through alternative forms of transportation, including greenways, bicycle paths, and protection of the tree canopy.
- Continue to protect historic resources in the Town.

Specific recommendations related to balanced growth through housing strategies include the following:

- Encourage both vertical and horizontal integration of uses in mixed-use districts, with an emphasis on pedestrian linkages.
- Accommodate a mix of housing by type (e.g. single-family homes, townhomes, multi-family) and tenure (own/rent) to serve a growing and increasingly diverse population.
- Encourage density increases that do not alter the character of downtown through lot size changes and coverage modifications, cottage and cluster housing development models, and accessory units.
- Allow and encourage residential development, especially rental housing, above commercial uses in the downtown area.
- Facilitate the reuse of abandoned, vacant, and tax-delinquent properties for workforce housing.
- Amend ordinances to permit cottage housing or other alternative housing models in appropriate locations to provide housing options for a variety of age and income groups.
- Give additional consideration to providing housing options for Baby Boomers who wish to age-in-place. This includes owner and renter options within close proximity to retail and medical services.
- Encourage weatherization of existing homes to improve energy-efficiency and reduce utility costs.

- In order to improve and maintain existing public spaces in neighborhoods, consider starting a Neighborhood Improvement Grant program that provides matching funds for aging neighborhoods without Homeowner Associations and for those with expired covenants.

In 2004, the Town developed a small area land use plan in response to development pressure at the South Salem Street and NC 540 interchange area. The plan depicts the area as an activity center with compact development of mixed retail, office, and residential uses, allowing for preservation of more open land and for multi-modal access (Town of Apex, 2004). The Town developed a future land use map for the NC 540 corridor area in recent planning efforts (Town of Apex, 2011b). Appendix D includes a land use map for the NC 540 corridor.

In 2008, the Town developed a small area land use plan for the western part of the Planning Area (Western Area Plan) in response to development pressure. The purpose of the plan is to guide development as well as identify opportunities for preservation of rural and historic areas (Town of Apex, 2008). The Town also develops zoning maps identifying large developments within the Planning Area (Town of Apex, 2009). Both the Western Area Plan and Large Development Zoning map are found in Appendix D.

The Town's zoning classifications include a conditional district for sustainable development, which encourages several aspects of sustainable development, including transit-oriented development, preservation of natural resources, and efficient use of energy and materials.

6.2.2 Open Space Preservation

The Town has several programs to guide the preservation of open space. These include the Parks, Recreation, Greenways, and Open Space Master Plan, the Comprehensive Plan, the UDO, and other initiatives. Each of these initiatives is described below.

6.2.2.1 Parks, Recreation, Greenways, and Open Space Master Plan

The current Parks, Recreation, Greenways, and Open Space Master Plan was formally adopted by the Town Council in June 2013. It sets forth a plan of action to identify and protect the Town'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. The 2013 Parks, Recreation, Greenways and Open Space Master Plan Map (Appendix G) illustrates additional areas planned for preservation within the Town's ETJ (Sage Design and Alta/Greenways, 2013).

Resident surveys were conducted by the Town's Parks, Recreation, and Cultural Resources Department, and the Parks Advisory Commission, to identify resident priorities. The survey consisted of 23 questions, inviting an open-ended response, tailored to capture user needs regarding several areas, including access to parks and greenways via bicycling and walking, as well as preferred areas for additional greenways and open space. Building from this stakeholder input, the following measures of success were developed:

- Provide recreational opportunities that suit residents' needs within a service area.
- Create a park system that residents can access by walking, biking, and driving.

- Provide recreational opportunities that promote an "active" lifestyle to maintain a high quality of life in the Town.
- Provide opportunities for residents to enjoy natural, historical, and cultural resources, and protect these resources for future generations.
- Ensure residents are satisfied with the types of facilities available, as well as their condition and maintenance.

Four categories were established for implementation of the plan: Facilities, Programs, Greenways, and Land Acquisition. The plan established immediate, near-term, and long-term needs with a focus of acquisition of land in four underserved areas.

The Town's Open Space system currently contains 265 acres of developed parkland, which includes 13 parks ranging in size from 1 acre to 158 acres and over 13 miles of greenways. The Town partnered with the CWMTF and Wake County Parks, Recreation, and Open Space Department to acquire 45.8 acres of undisturbed land along a tributary of Beaver Creek. A conservation easement has been placed on the portion of the property along the tributary to protect water quality. The Town owns another 160 acres of land adjacent to that property that is being developed primarily for passive recreation (Apex Nature Park) and will further protect the waters of Beaver Creek from the pressures of development. The emphasis of the park will be stormwater management, wildlife and nature education, and open space preservation. The site also will have a strong emphasis on preserving water quality due to the amount of protected wetlands and riparian buffers and protection of the Beaver Creek corridor. The park is expected to open in 2014, with additional phases planned for near-term implementation, including athletic fields and an environmental center.

More than 17 miles of multi-use paths and greenways are being planned to connect open space and create a destination-based greenway system, as illustrated in the Comprehensive Plan and the Parks, Recreation, Greenways and Open Space Master Plan. To add connectivity to the Apex Nature Park, a 1.2-mile greenway is planned to connect to the Kelly Road Park, and the Apex Barbecue Road Greenway is planned from the Nature Park to Salem Street downtown. Another 2.3-mile portion of the Beaver Creek Greenway is planned to connect to the ATT. Additional regional greenways planned include Middle Creek Greenway along NC 55, which will connect to the Town of Holly Springs greenway network, and White Oak Creek Greenway in partnership with the Town of Cary to connect to the ATT. Other longer-term greenway goals include further development of the Bond Park Connector Greenways, Reedy Branch Greenway, Green Level Church Multiuse Path, and other greenways in the underserved southeast and northwest areas of Town (Sage Design and Alta/Greenways, 2013).

6.2.2.2 Bond Referendums

The Town passed a Parks Bond Referendum in November 2004 with 87 percent approval. It provided $13 million and will assist with implementation of the Parks, Recreation, Greenways, and Open Space Master Plan and the Town's current plan for downtown revitalization. Five major potential projects are currently identified and completed to various degrees:

- Completion of the Beaver Creek Greenway, connecting downtown to the ATT (currently connects to Kelly Road Park; future phases will connect it to the Nature Park and ATT)

- Completion and/or retrofitting of greenways in Haddon Hall and Beckett Crossing (completed)
- Construction of the 160-acre Nature Park, opened March 2014 (future phases will include an environmental center)
- Expansion of the current Community Center (completed)
- Renovation of the original Town Hall into a Cultural and Performing Arts Center (completed)

In addition to Town actions, Wake County passed a $26 million open space preservation referendum in November 2004. The focus of this referendum was open space preservation to continue efforts to protect water quality throughout the county. This was the second such bond referendum for the County, with voters having approved a similar $15 million referendum in 2000. As a result of these referendums, the Town of Apex received approximately $1.2 million in support from the County to purchase and preserve over 100 acres in southwestern Apex incorporated into the 160-acre Nature Park. With the help of the CWMTF and the Trust for Public Land, Town and County staff are continuing to pursue opportunities to add additional acres to this project.

6.2.2.3 Land Use Planning

The Town's Comprehensive Plan and 2030 Land Use Map direct growth to the Town Center and along other growth corridors, which will aid in the protection of open space. The Comprehensive Plan incorporates open spaces in each land use type, including mixed uses. Community spaces, pocket parks, and recreational areas are encouraged. The Comprehensive Plan encourages more dense development in certain areas while allowing for preservation of more open spaces. These areas designated for more dense development are balanced with the planned low-density residential development and preserved open spaces in the southwest portion of the Planning Area. Further detail regarding the Comprehensive Plan is included later in this section.

6.2.2.4 Unified Development Ordinance

The UDO includes regulations for new developments that preserve open space. New development must dedicate a portion of the land being developed for the purpose of providing parks, recreation, or open space for the future residents of the area (1/20 to 1/35 acre per new lot or dwelling unit, UDO Section 7.3.5). If it is not feasible to dedicate land for this purpose within the development, the developer may in some cases dedicate land in another location or provide a fee-in-lieu. An example of this is a 25-acre lot that has been jointly purchased by four developers and dedicated for the purposes of open space. Other land development dedication requirements are discussed below.

Section 8.1 of the UDO establishes RCAs. The objective of an RCA is to protect the Town's natural and cultural resources and encourage site design that protects them. The RCA must be shown on the site plan, be field inspected, be recorded on the plat, and be protected in perpetuity. The purposes of RCAs are to:

- Protect the Town's existing natural and cultural resources to preserve the visual and aesthetic qualities of the Town.

- Encourage site design techniques that preserve the natural and cultural environment and enhance the developed environment.
- Control erosion, slippage, and sediment runoff into streams and waterways.
- Increase slope stability.
- Protect wildlife habitat and migration corridors.

The UDO requires the total RCA area to be at least 20 to 25 percent of the site acreage for residential and non-residential new development. RCAs allow for the preservation of undisturbed floodplains, undisturbed riparian buffers, wetlands, steep slopes, significant tree stands, important habitat elements, and geological features. Environmental features must be undisturbed in order to count as RCAs. Recreation space may be counted as an RCA, but 4 acres of recreation space count as 1 acre of RCA.

6.2.3 Riparian Buffers and Floodplain Protection

6.2.3.1 Riparian Buffers

The buffer component of the Neuse Basin Rules and Jordan Rules apply to portions of the Town and 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. These rules do 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 Natural Resources Conservation Service or the most recent version of USGS topographic maps (7.5 minute quadrangle). The rule provides a number of exemptions.

The Town has established rules for protecting riparian buffers in Section 6.1.11 of the UDO. These rules require 100-foot-wide riparian buffers along perennial streams and 50-foot-wide riparian buffers along intermittent streams. For lakes and ponds, 100-foot vegetated buffers are required if the lake or pond joins with a perennial stream; otherwise, a 50-foot vegetated buffer is required if the lake or pond joins with an intermittent stream. For each of these buffers, the inner 30 feet is undisturbed forested buffer. Developers are required to delineate streams, wetlands, and floodplains. The perennial or intermittent stream classification is determined by the most recent version of a USGS quadrangle topographic map and/or Soil Survey for Wake County. In the event of discrepancy, the classification requiring the most stringent buffer applies. Only an undisturbed riparian buffer can be counted as RCA. In waters that are not classified as water supply, the Town allows the buffer width to be averaged. Under this scenario, the minimum width along any point on the stream is 50 feet, but the average buffer width must be 100 feet. Allowing buffer widths to be averaged may result in wider buffers along steep slopes or along floodplains.

NCDWR's methodology to determine whether a stream is present is followed if an appeal is made. In the Neuse River basin and Jordan Lake watershed, where conflicts exist between actual field conditions and USGS and Wake County Soil Survey maps, appeals are made to NCDWR in writing (UDO Section 6.1.11). In the Cape Fear portion of the Town, appeals may be made to the Town's Environmental Coordinator. The state buffer rules and the riparian buffer ordinance do not require that riparian buffers be restored where they no

longer exist. However, the Town's ordinance requires that when the land use is modified, the riparian buffer must be restored to the maximum extent practicable.

Greenways are allowed in the outer zones of the riparian buffer but are designed and located to minimize disruption to the buffer and to protect the water quality and habitat functions of the buffer. The Town tries to limit the placement of greenways in the riparian buffer to the maximum extent practicable.

6.2.3.2 Floodplain Development Regulations

The Town has established rules for protecting floodplains in Section 6.2.16 of the UDO, and additionally has a Flood Damage Prevention Overlay zoning district. The Town does not allow either residential or non-residential development in the 100-year floodplain, and according to 6.2.18, residential lots must be platted outside floodplains. The UDO does allow accessory structures for grandfathered properties, providing that construction plans were approved before August 1, 2000. No encroachments, including fill, are permitted in the floodway. Within all inner buffer zones, no fill is allowed according the riparian buffer rules. Only an undisturbed floodplain can be counted as an RCA. The Town requires that the bottom floor be elevated 2 feet above base flood elevation on FEMA-mapped streams for commercial, industrial, or nonresidential structures (UDO Section 6.2.16).

According to Section 6.2.17 of the UDO, where base flood elevations (100-year flood) are unknown, the Town allows no encroachments, including fill, within 20 feet of the top of the stream bank or within a distance of 5 times the stream width, whichever is greater, unless a Professional Engineer certifies that the encroachment will not result in an increase in the base flood level. When base flood elevation data or floodway data are unknown, a hydraulic report must be submitted that defines the base flood or floodway elevation. Such a hydraulic report must also be prepared for developments greater than 5 acres in size or with more than 50 lots.

FIRMs for the Neuse and Cape Fear River basins 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. The new maps will be based on full build-out conditions to reflect the change in hydrology that will occur as imperviousness increases. The Flood Damage Prevention Overlay zoning districts will be modified as necessary to reflect any changes in flood elevations.

6.2.4 Water Supply Watershed Protection Regulations

Approximately 42 percent of the Town's Planning Area is within the Jordan Lake and Swift Creek (Neuse River watershed) WSWs. The Town has similar protection rules for waters not classified as water supply by designating each of these waters as Secondary Watershed Protection Districts. The Town developed watershed protection overlays and limitations on impervious surface areas and densities associated with these areas, which are presented in Section 6.1 of the UDO. The Primary Watershed Protection District consists of lands classified as WSWs by NCDWR, while the Secondary Watershed Protection District consists of the remainder of lands within the Town and its ETJ. There are three development options within the watershed protection overlay: low-density, high-density, and clustered development.

In the low-density option, any development that has 12 percent imperviousness or less is not required to include stormwater controls onsite. The high-density and cluster options have impervious surface limits that may approach 70 percent, although very few developments have that level of imperviousness due to the RCA requirements described in UDO Section 8.1. Under the high-density and cluster options, stormwater controls must be implemented that control the first inch of rainfall. In addition, pre- and post-development peak runoff rates must be equivalent for the 1-year, 24-hour and 10-year, 24-hour storms. These options are in line with the Swift Creek Land Management Plan developed by the County and local governments with jurisdiction in the Swift Creek watershed and approved by the Wake County Board of Commissioners (Appendix F).

The Town conducts street sweeping to remove potential stormwater pollutants that would otherwise eventually enter the stormwater drainage system and ultimately the waterways. The Town conducts street sweeping every month in the Swift Creek watershed, and every 3 months for the remaining jurisdiction (Town of Apex, 2013b).

6.2.5 Erosion and Sediment Control

The Town has a delegated Local Program for enforcement of the state's Soil Erosion and Sedimentation Control standards. Erosion and sediment control plans must be submitted for most properties that disturb over 20,000 square feet. State law excludes agricultural land from erosion and sediment control. Owners of agriculture lands are required to implement BMPs for nitrogen control in the Neuse River basin, and for both nitrogen and phosphorus control in the Jordan Lake watershed.

The Erosion and Sediment Control Program has eliminated a substantial amount of sediment transport to local streams. The erosion and sediment control process is regulated through Chapter 5, Article X, Section 5-140 to 5-161 of the Town Code, as well as by the Town's NPDES General Permit NCG 010000 for construction-related activities.

The six basic control objectives for the Town's Erosion and Sediment Control Program are listed in Table 6-4.

TABLE 6-4
Six Basic Control Objectives of the Town of Apex's Erosion and Sediment Control Program

Objective	Description
Identify especially vulnerable areas that are subject to severe erosion and ensure they receive special attention	For example, avoid steep slope areas
Limit time of exposure	Maximum time of exposure is 7 calendar days for slopes (14 calendar days for non-slopes)
Limit exposed area	Plan and conduct activities to minimize the size of the area to be exposed at any one time
Control surface water	Control surface water originating upgradient of exposed areas to reduce erosion and sediment loss during the exposure period
Control sedimentation	Prevent offsite damage from sedimentation
Manage stormwater runoff	Control the velocity at the point of discharge to minimize accelerated erosion of the site and increased sedimentation to the stream

The Town's sediment and erosion control practices support an overall stream protection plan by limiting in-stream suspended sediment and sediment deposition. The erosion and sediment control strategy is discussed at a pre-construction conference through the permit and plan approval process. This process also allows for the review of stormwater controls. The Town may require more stringent controls than are outlined in its ordinance by making them a condition of development plan approval. The Town has used this authority to require shorter time frames for reseeding, phasing of construction, and the use of control devices.

The Town does not allow any land-disturbing activity near a lake or natural watercourse unless erosion and sedimentation control measures are present. An undisturbed buffer may be used, provided the undisturbed zone is of sufficient width to confine visible siltation within the 25 percent of the undisturbed zone nearest the land-disturbing activity. The Town has established maximum permitted velocities for stormwater discharges.

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; in general, the Town encourages phases that are 5 acres or less. The Town requires that all land-disturbing activities be planned and conducted to limit exposure to the shortest feasible time. Soils are stabilized as rapidly as possible by establishing a grass cover and mulching and tacking.

The Town requires the identification of especially vulnerable areas in the development plan, and these areas receive special attention in the permit and plan approval process. Steep slope areas are discussed in a pre-construction conference and avoided to the maximum extent possible. The Town allows for the protection of steep slopes to be used to meet RCA and buffer requirements. The angle for graded slopes and fills cannot be greater than the angle that can be retained by vegetative cover. 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.

The Town requires tree protection fencing and silt fencing as erosion and sediment control measures, along with perimeter ditches or perimeter swales, if practical. The tree protection policy outlined in Section 8.1.3 of the UDO applies only to Site Development Plans. Section 2.3.15 of the UDO also protects trees and applies to most land, but single family residences are exempt. The Town requires sediment and erosion control plans to use the proven latest technology related to erosion and sediment control practices. The Soil Erosion and Sedimentation Control Ordinance also requires minimum erosion control measures for single-family residential lots, including a construction entrance and silt fence.

In 2007, the Town elected to increase the minimum design standard for planning, designing, and construction of soil erosion and sedimentation control measures, structures, and devices from the 10-year storm event to that of the 25-year storm event.

In August 2009, the Town added a section to the Soil Erosion and Sedimentation Control Ordinance to add a provision for a performance guarantee. The amount of the performance guarantee collected is $2,500 per disturbed acre. The purpose of the guarantee is to stabilize and otherwise bring a site into compliance if a developer were to default.

A Preconstruction Conference is required for all new projects. Contractors and owners are required to be present along with staff who will be involved in the project. A final site inspection is required prior to issuance of a Certificate of Occupancy (CO) for all residential and non-residential structures. At this inspection, environmental staff reviews the site for sufficient groundcover, stabilization, buffers, and installation of stormwater devices prior to approving a CO. No performance guarantee is released until the CO is issued.

The Town 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. Contractors are interested in attending this training as it provides them with an opportunity to develop a relationship with Town staff, which helps with communication concerning their projects.

6.2.6 Stormwater Programs and Impervious Surface Limitations

The Town has developed a Comprehensive Plan that includes lower levels of imperviousness in water supply watersheds (WSW) as well as stormwater management programs to control the rate and quality of stormwater runoff in all watersheds (LandDesign, 2013). In addition, the NPDES Phase II program regulates discharges of stormwater to surface waters and requires control of suspended solids, fecal coliform, and nutrients town-wide. Thus, the Town has developed stormwater management programs that use a combination of impervious cover reduction and BMPs to control the rate of stormwater runoff.

The Town created an Environmental Program Division in 2003 to minimize the impacts of stormwater. The staff is charged with upholding the local, state, and federal regulations related to stormwater. These legal requirements include:

- Floodplain Management
- Sediment and Erosion Control
- WSW Protection
- NPDES Phase II Stormwater Regulations
- Neuse River Basin Stormwater Rules
- Jordan Lake Stormwater Rules
- Swift Creek TMDL and Watershed Land Management Plan

6.2.6.1 Stormwater Regulations

The Town maintains a strict policy of prohibiting unnecessary piping of stormwater (Memorandum dated March 4, 2002, Appendix F). Stormwater from new development is made to flow by way of grass-lined swales instead of pipe where possible.

In the UDO, The Town also requires that the pre-development peak runoff rate be maintained for the 1-year, 24-hour storm and the 10-year, 24-hour storm. Detention volumes stored to reduce peak flows shall drain within 72 hours to allow for subsequent storms (UDO 6.1.7). Stormwater from non-residential development is typically treated in ponds; stormwater is not directly transported to creeks or riparian areas, but to detention areas.

For each new development, the Town requires a stormwater impact statement indicating the impacts of the proposed development to the confluence point downstream where the area of the proposed development is less than 10 percent of the total drainage area. The impact statement verifies that downstream hydrograph peaks do not increase for a given storm. If backwater from detention appears to be a problem, then the potential effects on upstream properties for the 100-year, 24-hour storm must be considered (UDO 6.1.7). The stormwater impact statement must account for all existing development in the watershed. As part of the stormwater impact statement, the developer must show the peak flow calculations for existing conditions and the conditions with the proposed development.

The Town added a provision to Section 6.1.12 of UDO for both a performance and a maintenance guarantee requirement for BMPs. The guarantees are required in the amount of 125 percent and 25 percent of the total construction cost of the BMP, respectively. The performance guarantees run until the Town gives final approval of the required BMP. The maintenance guarantee runs for 1 year after the final approval is given. The BMP owner is responsible for annually submitting an inspection report performed by a registered North Carolina Professional Engineer.

In addition to the UDO, the Town has a Standard Specifications and Details Manual that includes stormwater elements. Drainage structures in the floodplain should pass the 100-year storm event without over-topping the roadway or the structures may be designed to pass only the 25-year event, in which case, the downstream roadway embankment must be fully protected from the residual flow which may overtop the roadway during a 100-year event (Standards Specifications and Details Manual, Section 500).

The Town has been delegated authority from NCDWR to review and approve Stormwater Management Plans (SMP) required for 401 water quality certifications. In accordance with this delegation, the Town began requiring that NCDWR supplement forms be submitted with SMPs for each structural stormwater BMP being proposed. The BMP supplement forms require the engineer to enter design data into a NCDWR spreadsheet online. The spreadsheet checks the data entered against the BMP manual to make sure all aspects of the design are in compliance. This helps streamline the SMP review process and ensures consistency with NCDWR approvals.

In 2012, the Town began requiring the submittal of BMP as-built supplement forms along with required BMP as-built drawings. The forms are in a checklist format, requiring the engineer to certify that all aspects of the structural BMP were installed in accordance with approved construction drawings.

6.2.6.2 NPDES Phase II Stormwater Program

The Town submitted an NPDES Phase II NPDES stormwater compliance re-application on February 1, 2010 and received its renewal on November 11, 2011 (Appendix F). The NPDES Phase II program regulates discharges of stormwater to surface waters and requires control of suspended solids, fecal coliform, and nutrients town-wide. NCDEMLR's existing NPDES Phase II regulations require that the overall runoff volume be controlled.

The NPDES Phase II permit requires that any new development that exceeds 24 percent built upon area, must implement storm water BMPs. These BMPs are required to treat the first one inch of rain, remove 85 percent average annual TSS and draw down the treatment volume no faster than 48 hours, but no slower than 120 hours.

The Town has impervious surface limitations that range from less than 12 percent for its low-density development option, to a maximum of 70 percent for its high-density development option. However, few developments result in 70 percent imperviousness due to the RCA requirements described in the UDO. The Town requires stormwater controls on any development that exceeds 12 percent imperviousness, and most new development must implement stormwater controls.

As a part of the NPDES Phase II requirements, the Town adopted an ordinance to establish an Illicit Discharge Detection and Elimination (IDDE) program including a provision for assessing civil penalties on violators (Town Code, Chapter 12, Article VIII).

The Town generally supports development practices which maintain the pre-development hydrograph. The Town actively hosts North Carolina State University Cooperative Extension workshops relating to LID and stormwater.

The Town has an active stormwater education program. Elements of this program include utility bill inserts and other mailings, and the internet. The Town is part of the Clean Water Education Partnership, which is a cooperative nonpoint source pollution education and awareness program involving many different local governments and agencies in North Carolina. The program's education and awareness campaign includes four components: television, radio, print, and a website emphasizing the impacts of nonpoint pollution and the importance of the protection of water quality. The Town also began selling rain barrels in 2003 and has remained a regular presence since 2005 at local festivities including Peak Fest and Apex Night Out, as well as conducting special workshops on topics such as backyard rain gardens. At the public events, the Town displays posters and provides brochures on various environmental topics including water conservation, fertilizer management, stormwater BMPs. A public stormwater survey is periodically conducted to gauge citizen awareness and target future education and outreach activities.

The Town maintains a watershed map depicting the location and type of all of the structural BMPs currently in place in Apex. Having this data on a single map is required by the Town's NPDES Phase II permit and is also beneficial in Town stormwater education efforts. The most recent version of the map as well as a list of BMPs is included in Appendix G.

6.2.6.3 Water Supply Watersheds

WSW rules apply to new development in the Swift Creek (Neuse River basin) and Jordan Lake watersheds as discussed in the WSW Protection Regulations section above. These rules, similar to those of the NPDES Phase II permit, require most new development to control the runoff resulting from the first inch of precipitation from storm events and to remove 85 percent of TSS from stormwater runoff using approved BMPs. As discussed in Section 6-1, development in the Jordan Lake and Swift Creek watersheds that exceeds a certain level of imperviousness must control its stormwater runoff. All new impervious area within the Town is being tracked for future analysis.

6.2.6.4 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; therefore they do not apply to the Town at this time. The buffer component of the Neuse Basin Rules is met by the Town's buffer requirements discussed previously.

Cooperative efforts related 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)

6.2.6.5 Jordan Water Supply Nutrient Strategy (Jordan Rules)

The Town is subject to the Jordan Rules, as required by the NC General Assembly, to reduce the average annual loads of nitrogen and phosphorus delivered to Jordan Lake from all point and nonpoint sources of these nutrients located within its watershed, including stormwater from new development in this jurisdiction. Nitrogen and phosphorus loads contributed by the proposed new development shall not exceed the following unit-area mass loading rates: 4.4 and 0.78 pounds per acre per year for nitrogen and phosphorus, respectively.

The implementation of the Jordan Rules has been delayed by the state until 2016. The Town plans to incorporate the nutrient reduction component of the Jordan Rules into their Town code in preparation. The portion of the regulation relating to buffers was not put on hold, and is met by the Town's buffer requirements, discussed previously.

As part of the Jordan 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 on an annual basis to identify two (2) potential stormwater BMP retrofit locations within existing development. NCDWR will determine in the future if the Town will be required to construct the BMP retrofits previously identified beginning in 2011.

6.2.6.6 Swift Creek Watershed Land Management Plan and TMDL

The Swift Creek Watershed Land Management Plan (LMP) was developed in 1988 by a joint committee of the Towns of Apex, Cary, and Garner, the City of Raleigh, and Wake County officials to help the Swift Creek watershed achieve a WSW WS-III Classification. The LMP recommended achieving the WS- II Classification through prohibiting all point source discharges within the watershed, establishing minimum critical buffer areas around bodies of water, limiting impervious cover and new development in critical areas. The LMP included a land use assessment and recommended performance standards for future development to protect water quality in the Swift Creek watershed. Finally, the LMP recommended further areas of study that would ultimately enhance the water quality of the watershed and its ability to maintain a WS – II Classification (Jordan, 1988). Currently, the Swift Creek and Williams Creek watersheds are classified as WS – III which carry less stringent development requirements than do WS- II watersheds.

Many TMDLs, such as those for Jordan Lake and the Neuse River Estuary, have resulted in the state developing rules to reduce the targeted pollutants in the watersheds that drain to the areas under the TMDLs. The Swift and Williams Creeks TMDLs are different from the Jordan Lake and Neuse River Estuary TMDLs in that there are no comprehensive Rules currently proposed

by NCDWR to address the TMDL requirements; however, the TMDL includes a 9 percent impervious cover that serves as a surrogate for effective stormwater management. Impervious cover is considered a surrogate for typical urban stormwater pollutants that were identified in the Swift Creek TMDL as causing the impairments. Additionally, the watershed is subject to WS-III requirements, which already has more stringent impervious cover limitations than those of most WSWs in urbanizing areas (typically WS-IV and WS-V).

6.2.7 Water Conservation

In 1973, the Town recognized water as a valuable natural resource and adopted its first water conservation ordinance. In 1986, the Town updated this ordinance to recognize water as a limited natural resource. Recent advances in water-saving devices like the low-flow showerheads and toilet tanks can use up to a third less water than devices installed just a few years ago. Required by current building code, these two advances save millions of gallons per year.

The Town's Water Conservation Ordinance (Town Code, Chapter 12, Article III), details continuing water conservation measures. To prevent the unnecessary depletion the water supply, the following measures apply to all Town water customers at all times, whether or not a water shortage exists. These measures are as follows:

- No person shall operate an irrigation system in a manner that allows water to fall on impervious surfaces, such as driveways, roads, sidewalks and/or the like.
- No person shall operate an irrigation system in a manner that allows water to accumulate to the extent that it runs off the property.
- An odd/even day irrigation schedule for all Town customers is enforceable year-round, allowing customers to irrigate three days per week. Hand-held hose watering is allowed every day.
- Rain sensors are required on all automatic irrigation systems. Rain sensors are devices that measure rainfall and override the irrigation systems, thus shutting them off. To meet the requirements of this ordinance, meters should shut off irrigation systems when one-quarter inch or more of rain has fallen.

The Town has developed a five-stage conservation measurement system, shown in Table 6-5, with Stage I being voluntary conservation and Stage V being the most stringent conservation. Note that each stage imposes the requirements of all preceding stages.

The Town wants to ensure that simple conservation measures become common knowledge and common practice through an active education program. The Town distributes a brochure that identifies several additional conservation ideas for the kitchen, the bathroom, and the yard to help conserve water.

TABLE 6-5
Town of Apex Five-Stage Conservation Measurement System

Stage	Requirements
I – Voluntary Conservation	Water shrubbery the minimum required, reusing household water when possible
	Limit vehicle washing to the minimum
	Refrain from washing down outside areas such as sidewalks, patios, etc.
	Use shower for bathing rather than bathtub, and limit shower to no more than 4 minutes
	Limit flushing of toilets by multiple usages
	Refrain from leaving faucets running while shaving or while rinsing dishes
	Limit use of clothes washers and dishwashers and when used, operate fully loaded
	Install water-flow restrictive devices in showerheads
	Use disposable and biodegradable dishes
	Install water-saving devices such as bricks, plastics, bottles, or commercial units in toilet tanks
	Limit hours of operation of water-cooled air conditioners
II – Moderate Mandatory Conservation	Filling of newly constructed or drained swimming or wading pools shall require the approval of the Public Works Director. Makeup water is allowed for maintaining the operation of swimming or wading pools.
(Apex's Current Stage)	If so ordered by the Town Manager, the Town shall eliminate the provision of irrigation water to all irrigation metered customers except single-family and duplex residential customers.
	There shall be no washing down of outside areas such as streets, driveways, service station aprons, parking lots, office buildings, exteriors of existing or newly-constructed homes or apartments, sidewalks, or patios, or use of water for other similar purposes.
	Water shall not be introduced into any ornamental fountain, pool, pond, or other structure making similar use of water.
	Water shall not be used from public or private fire hydrants for any purposes other than fire suppression or other public emergency.
	Watering for dust control or compaction requires the approval of the public works director.
	Water shall not be intentionally wasted or used for any unnecessary purpose.
III – Severe Mandatory Conservation	No watering of lawns, grass, shrubbery, trees, flowers, or vegetable gardens
	No nonessential use of water for commercial or public use, and the use of single service plates and utensils is encouraged and recommended in restaurants
IV – Stringent Mandatory Conservation	No using water outside of structures for any use other than emergencies involving fire
	No operating evaporative air conditioning units that recycle water except during the operating hours of the business
	No introducing water into swimming pools
V – Rationing	All industrial uses of water are prohibited
	Fire protection will be maintained, but where possible, tank trucks shall use raw water
	All other uses of water will be limited to those uses necessary to meet essential health and safety needs of customers

6.2.8 Air Quality Protection

6.2.8.1 Town of Apex Air Quality Efforts

The Town's Transportation Plan update supports a diversified transportation system including pedestrian, bicycle, and transit elements that will reduce air pollution by reducing

vehicular traffic (Town of Apex, 2011a). The Plan Update outlined several policy framework objectives that support open space preservation and connectivity. These objectives:

- Create a system of interconnected streets to improve mobility and to distribute traffic efficiently and appropriately by purpose and function.
- Support mixed use development to encourage walking and bicycling by promoting context-sensitive roadway design.
- Encourage 2-lane and 3-lane roads with street trees and plantings between roadway and development
- Promote a pedestrian-friendly environment by filling in gaps and improving interconnectivity in the sidewalk system.
- Support more bike lanes and trails to parks and community activity centers.
- Encourage a rail system spurring Triangle Transit's plans for passenger rail service.

Current transportation projects that indirectly reduce air pollution by providing option for alternative forms of transportation include the Laura Duncan Road Multi-Use path, which uses both municipal and federal funds to connect US 64 to Town of Cary town limits. Construction for this $605,000 project spanning 4,500 feet is planned for 2014. The Town has several future sidewalk completion projects planned including along Tingen Road, Old Raleigh Road, Apex Barbeque Road, and Kelly Road. Over 23,000 feet of Town-funded sidewalk projects have been completed, totaling $785,000, since 2002. In addition to the Town's sidewalks, the Town has established over 13 miles of greenways and is working to provide connectivity within its jurisdiction and with neighboring jurisdiction greenways.

The Town has three "closed loop" coordinated traffic signal systems controlled by NCDOT, and two locations coordinated with the Town of Cary centralized signal system. The Town had a timing study done in 2013 that was used to revise the timing plan and is expected to greatly improve traffic flow and efficiency, indirectly reducing air pollution.

Traffic flow has additionally improved through the strategic planning of the Apex Peakway, which serves as a bypass to NC 55 and makes a continuous route from NC 55 near US 1 to Center Street. The roadway plan includes pedestrian signals, crosswalks and 10-foot multi-use paths as well as wide outside travel lanes to serve bicycles. A study of a 19-mile section of US 64 corridor was conducted by NCDOT resulting in recommendations that will also improve efficiency.

The UDO also incorporates measures that protect or improve air quality. In Section 7.2.1 of the UDO, the connectivity requirements for the Town of Apex are presented. These standards reduce the overall times a motor vehicle is operating, which have positive impacts on air quality. The Town of Apex has a tree protection ordinance, found in Section 8.1 of the UDO. This requires preservation of existing healthy vegetation. Trees and vegetation are integral to the improvement of air quality.

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. The Town, in addition to local transportation activities, continues to be active in regional planning through NCDOT,

the Capital Area Metropolitan Planning Organization (CAMPO), and 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 NC 540 and I-540 around the greater Raleigh area. This project will link the Towns of Apex, Cary, Clayton, Garner, Fuquay Varina, and Holly Springs, and the City of Raleigh. 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 Triangle J Council of Governments (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 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 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 Regional Transportation Alliance (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 building a regional light rail service (Wake County, 2012).

The EIS prepared for the regional light rail project indicate 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, DC 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 Towns of Cary, Chapel Hill-and Carrboro and the Cities of Durham and Raleigh Chambers of Commerce in 1999, serves as a regional business voice for transportation initiatives. Currently the RTAs members include more than 100 businesses, two metropolitan planning organizations (MPOs), Triangle Transit, and the RDU airport. The Town is an active member of this group, which continues to focus on advancing multimodal solutions 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 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

Trees and other vegetation are integral to habitat protection, air quality improvement, controlling surface water runoff, and moderating temperatures. The Town has incorporated tree protection into Section 8.1.3 of the UDO (Appendix F). The Town requires a champion and specimen tree survey and landscape buffers in the plan review process. The removal of trees in a designated RCA is prohibited. Areas outside designated RCAs must be preserved to the extent practical and reasonable. Tree protection fencing at construction sites is required as a measure in erosion and sediment control. Special care is to be taken when grading and filling in the vicinity of tree protection areas.

The Town recognizes the need to maintain and preserve the natural environment while allowing development and growth to occur; the Town has developed a landscape ordinance (Section 8.2 of the LDO). The Town requires landscaped areas and perimeter buffers of varied widths and types depending on the land use. This ordinance includes minimum tree requirements for those buffers as well as standards related to preservation and planting.

6.2.10 Sanitary Sewer Installation

Proper design and installation of wastewater infrastructure reduces impacts from this infrastructure to the environment. Town of Apex Standard Specifications and Construction Details adopted December 3, 2002 and revised December 18, 2012, addresses the design of pump stations, gravity sewers, and force mains. The document lists the minimum design standards for construction of these facilities, including standards for separation distances, materials, installation techniques, and overall design. The Town operates its wastewater collection system under a Wastewater Collection System permit issued by NCDWR. As part of its riparian buffer program, the Town avoids installing sewer lines within riparian buffers and avoids 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.

6.2.11 Energy Load Management Program

The Town offers a program to its residential customers aimed at reducing peak energy demand. A residential customer subscribed to the energy Load Management Program receives a radio frequency controlled switch for certain household appliances. Since 1993, all new homes and homes with renovation projects greater than $10,000 in costs have received load management switches from the Town. The load of certain appliances can then be controlled or removed during peak periods of electricity demand. To incentivize participation in the program, a residential customer receives a credit on their monthly energy bill from the Town. The Town also benefits in that reducing peak electricity demands slows the need for expansion of electricity infrastructure, providing cost savings to the Town. Environmental benefits of this program include the reduced rate of expansion of infrastructure and the air quality benefits of energy load management. Under normal load conditions, power producers operate most efficiently. To meet peak demands, power producers often need to increase usage of their more inefficient and often technologically outdated facilities.

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SECTION 7

Summary of Secondary and Cumulative Impacts and Mitigation

As described in Section 6, the Town of Apex is taking a progressive approach to protecting the environment. The Town has developed many programs to balance the competing goals of growth and environmental protection. This section summarizes the potential SCI to natural resources and the mitigation programs in place to address them, as shown in Table 7-1 following the discussion below.

7.1 Topography and Floodplains

Clearing and grading of undeveloped lands will change a site's topography. The Town reviews erosion and sediment control plans to minimize grading in area of steeps slopes. The angle for graded slopes and fills is not permitted to be greater than the angle which can be retained by vegetative cover.

The current Town floodplain provisions in the UDO do not allow residential structures within FEMA-regulated floodplains. No encroachments, including fill, are permitted in the floodway. In addition, the Town's riparian buffer rules prohibit fill in the inner buffer zone. The Town requires that the base floor elevations be 2 feet above the floodplain for commercial, industrial, or nonresidential structures in the floodway. While commercial development is allowed, Town staff recalled only one occasion of non-residential development (Beaver Creek Commons) where grading occurred in the floodplain. The development was required to obtain a Letter of Map Revisions from FEMA.

Floodplains of smaller streams not under FEMA's jurisdiction are protected through the implementation of the stream buffer provisions in the UDO. These rules require 100-foot-wide riparian buffers along perennial streams and 50-foot-wide riparian buffers along intermittent streams. For lakes and ponds, 100-foot vegetated buffers are required if the lake or pond joins with a perennial stream; otherwise, a 50-foot vegetated buffer is required if the lake or pond joins with an intermittent stream. For each of these buffers, the inner 80 feet or inner 30 feet, respectively, is undisturbed forested buffer. The outer 20 feet must be vegetated.

In areas outside the Town's jurisdiction but within the Planning Area, floodplains are also protected. A Wake County ordinance prohibits development, including fill, in the floodplain. The County regulates streams outside FEMA's jurisdiction by prohibiting development in flood hazard soils and through buffer requirements. Thus, impacts to floodplains will be limited.

The floodplain maps within the Planning Area and County are being updated; these 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 UDO'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. Contractor education will also limit impacts on soils (Clear Water Contractor program). Development of lands will result in higher levels of soil disturbance and imperviousness, but good land use planning practices can accommodate future populations while limiting impacts to imperviousness.

7.3 Land Use

As outlined in Sections 4 and 5, agricultural and forested land will be lost as development occurs within the Planning Area, and open space areas may become more fragmented. The Town has several programs in place to help minimize these impacts. The Comprehensive Plan lays the foundation for preserving open space through open space planning and preservation and land use planning. The UDO also serves as the framework for development and is the implementation mechanism for the Comprehensive Plan.

The Town's prioritized areas for preservation are based in part on ecological significance of the land, mitigating for land use changes by focusing development in appropriate areas. The Town partnered with the CWMTF and Wake County Parks, Recreation, and Open Space to acquire 45.8 acres of undisturbed land along a tributary of Beaver Creek. A conservation easement has been placed on the portion of the property along the tributary to protect water quality. The Town owns another 160 acres of land adjacent to that property that is being developed into the Apex Nature Park and will further protect the waters of Beaver Creek from the pressures of development. The emphasis of the Apex Nature Park will be stormwater management, wildlife and nature education, and open space preservation. The site also has a strong emphasis on preserving water quality due to the amount of protected wetlands and riparian buffers and protection of the Beaver Creek corridor. In addition, the Town negotiates preservation of identified open space areas during the development process. Developing park lands and greenways will also limit the impacts to open space.

The Comprehensive Plan and UDO focus development in appropriate areas. The Town directs growth to its urban centers (inside the Apex Peakway) through its zoning where higher density development is currently zoned in areas where the Town would like to promote growth. UDO Section 6.3.1 defines a Residential Infill Overlay District and provides incentives for infill within the designated area around downtown.

The UDO requires RCAs that protect at least 20 percent of all new development as open space. It requires stream buffers and floodplains, open space in subdivisions, landscape buffers between different land uses, park lands, and greenways will limit the impacts to open space. Clustered development is allowed. While open spaces such as agricultural land and some forested areas will likely still be lost to development, the impacts will be limited

by these efforts. The riparian buffer and floodplain corridors will be largely protected through implementation of the UDO, which will provide habitat corridors and help limit impacts to habitat fragmentation.

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 illustrated in Section 4, the majority of wetlands are located in riparian areas. While some wetland loss still occurs with permitting, overall SCI to wetlands in the Planning Area will be minimized to by limiting or prohibiting construction and fill according to the UDO's floodplain and stream buffer regulations. While the Town does not have a wetlands permitting program, it requires all USACE permits and certifications/authorizations from NCDWR be obtained before it will allow a site to be developed. This minimizes impacts to wetlands within the Planning Area. The Town considers wetlands priority areas for RCA development. If riparian buffers or wetlands are disturbed, a developer does not get credit for that area as part of its RCA requirement. By protecting the wetlands, their habitat functions and associated species and genetic diversity functions are also protected.

As outlined in Section 5, increased pollutant loading that occurs with development can result in a decrease in a wetland's ability to filter pollutants. A wetland's ability to attenuate flow may also be compromised by increased stormwater runoff or stream channel entrenchment. The Town has a stormwater program in place that is designed to control nitrogen loading. BMPs installed to reduce nitrogen loading will also address other pollutants.

7.5 Prime or Unique Agricultural Lands

As development pressures increase in the area, agriculture will be lost, and remaining prime farmlands may be developed. The Town and Wake County have programs in place to help minimize these impacts although agricultural land is likely to be lost. A goal of the Town's Comprehensive Plan is to preserve the Town's character. Implementation of this plan will help offset some of the SCI associated with development in the Town.

The Comprehensive Plan directs highest density development to areas along major roads, within the Apex Peakway, and the northern portions of the Planning Area closest to RTP and the City of Raleigh. Lowest density development is planned for areas in proximity to Jordan Lake. These land use planning practices will also help conserve farmland.

The Wake County Soil and Water Conservation District works cooperatively with landowners to encourage farmland preservation and protection as discussed in Appendix B. This voluntary program was established in 1998 and includes efforts to provide farmers with proper estate planning, and protect farms through the purchase of development rights. The latter program has received limited funding, but has been successful in its limited applications. In addition, the County provides tax relief to qualifying farm owners to help offset tax burdens as property values rise in the County. The County also has a Voluntary Agricultural District program to promote farming and its value to the community.

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

The Town recognizes the values of open space and is implementing a Parks, Recreation, Greenways, and Open Space Master Plan and its Comprehensive Plan. 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. These planned greenways and additions to the park system will offer recreational opportunities and wildlife habitat and links with the American Tobacco Trail (ATT). For example, the Town acquired lands along Beaver Creek to protect the stream from further development.

The Town does not have explicit ordinances to protect the SNHAs. However, as development occurs in these areas protection can be negotiated. The Town may be able to negotiate protection as part of the required RCAs associated with new developments.

7.7 Areas of Archaeological or Historical Value

Historical areas may be impacted directly by future projects, but indirect impacts are unlikely. It is likely that little SCI will occur to cultural and historical resources due to the permitting and review process established by the Town and implementation of the Comprehensive Plan, which recognizes the value of the Town's historical areas.

Increased traffic vibration and reduced air quality (through acid rain) could impact historic structures. The Town is developing alternative modes of transportation and increasing the interconnections of sidewalks, trails, and bike lanes to promote alternatives to vehicle use which will help reduce the source of these impacts. The Town's tree protection ordinance also helps address air quality issues, because trees filter air.

7.8 Air Quality

To address the impacts of growth on air quality, the Town is actively pursuing alternative modes of transportation. Increasing the interconnections of sidewalks, greenways, trails, and bike lanes will reduce the needs for vehicular use. Bike trails and lanes will connect many of the mixed-use development areas to the Town Center and the ATT, encouraging transportation alternatives for commuting. As growth occurs, such efforts to reduce vehicular use will limit air pollution increases. A connectivity requirement is detailed in the UDO to assist in reducing air pollution. A tree ordinance is also in place to protect trees during construction, which also improves air quality, because trees are natural air filters.

The Town's Load Management Program reduces peak demand energy usage within the Town. Participation in the program will increase, as all new homes and any home undergoing a renovation of greater than $10,000 receive the load management switch boxes at no cost. By reducing peak residential energy demands, the Town is limiting air quality impacts from energy generation and limiting air quality impacts associated with population growth and increasing energy demands.

In addition, Wake County appointed a sustainability task force that has identified several strategies and performance measures for air quality goals (Wake County, 2011). Several regional planning efforts aim to reduce vehicle miles traveled and appropriately size roads according to air quality modeling analyses (TJCOG, 2013 and 2014).

A regional light rail system is planned for the Triangle area (Wake County, 2012). The EIS prepared for this project indicated that parking areas to serve the light rail system will not impact levels of carbon monoxide. The document also indicated that the light rail system will result in lower levels of vehicle pollutant emissions (U.S. Department of Transportation, 2002).

In 2013, North Carolina had its lowest ozone levels since air monitoring began in the early 1970s. The declining ozone levels coincided with lower emissions from the state's power plants. The state's coal-fired power plants have reduced their NOx 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).

State legislation to decrease NOx 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 limit SCI to air quality.

7.9 Noise Levels

Efforts to improve air quality by promoting alternative forms of transportation will also limit SCI associated with noise levels in the Planning Area. As quieter 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 are likely to be reduced. In addition, tree protection and buffers around different development types are required in the UDO; these buffers help reduce noise.

7.10 Water Resources

7.10.1 Surface Water

As growth occurs, impacts to water resources will be minimized by existing stream buffer regulations, the Town's NPDES Phase II stormwater program, nitrogen stormwater regulations that comply with the Jordan Rules, WSW management efforts, and requirements related to erosion and sediment control and open space preservation. The greatest water quality and quantity protection will be achieved by preserving stream buffers and installing stormwater control measures during development. Stream buffers will limit changes in stream channel morphology, erosion, and other habitat degradation. Stormwater controls limit sediment loading and hydrology changes. The Town requires that stormwater volumes be controlled for the 1-year, 24-hour storm to maintain the natural hydrograph and protect the channel morphology. Without these regulations and programs, SCI to water resources would be more pronounced.

Most waters within the Planning Area are classified as NSW in response to excessive growths 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.

It should also be noted that as redevelopment occurs, the Town has opportunities to require stormwater controls and riparian buffer restoration to the maximum extent practicable. While the stormwater controls and riparian buffers may not be as extensive as those required for new development due to site constraints, it provides an opportunity to improve

water quality and aquatic habitat. These practices may help improve water quality on 303(d) listed streams and in NSWs and WSWs.

Some watersheds also are subject to additional regulations designed to limit development impacts to water resources. Surface water impacts will be limited in the Swift Creek watershed, due to its designation as a WSW and the implementation of the Swift Creek Land Management Plan and TMDL. This watershed has development density limits as well as BMP mandates to protect water quality. The Jordan Lake watershed is also subject to WSW rules to limit impervious surfaces, nutrient and phosphorus from new and existing development, development densities, and stream buffers.

In addition to the Town's UDO, ordinances, and policies described in Section 6, the Town will also look for opportunities to improve water quality. For example, the Town has worked with agencies to identify areas for stream restoration and other strategies and will pursue funding through the EEP, CWMTF, SRF, Section 319 program, and other funding sources. The Town also actively participates in the development of any TMDLs where activities in Town may be impacting 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 impacts, but there is also a cumulative direct impact from previous crossings and other future crossings. The Town will review the cumulative direct impact in future EAs and EISs.

The Town is also developing a reclaimed water program that will reduce the water supply withdrawal from Jordan Lake during dry weather periods, reduce nutrient loading to streams that receive the treated wastewater effluent, and minimize impacts to natural flow regimes.

Wake County also implements stormwater management programs, WSW protection programs, riparian buffers, and open space preservation programs in areas outside Apex's jurisdiction. These programs are described in Appendix B. The Wake County Watershed Management Plan recommended that the County develop an instream monitoring program. Implementing such a program at the County level is more efficient than at the Town level. Wake County is performing targeted instream monitoring.

7.10.2 Groundwater

As growth occurs, impacts to groundwater resources will be mitigated by stormwater programs. These programs can be used to limit the amount of impervious surface in developments, reducing the impacts to groundwater recharge rates. 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 serving residences may be eliminated. This is a positive impact also, reducing the public health risk of groundwater contamination from leaking or failing septic tanks.

Stormwater from non-residential development is typically treated in BMP ponds; stormwater is not directly transported to creeks or riparian areas, but to detention areas. The Town maintains a strict policy of prohibiting unnecessary piping of stormwater (Memorandum dated March 4,

2002, Appendix F). Stormwater from new development is made to flow by way of grass-lined swales instead of pipe where possible. This promotes infiltration of stormwater, which also helps to protect groundwater resources.

7.11 Forest Resources

As outlined in Sections 4 and 5, agricultural and forested land will be lost as development occurs within the Planning Area, and open space areas may become more fragmented. The Town has several programs in place to help minimize these impacts. Its Comprehensive Plan lays the foundation for preserving open space through open space planning and land use planning. The UDO is the implementation tool for the Comprehensive Plan.

The Town's prioritized areas for preservation are based in part on ecological significance of the land. The Town partnered with the CWMTF and Wake County Parks, Recreation, and Open Space to acquire 45.8 acres of undisturbed land along a tributary of Beaver Creek. A conservation easement has been placed on the portion of the property along the tributary to protect water quality and will in turn protect the forest there. The Town owns another 160 acres of land adjacent to that property where the Apex Nature Park is being developed. This will further protect the waters of Beaver Creek from the pressures of development.

The UDO requires RCAs. It also requires stream buffers and floodplains, open space in subdivisions, landscape buffers between different land uses, park lands, and greenways that will limit the impacts to open space and preserve trees. Clustered development is allowed. While open spaces including forests will still be lost to development, the impacts will be limited by these efforts. The riparian buffer and floodplain corridors will be largely protected as a large portion of the buffer area is to remain undisturbed, which will protect trees and provide habitat corridors and help limit impacts to habitat fragmentation.

The Town's Comprehensive Plan and UDO also protect forest land. The majority of forested lands within the Planning Area are located within the Jordan Lake watershed. Impacts to forested lands will be lower in the Jordan Lake watershed because of WSW regulations limiting the amount of built-upon area and the presence of 200-foot buffers along many of the streams. The Comprehensive Plan only includes very low and low-density residential development in this watershed, protecting some forest resources, wildlife habitat, and the Town's drinking water supply. In addition, the Town has a tree protection provisions in its UDO.

7.12 Shellfish or Fish and their Habitats

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

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. There are sediment impacts from construction, although the use of proper erosion and sediment controls helps minimize such impacts. In addition, where culverts are used for road crossings and not buried to sufficient depths, a natural substrate will no longer exist to

provide aquatic habitat. In general, these impacts are direct impacts, but there is also a cumulative direct impact from previous crossings and other future crossings. The Town will review the 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.

In summary, SCI to fisheries will be limited over time because of the protective measures already in place.

7.13 Wildlife and Natural Vegetation

The mitigation measures to protect wildlife resources include protecting habitat with riparian buffers, protecting open spaces, and limiting habitat degradation through control of erosion, sediment, and stormwater runoff. Wildlife habitat may become more fragmented, but the Town's riparian buffer and floodplain protection ordinances will help maintain wildlife corridors. Trees and vegetation are integral to habitat protection, air quality improvement, control of surface water runoff, and temperature moderation. The Town has a tree protection ordinance, which is found in Section 8 of the UDO described in Section 6. The Town's required RCAs allows for some areas to be negotiated for preservation within the development process.

In the Swift Creek watershed, rare mussel species are located outside the Planning Area downstream of Lakes Benson and Wheeler. These impoundments will also help alleviate the impacts of increased stormwater runoff and pollutant loading to the rare mussels. The Swift Creek watershed is classified by the state as SAESH and Wake County and local governments with jurisdiction in the watershed have developed the Swift Creek Land Management Plan to protect the Lake Wheeler drinking water supply (Appendix F). The components of this Plan will also limit impacts to aquatic species.

There are also rare mussel species in Middle Creek downstream of Sunset Lake.

The Town's current and planned stormwater programs, riparian buffer ordinance, floodplain protection, and erosion and sediment control ordinance will help protect these species. In addition, the FEMA floodplain boundaries along Middle Creek within the Town's jurisdiction are wider than the required riparian buffers. Since the Town does not allow development in FEMA floodplains, impacts to the species will be minimized.

In addition to the Town ordinances and policies described in Section 6, the Town will also look for opportunities to improve aquatic habitat. For example, the Town will work with agencies to identify areas for stream restoration and other strategies, as well as pursue funding through the EEP, CWMTF, Section 319 program, and other programs.

Impacts to other federally listed species known to occur within Wake County and near Jordan Lake are not likely to occur. Impacts to the bald eagle populations near Jordan Lake and Harris Lake are not likely given Jordan Lake is within USACE managed land and Harris Lake is within significant Duke Energy landholdings. These areas should not be impacted by surrounding development. The Northern long-eared bat is proposed for federal listing; this species is not known to occur within the Planning Area and impacts are not likely. Michaux's sumac is listed as federally endangered and has been located elsewhere in Wake County. Since no occurrences of Michaux's sumac have been recorded in the Planning Area, it is unlikely that this species would be impacted by SCI within the

Planning Area. Protected and rare freshwater mussel species are known to occur and/or have been recorded downstream of the Planning Area and have the potential to be impacted by upstream development although riparian buffers, stormwater controls, open space protection, and other measures are in place to mitigate the potential for this impact.

State-designated protected areas such as some state-owned SNHAs and the Swift Creek watershed afford additional protection of wildlife habitats and vegetative communities. Many SNHAs also provide habitat to state-listed plant species. These areas afford species protection, limiting impacts of SCI. The Town does not have explicit ordinances to protect the SNHAs. Many of the SNHAs within the Planning Area are privately owned and not permanently protected. The Town will work with NCNHP and NCWRC to identify SNHAs and other important habitat areas and make efforts during the development process to negotiate their protection.

7.14 Introduction of Toxic Substances

The Town has programs to prevent toxic releases, and to treat them when they do occur. The Town also has an active stormwater education program that provides the public with valuable knowledge to increase awareness 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 promotes the use of BMPs and LID, which also reduce some of the toxic substance impacts.

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TABLE 7-1

Areas of Potential Impacts to be Addressed by Permitting and Mitigation Programs

Environmental Resource	Potential for SCI	Types of SCIs	Mitigation Programs
Topography and Floodplains	LI	Some floodplain loss from commercial development although floodway protected Isolation of floodplain from stream by channel entrenchment; loss of nutrient exchange capabilities	Floodplain Protection – No residential development in floodplain; no development within floodway Open Space goals often preserve additional corridors along required riparian buffers Resource Conservation Areas (RCAs) – Floodplain protection is not counted toward an RCA unless the floodplain is undisturbed Erosion and Sediment Control Program Stormwater Programs and Impervious Surface Limitations Sanitary Sewer Installation – deters installation of sewer lines in riparian buffers
Soils	PI	Soil erosion and compaction from new development	Erosion and Sediment Control Program Open Space Preservation and RCAs Comprehensive Plan – encourages development inside the Apex Peakway and along growth corridors to focus growth in areas of existing infrastructure and development Riparian buffers and floodplain protection WSW Protection Regulations – runoff controls and impervious surface restrictions reduce erosion potential Stormwater Programs
Land Use	PI	Conversion of agricultural and forested land uses to mainly residential land uses	Comprehensive Plan encourages development inside the Apex Peakway, selected corridors, and mixed use developments Comprehensive Plan Parks, Recreation, Greenways, and Open Space Planning RCAs – Protect environmentally important areas Unified Development Ordinance (UDO) Riparian buffer and floodplain protection Water Supply Protection (WSW) Protection Regulations – development density regulations Stormwater Programs and Impervious Surface Limitations – land management plans for certain watersheds

TABLE 7-1

Areas of Potential Impacts to be Addressed by Permitting and Mitigation Programs

Environmental Resource	Potential for SCI	Types of SCIs	Mitigation Programs
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 Majority of wetlands located in floodplain and riparian buffers which have local protection programs described above RCAs – Protect environmentally important areas Riparian Buffers and Floodplain Protection WSW Protection Regulations Erosion and Sediment Control Program Stormwater Programs and Impervious Surface Limitations reduce pollutant loads and limit stormwater impacts to wetlands
Prime or Unique Agricultural Land	PI	Conversion to other uses	Comprehensive Plan – encourages development inside the Apex Peakway and along major corridors Open space planning Wake County Voluntary Agricultural Districts Wake County Tax Incentive Program Farmland Protection Policy Act
Public Lands and Scenic, Recreational Areas, and State Natural Areas	LI	Possible conversion of adjacent land uses	Comprehensive Plan Parks, Recreation, Greenways, and Open Space Planning Establishment of Nature Park UDO
Areas of Archaeological and Historical Value	LI	Possible conversion of adjacent land uses Structural damage due to acid rain and vibrations	Comprehensive Plan - Land use planning controls; allowed uses UDO and open space preservation
Air Quality	PI	Reduction in air quality due to increased vehicular traffic Reduction in air quality benefits of trees Negative impacts to human health (such as asthma); acid rain; reduced visibility	Transportation Plan and Comprehensive Plan - bicycle and greenway planning UDO connectivity and tree protection requirements Open space preservation Riparian buffers protection Wake County Sustainability Task Force
Noise	PI	Increase in overall noise level in Planning Area Negative impacts to human health	Transportation Plan – connectivity requirements Comprehensive Plan UDO – connectivity requirements, tree protection and landscape buffers

TABLE 7-1

Areas of Potential Impacts to be Addressed by Permitting and Mitigation Programs

Environmental Resource	Potential for SCI	Types of SCIs	Mitigation Programs
Surface Water Resources	PI	Water quality degradation; increase in stormwater runoff Alteration of natural hydrograph (i.e., magnitude, timing, frequency, duration, rate of change); lower and more frequent low-flow conditions; alteration of channel morphology	Wetland Protection through CWA Section 404 and Section 401 UDO Riparian Buffers and Floodplain Protection – No residential development in floodplain WSW Protection Regulations – Watershed Protection Overlay District establishes additional stringent regulations Stormwater – Impervious limited to 12 percent or stormwater controls required; outfall velocity requirements Erosion and Sediment Control RCAs – Protect environmentally important areas Stormwater Programs and Impervious Surface Limitations Sanitary Sewer Installation and Road Construction – stream crossings with directional borings and crossings with buried culverts or bridges Water Conservation and Water Reuse programs
Groundwater Resources	LI	Reduction in use for drinking water; potential to become contaminated Groundwater inflow provides baseflow in streams, which supports life during droughts	Land Use Planning and UDO encourage development around Town Center, selected corridors, and mixed use developments Riparian Buffers and Floodplain Protection – allow for natural infiltration Stormwater Programs and Impervious Surface Limitations including promotion of LID Sanitary Sewer Installation - failing septic systems taken offline as infrastructure developed Water Conservation and Water Reuse programs
Forest Resources	PI	Conversion to other uses Reduction in air quality; increase in near-surface air temperature; habitat fragmentation	Comprehensive Plan and UDO encourage development inside the Apex Peakway, selected corridors, and mixed use developments RCAs – Protect environmentally important areas Parks, Recreation, Greenways, and Open Space Planning Riparian Buffers and Floodplain Protection WSW Protection Regulations – development densities

TABLE 7-1

Areas of Potential Impacts to be Addressed by Permitting and Mitigation Programs

Environmental Resource	Potential for SCI	Types of SCIs	Mitigation Programs
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; dispersal distance to suitable habitat; reduction in potential for long-term population sustainability	Endangered Species Act (ESA) Wetland and Stream Protection through CWA Section 404 and Section 401 Comprehensive Plan and UDO - Riparian Buffers and Floodplain Protection WSW Protection Regulations – Watershed Protection Overlay District establishes additional stringent regulations Stormwater – Impervious area limited to 12 percent or stormwater controls required; outfall velocity requirements Erosion and Sediment Control – Plan review and pre-construction process RCAs – Protect environmentally important areas UDO Tree Protection
Wildlife and Natural Vegetation	PI	Reduction in available habitat Habitat fragmentation; reduction in genetic diversity; reduction of intolerant species; increased dispersal distance to suitable habitat; reduction in potential for long-term population sustainability	ESA Riparian Buffers and Floodplain Protection– habitat protection and maintenance of habitat corridors Parks, Recreation, Greenways, and Open Space Planning – important habitat areas prioritized for protection Establishment of Nature Park
Introduction of Toxic Substances	LI	Increase in likelihood of contamination Negative impacts to human health	Comprehensive Plan and UDO – controls use and likely exposure Stormwater Program and Impervious Surface limitations - education programs Sanitary Sewer Installation – design standards to limit spills

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)

SECTION 8

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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

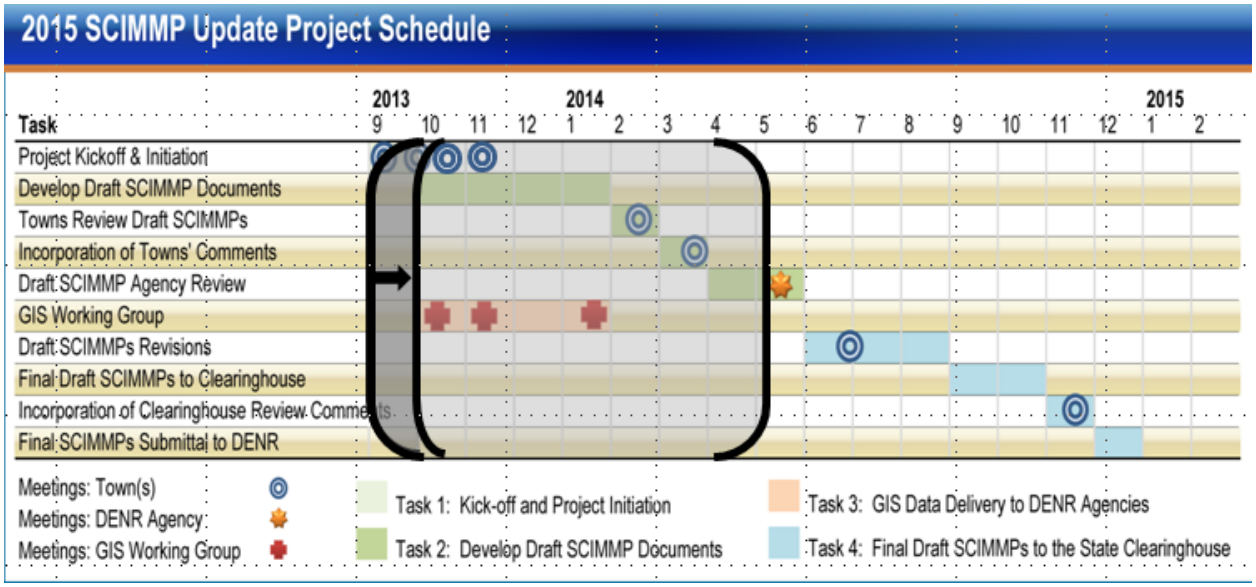
Schedule

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 TIME & LOCATION: Friday, November 22, 2013; 1:30 PM – 3:30 PM
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 Georgoulias	NC DEMLR	Mike Deaton,	Apex	Tim Gauss	Morrisville
		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 Georgoulias 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 Georgoulias – 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 Apex

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 Shackleford	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 Apex 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 manages its construction activities with due diligence. 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. The Town encourages proper waste disposal/recycling to the private sector through our construction site waste management policies. We distribute a general construction site waste management plan along with our letter of plan approval for all projects requiring an approved erosion control plan.
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 Apex and may occur within close proximity to Town projects. It is recommended that the Town incorporate into it s 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 exercises due diligence when planning for infrastructure and when acquiring land.
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.
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 imitation 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 Apex

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

Division	Point of Contact	Role/Office	Comment	Response to comment
NCDENR - 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 Apex

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 Apex. 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 Apex: http://www.apexnc.org/

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: Michael Deaton, PE, Town of Apex
Jessica Bolin, PE, Town of Apex

North Carolina
Department of Administration

Pat McCrory, Governor

Bill Daughtridge, Jr., Secretary

November 5, 2014

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

Re: SCH File # 15-E-4300-0229; Secondary and Cumulative Impacts Master Management Plan for the Town of Apex.

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,

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

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NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

COUNTY: WAKE

H12: OTHER

STATE NUMBER: 15-E-4300-0229
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 Apex
TYPE: State Environmental Policy Act
Environmental Review

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

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: 10-27-14

NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

COUNTY: WAKE

H12: OTHER

STATE NUMBER: 15-E-4300-0229
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

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DENR LEGISLATIVE AFFAIRS
DEPT OF CULTURAL RESOURCES
DEPT OF TRANSPORTATION
TRIANGLE J COG

PROJECT INFORMATION

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

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

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: [X] NO COMMENT [ ] COMMENTS ATTACHED

SIGNED BY: John D Bubolz DATE: 15 OCT 2014

OCT 2014
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Secretary's Office
DOA

NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

COUNTY: WAKE

H12: OTHER

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OCT 03 2014
HISTORIC PRESERVATION OFFICE

STATE NUMBER: 15-E-4300-0229
DATE RECEIVED: 09/30/2014
AGENCY RESPONSE: 10/27/2014
REVIEW CLOSED: 10/30/2014

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

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DENR LEGISLATIVE AFFAIRS
DEPT OF CULTURAL RESOURCES
DEPT OF TRANSPORTATION
TRIANGLE J COG

PROJECT INFORMATION

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

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

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 2014
RECEIVED
Secretary's Office
DCA

OCT 08 2014

Rupal Desai

NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

COUNTY: WAKE

H12: OTHER

STATE NUMBER: 15-E-4300-0229
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



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DENR LEGISLATIVE AFFAIRS
DEPT OF CULTURAL RESOURCES
DEPT OF TRANSPORTATION
TRIANGLE J COG

PROJECT INFORMATION

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

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

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: [X] NO COMMENT [ ] COMMENTS ATTACHED

SIGNED BY: Rupal DATE: 10/13/14



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 Apex, 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 Apex. 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 Apex 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 Apex 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



Kathryn Benson, PE
Project Manager
kbenson@ch2m.com

c: Michael Deaton, PE, Town of Apex
Jessica Bolin, PE, Town of Apex
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 Apex
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 Apex in the near future. If I can be of further assistance please contact me at 252-948-3842 or lyn.hardison@ncdenr.gov.

Sincerely,

Lyn B. Hardison

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

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NCDENR
North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

John E. Skvarla, III
Secretary

July 9, 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 Apex
Wake County

Dear Mrs. Benson,

NCDENR agencies reviewed the Draft 2015 SCIMMP for the Town of Apex 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 Apex 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

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 Apex
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 Apex 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

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

NCDENR
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 #1601 Draft 2015 Secondary and Cumulative Impacts Master Management Plan for the Town of Apex, NC

A review of the Draft 2015 Secondary and Cumulative Impacts Master Management Plan (SCIMMP) for the Town of Apex by the Superfund Section has been completed. The SCIMMP includes backgrounds and descriptions of the Apex's infrastructure plans for its future wastewater, reclaimed water, and water systems, as well as its future improvements to transportation and electricity distribution throughout the town's planning area of approximately 51 mi^2.

CERCLIS and other contaminated sites under the jurisdiction of the Superfund Section are located within the Town of Apex's 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 Apex 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
Division of Waste Management

Pat McCrory
Governor

Dexter R. Matthews
Director

John E. Skvarla, III
Secretary

MEMORANDUM

TO: Kathleen Lance, Administrative Assistant
Division of Waste Management

FROM: Dennis Shackelford, Eastern District Supervisor
Solid Waste Section

DATE: May 9, 2014

SUBJECT: SEPA Review - Project #1601 SCIMMP 2015 Apex, Wake County, North Carolina
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 Apex 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 Apex 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 Apex 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	County	Date Received	Date Response Due
# 1601	Wake	4/14/2014	5/15/2014

Draft 2015 Secondary and Cumulative Impact Master Plan - Town of Apex -
Go to CH2MHill FTP site https://transfer.ch2m.com/Log on with "EXT\" directly in front of the usernameUsername = ext\SCIMMP -Password = CH2MHillEnter the password and click OK

This project is being reviewed as indicated below:

Regional Office	Sections	In-House Review
☐ Asheville	☒ Air	☐ Marine Fisheries ☐ Coastal Management
☐ Fayetteville	☒ DWR – All Water Quality Programs	☒ Waste Mgmt (Haz, Solid, Inactive, Superfund & UST)
☐ Mooresville	☒ Land Quality & Stormwater Programs	☒ Air Quality
☒ Raleigh	☒ UST	☒ Water Resources Management (Public Water, Planning & Water Quality Programs
☐ Washington	☒ Public Water MLD 04/24/14	☐ Shellfish Sanitation
☐ Wilmington		☒ Parks & Recreation
☐ Winston-Salem		☐ DWR – Transportation Unit_____
		☒ Wildlife Vann Stancil
		☐ Wildlife (DOT)_____

Regional Coordinator Sign-off:		In-House Reviewer/Agency:
Janene S. Childs	5/13/14	RKO

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

State of North Carolina
Department of Environment and Natural Resources

Reviewing Office: RRO

INTERGOVERNMENTAL REVIEW - PROJECT COMMENTS

Project Number: 1601 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 919-707-5950.		
☐	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 isavailable 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 404 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)
☐	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
☐	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
☐	State Lakes Construction Permit	Applicationfee is charged based on structure size. Must include descriptions & drawings of structure & proof of ownership of riparianproperty.	15-20 days N/A
☐	401 Water Quality Certification	N/A	60 days (130 days)
☐	CAMA Permit for MAJOR development	$250.00 fee must accompany application	55 days (150 days)
☐	CAMA Permit for MINOR development	$50 00 fee must accompany application	22 days (25 days)
☐	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		
☐	Abandonment of any wells, if required must be in accordance with Title 15A. Subchapter 2C.0100.		
☒	Notification of the proper regional office is requested if "orphan" underground storage tanks (USTS) are discovered during any excavation operation		
☐	Compliance with 15A NCAC 2H 1000 (Coastal Stormwater Rules) is required.		45 days (N/A)
☐	Tar Pamlico or Neuse Riparian Buffer Rules required.		
☒	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
☐	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

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

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

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

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

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

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

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☐ Wilmington		☒ Parks & Recreation
☐ Winston-Salem		☐ DWR – Transportation Unit_____
		☒ Wildlife Vann Stancil
		☐ Wildlife (DOT) _____

Regional Coordinator Sign-off:		In-House Reviewer/Agency:
	5-15-14	[signature]

Response (check all applicable)

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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)	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. 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. Plans to identify areas subject to severe erosion, limit time of exposure, and limit exposed area are required. 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. Encourages contractor education and training related to erosion and sediment control.
Stormwater and Impervious Surface Limits (UDO Article 9 and Article 5)	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. 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. 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

TABLE B-1
Summary of Selected Wake County UDO Protection Measures

Program	Summary
	management practices (BMPs) are required to mitigate for target curve number exceeedances, 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. Compliance with Neuse River basin and Jordan Lake watershed nutrient sensitive waters (NSW) nutrient management strategies is required.
Riparian Buffers (UDO, Article 11)	In Water Supply Watersheds: (Swift Creek and Jordan Lake) • Buffer requirements: – 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. In Resource Conservation Overlay (Bass Lake): • Buffer requirements: – 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. 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.
Floodplain Protection (UDO Article 14)	In floodways and the 100-year floodplain: • 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. In special flood hazard areas (non-Federal Emergency Management Agency [FEMA]

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	Article 5 establishes building set-backs from property line, buffers around parcels, and other site development restrictions.
(UDO Articles 5 & 8)	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 1997and 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	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.	Impervious surface limits exist in water supply watersheds.
	Encourage use of low-impact development site planning principles.	UDO includes a credit system to provide incentives for better site design.
	Use offset fees if development exceeds impervious surface limits.	
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.	The County developed a Conservation Subdivision Ordinance that grants a 20% density bonus to subdivisions that preserve 65% or more as open space.
		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.
Erosion and Sediment Control	Cross-train inspectors from other divisions to identify erosion problems.	Watershed Managers perform ride-alongs in other territories to identify problems and ensure consistency.
	Update the erosion and sediment control manual to incorporate new technologies.	The website has been enhanced with design details, individual lot control, and other information. A new manual is also currently under construction.
	Provide education programs for contractors and residents.	Information on silt fences and entrance way requirements has been developed.
Septic Systems	Improve the data monitoring system for septic systems; creating a database for trend analysis.	
	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.	These have been implemented.
	Require certification for septic system installers.	The state passed this legislation in 2012 and contractors are now

TABLE B-3
Wake County Watershed Management Plan Implementation Actions and Status

Area	Implementation Action	Status/Notes
		registering as required.
	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.	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 and 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

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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.

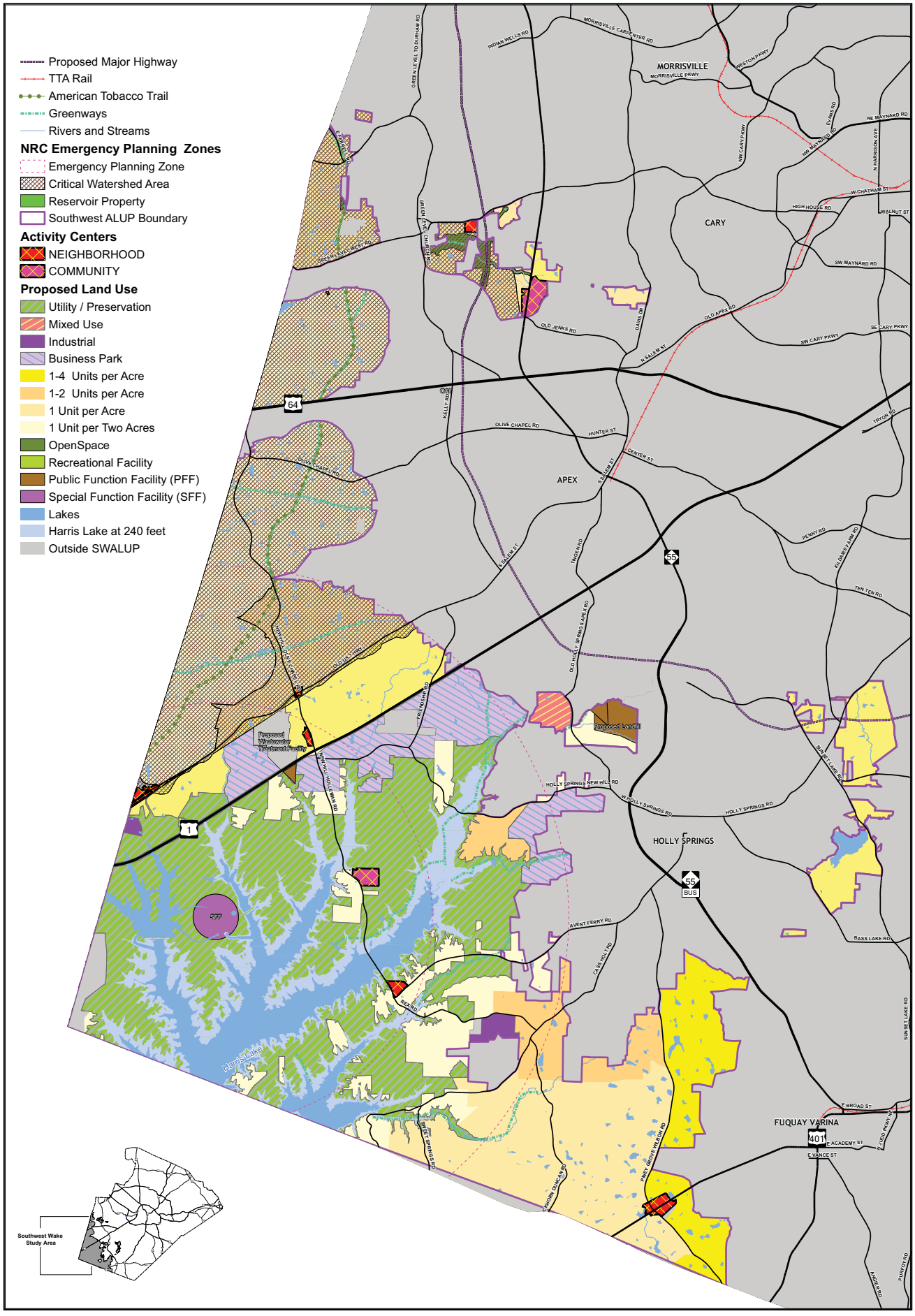
On May 19, 1999 the County Commissioners adopted **the Southwest Wake County Area Land Use Plan** that included activity centers, greenways, parks, residential densities and other future uses, generally missing from the Phase One Plan. The 1999 Wake County Southwest Area Land Use Plan encouraged growth 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	***Water Supply Watershed Critical Area (Jordan Lake)***: 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. ***Water Supply Watershed Non-Critical Area***: The recommended density for this area is **up to 1 dwelling unit per acre**. ***Non-Water Supply Watershed Area (Harris Lake-Cape Fear Watersheds)***: The recommended density for this area is **up to 0.5 dwelling units per acre**. ***Non-Water Supply Watershed Area***: The recommended density for this area is **up to 1.5 dwelling units per acre**.
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.

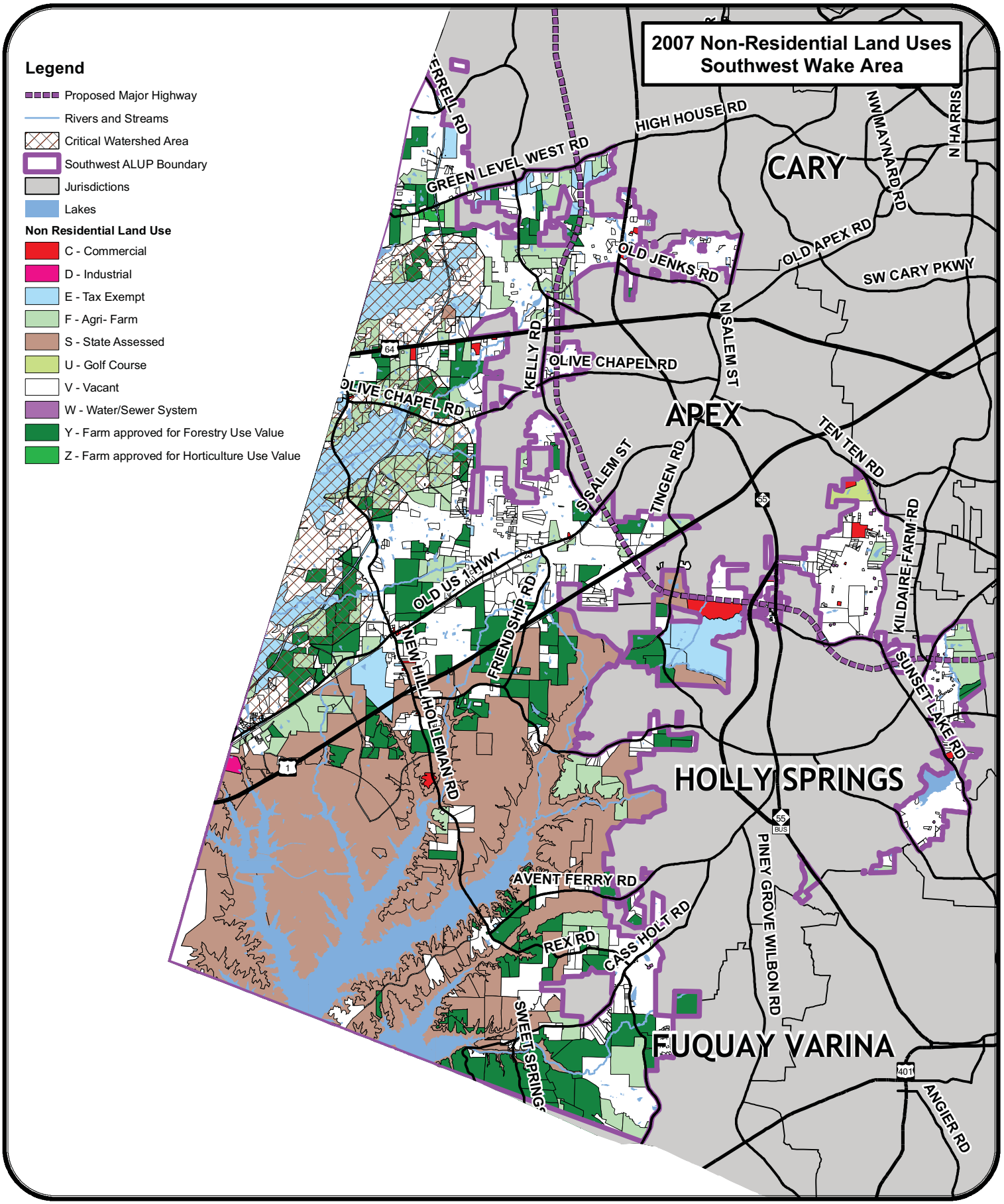
Office / Research Park (ORP)	Land uses include mostly offices, labs, research facilities, maintenance facilities, and lake / stream buffers.
Industrial	Land uses include manufacturing, warehousing, freight handling, wholesaling, research and development activities with office support services.
Office & 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): • **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. ▪ 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.



Southwest Wake ALUP Update
Adopted July 9, 2007
(Amended 4/5/10, LUPA 03-09)

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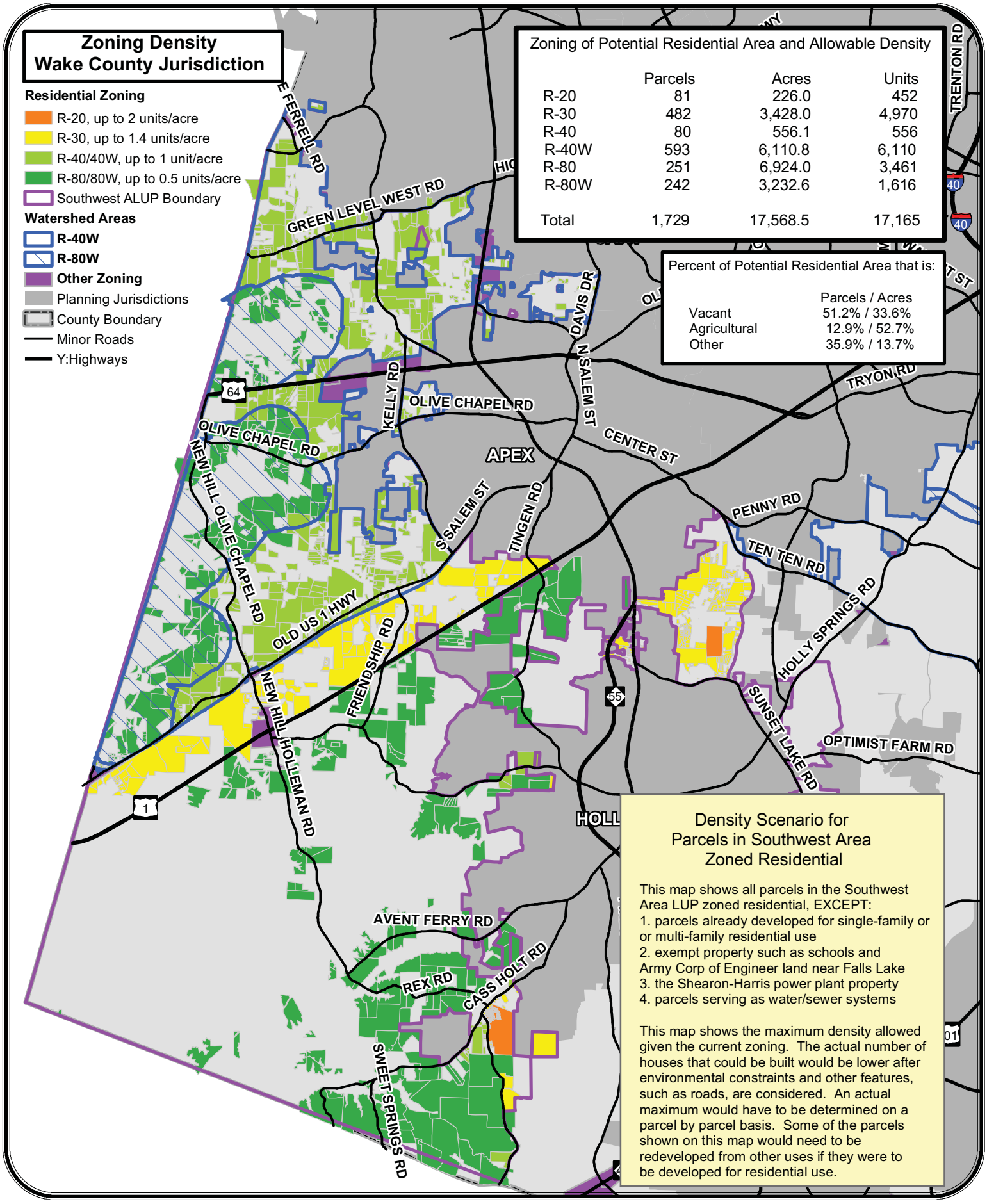
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Created by Wake County
Wake County Planning Department
Mar 23, 2011



Southwest Wake ALUP Update

0 1 2 Miles

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Created by Wake County
Wake County Planning Department
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Southwest Wake ALUP Update

0 1 2 Miles

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Created by Wake County
Wake County Planning Department
Printed at 04:44:51 PM on May 05, 2007

PLANNING JURISDICTION	
AP	APEX
AN	ANGIER
CA	CARY
CL	CLAYTON
DU	DURHAM
FD	FIRE DISTRICT
FV	FUQUAY VARINA
GA	GARNER
HS	HOLLY SPRINGS
KN	KNIGHTDALE
MO	MORRISVILLE
RA	RALEIGH
RD	RDU AIRPORT
RO	ROLESVILLE
WC	WAKE COUNTY
WE	WENDELL
WF	WAKE FOREST
ZB	ZEBULON
TOWNSHIPS	
01	RALEIGH
02	BARTON'S CREEK
03	BUCKHORN
04	CARY
05	CEDAR FORK
06	HOLLY SPRINGS
07	HOUSE CREEK
08	LEESVILLE
09	LITTLE RIVER
10	MARK'S CREEK
11	MEREDITH
12	MIDDLE CREEK
13	NEUSE
14	NEW LIGHT
15	PANTHER BRANCH
16	ST MARY'S
17	ST MATTHEW'S
18	SWIFT CREEK
19	WAKE FOREST
20	WHITE OAK
FIRE DISTRICTS	
1	BAYLEAF
2	DURHAM HIGHWAY
3	STONEY HILL
4	ROLESVILLE
5	CARY
6	RALEIGH
7	WAKE-NEW HOPE
8	SIX FORKS
9	WAKE FOREST
10	ZEBULON
11	MORRISVILLE
12	SWIFT CREEK
13	KNIGHTDALE
14	FAIRVIEW
15	FALLS
16	FUQUAY VARINA
17	HOLLY SPRINGS
18	WENDELL
19	FAIRGROUNDS
20	HOPKINS
21	APEX
22	GARNER
23	FIRE TAX DISTRICT
ZONING	
WWW.WAKEGOV.COM/COUNTY/ PLANNING/ZONING/DISTRICTS	
SPECIAL DISTRICTS	
AMD	APEX MUNICIPAL
BKR	ANGIER BLACKRVR
FMD	FUQUAY MUNICIPAL
HMD	HILLSBOROUGH STREET
RMD	RALEIGH MUNICIPAL
RML	RALEIGH MUNICIPAL I
RMS	RALEIGH MUNICIPAL II
RTP	RESEARCH TRIANGLE
WMD	WAKE FOREST
BILLING CLASS	
1	CORPORATIONS
2	INDIVIDUALS
3	EXEMPT
4	PUBLIC SERVICE
5	LIFE ESTATE
6	HOA

LAND CLASS	
A	AC-W/IMP
B	AC> 10-HS
C	COMMERCIAL
D	INDUSTRIAL
E	EXEMPT
F	AGRI-FARM
G	APARTMENT
H	HISTORIC
I	HOA
J	CEMETERY
K	RET HOME
L	LEASED
M	MFG HOME
N	CONDO
O	MA+CONDO
P	PART EXEMPT
R	R<10-HS
S	ST ASSESS
T	MOBILE HOME PK
U	GOLF COURSE
V	VACANT
W	WATER/SEWER
Y	FOR-FARM
Z	HOR-FARM
U	GOLF COURSE
UTILITIES	
A	ALL
E	ELECTRIC
G	GAS
W	WATER
S	SEWER
TOPOPGRAPHY	
	Code no longer used
STORY HEIGHT	
A	ONE STORY
B	1 ½ STORY
C	TWO STORY
D	2 ½ STORY
E	THREE STORY
F	3 ½ STORY
G	FOUR STORY
H	MULTI STORY
I	1 ¾ STORY
J	1.4 STORY
K	1.63 STORY
L	1.88 STORY
M	2.4 STORY
N	2.63 STORY
R	2.75 STORY
DESIGN STYLE	
A	CONVENTIONAL
B	DUPLEX
C	TOWNHOUSE
D	CONDO
E	CONVERSION
F	COLONIAL
G	RANCH
H	CAPE
I	SPLIT LEVEL
J	SPLIT FOYER
K	CONTEMPORARY
L	LOG
M	MANUF SNGL
N	MANUF MULTI
O	MODULAR
FD OR BASEMENT	
A	FULL BASEMENT
B	% BASEMENT
C	PIER FOUNDATION
D	NO BASEMENT
EXTERIOR WALL	
A	FRAME
B	BRICK
C	C-BLOCK
D	BRICK & FRAME
E	BRICK & C-BLOCK
F	C-BLOCK & FRAME
V	C-BLOCK & METAL
G	STUCCO
H	STUCCO MASONARY
I	STONE
J	STONE & FRAME
K	STONE & BRICK
L	SGL FR SIDING
M	REINF CONCRETE

EXTERIOR WALL CONTINUED	
N	ENAMELED STEEL
O	METAL
R	BRICK & METAL
P	INSULATED PANEL
S	PRECAST CONCRETE
T	SOLAR GLASS
U	GLASS ALUMINUM
W	SIMULATED BRICK
X	SIMULATED STONE
Y	FACTORY SASH
Z	ALUM VINYL SIDING
Q	LOG
COMMON WALLS	
	Code no longer used
ROOF TYPE	
	Code no longer used
ROOF FLOOR	
A	WOOD JOIST
B	TIMBER
C	EXPOSED STEEL
D	FIREPROOF STEEL
E	REINF CONCRETE
F	CELLULAR STEEL
FLOOR FINISH	
G	CARPET
D	MIXED
A	HARDWOOD
C	PINE
J	CEMENT/CONCRETE
H	GLAZED TILE
P	ASPHALT TILE
I	PART TERRAZZO
B	EARTH FLOOR
K	BRICK FLOOR
Q	VINYL FLOOR
O	VARIOUS MTLS
E	SINGLE
R	RUBBER COVERING
INTERIOR FINISH	
	Code no longer used
INTERIOR FINISH 1 & 2	
A	% FINISHED
B	% SEMI-FINISHED
C	FULLY FINISHED
S	FULLY SEMI-FINISHED
MEZZANINE	
D	% FLOOR ONLY
E	% FINISHED
F	% SEMI-FINISHED
UNFINISHED INTERIOR	
G	% UNFINISHED
H	% SEMI-FINISHED
I	FULLY UNFINISHED
T	FULLY SEMI-FINISHED
ATTIC FINISH	
J	FULLY FINISHED
K	% FINISHED
L	FULLY SEMIFINISHED
M	% SEMI-FINISHED
BASEMENT FINISH	
N	FULLY FINISHED
O	% FINISHED
P	% REC ROOM
Q	FULLY SEMI-FINISHED
R	% SEMI-FINISHED
HEATING	
A	FORCED AIR
K	HEAT PUMP
C	STEAM
D	ELECTRIC
E	NO AUTOM-BURNER
F	% FORCED AIR
G	UNIT HEATERS
H	CENTRAL SYST-UNITS
I	LIMITED/PARTIAL
J	NO HEATING
B	HOT WATER
L	SOLAR
GRADE FACTOR	
AA	HIGHEST
A	HIGH
B	ABOVE AVERAGE
C	AVERAGE
D	BELOW AVERAGE
E	LOW

AIR	
A	SEPARATE
B	COMBINED
C	UNIT AIR COND
D	% SEP
E	% COMB
F	% UNIT
G	LIMITED/PARTIAL
H	NO AIR COND
I	% CLIMATE CONTROL
BATH	
A	ONE BATH
B	1 ½ BATH
C	TWO BATH
D	½ BATH
E	THREE BATH
F	3 ½ BATH
G	LIMITED PLBG
H	NO PLUMBING
I	ADEQUATE
J	NO OF FIXTURES
BUILT INS	
1	ONE FIREPLACE
2	2 OR MORE FIREPL
3	RANGE DISHWASHER
4	RNGE /DISHWR/ DISPOS
5	OVEN
6	RANGE
7	DISHWASHER
8	DISPOSAL
OTHER BUILT-INS	
14	SPRINKLER SYS
15	PASS ELEVATOR
16	FREIGHT ELEV
18	ESCALATOR
CITY	
ANG	ANGIER
APE	APEX
CAR	CARY
FUQ	FUQUAY VARINA
GAR	GARNER
HOL	HOLLY SPRINGS
KNI	KNIGHTDALE
MOR	MORRISVILLE
OUT	OUTSIDE CITY LIMIT
RAL	RALEIGH
ROL	ROLESVILLE
WEN	WENDELL
WAK	WAKE FOREST
ZEB	ZEBULON
TYPE & USE	
RESIDENTIAL	
1	ONE FAMILY
2	TWO FAMILY
3	THREE FAMILY
4	FOUR FAMILY
5	MULTI-FAMILY
6	RES. W/BUSI USE
APARTMENTS	
7	GARDEN
8	TOWNHOUSE
9	ELEVATOR
10	ROOMING HOUSE
BANKS	
11	BANK BUILDING
12	DRIVE-IN ONLY
BOWLING ALLEY	
	BOWLING ALLEY
SPECIALTY BLDGS	
16	DAY CARE
17	CLUB HOUSE
18	BATH HOUSE
GARAGE BLDGS	
19	SALES & SERVICE
20	SERVICE GARAGE
21	PARKING DECK
22	OIL & LUBE
23	CAR WASH
24	WAND CAR WASH
GASOLINE STATIONS	
25	SERVICE STATION
27	OTHER/BOOTH
HOTELS/MOTELS	
28	HOTEL/MOTEL-FULL
29	HOTEL/MOTEL-LTD
30	MOTEL EXT STAY
31	HOTEL HIGH-RISE

TYPE & USE CONTINUED	
32	HOTEL/MOTEL-IND
OFFICE BLDGS	
34	TYPICAL OFFICE
35	OFC/RTL/RES CONV
36	MEDICAL TYPE
37	OFFICE/APARTMENT
38	OFFICE BLDG-H.R.
RESTAURANTS	
39	RESTAURANT
40	FAST FOOD
41	PLAIN DRIVE
42	STORE TYPE BLDG
43	BAR/CLUB
44	CAFETERIA
RETAIL TYPE BLDGS	
46	FOOD MART
47	SINGLE TENANT
48	MULTI TENANT
49	SUPERMARKET
50	DISCOUNT STORE
51	DEPARTMENT STORE
52	BULK RETAIL
53	MALL
54	COMMUNITY CTR
55	NHBD CENTER
56	JUNIOR ANCHOR
57	STORES W/APTS
58	STORES W/OFCS
59	STORES W/ OFC & APT
60	JUNIOR DEPT STORE
OTHER FINISHED BLDGS	
62	AIRPORT TERMINAL
63	VET CLINIC
64	CLINIC
65	CLUB
66	CHURCH
67	DORMITORY
68	FIRE STATION
69	GYMNASIUM
70	HOSPITAL
71	LIBRARY
72	MOBILE HOME
73	MUNICIPAL BLDG
74	NURSING HOME
75	FUNERAL HOME
76	RETIREMENT HOME
77	SCHOOL
78	THEATER
INDUSTRIAL TYPE BLDGS	
79	LIGHT MANUF
80	MANUFACTURING
81	PHARM PLANT
82	PREFAB WHSE
83	WAREHOUSE
84	BULK/DIST WHSE
85	FLEX WAREHOUSE
86	MINI WAREHOUSE
87	BOTTLING PLANT
88	CHEMICAL PLANT
89	BIOLOGICAL PLANT
90	R & D
91	HANGAR
92	POWER HOUSE
94	TELEPHONE FIX
95	TRUCK TERMINAL
96	LABORATORY
98	LAUNDRY
99	SPECIAL WRITE-INS
100	STUDENT APTS
101	LUXURY APTS
102	MUSEUM
103	CAR SALES
104	FRATERNITY
105	SORORITY
106	POST OFFICE
107	ARMORY
108	GROUP HOME
109	RESTROOM BUILDING
110	GUARD HOUSE
111	PRISON/JAIL
113	SPORTS ARENA
114	ROOMING HSE CONV
210	PARKING DECK (PUB)
340	TYPICAL OFFICE (NET)
360	MEDICAL OFFICE (GROSS)

QUALIFYING SALE FLAGS	
A	QUALIFIED SINGLE PROPERTY SALE
C	QUALIFIED MULTI PROPERTY SALE
DISQUALIFIYING 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.

Estimated 2010 and Forecast 2040 Population and Jobs	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 Metropolitian Transportation Plan

February 28, 2013

Roadway Improvements

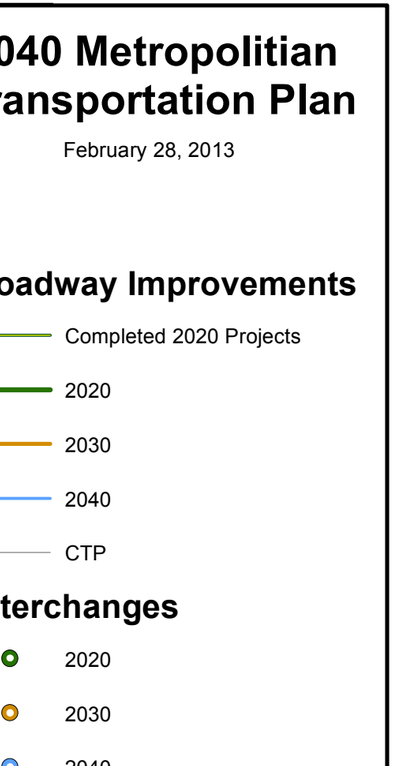
- Completed 2020 Projects
- 2020
- 2030
- 2040
- CTP

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.

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Miles

N

DCHC
DURHAM-CHAPEL HILL-CARRBORO METROPOLITAN PLANNING ORGANIZATION

North Carolina
Capital Area Metropolitan Planning Organization

INSET A
INSET B
INSET C

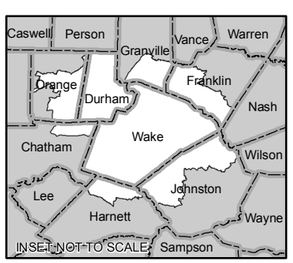
2040 Metropolitian Transportation Plan

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.

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DURHAM-CHAPEL HILL-CARRBORO METROPOLITAN PLANNING ORGANIZATION



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

	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.

(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.

[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

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.]

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

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

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

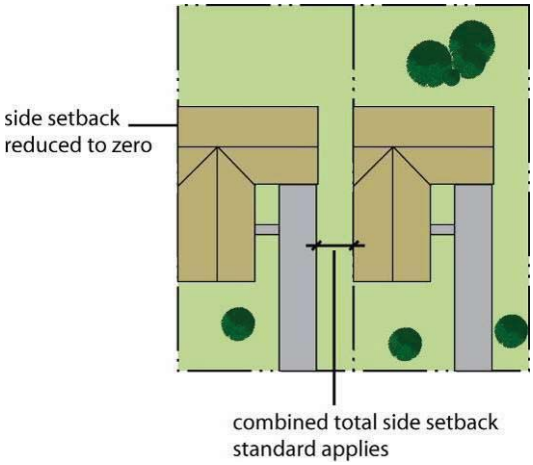
through vegetated areas. (See also Sec. 8-43 and subsection 8-32-18 for standards applicable in Water Supply Watersheds.)

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 furthermost 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

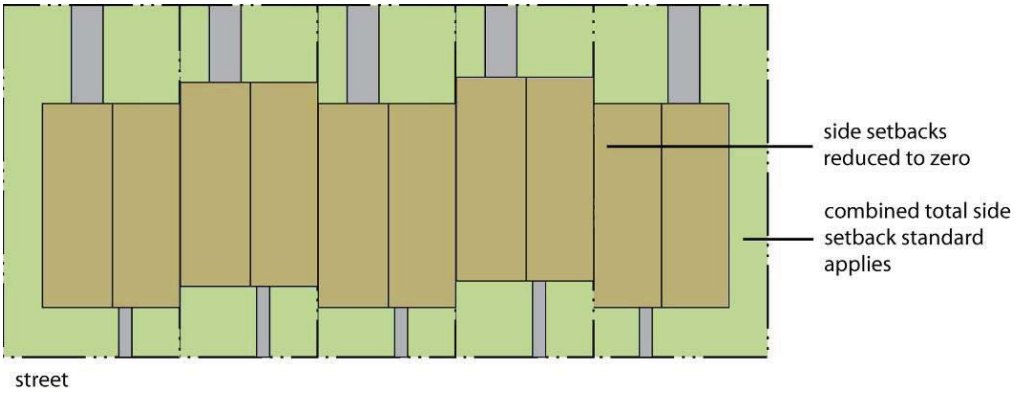
5-14-1 General

Attached (single-family) houses are allowed in accordance with the use table of Sec. 4-11.

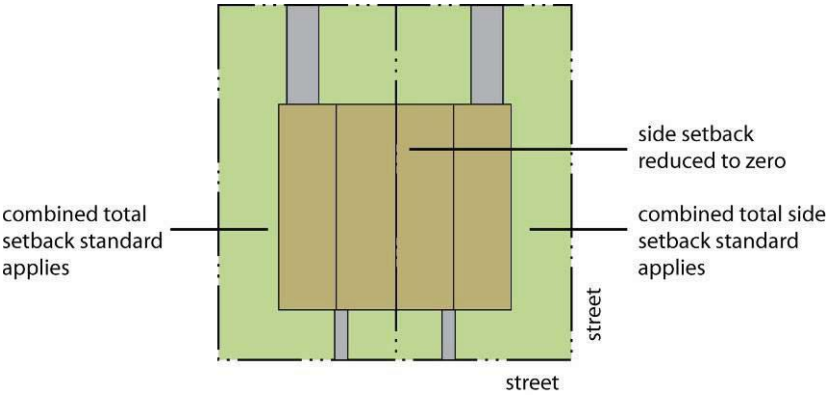
(A) All attached houses must comply with the lot and building standards that apply to the type of development (conventional, cluster or open space) in which such houses are located, except when those standards are expressly modified by the attached house standards of this section.

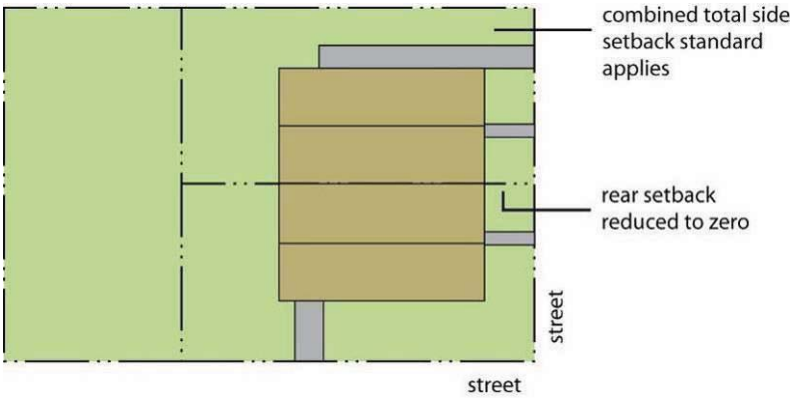
(B) The common or abutting wall between attached units must be shared for at least 50 percent of the length of each unit.

(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.

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*).

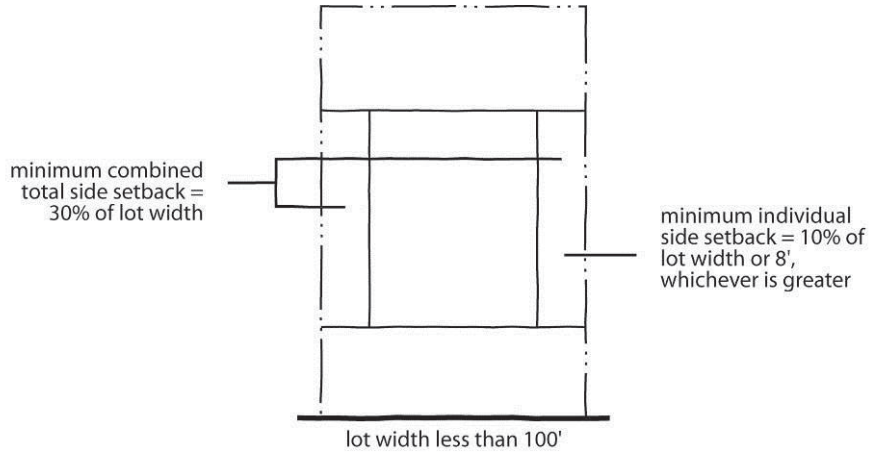
5-30-3 Features Allowed within Required Setbacks

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.

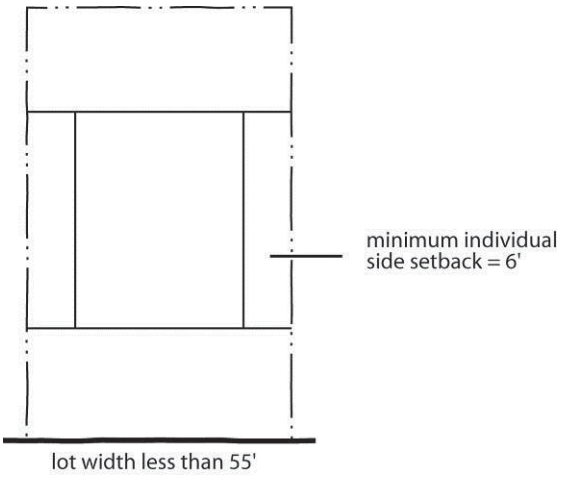
5-30-4 Side Setbacks on Narrow Lots

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.



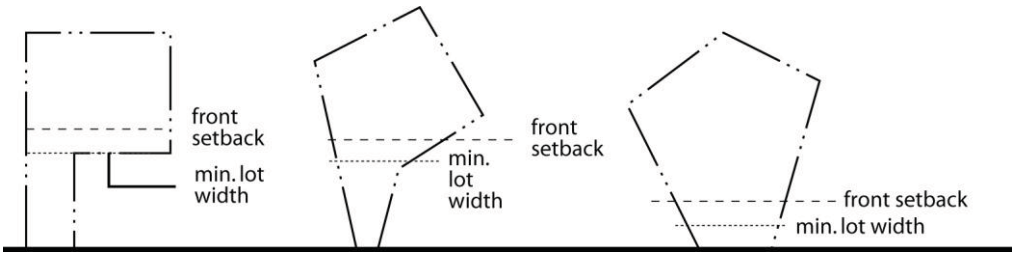
5-30-5 Setbacks on Irregularly Shaped Lots

(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.

(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:

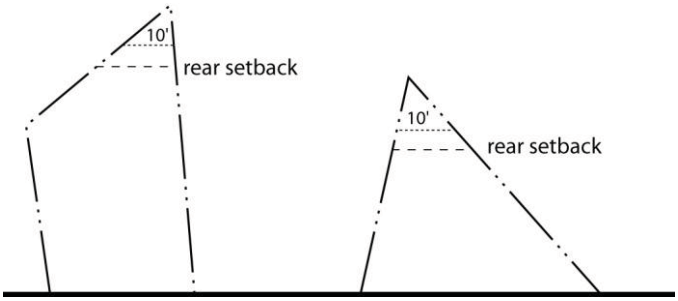
(a) is within the lot;

(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

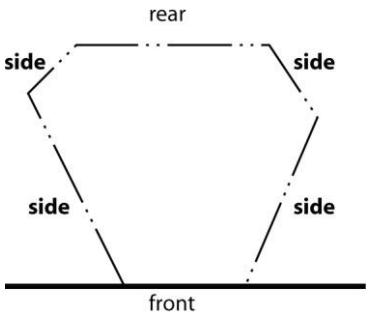
(d) extends across the entire width of the lot.

(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.



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

(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

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.

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.

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

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

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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.

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.

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.

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.

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

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 co**n**sidered 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.

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 Statues.

(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.

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 of 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

(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 or 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

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.

(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

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 1I.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 that 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;

(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.

(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 upgrade of exposed areas must be controlled to reduce erosion and sediment loss during the period of exposure.

(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

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.

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.

(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

(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.

(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-

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 competed 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

(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.

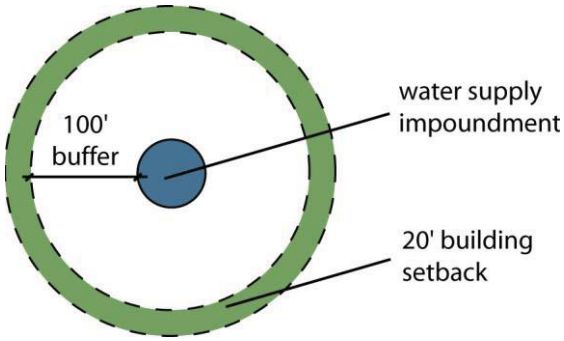
(D) All limits of disturbance within watershed buffers apply to each side of the water body.

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.

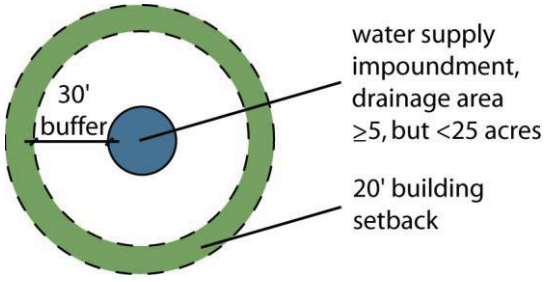


11-21-3 Water Supply Impoundments, 5 to 25 Acres

(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.

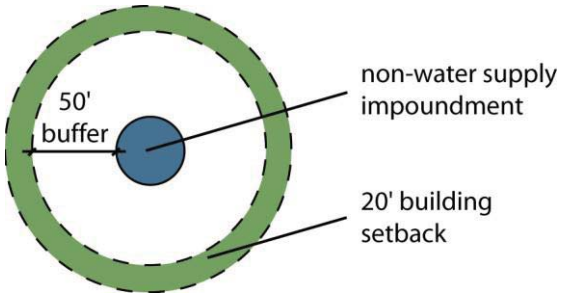


11-21-4 Non-Water Supply Impoundments

(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.

(C) Buildings must be setback at least 20 feet from the outer boundary of the required buffer area.



11-21-5 Perennial Streams

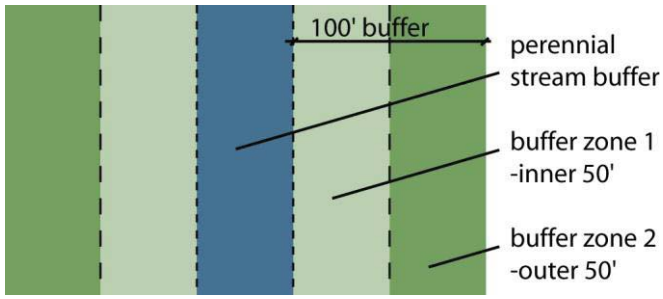
(A) A water supply watershed buffer with a minimum width of 100 feet must be provided along each side of a stream shown as a perennial stream on the most recent edition of U.S.G.S. 1:24,000 (7.5 minute) scale topographic maps. [1]

(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.

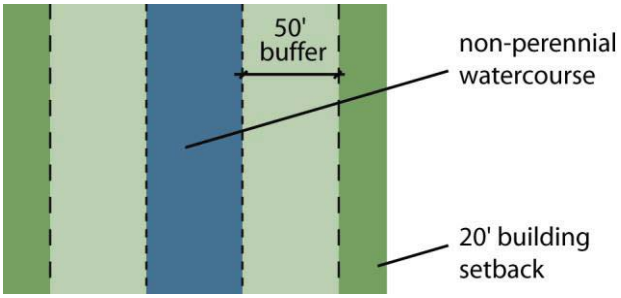


11-21-6 Non-Perennial Watercourses

(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.

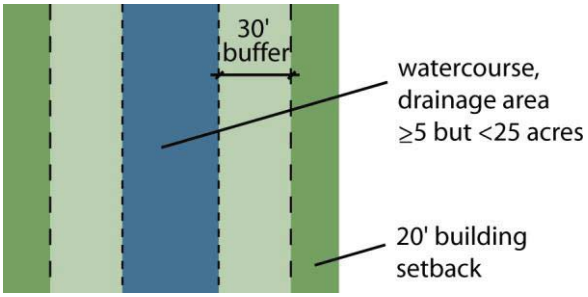


11-21-7 Watercourses and Channels, 5 to 25 Acres

(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;

(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;

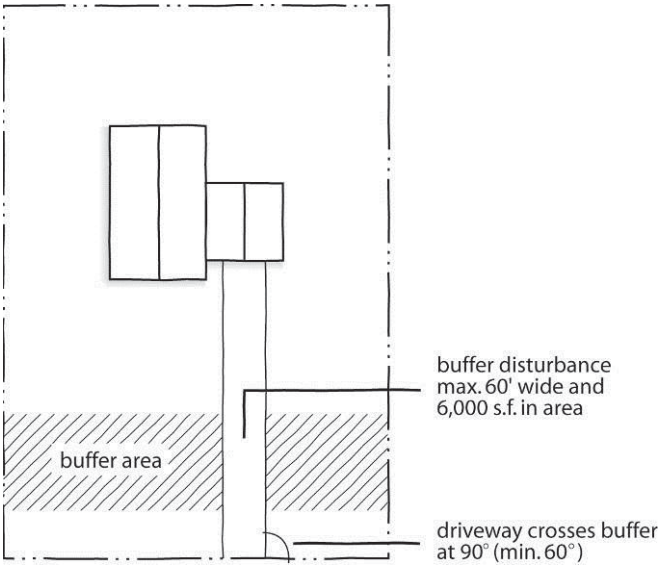
(2) buffer disturbance is no more than 60 feet wide;

(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.



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

(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);

(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.

(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				

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-though 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.

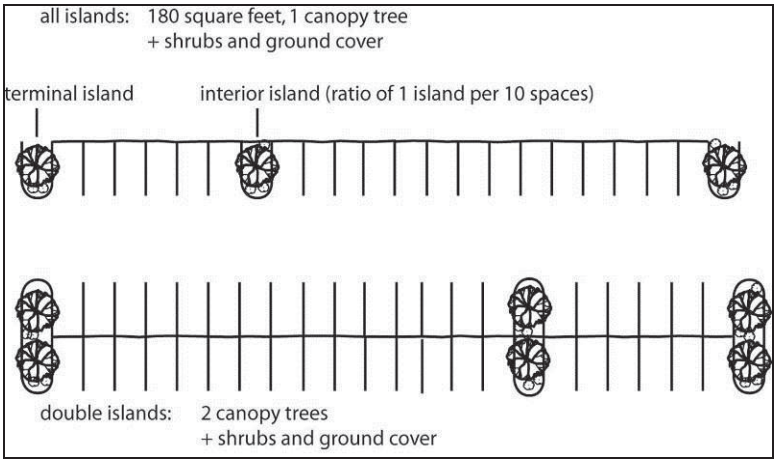
(B) Interior Landscaping

(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

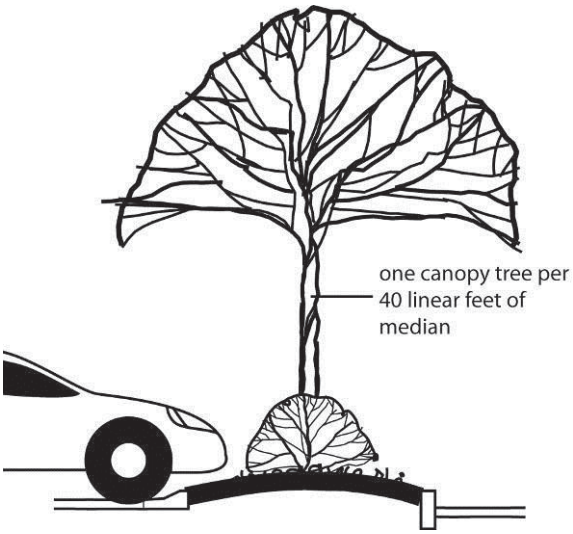
ii. a landscape divider median between abutting rows of parking spaces. Each terminal and interior landscape island must be at least 180 square feet in size and be planted with a minimum of 1 canopy tree, as well as shrubs, and ground cover. Double islands within a double row of parking (typically the area of 2 abutting parking spaces combined into a single parking lot island) must be planted with 2 canopy trees, shrubs, and ground cover.



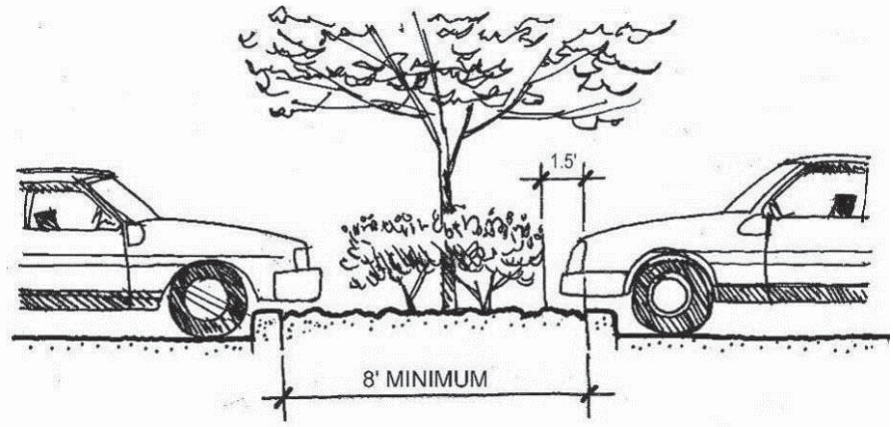
(2) Each landscape island must have a horizontal dimension of at least 9 feet, as measured back-of-curb to back-of-curb.

(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.



(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

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.

Bufferyard Depth and Screening (feet/screen type)

	Class of Proposed Use					
	Residential			Nonresidential		
	Low-density [1]	Medium-density [2]	High-density [3]	Low-intensity [4]	Medium intensity [5]	High-intensity [6]
Class of Adjacent Existing Use						
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

(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

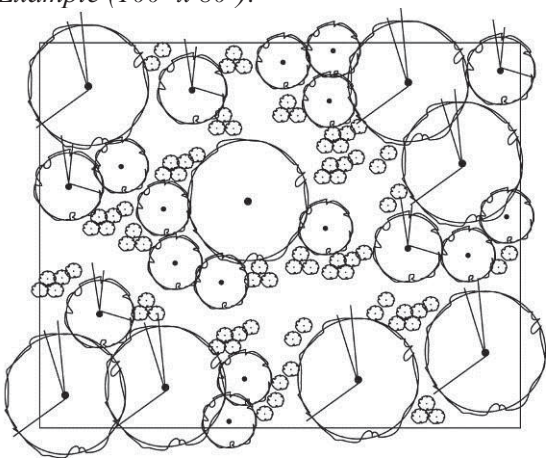
(b) Example 2—Deciduous Screen

- **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

Example (100' x 80'):



(d) Example 4—Overhead Utility Screen

i. 0 deciduous canopy trees

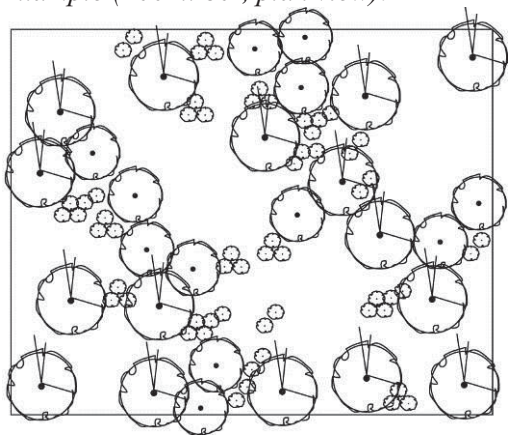
ii. 0 evergreen trees

iii. 16 deciduous understory trees

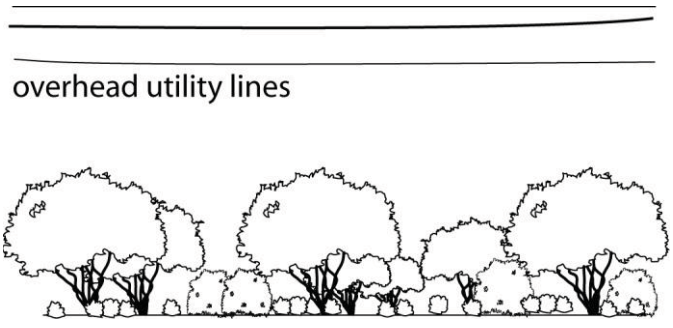
iv. 12 evergreen understory trees

v. 65 shrubs

Example (100' x 80', plan view):



Example (100' x 80', elevation view):



(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

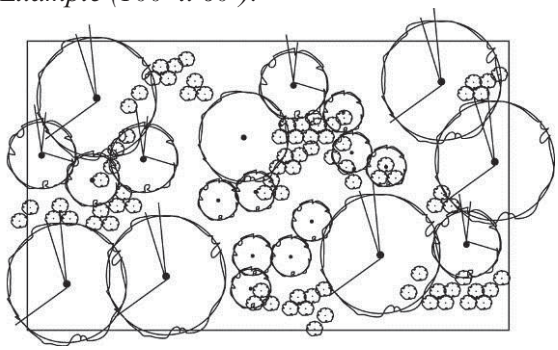
(b) Example 2—Deciduous Screen

- **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

i. 0 deciduous canopy trees

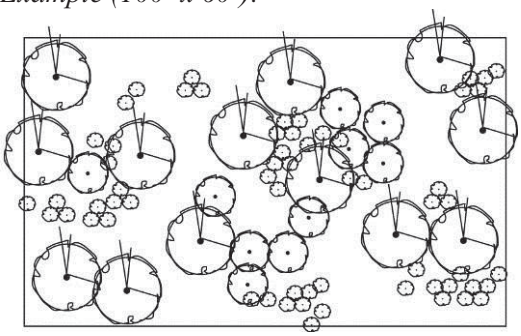
ii. 0 evergreen trees

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

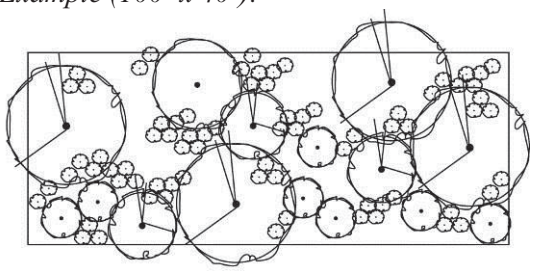
ii. 1 evergreen tree

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

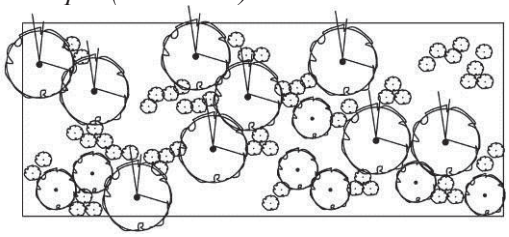
ii. 0 evergreen trees

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

(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

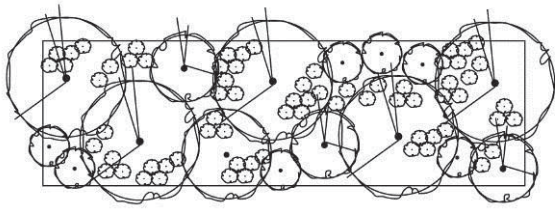
ii. 1 evergreen tree

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

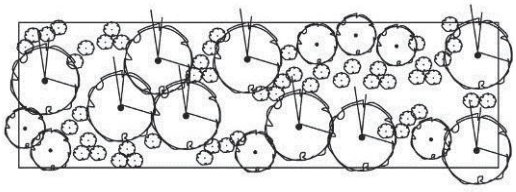
ii. 0 evergreen trees

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

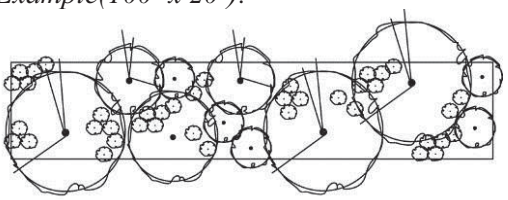
ii. 1 evergreen tree

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

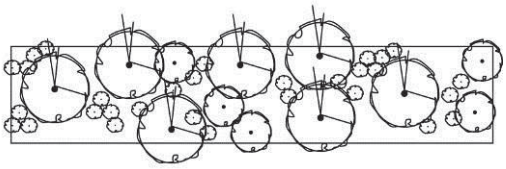
ii. 0 evergreen trees

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

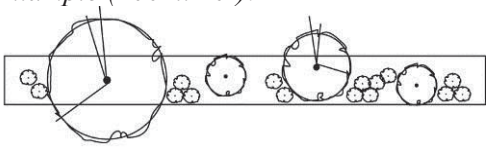
ii. 0 evergreen trees

iii. 1 deciduous understory tree

iv. 2 evergreen understory trees

v. 15 shrubs

Example (100' x 10'):



(d) Example 4—Overhead Utility Screen

i. O deciduous canopy trees

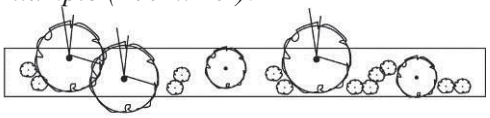
ii. 0 evergreen trees

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.

(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-feet-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 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.

(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.

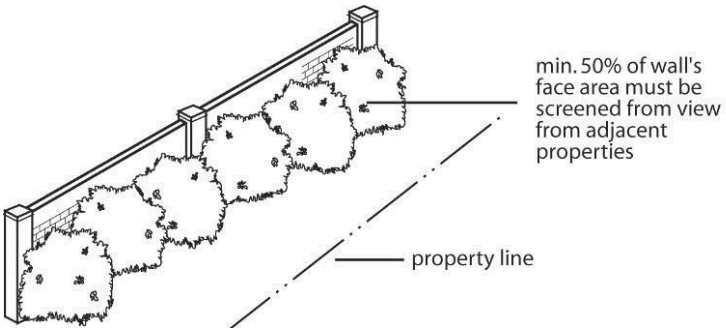
(6) Minimum Height at Maturity

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 (½) 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

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.

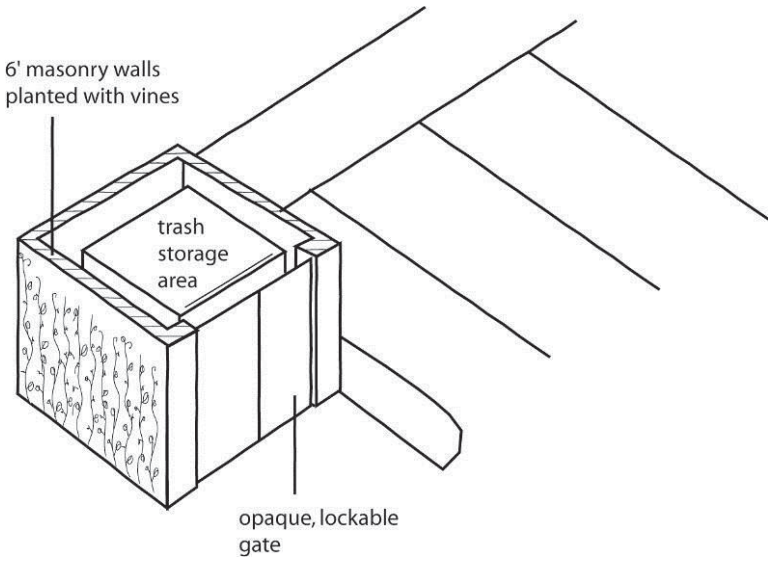
OA 05/03 September 19, 2005

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.

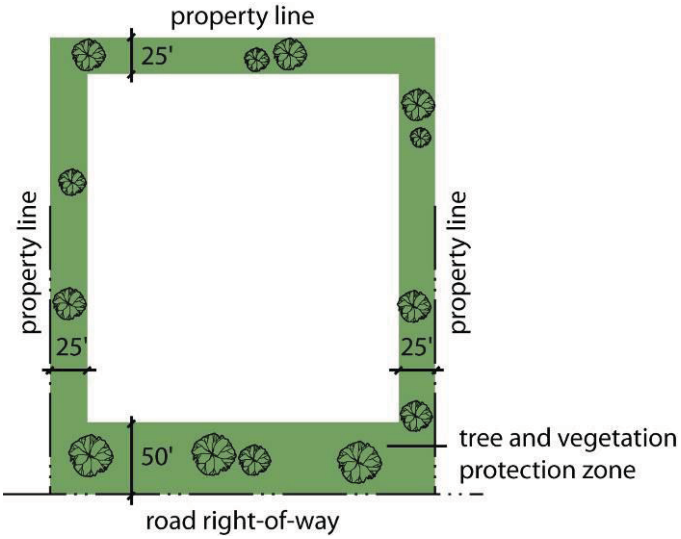
[Amended of 1/22/2008 by OA 04-07.]

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:

(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.]

(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.

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.

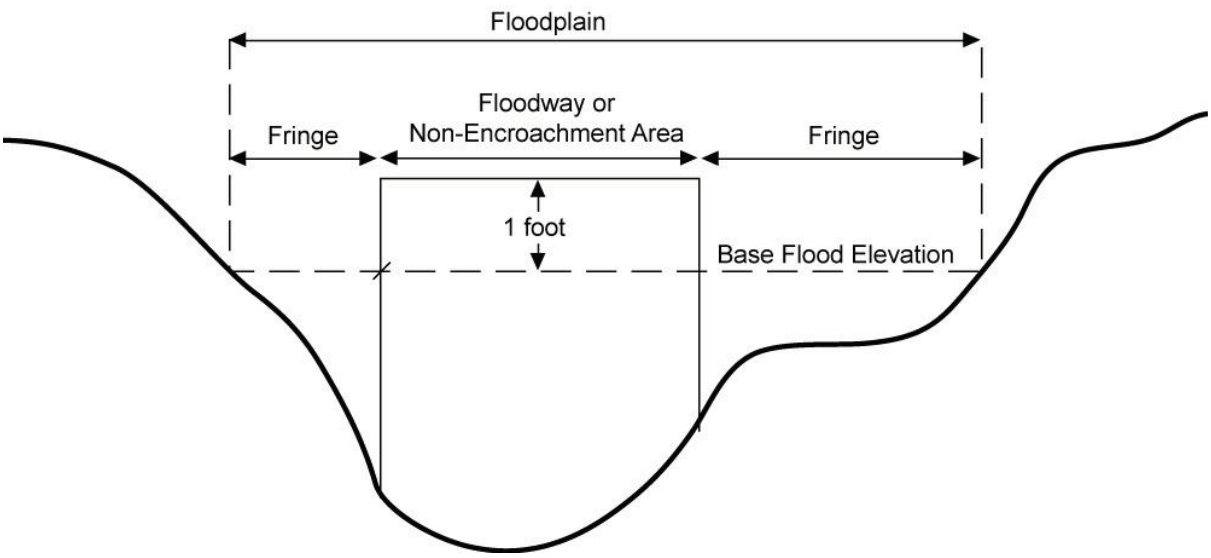
Flood Study
A study of the potential changes in the base flood elevation caused by the obstruction, encroachment, alteration or relocation of: (1) a FEMA mapped floodway; (2) a non-encroachment area; (3) a FEMA mapped area of special flood hazard that has not previously been studied in detail; (4) flood hazard soils areas with a total drainage area of more than 5 acres but no more than 25 acres;

(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.

Stream Cross-Section Showing Floodplain, Flood Fringe, Non-Encroachment Area and Floodway



Note: 1 foot indicates the maximum rise of the base flood elevation attributable to fill and or encroachment into the floodway fringe.

Floodplains accommodate increased water flow during storm events. As the level of development within a watershed increases, many characteristics of streams change, including the location/elevation of the floodplain. As development occurs and impervious surfaces increase, there is more runoff during storms, and the water levels within urban streams rise quickly.

Limiting development in the floodplain minimizes the amount of property damage that will occur during storms and protect lives. In addition, undeveloped floodplains filter sediment and other pollutants and help protect water quality.

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.

(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

(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

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.

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

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

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

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.

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;

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);

(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;

(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:

(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 l, 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 11-22-2 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;

(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.

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).

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

(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;

(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;

(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.

(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

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.

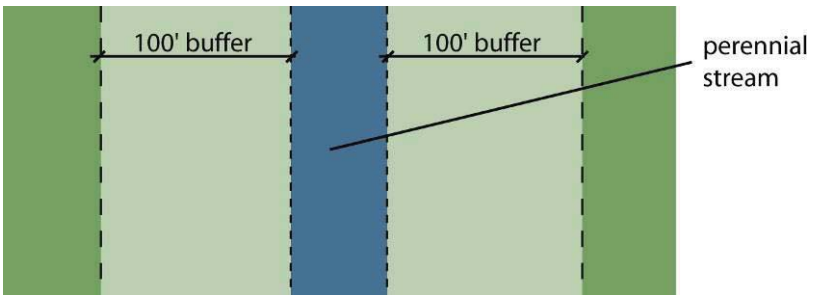
(b) Some streams may require both special watershed buffers and Neuse River riparian buffers.

(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

(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);

(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;

(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

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.

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

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 1I .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

- Long-Range CIP Plan

Long-Range Capital Improvement Program (CIP) Plan

Last Updated : 2/25/14

PROJECT DESIGNATIONS	FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	Total
Water System Projects											
General Water System Improvements	$250,000	$250,000	$300,000	$300,000	$350,000	$350,000	$350,000	$350,000	$350,000		$2,850,000
Waterline Improvements at Hwy 55/US-1		$1,500,000									$1,500,000
PW / Hwy. 55 Waterline		$400,000									$400,000
Water System Storage					$2,500,000						$2,500,000
Elevated Tank Coating	$115,000	$1,400,000									$1,515,000
WTF Expansion (40 mgd to 56 mgd)	$5,000,000	$5,500,000	$5,500,000								$16,000,000
WTF Supplemental Supply / Recycle									$3,000,000		$3,000,000
48-Inch Raw Water Transmission Line				$4,500,000							$4,500,000
Jordan Lake Aeration		$500,000									$500,000
Upgrade Metering / IVR		$1,000,000	$1,000,000	$1,000,000							$3,000,000
Total - Water System											**$35,765,000**
Sewer System Projects											
I & I Reduction	$300,000	$350,000	$400,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000		$3,750,000
General Sewer System Improvements	$200,000	$250,000	$250,000	$250,000	$300,000	$300,000	$300,000	$300,000	$300,000		$2,450,000
Ph. I-Western Regional WRF Project	$10,000,000	$5,000,000									$15,000,000
Site 14 Water/Sewer Plan	$1,200,000										$1,200,000
Regional Sewer Collection System	$6,000,000	$2,000,000									$8,000,000
Ph. II-Western Regional WRF Project								$1,000,000			$1,000,000
Replace Genset at WWTP (Genset 500KW and 400KW)	$200,000	$150,000									$350,000
Total - Sewer System											**$31,750,000**
Environmental Programs											
New Grapple Truck	$135,000										$135,000
Replacement Grapple Truck					$135,000					$135,000	$270,000
New Vacuum Truck	$140,000										$140,000
Replacement Vacuum Truck			$140,000				$140,000				$280,000
Replacement Chipper				$45,000				$45,000			$90,000
Replacement Chipper Truck		$90,000				$90,000					$180,000
Replacement F-450		$55,000							$55,000		$110,000
Total - Environmental Programs											**$1,205,000**
Fire Department											
2002 Quality Pumper						$425,000					$425,000
New Engine/Quint for Station 5		$450,000									$450,000
2006 E-One 95 ' Platform Ladder								$875,000			$875,000
2004 75" Quint Ladder					$650,000						$650,000
2006 Pierce Pumper									$350,000		$350,000
2001 HME Pumper				$425,000							$425,000
1995 HME Heavy Rescue				$425,000							$425,000
1990 GMC Mobile Command Unit					$75,000						$75,000
1991 International Tanker				$165,000							$165,000
1987 Ford Rescue		$37,000									$37,000
2001 Chevy Blazer						$25,000					$25,000
2005 Expedition Fire Marshal		$32,000									$32,000
2004 Expedition - Assistant Chief		$32,000									$32,000
Replacement compressor for breathing air			$200,000								$200,000
6000 PSI Bottle System for Cascade Storage		$20,000									$20,000
New Engine for Station 6				$425,000							$425,000
3 Year Replacement of SCBA Breathing Apparatus (65 Units) 21/Year					$94,700	$94,700	$94,700				$284,100
3 year 800 Mhz. Radio replacement/upgrade	$43,000	$47,000	$47,000								$137,000
Total - Fire Department											**$5,032,100**
Electric System Improvements											
Upgrade Metering / IVR	$90,000	$1,000,000	$1,000,000	$1,000,000							$3,090,000
Upgrade Load Management System		$500,000	$500,000								$1,000,000
Point of Delivery #3 - Two Circuits Southwest	$500,000										$500,000
Point of Delivery #3 - Add Transformer			$1,500,000								$1,500,000
Point of Delivery #4 - Land Acquistion				$550,000							$550,000
Point of Delivery #4 - Circuits						$550,000	$550,000				$1,100,000
Point of Deliver #4 - Substation					$3,575,000	$3,575,000					$7,150,000
Point of Delivery #1 - Add Transformer						$1,250,000	$1,250,000				$2,500,000
Point of Deliver #1 - Circuits							$500,000	$500,000			$1,000,000
Facilities Installation for Regional Water Reclamation Facility	$850,000										$850,000
Total - Electric Improvements											**$19,240,000**
Transportation Improvements											
Fully Funded Active Projects											
Intersection - U-5118 AC: NC 55 Improvements (LAPP match 20%)	$122,600										$122,600
Intersection - U-5118 AD: Ten Ten Rd Improvements (LAPP match 20%)	$132,000										$132,000
Sidewalk - EL-5100 DD - Laura Duncan Rd MUP (LAPP match 20%)	$121,000										$121,000
Sidewalk - Moore St from Apex Middle School to Tunstall Ave	$96,000										$96,000
Sidewalk - U-5530 AA: Old Raleigh Rd East Sidewalk (LAPP match 20%)	$38,500										$38,500
Sidewalk - U-5530 AB: Tingen Rd Sidewalk (LAPP match 20%)	$20,000										$20,000
Sidewalk - W Chatham St from east of Jones St to Saunders St	$175,000										$175,000
Widening - Second St from Lynch St to Harwood St (CDBG match 20%)	$92,000										$92,000
Widening - U-5537: Lake Pine Dr at Community Park (PE only, LAPP match 30%)	$99,000										$99,000
Future Projects with Anticipated Funding											
Intersection - Kelly Road at Olive Chapel Road (LAPP match 20%)		$126,000									$126,000
Peakway - Olive Chapel Road and NC 55 (LAPP match 20%)		$97,000									$97,000
Annual Program Allocations with Anticipated Funding											
Resurfacing & Rehab - General Street System	$1,100,000	$1,160,000	$1,220,000	$1,280,000	$1,340,000	$1,410,000	$1,480,000	$1,550,000	$1,630,000	$1,710,000	$13,880,000
Sidewalk - New Construction, Multiple Locations		$110,000	$120,000	$130,000	$140,000	$150,000	$160,000	$170,000	$180,000	$190,000	$1,350,000
Signalization and Coordination		$110,000	$120,000	$130,000	$140,000	$150,000	$160,000	$170,000	$180,000	$190,000	$1,350,000
Proposed Future Projects - Funding Needed											
Peakway - S Salem St Quadrant Interchange (over CSX and S Salem St)			$3,900,000								$3,900,000
Sidewalk - Olive Chapel Rd from Hollands Crossing to American Tobacco Trail			$550,000								$550,000
Sidewalk - S Salem St from Apex Barbecue Rd to West St			$400,000								$400,000
Peakway - NC 55 to Schieffelin Road				$4,900,000							$4,900,000
Sidewalk - Apex Barbecue Rd from Evans Rd to S Salem St				$550,000							$550,000
Sidewalk - Apex Barbecue Rd from Olive Chapel Rd to Evans Rd				$350,000							$350,000
Sidewalk - W Chatham St from Saunders St to Hunter St				$200,000							$200,000
Railroad - Center Street Crossing Improvements					$500,000						$500,000
Roadway - North Tunstall Ave, complete gaps from Center St to Old Raleigh Rd					$710,000						$710,000
Widening - S-N Tunstall Ave, NC 55 to Center St, widen, curb and sidewalk					$740,000						$740,000
Widening - Templeton Street - widen, curb and sidewalk					$150,000						$150,000
Peakway - Inside Loop, Olive Chpl Rd to NC 55, widening w/MUP						$1,000,000					$1,000,000
Widening - Pate Street, Hunter St. to Cash St - widen, curb and sidewalk						$250,000					$250,000
Peakway - Inside Loop, NC 55 to N Salem St, widening w/ MUP							$4,000,000				$4,000,000
Peakway - Inside Loop, Center St (Schieffelin Rd) to NC 55, widening w/ MUP								$4,000,000			$4,000,000
Peakway - Inside Loop, Laura Duncan Rd to Center St, widening w/ MUP									$4,000,000		$4,000,000
Peakway - Inside Loop, N Salem St to Laura Duncan Rd, widening w/ MUP										$5,000,000	$5,000,000
Total Proposed Transportation Improvements											**$48,899,100**
Parks and Recreation											
Nature Park Enviornomental Education Center			$870,000								$870,000
Beaver Creek Greenway (Kelly Road to Nature Park)		$370,000									$370,000
Apex Skate Plaza (Bown included in Phase 1)		$440,000	$345,000								$785,000
Salem Pond Park (Design Complete)		$715,000									$715,000
Middle Creek Greenway (Miramonte to Holly Springs)			$900,000								$900,000
White Oak Creek Greenway (Developer Fees/Construction)				$300,000	$2,000,000						$2,300,000
NorthWest Park (50 acres min)				$5,000,000							$5,000,000
NorthWest Park Construction					$5,000,000						$5,000,000
Southwest Park (50 acres min)				$5,000,000							$5,000,000
Southwest Park Construction					$5,000,000						$5,000,000
Total - Parks and Recreation											**$25,940,000**
Facilities											
Construct Public Works Expansion - Phase 1	$2,900,000										$2,900,000
Design Public Works Expansion - Phase 2 (Electric Division Relocation)				$300,000							$300,000
Construct Public Works Expansion - Phase 2 (Electric Division Relocation)					$3,600,000						$3,600,000
Design Public Works Expansion - Phase 3 *($3M in FY 2022-23)*									$240,000		$240,000
Construct Public Works Expansion - Phase 3											$0
Pre - Design of Annex Building - Town Campus	$20,000		$415,000								$435,000
New Annex Building - Town Campus					$5,500,000						$5,500,000
Long Term Feasability Studies for Fire Stations 1 & 2		$16,000									$16,000
Lot Acquisition behind Fire Station #3		$685,000									$685,000
Design Administrative/Training Station at Fire Station #3		$450,000									$450,000
Public Safety Center #5 - Design		$180,000									$180,000
Public Safety Center #5 - Acquisition & Improvements		$3,200,000									$3,200,000
Public Safety Center #6 - Design				$200,000							$200,000
Public Safety Center #6 - Acquisition & Improvements					$3,500,000						$3,500,000
Town Campus Senior Center Project - Full Design		$340,000									$340,000
Town Campus Senior Center Project - Construction			$2,850,000								$2,850,000
Total - Facilities Improvements											**$24,396,000**

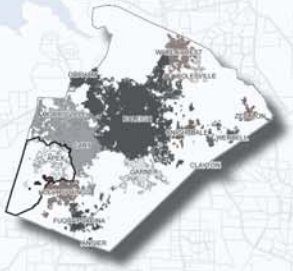
Appendix D – Land Use Definitions & Maps

- Peak Plan 2030 - Future Land Use Map
- Peak Plan 2030 - Future Land Use Definitions
- Southwest Wake County Land Use Map & Wake County Land Use Definition (see Appendix B)
- NC 540/Western Wake Freeway Apex Corridor Plan
- Town of Apex Western Area Plan

2030 Land Use Map

Town of Apex, North Carolina

Printed August 21, 2013



0 0.5 1 2 3 4 Miles

0 2,500 5,000 10,000 15,000 20,000 Feet

CARY

N

CHATHAM COUNTY

HOLLY SPRINGS

CHATHAM COUNTY

Land Use Inside Apex Peakway

Future Land Classifications

- Protected Open Space
- Rural Density Residential
- Low Density Residential (Single-family homes)
- Medium Density Residential (Single-family homes and townhomes)
- Medium/High Density Residential (Single-family homes and townhomes)
- High Density Residential (Townhomes and apartments)
- Office Employment
- Commercial Services
- Industrial Employment
- Park
- Golf Course
- School
- Landfill
- Right-of-Way
- Property Lines
- Duke Energy Land
- Proposed Major Collectors/Thoroughfares

Potential Activity Centers

- Neighborhood Mixed Use (NMU)
  - •Up to 100,000 ft² of retail
  - •1 to 2-mile trade area
- Employment Mixed Use (EMU)
  - •Office, warehousing, tech/flex
  - •Some retail
- Community Mixed Use (CMU)
  - •Up to 350,000 ft² of retail
  - •4 to 6-mile trade area
- Regional Mixed Use (RMU)
  - •Over 500,000 ft² of retail
  - •>10-mile trade area

2030 Land Use Map Classification	Allowable Zoning Districts
Protected Open Space	CB
Rural Residential	RA, RR, PUD
Low Density Residential	RA, RR, LD, PUD
Medium Density Residential	MD, PUD
Medium/High Density Residential	MH, MHP, HDSF, HDMF, PUD, TND
High Density Residential	HDMF, PUD, TND
Office Employment	B1, B2, O&I, TF, PUD, MEC
Commercial Services	B1, B2, PC, PUD
Industrial Employment	LI, TF, PUD, MEC
Mixed Use	MORR, PUD, TND, MEC, SD

The 2030 Land Use Map is based on the recommendations of *Peak Plan 2030: The Apex Comprehensive Plan*. *Peak Plan 2030* was adopted by the Town of Apex Town Council on August 6, 2013 and provides a snapshot of the Town's vision for future land use on that date. All land use classification amendments approved by the Town Council following the original Map adoption are reflected on this map and, therefore, make the 2030 Land Use Map a dynamic document. Amendment dates are listed below.

August 20, 2013

Created and published by the Town of Apex Planning Department

Description of Land Uses

Fourteen land use categories are depicted on the map, including variations of mixed-use development in certain areas. Each category is intended to indicate a predominant land use—or set of uses—as well as other features that define the character of the category. A brief description of each category is provided below. Each description is consistent with the ideas and vision the community has for the future development pattern. These descriptions do not propose a change to existing development within each category; instead, they suggest a direction moving forward and list qualities to be embodied by new development and redevelopment. *Table 4* details the relationship between categories on the 2030 Land Use Map and existing zoning districts.

PROTECTED OPEN SPACE

- Protected Open Space characterizes the areas around the Shearon Harris Reservoir and large portions of the land adjacent to Jordan Lake owned by the federal government and managed by the North Carolina Wildlife Resources Commission.
- The area will remain largely undeveloped because of the desire of the landowners to preserve the area as protected open space.

RURAL RESIDENTIAL

- Rural Residential is intended to protect and enhance the rural character of the western-most and southwestern portions of the study area. The land is to remain minimally developed with single-family residential uses at very low densities.
- The area is characterized by homestead properties, defined as one home on more than ten acres, and large tracts of agricultural lands.
- Rural Residential provides a transition from the Protected Open Spaces around Jordan Lake and Shearon Harris Reservoir to Low Density Residential.

LOW DENSITY RESIDENTIAL

- Low Density Residential is intended to remain predominately rural in character and provide for low density single-family residential development on lots smaller than those in Rural Residential areas.
- The area is characterized by single-family homes on lots averaging 10,000 square feet with densities not to exceed three units per acre.
- Low Density Residential provides a transition from the more suburban areas of Apex to the rural edges of western Wake County.

MEDIUM DENSITY RESIDENTIAL

- Medium Density Residential primary uses include both single-family homes and townhomes up to 6 units per acre.
- Medium Density Residential provides a transition from the more urbanized areas of Apex to the Low Density neighborhoods in the western part of the study area.

MEDIUM/HIGH DENSITY RESIDENTIAL

- Medium/High Density Residential primary uses include single-family homes and townhomes up to 14 units per acre.
- Medium Density/High Density Residential provides for a variety of housing options located in close proximity to major transportation corridors.

HIGH DENSITY RESIDENTIAL

- Townhomes and apartments up to 20 units per acre are included in the High Density Residential category.
- High Density Residential provides for housing options to be located in close proximity to major commercial areas and transportation corridors.

OFFICE EMPLOYMENT

- Office Employment is intended to provide land that allows for a wide range of businesses

that provide professional, managerial, or administrative services in the study area.

- Depending on the location in question and the mixture of uses the character and intensity of Office Employment varies from neighborhood business services to large-scale regional employment centers.

COMMERCIAL SERVICES

- Commercial Services is intended to delineate land where commercial uses are appropriate to serve the residents of Apex and the greater region.
- A mix of commercial conveniences is encouraged in the areas defined as Commercial Services.
- The mixture of uses, character of development, and intensity of Commercial Services varies from neighborhood serving commercial to large-scale regional retail centers.

INDUSTRIAL EMPLOYMENT

- Industrial Employment is intended to delineate land that allows for industrial uses such as light manufacturing, tech-flex, warehousing, and processing facilities in the study area.

GOLF COURSE

- Golf Course recognizes the existing Knight's Play Golf Center.

PARKS

- Parks recognizes existing parks serving the study area. They vary in size, range of activities offered and level of programming depending on the type of park.

SCHOOL

- School recognizes existing and planned schools serving the study area.

LANDFILL

- Landfill notes the site of the existing landfill in Apex. Particular attention should be paid to adjacent uses to avoid nuisance conflicts.

RIGHT-OF-WAY

- Right-of-way illustrates the major transportation corridors in the study area.

Table 4: Relationship Between Land Use Map and Zoning Districts

2030 Land Use Map Classification	Allowable Zoning Districts
Protected Open Space	CB
Rural Residential	RA, RR, PUD
Low Density Residential	RA, RR, LD, PUD
Medium Density Residential	MD, PUD
Medium/High Density Residential	HDSF, MH, MHP, PUD, TND
High Density Residential	HDMF, PUD, TND
Office Employment	O&I, TF, PUD, MEC
Commercial Services	B1, B2, PC, PUD
Industrial Employment	LI, TF, PUD, MEC
Mixed-Use	MORR*, PUD, TND, MEC, SD

*The MORR (Mixed Office-Residential-Retail) is only allowed where office, residential, and retail uses are depicted by the striped area.

Description of Mixed-Use Nodes

The 2030 Land Use Map identifies four types of mixed-use designations, each with their own character and economic development potential. While the uses within each may vary, all should be designed as walkable, pedestrian-oriented areas. In addition, this plan recognizes that economic and market conditions fluctuate. While the specific location and development program of each may change over time, the primary characteristics of each should serve as a flexible guide to help shape growth in Apex.

NEIGHBORHOOD MIXED-USE

As illustrated in *Figure 5: Humie Olive Development Concept*, neighborhood mixed-use is suited for a variety of residential uses developed around a concentration of retail and commercial uses. The scale of a neighborhood mixed-use node varies depending on the market, purchasing power of surrounding neighborhoods, and number of competing centers in close proximity. Typical neighborhood mixed-use nodes range from 30,000 square feet to 100,000 square feet of retail and have a service area of one to two miles.

Key characteristics of neighborhood mixed-use nodes include an interconnected street system that



Figure 5: Humie Olive Development Concept

provides linkages to shopping, services, housing, and amenities and a well-connected pedestrian and bicycle network. Residential development should be most dense around the retail core. Apartments and townhomes in close proximity to convenience retailers provide for more daily trips to be taken on foot or by bike. New single-family homes should provide the transition from the center to existing residential neighborhoods. Pocket parks and community greens should be connected by an internal network of sidewalks and greenways. In addition, the neighborhood center should be connected to adjacent facilities (in this case, the planned High School site) by greenways and trails to provide a safe, off-road transportation facility.

COMMUNITY MIXED-USE

Compared to neighborhood mixed-use, community mixed-use typically serves a larger population and includes up to 350,000 square feet of leasable space. The typical trade area of a community mixed-use node is four to six miles.

As illustrated in *Figure 6: Westford Development Concept*, a community mixed-use node should be anchored by a large commercial use such as a grocery store. Additional retail and commercial services should be oriented on an internal network of streets. Office and civic uses such as libraries or recreation facilities are also appropriate in community mixed-use nodes. Where the market permits, housing could



Figure 6: Westford Development Concept

be integrated as part of a vertical mix of uses in the community center core. Parking requirements should be reduced to maximize the amount of land used for buildings or public space. As with a neighborhood mixed-use node, apartments and townhomes in close proximity to retailers provide for more daily trips to be taken on foot or by bike. All portions of the development should be accessible by both a direct and convenient road network and a system of sidewalks and greenways. A safe and attractive pedestrian network should also connect community amenities such as pocket parks, pedestrian plazas, and recreation facilities. Single-family homes should provide the transition from the denser core of the commercial activity to adjacent developments.

EMPLOYMENT MIXED-USE

Employment mixed-use supports a greater diversity of land uses in Apex and promotes areas for job growth. Employment nodes could include a variety of uses including light industrial, warehousing, office, research, tech-flex, etc. As illustrated in *Figure 7: Middle Creek Development Concept*, the employment uses should be mixed with a limited amount of supporting commercial uses such as restaurants and convenience retailers to serve employees. Where feasible, buildings should be oriented around a common focal point such as a common green space or water feature. An internal network of sidewalks and pedestrian plazas would encourage employees to walk between destinations promoting a healthy workforce.



Figure 7: Middle Creek Development Concept

REGIONAL MIXED-USE

A regional mixed-use node, like the development planned at Veridea, provides the best opportunity for a vertical mixture of retail, employment, and residential uses in Apex. Regional nodes are ideally located at the intersection of major regional thoroughfares. These prime locations provide the high-visibility and accessibility sought by large-scale retailers and businesses. Regional mixed-use nodes typically have over 300,000 square feet of leasable area and draw from a trade area that ranges from ten to twenty-five miles.

An interconnected system of roadways and pedestrian and bicycle facilities should provide a variety of transportation options that are safe and accessible to all users internal and external to the site. Transit and transit stops should be integrated into the development. Residential options should vary from apartments, condominiums, and townhomes to detached single-family units. A network of parks, plazas, and natural areas should provide residents, employees, and visitors alike an opportunity for both active and passive recreation.

Veridea, a 1,100-acre mixed-use development in southern Apex, is expected to have 10 million square feet of office, 3.5 million square feet of retail, and approximately 2 million square feet of manufacturing space, in addition to 20,000 residents at build-out.

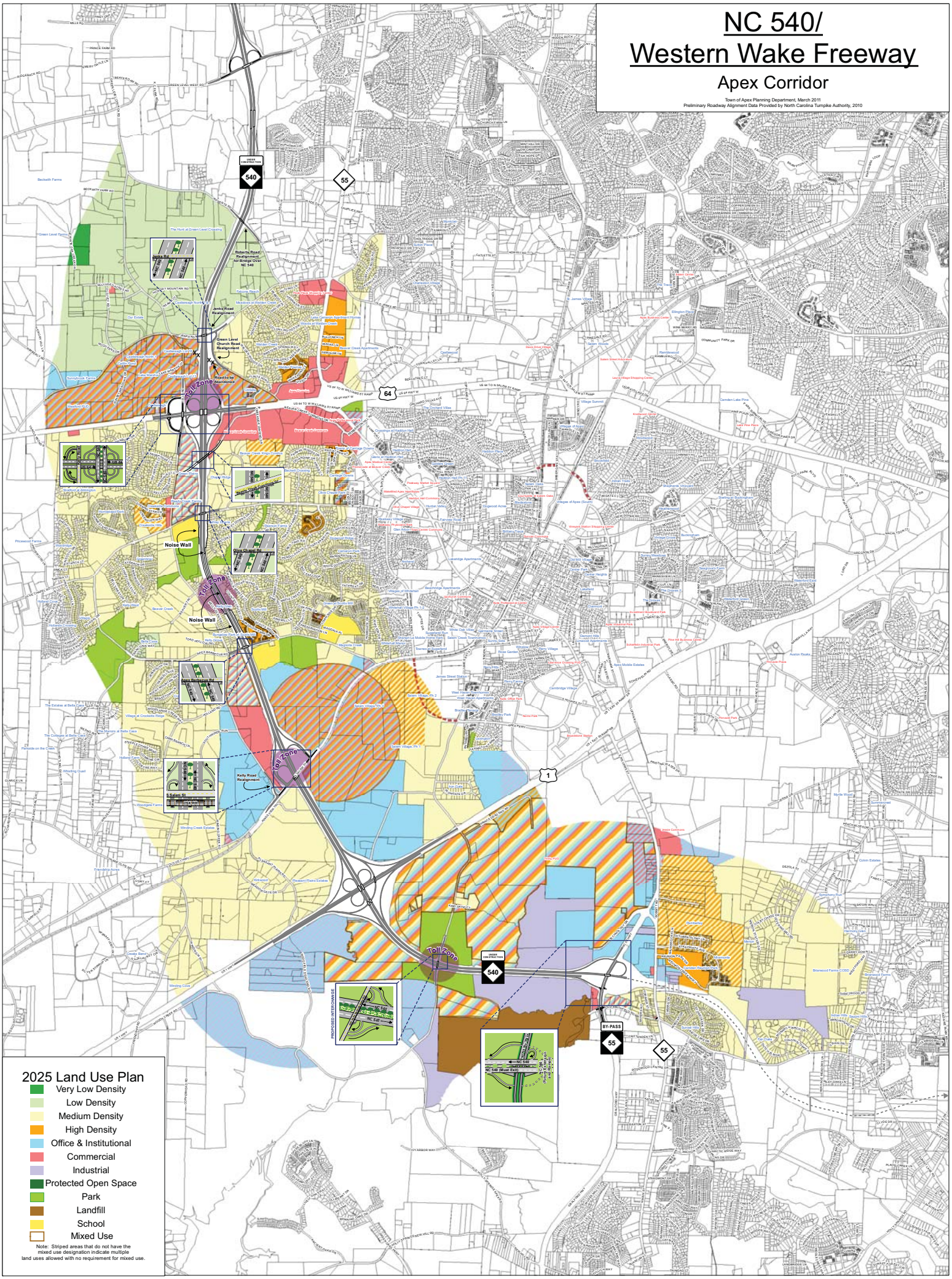


Figure 8: Veridea Development Concept Plan

NC 540/ Western Wake Freeway

Apex Corridor

Town of Apex Planning Department, March 2011
Preliminary Roadway Alignment Data Provided by North Carolina Turnpike Authority, 2010



2025 Land Use Plan

- Very Low Density
- Low Density
- Medium Density
- High Density
- Office & Institutional
- Commercial
- Industrial
- Protected Open Space
- Park
- Landfill
- School
- Mixed Use

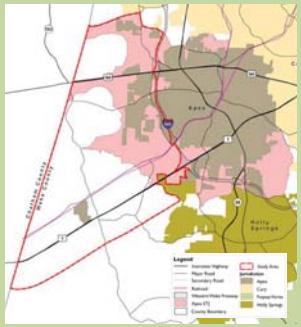
Note: Striped areas that do not have the mixed use designation indicate multiple land uses allowed with no requirement for mixed use.

PURPOSE OF THE WESTERN AREA PLAN

The Town of Apex is a desirable, sought after community in the Triangle region of North Carolina. Its western area is among one of the few remaining special places in Wake County where rural character and pastoral viewscapes are well preserved. The character of the area is rooted in the small, historic whistle stops and villages of New Hill, Friendship and Bonsal found located along the Chatham Railroad; the tobacco barns and other agricultural structures, equestrian development, and scenic areas found along New Hill–Olive Chapel Road and the American Tobacco Trail; and the pride area residents have in their neighborhoods and community. This area, however, is increasingly under development pressure to change.

Crafted in early 2008, the Town of Apex Western Area Plan was created in response to the Town's need for a vision of its future development pattern in the western area, to address current challenges and take advantage of opportunities for community development, and in some cases, community preservation. The western area as defined for this plan is generally bounded by the Chatham County / Wake County line to the west, Green Level West Road to the north, the future route of the North Carolina Turnpike Authority's Western Wake Freeway (I-540) to the east, and approximately a mile south of US 1 to the south. Approximately one-third of the Western Area Plan area is found within in the Town's Extraterritorial Jurisdiction (ETJ).

Building on the foundation of planning efforts reflected in the 2004 Apex Comprehensive Plan and subsequent efforts, the Western Area Plan focuses on land use, recognizing the existing land development pattern and envisioning future uses. Importantly, the plan seeks to prepare the area for the uncertain timing of two significant capital investments in the western area anticipated to hasten growth within the area: 1) the development of the Western Wake Freeway (I-540) and 2) the expansion of the Town's wastewater capacity through the introduction of the Western Wake Regional Water Reclamation Facility adjacent to New Hill and related improvements systemwide. Landuse balance is also an important, overarching theme of the plan. Establishment of a mix of land uses for the western area—many of which seek to expand jobs and economic opportunities—is an important plan objective. Part of the plan's strategy for land use diversity is to keep much of the rural character found in the western area, preserving these elements for future generations and supporting land use densities in keeping with the important environmental and water resources found within and proximate to the area. Finally, the plan seeks to locate future land uses compatible with those immediately surrounding the Town's incorporated limits.



LOCATION MAP

PREPARED BY

LandDesign Kimley-Horn & Associates Warren & Associates

WITH ASSISTANCE FROM THE WESTERN AREA PLAN ADVISORY COMMITTEE

Mike Jones Staley Smith Angela Reincke Paul Barth Larry Harris Michael Copeland Ann Prince
Tonya Scott Mark Meech Joan Beachum Patrick Mallet Stuart Jones Jim Stella Leslee Turner Mark Bolebruch

TOWN OF APEX
WESTERN AREA PLAN

ADOPTED JUNE 17, 2008



TOWN OF APEX, 73 HUNTER STREET, APEX, NC 27502

PLANNING PROCESS

A collaborative, open planning process was a hallmark of the plan's six-month development cycle. The successful result of this effort could not have been achieved without the work and dedication of the Town Council, Planning Board, professional staff, Advisory Committee, and participation by community residents and business owners. The planning process and collaborative efforts with each of these groups and audiences is presented herein.

At the start of the planning effort, a project Advisory Committee representing a broad cross-section of western area residents, business representatives, local committees, and Town officials was established. The role of the Advisory Committee was to assist in the collection and interpretation of area data, communicate plan activities to community members and encourage participation at scheduled events, and assist in the evaluation of draft plan elements. A total of four Advisory Committee meetings were held at key points in the process

With this committee established, the effort moved through a series of planning tasks, starting with the inventory, analysis, and synthesis of information pertaining to conditions and issues of importance for the western area. A number of reports, plans, and maps that were reviewed provided vital information during the process to understand and document the existing conditions in Apex. Important documents included:

- 2004 Town of Apex Comprehensive Plan
- Town of Apex Land Use Map Series, inclusive of Existing and Adopted Future Land Uses for the Western Area
- Town of Apex environmental features map series
- 2007 Wake County Southwest Area Land Use Plan
- 2007 Town of Apex Preliminary Capital Funding Analysis and related Capital Improvement Plan(s)
- Apex Transportation Plan and related Transit, Bicycle/Pedestrian/Equestrian, and Thoroughfare/Collector Street Plans
- Parks, Recreation, Greenways, and Open Space Master Plan
- Apex Chamber of Commerce Economic Development plans and information
- North Carolina Turnpike Authority's Western Wake Freeway (I-540) plans
- Apex Public Works Department plans for water and wastewater systems collection, electricity, and other Infrastructure
- Stormwater Management Plan
- Unified Development Ordinance
- Ongoing planning efforts conducted by adjacent municipalities and county governments, including the towns of Cary and Holly Springs, and Wake and Chatham counties
- Jordan Lake Watershed Rules
- National Register of Historic Places, Wake County Inventory of Historic Structures, and related documentation of historic properties within the study area

The information uncovered while reviewing these documents, reports, and plans was supplemented with input from one-on-one meetings with Town staff, related agencies, and a variety of interested parties who deal on a regular basis with one or more aspects of the issues addressed by this plan. The information gathered from these individuals aided in the process by providing an additional layer of information that cannot be gleaned from reports, observations in the field, or data analysis.

From this base of information and observations, the first in a series of public meetings was conducted with community residents and business owners. This meeting was designed to initially introduce and engage the community in the planning process and early data collection results, as well as learn from the community on area issues, aspirations, and priorities. The feedback collected from these meetings served as the foundation for development of the plan's framework—the broad goals and framework from which initial land use plan concepts were drawn. Each of these framework elements are described in the Existing Conditions section of this summary brochure. Following framework preparation and at a midpoint in plan preparation, a two-day design workshop (design charrette) was held. This collaborative workshop was organized to develop feasible, creative land use alternatives and related concepts in series of focused sessions. Over the two-day period, the planning team worked closely with Town staff, the Advisory Committee, and community members to generate a series of concepts and ideas for review and assessment. The Western Area Plan charrette process welcomed more than 80 participants over the two-day period.

With initial concepts established, the plan entered the final stages of the process with more detailed refinement and establishment of a future land use approach, detailing of specific study focus areas, plan element research, and other tasks. A third community meeting and additional Advisory Committee interaction provided an opportunity to showcase preliminary plan results and seek final plan preparation guidance.

PLAN FRAMEWORK

The broad planning ideas, goals and objectives provide the support, or "framework" used as the basis for developing land use and growth management solutions. From the existing conditions assessment, and importantly, direct feedback from the Advisory Committee and measured community feedback, the following broad framework elements were established for the western area plan. These framework elements were used to guide the creation and evaluation of plan alternatives.

LAND USE

- Ensure the Western Area Plan provides a balance of land use types, encouraging a diversity of residential densities, employment center opportunities and zones permissive of a mix of uses (two or more use types).
- Focus commercial retail activities at limited nodes oriented around logical road intersections and discourage commercial strip development.
- The rural and equestrian character of the western area is highly desirable; the land strategy should continue to support these uses, and where appropriate, link them together to maximize open, undeveloped spaces and scenic views.

ECONOMIC DEVELOPMENT

- Encourage development of one or more strategic investment areas within the western area supportive of increased employment opportunities and Town revenue generation.
- Focus economic development efforts towards office and light industrial uses, especially in locations which can be brought on-line soon.
- In areas where commercial activity nodes are viable and desirable, support a broad mix of office and knowledge-based users along with retail activities, thereby allowing these nodes to offer quality employment within shorter distances from neighborhoods.

TRANSPORTATION

- Encourage land use patterns and mobility improvements supportive of future Western Wake Freeway (I-540) development.
- Support a transportation and mobility framework organized to improve connectivity, reduce congestion, and broaden mobility options within the western area overall and the surrounding communities for which it is a part.
- Promote and strengthen a north-south roadway hierarchy, with a logical, north-south thoroughfare and collector street framework, utilizing I-540, New Hill–Olive Chapel Road, and a new mid-point collector.
- Preserve the character of New Hill–Olive Chapel Road / New Hill-Holleman Road as rural and scenic through the scenic byways program.

UTILITIES AND PUBLIC SAFETY

- Support development of the planned future Western Wake Regional Water Reclamation Facility and related collection system.
- To the greatest degree possible, support the efficient placement and co-location of utilities and other public facilities.
- Ensure the plan considers placement of consolidated public safety centers, with the goal of locating two new facilities within the study area.

ENVIRONMENT

- Protect surface and ground water resources throughout the study area, with an emphasis placed on land areas proximate to the fingers of Jordan Lake.
- Maintain and enhance scenic and natural areas.
- Embrace tree preservation and buffers.
- Support sustainable development and design practices.

PARKS AND CULTURAL RESOURCES

- Protect and enhance the area's environmental features and open spaces and seek opportunities for additional park facilities, greenways, and other related recreational features linked together into a definable circuit of activity in the western area.
- New Hill, Friendship, and Bonsal are important historic assets within the western area and the region overall; seek and encourage their preservation and context-sensitive reuse.
- Encourage the identification of locations for future school facilities where appropriate and supported by adequate transportation features and surrounding neighborhood densities.
- Continue to seek opportunities to co-locate parks, cultural resources, and schools.

COMMUNITY INVOLVEMENT


Community Meeting


Design Workshop


Design Workshop

EXISTING CONDITIONS: THE WESTERN AREA TODAY

LAND USE, DEMOGRAPHICS AND HOUSING

Comprising of over 22,100 acres, the western area is best described as a rural, almost serene portion of Wake County. US 64 and US 1 frame the northern and southern portions of the study area. The leading urban and suburban development edge of the Town and location of Apex's newer residential developments punctuates the eastern fringe of the study area.


One of the goals of the Western Area Plan is to balance residential and non-residential uses.

Land use diversity and density rapidly decrease in intensity as one moves from east to west through the study area, eventually tapering into the lowest development intensity along the Chatham County / Wake County line within the Jordan Lake Protected Watershed. Low and very low density residential development comprise approximately 32.5% of land uses currently present in the western area, with a majority (42%) of the western area classified as vacant and/or undeveloped. Other supporting details are as follows:

- An estimated 7,233 residents were present in the study area in 2007, 37.3% more than 5,268 in 2000. Household growth was also above 35%, expanding from 1,944 households to 2,705 over the seven-year period observed. Most residents and households were concentrated in the eastern portion of the study area, closer to the Town of Apex.

POPULATION GROWTH IN THE WESTERN AREA, 2000 – 2007

Area	2000	2007	2000-2007 Change
Number (%)			
Study Area	5,268	7,233	1,965 (37.3%)
Town of Apex	20,212	33,780	13,568 (67.1%)
Wake County	623,788	803,941	179,153 (28.7%)

Source: ESRI, Town of Apex

- Parcels of greater than 10 acres in size are prevalent in the western area, a size suggestive of the area's agricultural past and current rural character. Significant U.S. Army Corps of Engineers' land holdings are found along the western portion of the study area within the Jordan Lake Protected Watershed. Similarly, Progress Energy controls a number of large parcels south of US 1 associated with the Sharon Harris Nuclear Power Plant.
- Closings on single-family residences and townhomes showed steady activity and expansion between 2003 and 2007.

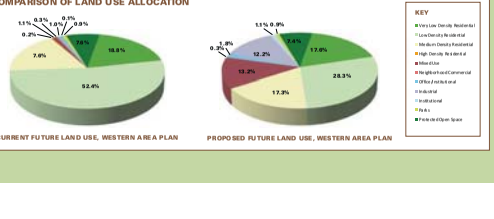
Activity is expected to continue over the near term, albeit at a slower pace given changing national economic conditions and a limit in available wastewater capacity and collection systems in the study area. According to data provided by the Town of Apex and Wake County, there are a total of 3,288 approved residential units in study area developments. Over 2,000 (63.2%) of the approved units are already built. Another 1,092 units remain to be built in subdivisions that are currently under construction, with 117 additional units in two approved subdivisions that have yet to break ground.

SINGLE FAMILY, TOWNHOUSE, AND CONDOMINIUM CLOSINGS IN APEX, 2003 - 2007 *Source Coldwell Banker*

	Single-family		Townhouse		Condominium	
	No. of Closings	Avg. Price	No. of Closings	Avg. Price	No. of Closings	Avg. Price
2003	742	$216,579	95	$138,432	7	$153,543
2004	788	$217,819	87	$136,694	20	$150,580
2005	825	$247,336	154	$146,016	17	$146,282
2006	771	$251,901	260	$158,810	11	$154,836
2007	664	$274,573	237	$183,711	4	$185,150
Total/Avg.	3,790	$241,641	779	$152,337	59	$158,078

- Residential uses are the dominate land uses identified under Apex's Future Land Use Plan for the study area. Nearly 90% of future land uses are anticipated in the very low, low, and medium density residential categories. A general consensus opinion formed by Advisory Committee members and the community was that Apex is too heavily reliant on residential property; working to diversify land uses, as well as preserving large, strategic tracts for commercial, office and institutional, and light industrial growth is key and essential to the long term health of Apex overall and the study area specifically. Residents and business owners also indicated through the public process an increased acceptance for more compact and mobility friendly development with the objective to promote quality growth, reduce vehicle trips and congestion, and preserve rural and open space areas.

COMPARISON OF LAND USE ALLOCATION



CURRENT FUTURE LAND USE, WESTERN AREA PLAN

PROPOSED FUTURE LAND USE, WESTERN AREA PLAN

ECONOMIC DEVELOPMENT

Economic development is an important topic as identified by the Advisory Committee and community. Highlights of existing economic activity and issues are provided below.

- In 2000, the study area median household income was $63,923, 16.4% higher than Wake County, but 20.3% lower than the Town of Apex. The 2007 median household income in the study area was $86,637, 35.5% higher than it was in 2000.
- Nearly 3,500 of the 7,233 people residing in the study area were employed in 2007, with almost half of these individuals present in the services sector. The construction, manufacturing, and retail trade sectors were also important categories.
- A total of 14 projects, including nearly 3.5 million square feet of retail space, were under construction or proposed within the Town of Apex in 2008. Almost 64% of the retail space is located in the proposed Trinity Planned Unit Development (PUD), located at US-1 and NC-55. Three of the 14 projects are currently under construction, including the 350,000-square-foot Broadstone Station development anchored by a Wal-Mart Super Center. There is no current or proposed retail development activity in the study area.
- Detailed neighborhood retail demand analysis for the study area suggests over the long term, residential populations may support creation of an additional neighborhood activity center of between 75,000 to 100,000 square feet. This activity center would be supported by a large grocery store (approximately 45,000 to 50,000 square feet).
- The availability of wastewater treatment capacity and collection are limiting factors for near term economic growth for the study area and Apex overall. While this issue is being rectified as part of the Town's creation of a new Water Reclamation Facility adjacent to New Hill, Apex may continue to lose out on quality economic development opportunities to other areas over the next few years. With the potential arrival of new capacity by as early as 2013 and development of I-540, economic development fundamentals improve over the mid- to long-term. Individuals contacted as part of this study effort suggest demand will be strongest for light industrial areas of three to five acre parcels—preferably certified sites—as well as a mix of commercial uses associated with neighborhood and regional activity centers.

TRANSPORTATION

A number of transportation projects and features play an important role in the study area. Several of these are summarized as follows:

- North Carolina Turnpike Authority's Western Wake Freeway (I-540), the most significant planned improvement for the study area and region, is scheduled to be completed by 2012. Future interchanges associated with this freeway are planned at US 64 and US 1 (Freeway to Freeway) and South Salem Street (Freeway to Grade).
- Regional thoroughfare transportation assets US 64 and US 1 provide primary east-west movement through the study area. US 1 provides limited access via New Hill–Holleman Road within the study area (Freeway to Grade), with a future interchange planned for I-540 (Freeway to Freeway). NCDOT plans call for limiting access along US 64 from I-540 west to NC 751, with interchanges at NC 751, Jenks Road, and Kelly Road (Freeway to Grade), and I-540 (Freeway to Freeway).
- Regional commuting patterns and development within the study area are placing increased demand for north-south connectivity and a need for enhancement of the carrying capacity of strategic arterials. Commuting patterns are already placing peak hour strains on New Hill–Olive Chapel Road / New Hill–Holleman Road / NC 751, a two-lane rural road which runs north-south through the planning area, connecting Hollemans Crossroads/Sharon Harris reservoir to NC 751. Such increasing traffic volumes are likely to warrant a widening of this road to a 4-lane facility. In response to this regional mobility issue, the NC 751 in Chatham County is planned (see Durham-Chapel Hill-Carboro MPO Long-Range Transportation Plan and Cary Comprehensive Transportation Plan) as a 4-lane divided suburban boulevard from US 64 northward, and Holly Springs supports widening this road south of US 1. The Richardson Road/Jenks Road corridor also has the potential for increased traffic demand and could provide a secondary relief to the New Hill–Olive Chapel Road corridor. Through future expansion and improvement, it could serve as a midpoint arterial for north-south connectivity.
- Transit service is provided in part by the Triangle Transit Authority to the Town of Apex (Route 305) to NCSU and Raleigh via US 64 and the Research Triangle Park (Route 311). Another transit option exists from TRACS, or the Transportation and Rural Access program. This service provides door-to-door service rather than following a specific route for citizens in the southern and western rural areas of Wake County.


Many of the rural, low volume roads in the study area provide scenic trips for bicyclists.

- Many of the rural, low volume roads in the study area provide scenic trips for bicyclists. Currently, several roadways are designated as bicycling routes. In addition, plans are moving forward to create a link to the regional American Tobacco Trail via the Beaver Creek Greenway. A series of greenway improvements, including the White Oak Greenway connecting Apex and Cary via the American Tobacco Trail, are also in the planning stages.

UTILITIES AND PUBLIC SAFETY

Apex continues to improve the quality and capacity of services provided as part of the Town's utility systems and public safety services. Approximately 90% of the utility infrastructure in Apex is provided by private development, and while Apex has several plans in place for utilities, the implementation of such plans will also depend on developer support.

Of primary note, a new regional Western Wake Regional Water Reclamation Facility planned adjacent to New Hill is in the permitting process, with construction anticipated to be complete by 2013. The new plant—supported by collection infrastructure improvements system wide—will treat up to 6 million gallons per day (mgd) of wastewater for the growing Town.

For potable water, the Cary-Apex Water Treatment Plant has a total capacity to support the water service demands of 50,000 residents. The next proposed plant expansion—scheduled for 2015—will improve capacity to serve up to 70,000 people.

Apex, through a cooperative agreement with Progress Energy, currently provides electricity service to 35,000 customers. To meet continuing and future demand, a new substation (the third) is planned for the western area that will allow the Town to serve 40,000 to 50,000 customers. Ultimately, a fourth substation may also be necessary.

Growth continues to place increased demand on public safety services and facilities for the region overall and Apex specifically. By example, Apex Police Department calls have increased at an average annual rate of 8% over the past decade. Public safety officials suggest future development may require up to four new public safety stations with related Fire, EMS, and Police personnel.

ENVIRONMENT

As discussed previously, the quality of the natural environment is a strong, desirable characteristic of the western area, with significant portions offering wildlife habitat and watershed recharge. The study area traverses three drainage basin leading to Jordan Lake—White Oak Creek Basin, Beaver Creek Basin, and Little Beaver Creek Basin. Wetlands and streams are common in the area, especially surrounding the fingers of Jordan Lake and the southwestern corner of the study area (within one-mile arc of the Shearon Harris Nuclear Power Plant).

Soil conditions in the area are mostly unsuitable for septic fields, or applications, which will discourage some development until such time as sewer services are expanded into the region after the construction of the Western Wake Regional Water Reclamation Facility.

Apex has always shown leadership in the establishment of more stringent requirements for riparian buffers (50' along intermittent streams / 100' along perennial streams), requiring resource conservation area, limiting development within the floodplain, regulating tree clearing, and requiring stormwater controls. In addition, the Town is in receipt of an NPDES Phase II stormwater permit and shall implement six (6) minimum control measures which include the following:

- Public education and outreach
- Public involvement and participation
- Pre-Construction Runoff Controls
- Post-Construction Runoff Controls
- Illicit Discharge Detection and Elimination
- Pollution Prevention and Good Housekeeping

Furthermore, the Town is subject to the recently approved Jordan Lake Watershed Rules which will require all future development projects in this watershed to implement stormwater BMPs that have high nutrient (nitrogen and phosphorous) and pollutant (TSS) removal efficiencies.

SCHOOLS

The Wake County Public School System has a Southwest Area Plan that anticipates at least six new schools in the Apex vicinity to serve the growing student populations in this part of the county. A new high school is their first priority. In order to build these facilities, the school system must find enough land with access to wastewater to build them. The average parcel size of an elementary school is 20 acres, of a middle school is 30 acres, and of a high school is between 60 and 70 acres.

PARKS AND CULTURAL RESOURCES

Area growth in and around Apex translates into more demands for parks and open space. The Town will begin construction on the first phase of a 160-acre, centrally located nature park in 2008, with the second phase scheduled for 2010. The Town also has a number of passive and active park and recreation opportunities in the western area, including a 25-acre park adjacent to Olive Chapel Elementary School. For the past two years, the Town has been seeking additional park acreage of up to 75 acres in the northwest quadrant of Town for an athletic complex and a similarly sized park in the southern portion of the study area. The Town is also seeking greenway linkages between these facilities, as well as to the American Tobacco Trail.



Apex has an opportunity to connect its own greenway and trail facilities to the regional American Tobacco Trail.



The majority of the western area's historically and culturally significant resources are found along Old US 1 in the communities of New Hill, Friendship, and Bonsal.

The majority of the western area's historic and culturally significant resources are found along Old US 1 in the communities of New Hill, Friendship, and Bonsal. The New Hill National Register Historic District exists at the crossroads of Old US 1 and New Hill–Olive Chapel Road. In addition, there are prominent farmstead homes along Olive Chapel Road. Several sites are listed and defined as historic by the Wake County Historic Preservation Commission; however, there has been no formal preservation effort of these sites.

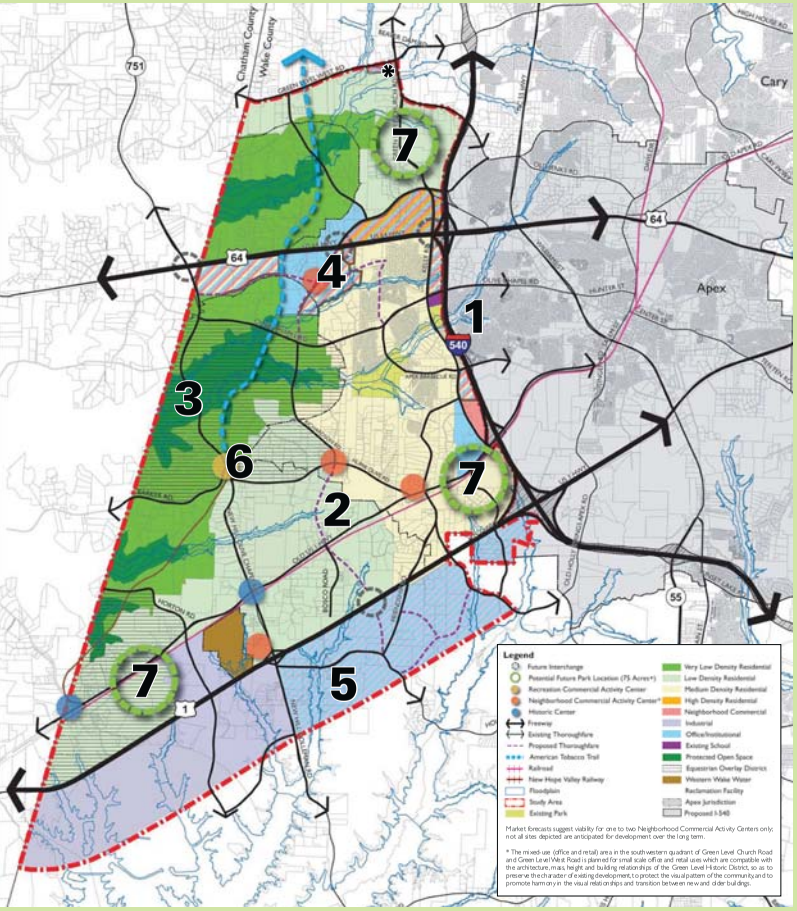

One of the intentions of the Western Area Plan is to protect and preserve open space and linear park facilities.

One of the unique historical features of the study area is a section of the former Durham & South Carolina Railroad line, which is today preserved as the New Hope Valley Railway. The rail line is operated as a living railroad museum.


The New Hope Valley Railway in Bonsal is one of the region's most unique historical and recreational assets.

Another remnant section of the former D&SC track was removed and is now the pathway of the American Tobacco Trail in the study area.

APEX WESTERN AREA PLAN



Market forecasts suggest viability for one to two Neighborhood Commercial Activity Centers only; not all sites depicted are anticipated for development over the long term.

* The mixed-use (office and retail) area in the southwestern quadrant of Green Level Church Road and Green Level West Road is planned for small scale office and retail uses which are compatible with the architecture, mass, height and building relationships of the Green Level Historic District, so as to preserve the character of existing development, to protect the visual pattern of the community and to promote harmony in the visual relationships and transition between new and older buildings.

CONCEPT: EQUESTRIAN OVERLAY DEVELOPMENT



CONCEPT: NEIGHBORHOOD COMMERCIAL ACTIVITY CENTER



FUTURE LAND USE PLAN MAP FEATURES

The Western Area Plan Land Use Plan Map is a conceptual representation that illustrates the development patterns leaders and citizens of Apex envision for the future of the study area. The map is descriptive, not prescriptive, conveying Apex's desires for the future and the flexibility needed to accommodate unforeseen opportunities that may achieve the community's new vision in existing new ways. The map's features include the following:

- Clearly defined and delineated development areas that reflects the community's desire to contain and/or encourage growth in specific geographic areas;
- Historic corridors and communities to be the focus of preservation efforts and that have the potential to become regional destinations;
- Small town character and appropriately scaled mixed-use development and nodal activity center development where it is appropriate for moderately higher densities; and,
- An interconnected network of streets, bicycle routes, and pedestrian paths.

Seven areas are highlighted on the map, designated as sites 1-7. A brief description of each area follows:

1 The construction of I-540 in western Wake County through Apex (Area 1) will be the primary catalyst of future growth in the Town and the western area, providing greater connectivity between the Research Triangle Park region and areas south. In fact, many people believe that one day the intersection of I-540 and US 64 will be "the commerce center" of Apex. Once this roadway opens, access to a variety of places in the region will improve dramatically, putting additional development pressure on the whole area and increasing the need for sewer service. Retailers and employers will be accommodated here, attracted by the access and visibility along the I-540 corridor.

2 Area 2 on the proposed Land Use Plan Map serves as a primary north/south strategic arterial and transition point where development intensity in the western area changes from medium density to low / very low density development. This strategic arterial could be linked to US 64 and US 1 by proposed interchanges on each end. This arterial would support a variety of land uses, including a potential neighborhood commercial center.

3 Area 3 on the proposed Land Use Plan Map is located in the extreme western area of Apex near the fingers of Jordan Lake and the Chatham County line. The plan calls for very low density residential uses and existing development to be preserved. The land use strategy is linked to ensuring key roadway corridors, namely the New Hill–Olive Chapel Road / New Hill–Holleman Road / NC 751, a two-lane rural scenic byway, remaining rural in character.

4 To broaden the land use mix and take advantage of area connectivity and visibility, Area 4 on the proposed Land Use Plan Map is designated as a location for integrated mixed-use residential, office, commercial, and institutional development. These areas shall ideally be organized and developed as a handful of larger planned developments geared towards creating pedestrian-friendly, transit-supporting nodes of activity supportive of live, work, and play neighborhoods and enterprise areas. Providing access to this development would be a new interchange at US 64 and Jenks Road / Richardson Road.

5 Area 5 is shown on the proposed Land Use Plan Map south of US 1 in the extreme southern portion of the planning area. In this area where there is access to the US 1 corridor, the plan calls for office, institutional, and light industrial development.

6 Area 6 on the proposed Land Use Plan Map is designated as a recreation commercial activity center in the vicinity of New Hill–Olive Chapel Road, where the rural character of the western area is deeply valued by its residents. The plan seeks to build on the foundation of that rural character by recognizing its equestrian components and access to recreational amenities, common stable areas, supporting commercial retail—such as a farmers market, restaurant, rental shops (outfitters), and tours area—and access to the American Tobacco Trail, Jordan Lake, the Town's park facilities, and the historic communities to the south. This node is anticipated to provide the primary start and end point for a circuit of recreational activities throughout the western area.

7 The proposed Land Use Plan Map shows three potential areas designated for regional park facilities and the plans calls for at least two of these three sites to be developed to serve future populations in the western area. These regional park sites will need to be between 50 and 75 acres in size and have greenway linkages to the American Tobacco Trail and other facilities.

RECOMMENDATIONS & IMPLEMENTATION

LAND USE

The proposed plan calls for a mix of land use categories to be present within the study area, ranging from very low density residential to mixed-use development.

Recommendation 1: Promote land use in accordance with the plan for the western area. Extend the same land use dwelling unit densities and designations for the western area as found in the adopted Apex Comprehensive Plan, and modify the zoning—and zoning districts—as appropriate.

Recommendation 2: Promote creation of activity centers following best practices for urban design, mobility, and "healthy communities" initiatives. Ensure at-grade parking facilities are screened by buildings along primary street frontages and opportunities for the creation of quality pedestrian environments and open spaces are encouraged.

Recommendation 3: Prepare design standards for mixed-use and office/institutional uses planned along US 64 to ensure the highest quality of future development. Standards should address clustering of uses, concealment of parking, sensitive massing and density with respect to adjacent properties, efficient ingress and egress points, and other features of high quality development.

Strategy 1: Hold follow-up meetings with surrounding community residents and business owners. Consider using a visual preference survey to more finely measure development and design preferences within these land use areas.

Strategy 2: Based on input, prepare urban design standards for each primary mixed-use and office/institutional district that may be codified or documented in a set of design guidelines.

Recommendation 4: Prepare a design overlay district for Kelly Road to ensure continued growth and commercial activity is organized and oriented so as to be visually appealing and in keeping with surrounding residential and mixed-use developments in the area.

Recommendation 5: Protect the scenic qualities of properties and tree/vegetative buffers along primary regional roadway systems, inclusive of I-540, US 64, and US 1.

Strategy 1: Establish a minimum buffer width and preservation/planting requirements to be incorporated into the Town's existing regulations.

Recommendation 6: Develop a new equestrian overlay district along with criteria and standards for those areas designated within the Western Area Plan. Criteria should address minimum lot sizes, promote density in exchange for a common paddock, and require trail/amenity features, such as equestrian trail connections to the American Tobacco Trail.

Recommendation 7: Investigate enhanced conservation subdivision and clustering within low and very low density residential development areas to encourage the highest level of new development integrity as well as preservation of high quality, contiguous open space.

Recommendation 8: Encourage sustainable design best practices for residential and commercial uses found within the western area.

ECONOMIC DEVELOPMENT

While Apex will continue to serve primarily as a bedroom community for the region, the overall quality of life the community offers is highly conducive to attracting the Town's fair share of regional economic development and investment. One of the plan's key objectives is to broaden land use diversity within the western area to ensure a portion of the region's economic development will provide new jobs and a growing tax base for the Town.

Recommendation 1: Ensure through plan implementation a diversity of land uses within the study area intended to promote the Town's economic development objectives and a diversification of the western area and Town's tax base.

Note: One of the key goals of the plan is to diversify land uses and lessen Apex's reliance on residential property taxes to fund Town operations. While currently Apex is 81% residential and 19% non-residential, a goal of the plan is that Apex be 70% residential and 30% non-residential.

Recommendation 2: Work with the Chamber of Commerce and other Town economic development entities to identify key sites within the western area where light industrial, office, institutional, and other employment-based land uses can be prioritized upon expansion of the wastewater capacity and collection system within the study area.

Recommendation 3: As supported by the Apex Comprehensive Plan, accommodate a mix of housing types and tenure, including workforce housing, within the western area to serve a growing and increasingly diverse employment base.

Recommendation 4: Explore and participate in regional efforts to attract and expand mass transit options and transit oriented development to the Town and to key sites within the western area.

TRANSPORTATION

Numerous physical transportation improvements are required for the successful implementation of the Western Area Plan. Many improvements can and should occur in the short-term (1-10 years), while other improvements are not needed immediately and are proposed as more long-term solutions (10-20 years). These physical improvements are necessary in order for the transportation system to fully support the plan.

ROADWAYS AND STREETS

Recommendation 1: Designate the New Hill–Olive Chapel Road corridor as a North Carolina Scenic Byway.

Strategy 1: Submit application to the North Carolina Department of Transportation's (NCDOT) Roadside Environmental Unit for scenic byway designation.

Strategy 2: Apply for funding assistance from the NCDOT Roadside Environmental Unit's Wildflower Program to seed and maintain flower beds and planting areas along the corridor.

Note: For more information, go to www.dot.state.nc.us/wildflowers.

Strategy 3: Submit application to the Adopt-A-Highway program, NCDOT's volunteer program used to maintain and protect the scenic beauty of corridors.

Note: For more information, go to www.dot.state.nc.us/adopt-a-highway.

Recommendation 2: Develop a Corridor Master Plan for the New Hill–Olive Chapel Road corridor.

Strategy 1: Develop a Corridor Overlay District to guide design and access management through the development review process.

Note: The overlay should be tied to the centerline of the road and apply to an appropriate distance based on development depth and buffer areas. (Approximately 500 to 600 feet for a total width of 1,000 to 1,200 feet.)

Strategy 2: Establish an appropriate cross section that is endorsed and adopted by CAMPO and adopted as part of the Town of Apex's official Land Use Plan Map and Comprehensive Plan.

Note: Community desire is to maintain the existing character of New Hill–Olive Chapel Road as a rural, two-lane roadway.

Recommendation 3: Enhance the carrying capacity of strategic arterials.

Strategy 1: Improve connectivity by extending and widening Friendship Road/Humie Olive Road/Richardson Road/Jenks Road to a four-lane landscaped median divided boulevard from Friendship Road south of US 1 past US 64 to Wimberly Road to serve as the midpoint collector in the study area.

Note: This widened roadway would connect the two-lane roads within the planning area to proposed interchanges at US 1 and US 64.

Strategy 2: Improve interconnectivity and functional design of collector streets.

- Enhance access and mobility through two- and three-lane facilities that support the arterial roadway network.
- Implement the cross section design principles outlined in the Apex Transportation Plan to guide development when designing and constructing collector streets.
- Evaluate stormwater run-off into environmentally sensitive areas by determining the need for curb and gutter versus swale ditches during the design phase(s) of future collector streets.
- Redesign the strategic intersections of Humie Olive Road / Holland Road / Friendship Road and Richardson Road / Humie Olive Road where inadequate sight distances, roadway offset, and curvature issues are present.

Recommendation 4: Enhance safety along all roadways.

Strategy 1: Pursue NCDOT Hazard Elimination Funding to inventory and correct the safety concerns of all travel modes.

Note: These funds are a subset of the state's Transportation Improvement Program (TIP) funding, constituting 10% of TIP funds.

Strategy 2: Pursue Economic Development funding through the NCDOT Division 5 for recommended improvements near the New Hill historic district.

Strategy 3: Pursue NCDOT Division 5 Small Construction Funds and Contingency Funds.

Note: These funds are typically requested by members of the local delegation to the North Carolina House of Representatives and North Carolina Senate.

BICYCLE / PEDESTRIAN

Recommendation 1: Connect the historic New Hill community to the planned Recreation Commercial Activity Center to be located near New Hill–Olive Chapel Road and Humie Olive Road.

Strategy 1: Work with NCDOT, the development community, and bicycling organizations to acquire the rights-of-way to construct a 10-foot wide multi-use path along the corridor.

Note: This 10-foot wide multi-use path would connect walkers and novice cyclists to key recreational destinations and amenities in a safe and efficient manner.

Recommendation 2: Designate New Hill–Olive Chapel Road / New Hill–Holleman Road as a scenic bike route, provided it remains a two-lane road.

Note: For more information, go to www.dot.state.nc.us/transit/bicycl.

Strategy 1: Consider providing incentives to existing property owners and developers located along the New Hill–Olive Chapel / New Hill–Holleman road corridor for converting to "shared" driveways and constructing cross-access connections.

Strategy 2: Pursue NCDOT STP-Enhancement Grant funding to install pedestrian lighting, crosswalks, and pedestrian countdown signals along the corridor and at key signalized intersection locations.

Note: These funds are administered through a grant program with a 20% local match requirement.

UTILITIES

Recommendation 1: Actively encourage and seek political leadership to advance environmental permits associated with the Western Wake Regional Water Reclamation Facility.

Recommendation 2: Continue implementation of Town infrastructure improvements timed to development and as planned in the Capital Improvement Program.

PUBLIC SAFETY

Apex's police, fire, and emergency medical services (EMS), and the expansion of facilities necessary to serve the future population of the Town, is important to the orderly growth of the area.

Recommendation 1: As the Town grows, continually evaluate the need and locations of additional police, fire, and EMS facilities in the western area.

Strategy 1: Conduct a personnel / staffing study to evaluate the need for additional police, fire, and EMS staff.

Strategy 2: Evaluate the amount of space required to adequately serve additional staff.

Strategy 3: Evaluate the possibility of co-locating Town staff in multi-use facilities.

Recommendation 2: Based upon the Western Area Land Use Plan, review area evacuation procedures and signage along primary arterials related to an incident / accident at the Shearon Harris Nuclear Power Plant.

PARKS AND CULTURAL RESOURCES

PARKS AND TRAIL FACILITIES

Parks and recreational amenities, including greenways and trails, play a tremendous role in maintaining the quality of life for the residents of any given area. The same is true for Apex and the western area.

Recommendation 1: Establish an interconnected system of parks, open space, greenways, trails, and pedestrian walkways.

Strategy 1: Connect all park facilities, including the nature park, via greenways and trails.

Strategy 2: Allow equestrian trails within the Town and the western area.

Recommendation 2: Help plan and develop multi-jurisdictional greenway and trail connections.

Strategy 1: Support the development of the regional American Tobacco Trail and provide residents of Apex with multiple connections along the trail.

Strategy 2: Work with the State of North Carolina to connect to trails and amenity areas in and around Jordan Lake.

Strategy 3: Continually work with adjacent municipalities to ensure that greenway facilities connect from one town to the next throughout the region.

Recommendation 3: Use greenways and parks to promote conservation of environmentally sensitive areas.

Strategy 1: Design and construct all parks and greenways to be compatible with the natural features and character of individual facilities.

Strategy 2: Develop a trail-specific management plan for both paved greenways and natural surface trails to identify erosion repair and rehabilitation efforts.

Strategy 3: Incorporate existing natural areas into the greenway and trail system.

Strategy 4: Develop greenway corridors in environmentally sensitive areas to protect and conserve valuable ecological land, while keeping the greenway paths out of riparian buffers.

Strategy 5: Develop an educational program to promote environmental education and overall greenway safety.

Recommendation 4: Continue to work in cooperation with the Wake County Public School System and Wake County to jointly develop new recreation facilities and programs.

Strategy 1: Continue to co-locate park facilities and school sites, where practical and appropriate.

Recommendation 5: Continue to investigate the purchase of key, large parcels in the northern and southern portion of the study area intended for creation of two new regional parks.

Recommendation 6: Update the Town's Parks, Recreation, Greenways, and Open Space Master Plan, inclusive of the elements contained and outlined in the Western Area Plan.

HISTORIC PRESERVATION

Every community develops beliefs, art, and institutions that help shape and define the character of its society. Historic buildings and structures, unique commercial and residential areas, natural and scenic resources, archeological sites, as well as educational and religious sites shape the Apex community and its people.

Recommendation 1: Preserve historically significant properties in the western area.

Strategy 1: Continue to collaborate with Capital Area Preservation (CAP) to determine appropriate historical preservation efforts in Apex.

Strategy 2: Continue to designate specific and appropriate properties with "landmark" status to offer a level of protection.

Strategy 3: Update the Wake County Historical and Architectural Survey periodically with details on all the historic properties in Apex, particularly those properties in New Hill, Friendship, Bonsal, and along the Old US 1 corridor where the majority of unique and historic structures are located.

Strategy 4: Evaluate the advantages and disadvantages of establishing a New Hill Local Historic District with enhanced protection for historically and culturally significant buildings and structures.

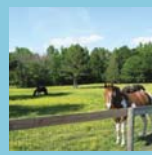
Strategy 5: Create a mechanism for educating property owners about the value of historic structures (particularly their value to the Town and wider community); raise awareness of losses and potential losses of historic structures; and inform them of the negative impacts of losing historic structures.

Recommendation 2: Consider the American Tobacco Trail as a unique resource in the western area and actively encourage connecting the trail to the designated historical assets in the region.

Recommendation 3: Stimulate those areas designated as historically and culturally significant with appropriate programming to enhance the experience there for residents and visitors.



Rural character is valued by residents of the western areas of Apex. As such, this plan seeks to build on the foundation of that rural character by recognizing equestrian components and access to recreational amenities, such as common stable areas.



To capitalize on the enthusiasm for horses in the western area, the plan calls for Apex to allow equestrian trails.



One recommendation of the plan is to establish an interconnected system of parks, open space, greenways, trails, and pedestrian walkways.



Like many communities along historic rail lines, the New Hill area is a significant historical asset in the western edge that has potential for being restored to its original form.



Specific properties in the area with historic values should seek landmark designation to help preserve historic architecture by raising awareness.

Appendix E – Endangered Species Information

- Wake County Listed Species
- Natural Heritage Element Occurrences Near Apex

TABLE E-1
Wake County Listed Species

Major Group	Scientific Name	Common Name	State Status	Federal Status	State Rank	County Status
Amphibian	Ambystoma tigrinum	Eastern Tiger Salamander	T		S2	Current
Amphibian	Hemidactylium scutatum	Four-toed Salamander	SC		S3	Current, Obscure
Amphibian	Necturus lewisi	Neuse River Waterdog	SC		S2	Current
Bird	Peucaea aestivalis	Bachman's Sparrow	SC	FSC	S3B,S2N	Current
Bird	Haliaeetus leucocephalus	Bald Eagle	T	BGPA	S3B,S3N	Current
Bird	Picoides borealis	Red-cockaded Woodpecker	E	E	S2	Historical
Bird	Vireo gilvus	Warbling Vireo	SR		S2B	Current
Butterfly	Pontia protodice	Checkered White	SR		S1S2	Current
Caddisfly	Dibusa angata	a caddisfly	SR		S2	Current
Crustacean	Cambarus davidi	Carolina Ladle Crayfish	SR		S2S3	Current
Crustacean	Orconectes carolinensis	North Carolina Spiny Crayfish	SC		S3	Current
Dragonfly or Damselfly	Coryphaeschna ingens	Regal Darner	SR		S2?	Current
Dragonfly or Damselfly	Gomphus septima	Septima's Clubtail	SR	FSC	S2	Current
Freshwater Bivalve	Fusconaia masoni	Atlantic Pigtoe	E	FSC	S1	Current
Freshwater Bivalve	Strophitus undulatus	Creeper	T		S2	Current
Freshwater Bivalve	Alasmidonta heterodon	Dwarf Wedgemussel	E	E	S1	Current
Freshwater Bivalve	Lampsilis radiata	Eastern Lampmussel	T		S1S2	Current
Freshwater Bivalve	Lasmigona subviridis	Green Floater	E	FSC	S1	Current
Freshwater Bivalve	Villosa constricta	Notched Rainbow	SC		S3	Current
Freshwater Bivalve	Elliptio roanokensis	Roanoke Slabshell	T		S1	Current
Freshwater Bivalve	Alasmidonta undulata	Triangle Floater	T		S2	Current
Freshwater Bivalve	Elliptio lanceolata	Yellow Lance	E	FSC	S1	Current
Freshwater Fish	Noturus furiosus	Carolina Madtom	T	FSC	S2	Historical
Freshwater Fish	Lampetra aepyptera	Least Brook Lamprey	T		S2	Current
Freshwater Fish	Notropis volucellus	Mimic Shiner	SR		S2	Historical
Mammal	Myotis septentrionalis	Northern Myotis	SR	PE	S3	Historical
Mammal	Myotis austroriparius	Southeastern Myotis	SC	FSC	S2	Historical

Major Group	Scientific Name	Common Name	State Status	Federal Status	State Rank	County Status
Mammal	Condylura cristata pop. 1	Star-nosed Mole - Coastal Plain population	SC		S2	Current
Moss	Tortula plinthobia	A Chain-teeth Moss	SR-O		S1?	Historical
Moss	Archidium donnellii	Donnell's Archidium	SR-O		S1	Current
Moss	Campylopus oerstedianus	Oersted's Campylopus	SR-D		S1	Historical
Moss	Sphagnum subsecundum	Orange Peatmoss	SR-P		S1	Historical
Moss	Cleistocarpidium palustre	Prairie Pleuridium	SR-D		S1	Current
Vascular Plant	Dichanthelium sp. 9	A Witch Grass	SR-L		S2	Historical
Vascular Plant	Buchnera americana	American Bluehearts	E		S1	Historical
Vascular Plant	Thermopsis mollis	Appalachian Golden-banner	SC-V		S2	Current, Historical
Vascular Plant	Magnolia macrophylla	Bigleaf Magnolia	T		S2	Current
Vascular Plant	Lindera subcoriacea	Bog Spicebush	SR-T	FSC	S2S3	Current
Vascular Plant	Trifolium reflexum	Buffalo Clover	T		S1S2	Current, Historical
Vascular Plant	Acmispon helleri	Carolina Birdfoot-trefoil	SC-V	FSC	S3	Current
Vascular Plant	Cirsium carolinianum	Carolina Thistle	E		S2	Historical
Vascular Plant	Clematis catesbyana	Coastal Virgin's-bower	SR-P		S2	Historical
Vascular Plant	Cardamine douglassii	Douglass's Bittercress	T		S2	Current
Vascular Plant	Liatris squarrulosa	Earle's Blazing-star	SR-P		S2	Current
Vascular Plant	Matelea decipiens	Glade Milkvine	SR-P		S3	Current, Historical
Vascular Plant	Cyperus granitophilus	Granite Flatsedge	T		S2	Current, Historical
Vascular Plant	Pseudognaphalium helleri	Heller's Rabbit-Tobacco	SR-P		S3	Current, Historical
Vascular Plant	Paspalum fluitans	Horsetail Crown Grass	SR-P		S1	Current
Vascular Plant	Gillenia stipulata	Indian Physic	T		S2	Current
Vascular Plant	Carex reniformis	Kidney Sedge	T		S1	Historical
Vascular Plant	Fothergilla major	Large Witch-alder	SR-T		S3	Current
Vascular Plant	Ruellia humilis	Low Wild-petunia	E		S1	Historical

Major Group	Scientific Name	Common Name	State Status	Federal Status	State Rank	County Status
Vascular Plant	Rhus michauxii	Michaux's Sumac	E	E	S2	Current, Historical
Vascular Plant	Heteranthera multiflora	Multiflowered Mud-plantain	SR-P		S1	Current
Vascular Plant	Isoetes piedmontana	Piedmont Quillwort	E		S2	Current
Vascular Plant	Ruellia purshiana	Pursh's Wild-petunia	SC-V		S2	Historical
Vascular Plant	Carex tetanica	Rigid Sedge	SR-P		S1	Historical
Vascular Plant	Dichanthelium annulum	Ringed Witch Grass	SR-P		S1	Historical
Vascular Plant	Polygala senega	Seneca Snakeroot	SR-D		S2	Current
Vascular Plant	Portulaca smallii	Small's Portulaca	T		S2	Current, Historical
Vascular Plant	Scutellaria australis	Southern Skullcap	E		S1	Historical
Vascular Plant	Micranthes pensylvanica	Swamp Saxifrage	E		S1	Current
Vascular Plant	Monotropsis odorata	Sweet Pinesap	SC-V	FSC	S3	Historical
Vascular Plant	Scutellaria nervosa	Veined Skullcap	E		S1	Historical
Vascular Plant	Trillium pusillum var. virginianum	Virginia Least Trillium	E	FSC	S1	Current
Vascular Plant	Pycnanthemum virginianum	Virginia Mountain-mint	SR-P		S1?	Current
Vascular Plant	Tradescantia virginiana	Virginia Spiderwort	T		S1	Current
Vascular Plant	Didiplis diandra	Water Purslane	SR-P		S1	Current, Historical
Vascular Plant	Solidago radula	Western Rough Goldenrod	E		S1	Historical
Vascular Plant	Agastache nepetoides	Yellow Giant-hyssop	SR-P		S1	Historical

Sources: NCNHP Database, 2014

TABLE E-2
Natural Heritage Element Occurrences Near the Town of Apex Planning Area

Scientific Name	Common Name	County Status	State Status	Federal Status	Aquatic	Wetland
Birds						
Picoides borealis	Red-cockaded Woodpecker	Historical	E	E	N	N
Picoides borealis	Red-cockaded Woodpecker	Historical	E	E	N	N
Picoides borealis	Red-cockaded Woodpecker	Historical	E	E	N	N
Insects						
Coryphaeschna ingens	Regal Darner	Current	SR		Y	N
Vascular Plants						
Carex tetanica	Rigid Sedge	Historical	SR-P		N	Y
Carex tetanica	Rigid Sedge	Historical	SR-P		N	Y

Key:

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 most, 5 miles of the Planning Area.

Each occurrence is listed, meaning that some species may be listed multiple times because multiple populations exist in the area.

Aquatic and wetland categories refer to a species' preferred habitat.

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 Section 6.1.7 and 6.1.11)**
2. **Floodplain Protection (UDO Section 6.2.16-19)**
3. **Erosion & Sediment Control (Town Code Chapter 5, Article X)**
   - Tree Protection (UDO Section 8.1.3, and 2.3.15)
4. **Stormwater Management**
   - UDO Section 6.1.12
   - UDO Section 6.1.1-7 Water Supply Watersheds
   - Standard Specifications and Standard Details (Section 500)
   - NPDES Phase II Stormwater Illicit Discharge Detection and Elimination Ordinances (Town Code Chapter 12, Article VIII)
5. **Open Space Dedication**
   - Zoning Districts (UDO Section 3)
   - Parks, Recreation and Open Space Sites (UDO Section 7.3)
   - Resource Conservation Area (UDO Section 8.1.2)
6. **Other**
   - Connectivity (UDO Section 7.2.1)
   - Fats, Oils, Grease Control (Town Code Chapter 12, Article VII)
   - Water Conservation (Town Code Chapter 12, Article III)
   - Landscaping Ordinance (UDO Section 8.2)

1. Riparian Buffers (UDO Section 6.1.7 and 6.1.11)

6.1.11 Riparian Buffers

No new clearing, grading, or development shall take place nor shall any new building permits be issued in violation of this section. No exemptions shall be permitted from this section except for any use, development, or activity that has been specifically exempted by any applicable state law from local regulations of the type established by this ordinance, or as provided in Sec. 6.1.11(J) *Exemption When Existing Uses are Present and Ongoing*. The following activities impacting Zone 1 and/or 2 of a riparian buffer in the Jordan Lake Watershed or in the Neuse River Basin shall be administered by the Division of Water Quality of the N.C. Department of Environment and Natural Resources ("Division of Water Quality"): (i) activities conducted under the authority of the State, the United States, multiple jurisdictions, or local units of government, (ii) forest harvesting or (iii) agricultural activities.

A) ***Relationship to Resource Conservation Areas***

The area of land on a property that is located within the riparian buffer may be counted by the developer, with the approval of the Planning Director, in accordance with Sec. 8.1.2 *Resource Conservation Area,* when calculating the amount of RCA that is required on that property by said Section.

B) ***Measurement of Riparian Buffers***

The buffer width at a particular point along a stream shall be measured on a line perpendicular to a vertical line marking the top of the stream bank to the landward edge of the buffer. For ponds and lakes the buffer shall begin at the normal water level and extend landward on a line perpendicular to a vertical line marking the normal water level.

C) ***Classification of Surface Waters on Property***

Riparian buffers shall be maintained for all perennial and intermittent streams, lakes, and ponds as set forth in Sec. 6.1.6 *Low-Density Development Option*, and Sec. 6.1.7 *High-Density Development Option* of this ordinance. Classifications of surface waters as perennial or intermittent streams, as ephemeral streams (a classification requiring no buffer under the requirements of Sec. 6.1 *Watershed Protection Overlay Districts*), or as a lake or pond shall be as indicated on the most recent version of the U.S.G.S. 1:24,000 (7.5 minute) scale topographic maps, the most recent version of the soil survey map prepared by the Natural Resources Conservation Service of the United States Department of Agriculture, or a map approved by the Geographic Information Coordinating Council and the Environmental Management Commission. In the event that there exists a discrepancy among any of these maps that would affect a required buffer, the classification requiring the most stringent buffer shall be applied. However, an alternative map approved by the Environmental Management Commission shall not be used for buffer delineation on projects that are existing and ongoing within the meaning of Sec. 6.1.11(J).

D) ***Appeals of Stream Classification***

Because the Neuse River is protected by a state-wide buffer program, which is managed by the Division of Water Quality, the authority to hear appeals of stream classifications for that portion of the Town of Apex and its ETJ that lies within the Neuse River Basin, which shall be indicated on the Town of Apex's "Watershed Protection Overlay District Map," rests within the sole jurisdiction of the Division of Water Quality unless the Town of Apex is delegated the authority to maintain its Neuse Buffer Program locally. Therefore, appeals of stream classifications shall be handled in the following manner:

1) *Within the Neuse River Basin*

When any affected party within the Neuse River Basin believes that the maps have inaccurately depicted surface waters, he or she shall consult the Division of Water Quality as set forth in 15A N.C.A.C. 2B.0233(3).

In the event that the Town of Apex is delegated the authority to maintain Neuse buffers locally, the Town of Apex Environmental Programs Manager shall make decisions and interpretations regarding stream classifications in accordance with all applicable state criteria and the best available scientific information. Any disputes over such on-site determination shall be referred to the Director of the Division of Water Quality in writing. A determination of the Director as to the accuracy or application of the maps is subject to review as provided in Articles 3 and 4 of G.S. 150B.

2) *Within the Jordan Lake Watershed*
When any affected party within the Jordan Lake Watershed believes that the maps have inaccurately depicted surface waters, the Town of Apex Environmental Programs Manager, or his or her designee, shall make decisions and interpretations regarding stream classifications in accordance with the protocol in Sec. 6.1.11(D)(4) and all applicable state criteria and the best available scientific information. Any disputes over such on-site determination made by the Town of Apex shall be referred to the Director of the Division of Water Quality in writing. A determination of the Director as to the accuracy or application of the maps is subject to review as provided in Articles 3 and 4 of G.S. 150B.

3) *In All Remaining Areas Within Both the Primary Watershed Protection District and the Secondary Watershed Protection District*
In all remaining areas, the Town of Apex Environmental Programs Manager, or his or her designee, shall make decisions and interpretations regarding stream classifications in accordance with the protocol in Sec. 6.1.11(D)(4) and all applicable state criteria and the best available scientific information. Any person aggrieved by a decision of the Town regarding such on-site determination may appeal such decision to the Town of Apex Board of Adjustment.

4) *Exemption Based On On-Site Determination*
A Town representative who makes an on-site stream classification shall have successfully completed the Division of Water Quality's *Surface Water Identification Training Certification* course, its successor, or other equivalent training curriculum approved by the Division of Water Quality. The specific origination point of a stream shall be established using the latest version of the Division publication, *Methodology for Identification of Intermittent and Perennial Streams and Their Origins,* available at http://portal.ncdenr.org/web/wq/swp/ws/401/waterresources/streamdeterminations or from the NC Division of Water Quality – 401 Oversight Express Permitting Unit, or its successor.

Surface waters that appear on the maps used to determine surface water classifications shall not be subject to the requirements of Sec. 6.1.11 if a site evaluation reveals any of the following cases:

a) Man-made ponds and lakes that are not part of a natural drainage way that is 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.

b) Ephemeral streams.

c) The absence on the ground of a corresponding intermittent or perennial stream, lake, reservoir, or pond.

d) Ditches or man-made water conveyances, other than modified natural streams.

E) ***Diffuse Flow Requirement***

Diffuse flow of runoff shall be maintained in the riparian buffer by dispersing concentrated flow and reestablishing vegetation.

1) Concentrated runoff from new ditches or manmade conveyances shall be converted to diffuse flow before the runoff enters the riparian buffer.

2) Periodic corrective action to restore diffuse flow shall be taken if necessary to impede the formation of erosion gullies.

3) As set out in Sec. 6.1.11(E) and (G)(1) of this Ordinance, Zones of the Riparian Buffer and Table of Uses respectively, no new stormwater conveyances are allowed through the buffers except for those specified in the Table of Uses, Sec. 6.1.11(G)(1) of this Ordinance.

F) ***Zones of the Riparian Buffer***

1) Perennial Streams: The protected riparian buffer for perennial streams shall have three zones as follows:

a) Zone 1 shall consist of a vegetated area that is undisturbed except for uses provided in TABLE OF USES 6.1.11(G)(1). Zone 1 shall begin at the most landward limit of the top of bank and extend landward a distance of thirty (30) feet on all sides of the surface water.

b) Zone 2 shall consist of a vegetated area that is undisturbed except for uses provided in TABLE OF USES 6.1.11(G)(1). Zone 2 shall begin at the outer edge of Zone 1 and extend landward a distance of twenty (20) feet. The combined width of Zones 1 and 2 shall be fifty (50) feet on all sides of the surface water.

c) Zone 3 shall consist of a vegetated area that is undisturbed except for the same uses provided in TABLE OF USES 6.1.11(G)(1) that are permitted in Zone 2. In the Primary Watershed Protection District, Zone 3 shall begin at the outer edge of Zone 2 and extend landward a distance of fifty (50) feet. The combined width of Zones 1, 2 and 3 in the Primary Watershed Protection District shall be one hundred (100) feet on all sides of the surface water. In the Secondary Watershed Protection District, Zone 3 shall begin at the outer edge of Zone 2 and extend landward an average distance of fifty (50) feet. The combined width of Zones 1, 2 and 3 in the Secondary

Watershed Protection District shall average one hundred (100) feet on all sides of the surface water.

2) Intermittent Streams: The protected riparian buffer for intermittent streams shall have two zones as follows:

a) Zone 1 shall consist of a vegetated area that is undisturbed except for uses provided in TABLE OF USES 6.1.11(G)(1). Zone 1 shall begin at the most landward limit of the top of bank and extend landward a distance of thirty (30) feet on all sides of the surface water.

b) Zone 2 shall consist of a vegetated area that is undisturbed except for uses provided in TABLE OF USES 6.1.11(G)(1). Zone 2 shall begin at the outer edge of Zone 1 and extend landward a distance of twenty (20) feet. The combined width of Zones 1 and 2 shall be fifty (50) feet on all sides of the surface water.

3) Lakes and Ponds: The protected riparian buffer for lakes and ponds that are part of a natural drainage way shall have Zones 1 and 2 as described below, unless the lake or pond joins with a perennial stream in which case the riparian buffer shall have Zones 1, 2, and 3 as follows:

a) Zone 1 shall consist of a vegetated area that is undisturbed except for uses provided in TABLE OF USES 6.1.11(G)(1). Zone 1 shall begin at the most landward limit of the top of bank and extend landward a distance of thirty (30) feet on all sides of the surface water.

b) Zone 2 shall consist of a vegetated area that is undisturbed except for uses provided in TABLE OF USES 6.1.11(G)(1). Zone 2 shall begin at the outer edge of Zone 1 and extend landward a distance of twenty (20) feet. The combined width of Zones 1 and 2 shall be fifty (50) feet on all sides of the surface water.

c) Zone 3, where a lake or pond joins a perennial stream in the Primary Watershed Protection District, shall consist of a vegetated area that is undisturbed except for the same uses provided in TABLE OF USES 6.1.11(G)(1) that are permitted in Zone 2. Zone 3 shall begin at the outer edge of Zone 2 and extend landward a distance of fifty (50) feet. The combined width of Zones 1, 2 and 3 shall be one hundred (100) feet on all sides of the surface water. Where a lake or pond joins a perennial stream in the Secondary Watershed Protection District, Zone 3 shall begin at the outer edge of Zone 2 and extend landward an average distance of fifty (50) feet. The combined width of Zones 1, 2 and 3 shall average one hundred (100) feet on all sides of the surface water.

G) ***Uses Permitted Within the Riparian Buffer***

This section shall apply to activities conducted within, or outside of with hydrologic impacts in violation of the diffuse flow requirements set out in Sec. 6.1.11(E) upon, a riparian buffer regulated by this section. The Town shall issue an approval for new development only if the proposed development will avoid

impacts to riparian buffers regulated by this section or, if an impact to any such buffer is proposed, in accordance with the requirements in Sec. 6.1.11(G)(1) or (2) below, as applicable, the applicant has demonstrated that: (i) the proposed activity is exempt, (ii) the proposed activity is allowable or allowable with mitigation, and the requirements of this section for proceeding such designated use have been met, or (iii) a variance authorizing the proposed activity has been obtained.

1) *Within Zones 1 and 2 of the Neuse River Basin*
Riparian buffers within the Neuse River Basin shall be maintained and protected per 15A NCAC 2B.0233 Neuse River Basin: Nutrient Sensitive Waters Management Strategy: Protection and Maintenance of Existing Riparian Buffers. Development activity may take place within Zone 1 or Zone 2 of a riparian buffer provided that the landowner has one of the following:

   a) For any use, other than one specified as exempt, an authorization certificate that documents that the North Carolina Division of Water Quality has approved an allowable use, or an allowable use with mitigation, as described in 15A NCAC 2B.0233 Neuse River Basin: Nutrient Sensitive Waters Management Strategy: Protection and Maintenance of Existing Riparian of Existing Riparian Buffers.

   b) An opinion from the North Carolina Division of Water Quality that vested rights has been established for that activity.

   c) A letter from the North Carolina Division of Water Quality documenting that a variance has been granted for the proposed activity.

2) *Within Zone 3 of a Riparian Buffer in the Neuse River Basin and All Other Remaining Areas of Both the Primary Watershed Protection District and the Secondary Watershed Protection District*
Within all areas, other than Zones 1 and 2 or the Neuse River Basin, the following land disturbing activities and uses shall be permitted within any required riparian buffer:

   a) Those activities and uses that are specifically listed as exempt, allowable, or allowable with mitigation in THE TABLE OF USES shown below in Table 6.1.11(G)(1). The requirements for each category are given in Sec. 6.1.11(G)(4) below.

   b) All uses not categorized as exempt, allowable, or allowable with mitigation are considered prohibited and may not proceed within the riparian buffer or outside the buffer if the use would impact the buffer, unless a variance is granted pursuant to Sec. 6.1.13 below.

Table 6.1.11(G)(1)

Use	Exempt*	Allowable*	Allowable with Mitigation*
Access trails: Pedestrian access trails leading to the surface water, docks, fishing piers, boat ramps and other water			

Use	Exempt*	Allowable*	Allowable with Mitigation*
dependent activities: • Pedestrian access trails that are restricted to the minimum width practicable and do not exceed 4 feet in width of buffer disturbance, and provided that installation and use does not result in removal of trees as defined in this Ordinance and no impervious surface is added to the riparian buffer • Pedestrian access trails that exceed 4 feet in width of buffer disturbance, the installation or use results in removal of trees as defined in this Ordinance or impervious surface is added to the riparian buffer	X	X	
Airport facilities: • Airport facilities that impact equal to or less than 150 linear feet or one-third of an acre of riparian buffer • Airport facilities that impact greater than 150 linear feet or one-third of an acre of riparian buffer • Activities necessary to comply with FAA requirements (e.g. radar uses or landing strips)[1]		X X	 X
Archaeological activities	X		
Bridges		X	
Canoe access provided that installation and use does not result in removal of trees as defined in this Ordinance and no impervious surface is added to the buffer	X		
Dam maintenance activities: • 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 • 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	X	
Drainage ditches, roadside ditches and stormwater conveyances through riparian buffers: • 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 • High flow bypass from structural BMPs • 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 • 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 • New drainage ditches, roadside ditches and stormwater	X	 X X X	 X

Use	Exempt*	Allowable*	Allowable with Mitigation*
conveyances applicable to linear projects that do not provide a stormwater management facility due to topography constraints provided that other practicable BMPs are employed			
Drainage of a pond in a natural drainage way provided that a new riparian buffer that meets the requirements of Sec. 6.1.11(E) and (F) of this Ordinance is established adjacent to the new channel.	X		
Driveway crossings of streams and other surface waters subject to this Rule: • Driveway crossings on single-family residential lots that disturb equal to or less than 25 linear feet or 2,500 square feet of riparian buffer • Driveway crossings on single-family residential lots that disturb greater than 25 linear feet or 2,500 square feet of riparian buffer • In a subdivision that cumulatively disturb equal to or less than 150 linear feet or one-third of an acre of riparian buffer • In a subdivision that cumulatively disturb greater than 150 linear feet or one-third of an acre of riparian buffer	X	X X	X
Driveway impacts other than crossing of a stream or other surface waters subject to this Rule			X
Fences: • Fences provided that disturbance is minimized and installation does not result in removal of trees as defined in this Ordinance • Fences provided that disturbance is minimized and installation results in removal of trees as defined in this Ordinance	X	X	
Fertilizer application: one-time application to establish vegetation	X		
Forest harvesting – see 15A NCAC 2B .0267(14) for requirements[6]			
Grading and revegetation in Zones Two and Three provided that 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: a grassed travel way on one side of the water body when less impacting alternatives are not practical. The width and specifications of the travel way shall be only that needed for equipment access and operation. The travel way shall be located to maximize stream shading		X	
Mining activities: • Mining activities that are covered by the Mining Act		X	

Use	Exempt*	Allowable*	Allowable with Mitigation*
provided that new riparian buffers that meet the requirements of Sec. 6.1.11(E) and (F) of this Rule are established adjacent to the relocated channels • Mining activities that are not covered by the Mining Act OR where new riparian buffers that meet the requirements of Sec. 6.1.11(E) and (F) of this Rule are not established adjacent to the relocated channels			X
• Wastewater or mining dewatering wells with approved NPDES permit	X		
Playground equipment: • Playground equipment on single-family lots provided that installation and use does not result in removal of vegetation	X		
• Playground equipment installed on lands other than single-family lots or that requires removal of vegetation		X	
Ponds created by impounding streams and not used as stormwater BMPs: • New ponds provided that a riparian buffer that meets the requirements of Sec. 6.1.11(E) and (F) of this Ordinance is established adjacent to the pond		X	
• New ponds where a riparian buffer that meets the requirements of Sec. 6.1.11(E) and (F) of this Ordinance is NOT established adjacent to the pond			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 Ordinance			X
Railroad crossings of streams and other surface waters subject to this Ordinance: • Railroad crossings that impact equal to or less than 40 linear feet of riparian buffer	X		
• Railroad crossings that impact greater than 40 linear feet but equal to or less than 150 linear feet or one third of an acre of riparian buffer		X	
• Railroad crossings that impact greater than 150 linear feet or one-third of an acre of riparian buffer			X
Recreational and accessory structures in Zones Two and Three: • Sheds and gazebos in Zones Two and Three, except along perennial waters in Neuse River Basin where high density development option is utilized o Total footprint less than or equal to 150 square feet per lot		X	
o Total footprint greater than 150 square feet per lot			X
• Wooden slatted decks and associated steps, provided the use meets the requirements of Sec. 6.1.11(E) and (F) of this Ordinance: o Deck at least eight feet in height and no vegetation removed from Zone One		X	
o Deck less than eight feet in height or vegetation			X

Use	Exempt*	Allowable*	Allowable with Mitigation*
removed from Zone One			
Removal of previous fill or debris provided that diffuse flow is maintained and vegetation is restored	X		
Road impacts other than crossings of streams and other surface waters subject to this Ordinance			X
Road crossings of streams and other surface waters subject to this Ordinance: • Road crossings that impact equal to or less than 40 linear feet of riparian buffer • Road crossings that impact greater than 40 linear feet but equal to or less than 150 linear feet or one-third of an acre of riparian buffer • Road crossings that impact greater than 150 linear feet or one-third of an acre of riparian buffer	X	X	X
Road relocation: Relocation of existing private access roads associated with public road projects where necessary for public safety: • Less than or equal to 2,500 square feet of buffer impact • Greater than 2,500 square feet of buffer impact		X	X
Scientific studies and stream gauging	X		
Stormwater BMPs: • Wet detention, bioretention, and constructed wetlands in Zones Two and Three if diffuse flow of discharge is provided into Zone One • Wet detention, bioretention, and constructed wetlands in Zone One		X	X
Streambank or shoreline stabilization		X	
Temporary roads, provided that the disturbed area is restored to pre-construction topographic and hydrologic conditions immediately after construction is complete and replanted immediately with comparable vegetation, except that tree planting may occur during the dormant season. A one-time application of fertilizer may be used to establish vegetation: At the end of five years the restored buffer shall comply with the restoration criteria in Item (8) of Rule 15A NCAC 02B.0268: • Less than or equal to 2,500 square feet of buffer disturbance • Greater than 2,500 square feet of buffer disturbance • Associated with culvert installation or bridge construction or replacement	X	X X	
Temporary sediment and erosion control devices, provided that the disturbed area is restored to pre-construction topographic and hydrologic conditions immediately after construction is complete and replanted immediately with comparable vegetation, except that tree planting may occur during the dormant season. A one-time application of fertilizer may be used to establish vegetation. At the end of five years the restored buffer shall comply with the restoration criteria in Item (8) of Rule 15A NCAC 02B.0268: • In Zones Two and Three provided ground cover is established within timeframes required by the	X		

Use	Exempt*	Allowable*	Allowable with Mitigation*
Sedimentation and Erosion Control Act, vegetation in Zone One is not compromised, and runoff is released as diffuse flow in accordance with Sec. 6.1.11(E) of this Ordinance			
• In Zones One, Two and Three to control impacts associated with uses approved by the local government or that have received a variance, provided that sediment and erosion control for upland areas is addressed, to the maximum extent practical, outside the buffer		X	
• In-stream temporary erosion and sediment control measures for work within a stream channel that is authorized under Sections 401 and 404 of the Federal Water Pollution Control Act	X		
• In-stream temporary erosion and sediment control measures for work within a stream channel		X	
Utility, electric, aerial, perpendicular crossings of streams and other surface waters subject to this Ordinance[2,3,5]:			
• Disturb equal to or less than 150 linear feet of riparian buffer	X		
• Disturb greater than 150 linear feet of riparian buffer		X	
Utility, electric, aerial, other than perpendicular crossings[5]:			
• Impacts in Zones Two and Three		X	
• Impacts in Zone One[2,3]			X
Utility, electric, underground, perpendicular crossings[3,4,5]:			
• Disturb less than or equal to 40 linear feet of riparian buffer	X		
• Disturb greater than 40 linear feet of riparian buffer		X	
Utility, electric, underground, other than perpendicular crossings[4]:			
• Impacts in Zones Two and Three	X		
• Impacts in Zone One[1]	X		
Utility, non-electric, perpendicular crossings of streams and other surface waters subject to this Ordinance[3,5]:			
• Disturb equal to or less than 40 linear feet of riparian buffer with a maintenance corridor equal to or less than 10 feet in width	X		
• Disturb equal to or less than 40 linear feet of riparian buffer with a maintenance corridor greater than 10 feet in width		X	
• Disturb greater than 40 linear feet but equal to or less than 150 linear feet of riparian buffer with a maintenance corridor equal to or less than 10 feet in width		X	
• Disturb greater than 40 linear feet but equal to or less than 150 linear feet of riparian buffer with a maintenance corridor greater than 10 feet in width			X
• Disturb greater than 150 linear feet of riparian buffer			X
Utility, non-electric, other than perpendicular crossings[4,5]:			
• Impacts in Zones Two and Three		X	
• Impacts in Zone One[1]			X
Vegetation management:			
• Emergency fire control measures provided that	X		

Use	Exempt*	Allowable*	Allowable with Mitigation*
topography is restored • Mowing or harvesting of plant products in Zones Two and Three • Planting vegetation to enhance the riparian buffer • Pruning forest vegetation provided that the health and function of the forest vegetation is not compromised • Removal of individual trees which are in danger of causing damage to dwellings, other structures or human life, or are imminently endangering stability of the streambank • Removal of individual trees which are dead, diseased or damaged • Removal of poison ivy • Removal of invasive exotic vegetation as defined in: *Smith, Cherri L. 1998. Exotic Plant Guidelines. Dept. of Environment and Natural Resources. Division of Parks and Recreation. Raleigh, NC. Guideline #30*	X X X X X X X		
Vehicular access roads leading to water-dependent structures as defined in 15A NCAC 02B .0202, provided they do not cross the surface water and have minimum practicable width not exceeding ten feet		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 Sec. 6.1.11(E) and (F) of this Ordinance is established adjacent to the reservoir • New reservoirs where a riparian buffer that meets the requirements of Sec. 6.1.11(E) and (F) of this Ordinance is not established adjacent to the reservoir		X	X
Water wells: • Single-family residential water wells • All other water wells	X	X	
Wetland, stream and buffer restoration that results in impacts to the riparian buffers • Wetland, stream and buffer restoration that requires Division approval for the use of a 401 Water Quality Certification • Wetland, stream and buffer restoration that does not require Division approval for the use of a 401 Water Quality Certification	X	X	
Wildlife passage structures		X	

*To qualify for the designation indicated in the column header, an activity must adhere to the limitations defined for it in a given listing as well as the requirements established in Sec. 6.1.11(G)(3) of this Ordinance.

[1]Provided that:
- 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.
-Zones One, Two, and Three meet the requirements of Sec. 6.1.11(E) and (F) of this Ordinance.
[2] Provided that, in Zone 1 of the buffer, all of the following BMPs for overhead utility lines are used. If all of these BMPs are not used, then the overhead utility lines shall require a no practical alternatives evaluation by the Town.
- 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.
- Rip rap 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.
[3] Provided that poles or towers shall not be installed within 10 feet of a water body unless the Town completes a no practical alternatives evaluation.
[4] Provided that, in Zone 1 of the buffer, all of the following BMPs for underground utility lines are used. If all of these BMPs are not used, then the underground utility line shall require a no practical alternatives evaluation by the Town of Apex.
- 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.
- 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.
[5]Perpendicular crossings are those that intersect the surface water at an angle between 75 degrees and 105 degrees.
[6]Requirements are administered by the Division of Water Quality in Zones 1 and 2 in the Jordan Lake Watershed and in Zones 1 and 2 in the Neuse River Basin, but the Town shall be notified in advance of forest harvesting activity in those buffer areas. Requirements are administered by the Town in Zone 3 in the Jordan Lake Watershed and the Neuse River Basin and in Zones 1, 2 and 3 in the Cape Fear River Basin outside of the Jordan Lake Watershed. The requirements in 15A NCAC 2B .0267(14) that are applicable to Zone 2 shall also apply to Zone 3.

3) *Requirements for Categories of Uses*
Uses designated as exempt, allowable, and prohibited in Sec. 6.1.11(G)(1) *Uses Permitted Within the Riparian Buffer* shall have the following requirements:

a) EXEMPT. Uses designated as exempt are allowed within the riparian buffer without written authorization from the Town of Apex. Exempt uses shall be designed, constructed and maintained to minimize soil disturbance and to provide the maximum water quality protection practicable, including construction, monitoring, and maintenance activities.

b) ALLOWABLE. Uses designated as allowable may proceed within the riparian buffer provided that there are no practical alternatives to the requested use pursuant to Sec. 6.1.11(G)(4) *Determination of "No Practical Alternatives".* This includes construction, monitoring, and maintenance activities. These uses require written authorization from the Town of Apex.

c) ALLOWABLE WITH MITIGATION. Uses designated as allowable may proceed within the riparian buffer provided that there are no practical alternatives to the requested use pursuant to Sec. 6.1.11(G)(4) *Determination of "No Practical Alternatives"* and an appropriate mitigation strategy has been approved pursuant to Sec. 6.1.14 below. These uses require written authorization from the Town of Apex.

4) *Determination of "No Practical Alternatives"*
Persons who wish to undertake uses designated as allowable, or allowable with mitigation, in TABLE OF USES 6.1.11(G)(1) shall submit a request for a "no practical alternatives" determination to the Town of Apex Environmental Programs Manager . The applicant shall certify that the project meets the criteria identified in this Sec. 6.1.11(G)(4)(a)(i)-(iii). The Town of Apex shall grant an Authorization Certificate upon making a "no practical alternatives" determination. The Town may attach conditions to the Authorization Certificate that support the purpose, spirit, and intent of Sec. 6.1.11. The procedure for making a decision whether to grant an Authorization Certificate shall be as follows:

a) For any request for a "no practical alternatives" determination for which the applicant has made a complete submission of all information set forth in Sec. 6.1.11(G)(4)(c), the Town of Apex shall review the entire project and make a finding of fact as to whether the following criteria have been met in support of such determination:

(i) The basic project purpose cannot be practically accomplished in a manner that would better minimize disturbance, preserve aquatic life and habitat, and protect water quality.

(ii) The use cannot practically be reduced in size or density, reconfigured or redesigned to better minimize disturbance, preserve aquatic life and habitat, and protect water quality.

(iii) Best management practices shall be used if necessary to minimize disturbance, preserve aquatic life and habitat, and protect water quality.

b) Requests for a "no practical alternatives" determination shall be reviewed and either approved or denied within 60 days of receipt of a complete submission that includes the information set forth in Sec.6.1.11(G)(4)(c). Failure to issue an approval or denial within 60 days of an applicant's submission shall constitute a determination that the applicant has demonstrated "no practical alternatives" and an Authorization Certificate shall be issued to the applicant unless one of the following occurs:

(i) The applicant agrees, in writing, to a longer period;

(ii) The Town of Apex determines that the applicant has failed to furnish requested information necessary to the Town's decision;

(iii) The final decision is made pursuant to a public hearing; or

(iv) The applicant refuses access to its records or premises for the purpose of gathering information necessary for the Town's decision. The Town may attach conditions to the Authorization Certificate that support the purpose, spirit and intent of the riparian buffer protection program.

c) Complete submissions shall include at least the following information in support of a "no practical alternatives" determination:

(i) The name, address and phone number of the applicant;

(ii) The nature of the activity to be conducted by the applicant;

(iii) The location of the activity;

(iv) A map of sufficient detail to accurately delineate the boundaries of the land to be utilized in carrying out the activity, the location and dimensions of any disturbance in riparian buffers associated with the activity, and the extent of riparian buffers on the land;

(v) An explanation of why this plan for the activity cannot be practically accomplished, reduced or reconfigured to better minimize disturbance to the riparian buffer, preserve aquatic life and habitat and protect water quality;

(vi) Plans for any best management practices proposed to be used to control the impacts associated with the activity; and

(vii) The applicant's certification that the project meets all of the criteria in Sec. 6.1.11(G)(4)(a)(i)-(iii) for finding "no practical alternatives."

d) Any person aggrieved by a decision of the Town of Apex Environmental Programs Manager pertaining to issuance of an Authorization Certificate for a riparian buffer within the Jordan Lake Watershed may appeal such decision in writing to the Director of the Division of Water Quality, c/o the 401 Oversight Express Permitting Unit, or its successor. The Director's decision is subject to review as provided in G.S. 150B Articles 3

and 4. Appeals of an Authorization Certificate decision by the Town's Environmental Programs Manager pertaining to a riparian buffer that is not within the Jordan Lake Watershed shall be to the Town of Apex Board of Adjustment.

5) *Mitigation*
Persons who wish to undertake uses designated as allowable with mitigation shall meet the following requirements in order to proceed with their proposed use:

a) Obtain an Authorization Certificate pursuant to Sec. 6.1.11(G)(4); and

b) Obtain approval for a mitigation proposal pursuant to Sec. 6.1.14.

H) ***Minimization of Impact***
All uses and activities that are permitted within any required riparian buffer shall be designed to minimize impact on water quality.

I) ***Notification on Site Plan and Subdivision Plan and Recording of Information***
Where required, stream buffers shall be shown on all site plans and subdivision plans approved pursuant to Sec. 6.1.4 of this Ordinance. A certificate in the form established in the *Town of Apex Design and Development Manual* shall be lettered on the face of the site plan or the recorded subdivision map. Prior to approval of a final plat (with respect to a subdivision), issuance of a certificate of occupancy (with respect to a site plan), or commencement of a use, a developer shall first cause all information pertaining to required riparian buffers to be shown on the final plat for the property.

J) ***Exemption When Existing Uses are Present and Ongoing***
This Sec. 6.1.11 shall not apply to uses that are existing and ongoing; however, this section shall apply at the time an existing, ongoing use is changed to another use. Change of use shall mean the initiation of any activity that does not meet either of the following criteria for existing, ongoing activity:

1) It was present within the riparian buffer as of the effective date of this Sec. 6.1.11 and has continued to exist since that time. Existing uses shall include agriculture, buildings, industrial facilities, commercial areas, transportation facilities, maintained lawns, utility lines and on-site sanitary sewage systems, any of which involve specific, periodic management of vegetation or displacement of vegetation by structures or regular activity. Only the portion of the riparian buffer occupied by the footprint of the existing use is exempt from Sec. 6.1.11. Change of ownership is not a change of use. Activities necessary to maintain uses are allowed provided that the site remains similarly vegetated, no impervious surface is added within the required buffer area where it did not previously exist as of the effective date of this section, and existing diffuse flow is maintained. Grading and revegetating Zones Two and Three is allowed provided that the health of the vegetation in Zone One is not compromised, the ground is stabilized and existing diffuse flow is maintained.

2) Projects or proposed development that are determined by the Town to meet at least one of the following criteria*:*

a) Project requires a 401 Certification/404 Permit and these were issued prior to the effective date of Sec. 6.1.11;

b) Projects that require a state permit, such as landfills, NPDES wastewater discharges, land application of residuals and road construction activities, have begun construction or are under contract to begin construction and had received all required state permits and certifications prior to the effective date of Sec. 6.1.11;

c) Projects that are being reviewed through Clean Water Act Section 404/National Environmental Policy Act Merger 01 Process (published by the US Army Corps of Engineers and Federal Highway Administration, 2003) or its immediate successor and that have reached agreement with DENR on avoidance and minimization by the effective date of Sec. 6.1.11; or

d) Projects that are not required to be reviewed by the Clean Water Act Section 404/National Environmental Policy Act Merger 01 Process (published by the US Army Corps of Engineers and Federal Highway Administration, 2003) or its immediate successor if a Finding of No Significant Impact has been issued for the project and the project has the written approval of the Town prior to the effective date of Sec. 6.1.11.

6.1.12 Structural BMPs

A) ***Professional Design***
All structural BMPs and any alterations thereof shall be designed by a North Carolina registered professional with qualifications appropriate for the type of system required and shall be in accordance with the NC DWQ Stormwater BMP Manual, the *Town of Apex Standard Specifications and Standard Details* and, when applicable, the *Town of Apex Design and Development Manual*; these registered professionals are defined as professional engineers, landscape architects (to the extent that G.S. Chapter 89A allows), and land surveyors (to the extent that the design represents incidental drainage within a subdivision, as provided in G.S. 89C-3(7)).

B) ***Design, Location, and Landscaping of Structural BMPs***
The following specific design criteria shall be met by these systems:

1) Specific requirements for structural BMPs shall be in accordance with the NC DWQ Stormwater BMP Manual and the *Town of Apex Standard Specifications and Standard Details*;

2) Structural BMPs shall be designed to remove 85% of total suspended solids in the permanent pool and store runoff from a one-inch rainfall from the site above the permanent pool;

3) The designed runoff storage volume shall be above the permanent pool;

4) The discharge rate from these systems following the one-inch rainfall design storm shall be such that the runoff does not draw down to the

feet shall be maintained along each side of a perennial stream. At no point shall the buffer width along each side of a perennial stream be less than fifty (50) feet. All variable width buffers must be delineated with monuments. All buffers shall meet the requirements of Sec. 6.1.11 *Riparian Buffers.*

c) *Riparian Buffers for Lakes and Ponds That Are Part of a Natural Drainage Way*
Within the Second Watershed Protection District, a vegetative buffer with a width of not less than fifty (50) feet shall be maintained around any lake or pond, provided, however, that any lake or pond that joins with a perennial stream shall have a vegetative buffer with an average width of not less than one hundred (100) feet maintained along each side of the lake or pond. At no point shall the buffer width around the lake or pond be less than fifty (50) feet. All variable width buffers must be delineated with monuments. All buffers shall meet the requirements of Sec. 6.1.11 *Riparian Buffers.*

6.1.7 High-Density Development Option

Developers wishing to exceed the built-upon limitations for low-density development within either the Primary Watershed Protection District or the Secondary Watershed Protection District, as set forth in Sec. 6.1.6(B) *Standards*, shall submit an appropriate development plan per Section 2.3 Development Approvals, which shall meet the following standards:

A) ***Within the Primary Watershed Protection District***

1) *Built-Upon Area*
Within the Primary Watershed Protection District, all development shall comply with the built-upon area limitations for the underlying district found in Sec. 5.1 *Table of Intensity and Dimensional Standards*.

2) *Vegetated Conveyances*
Stormwater runoff from the development may be transported from the development by vegetated conveyances to the maximum extent practicable provided that the standards of Article 7.5.4(B)(4) are met.

3) *Structural BMPs*
Within the Primary Watershed Protection District, structural BMPs shall be used to collect and hold the runoff from the first one-inch of rainfall. These storm water control structures shall meet the requirements in Sec. 6.1.12 *Structural BMPs*.

In addition, the post-development peak runoff rate shall be limited to the pre-development peak runoff rate for the 1-year, 24-hour and the 10-year, 24-hour storms. Detention volumes stored to reduce peak flows shall drain within seventy-two (72) hours to allow for subsequent storms.

A storm water impact statement shall be prepared by a qualified professional engineer registered to practice in North Carolina and submitted with the initial application for any development or activity that is not exempt from the requirements of Sec. 6.1 *Watershed Protection Overlay Districts* showing the impacts from the development site to the confluence point downstream where the area of the proposed development is less than 10% of the total drainage area (the “10%

point"). The impact statement shall verify the effects of detention on the downstream hydrographs to ensure that the peaks do not increase for a given storm. The impact statement shall list the infrastructure (ditches, culverts, etc.) and indicate all the adverse effects and impacts (to roads, culverts, businesses, homes, lawns, etc.) from the development to the 10% point. If backwater from detention appears to be a problem, then the impact statement shall also consider potential effects on upstream properties for the 100-year, 24-hour storm.

4) *Riparian Buffers for Perennial Streams*
Within the Primary Watershed Protection District, a vegetative buffer of not less than 100 feet shall be maintained along each side of a perennial stream. All buffers shall meet the requirements in Sec. 6.1.11 *Riparian Buffers.*

5) *Riparian Buffers For Intermittent Streams*
Within the Primary Watershed Protection District, a vegetative buffer with a width of not less than fifty (50) feet shall be maintained along each side of an intermittent stream. All buffers shall meet the requirements in Sec. 6.1.11 *Riparian Buffers*.

6) *Riparian Buffers For Lakes and Ponds That Are Part of a Natural Drainage Way*
Within the Primary Watershed Protection District a vegetative buffer with a width of not less than fifty (50) feet shall be maintained around any lake or pond, provided, however, that any lake or pond that joins with a perennial stream shall have a vegetative buffer width of not less than one hundred (100) feet around the lake or pond. All buffers shall meet the requirements of Sec. 6.1.11 *Riparian Buffers*.

B) ***Within the Secondary Watershed Protection District***

1) *Built-Upon Area Vegetated Conveyances, Structural BMPs and Riparian Buffers For Intermittent Streams*
Within the Secondary Watershed Protection District, the standards for Built-Upon Area, Vegetated Conveyances, Structural BMPs and Riparian Buffers for Intermittent Streams for the High Density Development option are the same as those in Sec. 6.1.7(A)(1) – (3) and (5) for within the Primary Watershed Protection District. As addressed below in Sec. 6.1.7(B)(2) and (3), the difference in standards in the Secondary Watershed Protection District pertaining to a required vegetative buffer for perennial streams, or a lake or pond that joins with a perennial stream, is that in the Secondary Watershed Protection District the buffer may average one hundred (100) feet.

2) *Riparian Buffers for Perennial Streams*
Within the Secondary Watershed Protection District, a vegetative buffer with an average width of not less than one hundred (100) feet shall be maintained along each side of a perennial stream. At no point shall the buffer width along each side of a perennial stream be less than fifty (50) feet. All variable width buffers must be delineated with monuments. All buffers shall meet the requirements in Sec. 6.1.11 *Riparian Buffers.*

3) *Riparian Buffers For Intermittent Streams*
Within the Secondary Watershed Protection District, a vegetative buffer with a width of not less than fifty (50) feet shall be maintained along each

side of an intermittent stream. All buffers shall meet the requirements in Sec. 6.1.11 *Riparian Buffers*.

4) *Riparian Buffers for Lakes and Ponds*
Within the Secondary Watershed Protection District, a vegetative buffer with a width of not less than fifty (50) feet shall be maintained around any lake or pond, provided, however, that any lake or pond that joins with a perennial stream shall have a vegetative buffer with an average width of not less than one hundred (100) feet maintained along each side of the lake or pond. At no point shall the buffer width around the lake or pond be less than fifty (50) feet. All variable width buffers must be delineated with monuments. All buffers shall meet the requirements of Sec. 6.1.11 *Riparian Buffers.*

6.1.8 Clustered Development Option

Clustering of development is allowed under either the low-density development option or the high-density development option under Sec. 2.3.4 *Planned Development Districts*, if the development complies with the following additional standards:

A) ***Density***
The overall density of the development shall not exceed the density allowed in the underlying base zoning district found in Sec. 5.1 *Table of Intensity and Dimensional Standards* (for the high-density development option) or the density limitation of the low-density development option for the Primary or Secondary Watershed Protection District;

B) ***Built-Upon Areas***
Built-upon areas shall be designed and sited to minimize storm water runoff volume and velocity and the overall impact of storm water runoff on receiving streams; and

C) ***Plat Certificate***
No plat shall be approved until the developer has caused the final plat to be certified as follows:

"This is a clustered development pursuant to the *Town of Apex Unified Development Ordinance* and may not be further subdivided or developed."

6.1.9 Definition of Built-Upon Area

For the purposes of complying with the standards and requirements of the Watershed Protection Overlay Districts, calculation of the built-upon area within the proposed development shall include, but not be limited to, all existing public and private streets, proposed public streets, sidewalks, driveways, rooftops, parking lots, patios, and all other impervious and partially impervious surfaces, including CABC and gravel within the development. The water area of swimming pools and wooden slatted decks shall not be included in the calculation of the built-upon area.

6.1.10 Calculation of Built-Upon Area

For the purposes of complying with the standards and requirements of the Watershed Protection Overlay Districts, built-upon area calculations shall be made based on the total acreage of built-upon area within a proposed development, divided by the total acreage of the lot area. Density calculations for expansions shall be based on the total acreage of built-upon area proposed for expansion, divided by the total acreage of lot area proposed for expansion. A certificate of occupancy shall not be granted, nor shall any final plat be recorded until a developer has caused all information pertaining to the percentage of the built-upon area on a property to be shown on the final plat for the property.

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maintenance and repair of public utilities and facilities such as sewer, gas, electrical and water systems, and streets and bridges.

11) No variance shall be issued for solid waste disposal facilities, hazardous waste management facilities, salvage yards, or chemical storage facilities that are located in Special Flood Hazard Areas.

C) ***Attach Conditions***
Upon consideration of the factors listed above and the purposes of this section, the Board of Adjustment may attach such conditions to the granting of variances, as it deems necessary to further the purposes of this section.

D) ***No Increase in Flood Levels***
Variances shall not be issued within any designated floodway or non-encroachment area if any increase in flood levels during the base flood discharge would result.

E) ***Conditions***
Conditions for variances:

1) *No violation of law.* Variances may not be issued when the variance will make the structure in violation of other federal, state or local laws, regulations, or ordinances.

2) *Minimum necessary*. Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.

3) *Other.* Variances shall only be issued upon:

a) A showing of good and sufficient cause;

b) A determination that failure to grant the variance would result in exceptional hardship; and,

c) A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisance, cause fraud on or victimization of the public, or conflict with existing local laws or articles.

F) ***Written Notice***
Any applicant to whom a variance is granted shall be given written notice specifying the difference between the base flood elevations and the elevation to which the structure is to be built and a written statement that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced lowest floor elevation. Such notification shall be maintained with a record of all variance actions.

G) ***Records***
The floodplain administrator shall maintain the records of all appeal actions and report any variances to the Federal Emergency Management Agency upon request.

6.2.16 Provisions for Flood Hazard Reduction

A) ***General Standards***

In all Special Flood Hazard Areas the following provisions are required:

1) *Anchored.* All new construction and substantial improvements shall be anchored to prevent flotation, collapse, or lateral movement of the structure;

2) *Material resistant to flood damage*. All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage;

3) *Construction methods and practices minimize flood damages*. All new construction or substantial improvements shall be constructed by methods and practices that minimize flood damages;

4) *Prevent water from entering or accumulating within the components during conditions of flooding*. 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;

5) *Water supply systems*. All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of floodwaters into the system;

6) *Sanitary sewage systems*. New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of floodwaters into the systems and discharges from the systems into the floodwaters;

7) *Waste disposal systems*. Solid waste disposal facilities and sites, hazardous waste management facilities, salvage yards, and chemical storage facilities shall not be permitted;

8) *New construction*. Any alteration, repair, reconstruction, or improvements to a structure that is in compliance with the provisions of this section shall meet the requirements of “new construction” as contained in this section; and

9) *Nonconforming buildings*. Nonconforming buildings or uses may not be enlarged, replaced, or rebuilt unless such enlargement or reconstruction is accomplished in conformance with the provisions of this section. Provided, however, nothing in this section shall prevent the repair, reconstruction, or replacement of a building or structure existing on August 1, 2000 and located totally or partially within the Special Flood Hazard Area, provided that the bulk of the building or structure below the regulatory flood protection elevation in the Special Flood Hazard Area is not increased and provided that such repair, reconstruction, or replacement meets all of the other requirements of this section.

B) ***Specific Standards***

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, as set forth in Section 6.2.6 or Section 6.2.17, the following provisions, in addition to the provisions of Section 6.2.16A, are required:

1) *Residential Construction*. No new residential structures, with the following exception:

   a) Development shall be permitted on properties for which construction plans were approved by August 1, 2000 provided such development is authorized in accordance with Section 6.1.11 *Riparian Buffers*.

      (i) New construction or substantial improvement of any residential structure (including manufactured homes) existing on August 1, 2000 shall have the reference floor, including basement, elevated no lower than the Regulatory Flood Protection Elevation, as defined in Section 6.2.19 of this ordinance.

2) *Non-Residential Construction*. No new non-residential structures, with the following exception:

   a) Development shall be permitted on properties for which SD Plans, PD Plans (for PUD, MEC, and TND), or Site Plans were approved by April 17, 2012 provided such development is authorized in accordance with Section 6.1.11 *Riparian Buffers*.

      (i) New construction or 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, as defined in Section 6.2.19 of this ordinance.

      (ii) Structures located in AE and X (Future) Zones may be floodproofed to the Regulatory Flood Protection Elevation in-lieu of elevation provided 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, using structural components having the capability of resisting hydrostatic and hydrodynamic loads and the effect of buoyancy. A registered professional engineer or architect shall certify that the floodproofing standards of this subsection are satisfied. Such certification shall be provided to the Floodplain Administrator as set forth in Section 6.2.13(B)(5), along with the operational plan and the inspection and maintenance plan.

3) *Manufactured or mobile homes*. Manufactured or mobile homes existing on August 1, 2000.

   a) Manufactured or mobile homes that are placed or substantially improved in sites:

      (i) Outside a manufactured home subdivision or mobile home park;

(ii) In a new manufactured home subdivision or mobile home park;

(iii) In an expansion to an existing manufactured home subdivision or mobile home park; or

(iv) In an existing manufactured home subdivision or mobile home park on which a manufactured or mobile home has incurred "substantial damage" as the result of a flood, must be elevated on a permanent foundation such that the lowest floor of the manufactured or mobile home is elevated no lower than two feet above the base flood elevation and be securely anchored to an adequately anchored foundation system to resist flotation, collapse, and lateral movement.

b) Manufactured or mobile homes that are to be placed or substantially improved on sites in an existing manufactured home subdivision or mobile home park that are not subject to the provisions of Section 6.2.16(B)(4)(a) above must be elevated so that the lowest floor of the manufactured or mobile home is elevated no lower than two feet above the base flood elevation, and is securely anchored to an adequately anchored foundation to resist flotation, collapse, and lateral movement.

c) Manufactured and mobile homes shall be anchored to prevent flotation, collapse, or lateral movement. For the purpose of this requirement, manufactured or mobile homes must be anchored to resist flotation, collapse, or lateral movement in accordance with the Regulations for Mobile Homes and Modular Housing adopted by the Commissioners of Insurance pursuant to Section 143.143.15 N.C.G.S. Additionally, when the elevation would be met by an elevation of the chassis at least 36 inches or less above the grade at the site, the chassis shall be supported by reinforced piers or other foundation elements of at least equivalent strength. When the elevations of the chassis are above 36 inches in height an engineering certification is required.

d) An evacuation plan shall be developed for evacuation of all residents of all new, substantially improved or substantially damaged manufactured home subdivisions or mobile home parks located within flood prone areas. This plan shall be filed with and approved by the floodplain administrator and the local emergency management coordinator.

4) *Recreational vehicle*. A recreational vehicle is ready for highway use if it is on wheels or a jacking system, is attached to the site only by quick disconnect type utilities and security and devices, and has no permanently attached additions. Recreation vehicles placed on sites shall either:

a) Be on site for fewer than 180 consecutive days;

b) Be fully licensed and ready for highway use; or

c) Meet the requirements of Section 6.2.13(B), *Floodplain Development Permit and Certification Requirements*, Section 6.2.16(A), *General Standards*, and Section 6.2.16(B)(4), *Manufactured or Mobile Homes*.

5) *Elevated buildings*. New construction or substantial improvements of elevated buildings that include fully enclosed areas that are usable solely for the parking of vehicles, building access or storage in an area other than a basement and which are subject to flooding shall be designed to preclude finished living space and be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for entry and exit of floodwaters.

a) Designs for complying with this requirement must either be certified by a professional engineer or architect or meet the following standards:

(i) Provide a minimum of two openings having a total net area of not less than one square inch for every one square foot of enclosed area subject to flooding;

(ii) The bottom of all openings shall be no higher than one foot above grade; and

(iii) Openings may be equipped with screens, louvers, valves, or other coverings or devices provided they permit the automatic flow of floodwaters in both directions.

b) Access to the enclosed area shall be the minimum necessary to allow for parking of vehicles (garage door) or limited storage of maintenance equipment used in connection with the premises (standard exterior door) or entry to the living area (stairway or elevator).

c) The interior portion of such enclosed areas shall not be partitioned or finished into separate rooms, except to enclose storage areas.

6) *Floodways and Non-Encroachment Areas*. Located within Special Flood Hazard Areas established in Section 6.2.6, *Basis for Establishing the Special Flood Hazard Areas*, Section 6.2.17(B), *Provide Flood Data*, or Section 6.2.18(D), *Base Elevation Data or Certification of No Floodplain*, are areas designated as floodways and non-encroachment areas. The floodways and non-encroachment areas are extremely hazardous areas due to the velocity of floodwaters which carry debris and potential projectiles and has erosion potential. The following provisions shall apply:

a) No encroachments shall be permitted. Substantial improvements of structures and buildings in existence on August 1, 2000 shall be permitted if it is demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in the flood levels during the occurrence of

the base flood. Such certification and technical data shall be presented to the floodplain administrator.

b) If Section 6.2.16(B)(7)(a) above is satisfied, all substantial improvements shall comply with all applicable flood hazard reduction provisions of Secs. 6.2.16(A), *General Standards,* through 6.2.18, *Standards for Subdivisions.*

c) No manufactured or mobile homes shall be permitted, except in an existing manufactured home subdivision or mobile home park. A replacement manufactured or mobile home may be placed on a lot in an existing manufactured home subdivision or mobile home park provided the anchoring and the elevation standards of Section 6.2.16(B)(4), *Manufactured or Mobile Homes*, are met.

6.2.17 Standards for Streams without Established Base Flood Elevations, Floodways, and/or Non-Encroachment Areas

Located within the Special Flood Hazard Areas established in Section 6.2.6, *Basis for Establishing the Special Flood Hazard Areas*, are small streams where no base flood data has been provided or where no floodways or non-encroachment areas have been identified. The following provisions apply within such areas:

A) ***No Encroachment***

No encroachments, including fill, new construction, substantial improvements and other developments shall be permitted within a distance of the stream bank equal to five times the width of the stream at the top of the bank or 20 feet each side from the top of the bank, whichever is greater, unless certification with supporting technical data by a registered professional engineer is provided demonstrating that such encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge.

B) ***Provide Flood Data***

A hydraulic report shall be prepared by a licensed professional engineer to define the Base Flood Elevation (BFE) for a master subdivision plan, minor subdivision plan, site plan, planned development, and other proposed development if development is greater than five (5) acres or has more than fifty (50) lots. Such Base Flood Elevation (BFE) data shall be adopted by reference per Section 6.2.6 to be utilized in implementing this ordinance.

C) ***General***

If Section 6.2.17(A), *No Encroachment*, is satisfied and base flood elevation data is available from other sources, all new construction and substantial improvements within such areas shall comply with all applicable provisions of Secs. 6.2.16(A), *General Standards*, through 6.2.18, *Standards for Subdivisions*, and shall be elevated or floodproofed in accordance with elevations established in accordance with Section 6.2.17(B) *Provide Flood Data*. When base flood elevation data is not available from a federal, state, or other source, the lowest floor, including basement, shall be elevated at least two feet above the highest adjacent grade. No encroachment shall be permitted in an unnumbered A Zone.

6.2.18 Standards for Subdivisions

A) ***Minimize Flood Damage***

All applications for subdivision shall be consistent with the need to minimize flood damage. No residential lots shall be located within the floodplain;

B) ***Utilities Located to Minimize Flood Damage***
All applications for subdivision shall have public utilities and facilities such as sewer, gas, electrical and water systems located and constructed to minimize flood damage;

C) ***Adequate Drainage***
All applications for subdivision shall have adequate drainage provided to reduce exposure to flood hazards; and

D) ***Base Elevation Data or Certification of No Floodplain***
Base flood elevation data or certification of no floodplain shall be provided for all subdivision proposals and other proposed development.

6.2.19 Terms Defined

Unless specifically defined below, words or phrases used in this ordinance shall be interpreted so as to give them the meaning they have in common usage and to give this ordinance its most reasonable application.

"**Accessory Structure (Appurtenant Structure)**" means a structure located on the same parcel of property as the principal structure and the use of which is incidental to the use of the principal structure. Garages, carports and storage sheds are common urban accessory structures. Pole barns, hay sheds and the like qualify as accessory structures on farms, and may or may not be located on the same parcel as the farm dwelling or shop building.

"**Addition (to an existing building)**" means an extension or increase in the floor area or height of a building or structure.

"**Appeal**" means a request for a review of the floodplain administrator's interpretation of any provision of this ordinance.

"**Area of Special Flood Hazard**" see "Special Flood Hazard Area (SFHA)"

"**Basement**" means any area of the building having its floor subgrade (below ground level) on all sides.

"**Base Flood**" means the flood having a one (1) percent chance of being equaled or exceeded in any given year based on current conditions hydrology.

"**Base Flood Elevation (BFE)**" means a determination of the water surface elevations of the base flood based on current conditions hydrology as published in the Flood Insurance Study. When the BFE has not been provided in a "Special Flood Hazard Area", it may be obtained from engineering studies available from a Federal or State other source using FEMA approved engineering methodologies. This elevation, when combined with the "Freeboard", establishes the "Regulatory Flood Protection Elevation" in Special Flood Hazard Areas.

"**Building**" see "Structure"

"**Chemical Storage Facility**" means a building, portion of a building, or exterior area adjacent to a building used for the storage of any chemical or chemically reactive products.

"**Current Conditions Hydrology**" means the flood discharges associated with the land-use conditions existing within the drainage area of a watercourse at the time a flood study

of the watercourse was conducted. Current conditions flood discharges and historical flood study information are published in the Flood Insurance Study.

"**Development**" means 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.

"**Disposal**" means, as defined in NCGS 130A-290(a)(6), 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.

"**Elevated Building**" means a non-basement building which has its lowest elevated floor raised above ground level by foundation walls, shear walls, posts, piers, pilings, or columns.

"**Encroachment**" means the advance or infringement of uses, fill, excavation, buildings, permanent structures or development into a floodplain, which may impede or alter the flow capacity of a floodplain.

"**Existing Manufactured Home Park or Manufactured Home Subdivision**" means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including, at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) was completed before the original effective date of the floodplain management regulations adopted by the community.

"**Flood" or "Flooding**" means a general and temporary condition of partial or complete inundation of normally dry land areas from:

(1) the overflow of inland or tidal waters; and/or

(2) the unusual and rapid accumulation of runoff of surface waters from any source.

"**Flood Boundary and Floodway Map (FBFM)**" means an official map of a community, issued by the Federal Emergency Management Agency, on which the Special Flood Hazard Areas and the floodways are delineated. This official map is a supplement to and shall be used in conjunction with the Flood Insurance Rate Map (FIRM).

"**Flood Hazard Boundary Map (FHBM)**" means an official map of a community, issued by the Federal Emergency Management Agency, where the boundaries of the Special Flood Hazard Areas have been defined as Zone A.

"**Flood Insurance**" means the insurance coverage provided under the National Flood Insurance Program.

"**Flood Insurance Rate Map (FIRM)**" means an official map of a community, issued by the Federal Emergency Management Agency, on which the Special Flood Hazard Areas, the Future Conditions Flood Hazard Areas, and the risk premium zones applicable to the community are delineated.

"**Flood Insurance Study (FIS)**" means an examination, evaluation, and determination of flood hazards, corresponding water surface elevations (if appropriate), flood hazard risk zones, and other flood data in a community issued by the Federal Emergency Management Agency. The Flood Insurance Study report includes Flood Insurance Rate

Maps (FIRMs) and Flood Boundary and Floodway Maps (FBFMs), if published.

"**Flood Prone Area**" see "Floodplain"

"**Floodplain**" means any land area susceptible to being inundated by water from any source.

"**Floodplain Administrator**" is the individual appointed to administer and enforce the floodplain management regulations.

"**Floodplain Development Permit**" means any type of permit that is required in conformance with the provisions of this ordinance, prior to the commencement of any development activity.

"**Floodplain Management**" means the operation of an overall program of corrective and preventive measures for reducing flood damage and preserving and enhancing, where possible, natural resources in the floodplain, including, but not limited to, emergency preparedness plans, flood control works, floodplain management regulations, and open space plans.

"**Floodplain Management Regulations**" means this ordinance and other zoning ordinances, subdivision regulations, building codes, health regulations, special purpose ordinances, and other applications of police power which control development in flood-prone areas. This term describes federal, state or local regulations, in any combination thereof, which provide standards for preventing and reducing flood loss and damage.

"**Floodproofing**" means any combination of structural and nonstructural additions, changes, or adjustments to structures, which reduce or eliminate flood damage to real estate or improved real property, water and sanitation facilities, structures, and their contents.

"**Floodway**" means 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 (1) foot.

"**Flood Zone**" means a geographical area shown on a Flood Hazard Boundary Map or Flood Insurance Rate Map that reflects the severity or type of flooding in the area.

"**Freeboard**" means the height added to the Base Flood Elevation (BFE) or the Future Conditions Flood Elevation to account for the many unknown factors that could contribute to flood heights greater that the height calculated for a selected size flood and floodway conditions, such as wave action, bridge openings, and the hydrological effect of urbanization on the watershed. The Base Flood Elevation plus the freeboard establishes the "Regulatory Flood Protection Elevation".

"**Future Conditions Flood**" means the flood having a one (1) percent chance of being equaled or exceeded in any given year based on future conditions hydrology.

"**Future Conditions Flood Elevation**" means a determination of the water surface elevations of the one percent (1%) annual chance flood based on future conditions hydrology as published in the Flood Insurance Study. This elevation, when combined with the freeboard, establishes the "Regulatory Flood Protection Elevation" in Future Conditions Flood Hazard Areas.

"**Future Conditions Flood Hazard Area**" means the land area that would be inundated by the one percent (1%) annual chance flood based on future conditions hydrology as

determined in Section 6.2.6 of this ordinance.

"**Future Conditions Hydrology**" means the flood discharges associated with projected land-use conditions based on the Wake County June 2003 Countywide Equivalent Zoning Classification data and without consideration of projected future construction of flood detention structures or projected future hydraulic modifications within a stream or other waterway such as bridge and culvert construction, fill, and excavation. Future conditions flood discharges are published in the Flood Insurance Study.

"**Functionally Dependent Facility**" means a facility which cannot be used for its intended purpose unless it is located in close proximity to water, such as a docking or port facility necessary for the loading and unloading of cargo or passengers, shipbuilding, or ship repair. The term does not include long-term storage, manufacture, sales, or service facilities.

"**Hazardous Waste Facility**" means, as defined in NCGS Article 9 of Chapter 130A, a facility for the collection, storage, processing, treatment, recycling, recovery, or disposal of hazardous waste.

"**Highest Adjacent Grade (HAG)**" means the highest natural elevation of the ground surface, prior to construction, immediately next to the proposed walls of the structure.

"**Historic Structure**" means any structure that is:

1) *Individually listed*
Listed individually in the National Register of Historic Places (a listing maintained by the U.S. Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register);

2) *Certified*
Certified or preliminarily determined by the Secretary of the Interior as contributing to the significance of a registered district or a district preliminarily determined by the Secretary to qualify as a registered historic district;

3) Listed as a contributing structure
Listed as a contributing structure in the National Register of Historic Places as identified in the National Register Nomination for the Apex Historic District (1994); the National Register Nomination for the Apex Historic District Boundary Increase (1995); and the National Register Nomination for the Apex Historic District Boundary Increase II (2001);

4) *State inventory*
Individually listed in the state inventory of historic places;

5) *County register*
Listed in the Wake County Register of Historic Places;

6) *Local inventory*
Individually listed in a local inventory of historic places in communities with historic preservation programs that have been certified:

a) By an approved state program as determined by the Secretary of the Interior; or

b) Directly by the Secretary of the Interior in states without approved programs.

(Town of Apex is not a Certified Local Government (CLG) Program; the Town is subject to the Wake County CLG Program)

"**Lowest Adjacent Grade (LAG)**" means the elevation of the ground, sidewalk or patio slab immediately next to the building, or deck support, after completion of the building.

"**Lowest Floor**" means lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access, or limited storage in an area other than a basement area is not considered a building's lowest floor, provided that such an enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of this ordinance.

"**Manufactured Home**" means a structure, transportable in one or more sections, which is built on a permanent chassis and designed to be used with or without a permanent foundation when connected to the required utilities. The term "manufactured home" does not include a "recreational vehicle".

"**Manufactured Home Park or Subdivision**" means a parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

"**Market Value**" means the building value, not including the land value and that of any accessory structures or other improvements on the lot. Market value may be established by independent certified appraisal; replacement cost depreciated for age of building and quality of construction (Actual Cash Value); or adjusted tax assessed values.

"**Mean Sea Level**" means, 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.

"**New Construction**" means structures for which the "start of construction" commenced on or after the effective date of the original version of the community's Flood Damage Prevention Ordinance and includes any subsequent improvements to such structures.

"**Non-Encroachment Area**" means 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 (1) foot as designated in the Flood Insurance Study report.

"**Post-FIRM**" means construction or other development for which the "start of construction" occurred on or after the effective date of the initial Flood Insurance Rate Map for the area.

"**Pre-FIRM**" means construction or other development for which the "start of construction" occurred before the effective date of the initial Flood Insurance Rate Map for the area.

"**Principally Above Ground**" means that at least 51% of the actual cash value of the structure is above ground.

"**Public Safety and/or "Nuisance**" means anything which is injurious to the safety or health of an entire community or neighborhood, or any considerable number of persons, or unlawfully obstructs the free passage or use, in the customary manner, of any navigable lake, or river, bay, stream, canal, or basin.

"**Recreational Vehicle (RV)**" means a vehicle, which is:

(1) built on a single chassis;

(2) 400 square feet or less when measured at the largest horizontal projection;

(3) designed to be self-propelled or permanently towable by a light duty truck; and

(4) designed primarily not for use as a permanent dwelling, but as temporary living quarters for recreational, camping, travel, or seasonal use.

"**Reference Level**" is the top of the lowest floor for structures within Special Flood Hazard Areas and Future Conditions Flood Hazard Areas designated as Zone A1-A30, AE, A, A99 or Zone X (Future).

"**Regulatory Flood Protection Elevation**" means 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.

(1) In "Special Flood Hazard Areas" where Base Flood Elevations (BFEs) have been determined, this elevation shall be the BFE plus two (2) feet of freeboard.

(2) In "Special Flood Hazard Areas" where no BFE has been established, this elevation shall be at least two (2) feet above the highest adjacent grade.

(3) In Future Conditions Flood Hazard Areas this elevation shall be the Future Conditions Flood Elevation plus two (2) feet of freeboard.

"**Remedy a Violation**" means to bring the structure or other development into compliance with State and community floodplain management regulations, or, if this is not possible, to reduce the impacts of its noncompliance. Ways that impacts may be reduced include protecting the structure or other affected development from flood damages, implementing the enforcement provisions of the ordinance or otherwise deterring future similar violations, or reducing Federal financial exposure with regard to the structure or other development.

"**Riverine**" means relating to, formed by, or resembling a river (including tributaries), stream, brook, etc.

"**Salvage Yard**" means any non-residential 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.

"**Solid Waste Disposal Facility**" means, as defined in NCGS 130A-290(a)(35), any facility involved in the disposal of solid waste.

"**Solid Waste Disposal Site**" means, as defined in (NCGS 130A-290(a)(36), any place at which solid wastes are disposed of by incineration, sanitary landfill, or any other method.

"**Special Flood Hazard Area (SFHA)**" means the land in the floodplain subject to a one (1%) percent or greater chance of being flooded in any given year based on current conditions hydrology, and future conditions hydrology as determined in Section 6.2.6 of this ordinance.

"**Start of Construction**" includes substantial improvement, and means the date the

building permit was issued, provided the actual start of construction, repair, reconstruction, rehabilitation, addition placement, or other improvement was within 180 days of the permit date. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading, and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, 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 actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of the building, whether or not that alteration affects the external dimensions of the building.

"**Structure**" means a walled and roofed building, a manufactured home, or a gas, liquid, or liquefied gas storage tank that is principally above ground.

"**Substantial Damage**" means damage of any origin sustained by a structure during any one-year period whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred. See definition of "substantial improvement". Substantial damage also means flood-related damage sustained by a structure on two separate occasions during a 10-year period for which the cost of repairs at the time of each such flood event, on the average, equals or exceeds 25 percent of the market value of the structure before the damage occurred.

"**Substantial Improvement**" means any combination of repairs, reconstruction, rehabilitation, addition, or other improvement of a structure, taking place during any one-year period for which the cost equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures which have incurred "substantial damage", regardless of the actual repair work performed. The term does not, however, include either:

(1) any correction of existing violations of State or community health, sanitary, or safety code specifications which have been identified by the community code enforcement official and which are the minimum necessary to assure safe living conditions; or,

(2) any alteration of a historic structure, provided that the alteration will not preclude the structure's continued designation as a historic structure.

"**Variance**" is a grant of relief from the requirements of this ordinance.

"**Violation**" means the failure of a structure or other development to be fully compliant with the community's floodplain management regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in Sections 6.2.13 and 6.2.16 is presumed to be in violation until such time as that documentation is provided.

"**Water Surface Elevation (WSE)**" means the height, in relation to mean sea level, of floods of various magnitudes and frequencies in the floodplains of coastal or riverine areas.

"**Watercourse**" means a lake, river, creek, stream, wash, channel or other topographic feature on or over which waters flow at least periodically. Watercourse includes specifically designated areas in which substantial flood damage may occur.

3. Erosion & Sediment Control

- Soil Erosion and Sediment Control (Town Code Chapter 5, Article X)
- Tree Protection (UDO Section 8.1.3, and 2.3.15)

ARTICLE X. SOIL EROSION AND SEDIMENTATION CONTROL

Sec. 5-140. Reserved.

Sec. 5-141. Title.

Sec. 5-142. Purposes.

Sec. 5-143. Definitions.

Sec. 5-144. Exclusions.

Sec. 5-145. General requirements.

Sec. 5-146. Basic control objectives.

Sec. 5-147. Mandatory standards for land-disturbing activity.

Sec. 5-148. Design and performance standards.

Sec. 5-149. Stormwater outlet protection.

Sec. 5-150. Borrow and waste areas.

Sec. 5-151. Access and haul roads.

Sec. 5-152. Operations in lakes or natural watercourses.

Sec. 5-153. Responsibility for maintenance.

Sec. 5-154. Additional measures.

Sec. 5-155. Existing uncovered areas.

Sec. 5-156. Procedures related to soil erosion and sedimentation control plans.

Sec. 5-157. Appeals.

Sec. 5-158. Inspections and investigations.

Sec. 5-159. Penalties.

Sec. 5-160. Injunctive relief.

Sec. 5-161. Restoration of areas affected by failure to comply.

Sec. 5-162. Performance guarantee.

Sec. 5-140. Reserved.

Editor's note—

Section 1 of an ordinance adopted Oct. 7, 1997, repealed former § 5-140, which pertained to incorporation of the soil erosion and sedimentation regulatory procedures by reference, and derived from Ch. 17.2 of the 1973 Code.

ARTICLE X. SOIL EROSION AND SEDIMENTATION CONTROL

Sec. 5-141. Title.

This article may be cited as the "Town of Apex Soil Erosion and Sedimentation Control Ordinance."

(Ord. of 7-16-96, § 1; Ord. No. 05-0719-11, § 1, 7-19-05)

Sec. 5-142. Purposes.

This article is adopted for the purposes of:

(1) Regulating certain land-disturbing activity within the corporate limits of the town and within the extraterritorial jurisdiction (ETJ) of the town 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

(2) Establishing procedures through which these purposes can be fulfilled.

(Ord. of 7-16-96, § 2; Ord. No. 05-0719-11, § 1, 7-19-05)

Sec. 5-143. Definitions.

As used in this article, unless the context clearly indicates otherwise, the following definitions apply:

Accelerated erosion means any increase over the rate of natural erosion as a result of land-disturbing activity.

Act means the North Carolina Sedimentation Pollution Control Act of 1973 and all rules and orders adopted pursuant to it.

Adequate erosion control measure, structure, or device means one which controls the soil material within the land area under responsible control of the person conducting the land-disturbing activity.

Affiliate means a person that directly or indirectly through one or more intermediaries, controls, is controlled by, or is under common control of another person.

Being conducted means a land-disturbing activity has been initiated and permanent stabilization of the site has not been completed.

Borrow means fill material which is required for on-site construction and is obtained from other locations.

Buffer zone means the strip of land adjacent to a lake or natural watercourse to remain undisturbed and in its natural state.

Certificate of compliance means a certificate issued by the town once all the measures shown on the approved soil erosion and sedimentation control plan are installed, inspected and approved.

Commission means the North Carolina Sedimentation Control Commission.

Completion of construction or development means that no further land-disturbing activity is required on a phase of a project except that which is necessary for establishing a permanent ground cover.

Department means the North Carolina Department of Environment, Health, and Natural Resources.

Director means the director of the division of land resources of the department of environment, health, and natural resources.

Discharge point means that point at which runoff leaves a tract of land or enters a water body or public storm drainage.

District means the Wake Soil and Water Conservation District created pursuant to G.S. ch. 139.

Energy dissipater means a structure or a 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 means the wearing away of land surface by the action of wind, water, gravity, or any combination thereof.

Ground cover means any natural vegetative growth or other material which renders the soil surface stable against accelerated erosion.

High quality waters means those 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 means areas that are within one mile and drain to waters designated as HQWs.

Lake or natural watercourse means 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-disturbing activity means any use of the land within the corporate limits or extraterritorial jurisdiction of the town by any person in residential, industrial, educational, institutional, or commercial development, 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.

Letter of soil erosion and sedimentation control plan approval means a letter issued by the town, only after tree protection fencing is installed and inspected, indicating approval of the proposed soil erosion and sedimentation control plan.

Local government means 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 Act.

Natural erosion means the wearing away of the earth's surface by water, wind, or other natural agents under natural environmental conditions undisturbed by man.

Parent an affiliate that directly, or indirectly through one or more intermediaries, controls another person.

Person means 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 means any person who may be held responsible for a violation unless expressly provided otherwise by this article, the Act, or any order adopted pursuant to this article or the Act.

Person responsible for the violation as used in this article, and G.S. 113A-64, means:

(1) The developer or other person who has or holds himself out as having financial or operational control over the land-disturbing activity; or

(2) The landowner or person in possession or control of the land when he has directly or indirectly allowed the land-disturbing activity or has benefited from it or he has failed to comply with any provision of this article, the Act, or any order adopted pursuant to this article or the Act as imposes a duty upon him.

Phase of grading means one of two types of grading, rough or fine.

Soil erosion and sedimentation control plan means plan to control soil erosion and sedimentation and to protect associated riparian buffers.

Sediment means 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.

Sedimentation means 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 or natural watercourse.

Siltation means 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.

Storm drainage facilities means 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 means the direct runoff of water resulting from precipitation in any form.

Subsidiary means an affiliate that is directly or indirectly through one or more intermediaries, controlled by another person.

Ten-year storm means the surface runoff resulting from a rainfall of an intensity expected to be equaled or exceeded, on the average, once in ten years, and of a duration which will produce the maximum peak rate of run-off, for the watershed of interest under average antecedent wetness conditions.

The town means the Town of Apex, North Carolina.

Tract means all contiguous land and bodies of water being disturbed or to be disturbed as a unit, regardless of ownership.

Twenty-five-year storm means the surface runoff resulting from a rainfall of an intensity expected to be equaled or exceeded, on the average, once in 25 years, and of a duration which will produce the maximum peak rate of runoff, from the watershed of interest under average antecedent wetness conditions.

Uncovered means the removal of ground cover from, on, or above the soil surface.

Undertaken means the initiating of any activity, or phase of activity, which results or will result in a change in the ground cover or topography of a tract of land.

Velocity means 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 shall be that area defined by the geometry of the 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.

Waste means surplus materials resulting from on-site construction and disposed of at other locations.

Working days means days exclusive of Saturday and Sunday during which weather conditions or soil conditions permit land-disturbing activity to be undertaken.

(Ord. of 7-16-96, § 3; Ord. No. 05-0719-11, § 1, 7-19-05)

Cross reference— Definitions and rules of construction generally, § 1-3.

Sec. 5-144. Exclusions.

This article shall not apply to the following land-disturbing activities:

(1) Activities, including the breeding and grazing of livestock, undertaken on agricultural land for the production of plants and animals useful to man, including, but not limited to:

   a. Forages and sod crops, grains and feed crops, tobacco, cotton, and peanuts.

   b. Dairy animals and dairy products.

   c. Poultry and poultry products.

   d. Livestock, including beef cattle, sheep, swine, horses, ponies, mules, and goats.

   e. Bees and apiary products.

   f. Fur-producing animals.

(2) Activities undertaken on forestland for the production and harvesting of timber and timber products and conducted in accordance with best management practices set out in forest practice guidelines related to water quality, as adopted by the department. If land-disturbing activity undertaken on forestland for the production and harvesting of timber and timber products is not conducted in accordance with forest practice guidelines related to water quality, the provisions of this article shall apply to such activity and any related land-disturbing activity on the tract; and

(3) Activities for which a permit is required under the Mining Act of 1971, G.S. ch. 74, art. 7.

(4) Land-disturbing activity over which the state has exclusive regulatory jurisdiction as provided in G.S. 113A-56(a).

(5) For the duration of an emergency, activities essential to protect human life.

(6) For the purpose of fighting fires.

(7) For the stock piling of raw or processed sand, stone, or gravel in material processing plants and storage yards, provided that sediment control measures have been utilized to protect against off-site damage.

To qualify for exemption under this section, a request for exemption shall be submitted to the town (no exemption is to be assumed until approval of the request by the town). Where land disturbing activities are undertaken for the purpose of establishing a farm, constructing farm roads, paths, or ponds, the owner of the property shall file an application for exemption to the town's environmental programs coordinator. The environmental programs coordinator shall review the application and grant or deny the exemption within 15 working days of receipt. The land owner shall receive notification of this decision in writing and have ten working days to respond if the exemption is denied. The director of public works and utilities shall have five days to review and decide on the appeal. After receipt of the exemption, the property owner shall have 30 days to file a conservation plan for review with the Wake Soil and Water Conservation District board of supervisors. The board of supervisors will have 30 days to review the request. Conservation measures must be installed as scheduled in the approved plan. Failure to meet the conditions of the exemption shall constitute a violation of this article and shall be retroactive to the approved date of the original exemption.

(Ord. of 7-16-96, § 4; Ord. No. 05-0719-11, § 1, 7-19-05)

Sec. 5-145. General requirements.

(a) *Soil erosion and sedimentation control plan, letter of soil erosion and sedimentation control plan approval and certificate of compliance required.* No person shall initiate any land-disturbing activity which uncovers more than 20,000 square feet without having a soil erosion and sedimentation control plan approved by the town as evidenced by receipt of a letter of soil erosion and sedimentation control plan approval. Applicants shall receive a letter of soil erosion and sedimentation control plan approval only after all required tree protection fencing is installed and inspected. Before installing any approved erosion and sedimentation control measures the applicant must have received the letter of soil erosion and sedimentation control plan approval. No land disturbing activity, other than the installation of the erosion and sedimentation control measures, shall be started until the town issues a certificate of compliance to the applicant. A certificate of compliance will be signed once all the measures shown on the approved soil erosion and sedimentation control plan are installed, inspected and approved. Sites must follow the approved soil erosion and sedimentation control plan which includes the construction sequence. Grading and development of sites, including single-family residential lots, not exceeding 20,000 square feet shall meet the requirements of subsection (b) of this section.

(b) Grading and development of sites including single-family residential lots not exceeding 20,000 square feet in surface area shall implement and maintain control measures to restrain erosion and prevent off-site sediment migration. No person shall initiate any land disturbing activity under 20,000 square feet without submitting an erosion and sedimentation control installation and maintenance agreement for residential lots. Minimum required measures will include: silt fencing (steel posts, woven wire, and silt fence geotextile fabric), construction entrances, and downstream rock check dams in ditch lines. Disturbed areas shall not be left exposed after 15 working days or 30 calendar days of completion of any phase of grading. No footing inspection by the building inspection division shall be approved without proper installation of the required sedimentation and erosion control measures.

(c) *Protection of property.* Persons conducting land-disturbing activity shall take all reasonable measures to protect all public and private property from damage caused by such activity.

(d) *More restrictive rules shall apply.* Whenever conflicts exist between federal, state, or local laws, ordinance or rules, the more restrictive provision shall apply.

(e) Applicants shall post a performance guarantee as provided by section 5-162 of the Apex Town Code.

(Ord. of 7-16-96, § 5; Ord. No. 05-0719-11, § 1, 7-19-05; Ord. No. 09-0804-07, § 1, 8-4-09)

Sec. 5-146. Basic control objectives.

A soil erosion and sedimentation control plan may be disapproved pursuant to section 5-157 of this article if the plan fails to address the following control objectives:

(1) *Identify critical areas.* On-site areas which are subject to severe erosion, and off-site areas which are especially vulnerable to damage from erosion and/or sedimentation, are to be identified and receive special attention.

(2) *Limit time of exposure.* All land-disturbing activity is to be planned and conducted to limit exposure to the shortest feasible time In any event, areas left exposed will, within 15 working days or 30 calendar days of completion of any phase of grading, whichever period is shorter, be planted or otherwise provided with ground cover, devices, or structures sufficient to restrain erosion.

(3) *Limit exposed areas.* All land-disturbing activity is to 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 upgrade of exposed areas should be controlled to reduce erosion and sediment loss during the period of exposure.

(5) *Control sedimentation.* All land-disturbing activity is to be planned and conducted so as 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 are to include measures to control the velocity to the point of discharge so as to minimize accelerated erosion of the site and increased sedimentation of the stream. Measures are to be implemented to ensure that post-development stream velocities of the receiving watercourses do not exceed the pre-development velocities as defined in section 5-149 of this article.

(Ord. of 7-16-96, § 6; Ord. No. 05-0719-11, § 1, 7-19-05)

Sec. 5-147. Mandatory standards for land-disturbing activity.

No land-disturbing activity subject to the control of this article shall be undertaken except in accordance with the following mandatory standards:

(1) *Buffer zone.*

a. No land-disturbing activity during periods of construction or improvement to land shall be 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 percent of the buffer zone nearest the land-disturbing activity. This subdivision shall not apply to a land-disturbing activity in connection with the construction of facilities to be located on, over, or under a lake or natural watercourse. Refer to section 6.1, watershed protection overlay districts, of the town's UDO for primary and secondary buffers.

b. Unless otherwise provided, the width of a buffer zone is measured horizontally from the top of the bank (nearest the land-disturbing activity) of the stream or waterbody to the nearest edge of the disturbed area. The 25 percent of the strip nearest the land-disturbing activity must contain natural or artificial means of confining visible siltation.

(2) *Graded slopes and fills.* The angle for graded slopes and fills shall be no greater than the angle which can be retained by vegetative cover or other adequate erosion control devices or structures. In any event, slopes left exposed will, within 21 calendar days of completion of any phase of grading, whichever period is shorter, be planted or otherwise provided with groundcover, devices, or structures sufficient to restrain erosion.

(3) *Groundcover.* Whenever land-disturbing activity is undertaken on a tract compromising more than 20,000 square feet, if more than 20,000 square feet is uncovered, the person conducting the land-disturbing activity shall install such sedimentation and erosion control devices and practices as are sufficient to retain the sediment generated by the land-disturbing activity within the boundaries of the tract during construction upon and development of said tract, and shall plant or otherwise provide a permanent ground cover sufficient to restrain erosion after completion of construction or development. All seeding and mulch activities shall be stabilized with a tackifier, netting or other suitable material that secures the mulch. Except as provided in section 5-148(b)(5) of this article, provisions for a ground cover sufficient to restrain erosion must be accomplished 15 working days or 30 calendar days following completion of construction or development whichever period is shorter.

(4) *Prior plan approval.* No person shall initiate any land-disturbing activity on a tract if more than 20,000 square feet is to be uncovered unless, 30 or more days prior to initiating the activity, a soil erosion and sedimentation control plan for such activity is filed with and approved by the town as outlined in section 5-145

(5) *Fill material.* Unless a permit from the state department of environment and natural resources division of solid waste management to operate a landfill is on file for the official site, acceptable fill material shall 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 or a landfill by the state.

(6) The land-disturbing activity shall be conducted in accordance with the approved soil erosion and sedimentation control plan.

(Ord. of 7-16-96, § 7; Ord. No. 05-0719-11, § 1, 7-19-05; Ord. No. 07-0821-12, § 2, 8-21-07)

Sec. 5-148. Design and performance standards.

(a) Except as provided in subsection (b)(2) herein, erosion and sedimentation control measures, structures, and devices shall be so planned, designed, and constructed as to provide protection from the calculated maximum peak rate of runoff from the 25-year storm. Runoff rates shall be calculated using the procedures in the USDA Soil Conservation Service's "National Engineering Field Manual for Conservation Practices," or other acceptable calculation procedures.

(b) In high quality water (HQW) zones the following design standards shall apply:

(1) Uncovered areas in HQW zones shall be limited at any time to a maximum total area within the boundaries of the tract of 20 acres. Only the portion of the land-disturbing activity within a HQW zone shall be governed by this section. Larger areas may be uncovered within the boundaries of the tract with the written approval of the director.

(2) Erosion and sedimentation control measures, structures, and devices within HQW zones shall be so planned, designed and constructed to provide protection from the run off of the 25-year storm which produces the maximum peak rate of run-off as calculated according to procedures in the United States Department of Agriculture Soil 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.

(3) Sediment basins within HQW zones shall be designed and constructed such that the basin will have a settling efficiency of at least 70 percent for the 40 micron (0.04 mm) size soil particle transported into the basin by the runoff of that two-year storm which produces the maximum peak rate of runoff as calculated according to procedures in the United States Department of Agriculture Soil 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.

(4) Newly constructed open channels in HQW zones shall be designed and constructed with side slopes no steeper than two horizontal to one 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 slope shall be sufficient to restrain accelerated erosion.

(5) 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 60 calendar days following completion of construction or development, whichever period is shorter.

(Ord. of 7-16-96, § 8; Ord. No. 05-0719-11, § 1, 7-19-05; Ord. No. 07-0821-12, § 3, 8-21-07)

Sec. 5-149. Stormwater outlet protection.

(a) *Intent.* Stream banks and channels downstream from any land disturbing activity shall be protected from increased degradation by accelerated erosion caused by increased velocity of runoff from the land disturbing activity.

(b) *Performance standards.* Persons shall conduct land-disturbing activity so that the post construction velocity of the ten-year storm runoff in the receiving watercourse to the discharge point does not exceed the greater of:

(1) The velocity established by the table in subsection (d) of this section; or

(2) The velocity of the ten-year storm runoff in the receiving watercourse prior to development.

If conditions (1) or (2) of this subsection cannot be met, then the receiving watercourse to and including the discharge point shall be designed and constructed to withstand the expected velocity anywhere the velocity exceeds the prior to development velocity by ten percent.

(c) *Acceptable management measures.* Measures applied along or in combination to satisfy the intent of this section are acceptable if there are no objectionable secondary consequences. The commission 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 are to:

(1) Avoid increases in surface runoff volume and velocity by including measures to promote infiltration to compensate for increased runoff from areas rendered impervious.

(2) Avoid increases in stormwater discharge velocities by using vegetated or roughened swales and waterways in lieu of closed drains and high velocity paved sections.

(3) Provide energy dissipaters at outlets of storm drainage facilities to reduce flow velocities to the point of discharge. These may range from simple rip-rapped sections to complex structures.

(4) Protect watercourses subject to accelerated erosion by improving cross sections and/or providing erosion-resistant lining.

(5) Upgrade or replace the receiving device structure or watercourse such 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.

(6) Energy dissipaters and outlet structures shall not be constructed in riparian buffer areas unless no practical alternative exists. In any event, there shall be no direct discharge of stormwater into watercourses.

(d) *Exceptions.* This rule shall not apply where it can be demonstrated that stormwater discharge velocities will not create an erosion problem in the receiving watercourse.

(e) *Maximum permissible velocities.* The following is a table for maximum permissible velocity for stormwater discharges:

Material	F.P.S.	M.P.S.
Fine sand (noncolloidal)	2.5	.8

Sandy loan (noncolloidal)	2.5	.8
Silt loan (noncolloidal)	3.0	.9
Ordinary firm 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
Graced, 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

Source—Adapted from recommendations by Special Committee on Irrigation Research, American Society of Civil Engineers, 1926, for channels with straight alignment. 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.

(Ord. of 7-16-96, § 9; Ord. No. 05-0719-11, § 1, 7-19-05)

Sec. 5-150. Borrow and waste areas.

When the person conducting the land-disturbing activity is also the person conducting the borrow or waste disposal activity, areas from which borrow is obtained and which are not regulated by the provisions of the Mining Act of 1971, and waste areas for surplus materials other than landfills regulated by the department's division of solid waste management shall be considered as part of the land-disturbing activity where the borrow material is being used or from which the waste material originated. When the

person conducting the land-disturbing activity is not the person obtaining the borrow and/or disposing of the waste, these areas shall be considered a separate land-disturbing activity.

(Ord. of 7-16-96, § 10; Ord. No. 05-0719-11, § 1, 7-19-05)

Sec. 5-151. Access and haul roads.

Temporary access and haul roads, other than public roads, constructed or used in connection with any land-disturbing activity shall be considered a part of such activity.

(Ord. of 7-16-96, § 11; Ord. No. 05-0719-11, § 1, 7-19-05)

Sec. 5-152. Operations in lakes or natural watercourses.

Land-disturbing activity in connection with construction in, on, over, or under a lake or natural watercourse shall be planned and conducted in such a manner as to minimize the extent and duration of disturbance of the stream channel. The relocation of a stream, where relocation is an essential part of the proposed activity, shall be planned and executed so as to minimize changes in the stream flow characteristics, except when justification for significant alteration to flow characteristic is provided.

(Ord. of 7-16-96, § 12; Ord. No. 05-0719-11, § 1, 7-19-05)

Sec. 5-153. Responsibility for maintenance.

During the development of a site, the person conducting the land-disturbing activity shall install and maintain all temporary and permanent erosion and sedimentation control measures as required by the approved soil erosion and sedimentation control plan or any provision of this article, the Act, or any order adopted pursuant to this article or the Act. After site development, the landowner or person in possession or control of the land shall 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.

(Ord. of 7-16-96, § 13; Ord. No. 05-0719-11, § 1, 7-19-05)

Sec. 5-154. Additional measures.

Whenever the town determines that significant 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.

(Ord. of 7-16-96, § 14; Ord. No. 05-0719-11, § 1, 7-19-05)

Sec. 5-155. Existing uncovered areas.

(a) All uncovered areas existing on the effective date of this article which resulted from land-disturbing activity, exceed 20,000 square feet, are subject to continued accelerated erosion, and are causing off-site damage from sedimentation, shall be provided with a ground cover or other protective measures, structures, or devices sufficient to restrain accelerated erosion and control off-site sedimentation.

(b) The town will serve upon the landowner or other person in possession or control of the land a written notice of violation by registered or certified mail, return receipt requested, or by any means

authorized under G.S. 1A-1, Rule 4. The notice will set forth the measures needed to comply and will state the time within which such measures must be completed. In determining the measures required and the time allowed for compliance, the authority serving notice shall take into consideration the economic feasibility, technology, and quantity of work required, and shall set reasonable and attainable time limits of compliance.

(c) The town reserves the right to require preparation and approval of a soil erosion and sedimentation control plan (with appropriate fees) in any instance where extensive control measures are required.

(d) This rule shall not require ground cover on cleared land forming the future basin of a planned reservoir.

(Ord. of 7-16-96, § 15; Ord. No. 05-0719-11, § 1, 7-19-05)

Sec. 5-156. Procedures related to soil erosion and sedimentation control plans.

(a) In determining the area to be disturbed, lands under one or diverse ownership being developed as a unit will be aggregated. If the combined total area of aggregated lots in any subdivision equals 20,000 square feet by one owner, a grading fee and a soil erosion and sedimentation control plan will be required even if the lots are not contiguous.

(b) A soil erosion and sedimentation control plan may be disapproved if implementation of the plan would result in a violation of rules adopted by the environmental management commission, other town rules, or for failure to pay fees or fines owed to the town.

(c) The town will establish a fee schedule and payment shall be required.

(d) All proposed soil erosion and sedimentation control plans shall be filed with the town accompanied by appropriate fees and a copy shall be simultaneously submitted to the Wake Soil and Water Conservation District, at least 30 days prior to the anticipated commencement of the proposed activity. The town shall forward to the director of the division of water quality a copy of each soil 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, pursuant to G.S. 113A-57(4).

(e) All applicants shall file two copies of the soil erosion and sedimentation control plan with the town, at least 30 days prior to the anticipated beginning of such activity and shall keep a copy of the approved plan on file at the job site. After approving the plan, if the town either upon review of such plan or on inspection of the job site, determines that a significant risk of accelerated erosion or off-site sedimentation exists, the town will require a revised soil erosion and sedimentation control plan. Pending the preparation of the revised plan, work shall cease or shall continue under conditions outlined by the town public works and utilities director.

(f) Soil erosion and sedimentation control plans may be disapproved unless accompanied by an authorized statement of financial responsibility and ownership. This statement shall be signed by the person financially responsible for the land-disturbing activity or his attorney in fact. The statement shall include the mailing and street addresses of the principal place of business of: (1) the person financially responsible; (2) the owner of the land; and (3) any registered agents. If the person financially responsible is not a resident of North Carolina, a North Carolina agent must be designated in the statement for the purpose of receiving notice of compliance or noncompliance with the plan, the Act, this article, or rules or orders adopted or issued pursuant to this article as well as for service of civil summonses and complaints. If the applicant is not the owner of the land to be disturbed, the draft soil erosion and sedimentation control plan must include the owner's written consent for the applicant to submit a draft soil erosion and sedimentation control plan and to conduct the land-disturbing activity.

(g) The Wake Soil and Water Conservation District shall review the soil erosion and sedimentation control plan and submit any comments and recommendations to the town within 20 days after the soil and water conservation district received the soil erosion and sedimentation control plan or within any shorter period of time as may be agreed upon by the soil and water conservation district and the town. Failure of the soil and water conservation district to submit its comments and recommendations within 20 days or within any agreed upon shorter period of time shall not delay final action on the plan.

(h) The town will review each complete soil erosion and sedimentation control plan submitted to them and within 30 days of receipt thereof will notify the person submitting the plan that it has been approved, approved with modifications, approved with performance reservations, or disapproved. Any type of approval shall be indicated by the town's executing the letter of plan approval to the applicant. The letter of plan approval is issued only after the tree protection fencing (if applicable to the project) is inspected and approved by the town's planning and community development department. Failure to either approve, approve with modifications, approve with performance reservations, or disapprove a completed soil erosion and sedimentation control plan within 30 days of receipt shall be deemed approval. Disapproval of a plan must specifically state in writing the reasons for disapproval. The town must approve, approve with modifications, or disapprove a revised plan within 15 days of receipt, or it is deemed to be approved. If, following commencement of a land-disturbing activity pursuant to an approved soil erosion and sedimentation control plan, the town determines that the plan is inadequate to meet the requirements of this article, the town may require any revision of the plan that is necessary to comply with this ordinance. Failure to approve, approve with modifications, or disapprove a revised erosion control plan within 15 days of receipt shall be deemed approval of the plan. If land disturbing activities are not initiated within one year from the date of the letter of plan approval, plan approval shall expire and a new plan submittal is required. The approval of an soil erosion and sedimentation control plan is conditioned upon the applicant's compliance with federal and state water quality laws, regulations and rules pursuant to G.S. 113A-61(b)(1). Documentation of compliance with federal and state water quality laws, rules and regulations from the regulating agency shall be submitted at the request of the plan reviewer.

(i) Any soil erosion and sedimentation control plan submitted for a land-disturbing activity for which an environmental document is required by the North Carolina Environmental Policy Act (G.S. 113A-1 et seq.) shall be deemed incomplete until a complete environmental document is available for review. The town shall promptly notify the person submitting the plan that the 30-day time limit for review of the plan pursuant to subsection (h) of this section shall not begin until a complete environmental document is available for review.

(j) The soil erosion and sedimentation control plan required by this section shall contain architectural and engineering drawings, maps, assumptions, calculations, and narrative statements appropriately sealed by the responsible designer as needed to adequately describe the proposed development of the tract and the measures planned to comply with the requirements of this article. Soil erosion and sedimentation control plan content may vary to meet the needs of specific site requirements. Detailed mandatory guidelines for plan preparation shall be drafted by the public works department of the town and may be obtained from the town on request.

(k) The town may disapprove a plan or draft plans if implementation of the plan would result in a violation of the rules adopted by the environmental management commission to protect riparian buffers along surface waters. The town may disapprove or revoke a soil erosion and sedimentation control plan upon a finding that an applicant, or a parent, subsidiary, or other affiliate of the applicant:

(1) Is conducting or has conducted land-disturbing activity without an approved soil erosion and sedimentation control plan, or has received notice of violation of a plan previously approved by the commission or a local government pursuant to the Act and has not complied with the notice within the time specified in the notice;

(2) Has failed to pay a civil penalty assessed pursuant to the Act or a local ordinance adopted pursuant to the 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 Act;

(4) Has failed to pay appropriate fees required by the town; or

(5) Has failed to substantially comply with state rules or local ordinances and regulations adopted pursuant to the Act.

For purposes of this subsection an applicant's record may be considered for only the two years prior to the application date.

In the event that a plan is disapproved pursuant to this subsection, the town shall notify the director of such disapproval within ten days. The town shall advise the applicant and the director in writing as to the specific reasons that the plan was disapproved.

(l) Applications for amendment of a soil 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 such time as said amendment is approved by the town the land-disturbing activity shall not proceed except in accordance with the soil erosion and sedimentation control plan as originally approved.

(m) No person may initiate a land-disturbing activity in accordance with an approved plan before notifying the town of the date that the land-disturbing will begin.

(n) When deemed necessary by the town, a preconstruction conference may be required.

(o) Any person engaged in land-disturbing activity who fails to file a soil erosion and sedimentation control plan in accordance with this article, or who conducts a land-disturbing activity except in accordance with provisions of an approved soil erosion and sedimentation control plan shall be deemed in violation of this article.

(p) The public works director may issue a stop work order to any person in violation of any section of this article.

(q) *Fees.* The town shall adopt and periodically update a fee schedule to cover the costs of administering the sediment and erosion control program.

(Ord. of 7-16-96, § 16; Ord. No. 05-0719-11, § 1, 7-19-05; Ord. No. 07-0821-12, §§ 4—6, 8-21-07)

Sec. 5-157. Appeals.

(a) Except as provided in subsection (b) of this section, the appeal of a disapproval or approval with modifications of a soil erosion and sedimentation control plan shall be governed by the following provisions:

(1) The disapproval or modification of any proposed soil erosion and sedimentation control plan by the town shall entitle the person submitting the plan to a public hearing if such person submits written demand for a hearing to the town clerk within 15 days after receipt of written notice of disapproval or modification.

(2) Hearings held pursuant to this section shall be conducted by the town council within 30 days after the date of the town's receipt of the appeal or request for a hearing.

(3) The town council will render its final decision on any soil erosion and sedimentation control plan upon which a hearing is requested within 20 days of the close of the hearings record.

(4) If the town upholds the disapproval or modification of a proposed soil erosion and sedimentation control plan following the hearing, the person submitting the plan shall then be entitled to appeal

the local government's decision to the state sedimentation control commission as provided in G.S. 113A-61(c) and title 15A NCAC 4B.0018(d).

(b) In the event that a soil erosion and sedimentation control plan is disapproved pursuant to section 5-156(k) of this article, the town shall notify the director of the division of land resources of such disapproval within ten days. The town shall advise the applicant and the director in writing as to the specific reasons that the plan was disapproved. The applicant may appeal the town disapproval of the soil erosion and sedimentation control plan pursuant to section 5-156 of this article directly to the commission.

(Ord. of 7-16-96, § 17; Ord. No. 05-0719-11, § 1, 7-19-05)

Sec. 5-158. Inspections and investigations.

(a) Agents, officials, or other qualified persons authorized by the town will periodically inspect land-disturbing activities to ensure compliance with the Act, this article, or rules or orders adopted or issued pursuant to this article, and to determine whether the measures required in the soil erosion and sedimentation control plan are effecting in controlling erosion and sediment resulting from land-disturbing activity. Notice of the right to inspect shall be included in the letter of soil erosion and sedimentation control plan approval of each soil erosion and sedimentation control plan.

(b) No person shall willfully resist, delay, or obstruct an authorized representative, employee, or agent of the town while that person is inspecting or attempting to inspect a land-disturbing activity under this section.

(c) If, it is determined that a person engaged in land-disturbing activity has failed to comply with the Act, this article, or rules, or orders adopted or issued pursuant to this article, a notice of violation shall be served upon that person. The notice may be served by any means authorized under G.S. 1A-1, Rule 4 or in the case of violations on single-family residential lots, be served by personnel service with a return of service form.

The notice shall specify a date by which the person must comply with the Act, or this article, or rules, or orders adopted pursuant to this article, and inform the person of the actions that need to be taken to comply with the Act, this article, or rules or orders adopted pursuant to this article. However, no time period for compliance need be given for failure to submit a soil erosion and sedimentation control plan for approval or for obstructing, hampering or interfering with an authorized representative while in the process of carrying out his official duties. Any person who fails to comply within the time specified is subject to the civil and criminal penalties provided in this article.

(d) The town shall have the power to conduct such investigation as it may reasonably deem necessary to carry out its duties as prescribed in this article, and for this purpose to enter at reasonable times upon any property, public or private, for the purpose of investigating and inspecting the sites of any land-disturbing activity.

(e) The town shall also have the power to require written statements, or the filing of reports under oath, with respect to pertinent questions relating to land-disturbing activity.

(f) The landowner, the financially responsible party, or the landowner's or the financially responsible party's agent shall perform an inspection of the area covered by the 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). The person who performs the inspection shall maintain and make available a record of the inspection at the site of the land-disturbing activity. The record shall set out any significant deviation from the approved erosion control plan, identify any measures that may be required to correct the deviation, and document the completion of those measures. The record shall be maintained until permanent ground cover has been established as required by the approved

erosion and sedimentation control plan. The inspections required by this subsection shall be in addition to inspections required by G.S. 113A-61.1.

(Ord. of 7-16-96, § 18; Ord. No. 05-0719-11, § 1, 7-19-05; Ord. No. 07-0821-12, § 7, 8-21-07)

Sec. 5-159. Penalties.

(a) *Civil penalties.*

(1) Any person who violates any of the provisions of this article, or rules or orders adopted or issued pursuant to this article, or who initiates or continues a land-disturbing activity for which an soil erosion and sedimentation control plan is required except in accordance with the terms, conditions, and provisions of an approved plan, is subject to a civil penalty. The maximum civil penalty for a violation is $5,000.00. Civil penalties may be assessed from the date of the violation. However, no penalty shall be assessed until the person alleged to be in violation has been notified of the violation as provided in subsection 5-158(c) of this article. If, after the allotted time period has expired, the violator has not completed corrective action a civil penalty may be assessed. Nevertheless, no time period for compliance need be given for failure to submit a soil erosion and sedimentation control plan for approval, proceeding with the work before the letter of plan approval is signed by the town, or for obstructing, hampering or interfering with an authorized representative while in the process of carrying out his official duties. Proceeding with work before the letter of soil erosion and sedimentation control plan approval is signed shall constitute grading without a permit. Each day of continuing violation shall constitute a separate violation.

In addition to the civil penalty schedule listed below, the public works and utilities director may assess a one-time civil penalty of $5,000.00 on the day of the violation for off-site sedimentation damage especially in the case of damage to a body of water, wetlands or buffer. Moreover, any malicious or intentional destruction of silt fencing or other sedimentation and erosion control device will result in a one-time fine of up to $1,000.00.

Civil penalties for specific violations may be assessed as follows:

Grading without a soil erosion and sedimentation control plan or land-disturbing permit: $5,000.00 per day for failure to secure a valid, required land disturbing permit (certificate of compliance) prior to conducting a land-disturbing activity.

Grading beyond the limits of a grading permit: $1,000.00 per day per 1/10 of a graded acre beyond the limits of an existing grading permit without the approval of an amended grading permit, but not to exceed $5,000.00 per day.

Failure to protect: $5,000.00 per day for failure to take all reasonable measures to protect public property or private property, from damage caused by the failure to retain sediment on-site.

Failure to follow soil erosion and sedimentation control plan: $3,000.00 per day for failure to conduct a land disturbing activity in accordance with the provisions of an approved erosion and sedimentation control plan.

Failure to install devices: $5,000.00 per day for failure, when more than one acre is disturbed ($2,500.00 per day when 20,000 square feet or less than 20,000 square feet is disturbed), to install erosion and sedimentation control devices sufficient to retain the sediment generated by the land-disturbing activity within the boundaries of the tract(s) and prevent off-site sedimentation.

Failure to maintain permanent and/or temporary measures: $2,500.00 per day for failure to maintain adequate erosion control measures.

Failure to maintain properly slopes and fills: $2,500.00 per day for failure on graded slopes and fills to maintain an angle sufficient to retain vegetative cover or other adequate erosion control measures.

Failure to protect exposed slopes: $2,500.00 per day for failure, within 15 working days or 30 calendar days of completion of any phase of grading, whichever period is shorter, to plant or otherwise provide exposed, graded slopes or fills with groundcover, devices, or structures sufficient to restrain erosion.

Failure to provide adequate cover: $2,500.00 per day for failure, within 15 working days or 30 calendar days of competition of any phase of grading, whichever is shorter, to plant or otherwise provide exposed, graded slopes or fills with groundcover, devices, or structures sufficient to restrain erosion.

Failure to correct a violation after notice: $5,000.00 per day for failure to correct violation within the time limitations established in a notice of violation.

Failure to revise plan: $2,500.00 per day for failure to file an acceptable revised erosion and sedimentation control plan within the established deadline after being notified of the need to do so.

Any other action or failure to act that constitutes a violation of this article: $2,500.00 per day for any other action or failure to act that constitutes a violation of this article.

Failure to keep dirt and mud off public streets: $1,000.00 per day for failure to prevent the accumulation of more than one-fourth-inch of dirt, mud, both on public streets, or in public storm drainage, plus $500.00 per hour per wash truck if the street is cleaned by the town, its employees or its contractors.

An additional civil penalty of $1,000.00 per day shall be charged to any person assessed a civil penalty for any violation of this article within the prior two years. A person may be assessed a civil penalty from the date the violation is detected if the deadline stated is not met. Each day of a continuing violation shall constitute a separate violation.

(2) The town public works and utilities director shall determine the amount of the civil penalty to be assessed. In determining the amount of the penalty the town public works and utilities director shall consider the degree and extent of harm caused by the violation and the cost of rectifying the damage, the amount of money the violator saved by noncompliance, whether the violation was committed willfully, and the prior record of the violator in complying of failing to comply with this article.

(3) The town public works and utilities director shall provide notice of the civil penalty amount and basis for assessment to the person assessed. The notice of assessment shall be served by any means authorized under G.S. 1A-1, Rule 4, and shall direct the violator to either pay the assessment or contest the assessment, within 30 days after receipt of the notice of assessment, by written demand for a hearing.

(4) A hearing on a civil penalty shall be conducted by the town board of adjustment within 30 days after the date of the written demand for the hearing. The board shall render its final decision on the civil penalty within 20 days after the close of the hearing record. Appeal from the final decision of the town board of adjustment shall be to the superior court of the county where the violation occurred, or the location of the violator's residence or principal place of business.

(5) If payment is not received within 30 days after demand for payment is made the town may institute a civil action to recover the amount of the assessment. The civil action may be brought in the superior court of the county where the violation occurred, or the violator's residence or principal place of business is located. Such civil actions must be filed within three years of the date the assessment was due. An assessment that is not contested is due when the violator is served with a notice of assessment. An assessment that is contested is due at the conclusion of the administrative and judicial review of the assessment.

(6) Civil penalties collected pursuant to this article shall be used or disbursed as directed by law.

(b) *Criminal penalties.* Any person who knowingly or willfully violates any provision of this article, or rule or order adopted or issued pursuant to this article, or who knowingly or willfully initiates or continues a land-disturbing activity for which an erosion control plan is required except in accordance with the terms, conditions and provisions of an approved plan, shall be guilty of a class 2 misdemeanor which may include a fine not to exceed $5,000.00 as provided in G.S. 113A-64.

(Ord. of 7-16-96, § 19; Ord. No. 05-0719-11, § 1, 7-19-05; Ord. No. 07-0821-12, § 8, 8-21-07)

Sec. 5-160. Injunctive relief.

(a) Whenever the governing body has reasonable cause to believe that any person is violating or threatening to violate this article or any rule or order adopted or issued pursuant to this article, or any term, condition, or provision of an approved erosion control plan, it may, either before or after the institution of any other action or proceeding authorized by this article, institute a civil action in the name of the town for injunctive relief to restrain the violation or threatened violation. The action shall be brought in the superior court of the county.

(b) Upon determination by a court that an alleged violation is occurring or is threatened, the court shall enter any order or judgment that is necessary to abate the violation, to ensure that restoration is performed, or to prevent the threatened violation. The institution of an action for injunctive relief under this section shall not relieve any party to the proceedings from any civil or criminal penalty prescribed for violations of this article.

(Ord. of 7-16-96, § 20; Ord. No. 05-0719-11, § 1, 7-19-05)

Sec. 5-161. Restoration of areas affected by failure to comply.

The town may require a person who engaged in a land-disturbing activity and failed to retain sediment generated by the activity, as required by G.S. 113A-57(3), to restore the waters and land affected by the failure so as 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 article.

(Ord. of 7-16-96, § 21; Ord. No. 05-0719-11, § 1, 7-19-05)

Sec. 5-162. Performance guarantee.

(a) Prior to the town's issuing a letter of soil erosion and sedimentation control plan approval for an approved soil erosion and sedimentation control plan, the applicant shall provide a performance guarantee in the form of a certified check, cash or irrevocable letter of credit from any commercial bank doing business in the State of North Carolina in terms and form approved by the town. The amount of the performance guarantee shall be $2,500.00 per disturbed acre as defined in the request for plan approval and approved by the public works director or designee.

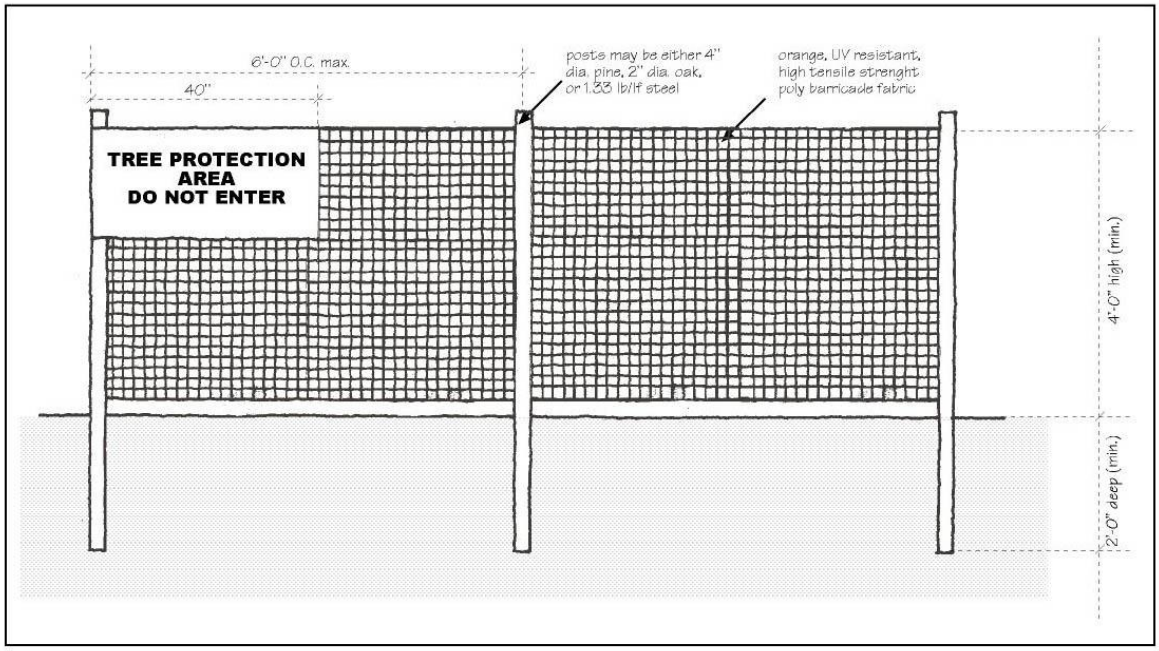
(b) Compliance with this chapter and an approved soil erosion and sedimentation control plan shall be at all times the responsibility of the applicant/owner. Land-disturbing activities that violate either this chapter or the applicable approved soil erosion and sedimentation control plan after the deadline for compliance stated in an applicable notice of violation has passed shall subject applicable performance guarantees to forfeiture.

(c) The performance guarantee shall be used by the town to stabilize the site and otherwise bring the site into compliance. Any monies in excess of cost of establishing protective measures shall be refunded to the person responsible for the land-disturbing activity after a certificate of completion for the project has been issued.

(d) The performance guarantee shall remain in full force and effect until 100 percent of the buildings (residential and commercial) in the area(s) covered under the performance guarantee have received a permanent certificate of occupancy and until a certificate of completion has been issued by the public works department. Failure to extend an irrevocable letter of credit until a certificate of completion has been issued by the town will result in collection of the performance guarantee.

(e) Collection or use of the performance guarantee by the town does not relieve the applicant, owner or financially responsible party of penalties, fines or other requirements of this chapter.

(Ord. No. 09-0804-07, § 2, 8-4-09)



TREE PROTECTION FENCE

Warning signs to be made of durable waterproof material all letters to be at least 3" high, clearly legible

Signs to be placed 200' on center, max.

Signs to be placed at each end of linear tree protection area and 200' on center thereafter

For tree protection areas less than 200' in perimeter, provide no less than one sign per protection area and/or side

Attach signs securely to fence posts and fabric

Fabric must be attached to approved posts only - do not attach to trees

Maintain tree protection fence throughout duration of project - fencing must remain upright and slack free

Additional signs and/or protection measures may be required by Planning Department based upon actual field conditions

Failing to maintain tree protection measures may result in fines and/or permit revocation

Figure 8.1.2(G)(1): Tree Protection Fencing

8.1.3 Tree and Vegetation Conservation

A) ***Purpose***

1) For all development sites, the Town requires both the conservation of existing trees and vegetation, and also the installation of new landscaping. This section sets forth requirements for the conservation of existing trees and vegetation, and new landscaping requirements are set forth in Section 8.2, *Landscaping, Buffering, and Screening*.

2) The Town encourages and supports saving all types of existing vegetation. This includes small caliper, mixed hardwood stands of trees to large significant vegetation. The intent of this section is to save not only large, significant vegetation, but also existing, small vegetation that over time will mature into stable, healthy stands of large trees.

B) ***Exemptions for Specific Activities***
The following activities shall be exempt from this section:

1) The removal, by hand, of dead or naturally fallen trees or vegetation, or the removal, by an approved method, of trees or vegetation that are found by the Town to be a threat to the public health, safety, or welfare;

2) The selective and limited removal of trees or vegetation necessary to obtain clear visibility at driveways, intersections, or within sight triangles;

3) The selective and limited removal of trees less than 2-inch caliper for the purpose of performing authorized field survey work;

4) The removal of trees or vegetation on land zoned or lawfully used for:

a) Agricultural, forestry, and horticultural uses as classified by Wake County, including normal forestry activities conducted pursuant to a forestry management plan prepared or approved by a forester registered pursuant to Chapter 89B of the General Statutes.

However, if a Tree Removal and Non-Structural Development Permit is not issued, per NCGS 160A-458.5(c)(1), no approval of a site or subdivision plan or issuance of a building permit shall occur for a period of 3 or 5 years from the date the tree removal activities are completed, based on the following:

(i) Three years after the completion of a timber harvest if the harvest results in the removal of all or substantially all of the trees that were protected under Town regulations governing development from the tract of land for which the permit or approval is sought.

(ii) Five years after the completion of a timber harvest if the harvest results in the removal of all or substantially all of the trees that were protected under Town regulations governing development from the tract of land for which the permit or approval is sought and the harvest was a willful violation of the Town regulations.

b) The removal of trees or vegetation for the purpose of sale by established commercial garden centers, greenhouses, or nurseries. Such land shall be classified by Wake County as horticultural use in order to meet this exemption.

C) ***Tree/Vegetation Removal***

1) *Inside the RCA*
No trees or vegetation shall be removed inside the approved RCA, except as specifically exempted in this section or article. Significant trees or vegetation removed from inside the RCA, including those removed for installation of utility lines, but not including those removed pursuant to exempted activities, shall be replaced as set forth in Section 8.2.3, *Maintenance Responsibility and Replacement of Damaged Vegetation.*

2) *Outside the RCA*

a) To the maximum extent feasible, significant trees or vegetation outside the RCA shall be preserved.

b) Any existing trees or vegetation outside the RCA that are in appropriate locations, in sufficient quantities, and of acceptable quality to be utilized to fulfill landscaping or buffering requirements of this Ordinance, including the "base buffer" as defined in Article 12, shall be preserved to the maximum extent feasible. All existing vegetation which meets the landscape buffer requirements of this article, or which is located in a preservation area (plant communities, groves and selected individual trees) designated on the approved site plan, subdivision plan, or PD plan shall be preserved on the site. Existing vegetation that is to remain on the site, as well as off-site vegetation to be protected, shall be clearly delineated and identified on all site plans, subdivision plans, and PD plans.

c) *Tree/Vegetation Removal for Views Prohibited*
No trees or vegetation shall be removed for the sole purpose of providing open views to or from structures on a site, except for the selected and limited removal of trees or vegetation necessary to obtain clear visibility at driveways, intersections, or within sight triangles.

d) *Site and Tree Survey Required.*
The applicant shall provide a site and tree survey to the Planning Director as part of the submission of an application for development approval. The site and tree survey shall follow the requirements of Section 8.1.2(B)(2).

D) ***Tree Protection During Construction and Grading Activities***
In addition to the general requirements for protection of natural resources during construction and grading activities set forth in Section 8.1.2(F), the following specific standards shall apply to protect all trees and vegetation on a development site throughout the site development and construction process:

1) If it is necessary to fill over the critical root zone, compacted soils shall be avoided by sandwiching fabric, rocks, and more fabric under the area to be filled.

2) Fill placed directly on the roots shall not exceed a maximum of six inches in depth.

3) If fill creates a tree well or depression around a tree or shrubs, such area shall be drained so that the vegetation is not drowned by the pooling of rainfall or irrigation.

4) If a tree's roots must be cut, the branches shall be trimmed by an amount equal to the percent of roots that were lost. Roots shall be pruned cleanly prior to digging and not ripped off by heavy equipment. Cutting more than 30 percent of the roots endangers the health of the tree, and over 40 percent affects the tree's stability.

5) Utility trenches near trees should be avoided. If a line must be near a tree, tunneling, auguring, or other mitigation measures shall be used.

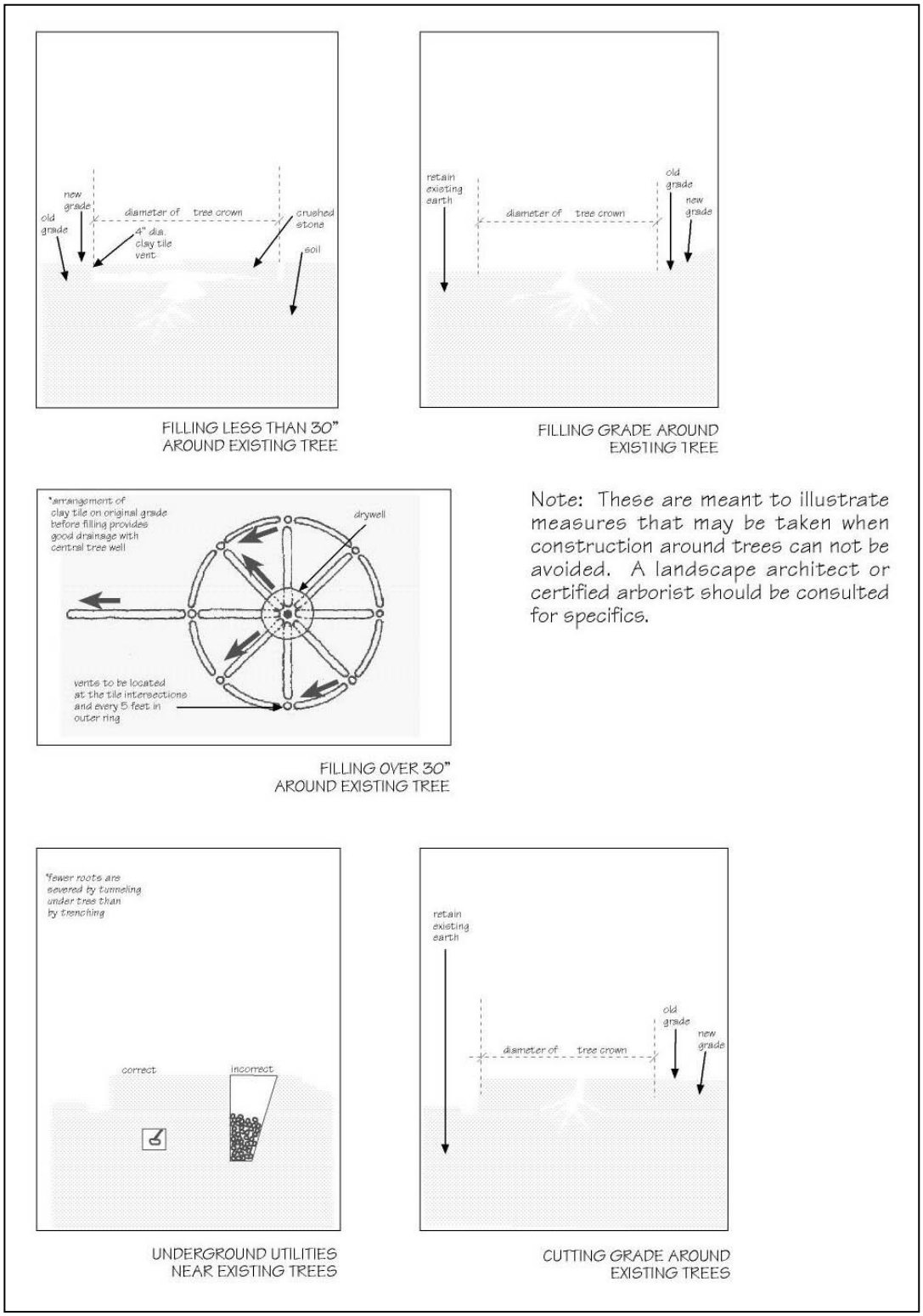


Figure 8.1.3(D): Filling and Cutting Around Trees

8.1.4 Development Restrictions on Steep Slopes

A) ***Staff Review Criteria***
Staff shall review all Site Plans and/or Subdivision Plans and evaluate them according to the following standards:

1) Site disturbance shall be minimized to the maximum extent practicable;

2) Cuts for utilities and access driveways shall be shared to the maximum extent feasible;

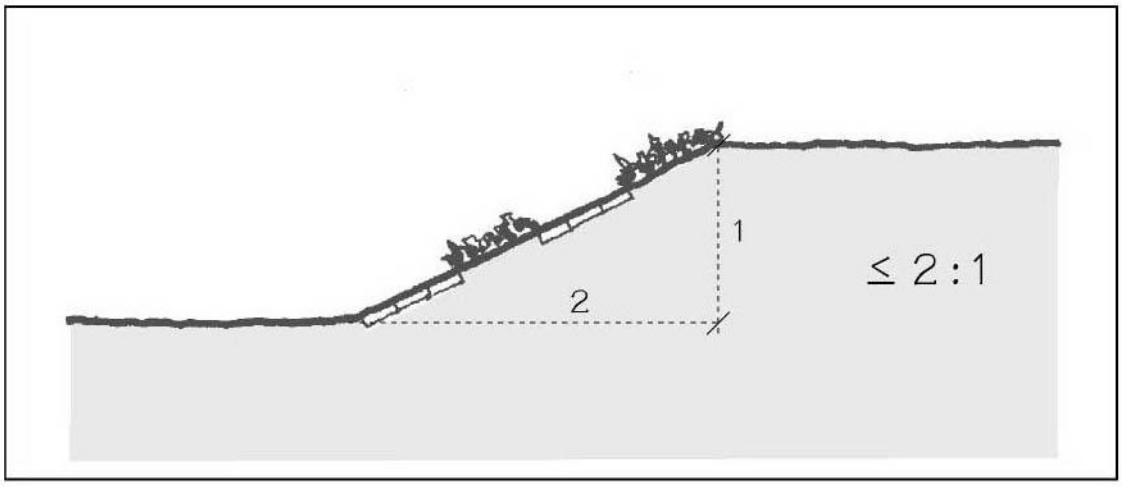
3) To the maximum extent feasible, new construction shall not take place on any portion of a parcel that shows slope instability, flooding, or other natural or man-made hazards;

4) The applicant shall demonstrate that the slope's ground surface and subsurface are not unstable, that the proposed development will not cause instability or increase the potential for slope failure, and that the development of the slope will not increase the degree of hazard both on-site and on adjacent properties.

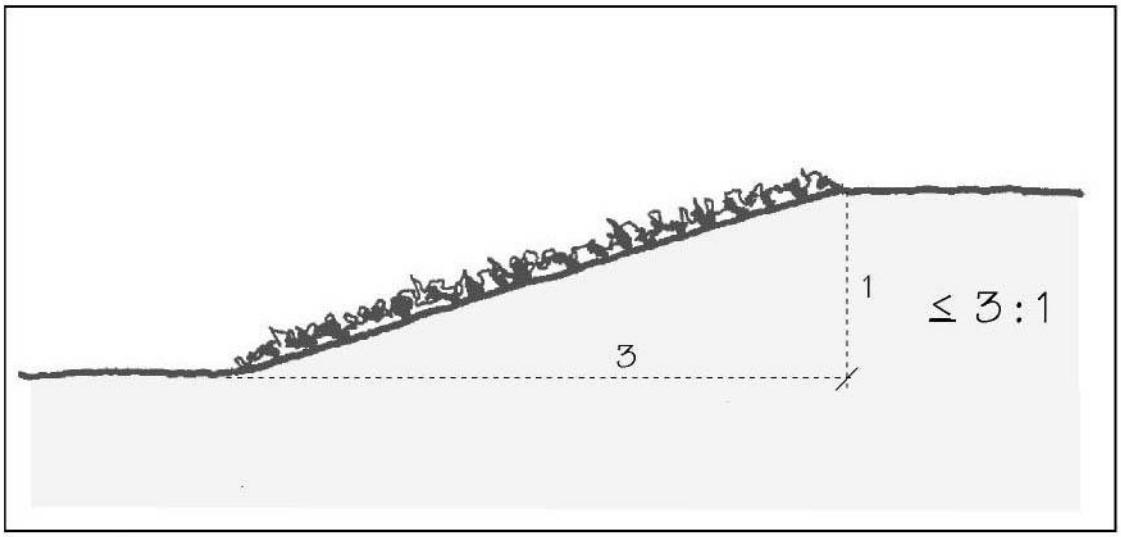
5) Slopes greater than a ratio of two to one (2:1) shall not be permitted.

B) ***Stabilization Measures***
On all sites containing steep slopes on which development is allowed pursuant to this subsection, the following stabilization measures shall be required:

1) All slopes equal to 2:1 shall be stabilized with a suitable combination of plantings and permanent slope retention devices. Slopes equal to or greater than 3:1 shall not be stabilized with turf grasses, but shall be stabilized with other permanent ground cover such as, but not limited to, weeping love grass or low junipers.



Stabilize 50 per cent or slopes greater than 2:1 with permanent slope retention devices or a suitable combination of plantings (ground cover, shrubs, etc.) and retention devices.



Stabilize slope greater than 3:1 with permanent ground covers rather than turf grasses (e.g. love grass, juniper).

Figure 8.1.4: Steep Slope Stabilization Measures

2) *Written consent.* With the written consent of the landowner of the property that has received a vested right for a site-specific development plan.

3) *Hazard poses threat if project proceeds*. Upon findings by the Town Council, by ordinance after notice and public hearing, that natural or man-made hazards on or in the immediate vicinity of the property, if uncorrected, would pose a serious threat to the public health, safety and welfare if the project were to proceed as contemplated in the site-specific development plan.

4) *Payment to affected landowner*. Upon payment to the affected landowner of compensation for all costs, expenses and other losses incurred by the landowner, including, but not limited to, all fees paid in consideration of financing, and all architectural, planning, marketing, legal and other consultant's fees incurred after approval by the Town, together with interest thereon at the legal rate until paid. Compensation shall not include any diminution in the value of the property that is caused by such action.

5) *Inaccurate information.* Upon findings by the Town Council, by ordinance after notice and a public hearing, that the landowner or the landowners' representative intentionally supplied inaccurate information or made material misrepresentations which made a difference in the approval of the Town Council of the site specific development plan.

6) *State or federal law or regulation that preclude development*. Upon the enactment or promulgation of a state or federal law or regulation that precludes development as contemplated in the site specific development plan, in which case the Town Council may modify the affected provisions, upon a finding that the change in state or federal law has a fundamental effect on the plan, by ordinance, after notice and a public hearing.

J) ***Voluntary Annexation***
A petition for annexation filed with the Town pursuant to Secs. 160A-31 or 160A-58.1, N.C.G.S., shall contain a signed statement declaring whether or not any vested right with respect to the land subject to the petition has been established under Secs. 160A-385.1 or 153A-344.1, N.C.G.S. A statement that declares no vested right has been established under Secs. 160A-385.1 or 153A-433.1, N.C.G.S., or failure to sign a statement declaring whether or not a vested right has been established, shall be binding on the landowner and any such vested right shall be terminated.

K) ***Limitations***
Nothing in this Section is intended or shall be deemed to create any vested right other than those established pursuant to Sec. 160A-385.1, N.C.G.S.

2.3.15 Tree Removal and/or Pond Drainage Plan

A) ***Purpose***
Tree Removal and/or Pond Drainage Plan review is required by this Ordinance to ensure that any tree removal and/or pond drainage activities are done in a manner that protects future buffers and Resource Conservation Areas, meets the Ordinance's watershed and floodplain restrictions, and ensures that appropriate

measures are taken for stormwater management and sedimentation and erosion control.

B) ***Applicability***

No person shall engage in tree removal and/or pond drainage activities unless he or she has applied for and has been issued a Tree Removal and/or Pond Drainage Permit, and all other applicable federal, state, and local permits have been issued. The Tree Removal and/or Pond Drainage Permit is issued by the Town of Apex Planning Department and authorizes tree removal and/or pond drainage activities consistent with this Ordinance. All tree removal and/or pond drainage activities shall be conducted in conformity with the approved Tree Removal and/or Pond Drainage Plan and Permit. Tree removal activities include cutting of trees. Pond drainage activities include drainage of water bodies.

The Tree Removal Plan cannot be reviewed concurrently with any other development application (including rezoning, conditional zoning, PUD-CZ, SD-CZ, TND-CZ, MEC-CZ, subdivision plan, site plan, administrative approval, etc.) and must be approved or withdrawn prior to the submission of any other development application.

The Pond Drainage Plan can be reviewed concurrently with any other development application (including but not limited to rezoning, conditional zoning, PUD-CZ, SD-CZ, TND-CZ, subdivision plan, site plan, administrative approval, etc.). Minimal tree removal and grading necessary to facilitate draining the pond and establishing sedimentation and erosion control measures shall be permitted as part of the Pond Drainage Plan.

C) ***Exemptions***

The following tree removal or non-structural development activities shall be exempted from the requirements of this section:

1) Tree removal activities which are not conducted to facilitate development and which are normal forestry activities conducted pursuant to a forestry management plan prepared or approved by a forester registered pursuant to Chapter 89B of the General Statutes on land classified by Wake County as agricultural, forestry, or horticultural land use or that meet Sec. 8.1.3(B) *Tree and Vegetation Conservation, Exemptions for Specific Activities*.

   However, if a Tree Removal and/or Pond Drainage Permit is not issued, per NCGS 160A-458.5(c)(1), no approval of a site or subdivision plan or issuance of a building permit shall occur for a period of 3 or 5 years from the date the tree removal activities are completed, based on the following:

   a) Three years after the completion of a timber harvest if the harvest results in the removal of all or substantially all of the trees that were protected under Town regulations governing development from the tract of land for which the permit or approval is sought.

   b) Five years after the completion of a timber harvest if the harvest results in the removal of all or substantially all of the trees that were protected under Town regulations governing development from the tract of land for which the permit or approval is sought and the harvest was a willful violation of the Town regulations.

2) Tree removal activities which are not conducted to facilitate development and which occur on property zoned for single-family or duplex residential uses or where single-family or duplex residential uses already exist. However, if a Tree Removal and/or Pond Drainage Permit is not issued, no subdivision or development applications shall be accepted for 48 months from the date the tree removal activities are completed.

3) Tree removal and/or pond drainage activities that are specifically authorized by a development plan approved by the Town Council (including but not limited to master subdivision plan or site plan) that specifically authorizes the tree removal and/or pond drainage activities.

4) Tree removal and/or pond drainage activities that meet the criteria of Section 2.3.6(C)(2)(b), (d), (e), (f), (g), (h) or (i) Exemptions from Site Plan approval and that are specifically authorized by an administrative approval (if applicable) by the Planning Director in accordance with Section 2.3.6(C) Exemptions.

D) ***Procedures***

1) *Application for Tree Removal and/or Pond Drainage Permit.* Applicants shall submit a form and fee specified by the Town of Apex Planning Department along with a Tree Removal and/or Pond Drainage Plan. The Tree Removal and/or Pond Drainage Plan shall specify that trees will not be removed in those areas of the site that correspond with areas that would be buffers or Resource Conservation Areas if the site were being developed for the highest and best use permitted in the applicable zoning district. No person shall remove trees or conduct pond drainage activities in these areas.

2) *Contents of application.* The Tree Removal and/or Pond Drainage Plan shall include the following information:

a) The boundaries of the site upon which tree removal and/or pond drainage activities are proposed.

b) A tree survey locating all trees 8” caliper and larger on the site.

c) The areas where the applicant proposes to cut trees and/or drain ponds.

d) Those areas of the site that correspond with areas that would be buffers or Resource Conservation Areas (including stream corridors, wetlands, stands of large trees, etc.) if the site were being developed for the highest and best use permitted in the applicable zoning district.

3) *Action by the Technical Review Committee*. The Technical Review Committee shall review the application. If the application complies with the standards set forth in 2.3.15(E) Standards, then the Tree Removal and/or Pond Drainage Permit shall be approved. If the application does not comply with the standards set forth in 2.3.15(E) Standards, then the Tree Removal and/or Pond Drainage Permit shall be denied. The applicant shall have the opportunity to revise and resubmit the application and Tree Removal and/or Pond Drainage Plan in accordance with the published schedule provided by the Planning Department.

E) ***Standards***
Prior to approval of a Tree Removal and/or Pond Drainage Permit, the Technical Review Committee shall find that the Tree Removal and/or Pond Drainage Plan complies with all applicable sections of the Ordinance, as well as any other applicable federal, state, or local requirements. Applicable sections of the Ordinance include, but are not limited to, Sec. 2.3.15 *Tree Removal and/or Pond Drainage Plan,* Sec. 6.1 *Watershed Protection Overlay Districts*, Sec. 6.2 *Flood Damage Prevention Overlay District*, Sec. 8.1 *Resource Conservation*, and Sec. 8.2 *Landscaping, Buffering, and Screening*.

F) ***Expiration***
A Tree Removal and/or Pond Drainage Permit shall expire at the end of one year after the date of its initial approval if the use has not been established, ongoing, and in operation. Upon written request, one 6 month extension of the Tree Removal and/or Pond Drainage Permit may be granted by the Planning Director for good cause shown.

G) ***Amendment***
A Tree Removal and/or Pond Drainage Permit may be amended, extended, or modified only in accordance with the procedures and standards established for its original approval.

H) ***Failure to Obtain Tree Removal and/or Pond Drainage Permit***
If a Tree Removal and/or Pond Drainage Permit is not issued prior to tree removal activities on land not exempted per Sec. 2.3.15(C) *Exemptions*, per NCGS 160A-458.5(c)(1), no approval of a site or subdivision plan or issuance of a building permit shall occur for a period of 3 or 5 years from the date the tree removal activities are completed, based on the following:

1) Three years after the completion of a timber harvest if the harvest results in the removal of all or substantially all of the trees that were protected under Town regulations governing development from the tract of land for which the permit or approval is sought.

2) Five years after the completion of a timber harvest if the harvest results in the removal of all or substantially all of the trees that were protected under Town regulations governing development from the tract of land for which the permit or approval is sought and the harvest was a willful violation of the Town regulations.

2.3.16 Sustainable Development Conditional Zoning District

A) ***General***
This Section establishes the procedures and standards applicable to the Town's Sustainable Development Conditional Zoning District SD-CZ.

B) ***General Applicability***
Before any development shall be designated as a Sustainable Development Conditional Zoning District SD-CZ on the Official Zoning District Map, it shall receive approval pursuant to the terms of this Section and Section 2.3.3 of this Ordinance.

C) ***Location***
A Sustainable Development Conditional Zoning District SD-CZ designation may be established on any land located in the Town and its ETJ that complies with all of the applicable standards of this Section and Section 3.3.4(B), including the requirement that a Sustainable Development Conditional Zoning District SD-CZ

4. Stormwater Management

- UDO Section 6.1.12
- UDO Section 6.1.1-7 Water Supply Watersheds
- Standard Specifications and Standard Details (Section 500)
- NPDES Phase II Stormwater Illicit Discharge Detection and Elimination Ordinances (Town Code Chapter 12, Article VIII)

a) Project requires a 401 Certification/404 Permit and these were issued prior to the effective date of Sec. 6.1.11;

b) Projects that require a state permit, such as landfills, NPDES wastewater discharges, land application of residuals and road construction activities, have begun construction or are under contract to begin construction and had received all required state permits and certifications prior to the effective date of Sec. 6.1.11;

c) Projects that are being reviewed through Clean Water Act Section 404/National Environmental Policy Act Merger 01 Process (published by the US Army Corps of Engineers and Federal Highway Administration, 2003) or its immediate successor and that have reached agreement with DENR on avoidance and minimization by the effective date of Sec. 6.1.11; or

d) Projects that are not required to be reviewed by the Clean Water Act Section 404/National Environmental Policy Act Merger 01 Process (published by the US Army Corps of Engineers and Federal Highway Administration, 2003) or its immediate successor if a Finding of No Significant Impact has been issued for the project and the project has the written approval of the Town prior to the effective date of Sec. 6.1.11.

6.1.12 Structural BMPs

A) ***Professional Design***
All structural BMPs and any alterations thereof shall be designed by a North Carolina registered professional with qualifications appropriate for the type of system required and shall be in accordance with the NC DWQ Stormwater BMP Manual, the *Town of Apex Standard Specifications and Standard Details* and, when applicable, the *Town of Apex Design and Development Manual*; these registered professionals are defined as professional engineers, landscape architects (to the extent that G.S. Chapter 89A allows), and land surveyors (to the extent that the design represents incidental drainage within a subdivision, as provided in G.S. 89C-3(7)).

B) ***Design, Location, and Landscaping of Structural BMPs***
The following specific design criteria shall be met by these systems:

1) Specific requirements for structural BMPs shall be in accordance with the NC DWQ Stormwater BMP Manual and the *Town of Apex Standard Specifications and Standard Details*;

2) Structural BMPs shall be designed to remove 85% of total suspended solids in the permanent pool and store runoff from a one-inch rainfall from the site above the permanent pool;

3) The designed runoff storage volume shall be above the permanent pool;

4) The discharge rate from these systems following the one-inch rainfall design storm shall be such that the runoff does not draw down to the

permanent pool level in less than two days and that the pond is drawn down to the permanent pool level within at least five days;

5) The mean permanent pool depth shall be a minimum of three feet;

6) The inlet structures shall be designed to minimize turbulence using baffles or other appropriate design features;

7) Retention basins, detention basins, headwalls, outlet structures, concrete flow channels, rip rap channels, and other drainage improvements shall be screened with plant material and/or berms and situated in the least visible location or, if visible, incorporated into the natural curves of the land;

8) Detention and retention basin embankments and the detention or retention basin itself shall be extensively landscaped with wet tolerant plant materials with the intention of re-creating a seasonal high water wet eco-structure; a list of guidelines for preferred plant materials can be found in the *Town of Apex Design and Development Manual*;

9) Detention or retention facilities shall be sized to accommodate the future growth of vegetation planted in the basin; and

10) In lieu of peripheral fencing, detention and retention basin edges shall be contoured and shaped to form low angles at primary water line thereby ensuring greater pedestrian safety.

11) All supporting calculation submittals for each proposed structural BMP shall include and comply with the latest version of the NC DWQ BMP supplement.

C) ***Identification on Site Plan/Subdivision Plan/Final Plat of Structural BMP***
A legal description of the area containing the structural BMP shall be delineated on the site plan (major or minor), subdivision plan, and recorded final plat along with any easements necessary for access to the structural BMP. The described area shall include sufficient area to perform inspections. The described area shall include, but is not limited to, the detention pond, vegetative filters, all pipes and water control structures, berms and dikes. Prior to approval of a final plat (with respect to a subdivision), issuance of a certificate of occupancy (with respect to a site plan), or commencement of a use, a developer shall first cause all information pertaining to required structural BMPs to be shown and certified by the Town of Apex Environmental Programs Manager on the final plat for the property. Such final, approved plat to be recorded shall also contain the following language: “All future development or redevelopment activities on this property shall be consistent with this approved plan. No changes to this plan shall be permitted without the Town of Apex’s prior written approval.”

D) ***Operation and Maintenance Agreement***
The owner shall have an operation and maintenance agreement for all structural BMPs approved by the Environmental Programs Manager prior to approval of a final plat (with respect to a subdivision) or issuance of a certificate of occupancy (with respect to a site plan) for any development upon which a structural BMP is required. The operation and maintenance agreement, which must be executed by the owner and shall be binding on all subsequent owners of the site, portions of the site, and lots or parcels served by the structural BMP, shall clearly indicate (i) what operation and maintenance actions are needed and what specific

quantitative standards will be used for determining when those actions need to be taken, (ii) the steps that will be taken for restoring a structural BMP if a failure occurs, and (iii) how cost will be apportioned among lot owners served. The operation and maintenance agreement must be recorded in the Wake County Register of Deeds office and referenced on the final plat. A copy of the recorded operation and maintenance agreement shall be provided to the Environmental Programs Manager within fourteen (14) days following its recordation.

E) ***Changes or Amendments to Plans and Specifications and/or Operation and Maintenance Agreement***
Any changes or amendments to the plans and specifications of a structural BMP, or the operation and maintenance agreement for a structural BMP shall meet all of the requirements of this rule regarding design and approval.

F) ***Compliance Prior to Receiving Plat Approval or Certificate of Occupancy***
Subject to Subsection (G) below, prior to approval of a final plat (with respect to a subdivision), issuance of a certificate of occupancy (with respect to a site plan), or commencement of a use for any development upon which a structural BMP is required, the owner shall have installed the improvements required by this Article and shall have received the approval of the Environmental Programs Manager with respect to the improvements. Upon installation of the required improvements, the Environmental Programs Manager or his designee shall inspect the structural BMP and the owner shall demonstrate that the required structure is in place, that it is operational, that it complies with all relevant portions of Sec. 6.1.12 *Structural BMPs*, and shall submit to the Environmental Programs Manager actual "as built" plans for the structure, which shall include the information listed in Article 6 Overlay Districts, and Section 1.06(c) Stormwater Drainage System of the *Town of Apex Standard Specifications and Standard Details*, certifying completion of the same.

G) ***Performance Guarantees***

1) As provided in (a), (b), and (c) below, in lieu of prior performance otherwise required by this Article, the Town may accept a performance guarantee that the improvements required by this Article will be constructed according to the Town's specifications at the owner's expense. Guarantees shall comply with the requirements of this Subsection (G).

   a) *Site plan:* In lieu of performance prior to the issuance of a temporary certificate of occupancy related to a site plan, a performance guarantee may be provided by the owner guaranteeing the installation of the improvements required by this Article. Improvements guaranteed under this Subsection (a) shall be constructed by the owner within one year after issuance of the temporary certificate of occupancy. All improvements required by this Article related to a site plan, shall be constructed prior to the issuance of a permanent certificate of occupancy.

   b) *Phased site plan:* In lieu of performance prior to the issuance of a temporary or permanent certificate of occupancy related to a phased site plan, a performance guarantee may be provided by the owner guaranteeing the installation of the improvements required by this Article for each phase. All improvements guaranteed under this Subsection (b) shall be completed prior to the issuance of certificates of occupancy for ninety percent

(90%) of the buildings within that phase, or within sixty (60) days after receipt of written notice that the Environmental Programs Manager has determined that the contributing drainage area to the BMP is sufficiently stabilized to install the BMP, whichever occurs first.

c) *Subdivisions:* In lieu of performance prior to approval of a final plat for subdivisions, a performance guarantee may be provided by the owner guaranteeing the installation of the improvements required by this Article. All improvements guaranteed under this Subsection (c) shall be completed prior to the issuance of certificates of occupancy for ninety percent (90%) of the lots within the subdivision. If the subdivision is to be phased, all improvements within or required for each phase shall be completed prior to issuance of certificate of occupancy for ninety percent (90%) of the lots within that phase.

2) *Performance guarantee.* Performance guarantees shall be provided by the owner in the amount equal to one hundred twenty-five percent (125%) of the total construction cost of the required structural BMP(s). The total cost of the structural BMP(s) shall include all construction costs, including but not limited to, the cost of materials, landscaping, seeding and soil stabilization, grading, excavation and fill. The owner shall submit his estimate of this amount subject to review, modification, and approval by the Environmental Programs Manager. Such estimate shall be signed and sealed by a licensed North Carolina professional engineer, landscape architect, or land surveyor. Guarantees required by this section may be in the form of a surety bond enforceable at the sole discretion of the Town and in the form prescribed by the Town, a letter of credit that meets the specifications of Sec. 7.5.17 *Irrevocable Letter of Credit in Lieu of Surety Bond or Other Guarantee of Performance*, certified check drawn in favor of the Town, or cash deposited with the Town.

3) *Duration of performance guarantee.* Performance guarantees shall run until the requirements in this Section 6.1.12 have been satisfied and the Environmental Programs Manager has given final approval of the required structural BMP(s).

4) *Default.* Failure of the owner to construct, repair, and if necessary, reconstruct the structural BMP(s) as required by this Section 6.1.12 is a default. Upon such default, the Town may obtain and use all or any portion of the performance guarantee necessary to complete the improvements.

5) *Costs in excess of performance guarantee.* In the event the Town calls the performance guarantee required by this section and the reasonable cost of performance exceeds the amount of the performance guarantee the Town may collect the difference from the owner.

H) ***Maintenance and Maintenance Guarantees***

1) *Duty to maintain and maintenance and defects guarantee*. The owner is responsible for all maintenance and repair of improvements required by this Article. In addition to the Operation and Maintenance Agreement required by UDO Subsection 6.1.12(D), prior to approval of a final plat,

with respect to a subdivision, a maintenance and defects guarantee shall be provided by the owner in the amount equal to twenty-five percent (25%) of the total construction cost of the structural BMP to ensure proper maintenance and repair prior to conveyance of the improvements to a property owners association. The owner shall submit his estimate of this amount subject to review, modification, and approval by the Environmental Programs Manager. Such estimate shall be signed and sealed by a licensed North Carolina professional engineer, landscape architect, or land surveyor. Guarantees required by this section may be in the form of a surety bond enforceable at the sole discretion of the Town and in the form prescribed by the Town, a letter of credit that meets the specifications of Sec. 7.5.17 *Irrevocable Letter of Credit in Lieu of Surety Bond or Other Guarantee of Performance,* certified check drawn in favor of the Town, or cash deposited with the Town.

2) *Duration of maintenance and defects guarantee for subdivision.* The maintenance and defects guarantee shall be in effect for one year after certificates of occupancy have been granted for ninety percent (90%) of the lots within the subdivision. If the subdivision is to be phased, the maintenance and defects guarantee required for a phase shall be in effect for one year after certificates of occupancy have been granted for ninety percent (90%) of the lots within that phase. Subsequent phases shall be required to post new guarantees.

3) *Default.* Upon failure of the owner to maintain the structural BMP as required, the Town may obtain and use all or any portion of the maintenance and defects guarantee necessary to continue maintenance of the structure.

l) ***Inspection***

1) *Inspect once a year*. On an annual basis after completion of construction of a structural BMP, the owner shall submit to the Environmental Programs Manager an inspection report for that structure from a qualified registered North Carolina professional engineer, surveyor, or landscape architect performing services only in their area of competence. The inspection report shall be on a form provided by the Environmental Programs Manager. An initial inspection report shall be provided to the Environmental Programs Manager beginning one year from the date of submittal of the certified as-built plans to the Town and each year thereafter on or before the date of the as-built certification.

2) *Inspection by Town of Apex*. All property within the Primary Watershed Protection District and/or the Secondary Watershed Protection District shall also be subject to inspection by the Environmental Programs Manager or his designee. Such inspections may include, but are not limited to, reviewing maintenance and repair records, sampling discharges, surface water, groundwater, and material or water in structural BMPs, and evaluating the condition of structural BMPs.

3) *Corrective action.* If at any time the Town of Apex determines that corrective actions or improvements to a structural BMP are required, the Town of Apex shall notify the owner of the needed corrections and of the date by which the work is to be completed. All corrective work shall be consistent with the approved operation and maintenance agreement.

4) *Authorization prior to repair or reconstruction of structure*. With the exception of general landscaping and grounds maintenance, the owner of the structural BMP shall obtain authorization from the Town prior to any repair or reconstruction of the structure. All improvements and repairs shall be consistent with the approved maintenance and operation agreement. In a bona fide emergency, necessary measures may be taken immediately in order to minimize damage to the structure and ensure its continued operation. Such measures must be promptly reported to the Environmental Programs Manager.

6.1.13 Modifications by Variance

A) ***General***

Requests for minor and major variances from the standards of the Watershed Protection Overlay Districts shall be made to the Board of Adjustment, except for variance requests pertaining to impacts within Zone 1 and/or Zone 2 of a riparian buffer within the Neuse River Basin which shall be made to the Director of the Division of Water Quality as specified below in Sec. 6.1.13(B)(1)(b) and (B)(2)(c). Due to certain process differences in State statutes or rules for decision making and appeals based on which basin or watershed a proposed project is located, a separate variance provision is set forth below for each of the following basins or watersheds: (i) the Neuse River Basin, (ii) the Jordan Lake Watershed portion of the Cape Fear River Basin and (iii) the Cape Fear River Basin outside of the Jordan Lake Watershed.

Sec 6.1.13(F) sets forth an alternative variance process that is available for, but not required to be used by, an applicant seeking a variance from Sec. 6.1 density requirements for a project located in the Secondary Watershed Protection District and/or from Town Buffer requirements. Town Buffers and State Buffers are defined in Sec. 6.1.14(C). The purpose of this alternative variance process is to provide additional design flexibility for a project that provides a unique or additional benefit to the Town or surrounding area that would not be available from a traditional development located in areas within the Town or its ETJ where the applicable requirements of Sec. 6.1 are not part of a State authorized program, or where separate State rules do not apply.

All applications for variances made to the Board of Adjustment shall be reviewed by the Board of Adjustment, which shall approve, approve with conditions (which may include mitigation requirements), or disapprove the variance after a public hearing noticed pursuant to Sec. 2.2.11, *Public Notification*, and conducted pursuant to Sec. 2.2.18, *Public Hearing Procedures*, based on the applicable standards in Sec. 6.1.13(E) or (F).

B) ***Variances for Activities in the Neuse River Basin***

1) *Minor Variances*

a) *Minor Variance Requests that are to be Submitted to the Board of Adjustment.* A variance request for an activity in the Neuse River Basin shall be considered minor and a decision on such request shall be made by the Board of Adjustment when:

(i) In a development that is subject to the low-density option, it results in a total built-upon area of no more than 26.4 percent (which represents a 10 percent

ARTICLE 6 OVERLAY DISTRICTS

6.1 WATERSHED PROTECTION OVERLAY DISTRICTS

6.1.1 Purpose, Authority, and Enactment

The purpose of the Watershed Protection Overlay Districts is to ensure the availability of public water supplies at a safe and acceptable level of water quality, to ensure protection of public water supplies for recreational and aesthetic purposes, to minimize sedimentation of streams, and to protect the environment, health, and general welfare of present and future residents of the Town and the Triangle Region under the authority set forth in Article 1, Sec. 1.2 AUTHORITY of this ordinance and in N.C.G.S. 160A-174. In addition, the Legislature of the State of North Carolina has, in Chapter 143, Article 21 of the North Carolina General Statutes, entitled Water and Air Resources, directed local governmental units to adopt regulations designed to promote the public health, safety, and general welfare pursuant to the more specific requirements set forth in 15A NCAC 2B .0100, 15A NCAC 2B .0200, and in the Jordan Water Supply Watershed Nutrient Management Strategy Rules, 15A NCAC 2B .0262 through .0273 and .0311(p). Also pursuant to the Federal Water Pollution Control Act of 1972, federal Phase II Stormwater rules promulgated under it, and N.C.G.S. 143-215.1 and S.L. 2006-246, the Town is required to obtain a Phase II National Pollutant Discharge Elimination System (NPDES) permit for stormwater management for its municipal separate storm sewer system and to adopt, among other things, requirements and procedures to control the adverse effects of increased post development stormwater runoff and nonpoint and point source pollution associated with new development and redevelopment. (Additional specific purposes may be found in the Swift Creek Land Management Plan, the 2030 Land Use Map Update, and the Growth Management Plan.) In furtherance of these goals and under such authorities, the Town of Apex promulgated this Sec. 6.1, *Watershed Protection Overlay Districts*.

6.1.2 Primary and Secondary Watershed Protection Overlay Districts

Except for those lands and uses exempted pursuant to Sec. 6.1.3 *Exemptions*, the Watershed Protection Overlay Districts shall encompass all lands within the Town of Apex and its extraterritorial jurisdiction as established in Article 1, Sec. 1.2.2 *Authority to Regulate Zoning, Subdivision And Building Practices in ETJ*. The boundaries for the Town's extraterritorial jurisdiction area (hereinafter "ETJ") are delineated on the Town of Apex's "Official Zoning District Map." A copy of this map shall be on record in the office of the Town Clerk and in the Planning Department for inspection by the general public during normal business hours.

The Town and its ETJ shall be divided into two districts for the purpose of watershed protection. The Primary Watershed Protection District shall consist of all lands identified by the state as water supply watershed protected areas. The Secondary Watershed Protection District shall consist of the remainder of lands within the Town and its ETJ. These two districts shall be identified on the Town of Apex's "Watershed Protection Overlay District Map." A copy of this map shall be on record in the office of the Town Clerk and in the Planning Department for inspection by the general public during normal business hours. All subsequent changes to the area that is identified by the state as water supply watershed protected area are herein adopted by reference, and the Planning Department shall cause such changes to be reflected on said map. A portion of the Jordan Lake Watershed, which consists of all lands and waters draining to the B. Everette Jordan Reservoir, is located within the Town's Primary Watershed Protection District and a portion is located within the Secondary Watershed Protection District as also depicted on the Town's Watershed Protection Overlay District Map.

The Town shall also maintain a "Structural BMP Map" of the Town and its ETJ that

depicts the geographic location of all the structural BMPs approved under Sec. 6.1, and the map shall be updated as necessary to accurately reflect the location of such structures. A copy of this map shall be on record in the office of the Town Clerk and in the Planning Department for inspection by the general public during normal business hours.

6.1.3 Exemptions

This section does not apply to Sec. 6.1.11 *Riparian Buffers*.
The following activities are exempted from the requirements of Sec. 6.1 *Watershed Protection Overlay Districts:*

A) Development that cumulatively disturbs less than one acre and is not part of a larger common plan of development;

B) Redevelopment that cumulatively disturbs less than one acre and is not part of a larger common plan or development or sale;

C) ***Development Existing as of the Effective Date of this Section***

1) *Date built*. The continued use of structures that were built prior to the effective date of this Section;

2) *Substantial expenditures*. The completion of development for which the developer prior to the effective date of this Section made substantial expenditures of resources (e.g. time, labor, money) based on a good faith reliance on a valid permit received from the Town;

3) *Outstanding building permit*. The construction of any structure for which a developer has an outstanding valid building permit in compliance with N.C.G.S. Sec. 160A-385.1 prior to the original effective date of this Section.

4) *Vested right*. The completion of development for which a vested right, as defined in N.C.G.S. Sec. 160A-385.1(b)(6), was obtained prior to the original effective date of this Section.

D) ***Expansions to Existing Development***

Any expansion to a lot or project that is exempt from the requirements of Sec. 6.1 pursuant to Sec. 6.1.3(C) *Development Existing as of the Effective Date of this Section* and disturbs greater than one acre must comply with the requirements of Sec. 6.1. The built-upon area of the existing development shall be included in the built-upon area calculations for any proposed expansion to any such lot or project. Provided, however, that the built-upon area of any school facility owned by the Wake County Public School System or any qualified nonpublic school that is exempt from the requirements of Sec. 6.1 pursuant to Sec. 6.1.3(C) Development Existing as of the Effective Date of this Section is not required to be included in the built-upon area calculations for any expansion to such existing development. For purposes of this section, “school facility” means any building, structure or other facility used by the Wake County Public School System or any qualified nonpublic school for educational purposes. For purposes of this section, “qualified nonpublic school” means a school having an enrollment of one hundred (100) or more students, and that has one or more of the characteristics set out in N.C.G.S. Sec. 115C-555.

E) ***Developments and Uses Exempted by State Law***
Any use, development, or activity that has been specifically exempted by any applicable state law from local regulations of the type established by this ordinance.

F) ***Complete Applications***
All projects for which a complete application for site plan or master subdivision plan was submitted and accepted by the Town on or before the effective date of Sec. 6.1 shall be exempt from complying with all provisions of Sec. 6.1 if the application is approved and development occurs in conformity with the permit terms. However, the project is not exempt from the watershed regulations in effect at the time of submittal.

6.1.4 General

A) ***Development Review***
All development within the Watershed Protection Overlay Districts shall comply with the watershed protection standards of this Sec. 6.1 *Watershed Protection Overlay Districts*, and shall demonstrate compliance concurrent with the submission for approval of a site plan (major or minor) (Sec. 2.3.6), master plan for subdivision (Sec. 2.3.7(D)) or development plan for MEC-CZ, PUD-CZ or TND-CZ (Sec. 2.3.4), whichever occurs first.

B) ***Compliance Prior to Approval of Certificate of Occupancy***
Prior to approval of a final plat (with respect to a subdivision), issuance of a certificate of occupancy (with respect to a site plan), or commencement of a use, in addition to meeting all other requirements of this ordinance, all of the watershed protection standards required by Sec. 6.1 must be met, all required facilities must be in place, be operational, and be approved by the Environmental Programs Manager.

C) ***Definitions***
Certain words in this Section have meanings that are specific for the purposes of Sec. 6.1 *Watershed Protection Overlay Districts*. Such words shall be defined in Article 12, *Definitions*.

6.1.5 Uses
The uses allowed within the Watershed Protection Overlay Districts shall be governed by the use regulations permitted in the base zoning district within which the land is located as set forth in the Sec. 4.2.2 *Use Table*.

6.1.6 Low-Density Development Option

A) ***General***
All development within both the Primary Watershed Protection District and the Secondary Watershed Protection District shall be designed to comply with the standards of the low-density development option unless the Technical Review Committee or Town Council, as applicable, approves a plan of development pursuant to the procedures and standards for the high-density development option, or unless a minor or major variance is approved pursuant to Sec. 6.1.13, *Modifications by Variance.*

B) ***Standards***
All development under the low-density development option shall meet the following standards:

1) *Within the Primary Watershed Protection District*

a) *Built-Upon Area*
Within the Primary Watershed Protection District, built-upon area for a development shall not exceed 12 percent of the total lot(s) area.

b) *Vegetated Conveyances*
Stormwater runoff from the development shall be transported from the development by vegetated conveyances to the maximum extent practicable provided that the standards of Article 7.5.4(B)(4) are met.

c) *Riparian Buffers for Perennial Streams*
Within the Primary Watershed Protection District, a vegetative buffer with a width of not less than 100 feet shall be maintained along each side of a perennial stream (defined for purposes of this Section in Article 12, *Definitions*). All buffers shall meet the requirements of Sec. 6.1.11 *Riparian Buffers.*

d) *Riparian Buffers for Intermittent Streams*
Within the Primary Watershed Protection District, a vegetative buffer with a width of not less than fifty (50) feet shall be maintained along each side of an intermittent stream (defined for purposes of this Section in Article 12, *Definitions*). All buffers shall meet the requirements of Sec. 6.1.11 *Riparian Buffers*.

e) *Riparian Buffers for Lakes and Ponds That Are Part of a Natural Drainage Way*
Within the Primary Watershed Protection District, a vegetative buffer with a width of not less than fifty (50) feet shall be maintained around any lake or pond, provided, however, that any lake or pond that joins with a perennial stream shall have a vegetative buffer width of not less than one hundred (100) feet around the lake or pond. All buffers shall meet the requirements of Sec. 6.1.11 *Riparian Buffers*.

2) *Within the Secondary Watershed Protection District*

a) *Built-Upon Area, Vegetated Conveyances, and Riparian Buffers for Intermittent Streams*
Within the Secondary Watershed Protection District, the standards for Built-Upon Area, Vegetated Conveyances and Riparian Buffers for Intermittent Streams for the Low Density Development option are the same as those in Sec. 6.1.6(B)(1)(a), (b) and (d) for within the Primary Watershed Protection District. As addressed below in Sec. 6.1.6(B)(2)(b) and (c), the difference in standards in the Secondary Watershed Protection District pertaining to a required vegetative buffer for perennial streams, or a lake or pond that joins with a perennial stream, is that in the Secondary Watershed Protection District the buffer may average one hundred (100) feet.

b) *Riparian Buffers for Perennial Streams*
Within the Secondary Watershed Protection District, a vegetative buffer with an average width of not less than one hundred (100)

feet shall be maintained along each side of a perennial stream. At no point shall the buffer width along each side of a perennial stream be less than fifty (50) feet. All variable width buffers must be delineated with monuments. All buffers shall meet the requirements of Sec. 6.1.11 *Riparian Buffers.*

c) *Riparian Buffers for Lakes and Ponds That Are Part of a Natural Drainage Way*
Within the Second Watershed Protection District, a vegetative buffer with a width of not less than fifty (50) feet shall be maintained around any lake or pond, provided, however, that any lake or pond that joins with a perennial stream shall have a vegetative buffer with an average width of not less than one hundred (100) feet maintained along each side of the lake or pond. At no point shall the buffer width around the lake or pond be less than fifty (50) feet. All variable width buffers must be delineated with monuments. All buffers shall meet the requirements of Sec. 6.1.11 *Riparian Buffers.*

6.1.7 High-Density Development Option

Developers wishing to exceed the built-upon limitations for low-density development within either the Primary Watershed Protection District or the Secondary Watershed Protection District, as set forth in Sec. 6.1.6(B) *Standards*, shall submit an appropriate development plan per Section 2.3 Development Approvals, which shall meet the following standards:

A) ***Within the Primary Watershed Protection District***

1) *Built-Upon Area*
Within the Primary Watershed Protection District, all development shall comply with the built-upon area limitations for the underlying district found in Sec. 5.1 *Table of Intensity and Dimensional Standards*.

2) *Vegetated Conveyances*
Stormwater runoff from the development may be transported from the development by vegetated conveyances to the maximum extent practicable provided that the standards of Article 7.5.4(B)(4) are met.

3) *Structural BMPs*
Within the Primary Watershed Protection District, structural BMPs shall be used to collect and hold the runoff from the first one-inch of rainfall. These storm water control structures shall meet the requirements in Sec. 6.1.12 *Structural BMPs*.

In addition, the post-development peak runoff rate shall be limited to the pre-development peak runoff rate for the 1-year, 24-hour and the 10-year, 24-hour storms. Detention volumes stored to reduce peak flows shall drain within seventy-two (72) hours to allow for subsequent storms.

A storm water impact statement shall be prepared by a qualified professional engineer registered to practice in North Carolina and submitted with the initial application for any development or activity that is not exempt from the requirements of Sec. 6.1 *Watershed Protection Overlay Districts* showing the impacts from the development site to the confluence point downstream where the area of the proposed development is less than 10% of the total drainage area (the “10%

point"). The impact statement shall verify the effects of detention on the downstream hydrographs to ensure that the peaks do not increase for a given storm. The impact statement shall list the infrastructure (ditches, culverts, etc.) and indicate all the adverse effects and impacts (to roads, culverts, businesses, homes, lawns, etc.) from the development to the 10% point. If backwater from detention appears to be a problem, then the impact statement shall also consider potential effects on upstream properties for the 100-year, 24-hour storm.

4) *Riparian Buffers for Perennial Streams*
Within the Primary Watershed Protection District, a vegetative buffer of not less than 100 feet shall be maintained along each side of a perennial stream. All buffers shall meet the requirements in Sec. 6.1.11 *Riparian Buffers.*

5) *Riparian Buffers For Intermittent Streams*
Within the Primary Watershed Protection District, a vegetative buffer with a width of not less than fifty (50) feet shall be maintained along each side of an intermittent stream. All buffers shall meet the requirements in Sec. 6.1.11 *Riparian Buffers*.

6) *Riparian Buffers For Lakes and Ponds That Are Part of a Natural Drainage Way*
Within the Primary Watershed Protection District a vegetative buffer with a width of not less than fifty (50) feet shall be maintained around any lake or pond, provided, however, that any lake or pond that joins with a perennial stream shall have a vegetative buffer width of not less than one hundred (100) feet around the lake or pond. All buffers shall meet the requirements of Sec. 6.1.11 *Riparian Buffers*.

B) ***Within the Secondary Watershed Protection District***

1) *Built-Upon Area Vegetated Conveyances, Structural BMPs and Riparian Buffers For Intermittent Streams*
Within the Secondary Watershed Protection District, the standards for Built-Upon Area, Vegetated Conveyances, Structural BMPs and Riparian Buffers for Intermittent Streams for the High Density Development option are the same as those in Sec. 6.1.7(A)(1) – (3) and (5) for within the Primary Watershed Protection District. As addressed below in Sec. 6.1.7(B)(2) and (3), the difference in standards in the Secondary Watershed Protection District pertaining to a required vegetative buffer for perennial streams, or a lake or pond that joins with a perennial stream, is that in the Secondary Watershed Protection District the buffer may average one hundred (100) feet.

2) *Riparian Buffers for Perennial Streams*
Within the Secondary Watershed Protection District, a vegetative buffer with an average width of not less than one hundred (100) feet shall be maintained along each side of a perennial stream. At no point shall the buffer width along each side of a perennial stream be less than fifty (50) feet. All variable width buffers must be delineated with monuments. All buffers shall meet the requirements in Sec. 6.1.11 *Riparian Buffers.*

3) *Riparian Buffers For Intermittent Streams*
Within the Secondary Watershed Protection District, a vegetative buffer with a width of not less than fifty (50) feet shall be maintained along each

side of an intermittent stream. All buffers shall meet the requirements in Sec. 6.1.11 *Riparian Buffers*.

4) *Riparian Buffers for Lakes and Ponds*
Within the Secondary Watershed Protection District, a vegetative buffer with a width of not less than fifty (50) feet shall be maintained around any lake or pond, provided, however, that any lake or pond that joins with a perennial stream shall have a vegetative buffer with an average width of not less than one hundred (100) feet maintained along each side of the lake or pond. At no point shall the buffer width around the lake or pond be less than fifty (50) feet. All variable width buffers must be delineated with monuments. All buffers shall meet the requirements of Sec. 6.1.11 *Riparian Buffers.*

6.1.8 Clustered Development Option

Clustering of development is allowed under either the low-density development option or the high-density development option under Sec. 2.3.4 *Planned Development Districts*, if the development complies with the following additional standards:

A) ***Density***
The overall density of the development shall not exceed the density allowed in the underlying base zoning district found in Sec. 5.1 *Table of Intensity and Dimensional Standards* (for the high-density development option) or the density limitation of the low-density development option for the Primary or Secondary Watershed Protection District;

B) ***Built-Upon Areas***
Built-upon areas shall be designed and sited to minimize storm water runoff volume and velocity and the overall impact of storm water runoff on receiving streams; and

C) ***Plat Certificate***
No plat shall be approved until the developer has caused the final plat to be certified as follows:

"This is a clustered development pursuant to the *Town of Apex Unified Development Ordinance* and may not be further subdivided or developed."

6.1.9 Definition of Built-Upon Area

For the purposes of complying with the standards and requirements of the Watershed Protection Overlay Districts, calculation of the built-upon area within the proposed development shall include, but not be limited to, all existing public and private streets, proposed public streets, sidewalks, driveways, rooftops, parking lots, patios, and all other impervious and partially impervious surfaces, including CABC and gravel within the development. The water area of swimming pools and wooden slatted decks shall not be included in the calculation of the built-upon area.

6.1.10 Calculation of Built-Upon Area

For the purposes of complying with the standards and requirements of the Watershed Protection Overlay Districts, built-upon area calculations shall be made based on the total acreage of built-upon area within a proposed development, divided by the total acreage of the lot area. Density calculations for expansions shall be based on the total acreage of built-upon area proposed for expansion, divided by the total acreage of lot area proposed for expansion. A certificate of occupancy shall not be granted, nor shall any final plat be recorded until a developer has caused all information pertaining to the percentage of the built-upon area on a property to be shown on the final plat for the property.

SECTION 500
STORM DRAINAGE

501 Design

502 Pipe Materials
- **A. General**
- **B. Reinforced Concrete Pipe (RCP)**

503 Materials - Storm Drainage Structures
- **A. General**
- **B. Concrete Brick Masonry Units**
- **C. Precast Concrete Manholes**
- **D. Mortar**
- **E. Castings**
- **F. Portland Cement Concrete**
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504 Miscellaneous Materials
- **A. Rip Rap**

505 Inlets and Outlets
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506 Structural BMP's Within The Primary and Secondary Watershed Protection Overlay Districts

507 Construction Methods
- **A. Trenching & Bedding for Storm Sewers**
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- **E. Concrete Construction**
- **F. Installation of Precast Concrete Structures**

508 Visual Inspection by Camera Prior to Acceptance

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501 Design

Storm drainage facilities shall be designed to dispose of storm water generated upon or passing through the project location. The determination of the quantities of water which must be accommodated will be based upon peak flows from storms having the following return periods:

Drainage Structure	*Storm Event - Return Frequency*
Curb Inlet, Roadside Ditches	2-year storm
Storm Sewer Collector	10-year storm
Cross Street Storm Drainage	25-year storm
Greenways	25-year storm
Structures in Flood Plain	100-year storm*

*Drainage structures in the flood plain should pass 100-year storm without over-topping the roadway -- or in the alternative, the structures may be designed to pass only the 25-year event, in which case, the downstream roadway embankment shall be fully protected from the residual flow which may overtop the roadway during a 100-year event.

Prediction of the peak flow rates shall be calculated using the procedure in the USDA Soil Conservation Service Method, the Rational Method, or other acceptable calculation procedures as determined by the TOWN. The size of storm water conduits shall be determined by utilizing the standard energy equation for inlet control or outlet control and headwater nomographs as published by various federal agencies – US FHWA - H.E.C. #5, Soil Conservation Service, etc. The minimum pipe size to be used shall be 15-inch diameter Reinforced Concrete Pipe (RCP). All pipes should be designed utilizing a Manning's roughness coefficient of 0.013 (n-value).

All storm sewers shall be installed in dedicated street rights-of-way or easements. Minimum widths of storm sewer easements shall be as follows:

Pipe Diameter	*Easement*
15" -- 36"	20'
42" -- 72"	30'
> 72"	to be determined by the Town of Apex

No structures such as buildings, fences, playsets, etc. shall be placed within any public easement.

Where multiple pipes are installed, the edges of the easement shall be a minimum of 10 feet from the centerline of the outside pipe with a 3′ clearance between the exterior of the parallel storm sewer pipes. Pipes shall not outfall in the front yard of a lot, but should extend to the rear third of the lot or property line in residential subdivisions.

Discharge from the drainage systems shall not be of such a velocity as to cause damage

after leaving the pipe. Maximum allowable outlet velocity will be 2.5 feet per second (refer to “Code of Ordinances, Town of Apex, North Carolina” enacted December 20, 2005; Chapter 5, Article X, Sec. 5-149). Exiting velocities shall be in conformance with the sedimentation and erosion guidelines and outlet protection used whenever the velocity exceeds the allowable limit. Pipe outlets, flared end sections and head walls shall be provided, with rip-rap aprons designed to reduce velocity and dissipate energy so that downstream damage from erosion does not occur. Calculations shall be submitted with plan review.

Manholes or structures shall be installed at each deflection of line or grade. Acute angle junctions (angles less than 90°) between pipe runs should be avoided. No inaccessible junction boxes shall be permitted. The maximum distance between access openings shall not exceed 400 feet for pipes 30 inches and smaller. For pipes 36 inches and larger, the maximum distance between access openings may be increased to 500 feet.

Manhole base diameters shall conform to the following for the various storm sewer pipe sizes:

Storm Sewer Pipe Size	***Manhole Base Diameter***
15" - 36"	5'
42" - 48"	6'
54"	8'

For pipes greater than 54 inches, manhole base sections shall be sized as required and shall be approved by the ENGINEER.

Joints between sections of pipe shall be constructed utilizing a watertight gasket, o-rings, or bitumastic impregnated rope-type joint material for the full circumference of the joint. For pipes 36-inches in diameter or larger, each interior joint shall also be filled with a Portland cement grout and troweled smooth for the circumference of the pipe.

The minimum cover shall be 2 feet from finish subgrade to the top of pipe under roadways, and 1 foot under a non-roadway area.

Storm water shall not generally be allowed to flow across the roadway. Any deviation shall require pre-approval by the ENGINEER. Drainage shall be provided to intercept the flow prior to the radius of an intersection, or the design of the roadway shall indicate a continuous grade around the radius to allow the flow to continue down the intersecting street. Water shall be picked up before the spread into the roadway exceeds eight feet for curb and gutter roadways. No catch basin shall be installed in the radius of a curve.

Piped storm water that originates within or passes through the public ROW shall be conveyed through a contiguous public storm drain easement, from the ROW. through points downstream, to the point of open discharge. Private storm drainage systems will be permitted, provided that: (1) such systems collect and discharge impounded storm water

wholly within the same lot or (2) such systems collect water from one single lot and discharge into the public storm drain system. Private storm drain systems that connect to the public storm drain system shall have the connecting leg of such a system, which crosses into the public ROW. or easement, constructed in accordance with Town Specifications, including but not limited to: the necessary easements, piping, inlets and junction boxes. Connection of plastic pipe to Town infrastructure is prohibited. Piped private storm drainage systems may not cross property lines or convey storm water from one lot to another. Where permitted by topography and site conditions, storm drain systems that serve a single non-residential lot (i.e., parking lots, private streets, vehicular use areas), shall be privately maintained.

502 Pipe Materials

A. General

All storm sewer pipes to be installed in projects within the jurisdictional limits of the Town of Apex shall be reinforced concrete pipe (RCP) conforming to the specifications presented herein. In special cases where material other than RCP may be required, the applicant's plan submittal must contain a formal request to use other material and complete background data to justify its use. Approval to use other material may only be granted by the Public Works Department.

B. Reinforced Concrete Pipe (RCP)

RCP shall be as per ASTM C76 (or the latest revision), Class III or Class IV with a minimum 15-inch diameter as furnished by NC Products or Gray Concrete Pipe Company or an approved equal. Joints shall be wiped with mortar or sealed with a plastic cement putty meeting Federal Specification SS-S-00210 such as “Ram-Nek”. Mortar shall be applied to the outside of all pipe joints and to both the inside and outside of joints of pipes 36 inches or larger.

503 Materials - Storm Drainage Structures

A. General

All structures (manholes, curb inlets, catch basins, junction boxes, etc.) shall be constructed of concrete brick masonry units, cast-in-place reinforced concrete, or pre-cast concrete. Structures shall be repaired and re-built with solid concrete brick and mortar. Materials such as broken concrete pipe, clay brick, and rock are prohibited. Structure walls shall be repaired to original manufacturer conditions.

Curb inlets in streets with curb and gutter shall be DOT type standard frame, grate, and hood. Yard inlets and area drains shall utilize a grate and frame, 4 feet by 8 feet size, minimum.

B. Concrete Brick Masonry Units

Concrete brick masonry units shall be solid units meeting the requirements of ASTM C55, Grade S-II. Clay brick shall not be permitted for any drainage structure.

C. Precast Concrete Manholes

Pre-cast concrete manholes shall meet the requirements of ASTM C478. Manholes shall have joints sealed with a pre-formed rope-type gasket per Federal Specifications SS-S-00210. Manholes shall have 5-foot diameter for storm drains with a diameter 15-inch through 36-inch, 6-foot diameter for storm drains with a diameter 42-inch through 48-inch, and 8 feet diameter for storm drains 54 inches in diameter. All pipes greater than 54 inches shall have manholes sized as required and approved by the ENGINEER.

Transition reducing slabs may be used to enable the use of 4' diameter eccentric cones at the top. All pre-cast manholes for storm sewers in traffic areas shall be of the eccentric type for ease of access. Manholes in non-traffic areas shall be flat-top type.

D. Mortar

Mortar shall be proportioned as shown below for either Mix No. 1 or Mix No. 2. All proportions are by volume. Water shall be added only in the amount required to make a workable mixture.

MIX NO. 1	1 part Portland Cement 1/4 part Hydrated Lime 3 3/4 parts Mortar Sand (maximum)
MIX NO. 2	1 part Portland Cement 1 part Masonry Cement 6 parts Mortar Sand (maximum)

Portland cement shall be ASTM C-150, Type 1. Hydrated lime shall conform to ASTM C207, Type S. Masonry cement shall meet the requirements of ASTM C91. Mortar sand shall be standard size 4S, per requirements of the NCDOT.

E. Castings

1) General – All castings shall meet the requirements of ASTM A48, Grade 35B iron and shall be manufactured in the USA. Country of origin shall be embossed on each casting.

   At a minimum, manufacturers shall submit the following to substantiate to the ENGINEER that castings meet the minimum criteria:

   a. Bar tensile test reports from an independent testing laboratory. The results must confirm that the material meets ASTM A48 Class 35B.

b. Casting proof load test report on the subject casting. Proof load tests shall be conducted in accordance with AASHTO M306, Section 7.0. During proof load testing, castings shall maintain a 40,000 lb proof load for one minute without experiencing any cracking or detrimental deflection.
c. A written statement of certification by a qualified licensed engineer, employed by the producing foundry, that castings meet these specifications.

2) Curb Inlet - Grates, frames, and hoods shall be in accordance with NCDOT Standard 840.02 and 840.03. Curb inlet hoods shall be embossed with "Dump No Waste! Drains to Waterways".

3) Grates & Frames - Cast iron grates and frames for yard inlets shall be of the size indicated on the approved plans. Grates and frames shall be in compliance with NCDOT Standards for a 2' X 2' masonry opening, or its equivalent with comparable features for other larger size openings as may be required.

   Grates and frames shall only be used outside of street rights-of-way.

4) Manhole Rings & Cover - Cast iron manhole rings and covers shall be in compliance with the Standard Detail with the words "STORM SEWER" cast on the cover. Covers shall have two 1-inch holes. Manhole castings shall be machined to provide a continuous bearing around the full periphery of the frame.

F. Portland Cement Concrete

Portland cement concrete used for storm drainage structures, end walls, etc. shall conform to the technical requirements presented in Section 200 of these Specifications, and shall have a minimum compressive strength of 3,000 psi at 28 days. Primary structures, such as box culverts, may require concrete having a compressive strength greater than 3,000 psi, and may require the submission of mix designs and testing of the concrete by an independent laboratory. These special requirements may be imposed by the ENGINEER for all such structures where deemed necessary.

G. Reinforcing Steel

Reinforcing steel shall be new billet steel conforming to ASTM A615 for grade 60. Reinforcing steel shall be deformed per current ASTM standards.

504 Miscellaneous Materials

A. Rip Rap

Riprap shall be large aggregate of the size and class shown on the approved drawings. Storm water calculations shall be submitted with plan review.

505 Inlets and Outlets

A. Headwalls, Endwalls, and Flared End Sections

Headwalls, Endwalls, and Flared End Sections shall be constructed of structural cast-in-place concrete or pre-cast concrete in accordance with NCDOT specifications and shall be installed at all discharge points and inlets where there is not a structure. Details and design of headwalls, endwalls, and flared end sections shall be in accordance with NCDOT requirements. Details shall be shown on all plan submissions.

Flared End Sections shall be installed on single pipe culverts up to and including 36 inches in diameter, and on multiple pipe culverts less than 30 inches in diameter. Flared End Sections shall also be installed at the outlet point of all storm drainage systems.

Headwall and Endwalls shall be installed on single pipe culverts greater than 36 inches in diameter, and on multiple pipe culverts greater than and including 30 inches in diameter.

B. Dissipaters and Scour Protection

Energy dissipaters shall be installed at all discharge points and shall be properly sized to ensure that stormwater is released at a non-erosive velocity.

Scour protection shall be provided for all drainage ways where, in the opinion of the Engineer, erosive velocities or other factors require the use of protective measures. All protective measures shall be shown on all plan submissions.

Additional information on the impact of stormwater discharge onto adjacent properties may be required by the Engineer.

506 Structural BMP's Within The Primary and Secondary Watershed Protection Overlay Districts

Structural Best Management Practices (BMP's) shall be designed and constructed per the guidelines and minimum design criteria presented in the State of North Carolina Department of Environmental and Natural Resources (DENR) BMP Manual, latest revisions. These structures shall be designed to meet all stormwater requirements presented in Section 6.1 of the Town of Apex Unified Development Ordinance.

In addition to the guidelines and minimum design criteria presented in DENR's BMP Manual, the following design criteria shall be used for inlet and outlet control devices in *all* Structural BMP's:

- The invert elevation for the inlet to the Structural BMP shall be set no lower than the normal/permanent pool elevation controlled by the water quality orifice(s).
- The outlet device shall be constructed of either precast Reinforced Concrete Pipe or CMP material. No masonry structures will be approved.

Prior to the approval of a final plat (with respect to a subdivision), issuance of a certificate of occupancy (with respect to a site plan), or commencement of a use for any development

upon which a Structural BMP is required, 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 and corresponding Structural BMP as-built supplements for all Structural BMP's.

The “as-built” plans shall show the final design specifications for all Structural BMP's and practices and the field location, size, elevations, and planted vegetation of all measures, controls, and devices, as installed. The designer of the Structural BMP's shall certify, under seal, that the as-built Structural BMP’s, controls, and devices are in compliance with the approved plans and designs as required by the Town of Apex UDO.

A final inspection and approval by the Town of Apex Environmental Programs Manager or his/her designee must occur before the release of any performance securities.

507 Construction Methods

A. Trenching & Bedding for Storm Sewers

The trench shall be excavated to 4 inches below the line grade indicated on the drawings. The trench bottom shall provide a firm and uniform support for the pipe and include 4 inches stone bedding. Where bell and spigot type pipe is used, recesses shall be excavated to receive the pipe bell.

Where the foundation is found to be of poor supporting value, the pipe foundation shall be conditioned by undercutting the unacceptable material to the required depth as directed by the ENGINEER, and backfilling with stone or other approved material. Where necessary, surface water shall be temporarily diverted in order to maintain the pipe foundation in a dry condition. The flow of water from such temporary diversions shall be directed into suitable erosion control devices.

B. Pipe Laying

Concrete pipe culverts shall be laid carefully with bells or grooves upgrade and ends fully and closely jointed. Joints of concrete pipe shall be made with cement mortar or with rope-type gasket joint meeting ASTM C 443 and C 361 materials as specified.

Where mortar is used, the joint shall be thoroughly wetted before making the mortar joint. Before succeeding sections of pipe are laid, the lower portions of the bell or groove of the pipe shall be filled on the inside with cement mortar of sufficient thickness to bring the inner surface of the abutting pipes flush and even. After the pipe is laid, the remainder of the joint shall be solidly filled with mortar and sufficient additional mortar used to form a bead or ring around the outside of the joint. The inside of the joint shall be wiped and finished smooth. Pipe which is not true to alignment, or which shows any settlement after installation, shall be taken up and re-laid.

C. Backfilling

The storm sewer trench shall be backfilled with #5, #57, or #67 stone to the springline of

the storm drain pipe. Selected earth or approved backfill shall be used from the springline to the finished project grade. The material shall be compacted in 6-inch lifts (loose measurement) to the top of the pipe and compacted to 95% of maximum dry density (Standard Proctor). The backfilling shall be done on both sides of the pipe simultaneously to prevent displacement of the pipe. If the pipe is within an area to be paved or where the trench is immediately behind the curb, the backfill material shall be placed on top of the pipe with an initial lift of twelve (12) inches followed by six (6) inch lifts to the top of the trench. If the pipe is outside of the paved area and is not located directly behind the curb, the backfill material shall be placed on top of the pipe in twelve (12) inch lifts to the top of the trench. The backfill materials shall be moistened when necessary in the opinion of the INSPECTOR to obtain maximum compaction. Water setting or puddling shall not be permitted.

All trash, forms, debris, etc., shall be cleared from the backfill material before backfilling. Backfilling around structures shall be done symmetrically and thoroughly compacted in 6-inch layers with mechanical tampers to the specified 95% density (Standard Proctor).

D. Masonry Structures

Excavations shall be made to the required depth, and the foundation, on which the brick masonry is to be laid, shall be approved by the TOWN. The brick shall be laid so that they will be thoroughly bonded into the mortar by means of the “shove-joint” method. Buttered or plastered joints will not be permitted. The headers and stretchers shall be so arranged as to thoroughly bond the mass. Brickwork shall be of alternate headers and stretchers with consecutive courses breaking joint. All mortar joints shall be at least 3/8 inches in thickness. The joints shall be completely filled with mortar. No spalls or bats shall be used except for shaping around irregular openings or when unavoidable to finish out a course. All details of construction shall be in accordance with approved practice and to the satisfaction of the ENGINEER.

Steps as shown on the plans shall be placed in all catch basins and inlets when they are greater than five feet in depth. The steps shall be set in the masonry as the work is built up, thoroughly bonded, and accurately spaced and aligned.

Inverts in the structures shall be shaped to form a smooth and regular surface free from sharp or jagged edges. They shall be sloped adequately to prevent sedimentation. The castings shall be set in full mortar beds. All castings when set shall conform to the finish grade shown on the drawings. Any castings not conforming shall be adjusted to the correct grade.

Two (2) 2-inch diameter weep holes shall be installed above the upstream pipe invert in all storm drain structures. Protect weep holes with screen wire or fabric outside the structure to prevent clogging.

E. Concrete Construction

The forming, placing, finishing, and curing of portland cement concrete shall be performed

in strict accordance with all applicable requirements as contained in the Standard Specifications for Road & Structures latest edition, as published by the NCDOT and pertinent ACI (American Concrete Institute) codes and guidelines.

F. Installation of Precast Concrete Structures

Pre-cast concrete manholes, junction boxes, etc. shall be installed level and upon a firm, dry foundation, approved by the ENGINEER. Structures shall be backfilled with suitable materials, symmetrically placed and thoroughly compacted so as to prevent displacement. Castings shall be set in full mortar beds to the required finished grade. Refer to the Standard Detail.

Waffle boxes shall be allowed only to a depth of 5 feet. All pre-cast boxes deeper than 5 feet shall be solid boxes.

Two (2) 2-inch diameter weep holes shall be installed above the upstream pipe invert in all storm drain structures. Protect weep holes with screen wire or fabric outside the structure to prevent clogging.

508 Visual Inspection by Camera Prior to Acceptance

Prior to acceptance of any development with storm drainage infrastructure, the INSPECTOR shall arrange with the Public Works Department a camera inspection of all storm drainage lines. Any discrepancies found in violation of these Specifications shall be repaired to the satisfaction of the Public Works Department prior to acceptance and prior to issuance of any Certificates of Occupancy.

ARTICLE VIII ILLICIT DISCHARGE DETECTION AND ELIMINATION PROGRAM

Sec. 12-197. Purpose.

Sec. 12-198. Definitions.

Sec. 12-199. Acronyms.

Sec. 12-200. Jurisdiction and scope of authority.

Sec. 12-201. Abrogation.

Sec. 12-202. Illicit discharge and connection prohibitions.

Sec. 12-203. Suspension of MS4 access in emergency situations.

Sec. 12-204. Right of entry/access to facilities.

Sec. 12-205. Requirement to prevent, control and reduce stormwater pollutants by the use of best management practices.

Sec. 12-206. Notification of spills.

Sec. 12-207. Enforcement.

Sec. 12-208. Appeal of notice of violation.

Sec. 12-209. Enforcement measures after appeal.

Sec. 12-210. Injunctive relief.

Sec. 12-211. Violations deemed a public nuisance.

Sec. 12-212. Remedies not exclusive.

Secs. 12-213—12-235. Reserved.

Sec. 12-197. Purpose.

The purpose of this article is to provide for the health, safety and general welfare of the citizens of the Town of Apex, by controlling the introduction of pollutants into the municipal separate storm sewer system (MS4) in order to comply with the requirements set forth in the National Pollutant Discharge Elimination System (NPDES) phase II permit, effective July 1, 2005. The objectives of this article are:

(1) To reduce or prevent pollutants in the MS4 to the maximum extent practicable;

(2) To prohibit illicit connections and discharges to the MS4;

(3) To prevent improper disposal of materials that degrade water quality; and

(4) To authorize all inspections, surveillance and monitoring procedures necessary to ensure compliance with this article.

(Ord. No. 08-0617-09, § 1, 7-15-08)

Sec. 12-198. Definitions.

For the purposes of this article, the following shall mean:

Best management practices (BMPs) means schedules of activities, prohibitions of practices, general good house keeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices, as approved by the environmental programs manager, to prevent or reduce the discharge of pollutants directly or indirectly to the MS4. BMPs also include treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

Clean Water Act means the Federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.), and any subsequent amendments thereto.

Environmental programs division means the town department created to manage the town's stormwater management program pursuant to G.S. 160A-311(10).

Environmental programs manager means the town employee hired by the town manager to manage the town's environmental programs division, or the environmental programs manager's designee.

Facility means any land use including, but not limited to, commercial, industrial and residential land uses, and any other source including, but not limited to, motor vehicles and rolling stock that directly or indirectly contribute, cause or permit the contribution of any discharge, illicit or otherwise, to the MS4.

Hazardous materials means any material, including any substance, waste or combination thereof, which because of its quantity, concentration or physical, chemical, or infectious characteristics may cause, or significantly contribute to, a substantial present or potential hazard to human health, safety, property or the environment when improperly treated, stored, transported, disposed of or otherwise managed.

Illicit connections. An illicit connection is defined as either of the following:

(1) A storm drainage system which allows, or may allow, an illicit discharge to enter the MS4; or

(2) Any pipeline, ditch or other conveyance connected to the MS4 which has not been documented in construction or site plans, a building permit, maps, or other equivalent records by which the town would have express notice of the existence and location of the connection to the MS4.

Illicit discharge means any direct or indirect nonstormwater discharge to the MS4, except as exempted in section 12-202 of this article.

Industrial activity means activities subject to NPDES industrial permits as defined in 40 CFR 122.26(b)(14).

Municipal separate storm sewer system (MS4) means, for purposes of regulation and not maintenance, the MS4 includes all storm drain systems, watercourses and waters of the state, as defined herein, within the town limits and any of the town's extra territorial jurisdictions (ETJ).

National Pollutant Discharge Elimination System (NPDES) stormwater discharge permit shall mean a permit issued by EPA (or by a state under authority delegated pursuant to 33 U.S.C. § 1342(b)) that authorizes the discharge of pollutants to waters of the United States, whether the permit is applicable on an individual, group or general area-wide basis.

Noncommercial car washing means any occasional automotive washing performed by individuals or groups without charging any fee or in exchange for a charitable donation. This shall include, but is not limited to, car washes performed by local church groups, school groups, athletic teams, youth organizations and individuals at their place of residence.

Nonstormwater discharge means any discharge to the MS4 that is not composed entirely of stormwater.

Person means any individual or group of individuals, association, organization, partnership, firm, corporation or other entity recognized by law, other than the town and including a user, as defined below.

Pollutant means anything which causes or contributes to pollution. Pollutants may include, but are not limited to: Paints, varnishes and solvents; oil and other automotive fluids; hazardous and nonhazardous liquids, solids and wastes; solid wastes, yard wastes, refuse, rubbish, garbage, litter, and floatables; pesticides, herbicides and fertilizers; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure; other discarded or abandoned objects and accumulations; or any noxious or offensive matter of any kind that may cause or contribute to pollution.

Premises means any building, lot, parcel of land, or portion of land whether improved or unimproved, including adjacent sidewalks and parking strips.

Primary watershed protection overlay district (water supply watershed) means an area from which water drains to a point of impoundment and where the water is then used principally as a source for a public water supply.

Storm drainage system means any publicly or privately owned facility, including the MS4, whether on the surface or subsurface, by which stormwater is collected and/or conveyed, including, but not limited to, watercourses, waters of the state, roads with drainage systems, town streets, gutters, curbs, inlets, piped storm drains, pumping facilities, retention and detention basins, natural and human-made or altered drainage channels, reservoirs and other drainage structures.

Stormwater means any surface flow, runoff and drainage consisting entirely of water from any form of natural precipitation and resulting from such precipitation.

Stormwater pollution prevention plan (SPPP) means a document which describes the BMPs and activities to be implemented by a person or business to identify sources of pollution at a site and the actions to eliminate or reduce pollutant discharges to the MS4 to the maximum extent practicable.

Town means the Town of Apex, a North Carolina municipal corporation.

Town manager means the town manager as appointed by the Town Council of the Town of Apex, or his designee.

User means any person who owns real property on which a facility is owned.

Wastewater means any water or other liquid, other than uncontaminated stormwater, discharged from a facility.

Watercourse means any channel, ditch, gully, swale or stream, which sole purpose is to convey the flow of water.

Waters of the state means all streams, lakes, ponds, marshes, water courses, waterways, wells, springs, reservoirs, aquifers, irrigation systems, drainage systems and all other bodies or accumulations of water, surface or underground, natural or artificial, public or private, which are contained within, flow through, or border upon the State of North Carolina or any portion thereof.

(Ord. No. 08-0617-09, § 1, 7-15-08)

Sec. 12-199. Acronyms.

The following acronyms when used in this article shall have the designated meanings:

CFR	Code of Federal Regulations
DENR	North Carolina Department of Environment and Natural Resources

DEM	North Carolina Division of Environmental Management
DWQ	North Carolina Division of Water Quality
EPA	United States Environmental Protection Agency
NCGS	North Carolina General Statutes

(Ord. No. 08-0617-09, § 1, 7-15-08)

Sec. 12-200. Jurisdiction and scope of authority.

The illicit discharge detection and elimination program ordinance, (hereinafter "this article"), shall apply to all facilities within the town's corporate limits. All users whose facility is subject to this ordinance, regardless of whether the user's facility is managed or operated by another person, shall comply with this article as well as any permits, enforcement actions or orders issued hereunder. The environmental programs division shall administer, implement, and enforce the provisions of this article. Any powers granted or imposed on the environmental programs manager may be delegated by the environmental programs manager to other environmental programs division personnel or other designated personnel as may be necessary. Nothing in this article shall be interpreted to impose an obligation on the town to construct, maintain, repair or operate a storm drainage system, or any part thereof, located on another person's property.

(Ord. No. 08-0617-09, § 1, 7-15-08)

Sec. 12-201. Abrogation.

This article is not intended to repeal, abrogate, annul, impair or interfere with any existing agreements, covenants, rules, regulations or permits previously adopted or issued. However, if any provisions or requirements of this article conflict with any existing regulations or ordinances, the more restrictive provisions shall apply.

(Ord. No. 08-0617-09, § 1, 7-15-08)

Sec. 12-202. Illicit discharge and connection prohibitions.

(a) *Illicit discharges.*

(1) 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 nonstormwater discharges associated with the following activities are allowed and provided that they do not significantly impact water quality:

a. Water line flushing.

b. Landscape irrigation.

c. Rising groundwaters.

d. Diverted stream flows.

e. Pumped groundwater.

f. Groundwater infiltration to storm sewers.

g. Discharges from potable water sources.

h. Irrigation water.

i. Foundation drains.

j. Springs.

k. Water from crawl space pumps and basement sump pumps.

l. Footing drains.

o. Noncommercial car washing.

p. Flows from habitats and wetlands.

q. Street washwaters.

r. Discharges from fire fighting activities.

s. Discharges from dechlorinated swimming pools.

t. Discharges associated with emergency removal and treatment activities for hazardous materials if authorized by the federal, state or local government on-scene coordinator.

u. Maintenance activities of the storm drainage system requiring flushing or cleaning with potable water.

v. Illicit discharge permitted under an NPDES permit, waiver, or waste discharge order issued to the user and administered under the authority of the EPA, or DWQ, provided that the user is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations. Discharges specified in writing by the environmental programs manager as being necessary to protect public health and safety or discharges that have been filtered through an approved pretreatment system that consistently demonstrate no discharge of pollutants.

w. Dye testing, but only if the user has notified the environmental programs manager at least 24 hours prior to the time of the test.

x. Washwater from the cleaning of exterior of buildings, including gutters, provided that the discharge does not pose an environmental or health threat.

y. Yard waste may be placed inside the curb and along the street for collection by the Town of Apex not more than 48 hours prior to the weekly scheduled collection day provided the yard waste is placed at least ten feet from any storm drain catch basin. The environmental programs manager will adopt a standard storm drainage catch basin cleanout schedule and maintenance program plan to ensure that water quality is protected.

(2) If any of the above-listed illicit discharge exceptions are found to be polluted and may therefore negatively impact the quality of the waters of the state, the polluted illicit discharge exception shall be deemed unlawful and shall not be discharged into the MS4. These conditions shall be determined by the environmental programs manager or designee. These polluted illicit

discharges, though listed as an exception above, shall be regulated as an illicit connection or discharge.

(b) *Illicit connections.*

(1) The construction, use, maintenance or continued existence of illicit connections is prohibited. Except as provided in the following subsection, this prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

(2) Where such connections exist in violation of this section and said connections were made prior to the adoption of this provision or any other ordinance prohibiting such connections, the property owner or the person using said connection shall remove the connection within one year following the effective date of the ordinance from which this article derives. 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.

(Ord. No. 08-0617-09, § 1, 7-15-08)

Sec. 12-203. Suspension of MS4 access in emergency situations.

When necessary to stop an actual or threatened discharge that is imminently dangerous or prejudicial to the public's health or safety, the environmental programs manager may, without prior notice, order that a user's access to the MS4 be suspended. If the violator fails to comply with this suspension order, the environmental programs manager may take such steps as deemed necessary to remove, abate or remedy the actual or threatened discharge. The user shall reimburse the town the full cost of such removal, abatement or remedy according to the terms of subsection 12-207(c). The user may appeal the environmental programs manager's decision pursuant to section 12-208, but the user may not reconnect to the MS4 without the prior written approval of the town manager.

(Ord. No. 08-0617-09, § 1, 7-15-08)

Sec. 12-204. Right of entry/access to facilities.

(a) The environmental programs manager shall be permitted to enter and inspect facilities as often as may be necessary to determine compliance with this article.

(b) Users shall allow the environmental programs manager immediate access to all parts of the facility for the purposes of inspection, sampling and examining all discharges into the MS4 and for copying records that must be kept under the conditions of an NPDES permit or to enforce compliance with any additional duties mandated by this article, state or federal law.

(c) The environmental programs manager shall have the right to install or to require the user to install on any facility such devices as are necessary in the opinion of the environmental programs manager, to monitor and/or sample the facility's discharges into the MS4.

(d) The user shall maintain the facility's sampling and monitoring equipment in a safe and proper operating condition at the user's expense. All devices used to measure the flow and quality of discharges to the MS4 shall be calibrated to ensure their accuracy.

(e) Upon the environmental programs manager's request, a user shall immediately remove any temporary or permanent obstruction to the safe and easy access to a facility. The obstruction shall not be replaced. The user shall bear the costs of clearing the access. If a user has security

measures in force which require proper identification and clearance before entry into its premises, the user shall make the necessary arrangements to allow access to the environmental programs manager.

(f) If the environmental programs manager has been refused access to any part of a facility and if the environmental programs manager is able to demonstrate probable cause to believe that the portion of the facility to which access has been refused contains a discharge into the MS4 and that there is a need to inspect and/or sample the discharge as part of a routine sampling and inspection program or probable cause to believe that there is a condition, object, activity or circumstance which legally justifies such a search or inspection of that property , then the environmental programs manager may seek issuance of an administrative search warrant pursuant to G.S. 15-27.2.

(Ord. No. 08-0617-09, § 1, 7-15-08)

Sec. 12-205. Requirement to prevent, control and reduce stormwater pollutants by the use of best management practices.

The environmental programs manager may require BMPs for any facility which may cause or contribute to an illicit discharge to the MS4. All users shall provide, at their own expense, reasonable protection from illicit discharges into the MS4 through the use of these structural and nonstructural BMPs. Compliance with all terms and conditions of a valid NPDES permit authorizing the discharge of stormwater associated with industrial activity, to the extent practicable, shall be deemed compliant with the provisions of this section. These BMPs shall be part of a SPPP as necessary for compliance with requirements of the NPDES permit.

(Ord. No. 08-0617-09, § 1, 7-15-08)

Sec. 12-206. Notification of spills.

Notwithstanding other requirements of law, as soon as any user has information of any known or suspected illicit discharge into the MS4, the user shall take all necessary steps to ensure the discovery, containment, and cleanup of such illicit discharge. In the event of a known or suspected illicit discharge of hazardous materials into the MS4, the user shall immediately notify emergency response agencies of the occurrence via emergency dispatch services. In the event of a nonhazardous illicit discharge, the user shall notify the environmental programs manager in person or by phone or facsimile no later than the next business day. Notifications in person or by phone shall be confirmed by written notice addressed and mailed to the Town of Apex Environmental Programs Division within three business days of the phone notice. If an illicit discharge emanates from a commercial or industrial land use, the user shall also retain an on-site written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

(Ord. No. 08-0617-09, § 1, 7-15-08)

Sec. 12-207. Enforcement.

(a) *Notice of violation.* Whenever the environmental programs division finds that a user has violated this article, the environmental programs division shall notify the user, in writing by registered or certified mail, personal service or posting of said notice at the facility where the alleged violation occurred, that the user shall perform any or all of the following:

(1) Install equipment or perform testing necessary to monitor, analyze and report on the condition of the user's storm drainage system;

(2) Eliminate illicit connections or discharges;

(3) Cease and desist all violating discharges, practices or operations;

(4) Abate or remedy the stormwater pollution or contamination hazards and restore any affected property;

(5) Pay a civil penalty;

(6) Implement source control or treatment BMPs.

If abatement of a violation and/or restoration of affected property are required, the notice shall set forth a deadline within which such remediation or restoration must be completed. Said notice shall further advise that, should the user fail to meet the deadline, then representatives of the environmental programs division shall enter upon the facility and are authorized to take any and all measures necessary to abate the violation and/or restore the facility and the expense thereof shall be charged to the user and collected pursuant to subsection (c) below. Refusal to accept the notice shall not relieve the user of the obligations set forth herein.

(b) *Civil penalties.*

(1) *Illicit discharges.* Any user or other person, including, but not limited to, a designer, contractor, agent or engineer, who, either directly or indirectly, allows, participates in, or directs an illicit discharge shall be subject to civil penalties as follows:

a. *Yard waste and household products less than five gallons.* Except as permitted under subsection 12-202(a)(1)y., first time offenders who discharge into the MS4 yard waste or five gallons or less of domestic or household products, where the quantity actually discharged is considered ordinary for household purposes shall be assessed a category I civil penalty in an amount set forth in the schedule of civil penalties. Each day's continuing violation shall constitute a separate and distinct offense for the purpose of assessing a civil penalty.

b. *Household products greater than five gallons, non-household products and unknown volume and nature.* First time offenders who discharge into the MS4 more than five gallons of domestic or household products, who discharge substances generally not used in a home including, but not limited to, process wastewater, or who cannot provide clear and convincing evidence of the volume and nature of the substance discharged, shall be assessed a category II civil penalty. Each day's continuing violation shall constitute a separate and distinct offense for the purpose of assessing a civil penalty.

c. *Waste products and bulk sales.* First time offenders who discharge into the MS4 any substance that is a byproduct of a commercial or industrial process or any substance that was purchased at a bulk sales location shall be assessed a category II civil penalty. Each day's continuing violation shall constitute a separate and distinct offense for the purpose of assessing a civil penalty.

d. *Repeat offenders.* A user who discharges into the MS4 in violation of this article more than once within a 12-month period shall be assessed a civil penalty at one category level higher than the category assessed for a first time offender of the substance discharged. Each day's continuing violation shall constitute a separate and distinct offense for the purpose of assessing a civil penalty.

(2) *Illicit connections.* Any user found with an illicit connection and any other person, including, but not limited to, a designer, engineer, contractor, or agent who allows, acts, participates, directs or assists directly or indirectly in the establishment of an illicit connection shall be subject to civil penalties as follows:

a. First time offenders shall be assessed a category II civil penalty in an amount set forth in the schedule of civil penalties. Each day's continuing violation shall constitute a separate and distinct offense for the purpose of assessing a civil penalty.

b. A user or person who is found to have violated subsection (2)a. more than once within a 12-month period shall be assessed a category III civil penalty in an amount set forth in the schedule of civil penalties. Each day's continuing violation shall constitute a separate and distinct offense for the purpose of assessing a civil penalty.

(3) In the event the town is fined by the state or federal governments resulting from an illicit discharge or connection made by a user or other person, the user or other person at fault shall reimburse the town for the full amount of the civil penalty assessed by the state and/or federal governments as well as for the abatement costs incurred by the environmental programs division during the investigation and restoration process pursuant to subsection (c) below.

(4) Civil penalties collected pursuant to this article shall be used or disbursed as directed by law.

(5) Any civil penalty assessed above shall be increased by 25 percent if the violation of this article occurs within the primary watershed protection overlay district.

(6) *Schedule of civil penalties.* The following civil penalties shall be imposed, up to the amount shown for each category, upon the user or person found to have violated this article. In determining the amount of the penalty, the director of public works or his designee shall consider:

a. The degree and extent of harm to the environment, public health and public and private property.

b. The cost of remedying the damage.

c. The duration of the violation.

d. Whether the violation was willful.

e. The prior record of the person responsible for the violation in complying with this article.

f. The town's enforcement costs and the amount of money saved by the violator through his, her or its noncompliance.

Category I: Civil penalty to not exceed $100.00 per day per violation.

Note: In lieu of a civil penalty for first time offenders, the town manager or his designee may impose upon a violator, alterative compensatory actions, such as storm drain stenciling, creek cleanup, etc.

Category II: Civil penalty not to exceed $500.00 per day per violation.

Category III violation: Civil penalty not to exceed $1,000.00 per day per violation.

(c) *Recovery of costs and fines.* As authorized by G.S. 160A-193, the offender shall be liable to the environmental programs division for the civil penalty, all costs incurred by the town while enforcing this article including, but not limited to, abatement costs, remedying the damage caused by the illicit discharge, restoring the facility, sampling, cleanup, the environmental programs division's administrative costs, costs of court, and costs of litigation, to include reasonable attorney's fees. Within 30 days after the environmental programs division has completed its abatement of the violation, restoration of the facility and/or its investigation and inspection, the violating user or person will be notified of the environmental programs division's total costs and the civil penalty, if any. The total amount due shall be paid within 30 days of the date of notice. If the amount due is not paid within 30 days, the charges shall constitute a lien on the land or premises where the nuisance

occurred. A lien established pursuant to this subsection shall have the same priority and be collected as unpaid ad valorem taxes. The total amount due is also a lien on any other real property owned by the user within the town limits or within one mile of the town limits, except for the person's primary residence. A lien established pursuant to this subsection is inferior to all prior liens and shall be collected as a money judgment. The user may avoid the lien on any other real property owned by the user within the town limits or within one mile of the town limits only if the user can show that the actual or threatened discharge was created solely by another person. In the event that the user is able to pass the liability onto another person, the other person shall be liable to the town pursuant to this section.

(Ord. No. 08-0617-09, § 1, 7-15-08)

Sec. 12-208. Appeal of notice of violation.

(a) Any person receiving a notice of violation may appeal the notice of violation to the town manager. The notice of appeal must be received by the town manager within 15 days from the date of the notice of violation. Hearing on the appeal before the town manager shall take place within 15 days from the date of receipt of the notice of appeal.

(b) The decision of the town manager may be appealed to the town board of adjustment. The notice of appeal must be received by the town manager within 15 days from the date of the town manager's decision pursuant to subsection (a) above. Hearing on the appeal before the town board of adjustment shall be scheduled by the committee with at least ten days' notice to the person appealing. The decision of the town board of adjustment shall be final.

(Ord. No. 08-0617-09, § 1, 7-15-08)

Sec. 12-209. Enforcement measures after appeal.

If the violation has not been corrected pursuant to the requirements set forth in the notice of violation, or, in the event of an appeal, within 30 days of the final decision, then representatives of the environmental programs division shall enter upon the facility and are authorized to take any and all measures necessary to abate the violation and/or restore the facility and the expense thereof shall be charged to the user and collected pursuant to subsection 12-207(c). It shall be unlawful for any user or person to refuse to allow the town or its designated contractor to enter upon the facility for the purposes set forth above.

(Ord. No. 08-0617-09, § 1, 7-15-08)

Sec. 12-210. Injunctive relief.

It shall be unlawful for any person to violate any provision or fail to comply with any of the requirements of this article. If a person has violated or continues to violate the provisions of this article, the town may petition for a preliminary or permanent injunction restraining the person from activities which would create further violations or compelling the person to perform abatement or remediation of the violation.

(Ord. No. 08-0617-09, § 1, 7-15-08)

Sec. 12-211. Violations deemed a public nuisance.

In addition to the enforcement processes and penalties provided, any condition caused or permitted to exist in violation of any of the provisions of this article is a threat to public health, safety and welfare, and is declared and deemed a nuisance, and may be summarily abated or restored at the violator's expense, and/or a civil action to abate, enjoin, or otherwise compel the cessation of such nuisance may be taken.

(Ord. No. 08-0617-09, § 1, 7-15-08)

Sec. 12-212. Remedies not exclusive.

The remedies listed in this article are not exclusive of any other remedies available under any applicable federal, state or local law and it is within the discretion of the town to seek cumulative remedies.

(Ord. No. 08-0617-09, § 1, 7-15-08)

Secs. 12-213—12-235. Reserved.

5. Open Space Dedication

- Zoning Districts (UDO Section 3)
- Parks, Recreation and Open Space Sites (UDO Section 7.3)
- Resource Conservation Area (UDO Section 8.1.2)

ARTICLE 3 ZONING DISTRICTS

3.1 PURPOSE AND INTENT

In order to ensure that development in the Town occurs in an orderly and consistent manner, maintains Apex's small town character and historic and cultural heritage, protects natural and scenic resources and does not result in inadequate public facilities, it is necessary and proper to establish a series of zoning districts. Each zoning district has its own purpose and has permitted uses and special uses and other regulations that control the use of land in each district. All development within each zoning district shall be consistent with the purposes stated in this article.

3.2 ZONING DISTRICTS ESTABLISHED

In order to carry out and implement the purpose and intent of this Ordinance, the following thirty-eight (38) zoning districts are hereby established:

3.2.1 Residential Districts

A) ***RA Residential Agricultural District;***
B) ***RR Rural Residential District;***
C) ***LD Low Density Residential District;***
D) ***MD Medium Density Residential District;***
E) ***HDSF High Density Single-Family Residential District;***
F) ***HDMF High Density Multi-Family Residential District;***
G) ***MH Manufactured Housing Residential District;***
H) ***MHP Mobile Home Park District; and***
I) ***MORR Mixed Office-Residential-Retail District.***

3.2.2 Business Districts

A) ***O&I Office and Institutional District;***
B) ***B1 Neighborhood Business District;***
C) ***B2 Downtown Business District;***
D) ***PC Planned Commercial District;***
E) ***TF Tech/Flex District; and***
F) ***LI Light Industrial District.***

3.2.3 Reserved

3.2.4 Other Districts

A) ***CB Conservation Buffer District.***

3.2.5 Conditional Zoning Residential Districts

A) ***RA-CZ Residential Agricultural Conditional Zoning District;***
B) ***RR-CZ Rural Residential Conditional Zoning District;***
C) ***LD-CZ Low Density Residential Conditional Zoning District;***
D) ***MD-CZ Medium Density Residential Conditional Zoning District;***
E) ***HDSF-CZ High Density Single-Family Residential Conditional Zoning District;***
F) ***HDMF-CZ High Density Multi-Family Residential Conditional Zoning District;***
G) ***MH-CZ Manufactured Housing Residential Conditional Zoning District;***
H) ***MHP-CZ Mobile Home Park Conditional Zoning District; and***

I) ***MORR-CZ Mixed Office–Residential-Retail Conditional Zoning District.***

3.2.6 Conditional Zoning Business Districts

A) ***O&I-CZ Office and Institutional Conditional Zoning District;***
B) ***B1-CZ Neighborhood Business Conditional Zoning District;***
C) ***B2-CZ Downtown Business Conditional Zoning District;***
D) ***PC-CZ Planned Commercial Conditional Zoning District;***
E) ***TF-CZ Tech/Flex Conditional Zoning District; and***
F) ***LI-CZ Light Industrial Conditional Zoning District.***

3.2.7 Conditional Zoning Planned Development Districts

A) ***MEC-CZ Major Employment Center Conditional Zoning District;***
B) ***TND-CZ Traditional Neighborhood Conditional Zoning District; and***
C) ***PUD-CZ Planned Unit Development Conditional Zoning District.***

3.2.8 Conditional Zoning Other Districts

A) ***CB-CZ Conservation Buffer Conditional Zoning District; and***
B) ***SD-CZ Sustainable Development Conditional Zoning District.***

3.2.9 Overlay Districts

A) ***Watershed Protection Overlay Districts; and***
B) ***Flood Damage Prevention Overlay District; and***
C) ***Small Town Character Overlay District.***

3.3 DISTRICT PURPOSES

The districts established have the following purposes and intent:

3.3.1 Residential Districts

The purpose and intent of the residential districts is to provide a comfortable, healthy, safe and pleasant environment for persons to live, to protect the Town's existing neighborhoods, to maintain the Town's small-town character, to maintain natural areas and open spaces within neighborhoods, to encourage the development and protection of pedestrian ways within and between neighborhoods, to encourage interconnectivity, and to ensure residential areas are served by adequate public facilities and services and sheltered from incompatible land uses.

A) ***RA Residential Agricultural District***

The purpose and intent of the RA Residential Agricultural District is to protect and enhance an agricultural and rural lifestyle by providing lands that allow for agricultural uses, and very low density rural and residential development. Single family homes in the Residential Agricultural (RA) District shall have an average lot size of 5 acres or greater per residential development.

B) ***RR Rural Residential District***

The purpose and intent of the RR Rural Residential District is to provide for lower density rural and residential development while accommodating smaller lot sizes than the RA Residential Agricultural District. Single family homes in the Rural Residential (RR) District shall have an average lot size of 1 acre or greater per residential development.

C) ***Low Density Residential District***
The purpose and intent of the LD Low Density Residential District is to provide lands for low density, single family residential uses at densities up to 3 units an acre.

D) ***Medium Density Residential District***
The purpose and intent of the MD Medium Density Residential District is to provide lands for medium density single-family and duplex residential uses at densities up to 6 units an acre.

E) ***High Density Single-Family Residential District***
The purpose and intent of the HDSF High Density Single-Family Residential District is to provide lands for high density single-family and duplex residential housing at densities up to 8 units an acre.

F) ***High Density Multi-Family Residential District***
The purpose and intent of the HDMF High Density Multi-Family Residential District is to provide lands for high-density multi-family residential uses, (townhouses, condominiums, apartments, duplexes, triplexes, and quadplexes) at densities up to 14 units an acre.

G) ***MH Manufactured Housing Residential District***
The purpose and intent of the MH Manufactured Housing Residential District is to provide lands for manufactured housing along with other multi-family (townhouse, condominium, duplex, and multi-family dwellings) and single family housing at densities of six units an acre.

H) ***MHP Mobile Home Park District***
The purpose and intent of the MH Mobile Home District is to provide lands for mobile home development in a planned environment at densities of eight units an acre.

I) ***MORR Mixed Office-Residential-Retail District***
The purpose and intent of the MORR Mixed Office-Residential-Retail District is to build on the traditional neighborhood and small-town character of Apex by providing lands that allow a mix of residential, professional office, and limited retail uses that are designed and developed consistent with neo-traditional principles. The district allows single family development on small lots, duplexes, bed and breakfasts, and small-scale professional office and retail uses built to a scale that is consistent with Apex's small-town character.

3.3.2 Business Districts

The purpose and intent of the business districts is to provide lands that allow for a wide range of businesses, services and goods to the residents of Apex and the Triangle region in ways that are consistent with the Town's small-town character, encourage interconnectivity between business uses and residential areas, encourage the development and protection of pedestrian ways between business and residential districts, and ensure businesses are served by adequate public facilities.

A) ***O&I Office and Institutional District***
The purpose and intent of the O&I Office and Institutional District is to encourage development of office and institutional uses at moderate intensities, and the integration of complementary retail uses to service the office and institutional development, primarily at major and minor thoroughfares.

B) ***B1 Neighborhood Business District***
The purpose and intent of the B1 Neighborhood Business District is to encourage the development of small-scale, neighborhood serving commercial and business uses providing a wide range of goods and services, generally located at intersections.

C) ***B2 Downtown Business District***
The purpose and intent of the B2 Downtown Business District is to encourage the development of a high intensity, mixed-use, pedestrian-oriented downtown business district, with retail, financial, service, office, governmental, cultural and entertainment uses, along with residential options on the top floors of buildings.

D) ***PC Planned Commercial District***
The purpose and intent of the PC Planned Commercial District is to encourage the development of a moderate and high intensity mix of convenience and city-wide serving convenience and regional retail and related uses within a planned environment at the intersections of the Town's arterials and major collector roads.

E) ***TF Tech/Flex***
The purpose and intent of the TF Tech/Flex District is to provide locations for a wide range of employment opportunities for office, institutional, research and development and light industrial uses. The district also provides for "flex space" where different combinations of uses on a site may occur over time as the market changes and adjusts to new or different conditions.

F) ***LI Light Industrial District***
The purpose and intent of the LI Light Industrial District is to provide sufficient lands in appropriate locations for certain types of businesses, light manufacturing, or processing uses that might cause undesirable effects upon residential or commercial lands.

3.3.3 Planned Development Districts

The purpose and intent of the planned development districts is to encourage the design of a more complete and sustainable environment consistent with the Town's small-town character through the application of imaginative approaches to community design that allows and encourages mixed uses, design flexibility, pedestrian-oriented development and interconnectivity among uses, sensitivity to the natural environment and natural features, and the coordination of development with the adequacy of public facilities. The specific procedures and standards for the review of planned development districts is found in Sec. 2.3.4, *Planned Development Districts*.

A) ***MEC-CZ Major Employment Center District***
The purpose and intent of the MEC-CZ Major Employment Center District is to encourage the development of a vibrant mix of employment uses at appropriate major intersections and corridors within the Town in a planned and aesthetically pleasing way. This is done by allowing design flexibility as well as a mix of office, research, light industrial, limited neighborhood commercial, and a mixture of residential uses that are reviewed as a plan for development subject to the application of performance standards that:

1) *Integration and mixing of MEC-CZ and a mixture of residential uses.* Encourage the integration and mixing, rather than separation of, major

employment center uses and a mixture of residential uses;

2) *Interconnectivity.* Encourage interconnectivity between uses;

3) *Small-town character.* Encourage the design of development at a scale that is consistent with Apex's small-town character;

4) *Opportunities for public transportation.* Establish land use patterns that promote and expand opportunities for public transportation and for efficient, compact networks of streets and utilities that lower development and maintenance costs and conserve energy;

5) *Preservation of natural features.* Encourage the preservation of natural features and the natural environment on the site;

6) *Integration of open space into plan for development.* Encourage the integration of open space into the plan for development; and

7) *Public facilities available.* Ensure that public facilities are available to serve the proposed development.

B) ***TND-CZ Traditional Neighborhood District***

The purpose and intent of the TND-CZ Traditional Neighborhood District is to encourage the development of a vibrant mix of residential, retail, and offices uses that adhere to neo-traditional neighborhood principles. This is done by allowing design flexibility and a mix of residential, retail, office and recreational uses, along with schools and churches, that are reviewed as a plan for development subject to the application of performance standards that:

1) *Neo-traditional design principles.* Generally require the use of a grid pattern for the majority of development, along with back alleyways and garages and parking at the rear of buildings;

2) *Town center*. Require the development of a town center which is memorable – a square, green, and/or transit stop, with retail and offices uses connected to the mix of residential uses in a practical way;

3) *Variety of residential types in neighborhood*. Encourage a variety of dwelling types within a neighborhood;

4) *Shops and offices at edge of neighborhood*. Encourage shops and offices to be located at the edge of neighborhoods;

5) *Schools and churches*. Encourage the location of schools and churches within neighborhoods;

6) *Narrow streets*. Require streets to be relatively narrow, with street trees and sidewalks on both sides;

7) *Passive and active recreational opportunities*. Encourage the provision of both passive and active recreational opportunities. Small playgrounds and parks should be scattered throughout the neighborhood within walking distance to most of the homes;

8) *Residential uses mixed with offices.* Encourage the location of residential uses as accessory uses on the upper floors of retail and office uses;

9) *Prominent sites*. Encourage prominent sites to be reserved for civic or important buildings

10) *Interconnectivity.* Require interconnectivity between uses;

11) *Small-town character.* Require the design of development at a scale that is consistent with Apex's small-town character;

12) *Expand opportunities for public transportation*. Establish land use patterns that promote and expand opportunities for public transportation and for efficient, compact networks of streets and utilities;

13) *Encourage preservation of natural features.* Encourage the preservation of natural features and the natural environment on the site;

14) *Encourage integration of open space into plan for development*. Encourage the integration of open space into the plan for development; and

15) *Public facilities available.* Ensure that public facilities are available to serve the proposed development.

C) ***PUD-CZ Planned Unit Development District***

The purpose of the PUD-CZ Planned Unit Development District is to permit variations in order to allow flexibility for landowners to creatively plan for a site specific, higher quality overall development of their land in a way that is not possible through the strict application of the minimum standards of this Ordinance. This is done through the application of performance standards that:

1) *Integration and mixing of uses where a mix of uses is proposed.* Ensure the integration and mixing, rather than separation of uses, so that retail, office, recreational, and educational facilities are conveniently located in relation to housing;

2) *Interconnectivity.* Ensure interconnectivity between uses and adjoining developments;

3) *Small-town character.* Ensure the design of development at a scale that is consistent with Apex's small-town character;

4) *Expand opportunities for public transportation.* Establish land use patterns that promote and expand opportunities for public transportation and for efficient, compact networks of streets and utilities that lower development and maintenance costs and conserve energy;

5) *Preservation of natural features.* Ensure the preservation of natural features and the natural environment;

6) *Integration of Resource Conservation Area into plan for development.* Ensure the integration of RCA into the plan for development; and

7) *Public facilities available.* Ensure that public facilities are available to serve the proposed development.

3.3.4 Other Districts

A) ***CB Conservation Buffer District***
The purpose and intent of the CB Conservation Buffer District is to designate lands that possess unique environmental values that are under public ownership and management.

B) ***Sustainable Development Conditional Zoning District***
The purpose and intent of the Sustainable Development Conditional Zoning District SD-CZ is to encourage the design of a sustainable community through the application of design approaches that allow and encourage flexibility, an intensity of uses, integration among uses, restoration and enhancement of the environment and natural resources, transit-oriented development, pedestrian-oriented development and the efficient use of resources, energy and materials. This shall be accomplished by allowing design flexibility and innovative approaches to environmental stewardship incorporated in a plan for development that:

1) addresses the relationship between building facades and the public realm, the form and mass of buildings in relation to one another, and the scale and types of streets and blocks;

2) facilitates a full diversity of building types, thoroughfare types, and public space types with appropriate characteristics for their respective locations; and

3) facilitates the restoration and enhancement of the environment and natural resources.

Further, because the aforementioned design standards are best implemented on a large-scale basis, a purpose and intent of the Sustainable Development Conditional Zoning District SD-CZ is to provide sufficient lands for such implementation. To this end, the Sustainable Development Conditional Zoning District SD-CZ must include a minimum of 500 contiguous acres. An SD-CZ District may include other parcels of any size within 2000 feet of such parcel of at least 500 contiguous acres.

The unique purpose and intent, and the scale and standards to which the development plan must adhere, distinguish the Sustainable Development Conditional Zoning District SD-CZ from the other districts established in Sec. 3.2. Therefore, the specific procedures and standards for the review of the Sustainable Development Conditional Zoning District SD-CZ are found in Sec. 2.3.16, *Sustainable Development Conditional Zoning District SD-CZ*.

3.3.5 Overlay Districts

A) ***Watershed Protection Overlay Districts***
The purpose and intent of the Watershed Protection Overlay Districts (Primary and Secondary) is to ensure the quality of the public drinking water supplies in the Swift Creek Watershed and the Jordan Lake Watershed are preserved and maintained for present and future residents of the Town and the Triangle region. This is done through the application of land use controls and water quality performance standards to development within each watershed.

B) ***Flood Damage Prevention Overlay District***
The purpose and intent of the Flood Damage Prevention Overlay District is to minimize public and private losses due to flood conditions in specific areas of the Town by provisions designed to:

1) Restrict or prohibit uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;

2) Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;

3) Control the alteration of natural floodplains, stream channels, and natural protective barriers which are involved in the accommodation of floodwaters;

4) Control filling, grading, dredging, and other development which may increase erosion or flood damage; and

5) Prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards to other lands.

C) ***Small Town Character Overlay District***
The purpose and intent of the Small Town Character Overlay District is to repeat the spirit of traditional character rather than imitate style. The Overlay identifies the architectural qualities that define the downtown character and proposes design standards to maintain that character in new and infill projects. These standards emphasize existing patterns and include: building hierarchy, building site relationship, building massing and proportions, building height and roof type, façade patterns, street level facades, and window patterns.

3.4 OFFICIAL ZONING DISTRICT MAP AND DISTRICT BOUNDARIES

3.4.1 Establishment of Official Zoning District Map
The location and boundaries of the zoning districts established in this article shall be set forth on the Official Zoning District Map, which is incorporated herein by reference into this article as if fully described and set forth herein. A copy of the Official Zoning District Map shall be located at all times for inspection by the general public during regular business hours in the office of the Planning Director.

3.4.2 Amendment to the Official Zoning District Map
When pursuant to Sec. 2.3.2, *Amendments to the Text of this Ordinance or the Official Zoning District Map (Rezonings)*, amendments are made to the boundaries of the Official Zoning District Map, such amendments shall be entered on the Official Zoning District Map by the Planning Director promptly following its adoption.

3.4.3 Replacement of Official Zoning District Map

A) ***Official Map Lost, Damaged or Illegible***
In the event the Official Zoning District Map becomes damaged, destroyed, lost or difficult to interpret because of the nature or number of changes and additions, the Town Council shall adopt a new Official Zoning District Map that shall supersede the prior Official Zoning District Map.

B) ***New Official Zoning District Map***

The new Official Zoning District Map may correct drafting and clerical errors or omissions in the prior Official Zoning District Map, but no such corrections shall have the effect of amending the original Official Zoning District Map or subsequent amendments thereto without a duly noticed public hearing pursuant to the procedures and standards of this Ordinance.

c) A unified theme along streets or sections of streets shall be demonstrated on the landscape plan, but diverse species of plant material shall be used throughout the development.

D) ***Exemptions***
The following shall be exempt from the provisions of Section 7.2.5 *Residential Grading and Topography Conservation*:

1) Grading and clearing in emergency situations involving immediate danger to life or property or substantial fire hazards.

2) Agricultural activities on bona fide farms.

3) Routine maintenance activities, including tree removal required to control vegetation on public roads and public utility rights-of-way.

7.3 PARK, RECREATION AND OPEN SPACE SITES

7.3.1 Dedication Generally; Fee in Lieu of Dedication Generally; Construction of Public Recreation Facilities with Fee-in-Lieu Monies Generally

A) Every person who subdivides or develops land for residential purposes shall at the time of final approval of the master subdivision plan agree to dedicate a portion of such land, as set forth in this section, for the purpose of providing park, recreation or open space sites to serve the future residents of the neighborhood within which the subdivision is located.

B) As an alternative to the dedication of a portion of such land by the subdivider, and where it is determined by the Parks, Recreation, and Cultural Resources Advisory Commission and the Town Council that a dedication of land is not feasible in a given subdivision or incompatible with the Town's plan, the subdivider may be allowed to:

1) Make provisions for an equitable amount of land to be dedicated in another location;

2) Pay to the Town a fee-in-lieu of dedication as provided herein;

3) Construct public recreation facilities with fee-in-lieu monies; or

4) Any combination of 7.3.1(B)(1), (2), or (3), as approved by the Town Council

7.3.2 Standards for Dedication
All land dedicated for recreation and park development shall substantially meet the following standards:

A) ***Unity***
The dedicated land shall form a single parcel of land except where the Town Council determines that 2 or more parcels would be in the public interest and determines that a connecting path or strip of land is in the public interest, and in which case the path shall not be less than 30 feet wide.

B) ***Shape***
The shape of the dedicated parcel of land shall be sufficiently square or round to be usable for recreational activities such as softball, tennis, croquet, etc.

C) ***Location***
The dedicated land shall be located so as to reasonably serve the recreation and open space needs of the subdivision for which the dedication was made and shall bear a reasonable relationship to the use of the area by the future inhabitants of the subdivision or residential development.

D) ***Access***
Public access to the dedicated land shall be provided either by adjoining street frontage or public easement at least 20 feet in width.

E) ***Topography***
Generally areas dedicated for recreation shall not exceed slopes of 5 percent.

F) ***Usableness***
The dedicated land shall be usable for recreation; lakes may not be included in computing dedicated land area. Where the Parks, Recreation, and Cultural Resources Advisory Commission determines that recreational needs are being adequately met, either by other dedicated parcels of land or existing recreational facilities, then land that is not usable for recreation may be dedicated as open space.

G) ***Plans***
Municipal and county plans shall be taken into consideration when evaluating land proposals for dedication.

7.3.3 Standards for Council's Choice Between Land Dedication, Payment of Fee-in-Lieu, Construction of Public Recreation Facilities with Fee-in-Lieu Monies, or Combination Thereof

A) Whether the Town Council accepts the land dedication, elects to require payment of fee-in-lieu, construction of public recreation facilities with fee-in-lieu monies, or combination thereof, shall be determined by consideration of the following:

1) Recreational element of the Town's land development plan;

2) The recommendations of the Parks, Recreation, and Cultural Resources Advisory Commission;

3) Topography, geology, access and location of land in the subdivision available for dedication; and

4) Size and shape of the subdivision and land available for dedication.

B) The determination of the Town Council as to whether land shall be dedicated, whether a fee should be exacted, whether construction of public recreation facilities, or a combination thereof shall be final and conclusive. When a development contains 30 units or less in a single-family, detached subdivision; 45 units or less in a single-family, attached subdivision; or 51 units or less in a multi-family development, only the payment of fees-in-lieu shall be required, unless the development abuts an existing or planned park.

7.3.4 Procedure for Determination of Choice Between Land Dedication, Payment of Fee-in-Lieu, Construction of Public Recreation Facilities with Fee-in-Lieu Monies, or Combination Thereof; Performance Guarantees

The procedure for determining whether the subdivider is to dedicate land, pay a fee-in-lieu, construct public recreation facilities with fee-in-lieu monies or some combination thereof, shall be as follows:

A) ***Subdivider***

The subdivider shall indicate on the master subdivision plan whether land dedication of property for park and recreational purposes is proposed, whether the subdivider proposes to pay a fee-in-lieu, whether the subdivider proposes to construct public recreation facilities with fee-in-lieu monies, or whether the subdivider proposes some combination thereof. If the subdivider proposes to dedicate land for this purpose, the subdivider shall designate the area on the master subdivision plan. The land proposed for dedication shall meet the standards in Section 7.3.2 *Standards for Dedication*.

B) ***Action of Town***

At the time of the master subdivision plan review, the Parks, Recreation, and Cultural Resources Advisory Commission shall recommend, and the Town Council shall determine as a part of such approval, whether to require a dedication of land, payment of a fee-in-lieu, construction of public recreation facilities with fee-in-lieu monies, or some combination thereof, pursuant to the standards in Section 7.3.3 *Standards of Council's Choice Between Land Dedication, Payment of Fee-in-Lieu, Construction of Public Recreation Facilities with Fee-in-Lieu Monies, or Combination Thereof*.

C) ***Prerequisites for Approval of Final Plat***

1) **Dedication, Fee, and/or Construction**. Where dedication is required, such dedication shall be shown upon the first final plat for subdivision submitted for approval. Where fees are required, the same shall be deposited with the Town prior to the recording of the first final plat for subdivision. In the event that Town Council authorizes the subdivider to construct required public recreation improvements in lieu of or in combination with the required dedication or fee-in-lieu, then such construction must be completed prior to first final plat approval or such performance must be guaranteed in accordance with subsection 2 herein. Open space covenants for park or recreational facilities shall be submitted to the Town prior to approval of the first final plat and shall be recorded with the first final plat.

2) **Performance Guarantee**. In lieu of prior construction of public recreational facilities required by this article, the Town may accept a guarantee from the subdivider that such improvements will be carried out according to the Town's specifications at subdivider's expense. Such guarantee shall be required prior to approval of the first final plat for the subdivision. Such guarantee may be in the form of a surety bond enforceable at the sole discretion of the Town and on the form prescribed by the Town, a letter of credit that meets the specifications of Sec. 7.5.17 *Irrevocable Letter of Credit in Lieu of Surety Bond or Other Guarantee of Performance*, certified check drawn in favor of the Town, or cash deposited with the Town. Such guarantee shall be in the amount of not less than 125 percent of the estimated cost of the construction of the required improvements. The developer shall submit an estimate of this

amount subject to review, modification, and approval by the Parks and Recreation Director or designee. Such guarantee shall remain in full force and effect until construction of all required public recreation facilities is completed. All public recreational facility requirements shall be completed and accepted by the Town per UDO Section 7.5.9(B) *Schedule of Installation*.

7.3.5 Computation of Size of Area Required for Dedication

The area of land required to be dedicated with respect to a development shall be the sum of the following:

1) the product of the number of single family detached dwelling units or lots in the development, whichever is greater, times 1/30 of an acre (for land proposed to be dedicated which (*a*) lies within the one hundred-year floodplain, (*b*) has slopes greater than 15 percent or (*c*) is within overhead utility easements, “1/20” of an acre per dwelling unit shall be substituted for “1/30” in the formula);

2) the product of the number of single family attached dwelling units or lots in the development, whichever is greater, times 1/45 of an acre (for land proposed to be dedicated which (a) lies within the one hundred-year floodplain, (b) has slopes greater than 15 percent or (c) is within overhead utility easements, “1/30” of an acre per dwelling unit shall be substituted for “1/45” in the formula); and

3) the product of the number of multi-family dwelling units or lots in the development, whichever is greater, times 1/51 of an acre (for land proposed to be dedicated which (a) lies within the one hundred-year floodplain, (b) has slopes greater than 15 percent or (c) is within overhead utility easements, “1/34” of an acre per dwelling unit shall be substituted for “1/51” in the formula).

7.3.6 Computation of Fee Payable In-lieu of Dedication

A) ***Generally***

Where a fee is to be paid in-lieu of land dedication with respect to a development, the amount of such fee shall be the following:

1) the product of the number of single family detached dwelling units or lots in the development, whichever is greater, times $2,930.00;

2) the product of the number of single family attached dwelling units or lots in the development, whichever is greater, times $1,962.00; and

3) the product of the number of multi-family dwelling units or lots in the development, whichever is greater, times $1,728.00.

B) ***Adjustment***

Each January 1 starting on January 1, 2010, the fee amounts per dwelling unit stated in 7.3.6(A) shall automatically be adjusted in correlation with the inflation rate in the previous calendar year as reported by the U.S. department of Commerce Consumer Price Index.

C) ***Fair Market Value***

Notwithstanding any other Town of Apex ordinance provision, the total fee in-lieu of dedication charged for a development or subdivision shall not exceed the fair

market value of the land area that would have otherwise been required to be dedicated by the development or subdivision. For the purpose of this section, fair market value is to be determined with respect to a development or subdivision, at the time the initial development application submittal is made to the Town. The process for determining fair market value shall be as follows:

1) the developer submits an appraisal completed within 12 months of the date of the initial submittal of the development application;

2) the developer's appraisal shall be reviewed by a review appraiser retained by the Town. The review appraiser shall either concur with the developer's appraisal or recommend that a new appraisal be prepared;

3) if a new appraisal is recommended, the Town's appraisal shall be done by an appraiser from a Town approved list at the Town's expense. The decision of the Town's appraiser shall constitute the Town's decision on fair market value; and

4) in the event of a disagreement about fair market value, it shall be determined by the special committee procedure provided in Section 7.3.8.

D) ***Projects Submitted Prior to May 20, 2008***

1) Projects submitted prior to May 20, 2008 shall be governed by the Ordinance in place at the time of their submittal where the development projects meet the following two criteria: (1) the development application for the project was pending at the time of amendments adopted on May 20, 2008 and (2) the development project had been to the Parks, Recreation and Cultural Resources Advisory Committee related to a fee in lieu determination prior to May 20, 2008.

2) Amendments to development projects approved prior to May 20, 2008 shall be governed by the Ordinance in place at the time of their approval where the development projects meet the following two criteria: (1) the development project was approved prior to May 20, 2008 and (2) the amendment does not increase the number of residential units in the development project. For the purpose of this Subsection, development projects grandfathered under 7.3.6(D)(1) shall treated as if they were approved prior to May 20. 2008.

7.3.7 Use of Land by Town; Sale of Land by Town; Use of Funds Received in Lieu of Dedication

A) ***Generally***
The land received by the Town under this article shall be used only for the purpose of providing neighborhood open space, park and recreational areas, but shall not be so restricted should the Town decide to sell such land as provided by the following paragraph.

B) ***Sale of Land***
The Town shall have the right to sell any land dedicated to the Town for neighborhood park and recreation purposes on finding by the Planning Board and the Parks, Recreation, and Cultural Resource Advisory Committee that a particular piece of property is not feasible or compatible with the Town's land development plan.

C) ***Special Fund***
Fees collected in lieu of dedications and any proceeds from such transactions or sales shall be held in a special fund by the Town, and the funds shall be used by the Town for the purpose of acquiring and developing public recreation areas as shown on the land development plan and for no other purpose. The depository for such funds may be the same as permitted for other funds of the Town and pending their expenditure in accordance with the terms of this section, such funds may be invested as other funds of the Town. The Town may, at its discretion, add additional monies to the fund for the purposes of purchasing public recreational land to be used for public recreational purposes. On all matters not specifically provided for in this section, the Local Government Budget and Fiscal Control Act shall be controlling.

D) ***Public Safety Facilities***
Lands acquired pursuant to this section after July 1, 1994 may be used for public safety facilities, including police, fire and rescue, notwithstanding any other limitations on such use under this section.

7.3.8 Special Committee to Settle Disagreements Between Town and Subdivider

A) ***Generally***
In the event that the Town and the subdivider of land cannot agree upon the location, terrain, size or shape of the land necessary to be dedicated for a neighborhood recreation area, or cannot agree upon the details of provisions for an equitable amount of land in another location or cannot agree about fair market value, such disagreement shall be determined by a special committee.

B) ***Membership and Action***
Where the subdivider disagrees with the fair market value determination per Section 7.3.6(C), the subdivider may appeal to the Special Committee, comprised of the subdivider's appraiser, the Town appraiser, and a third appraiser selected by the first two appraisers. An appraisal shall be completed by the third appraiser with the expense borne equally by the Town and the subdivider. The findings of the committee shall be by majority vote and shall be certified to the Town Council within 45 days of the time of appointment of the third member of the committee.

7.3.9 Privately Owned Park and Recreational Areas
Private parks and recreational facilities are encouraged; however, such facilities cannot be credited toward the requirement of dedication for public park and recreation purposes.

7.3.10 Greenways
Geenways may be credited against the requirements of the chapter provided that such greenways are: (1) a part of the Town's greenway plan; and (2) dedicated to public use.

7.4 DEDICATION OF ROW FOR THOROUGHFARE PLAN STREETS AND HIGHWAYS

When a street or highway corridor identified on the Town's Thoroughfare Plan established and adopted pursuant to Sec. 136-66.2, N.C.G.S, is located on land subject to subdivision site plan, or other development plan, the landowner shall dedicate the right-of-way for the street or highway to the Town if:

7.4.1 Reasonable Relationship
There is a reasonable relationship between the proposed street or highway right-of-way requested to be dedicated and the traffic that will be generated by the proposed

ARTICLE 8 GENERAL DEVELOPMENT STANDARDS

8.1 RESOURCE CONSERVATION

8.1.1 General

A) ***Purpose***
Protection of the Town's existing natural and cultural resources is intended to preserve the visual and aesthetic qualities of the Town; to encourage site design techniques that preserve the natural and cultural environment and enhance the developed environment; to control erosion, slippage, and sediment run-off into streams and waterways; to increase slope stability; and to protect wildlife habitat and migration corridors.

B) ***Applicability***
These resource conservation standards shall apply to all new development in the Town, except for development on lots of record that were approved for single-family residential use prior to the effective date of this UDO.

C) ***Structure of this Section***
This Section 8.1 requires applicants for development in the Town to protect a variety of types of sensitive natural and cultural resources. The resource conservation area (RCA) provisions of Sec. 8.1.2 require delineation of a protected area for every development site, and provide a general framework within which other, more specific types of protection must take place. Subsequent sections (8.1.3 through 8.1.5) provide specific rules for protecting specific types of resources.

8.1.2 Resource Conservation Area

A) ***Establishment of RCA***
RCA required. For every development subject to administrative approval, site plan review**,** master subdivision plan review, and/or planned development plan review, the applicant shall propose, and the Planning Director shall establish, a "resource conservation area" (RCA) according to the criteria set forth below. The RCA shall indicate the specific area(s) of a lot, lots, or site to be protected (the RCA), outside of which the developed project (including buildings, accessory structures, driveways, and parking) and all development activity shall be contained. The landscaping of non-vegetated RCA is governed by Sec. 8.2.3(C)(3) and the *Town of Apex Design and Development Manual*.

1) *Off-site RCA.* RCA may be established outside of the limits of the development site provided that the Town Council finds that all of the following criteria are met by the off-site RCA:

a) The area must include one or more of the RCA categories listed in 8.1.2(B)(1).

b) The area must be located within the Town of Apex's corporate limits or extra-territorial jurisdiction.

c) The area must be 1) located directly adjacent to existing RCA, existing public parks, existing conservation easements, or other publicly held land with environmental preservation or wildlife habitat preservation as its primary function (such as wetland

mitigation), or 2) be a minimum size of 2 acres and a minimum width of 30 feet.

d) The provision of off-site RCA shall be provided at a rate of 1.5 times the on-site RCA. However, the on-site RCA cannot be reduced more than 50% through the provision of off-site RCA.

e) The off-site RCA must be deeded to the Town of Apex or another qualified land management agency, such as but not limited to the Triangle Land Conservancy.

B) ***Criteria for Establishing RCA***
In establishing the RCA, the Planning Director shall take into account the criteria listed below:

1) *Categories of RCA:*

a) Undisturbed floodplains, floodways, flood fringes, and flood hazards.

b) Undisturbed riparian streams, wetland protection, and riparian buffering.

c) Undisturbed steep slopes equal to or greater than 3:1 (30%) and other erosion prevention and control measures, including, but not limited to, protection of natural drainage channels.

d) Preservation of undisturbed forested areas (including trees less than 18" caliper in size), or individual significant trees 18" caliper and larger.

e) Undisturbed significant wildlife and plant habitat areas.

f) Preservation of other significant site elements such as, but not limited to, historic and cultural sites and structures, scenic views, farm ponds, rock outcroppings, and cemeteries. The historic sites and structures, along with access and parking to same, may be allowed to be re-used if the Town Council determines that the proposed re-use is appropriate. For example, an historic farm house might be allowed to be converted to an office, clubhouse, or museum.

g) Private recreation area, including but not limited to, open space, pools, tennis courts, tot lots, ball fields, and village greens shall be allowed to be counted as partial credit toward the RCA requirement. In order to qualify as RCA, the private recreation area must be located on a lot .5 acre or larger in size. The credit for the private recreation area shall be 25% of the acreage provided in the private recreation area. (For example, 1 acre of private recreation area counts as .25 acre of RCA).

2) *Site and Tree Survey Required.*
In order to determine which categories of RCA shall be established on a site, the applicant shall provide a site and tree survey to the Planning Director as part of the submission of an application for development approval. The site and tree survey shall map the following items:

a) Provide boundaries of the site in metes and bounds.

b) Provide aerial photo-based topography of the site at a minimum of 2' or 5' contours (as available), showing existing grades. Field verified topography of the area located within the limits of disturbance (including stormwater retention areas within RCA) at a minimum of 2' contours is required at the site plan stage and subdivision construction plan stage of plan review.

c) Call out location of slopes equal to or greater than 3:1 (30%) and rock outcroppings.

d) Provide tree survey locating all specimen (hardwood) trees 18" caliper and larger within RCA and buffers on site. Fifty feet (50') outside of the perimeter of the site, document location of all trees 18" caliper and larger by providing an aerial photograph, registered forester's or certified arborist's report, tree survey, or other appropriate means.

e) Document that all proposed RCA areas meet the Criteria for Establishing RCA (per Section 8.1.2(B)(1)) by means of a tree survey or other appropriate means, including but not limited to a registered forester's or certified arborist's report referenced to-scale digital photos, a registered forester's or certified arborist's report referenced to aerial photographs. Aerial photographs are not an acceptable stand-alone means of documentation for trees in RCA.

f) Document that buffers meet the required "A", "B", "C", "D" or "E" type standards by means of a tree survey or other appropriate means, including but not limited to a registered forester's or certified arborist's report referenced to-scale digital photos, a registered forester's or certified arborist's report referenced to aerial photographs. Aerial photographs are not an acceptable stand-alone means of documentation for trees in buffers.

g) Show location of wetlands as determined by a licensed soil scientist, the Army Corps of Engineers (ACOG), or the NC Department of Environmental and Natural Resources Division of Water Quality (DWQ).

h) Show location of all creeks, streams, ponds, and dams.

i) Note whether the site is in the Primary or Secondary Watershed Protection Overlay District and show required riparian buffers on both sides of perennial and intermittent streams.

j) Show location of the 100 year floodplain and 100 year floodway based upon the FIRM maps, the FEMA detailed study, and field measurements (if applicable). If not applicable, certify that there is no FEMA floodplain on the subject property by giving FIRM map # and date. Provide non-FEMA flood study information on floodplains, floodways, flood fringes, and flood hazards at the construction plan stage of plan review.

k) Provide location of existing fencing, roads, and structures.

l) Provide locations of significant site elements such as, but not limited to, historic and cultural sites and structures, scenic views, farm ponds, rock outcroppings, and cemeteries.

m) Indicate clearly on the plans the location of all existing utilities (water, sewer, natural gas, electric, telephone, cable, fiber optic, etc.) above and/or below ground as well as existing utility easements.

n) Identify location of any underground storage tanks, hazardous waste and debris, abandoned wells, septic tanks or similar structures.

C) ***Size of the RCA***

The size of the RCA for each development site shall be calculated by the applicant and staff based on the following:

1) *Planned Developments*
The RCA for all planned developments shall be determined by the Town Council per Section 2.3.4(F)(1)(c) and per Section 8.1.2(C)(4), (5), or (6) as applicable, based on the criteria set forth in subsection (B) above.

2) *Residential Infill Development Overlay District*
All development meeting the criteria of Section 6.3 Residential Infill Development Overlay District shall be exempt from Section 8.1 Resource Conservation.

3) *Low Density Single-Family Residential Developments (maximum of two dwelling units per gross acre)*
Low density single-family residential developments with a maximum of two (2) dwelling units per gross acre shall be exempt from Section 8.1 Resource Conservation.

4) *Development located north and east of NC 540*
All developments which do not meet the criteria of subsections 8.1.2(C)(2) or (3) above and which are located north and east of NC 540 shall provide buffers and RCA equal to or greater than 20% of the gross site acreage.

5) *Development located south and west of NC 540*
All developments which do not meet the criteria of subsections 8.1.2(C)(2), (3), or (4) above and which are located south and west of NC 540 shall provide buffers and RCA equal to or greater than 25% of the gross site acreage.

6) *Resource Conservation Area Exchanged for Reduced Width Buffers*
Resource Conservation Areas may be established in lieu of portions of otherwise required perimeter, streetfront, thoroughfare, and fully- and limited-controlled access highway buffers, if approved by the Planning Director after taking into account unique site considerations, such as, but not limited to, existing healthy trees, topography, and water features.

The exchange shall be at a 1 to 1 (1:1) ratio. The reduced width buffers must still meet the screening (opacity) requirement for the type of buffer required. No required perimeter, streetfront, or thoroughfare buffer can be reduced to less than one half of the required buffer width or less than 10' (whichever is greater). No required fully- and limited-controlled access highway buffer can be reduced to less than 40', and such reduction is subject to the approval of the Town Council, as stated in 8.2.6(B)(5)(f) *Buffers Along Fully- and Limited-Controlled Access Highways.*

7) *Maximum Built-Upon Area*
The overall site (including RCA), shall not exceed the applicable maximum built-upon area limitations set forth in Sec. 5.1 *Table of Intensity and Dimensional Standards* and Sec. 6.1 *Watershed Protection Overlay Districts*.

8) Notwithstanding any other provisions in the UDO, if a public utility line or easement counts toward buffer requirements, then the Public utility line or easement shall be allowed to be counted in RCA calculations.

D) ***Ownership of RCA in Subdivisions***
No portion of the RCA in a planned development or residential or non-residential subdivision shall be part of an individual building lot. The RCA shall be designated so that the RCA is not removed, modified or damaged. The RCA shall be a separate lot or lots and be owned in common by the building lot owners or owned by a separate entity or entities (e.g. property owner's association, development corporation, building lot owner or owners, etc.) In no case shall the RCA for one subdivision be owned by more than 3 entities.

E) ***Designation of RCA on Plans and Plats***

1) *Master Subdivision Plan and Plats*. The approved RCA shall be shown on the master subdivision plan as a separate lot (or lots) from the individual residential or non-residential building lots. The RCA shall be shown on the final plat, to be preserved in perpetuity.

2) *Site Plans and Plats.* The approved RCA shall be shown on the site plan for each development site. The RCA shall be shown on the final plat, to be preserved in perpetuity.

F) ***Development Activity Inside of the RCA***

1) No development, including grading or vegetation removal or alteration, shall occur as part of the development project or associated construction activity inside the RCA except as provided in subsection (3) below.

2) No private utility easements shall be allowed within RCA. Existing and proposed private easements must be excluded from the RCA calculation.

3) Disturbance or construction activity may occur inside the RCA when construction is done in such a way as to protect significant resources with approval of the Planning Director for the following limited purposes:

a) Emergency public safety activities when such activities and installations cannot reasonably be restricted to areas outside the

RCA or other nearby developed areas. Measures shall be required to mitigate the impact of the disturbed area;

b) Engineered stormwater controls, including but not limited to retention and detention basins, when they are designed to look like natural areas, and meet the requirements of Section 6.1.12;

c) Construction of a trail, pedestrian walkway, or passive recreational amenity (e.g. picnic tables, benches, gazebo, etc.) that will provide public access for educational or recreational purposes when such trails, walkways, or amenities cannot reasonably be restricted to areas outside the RCA or nearby developed areas and where construction is done in such a way as to protect significant resources;

d) The enhancement of the habitat values and/or other natural resource values of an identified natural area; or

e) The removal of noxious species, such as kudzu or poison ivy for general maintenance of the area; see the *Town of Apex Design and Development Manual* for details.

G) ***Standards for Protection During Construction***

The owner of the property, the developer, and contractors shall be responsible for protecting all existing natural resources, including trees, vegetation, streams, wetlands, ponds, wildlife habitats, historic/cultural sites and structures, that are designated as RCA or as areas to be preserved. Natural areas shall be protected and maintained in a healthy, viable condition. The following minimum standards shall apply throughout the site and/or subdivision approval process:

1) *Protective Fencing*

a) The RCA shall be designated in the field prior to commencement of excavation, grading, or construction with construction barrier fencing or other methods approved by staff. Protective fencing shall also be placed around all other designated save areas identified by the Planning Director. Fence placement shall be based on the following minimum standards:

(i) *Trees and Vegetation:* Fencing shall enclose all stands of trees or vegetation within a buffer or other save area that meet the base buffer standard (trees with calipers of 2 ½ inches or greater). Where significant trees exist (18-inch caliper or greater), the fencing shall protect the critical root zone of such trees and shall be located no less than one foot from the trunk of the tree for each one inch of tree caliper (diameter at breast height). Both applicant and staff shall consider the existing site conditions in determining the exact location of any tree protection fencing. For the protection of trees and clusters of trees to be preserved outside the RCA, tree protection specifications as required in Sec. 8.1.2(G)(2)(c) below shall be followed.

(ii) *Floodplains:* Fencing shall be placed along the line representing the 100-year floodplain.

(iii) *Streams:* Fencing shall be placed at the outside edge of the required riparian buffer in accordance with Sec. 6.1 *Watershed Protection Overlay Districts*.

(iv) *Other Resources*: Fencing shall be placed at least 10 feet from the edges of other saved or protected features identified by the Planning Director. Such features may include, but are not limited to, wetlands, ponds, rock outcroppings, steep slopes and historic structures.

b) No construction, grading, equipment or material storage, or any other activity shall be allowed within the fenced protection area, and the fencing shall remain in place until all land alteration, construction, and development activities are completed.

2) *Other Requirements*

a) The owner shall keep all saved areas within the RCA free of refuse, debris, equipment, and supplies throughout the entire site development process.

b) The owner shall be responsible for replacing trees and/or vegetation if they are destroyed or substantially damaged and for paying any civil penalties associated with the encroachment into any protected area according to the standards set forth in Sec. 8.2.3.

c) The proposed methods for protection shall be reviewed and approved as part of the site plan and/or master subdivision plan approval process and must be clearly indicated on plans. If construction is proposed within any saved area, a registered architect, engineer, or landscape architect, certified arborist, or horticulturalist, must submit detailed plans indicating how the sensitive area will be protected, and shall supervise all construction activity within such areas. Protection measures must adhere to generally accepted good design standards and practices.

d) Out parcels that are graded shall be seeded, mowed, and maintained until development occurs on the parcel.

6. Other

- Connectivity (UDO Section 7.2.1)
- Fats, Oils, Grease Control (Town Code Chapter 12, Article VII)
- Water Conservation (Town Code Chapter 12, Article III)
- Landscaping Ordinance (UDO Section 8.2)

C) The Town shall be authorized to collect from the applicant a reasonable sum representing reimbursement for its administration costs involved in maintenance and administration of the funds created by the substitution.

D) If making a public improvement otherwise required by this article would require the relocation of all or a portion of a graveyard established prior to August 1, 1995, then a variance, without a fee in-lieu, may be granted (1) to the extent necessary to avoid the relocation of the graveyard or portion thereof, and (2) to the extent that, because of the graveyard, requiring the public improvements would cause an unnecessary hardship or provide an unwarranted or unrealistic result.

7.1.8 Penalties and Remedies for Violation of Article

Any person who, being the owner or agent of the owner of any land located within the territorial jurisdiction of the Town, hereafter subdivides such person's land in violation of this article or transfers or sells land by reference to, exhibition of, or any other use of a plat showing a subdivision of the land before the plat has been properly approved under the terms of this article and recorded in the office of the Wake County register of deeds, shall be guilty of a misdemeanor. The description by metes and bounds in the instrument of transfer or other document used in the process of selling or transferring land shall not exempt the transaction from this penalty. The Town, through its attorney or other official designated by the Town Council, may enjoin illegal subdivision, transfer or sale of land by action for injunction. Further, violators of this article shall be subject, upon conviction, to fine or imprisonment as provided by Chapter 11 of the Code of Ordinances, Town of Apex, North Carolina.

7.1.9 Inspection Fees as Prescribed

Fees for the inspection of street and related improvements shall be charged according to a schedule adopted and amended from time to time by the Town Council and posted in the Planning Department. Fees must be paid either before final plat for subdivision approval or before performance guarantees in lieu of construction are returned to the subdivider.

7.2 DESIGN STANDARDS

7.2.1 Streets

A) ***Interconnectivity***

1) ***Conformity with Apex Transportation Plan.*** The subdivision's street system shall conform to the Apex Transportation Plan. In areas where no thoroughfares or collector streets are represented thereon, streets shall be designed and located in proper relation to existing and proposed streets, to the topography of the area, and to natural features such as streams, hills, and stands of trees. Residential streets should further be laid out in such manner as to encourage the flow of through-traffic at slow speeds, except upon major and minor thoroughfares. All proposed street designs shall provide for the appropriate projection of principal streets in surrounding areas to permit reasonable access for surrounding properties, both for current use and future subdivision. No private streets shall be allowed to be built within developments or subdivisions approved on or after October 15, 2002.

2) ***Points of Ingress/Egress****.*

a) The points of ingress/egress shall comply with the Apex Transportation Plan.

b) A minimum of one point of ingress/egress shall be connected to an existing public street. Additional connections shall be required when:

(i) Necessary for the connection of existing and future principal streets, including major thoroughfares, minor thoroughfares, collector streets, and main residential streets.

(ii) A Traffic Impact Analysis shows that an additional connection or connections are needed.

(iii) More than one point of access is required per Sec. 7.5.4(E) *Public Access Requirements*.

c) *Stub streets shall be required as follows:*

(i) Stub streets shall be provided to all adjacent land-locked properties.

(ii) Stub street connections shall be provided to all existing and planned stub streets on adjacent properties.

(iii) Where severe topography or other physical features exist, the Planning Director in conjunction with the Environmental Services Manager, may determine that a stub street is not required.

3) ***Gates on Public Roads.*** The use of gates, manned or unmanned, shall be prohibited from all residential districts in order to maintain interconnectivity.

B) ***Street Rights-of-Way***

1) Minimum street right-of-way widths shall be determined on the basis of the street classification shown on the Town thoroughfare plan and/or street collector plan or, where such plans do not apply, according to the nature of the street as illustrated on the plat. The subdivider shall refer to the *Town of Apex Standard Specifications and Standard Details* for standard street sections and minimum rights-of-way.

2) Subdivisions along existing streets of inadequate right-of-way width shall provide additional right-of-way to meet the minimum widths specified. The entire right-of-way shall be provided where any part of a new subdivision is on both sides of an existing street, and one-half the required right-of-way measured from the centerline of the existing street shall be provided where a new subdivision is located only on one side of an existing street.

C) ***Pavement Widths***
Minimum pavement width shall be measured from back of curb to back of curb. The subdivider shall refer to the *Town of Apex Standard Specifications and Standard Details* for standard street sections.

ARTICLE VII. FATS, OILS AND GREASE CONTROL

Sec. 12-191. Introduction—Scope and intent.

Sec. 12-192. Definitions.

Sec. 12-193. Specific prohibitions.

Sec. 12-194. Grease interceptors.

Sec. 12-195. Grease interceptor inspections.

Sec. 12-196. Enforcement.

Sec. 12-191. Introduction—Scope and intent.

The intent of this article is to aid in the prevention of sanitary sewer blockages and overflows due to the accumulation of fats, oils and greases in the sanitary sewer from commercial establishments—particularly food preparation and food serving establishments—by requiring all food service establishments to install properly-sized and maintained grease traps or interceptors to prevent excess fats, oils and greases from entering the town's publicly-owned treatment works.

(Ord. No. 03-0902-07, § 1, 9-2-03)

Sec. 12-192. Definitions.

Cooking establishments means those establishments engaged in activities of preparing, serving, or making available for public or clientele consumption foodstuffs that require one or more of the following preparation activities: frying, baking, grilling, sautéing, rotisserie cooking, broiling, boiling, blanching, roasting, toasting, poaching, infrared heating, searing, barbecuing, and any other food preparation activity that produces a hot non-drinkable food product in or on a receptacle that requires washing.

Establishment means a cooking establishment or non-cooking establishment.

Fats, oils, and greases means organic polar compounds derived from animal and/or plant sources that contain multiple carbon chain triglyceride molecules. These substances are measured using analytical test procedures established in 40 CFR 136. Fats, oils, and greases are collectively referred to herein as "greases."

Grease interceptor minimum design capability means the design features of a grease interceptor and its ability or volume required to effectively intercept and retain greases from grease-laden wastewaters discharged to the sanitary sewer.

Grease trap or *interceptor* means a device for separating and retaining greases and like compounds from wastewater prior to entry into the sanitary sewer. These devices also serve to remove and collect settleable solids from food service establishments prior to entry into the sanitary sewer. Grease traps and interceptors are collectively referred to herein as "grease interceptors."

Non-cooking establishments means those establishments primarily engaged in the preparation of precooked foodstuffs that do not include any form of cooking. These include cold dairy and frozen foodstuffs preparation and serving establishments.

North Carolina Plumbing Code means written guidelines, regulations and ordinances governing the plumbing criteria for type and use of plumbing systems in the State of North Carolina and its political subdivisions.

Publicly-owned treatment works or *POTW* means that certain collective wastewater treatment system owned and/or operated by the town, including all devices, systems and appurtenances thereto used in the collection, storage, treatment, recycling, distribution and reclamation of municipal sewage, industrial wastes of a liquid nature, or other wastewater.

Sanitary sewer means a pipe or conduit intended to carry wastewater or waterborne wastes from homes, businesses, and industries to the POTW. A sewer collection system.

User means any person, including those located outside the jurisdictional limits of the town, who contributes, or causes or permits the contribution of, wastewater into the POTW, including mobile sources such as hauled wastewater.

(Ord. No. 03-0902-07, § 1, 9-2-03)

Cross reference— Definitions and rules of construction generally, § 1-3.

Sec. 12-193. Specific prohibitions.

No user shall allow any wastewater discharge of greases of animal or vegetable origin in concentrations greater than 250 milligrams per liter, as determined by appropriate EPA analytical methodologies. These limits shall be continually achieved without exception.

(Ord. No. 03-0902-07, § 1, 9-2-03)

Sec. 12-194. Grease interceptors.

(a) All cooking establishment users shall install a minimum 1,000-gallon in-ground grease interceptor, unless an alternative pretreatment method is approved by the town in accordance with subsection (h). Grease interceptors may also be required at non-cooking establishments and other industrial, commercial, or institutional establishments at the user's expense when deemed necessary by the director of public works and utilities for the proper handling of grease-laden wastewaters. No user shall allow any grease discharge from any grease interceptor to exceed 250 mg/l under any circumstances. All grease interceptors shall be of a type, design, and capacity approved by Town of Apex Plumbing Code Enforcement Officer and shall be readily and easily accessible for user cleaning and town inspection and sampling.

(b) Exterior in-ground grease interceptors shall be serviced and emptied of accumulated waste (greases, sludge, debris, etc.) content as required to maintain minimum design capability, but not less often than every 30 days. In-floor and under-the-counter grease interceptors shall be cleaned not less often than weekly.

(c) In-ground grease interceptors must have access manholes, minimum diameter of 24 inches shall be provided over each interceptor chamber and sanitary tee. The access manholes shall extend at least to finished grade and shall be designed and maintained to prevent inflow and infiltration. The manholes also shall have readily removable covers.

(d) Minimum design criteria for grease interceptors shall be approved by the Town of Apex Plumbing Code Enforcement Officer using the EPA-1 Design Manual Formula.

(e) Grease interceptors shall be kept free of inorganic solid materials such as rocks, grit, gravel, sand, eating utensils, cigarettes, shells, towels, rags, etc., which could settle and reduce the effective volume of the grease interceptor.

(f) There shall be no reintroduction of wastewater back into the grease interceptor unless and until said wastewater has been proven to contain 250 mg/l or less of greases.

(g) Users shall supply an adequate sampling point downstream of the grease interceptor, prior to mixing with other sanitary flows. The minimum requirement for the sampling point shall be a four-inch vertical cleanout or sanitary tee.

(h) A user may request an alternative to an out-of-building grease interceptor because of documented space constraints. The request shall contain the following information:

(1) Location of the town sewer main and easement in relation to available exterior space outside the building.

(2) Existing plumbing at or in an establishment that uses common plumbing for all services.

(3) Detailed list of all potential sources of grease at the subject premises.

(i) The use of biological additives as a grease degradation agent is conditionally permissible, upon written approval by the director of public works and utilities. Any establishment using these methods shall consistently meet the grease numerical limit of 250 mg/l specified in section 12-193, as measured at the grease interceptor's outlet required under subsection (g).

(j) The use of automatic grease-removal systems is conditionally permissible, upon prior written approval by the director of public works and utilities. Any establishment using such equipment shall operate the system in such a manner that compliance with the 250 mg/l limit specified in section 12-193 (as measured from the unit's outlet required under subsection (g)) is continually achieved.

(k) The director of public works and utilities reserves the right to make determinations of grease interceptor adequacy and need, based on review of all relevant information regarding grease interceptor performance, facility site and building plan review, and to require repairs to, or modification or replacement of such grease interceptors.

(l) Users are required to ensure that all material removed from grease interceptors is disposed of in a manner that complies with all federal, state and local statutes, rules, regulations, policies and ordinances.

(Ord. No. 03-0902-07, § 1, 9-2-03)

Sec. 12-195. Grease interceptor inspections.

(a) Users shall maintain a written record of all grease interceptor maintenance activities for three years after completion of the maintenance activities. These records shall contain clean-out dates, the name of the owner or manager of the facility, and the name of the firm that performed the clean-out. These records must be located on the premises and available for inspection during all business hours by the director of public works and utilities or his designee.

(b) The town will inspect an establishment's grease interceptor and maintenance records at the town's discretion. If problems are found during any such inspection, the user must take immediate corrective action as directed by the director of public works and utilities. If sampling of the grease interceptor effluent is warranted to assure compliance with the numerical grease numerical limit of 250 mg/l specified in section 12-193, in the town's sole and exclusive judgment, the user will be assessed for any analytical testing fees.

(c) At inspection, grease cap and solids measurements will be performed. Grease accumulation shall not be greater than four inches at any point within the grease interceptor. Solids accumulation shall not be greater than 20 percent of the total water depth from the grease interceptor's interior floor to the static working water level, at any point within the grease interceptor.

(Ord. No. 03-0902-07, § 1, 9-2-03)

Sec. 12-196. Enforcement.

(a) Violations of this article will result in enforcement actions in accordance with the then prevailing provisions of chapter 12, article III, division 4, of this Code. In addition, any user who is found to have failed to comply with any provision of this article, or any order, rule, regulation or permit issued hereunder, may be assessed a civil penalty in the amount of $50.00 per day per violation.

(b) For a period of one year following adoption of this article, no enforcement actions will be taken for failure to achieve limits on discharges of greases from grease interceptors. If, during such one-year period, an obstruction of a town sewer main occurs causing an overflow with environmental impact can be attributed in part or whole to an accumulation of greases in the sanitary sewer or the POTW, the town will take appropriate enforcement actions in accordance with the Apex Sewer Use Ordinance against the culpable user or other generator or contributor of such greases.

(Ord. of 9-2-03, § 1)

DIVISION 5. WATER CONSERVATION [4]

Sec. 12-100. Definitions.

Sec. 12-101. Continuing water conservation measures.

Sec. 12-102. Stages of conservation measures in response to water shortage.

Sec. 12-103. Violation, enforcement and penalties.

Sec. 12-104. Reserved.

Sec. 12-100. Definitions.

Customer means any person in whose name the town maintains an account for water use, or who is responsible for payment of water passing through a particular meter. All customers are responsible for any use of water that passes through the meter for which they have an account or are otherwise responsible and are deemed to be users hereunder.

Hand-watering means any form of irrigation that is connected to the town's public water supply system and held in hand during irrigation use.

Impervious surface means any surface which cannot be penetrated by water or which causes water to run off the surface, including streets, driveways and sidewalks.

Irrigation means the act of applying water to the outdoor landscape through means such as moveable sprinklers, installed watering systems, hoses or other devices.

Irrigation system means a device or combination of devices that transmit or apply town water or any mixture containing town water to residential or commercial lawns, landscapes or green space.

Person means any individual, corporation, company, association, partnership, or other entity.

Public works and utilities director means the town department head in charge of the public works and utilities department.

Rain sensor means a device that measures rainfall and overrides the irrigation cycle of an irrigation system, thus turning it off, when a predetermined amount of rain has fallen. To meet the requirements of this division, a rain sensor shall be adjusted to shut off irrigation systems when one-fourth inch of rain has fallen.

Town manager means, for the purposes of this division, the town manager or his designee.

Town water means all water available to the town for treatment and any treated water introduced by the town into its potable water distribution system. Not included in this definition is any treated wastewater effluent reclaimed for reuse in irrigation or other approved uses.

Trigger means conditions defined in the water shortage response plan (WSRP) which will cause a water shortage to be declared or ended, or cause water shortage response stages to be increased or decreased in severity.

Water shortage exists when the town cannot satisfy the ordinary demands and requirements of water consumers served by the town without depleting the water supply to a level that jeopardizes the continued availability of water for human consumption, sanitation, and fire protection.

Water system means the system of pipes, valves, meters, tanks, pumps, and treatment facilities owned and operated by the Town of Apex for the purpose of collecting, treating, and distributing town water.

(Ord. of 2-2-99, § 1; Ord. No. 07-0807-09, § 1, 8-7-07; Ord. No. 2010-0420-05, § 1, 4-20-10)

Cross reference— Definitions and rules of construction generally, § 1-3.

Sec. 12-101. Continuing water conservation measures.

The water conservation measures enumerated in this section shall apply to all town water customers, town water users, and other persons at all times whether or not a water shortage exists:

(1) *Mandatory year-round odd/even watering schedule.* Properties with odd-numbered addresses may water lawns and/or landscapes only on Tuesday, Thursday and Saturday. Properties with even numbered addresses may water lawns and/or landscapes only on Wednesday, Friday and Sunday. No lawns and/or landscapes shall be watered on Monday. Hand-watering is permitted every day.

Exemption: Property owners may obtain a 45-day new landscape permit from the public works department for the purpose of establishing new plantings. New plantings for the purpose of this permit are defined as large commercial plantings or the installation of new sod or seed to a bare area of more than 50 percent of the grassed or proposed grassed area of a residential yard. Such a permit may not be granted for over-seeding of established grass. The permit will become effective at the requested start date and expire 45 days later.

(2) *Prohibited conduct in operating irrigation systems.* No person shall operate or maintain an irrigation system in a manner that:

a. Allows water from emitting devices to fall on impervious surfaces to the extent that water runs off the property being irrigated onto public streets or property; or

b. Allows water from emitting devices to fall on any surface such that water accumulates to the extent that it runs off the property being irrigated onto public streets or property.

(3) *Rain sensors required.* Rain sensors are required on all automatic irrigation systems. The sensors shall be installed in appropriate locations in order to prevent irrigation during periods of rainfall.

(4) *Operation of rain sensors*. Rain sensors shall be adjusted and set so that for each rainfall event, the sensors shut off the irrigation system after one-fourth inch of rainfall has occurred. Rain sensors shall be installed according to the manufacturer's instructions and in a location that provides full exposure to rainfall. Rain sensors shall be maintained in proper working condition.

(5) *Irrigation surcharge.* The charges for water used for irrigation shall be computed by multiplying the customer's otherwise applicable water rate by a multiplier established by the town council and revised from time to time.

(6) *Damage to system.* No person shall damage, cut, break, obstruct, alter, interfere with, or tamper with any water pipe, water main, hydrant sewer pipe, water tank, water meter, water meter box, or any other part of the water system without the express written permission of the town.

(7) *Improper connections.* No person shall make a connection to any portion of the water system in a manner that violates the North Carolina State Building Code or the rules governing public water systems promulgated by the State of North Carolina or any agency thereof.

(8) *Unauthorized use.* No person shall consume, use, or otherwise take water from the water system without first obtaining permission from the town and making arrangements to pay the applicable fees for the water.

(Ord. of 2-2-99, § 1; Ord. No. 07-0807-09, § 2, 8-7-07; Ord. No. 2010-0420-05, § 1, 4-20-10)

Sec. 12-102. Stages of conservation measures in response to water shortage.

(a) The mandatory odd/even watering schedule shall be enforced year-round. To avoid or lessen the impact of a water shortage, the town manager will institute stages 1, 2, 3 and emergency/rationing by written declaration, which shall be effective upon being signed and posted on the town bulletin board and a copy placed with the town clerk.

(b) The town manager shall base his action upon a review of all factors that affect the town's water supply including, but not limited to, current water supply, stream flow, lake level, seasonal effect on water supply, and current consumption rates. The water shortage response triggers for declining days of supply as well as increasing days of supply will be followed as outlined in the town's water shortage response plan (WSRP). The following table illustrates the irrigation restrictions associated with each stage of mandatory water conservation:

	Stage 1	Stage 2	Stage 3	Emergency/ Rationing
Spray Irrigation	1 day/week	Not allowed	Not allowed	Not allowed
Hand Watering	Allowed	Allowed	Not allowed	Not allowed
Drip Irrigation[1]	Allowed	Allowed	Not allowed	Not allowed
Subsurface Irrigation[2]	Allowed	Allowed	Not allowed	Not allowed
Athletic Field Irrigation	Allowed	Allowed	Not allowed	Not allowed
New Turf Watering Exemption[3]	No new permits	No new permits	No new permits	No new permits

[1] Drip irrigation is the slow, even application of low-pressure water to soil and plants using plastic tubing placed directly at the root zone.

[2] Subsurface irrigation is irrigation that occurs underground, down as far as 9—12" to effectively irrigate the root zone with much less potential for evaporation than traditional spray irrigation systems.

[3] Exemptions granted prior to the declaration of a water shortage would continue to be honored until the 45-day period has expired.

_____

(1) *Stage 1.* In stage 1, the town shall publicize and request the public to comply with the following conservation measures:

a. Spray irrigation is limited to once per week. Hand-watering is permitted every day. Athletic field irrigation is permitted.

b. No new 45-day landscape permits shall be issued. Permits already issued during a stage 1 declaration would continue to be honored until the 45-day period has expired.

c. Reuse household water when possible, (within state gray water laws).

d. Limit vehicle washing to the minimum.

e. Refrain from washing down outside areas such as sidewalks, patios, etc.

f. Use shower for bathing rather than bathtub, and limit shower to no more than four minutes.

g. Limit flushing of toilets by multiple usages.

h. Refrain from leaving faucets running while shaving or while rinsing dishes.

i. Limit the use of clothes washers and dishwashers and when used, to operate fully loaded.

j. Install water-flow restrictive devices in showerheads.

k. Use disposable and biodegradable dishes.

1. Install water-saving devices such as bricks, plastics, bottles or commercial units in toilet tanks.

m. Limit hours of operation of water-cooled air conditioners.

(2) *Stage 2.* In stage 2, the town shall continue all recommendations of stage 1 and the following measures shall be mandatory:

a. Spray irrigation is not allowed. Hand-watering is permitted.

b. Filling of newly constructed or drained swimming or wading pools shall require the approval of the public works and utilities director. Makeup water is allowed for maintaining the operation of swimming or wading pools.

c. No introducing water into any ornamental fountain, pool or pond or other structure making similar use of water.

d. No using water from public or private fire hydrants for any purposes other than fire suppression or other public emergency.

e. Watering for dust control or compaction shall require the approval of the public works and utilities director.

f. No using water for any unnecessary purpose or intentionally wasting water.

(3) *Stage 3.* In stage 3, all the provisions of stages 1 and 2 apply and, in addition, the following measures shall be mandatory:

a. Spray irrigation is not allowed. Hand-watering is not allowed. The irrigation of athletic fields is not allowed.

b. No nonessential use of water for commercial or public use, and the use of single service plates and utensils is encouraged and recommended in restaurants.

c. No washing down outside areas such as streets, driveways, service station aprons, parking lots, office buildings, exterior of existing or newly constructed homes or apartments, sidewalks, or patios, or use of water for other similar purposes.

d. Washing of vehicles is not permitted.

(4) *Emergency/rationing stage.* In this stage, all the provisions of stages 1 through 3 apply and, in addition, the following measures are mandatory:

a. No using water outside of structures for any use other than emergencies involving fire. Fire protection will be maintained, but where possible, tank trucks shall use raw water.

b. All industrial uses of water are prohibited.

c. All other uses of water will be limited to those uses necessary to meet essential health and safety needs of customers.

d. No introducing water into swimming pools.

(Ord. of 2-2-99, § 1; Ord. of 3-20-00, § 1; Ord. No. 07-0807-09, § 3, 8-7-07; Ord. No. 2010-0420-05, § 1, 4-20-10)

Sec. 12-103. Violation, enforcement and penalties.

(a) *Violations.* It shall be unlawful for any person to violate any provision of this division including any mandatory water conservation measure.

(b) *Criminal penalties.* Violations of this section shall not be a crime under G.S. 14-4, or other law.

(c) *Civil penalties.* Any person who violates this division is subject to a civil penalty of up to $1,000.00 per violation, per day, for so long as the violation exits. Violations and penalties shall be determined by the public works and utilities director. In determining the amount of a civil penalty, the public works and utilities director shall take into account all relevant circumstances, including, but not limited to, the extent of harm caused by the violation, the magnitude and duration of the violation, efforts to correct the violation, the compliance history of the parties against whom the violation is assessed, the cost of enforcement to the town, whether the violation was willful or intentional and any other factor as justice requires. The town shall serve a written citation on the violator, and the customer if different, by personal delivery or by certified or registered mail, return receipt requested. The citation shall describe the violation and shall specify the amount of the civil penalty levied. If a person fails to pay a civil penalty within ten days after receiving written notice of violation, then the town may recover the penalty through a civil action in the nature of debt, including all further accruing penalties for continuing violations.

(d) *Continuing violation.* Each day that a violation continues shall constitute an additional and separate violation.

(e) *Discontinuance of service.* The town may discontinue service to a customer upon a determination by the public works and utilities director that the customer violated a provision of this division. Prior to

discontinuance, the public works and utilities director shall give the customer written notice of the violation and an opportunity to contest the discontinuance within 48 hours.

(f) *Multiple remedies.* The town may seek to enforce this division through any appropriate equitable or legal action or through any combination of these or the foregoing remedies.

(g) *Appeal.* A person who is assessed civil penalties or whose service is discontinued may appeal to the board of adjustment by serving written notice to the town clerk within ten days of the service of citation or notice of discontinuance. An order of discontinuance is not stayed pending appeal to the board of adjustment.

(Ord. of 2-2-99, § 1; Ord. No. 07-0807-09, § 4, 8-7-07; Ord. No. 2010-0420-05, § 1, 4-20-10)

Sec. 12-104. Reserved.

FOOTNOTE(S):

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Editor's note— An Ordinance adopted Feb. 2, 1999, deleted §§ 12-100—12-104 in their entirety and replaced them with similar provisions to read as herein set out. Former §§ 12-100—12-104 derived from the 1973 Code and an Ordinance of July 24, 1986. (Back)

8.1.5 Reserved

8.1.6 Retaining Structures

Retaining structures are permitted as elements of site design and shall meet the following requirements:

A) Retaining structures providing a cumulative vertical relief greater than five (5) feet in height within a horizontal distance of fifty (50) feet or less must be designed, inspected, and certified by a licensed professional engineer. Additionally, retaining structures meeting this provision must be constructed under a building permit from the Engineering and Construction Management Department.

B) All grading and support structures associated with the retaining structure shall not encroach into any required buffer or protected area (such as, but not limited to, RCA and critical root zones of buffer trees), and shall be contained entirely on site.

C) Retaining structures on land developed for single-family and duplex residences shall not exceed six (6) feet in height and shall not exceed two (2), six (6) feet tall terraced sections.

D) Terraced sections must be spaced a minimum of three (3) feet horizontally to allow for planting of small shrubs and groundcovers between the terraces.

E) Retaining structure materials must be an integrally tinted brown, rust, or earth-tone color.

8.2 LANDSCAPING, BUFFERING, AND SCREENING

8.2.1 Purpose and Intent

The intent of this section is to establish standards to protect and enhance the Town's appearance by the installation of appropriate landscaping and buffering materials; to encourage the preservation of native plant communities and ecosystems; to maintain and increase the value of land by providing for restoration of disturbed areas and by incorporating adequate landscaping into development; to restrict the spread of invasive plant species that disrupt and destroy native ecosystems; to encourage skilled installation and continued maintenance of all plant materials; and to establish procedures and standards for the administration and enforcement of this section.

8.2.2 General Landscaping Design Standards

A) ***Aesthetic Enhancement Requirements***

Landscaping shall be utilized in the design to enhance the aesthetic quality of the property by adding color, texture, and visual interest while obscuring views of parking and unsightly areas and uses. In locations where new development alters visually attractive and distinctive natural landscapes, the selection and arrangement of new plantings shall be designed to compliment and enhance the natural landscape character of the site. All areas not covered by parking, drives, streets, or structures shall be improved with landscape elements in accordance with this section.

B) ***Plant Materials***

1) *Use of Native or Adaptive Plant Materials*

In order to further water conservation and to assure growth and survival of new plantings, all new landscaping installed pursuant to this chapter shall be comprised entirely of native or adaptive plants that reflect the surrounding plant materials and environment. See the Town of Apex Development and Design Manual for a list of approved native or adaptive plants.

2) *Existing Plant Materials*

a) Healthy, existing trees and shrubs, including those preserved pursuant to the requirements of Section 8.1, *Resource Conservation*, shall be incorporated into the landscape to the maximum extent feasible, and may be used to meet the new landscaping requirements of this section. These existing plants shall be shown on the sensitive area analysis and labeled as "existing."

b) Design of the landscape shall take retained, existing trees into consideration with an adequate area provided around each tree that is free of impervious material to allow for infiltration of water and air. This pervious area shall be equal to 1.5 times the critical root zone of the tree. The root zones of existing trees and shrubs to be preserved shall be protected from unnecessary disturbance as stated in Sec. 8.2.2.

c) *Incentives.* The following incentives are provided to encourage the preservation of existing vegetation:

(i) Existing healthy vegetation may be counted towards meeting the performance criteria for buffers (Section 8.2.4) and parking lots (Section 8.2.5).

(ii) A 5 to 20 percent reduction in the number of parking spaces required on the site shall be allowed to the extent that the reduction will preserve existing healthy trees. The amount of reduction will be determined after taking all unique site conditions into account.

3) *Plant Sizes and Standards*
The standards for all trees and shrubs planted within buffers or as part of any landscaping, including the minimum height, root ball size, number of branches, and width shall conform with the American Standard for Nursery Stock published by the American Association of Nurserymen for that type of tree or shrub at the time of installation. The selection and planting of trees and shrubs shall conform to the standards set forth in the Town of Apex planting standards. Plants must meet the following sizes:

a) Large deciduous trees shall be at least 12 feet tall and 2 ½ inches caliper at the time of planting, and shall have an expected mature height of at least 30 feet.

b) Large evergreen trees shall be at least 8 feet tall and 2 ½ inches caliper at the time of planting, and shall have an expected mature height of at least 30 feet.

c) Small ornamental or under-story trees shall be at least 8 feet tall and at least 1 ½ inches caliper at the time of planting, and shall have an expected mature height of at least 18 feet.

d) Large type shrubs shall be at least 30 inches tall at the time of planting and at least 5-gallon container size. Mature height shall reach at least 4 feet. Large shrubs required to meet the standards for Type A buffer shall be between 5 and 6 feet tall at the time of planting, or at least 7-gallon container, and shall have a mature height of at least 6 feet.

e) Small type shrubs shall be at least 18 inches tall at the time of planting and at least 3-gallon container, and shall have a mature height of at least 2 feet.

f) Shrubs used as ground cover shall be at least one-gallon container size.

g) Grass shall be planted in species normally grown as permanent lawns in the Town and region. In swales or other areas subject to erosion, solid sod, erosion-reducing net, or suitable mulch shall be used and nursegrass seed shall be sown for immediate protection until complete coverage otherwise is achieved. Grass sod shall be free and clean of weeds and noxious pests or diseases. Ground cover shall be planted in such a manner as to provide 75 percent complete coverage after two growing seasons.

C) ***Location of Required Landscaping***

1) *On-Site Landscaping Required*
All landscaping shall be located on the property it serves. Landscaping located on adjacent properties or street rights-of-way shall not count toward the landscaping requirements of this section.

2) *Protection of Utilities*

a) No landscaping other than grasses shall be planted within underground public utility easements without the permission of the Public Works Director per the accepted list of plant material and planting standards as provided in the *Town of Apex Design and Development Manual*.

b) No private utility lines or easements shall be allowed to be counted in the calculations for RCA, riparian buffers, or required landscape areas.

c) Landscaped overhead public utility easements may encroach into required highway, thoroughfare, streetfront, and perimeter buffers and count toward the required buffer and undisturbed buffer width as determined by the Table in Section 8.2.6(B), provided that the following standards are met:

(i) The buffer provided is at least 30’ in width and the overhead public utility easement encroaches no more than 50% into the buffer.

(ii) The buffer plantings within the overhead public utility easements shall not exceed a mature height of 20' and shall be planted to meet the buffer type (e.g. Type A, B, C, etc.) requirements as closely as possible.

(iii) The buffer plantings in the first 15' outside the overhead public utility easement shall not exceed a mature height of 30'; the remainder of the buffer shall be planted to meet the requirements of the buffer type (e.g. Type A, B, C, etc.).

D) ***Irrigation***

If irrigation is to be used, no overhead spray type irrigation is allowed.

E) ***Landscape Installation and Inspection***

1) *Time Limit*

All landscaping, including mulching and seeding, shall be completed in accordance with the approved site plan or subdivision plan prior to issuance of a certificate of occupancy for the site or recording of a final subdivision plat.

2) *Extensions and Exceptions*

The Planning Department may grant exceptions and extensions to the above time limit in the following circumstances and under the following conditions:

a) All landscaping is required to be installed prior to a certificate of occupancy for the project, or in the case of phased development, for the phase of the project. If the applicant chooses to delay the installation of landscaping from April 1 through September 1, then the applicant shall provide a cash bond equal to 150 percent of the cost of materials and installation, based on the highest estimate received, to ensure installation of the required landscaping.

b) Exceptions may be granted due to unusual environmental conditions, such as drought, ice, over-saturated soil (deep mud) or inappropriate planting seasons for the plant species, provided that the developer or property owner provides the Town with a cash bond ensuring the installation of the remaining landscape materials. In such cases, the Planning Department may issue a temporary certificate of occupancy for a period of 30 to 180 days, depending on the zoning compliance enforcement officer's recommendation for the next earliest planting season. The bond shall be accompanied by documentation of the estimated cost of the remaining landscaping to be completed. This documentation may be a landscaping contractor's bid or contract, a nurseryman's bill or a similar document. The amount of the bond shall be equal to 150 percent of the cost of the plant material and installation costs yet to be installed, based on the highest estimate received.

c) Exceptions may be granted due to the substitution or unavailability of plant species or acceptable plant size as

specified on the site plan or subdivision plan, provided that the developer or property owner provides the town with a cash bond to ensure that the unavailable plants will be installed on the property. In such cases, the Planning Department may issue a certificate of occupancy for a term of 180 days or to the next planting season, whichever comes first. Only 20 percent of the plant materials to be installed on the property may be delayed and bonded under this exception. All such substitutions shall be marked on the "as-built" landscaping plans submitted to the Planning Department and must be signed, dated and approved by that department prior to installation.

d) Exceptions may be granted due to circumstances beyond the developer's or property owner's control, such as incomplete construction or utility work in a proposed landscaped area within 30 days after expected site completion, provided that the developer or property owner submits a letter from the utility company stating the expected installation date and provides a cash bond equal to 150 percent of the cost of materials and installation to ensure installation of the required landscaping. In such cases, the Planning Department may issue a temporary certificate of occupancy for a period not to exceed 30 days.

3) *Inspections*

a) The Planning Department and zoning compliance enforcement officer shall inspect the site prior to the issuance of a permanent certificate of occupancy or recording of the final subdivision plat.

b) Prior to obtaining a certificate of occupancy or recording of the final subdivision plat, the developer or property owner shall submit an "as-built" plan to the Planning Department for all landscaping-related components of the site plan or subdivision plan.

c) The zoning compliance enforcement officer shall inspect the site one year after the issuance of a permanent certificate of occupancy or recording of the final subdivision plat in order to ensure compliance with the approved site plan or subdivision plan and to ensure that the landscape is properly maintained.

8.2.3 Maintenance Responsibility and Replacement of Damaged Vegetation

A) ***Maintenance Responsibility***

The owners of the property and their agents, heirs, or assigns shall be responsible for the installation, preservation, and maintenance of all planting and physical features required under this article. Any vegetation that is dead, substandard, unhealthy, of poor structural quality, or missing, shall be removed and replaced in conformance with the standards of this section and to the approved site plan or subdivision plan. In the event that any vegetation or physical element functioning to meet the standards of this section is severely damaged due to an unusual weather occurrence or natural catastrophe, the owner shall have one year or one growing season, whichever is sooner, to replace or replant. All plant materials should be allowed to reach their mature size and maintained at their mature size. Plants shall not be cut or severely pruned so that their natural form is impaired. This section shall not apply when a

developer has damaged or destroyed vegetation in the buffer, or caused vegetation to be damaged or destroyed. In this case, revegetation according to subsection (c) is required.

B) ***Replacement of Disturbed and Damaged Vegetation***
The disturbance of any landscaped area or vegetation installed pursuant to this article shall constitute a violation of the site plan or subdivision plan. All disturbed landscaped areas and vegetation shall be replanted so as to meet the standards of this section as well as the approved site plan or subdivision plan.

C) ***Replacement of Existing, Original Vegetation***
Existing trees and vegetation preserved pursuant to this article shall be considered as elements of a development project in the same manner as parking, building materials, and other site details. If such trees or vegetation are damaged during construction or dead within two years of completion of development, they shall be promptly replaced based on the standards of this section, taking into account any unique site conditions and vegetation remaining within the landscaped area. Replacement consists of one or a combination of the following:

1) A base fine of $20.00 per square foot area of disturbed area, not to exceed $40,000 total in accordance with appropriate penalty requirements then in effect.

2) Any tree with a caliper of at least 8 inches that is damaged or removed shall be replaced with one or more trees that have a caliper of at least 2 ½ inches and a cumulative caliper equal to or greater than the original tree.

3) For all other cases where existing vegetation is damaged or removed, the type and amount of replacement vegetation required shall be that which is necessary to provide the type of landscaped buffer or Resource Conservation Area required. Each category listed below is equal to one unit. One unit represents the replacement for 200 square feet of disturbed area. Fractions of a unit must be rounded to the nearest whole unit. Depending on the type of vegetation disturbed and the type buffer or Resource Conservation Area required, the Planning Department shall determine which units must be used. For example, a 9,950 square foot disturbed area is required to have 49.75 units of replacement vegetation, which rounded to the nearest whole unit is 50 units of replacement vegetation. To ensure plant diversity and suitability, the Planning Department may, in consultation with the applicant, determine that twenty-five of category “a” and twenty-five of category “c” are required in one instance, while in another instance ten of each category (a, b, c, d, and e) are required. These requirements shall also be used to re-vegetate non-vegetated areas that are being used to meet Resource Conservation Area requirements. The five categories are as follows:

   a) One large deciduous tree of at least 2 ½ inches caliper and 12 feet high.

   b) Two small type trees of at least 1½ inches caliper and at least 8 feet high above ground level at the time of installation.

   c) One large evergreen tree of at least 2 ½ inches caliper and at least 8 feet high above ground level at the time of installation.

d) Four evergreen shrubs of at least 2 feet in height and 3-gallon container size at the time of installation.

e) Four deciduous shrubs of at least 2 feet in height and 3-gallon container size at the time of installation.

4) In addition to the above requirements, on existing slopes equal to or greater than a ratio of 2:1, provide 1-gallon groundcover plants spaced approximately 2 feet on center.

5) The specific quantities and sizes of plants listed above may be adjusted by the Planning Department in order to meet the standards for a required buffer type, the replacement or establishment of an approved Resource Conservation Area, and/or to more appropriately match the surrounding existing vegetation, so long as substantially the same performance is achieved. Refer to the *Town of Apex Design and Development Manual*, Section 2 for more specific information.

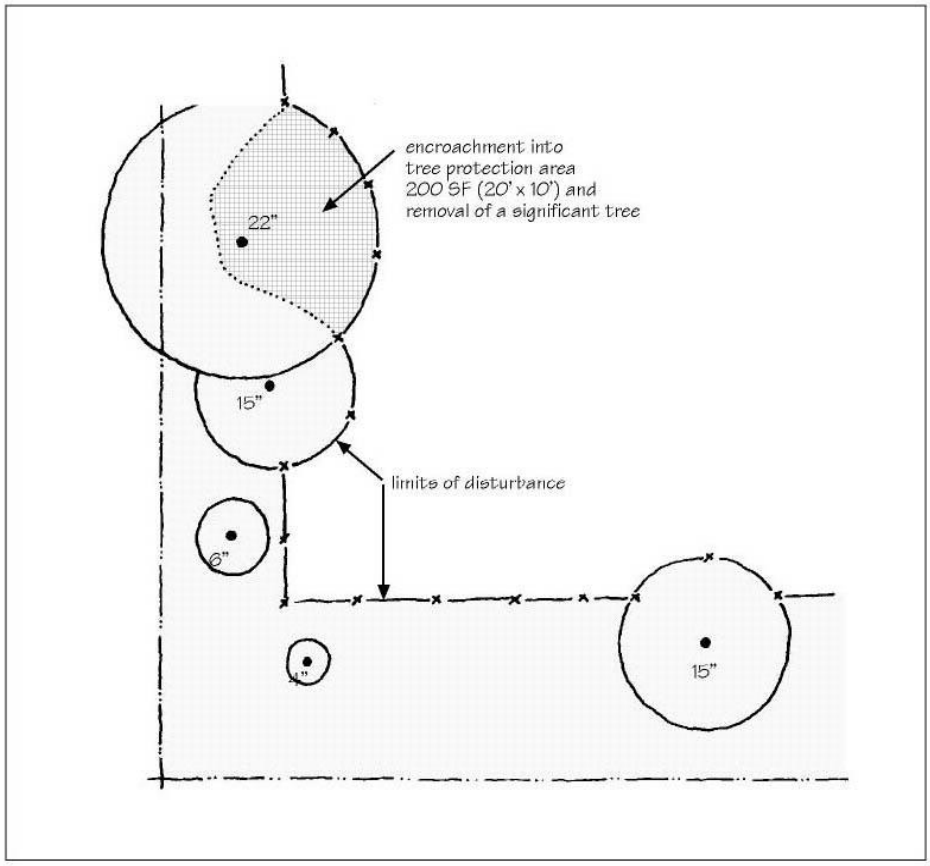


Figure 8.2.3(C): Illustration of Required Replacement of Existing, Original Vegetation

8.2.4 Building Landscaping Requirements

A) ***Applicability***

All multi-family and non-residential land uses and all residential subdivisions shall install landscaping pursuant to the requirements of this section. This landscaping shall be in addition to any other landscaping required by Article 8 and Sec. 7.5.6. *Street Yard Trees*.

1) *Multi-Family and Non-Residential Uses*

All multi-family and non-residential land uses shall install at least 1 tree and 3 shrubs for every 2,000 square feet of building footprint. This is above and beyond any vehicular use area landscaping requirements, screening requirements, buffers, and Resource Conservation Area plantings.

2) *Residential Subdivisions*

All residential subdivisions in districts other than Low Density (LD) and Medium Density (MD) shall install at least 1 tree and 3 shrubs for every two new dwelling units. All Low Density (LD) and Medium Density (MD) District subdivisions shall comply with Sec. 7.5.6 *Street Yard Trees*.

B) ***Installation Requirements***

1) Large trees shall be no closer than 20 feet from any structure with at least 350 square feet of non-paved area around the trunk, and small trees shall be no closer than 10 feet from any structure with at least 250 square feet of non-paved area around the trunk.

2) Planting beds may contain a combination of living plant materials and mulch. However, living plant materials shall comprise no less than 50 percent of the required planting beds.

3) Plant materials shall be located in close proximity to the building and shall enhance views from public streets and sidewalks.

8.2.5 Vehicle Use Area Landscaping

A) ***Purpose***

Vehicle use area landscaping is intended to improve the views from adjacent properties and public use areas, alter the microclimate of vehicle use areas by providing shade and reducing reflected heat, and break up large areas of impermeable surface allowing areas for water infiltration.

B) ***Vehicle Use Area Screening***

1) *Applicability*

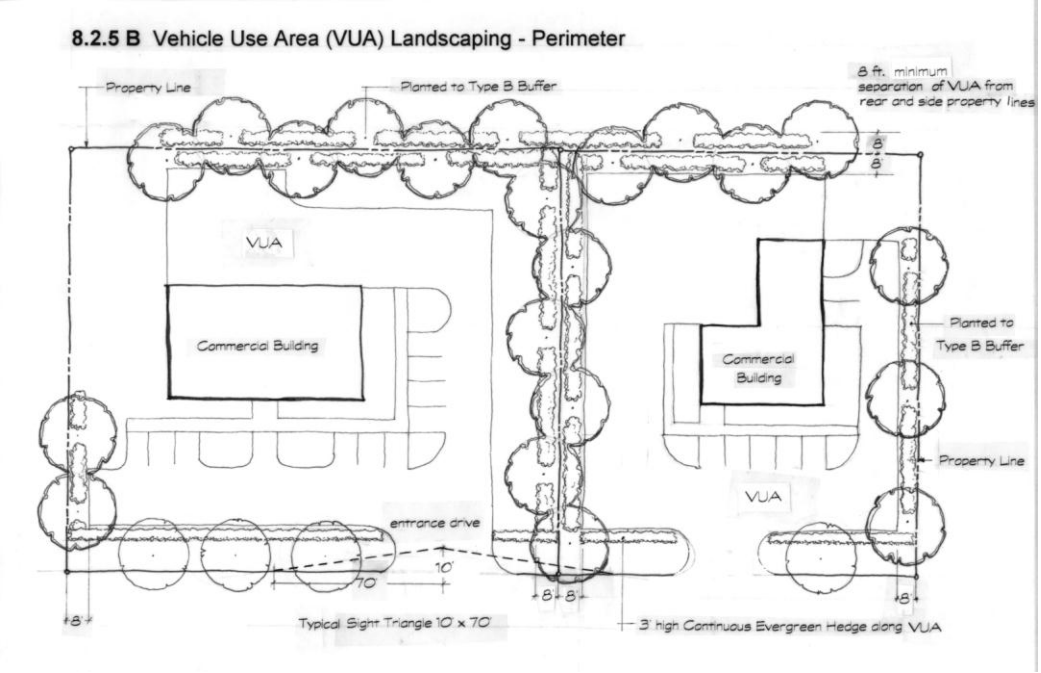
All vehicle use areas shall provide landscaping pursuant to the General Requirements below.

2) *General Requirements*

a) All vehicle use areas shall be screened from off-site view with a continuous evergreen hedge that will reach a minimum height of 42 inches within 3 years of installation.

b) *All vehicle use areas and access drives shall be separated from side and rear property lines by a planting area at least 8 feet wide that meets type B buffer standards (see Sec. 8.2.6(B)).*

c) *Perimeter plantings shall be arranged and maintained to protect visibility at any driveways.*



C) ***Vehicle Use Area Shading***

1) *Applicability*
All vehicle use areas shall comply with these landscaping requirements. Perimeter, streetfront, and thoroughfare buffer trees may be used to meet the vehicle use area landscaping requirements.

2) *Minimum Requirement*
No portion of the vehicle use area shall be further than 40 feet from the trunk of a large-type deciduous tree, except for areas that cannot reasonably be landscaped in the interior (as determined by the Planning Director), including, but not limited to, truck loading and unloading spaces and vehicle storage yards. In these cases, the same number of trees required to meet the 40-foot requirement are required to be planted along the perimeter of the exempted vehicle use area. Two small-type trees can be substituted for a large-type deciduous tree in cases where the health of the large-type deciduous tree may be compromised or where other circumstances so warrant, including, but not limited to, utility lines and/or easements located too close to the vehicle use area to allow the planting of a large-type deciduous tree or building location that does not provide a large enough planting bed for a large-type deciduous tree. No portion of the vehicle use area where the small-type tree substitution is allowed shall be further than 20 feet from the trunk of a small-type tree. The vehicle use area interior landscaping shall be designed to achieve shading of no less than 35 percent of the vehicle use area at maturity.

D) ***Additional Vehicle Use Area Requirements***

1) *Landscaped Islands*

a) Individual landscaped islands shall include a minimum of 1 tree and raised concrete curbs to prevent damage by automobile or pedestrian traffic. Planting areas shall be protected from

damage by vehicular traffic with barriers including but not limited to curbs, wheel stops, walls or fences.

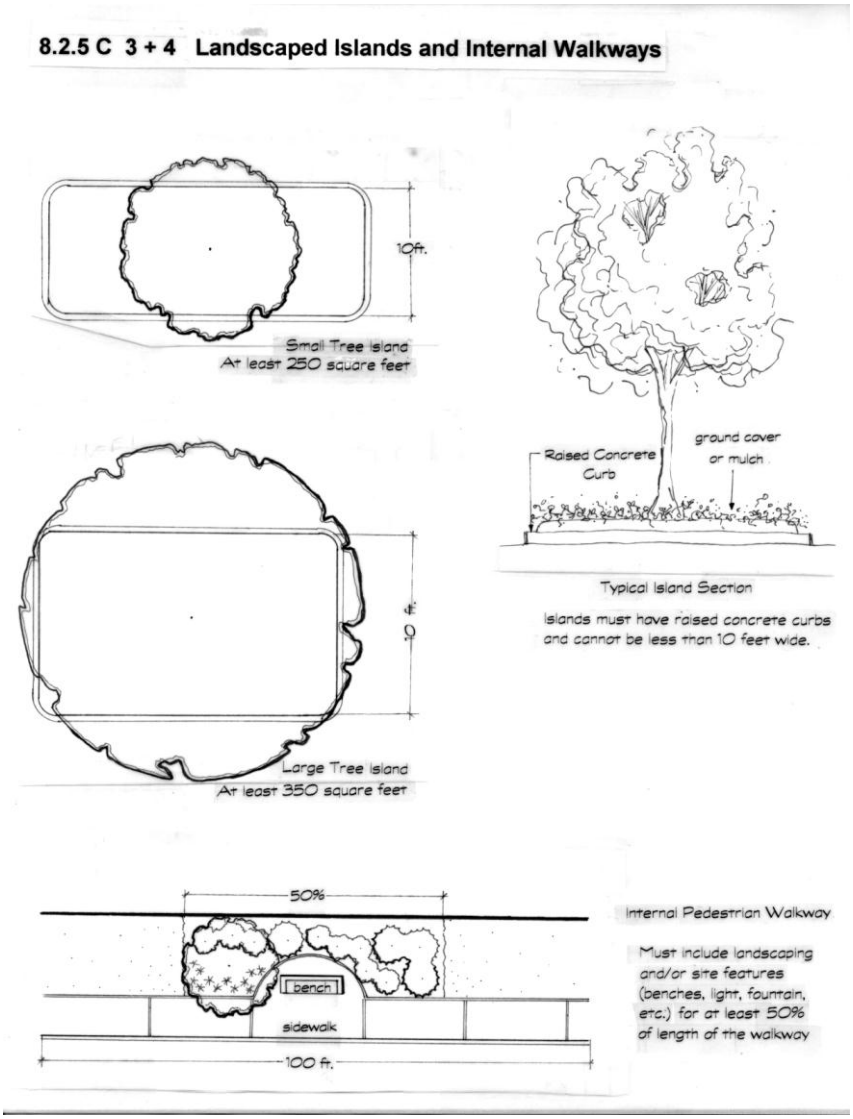
b) Landscaped islands shall have at least 350 square feet of planting area for each large tree, and 250 square feet for each small tree. The smallest dimension of a landscaped island shall be 10 feet to allow for adequate root aeration and expansion.

c) Islands shall be arranged to maximize shading of parking spaces.

d) Plantings shall be arranged so as not to interfere with driver vision, vehicle circulation, or pedestrian circulation.

2) *Internal Pedestrian Walkways*

Internal pedestrian walkways required pursuant to Section 8.4.4 shall feature landscaping, benches, and other such materials or facilities for approximately 50 percent of the length of the walkway. Such walkways may pass through required buffers and other protected areas as long as construction is done in such a way as to protect significant resources. This landscaping may be counted toward the landscaping requirements of Sec. 8.2.4 “General Landscaping Requirements.”


8.2.5 C 3 + 4 Landscaped Islands and Internal Walkways
10ft.
Small Tree Island
At least 250 square feet
Raised Concrete Curb
ground cover or mulch
Typical Island Section
Islands must have raised concrete curbs and cannot be less than 10 feet wide.
Large Tree Island
At least 350 square feet
50%
bench
sidewalk
100 ft.
Internal Pedestrian Walkway
Must include landscaping and/or site features (benches, light, fountain, etc.) for at least 50% of length of the walkway

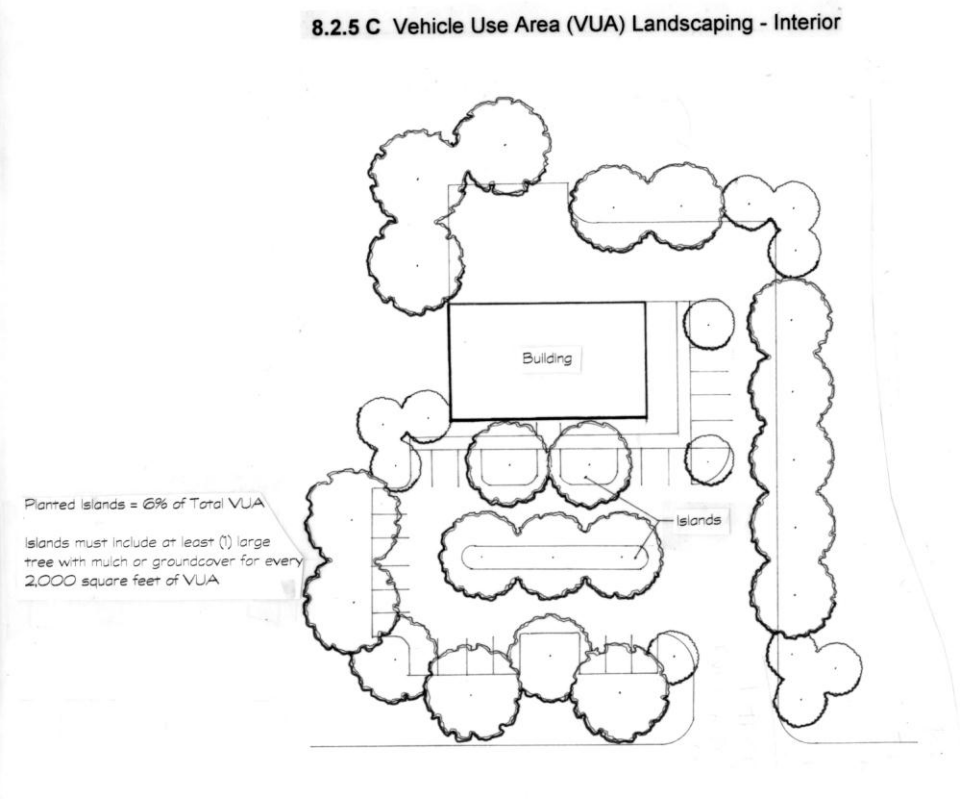


Figure 8.2.5(C): Comparison of Vehicle Use Areas With and Without Landscaping

8.2.6 Buffering

A) ***Purpose***
Landscaped buffers to separate adjacent land uses shall be provided in accordance with this section in order to fulfill the following purposes:

1) To shield adjacent properties from any adverse external effects of the development, so as to render incompatible adjacent uses more compatible;

2) To shield development from the negative impacts of adjacent land uses, so as to render incompatible adjacent uses more compatible;

3) To preserve open space and existing vegetation, using supplemental plantings only when necessary; and

4) To prevent adverse grade changes between properties and to provide adequate land area for transition of proposed grades.

B) ***Landscape Buffers Between Land Uses***

1) *Applicability*

a) All site and master subdivision plans shall provide a landscape buffer to separate that use or subdivision from differing land uses pursuant to the requirements of this section.

b) This buffer requirement shall not apply to the B-2 zoning district.

2) *Building Setbacks from Edge of Buffer*
All building setbacks along property lines with required buffers are determined by adding 10 feet to the buffer widths given in Table 1 below, except along the Streetfront D Type buffer, where building setbacks are determined according to the zoning of the parcel (see Sec. 5.1.2). Building setbacks along property lines with no required buffers are determined according to the zoning of the parcel (see Sec. 5.1.2).

3) *Type and Width of Buffer Required*
Table 1 below determines the type of landscape buffer that must be installed. Depending on the land use classifications of the proposed use and the use of the adjacent property, Table 1 specifies a landscaped buffer of a particular type and a particular minimum width. Subsection (5) below identifies the land uses that fall within each land use classification shown on Table 1. Subsection (6) below identifies the width and type of vegetation required for each type of buffer.

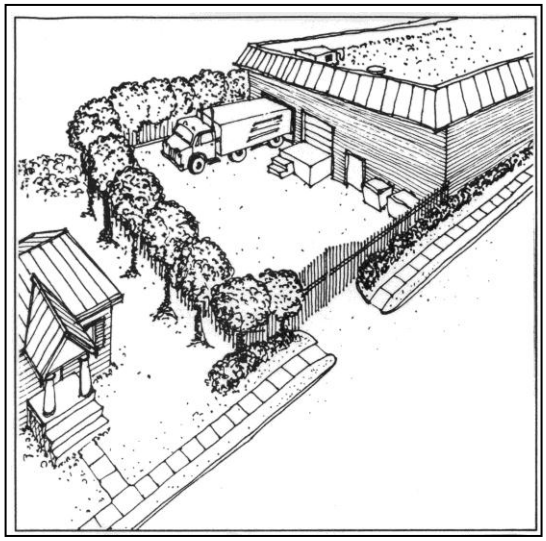
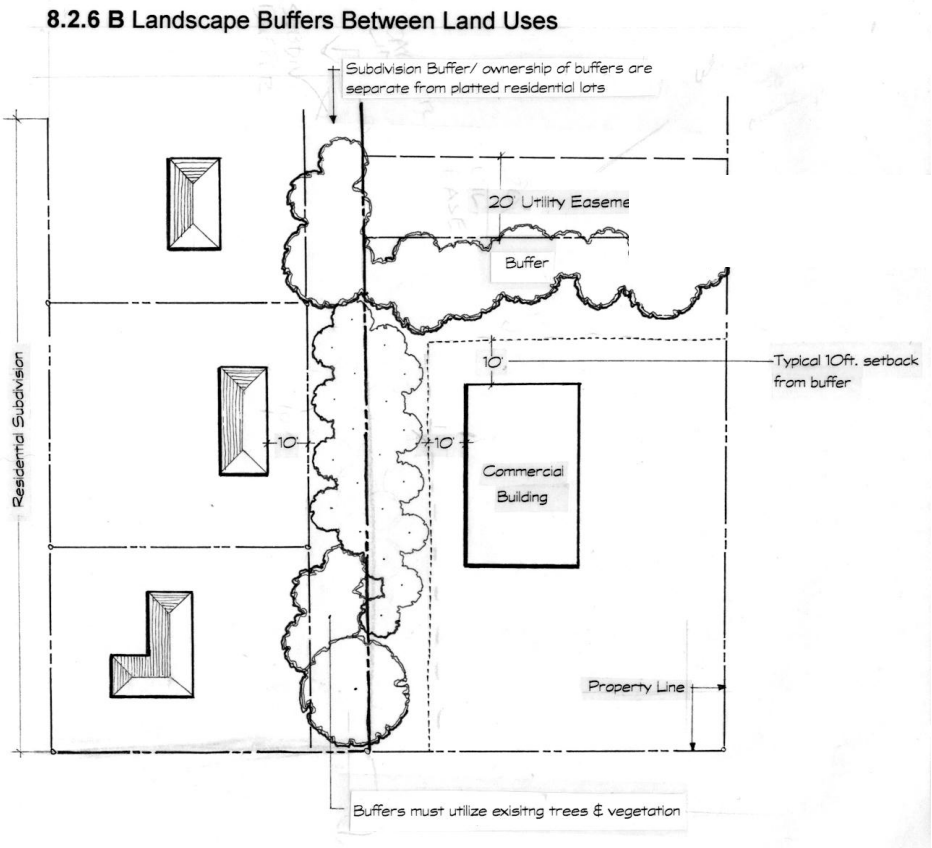


Figure 8.2.6(B): Illustration of Landscaped Buffer



A	B						C					D			E	
	PERIMETER BUFFER											STREETFRONT* (except thoroughfares and fully-/limited controlled access highways)			THOROUGHFARE	
Req'd Buffer	Adjacent Property Developed: Land Use Class						Adjacent Property Vacant: Zoning District									
Proposed Land Use Class	1	2	3	4	5	6**	All Res.	TND-CZ, PUD-CZ, SD-CZ	MEC-CZ, O&I, PC	B1, B2	LI, TF	1,2,3	4	5,6	Undisturbed ***	Disturbed ***
1	0	0	10 C	10 B	30 C	40 B	0	0	10 C	30 C	40 B	0	20 D	30 D	30 E	50 E
2	0	0	10 B	20 A	40 A	60 A	0	10 A	20 A	40 A	60 A	10 D	20 D	30 D	30 E	50 E
3	10 B	10 B	0	10 B	20 B	50 A	10 B	20 B	10 B	20 B	50 A	10 D	20 D	30 D	30 E	50 E
4	10 B	20 A	10 B	0	0	30 B	20 A	10 B	0	0	30 B	30 D	10 D	10 D	30 E	50 E
5	30 C	40 A	20 B	0	0	0	40 A	20 B	0	0	0	30 D	10 D	10 D	30 E	50 E
6**	40 B	60 A	50 A	30 B	0	0	60 A	60 A	30 B	0	0	30 D	20 D	10 D	30 E	50 E

1. To use Table 1 to determine Landscape Buffers Between Land Uses:
    a. Locate land use class of subject property in column A.
    b. Identify if adjacent parcel is developed or vacant (column B or C).
    c. Required buffer is at intersection of row and column. Buffer class is indicated by letter; width in feet is indicated by number.
2. To determine buffers along all street types except thoroughfares and fully-/limited-controlled access highways:
    a. Locate land use class of subject property in column A.
    b. Determine land use class of property across street from subject property in column D.
    c. Required buffer is at intersection of row and column. Buffer class is indicated by letter; width in feet is indicated by number.
3. To determine buffers along all thoroughfares:
    a. Locate land use class of subject property in column A.
    b. Determine if the buffer will be an undisturbed buffer or a disturbed buffer in column E.
    c. Required buffer is at intersection of row and column. Buffer class is indicated by letter; width in feet is indicated by number.

* For streetfront buffers only, non-residential uses in the Residential Agricultural (RA) zoning district shall have a 10' Type D buffer. No streetfront buffer is required on collectors or residential streets within residential developments.
** No buffer is required along the use "Railroad tracks", which is classified as Class 6, for Land Use Classes 1, 2, 3, 4, 5, and 6. However, it is recommended that the developer consider the comfort of future occupants and security of the development in determining if buffering and/or screening should be implemented.
***Pedestrian-oriented streetscape buffers shall be allowed in lieu of standard landscaped thoroughfare buffers when such buffers are located inside the Apex Peakway. Pedestrian-oriented streetscape buffer shall contain both hardscape elements (such as but not limited to sidewalks, decorative lighting, street furniture, and fountains) and street tree plantings which do not have to meet typical minimum island widths or sizes.

4) *Land Use Classes*
The 6 land use classes appearing in Table 1 include the following uses:

a) *Class 1:*
Active farm
Botanical gardens
Campgrounds
Cemeteries
Golf course
Greenways
Horse boarding and riding stables
Parks, active and passive
Water reservoir

b) *Class 2:*
Bed and breakfast
Manufactured home-detached, lots greater than 6,000 square feet
Single family-detached, lots greater than 6,000 square feet

c) *Class 3:*
Condominium
Duplex
Manufactured home-detached, lots less than 6,000 square feet
Multi-family or apartment
Single family-detached, lots less than 6,000 square feet
Townhouse
Townhouse, detached
Triplex or Quadplex
Zero lot line

d) *Class 4:*
Ambulatory Healthcare Facility with Emergency Department
Assembly hall, for-profit
Assembly hall, nonprofit
Barber/beauty shops
Bookstore
Church or place of worship
Congregate living
Day care facility
Drop-in or short-term daycare
Dispatching office
Farmers market
Financial institutions without drive thru
Floral shop
Funeral home
Government service
Health/fitness centers/spas
Indoor animal kennel
Laundromat
Medical, dental offices and clinics
Medical, dental laboratory
Mobile home park
Monument sales, retail
Newsstand or gift shop
Nursing or convalescent facility

Office, business or professional
Parking, parking lot, parking garage- commercial or residential
Personal services
Pet services
Pharmacy
Printing and copying services
Real estate sales
Restaurant, general
School, public or private
Studios for arts
Tailor shops
Utility, minor
Veterinary clinic or hospital
Vocational schools
Youth or day camps

e) *Class 5*
All drive through facilities
Automotive parts
Automotive service stations
Bars and nightclubs
Beach bingo
Broadcasting stations (radio and television)
Building supplies, retail
Carwash or auto detailing
Convenience store
Convenience store with gas pumps
Drycleaners and laundry services
Electronic gaming operation
Entertainment, indoor
Flea market
Game rooms and devices
Gas and fuel, retail
Greenhouse or nursery, retail
Grocery, general
Grocery, specialty
Hotel/motel
Pilot plant
Publishing office
Radio and television recording studios
Retail sales, bulky goods
Retail sales, general
Shopping center
Theater
Transportation facilities
Upholstery shop
Vehicle inspection center
Vehicle repair and service

f) *Class 6*
Adult establishment
Airplane landing strip
Airport
Animal kennel, outdoors
Arena, auditorium or stadium

Asphalt or concrete plant
Automotive paint or body shop
Building supplies, wholesale
Chipping and mulching
Communication tower, commercial
Contractor offices and storage yards
Dry-cleaning and dyeing plants
Electrical power facility
Entertainment, outdoor
Fish hatcheries and fish ponds
Forestry
Gas and fuel, wholesale
Glass sales
Greenhouse or nursery, wholesale
Heliport or helipad
Hospital
Incinerator
Industrial services
Laboratory, industrial research
Land clearing and inert debris landfill
Laundry plants
Machine or welding shop
Manufacturing and processing
Railroad facilities
Railroad tracks
Recycling center
Recycling collection station
Recycling plant
Regional recreation complex
Repair and maintenance, general
Repair services, limited
Research facilities
Sanitary landfill
Self-service storage
Towing services and storage
Truck terminals
Vehicle sales and rental, heavy
Vehicle sales and rental, light
Warehousing
Water or wastewater plant
Wholesaling, general
Wood or lumber processing
Woodworking or cabinetmaking
Zoological garden

5) *Types of Buffers*
The 7 types of landscaped buffers appearing in Table 1 are defined as follows and shall meet the following performance requirements:

a) *Type A: Opaque*
This buffer functions as an opaque screen from the ground to a height of at least 6 feet. Plantings of deciduous and evergreen trees shall obtain a height at maturity of between 18 and 60 feet and have no unobstructed openings between tree canopies at maturity. Large trees shall be spaced no wider than 15 feet at

time of planting. Screening plants for the Type A buffer shall be evergreen and between 5 and 6 feet tall at the time of installation (see Plant Standards Sec. 8.2.2(B)). At least 50 percent of the required trees and 100 percent of the shrubs must be evergreen species.

b) *Type B: Semi-Opaque*
This buffer serves as a semi-opaque screen from the ground to a height of between 3 and 6 feet with openings no greater than 10 feet. Trees shall obtain a height of between 18 and 40 feet at maturity and have no unobstructed openings greater than 20 feet between canopies at maturity. Large trees shall be spaced no wider than 40 feet at time of planting, and small trees shall be spaced no more than 20 feet. At least 75 percent of the required shrubs must be evergreen species.

c) *Type C: Spatial Definition*
This buffer is intended to provide a sense of separation between adjoining properties without significantly obstructing the view from one to the other. Generally, it will be less opaque than the Type B buffer, and more oriented towards aesthetic enhancement rather than screening. It shall include a combination of trees and shrubs that provide intermittent visual obstruction from the ground to a height of at least 20 feet. Large trees shall be spaced no wider than 50 feet at time of planting, and small trees shall be spaced no wider than 25 feet. At least 25 percent of the trees or shrubs must be evergreen species.

d) *Type D: Streetfront*
This buffer is intended to provide a softening of the view of a particular property from the street, without eliminating views to and from the property. This shall include at least one large type tree for every 1,000 square feet of buffer, or two small trees for every 1,000 square feet of buffer. Large trees may not be spaced more than 30 feet apart, and small trees no more than 15 feet apart. At maturity, these trees shall reach a height of at least 20 feet. A streetfront buffer is required along all private and public streets except thoroughfares and controlled access highways.

e) *Type E: Streetscape Buffers Along Thoroughfares*
Streetscape buffers are required on all thoroughfares as shown on the adopted thoroughfare map. Streetscape buffers are to remain undisturbed to the maximum extent practicable except where no existing vegetation is present.

All uses that require site plan approval or subdivision plan approval shall preserve, install, and maintain a planted streetscape along each thoroughfare it abuts which protects the existing vegetation and abuts the perimeter of the property. All streetscape plantings, including the installation of all plant materials, shall perform in accordance with specifications of this section.

The width of the streetscape buffer shall be at least 30 feet if it remains undisturbed. If the buffer will require encroachment in order to install street improvements, the buffer must be at least 50 feet wide. Up to 25 feet of the 50-foot buffer may be disturbed provided that the disturbed section is re-planted according to the requirements in subsection (iii) below.

If any part of the buffer is disturbed or non-vegetated, the owner shall plant one large tree and two small trees for every 1,000 square feet of disturbed or non-vegetated buffer. Where existing overhead utility lines interfere with part of the buffer, the large tree requirement may be substituted by installing all small trees (4 small trees for every 1,000 square feet).

Trees shall be installed on the thoroughfare side of any berm or screen planting no less than 10 feet from the right-of-way of the thoroughfare. Street trees may be installed in a linear fashion or in clusters or groupings of larger and/or small trees in combination with associated plantings so as to enhance the visual appearance of the streetscape and views from adjacent properties.

Each large canopy tree in the streetscape shall be provided with at least 350 square feet of pervious ground area for root growth. Any planting area bounded by a built-upon area shall be at least 10 feet wide.

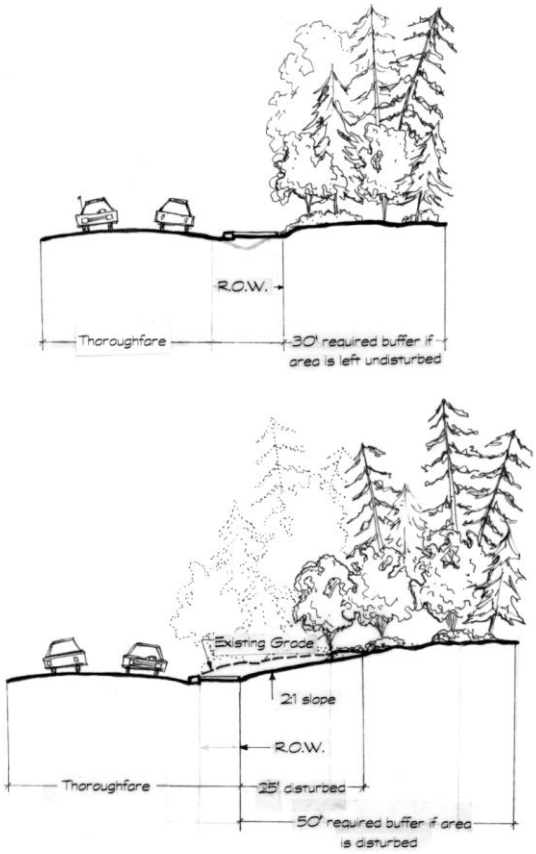
All slopes equal to two to one (2:1) shall be stabilized with permanent slope retention devices or a suitable combination of plantings and retention devices (see Sec. 8.1.4 *Slope Protection Standards*).

Where there is a vehicular use area between the right-of-way of the thoroughfare and a permanent building, the streetscape shall provide a semi-opaque screen or barrier between the right-of- way and the vehicular use area. The screen or barrier may consist of existing vegetation, plants, earthen berms, decorative entry fences (not privacy), walls, or any combination thereof that meets the following requirements:

The screen shall occupy the entire 100 percent length of the vehicular use area except for sidewalks and driveways. All vehicular use areas must be screened from off-site view. Plant material shall be at least 2 feet tall above the ground at the time of installation and must reach a height of 3 feet within 3 years.

Fences, walls, and berms may be installed in addition to plantings (see Sec. 8.2.7 *Fences, Walls, and Berms*). Plant materials shall be installed that meet these performance standards. Berms may be installed if there is no existing vegetation. The installation of additional plant materials is required so as to enhance the visual and aesthetical qualities of the streetscape.

8.2.6 (6) e Type E Streetscape Buffers Along Thoroughfares



f) *Buffers Along Fully- and Limited-Controlled Access Highways*
All uses that require site plan approval or subdivision plan approval shall install and maintain a vegetated buffer along each controlled access highway as follows:

(i) Residential Uses
A 100-foot Type A buffer is required along all fully- and limited-controlled access highways, measured from ultimate right-of-way. All highway buffers along residential uses shall remain undisturbed to the maximum extent practicable. The Planning Director or designee shall determine at the time of site plan or subdivision plan review what supplementation of plant material must occur to bring the existing natural buffer to a Type A standard. Disturbance within the buffer is only allowed as follows:

(a) Construction of driveways and public streets perpendicular to the buffer strip shall be allowed where such construction is necessary

for safe ingress or egress to the site. The nature and limits of such construction must be designated on the approved site plan or master subdivision plan.

(b) Notwithstanding any other provision pertaining to buffers, Town of Apex public utilities and easements shall be allowed, parallel and otherwise, within buffers, and the area within such easements shall still count towards buffer, undisturbed buffer, or RCA requirements.

(ii) Non-residential Uses

A 100-foot Type A buffer is required along all fully- and limited-controlled access highways, measured from ultimate right-of-way. All highway buffers along non-residential uses shall remain undisturbed to the maximum extent practicable. The Planning Director or designee shall determine at the time of site plan or subdivision plan review what supplementation of plant material must occur to bring the existing natural buffer to a Type A standard. Disturbance within the buffer is only allowed as follows:

(a) Construction of driveways and public streets perpendicular to the buffer strip shall be allowed where such construction is necessary for safe ingress or egress to the site. The nature and limits of such construction must be designated on the approved site plan or master subdivision plan.

(b) Notwithstanding any other provision pertaining to buffers, Town of Apex public utilities and easements shall be allowed, parallel and otherwise, within buffers, and the area within such easements shall still count towards buffer, undisturbed buffer, and RCA requirements.

(c) Highway buffers along non-residential uses meeting all of the following criteria shall be reduced to a planted 50' Type E buffer.

i. No more than 20% of the façades of non-residential buildings facing the highway can use EIFS or other synthetic stucco.

ii. Pedestrian connections in the form of sidewalks and/or multi-use paths shall be made from non-residential buildings to adjacent residential development and properties with future residential land use. The form of the connection

shall be determined by the Planning Director of designee.

g) *Buffers Along the American Tobacco Trail*
For sites that contain and/or are adjacent to the American Tobacco Trail, a buffer of at least fifty (50) feet in width is required. The buffer shall function as visual separation between the public trail and private property; it shall contain native plant material, supplemented where necessary with deciduous and evergreen trees to provide an opaque screen for the benefit of trail users and adjoining property owners. The buffer shall conform to the requirements of a Type 'A' Buffer as described in UDO Section 8.2.6(B)(5)(a).

C) ***General Buffering Requirements***

1) *Location of Buffers*

a) The buffers required by this section shall be located along the outer perimeter of the parcel and shall extend to the parcel boundary line or right-of-way line. Buffers shall not include any portion of an existing public or private street, proposed public street, easement, or right-of-way. The required buffer width does not just determine a simple setback but is to be totally planted to meet the requirements for the applicable buffer type. Therefore, the plants comprising the buffer shall be spread across the entire width of the buffer and not just planted in a row or rows.

b) Buffers for residential subdivisions shall not be located within the individual lots that make up the subdivision, but shall be located in common areas, and shall be owned and maintained by the homeowner's association.

2) *Existing Vegetation*
Existing significant vegetation within the required buffer shall be preserved and credited toward standards for the type of buffer required at the time of site plan approval, subdivision, or PD plan approval. In order to determine which existing vegetation shall be preserved, the applicant shall provide a Site and Tree Survey per the requirements of Sec. 8.1.2(B)(2).

3) *Installation of New Vegetation and Other Features*
If existing significant vegetation and other site features do not fully meet the standards for the type of buffer required, then additional vegetation and/or site features (including fences) shall be planted or installed within the required buffer area. All plantings must face toward the public right-of-way.

4) *No Development Within the Required Buffer*
The required buffer shall not contain any development, built-upon area, or site features that do not function to meet the standards of this section or that require removal of existing vegetation. No grading, development or land-disturbing activities shall occur within the buffer unless approved

by the Town Council or Planning Department at the time of site plan or subdivision plan review.

5) *Critical Root Zone Encroachment*
If the critical root zone of any tree encroaches one-third or more onto an adjacent parcel, the developing site must protect the critical root zone to protect the health and vigor of the tree.

6) *Ownership of Buffers*

a) No required buffer in a residential subdivision shall be wholly owned (in fee simple absolute) by the owner of an individual residential building lot zoned for residential uses. The buffers shall be owned by a property owner's association or be owned by a third party or shall be otherwise divided so that the buffer is not removed, modified, or damaged. Any required buffer (including those required as a zoning condition) for a residential development shall not be credited toward meeting the lot size requirements. The preferred method is that the residential buffer be a separate lot and owned by a separate entity (e.g., property owner's association).

b) The buffers required under this Section 8.2 may be left under the control of the lot owner provided that: (1) the width of the buffer is doubled; and (2) each lot that contains a buffer must have a deed restriction recorded with a restriction that the buffer is to be left undisturbed. In any case, where control of the buffer is through a property owner's association, modifications, removal, or damage to the buffer by an adjacent homeowner shall be prohibited. The property owner's association shall be responsible for any violation related to the buffers in accordance with Sec. 8.2.3, *Maintenance Responsibility and Replacement of Damaged Vegetation*. This Provision applies to residential developments only.

8.2.7 Fences, Walls, and Berms

Fences, walls, and berms are permitted as elements of site design and in some locations, may be used to conceal storage or other unsightly or conflicting land uses. Fences are not allowed around detention and retention basins per Section 6.1.12(B)(10). All fences, walls, and berms shall meet the following requirements:

A) ***Materials***

1) Fences or walls shall be constructed of wood, stone, brick, decorative concrete block, wrought iron, (or products created to resemble these materials), or a combination of any of these materials. Chain link fencing is allowed provided it meets the standards in Section 8.2.7(A)(4).

2) All fencing shall be finished on the side facing a public right-of-way or adjacent properties.

3) Materials such as, but not limited to, plywood, particleboard, sheet metal, concrete slabs, concrete barriers shall not be used for fencing or for walls.

4)

a) Chain link fencing used in non-residential zoning districts shall be coated in black, brown or dark green vinyl or equivalent, except that chain link fencing used in industrial zoning districts or for public utility purposes does not require vinyl coating.

b) In residential zoning districts, chain link fencing is only allowed in the side and/or rear yards of individual lots and is not allowed to be used by the developer of a subdivision for buffering and screening. Chain link fencing used for single-family recreational accessory uses as permitted in Section 4.5.4 such as but not limited to playgrounds, swimming pools, hot tubs, spas, tennis courts, volleyball courts, and basketball courts, shall be vinyl coated in black, brown or dark green, and must meet the requirements of Section 8.2.7(B)(1) “Fence/Wall Height”.

5) Barbed-wire and similar fence materials may only be used in conjunction with a permitted agricultural use or in conjunction with the permitted keeping of horses or livestock. Up to 2’ of barbed wire can be erected on top of another fence type for safety purposes for industrial and utility uses.

B) ***Fence/Wall Height***

1) No freestanding fence or wall shall exceed seven feet in height including piers, posts, and finials. Non-residential fences or walls may be higher for security and/or screening purposes with approval by the Planning Director, after taking into account topography, unique site conditions, and unique safety, security, and screening requirements of the property owner (see section 8.2.8, Screening). Vinyl coated chain link fencing for single-family recreational accessory uses that typically require taller fencing, such as tennis courts and basketball courts, may be approved up to 10 feet in height by the Planning Director, after taking into account site topography, existing and proposed vegetative screening, setbacks, unique site conditions, and the nature of the single-family recreational accessory use.

2) Fences and walls in front yards shall not exceed 48 inches in height. Piers or posts and finials may extend up to 6 inches higher than the finished fence or wall height.

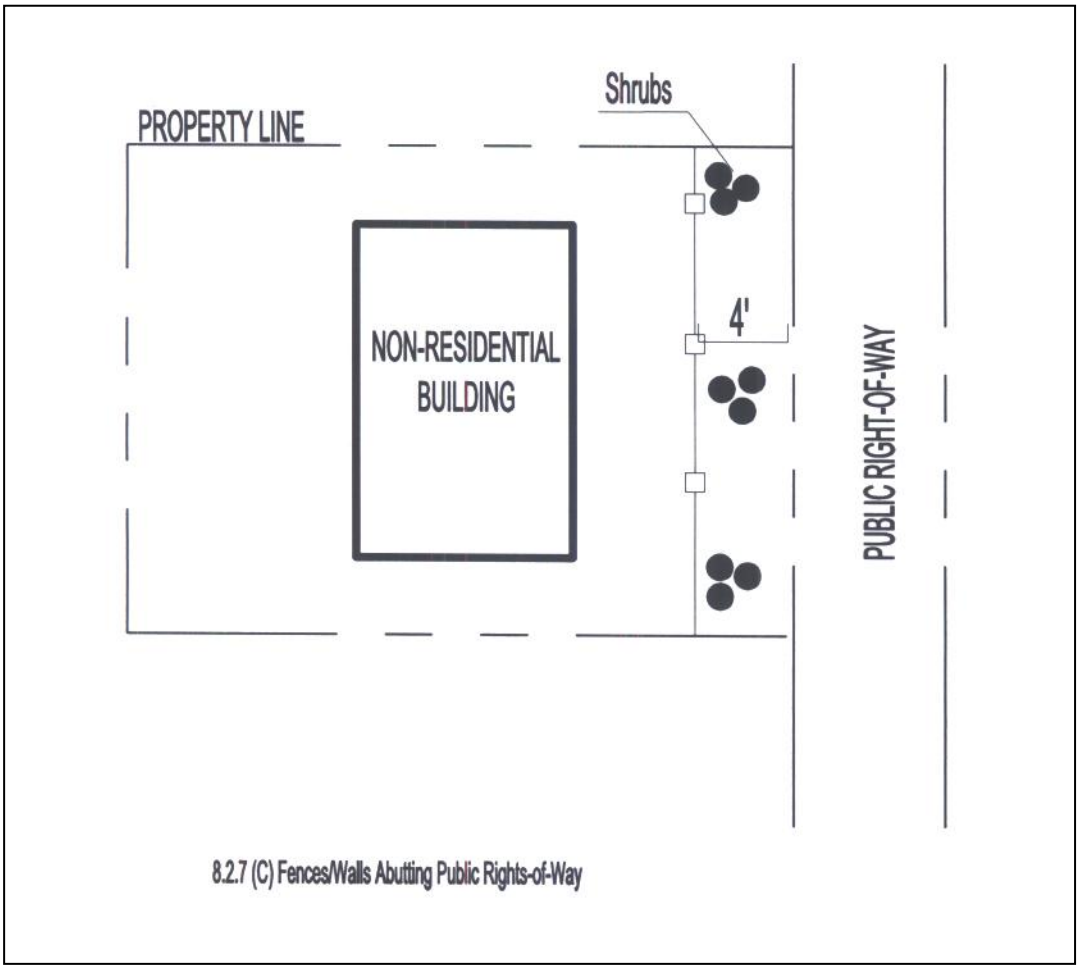
3) Fences and walls shall be allowed in the controlled and limited access highway buffer, thoroughfare buffer, and streetfront buffer provided that they meet the requirements of Section 8.2.7(F) “Fences in Required Buffers” and the height requirements of Section 8.2.7(B)(1) and (2).

C) ***Fences/Walls Abutting Public Rights-of-Way***

1) Where non-residential fencing or walls will abut a public right-of-way, it shall be set back at least 4 feet from the right-of-way, and a minimum of 3 small evergreen shrubs spaced every 20 feet shall be planted on the side of the fence or wall facing the surrounding rights-of way, walks, parks, trails, or other public use properties. Plantings shall not be planted within the public right-of-way. Fencing or walls must provide

visual interest through the use of different materials, decorative posts and finials.

2) Where a residential fence or wall will abut a major or minor thoroughfare, it must provide visual interest through changes in fence setbacks or materials, or through the use of decorative posts with finials, or through the use of plants spaced every 20 feet on the side of the fence or wall facing the public thoroughfare. Plantings shall not be planted within the public right-of-way.



D) ***Berms***

Berms may be utilized as part of the landscaping and shall be covered with turf grasses or other appropriate groundcovers, shrubs, and trees as required to meet specific landscaping, screening, or buffer requirements as determined by the Planning Department provided that:

1) Berms shall be constructed to blend into the overall landscape and undulate to imitate the surrounding topography.

2) Berms shall be constructed to drain well and be composed of soils suitable to grow and sustain plants with at least the top foot consisting of good quality topsoil.

3) The slope of a berm shall not exceed a three to one (3:1) run to rise ratio.

E) ***Fences/Walls in Required Buffers***

1) Fences/walls shall be permitted in buffers only where they are planned as an integral part of the buffer. Fences/walls are not allowed in Riparian Buffers per Sec. 6.1.11, except for fences/walls installed by the Town for utility protection. Where there is existing vegetation, the installation of the fence/wall must be done in such a manner as to protect significant vegetation, such as, but not limited to, being hand built and winding around trees. It is not the intent of this section to allow the piecemeal installation of fences/walls in buffers or the installation of private fences/walls that result in completely enclosing sections of buffer inside of a fence/wall or fences/walls.

2) Fences shall supplement and not replace the existing and/or required plantings. Fences shall be set back from the edge of the buffer so that the buffer plantings are located on both sides of the fence, with a minimum of four feet from public rights-of-way. Fences shall be of uniform design throughout the buffer. The property owners association or other entity controlling the buffer shall maintain fences. Privately owned and/or installed fences are not permitted in the buffers except where designed and approved as part of the overall buffer.

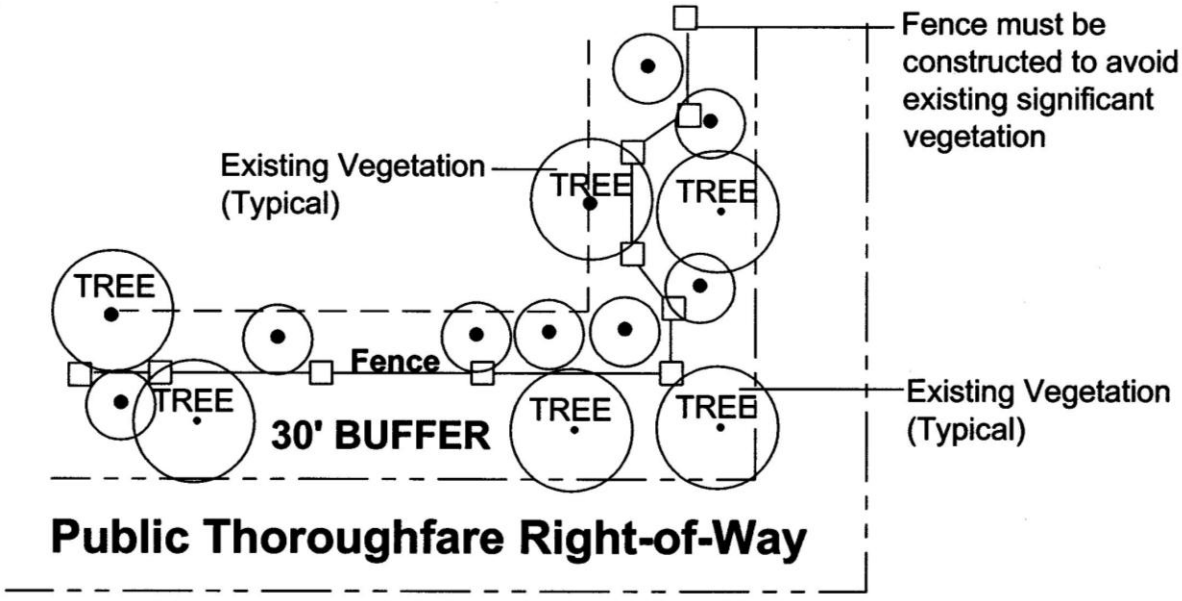


Figure 8.2.7(E): Fences/Walls in Required Buffers

F) ***Maintenance***

The owner of the property (or other party responsible for maintenance as depicted on the approved site plan) on which the fence, wall or berm is located is required to maintain the fence or wall in a safe and attractive condition. This shall mean the following:

1) No fence or wall shall have more that 20 percent of its surface area with disfigured, cracked, ripped or peeling paint or other material;

2) A fence or wall shall not stand with bent or broken supports, including loose or missing appendages;

3) Fences and walls shall be plumb (vertical) to the ground; and

4) Replacement of non-conforming fences, walls and berms shall comply with all the requirements of this section.

8.2.8 Screening

A) ***Integrate with Overall Design***
Loading docks, trash containers, outdoor storage, mechanical and HVAC equipment, and similar facilities on the roof, on the ground, or on buildings shall be incorporated into the overall design theme of the building and the landscape so that the architectural design is continuous and uninterrupted by ladders, towers, fences, and equipment, and no attention is attracted to such facilities by use of screening materials that are different from or inferior to the principal materials of the building and landscape. These areas shall be located and screened so that the visual and acoustic impacts of these facilities are fully contained and out of view from adjacent properties and public streets. See also Sec. 4.1.2 *Outside Storage, Display, and Sales/Rentals*.

B) ***Screening Methods***
Screening shall be accomplished by the following methods:

1) *Dumpsters.*

a) Dumpsters shall be screened with an opaque enclosure, fence or wall that reaches 8 feet in height or the height of the dumpster, whichever is higher. The design and materials of the enclosure, fence or wall must be presented as part of the exempt site plan, site plan, or master subdivision approval process. The screening structures must be constructed of masonry materials. The screening structures shall be architecturally compatible with the principal building(s) on site. The operational parts of the enclosure such as the gate frame and hinge assemblies must be built of heavy-duty material such as steel and engineered to hold up to daily use and abuse; wood is not allowed;

b) Gates or doors on dumpster enclosures shall be constructed of opaque metal, wood composite, or PVC composite. When composite products are used, they shall be placed close enough together to create an opaque gate. Any composite product used shall be lightweight. No wooden gates are permitted;

c) Where practical, shrubs or other plants must be planted outside the enclosure to visually soften the appearance;

d) The overall enclosure design must comply with the standards found in the Town's *Design and Development Manual*.

2) *Ground-located HVAC or other mechanical or utility equipment, including satellite dishes.* HVAC or other mechanical or utility equipment located on the ground shall be screened with an opaque fence and vegetation or with an opaque screen of evergreen shrubs. Fences or shrubs shall be a minimum height of the proposed structure to be screened at installation. If ground located HVAC or other mechanical or utility equipment (including satellite dishes) are 6' in height or taller, then fencing or other enclosure is required with vegetation planted outside the enclosure.

3) *Rooftop HVAC or other mechanical equipment, including satellite dishes.* HVAC or other mechanical equipment located on the roof of buildings and not adequately screened by parapet walls shall be screened with an opaque screen similar in materials and color to the building materials.

4) *Other.* Smaller devices such as but not limited to electrical boxes, vents, and externally mounted piping and conduit must also blend with and be incorporated into the overall architecture of the building. Where it is impractical to physically screen these smaller devices they may be painted to match the primary building color or the color of the portion of the building where they are mounted or affixed.

8.3 OFF-STREET PARKING AND LOADING

8.3.1 Applicability

A) ***New Development***
The off-street parking and loading standards of this section shall apply to the erection of any building, and to any new use established.

B) ***Downtown Exempted***
However, within the central business district, there shall be no minimum parking requirements in existing platted areas that are, or previously have been, in commercial use.

C) ***Expansions and Alterations***
The off-street parking and loading standards of this section shall apply when an existing structure or use is expanded or enlarged. Additional off-street parking and loading spaces shall be required to serve only the enlarged or expanded area, provided that in all cases the number of off-street parking and loading spaces provided for the entire use (pre-existing plus expansion) must equal at least 75 percent of the minimum ratio established in the Off-Street Parking Schedules of this section.

D) ***Change of Use***
Off-street parking and loading must be provided for any change of use or manner of operation that would, based on the Off-Street Parking Schedules of this section, result in a requirement for more parking or loading spaces than the existing use.

8.3.2 Off-Street Parking Requirements

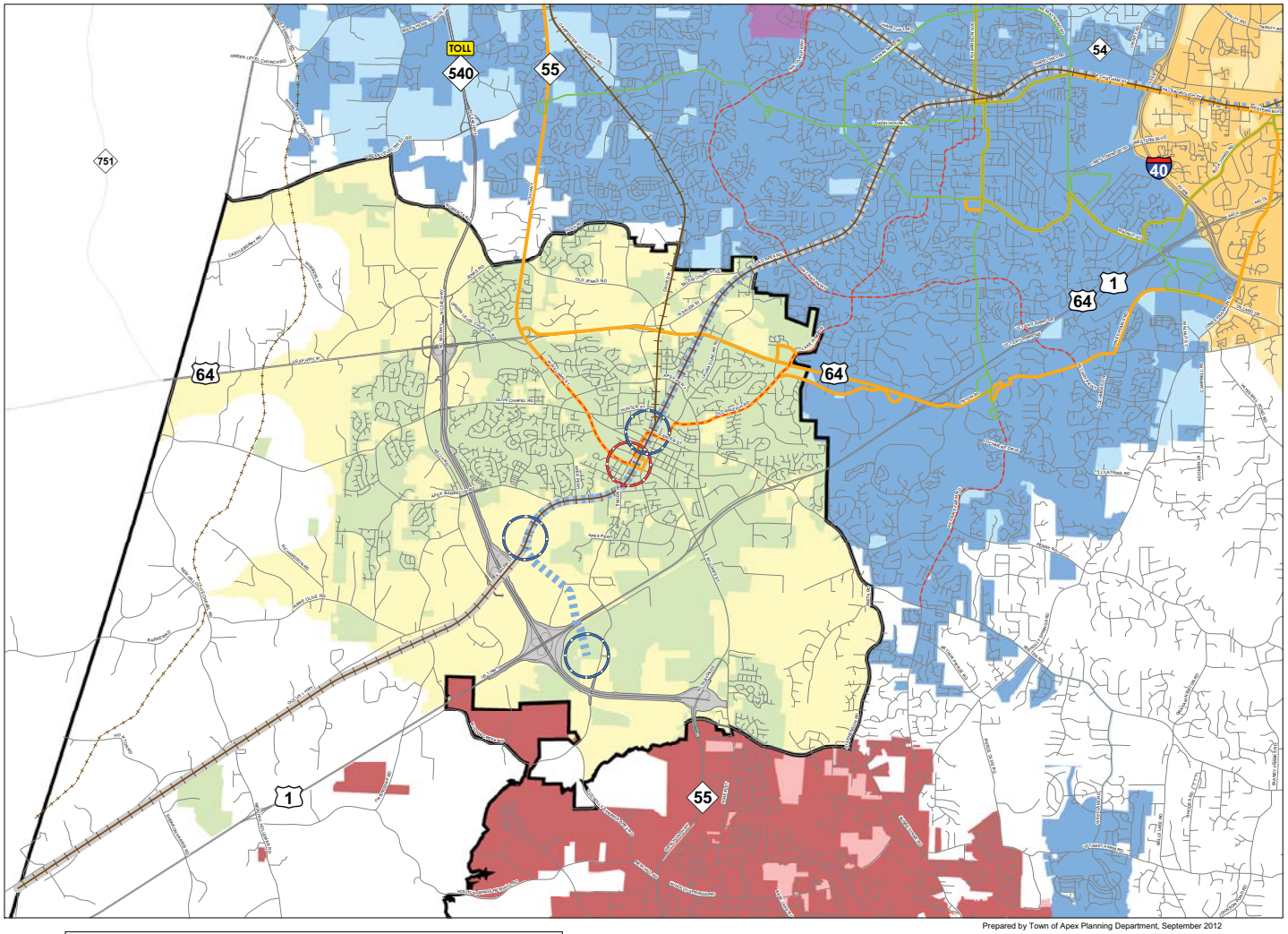
Appendix G – Master Plan Excerpts

1. **Transportation**
   - Transit Plan
   - Thoroughfare and Collector Street Plan
   - Bicycle, Pedestrian, and Equestrian Plan
2. **Open Space – Parks, Recreation, Greenways, and Open Space Master Plan**
   - Existing Facilities
   - Proposed Greenways
   - Propose Acquisitions
3. **Other Infrastructure**
   - Wastewater Systems Map
   - Collection System Operation with Regional Plant
   - Water Distribution System Facility Plan
   - National Register Historic District
   - Small Town Character Area Plan Overlay District
   - Map of Structural BMPs
   - List of BMPs

1. Transportation

- Transit Plan
- Thoroughfare and Collector Street Plan
- Bicycle, Pedestrian, and Equestrian Plan

Transit Plan
Apex, North Carolina



Prepared by Town of Apex Planning Department, September 2012

- Road
- NC 540 (Under Construction)

Potential Transit Center:
- Bus
- Rail and Bus

Transit Corridor:
- Existing Cary Transit Bus Corridor
- Existing Triangle Transit Bus Corridor
- Future Cary Transit Bus Corridor
- Former Rail Corridor, Preserved
- Existing Rail Corridor
- Existing Amtrak Corridor
- Possible Light Rail Corridor

- Study Area
- Wake County Line

Municipalities:
- Apex Corporate Limits
- Apex Extraterritorial Jurisdiction
- Cary Corporate Limits
- Cary Extraterritorial Jurisdiction
- Holly Springs Corporate Limits
- Holly Springs Extraterritorial Jurisdiction
- Morrisville Corporate Limits
- Morrisville Extraterritorial Jurisdiction
- Raleigh Corporate Limits
- Raleigh Extraterritorial Jurisdiction

N

Adopted by Town of Apex Town Council October 15, 2002

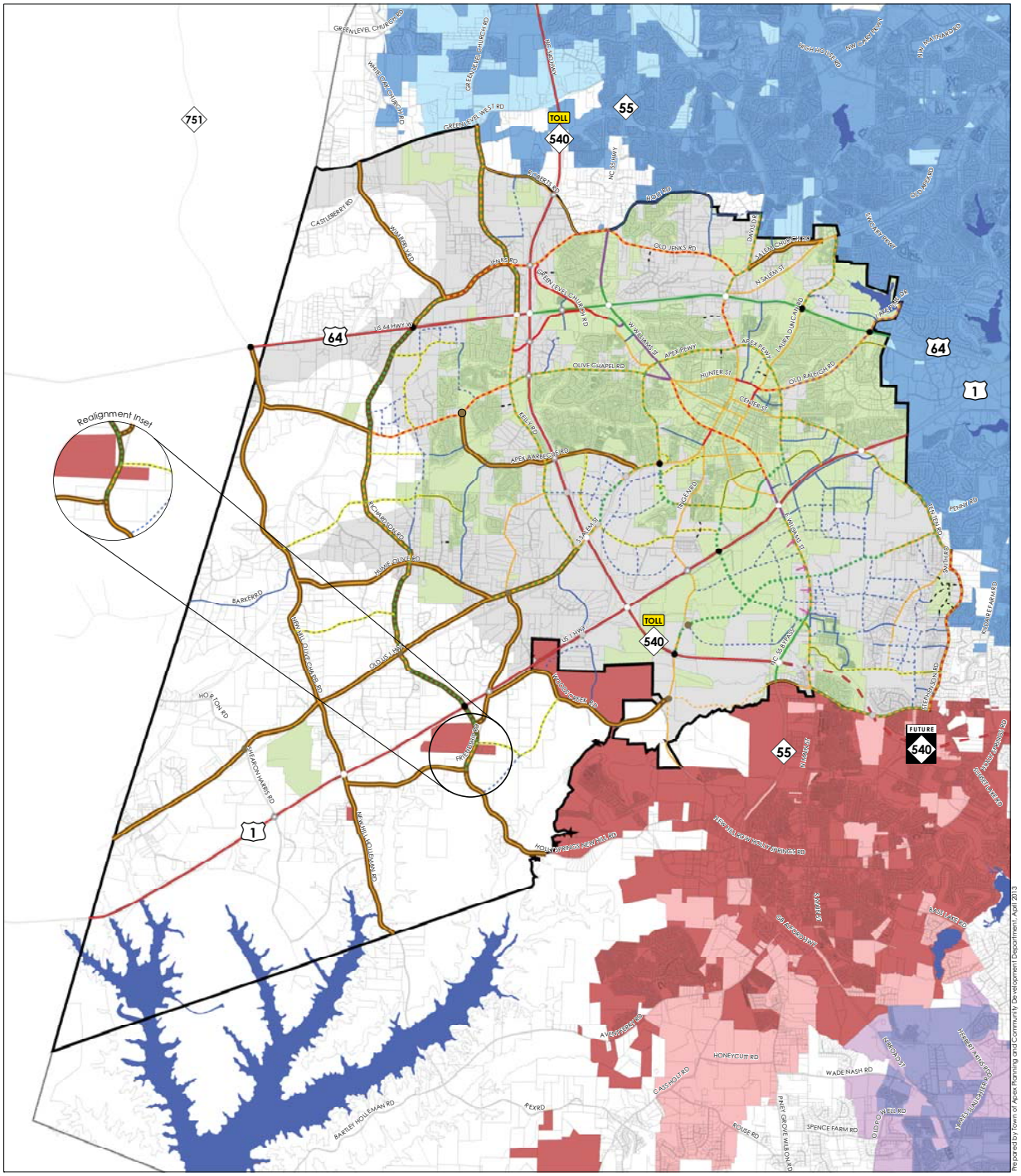
Amended:
March 15, 2005
September 15, 2009
October 19, 2010

0 5,000 10,000 15,000 Feet

0 0.5 1 2 3 Miles

Apex Transportation Plan

Thoroughfare and Collector Street Plan



- Existing Streets
- Study Area
- Wake County Line
- Parcel
- Water Body
- Apex Corporate Limits
- Apex Extraterritorial Jurisdiction
- Cary Corporate Limits
- Cary Extraterritorial Jurisdiction
- Holly Springs Corporate Limits
- Holly Springs Extraterritorial Jurisdiction
- Fuquay-Varina Corporate Limits
- Fuquay-Varina Extraterritorial Jurisdiction

Special Street Designations
- Rural
- Future Local Connector

Collector Streets

Minor Collector:
- Existing
- New Location

Major Collector:
- Existing
- New Location

Thoroughfares

2 Lanes:
- Existing
- New Location

3 Lanes:
- Existing
- New Location
- Widening

4 Lanes with Median:
- Existing
- New Location
- Widening

5 Lanes:
- Existing
- Widening

Freeway:
- Existing
- New Location

Intersection Treatments
- Future Realignment
- Existing Grade Separation
- Future Grade Separation
- Existing Interchange
- Future Interchange
- Future Full-Movement Intersection

The Town of Apex Planning Department and Geographic Information Services (GIS) shall not be held liable for any errors concerning content or positional accuracy of this mapped information. "New Location" roadway alignments are not exact. Proposed locations for future roadways are chosen using the best data available at the time of approval. The user must consult the primary sources from which the Town of Apex Planning Department and GIS compiled this product.

0 5,000 10,000 15,000 Feet

1 inch = 3,000 feet

0 0.5 1 2 3 Miles

Adopted by Town of Apex Board of Commissioners October 15, 2002

Amended:
March 16, 2004 *July 20, 2004* *March 15, 2005*
May 18, 2004 *October 19, 2004* *May 17, 2005*

Updated by the Town of Apex Town Council March 21, 2006

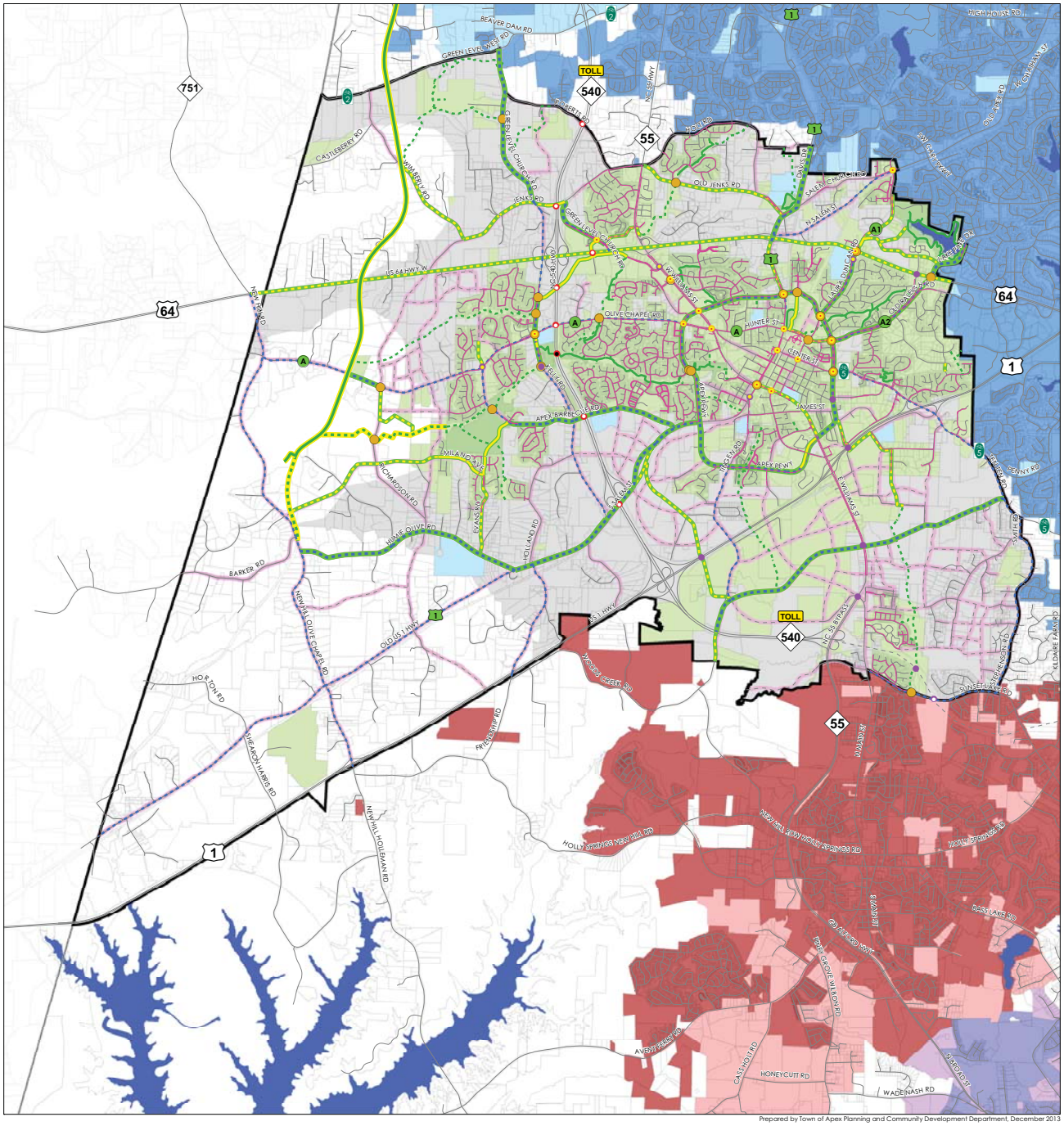
Amended:
February 20, 2007 *July 15, 2008* *October 19, 2010*
August 21, 2007 *October 21, 2008*
October 16, 2007 *December 15, 2009*

Updated by the Town of Apex Town Council July 19, 2011

Amended:
July 17, 2012 *September 18, 2012* *April 16, 2013*

Apex Transportation Plan

Bicycle, Pedestrian, and Equestrian Plan



Prepared by Town of Apex Planning and Community Development Department, December 2013

The Town of Apex Planning Department and Geographic Information Services (GIS) shall not be held liable for any errors concerning content or positional accuracy of this mapped information. "New Location" roadway alignments are not exact. Proposed locations for future roadways are chosen using the best data available at the time of approval. The user must consult the primary sources from which the Town of Apex Planning Department and GIS compiled this product.

- Existing Street
- Future Street
- Study Area
- Wake County Line
- Water Body
- Apex Corporate Limits
- Apex Extraterritorial Jurisdiction
- Cary Corporate Limits
- Cary Extraterritorial Jurisdiction
- Holly Springs Corporate Limits
- Holly Springs Extraterritorial Jurisdiction
- Fuquay-Varina Corporate Limits
- Fuquay-Varina Extraterritorial Jurisdiction
- Existing Sidewalk
- Proposed Sidewalk
- Existing Greenway
- Proposed Greenway
- Existing Greenway with Equestrian Facilities
- Proposed Greenway with Equestrian Facilities
- Existing Multi-Use Path (Bicycle & Pedestrian)
- Proposed Multi-Use Path
- Proposed Wide Outside Lane for Bicycle Use
- Proposed Wide Outside Lane and Multi-Use Path
- Community Park/Open Space
- Public School
- Existing Pedestrian/Vehicle Bridge
- Existing Pedestrian Underpass
- Proposed Pedestrian Bridge/Underpass
- Proposed Pedestrian/Vehicle Bridge
- Existing Pedestrian Crossing
- Proposed Pedestrian Crossing
- Proposed Pedestrian Intersection Improvements
- United States Bicycle Route 1
- North Carolina Bicycle Route 2
- North Carolina Bicycle Route 5
- Proposed Apex Bicycle Route

0 5,000 10,000 15,000 Feet

0 0.5 1 2 3 Miles

Adopted by Town of Apex Board of Commissioners: October 15, 2002

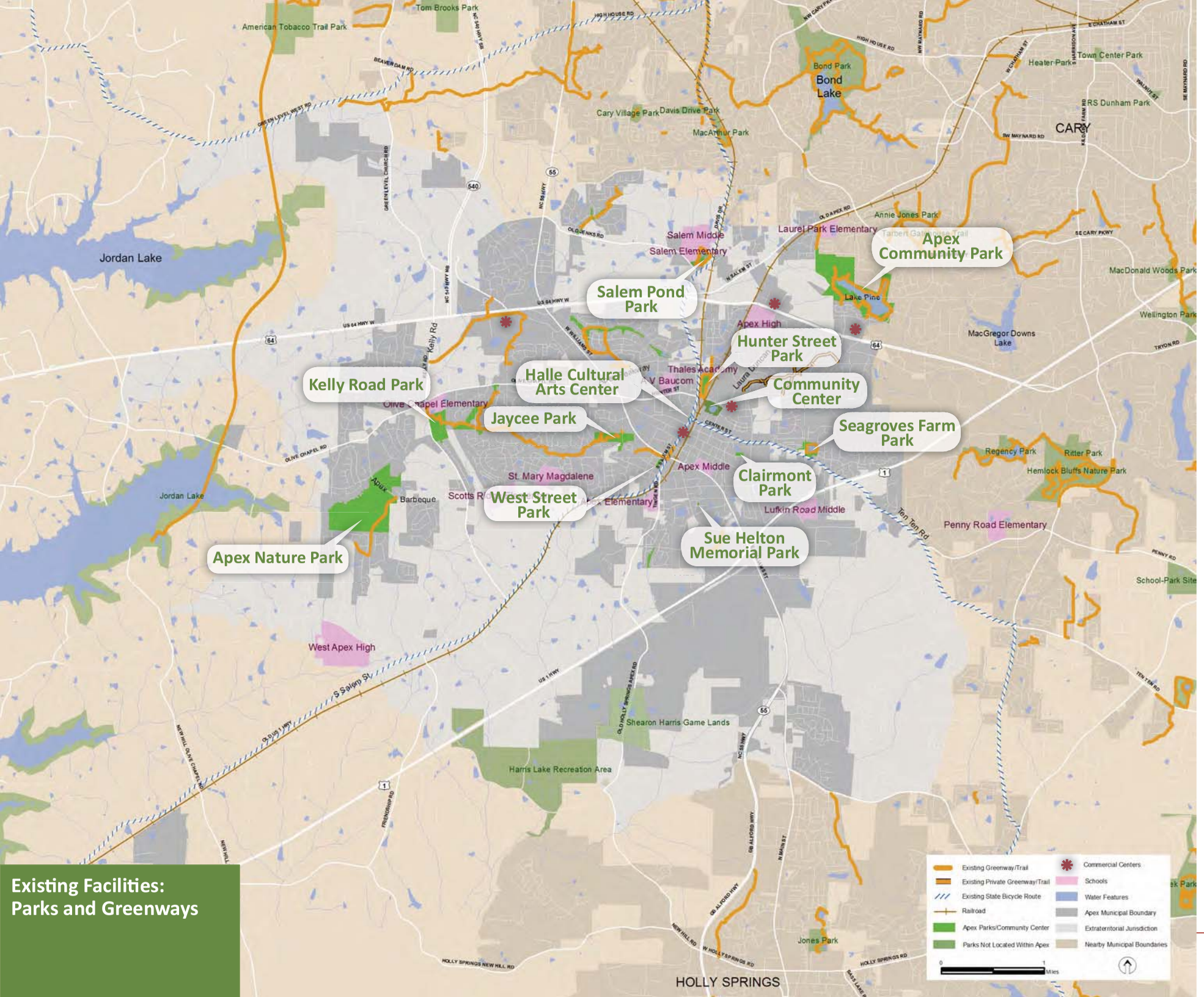
Amended:
May 18, 2004
June 21, 2005
October 17, 2006
October 16, 2007
April 15, 2008
July 15, 2008
December 16, 2008
September 15, 2009

Updated by Town of Apex Town Council: July 19, 2011

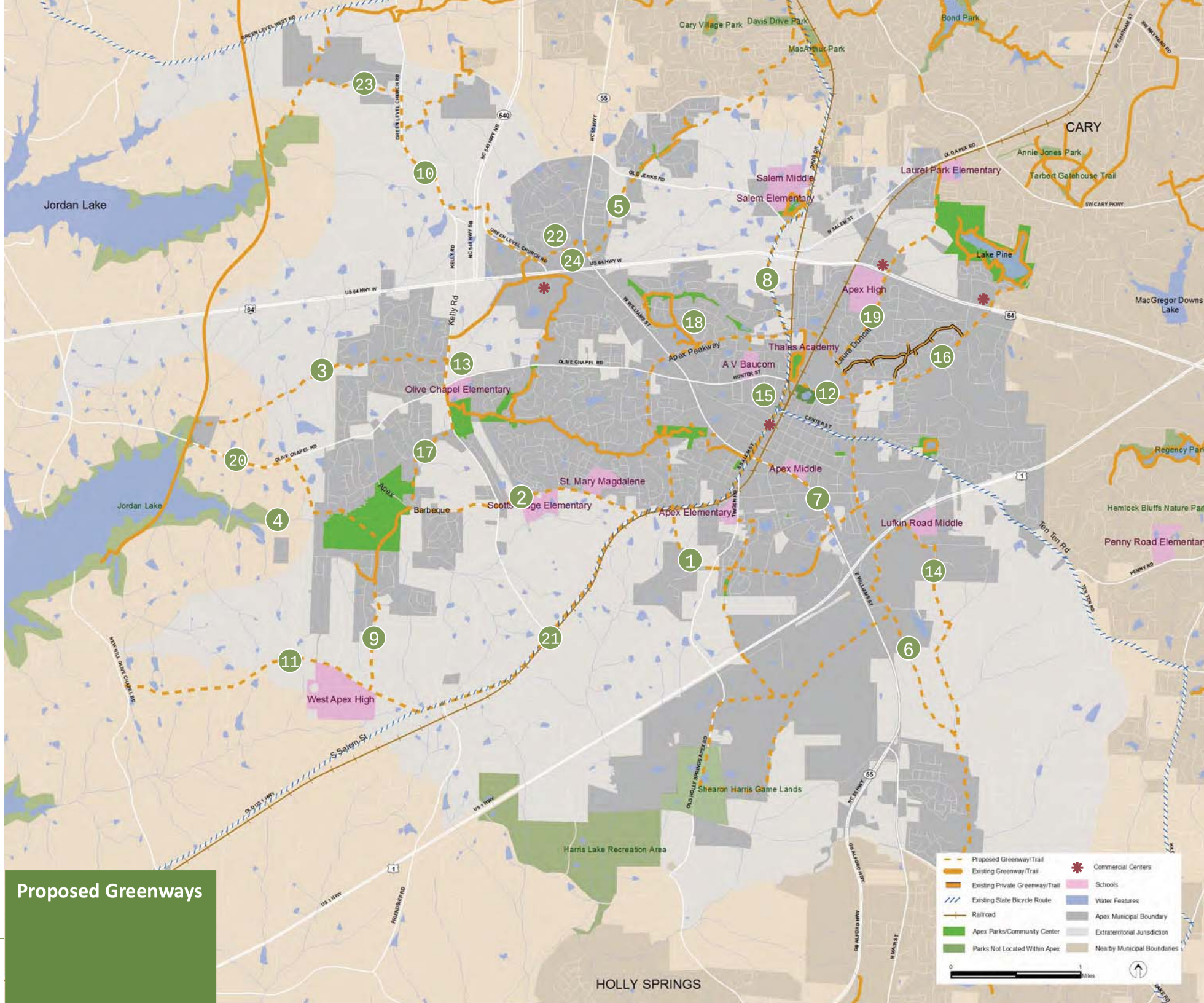
Amended:
September 18, 2012
December 17, 2013

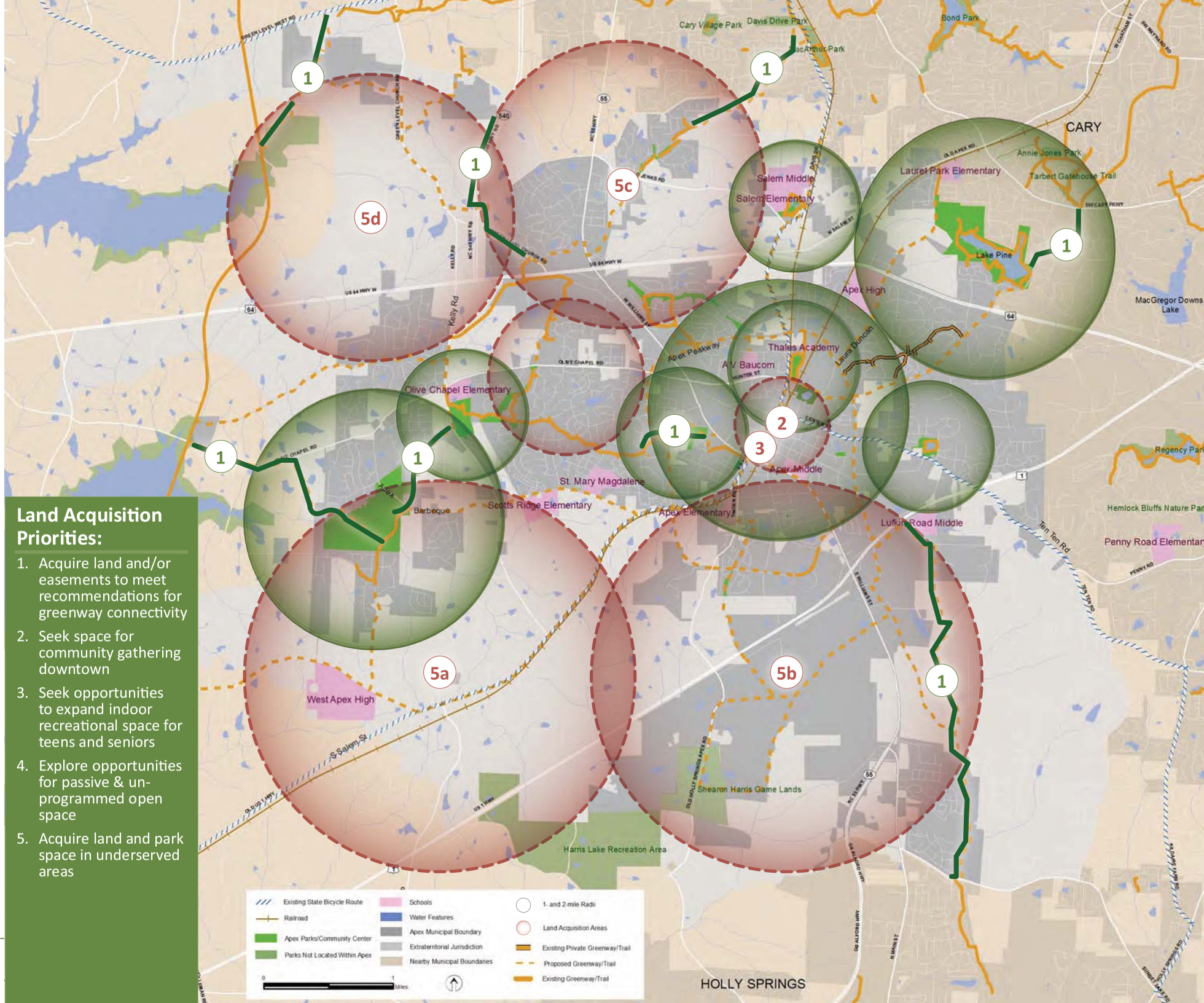
2. Open Space – Parks, Recreation, Greenways, and Open Space Master Plan

- Existing Facilities
- Proposed Greenways
- Propose Acquisitions



Existing Facilities: Parks and Greenways

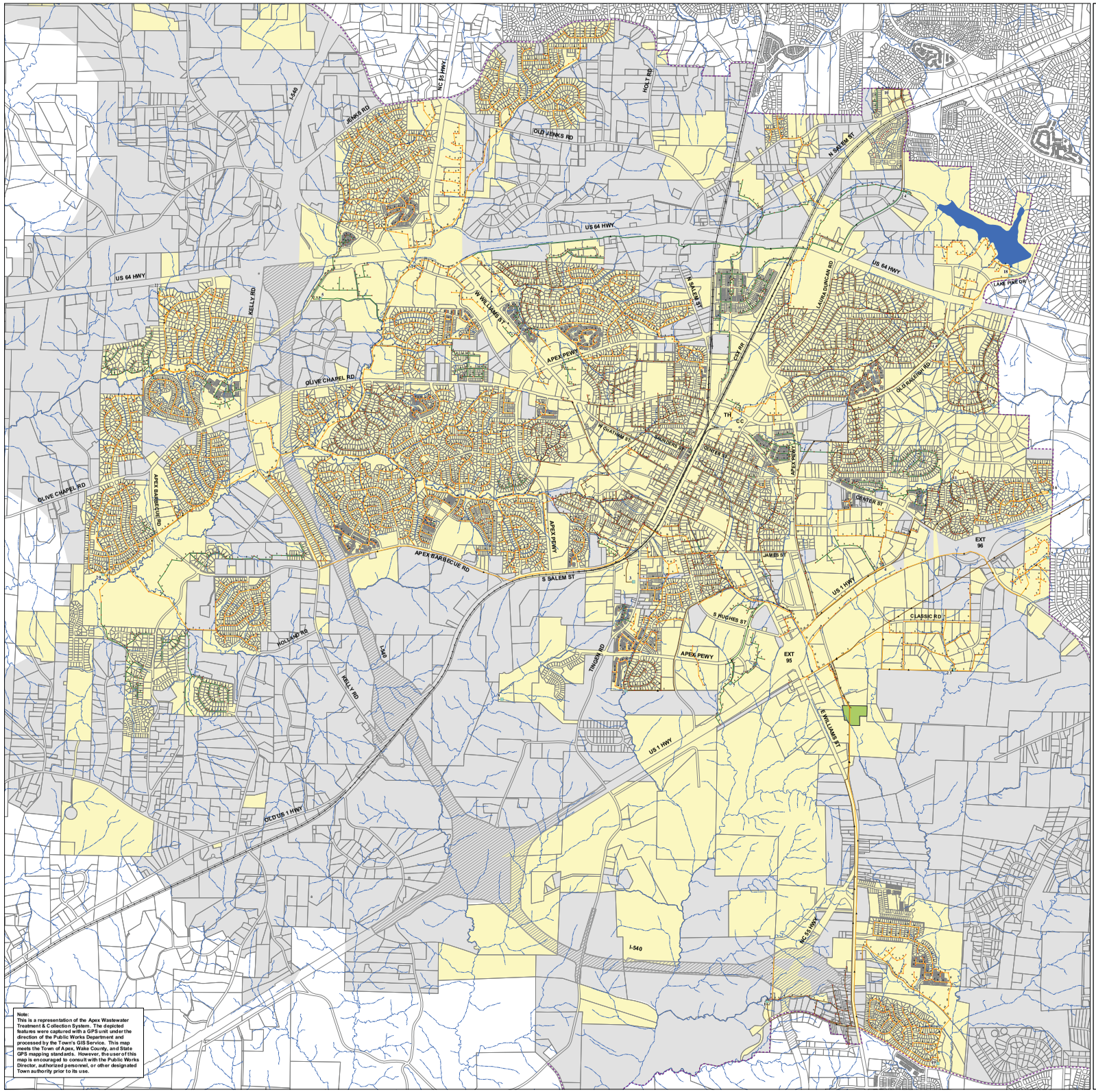

Proposed Greenways
Jordan Lake
Cary Village Park
Davis Drive Park
MacArthur Park
Bond Park
CARY
Annie Jones Park
Tarbert Gatehouse Trail
Laurel Park Elementary
Salem Middle
Salem Elementary
Lake Pine
Apex High
MacGregor Downs Lake
Thales Academy
Laura Duncan
A V Baucom
Olive Chapel Elementary
Kelly Rd
Apex Peakway
Apex Middle
St. Mary Magdalene
Apex Elementary
Lufkin Road Middle
Hemlock Bluffs Nature Par
Penny Road Elementar
Ten Ten Rd
Barbeque
West Apex High
Shearon Harris Game Lands
Harris Lake Recreation Area
HOLLY SPRINGS
Proposed Greenway/Trail
Existing Greenway/Trail
Existing Private Greenway/Trail
Existing State Bicycle Route
Railroad
Apex Parks/Community Center
Parks Not Located Within Apex
Commercial Centers
Schools
Water Features
Apex Municipal Boundary
Extraterritorial Jurisdiction
Nearby Municipal Boundaries
Miles


Land Acquisition Priorities:
1. Acquire land and/or easements to meet recommendations for greenway connectivity
2. Seek space for community gathering downtown
3. Seek opportunities to expand indoor recreational space for teens and seniors
4. Explore opportunities for passive & un-programmed open space
5. Acquire land and park space in underserved areas
5a
5b
5c
5d
1
2
3
CARY
HOLLY SPRINGS
Cary Village Park
Davis Drive Park
Bond Park
Annie Jones Park
Tarbert Gatehouse Trail
Laurel Park Elementary
Salem Middle
Salem Elementary
Lake Pine
Apex High
MacGregor Downs Lake
Thales Academy
A.V. Baucom
Laura Duncan
Apex Peakway
Olive Chapel Elementary
Barbeque
Scotts Ridge Elementary
St. Mary Magdalene
Apex Elementary
Apex Middle
Lufkin Road Middle
Regency Park
Hemlock Bluffs Nature Park
Penny Road Elementary
Ten Ten Rd
West Apex High
Shearon Harris Game Lands
Harris Lake Recreation Area
Kelly Rd
S Salem St
Existing State Bicycle Route
Railroad
Apex Parks/Community Center
Parks Not Located Within Apex
Schools
Water Features
Apex Municipal Boundary
Extraterritorial Jurisdiction
Nearby Municipal Boundaries
1- and 2-mile Radii
Land Acquisition Areas
Existing Private Greenway/Trail
Proposed Greenway/Trail
Existing Greenway/Trail
Miles

3. Other Infrastructure

- Wastewater Systems Map
- Collection System Operation with Regional Plant
- Water Distribution System Facility Plan
- National Register Historic District
- Small Town Character Area Plan Overlay District
- Map of Structural BMPs
- List of BMPs

Town of Apex, NC
Wastewater System Map
2012



Note:
This is a representation of the Apex Wastewater Treatment & Collection System. The depicted features were captured with a GPS unit under the direction of the Public Works Department and processed by the Town's GIS Service. This map meets the Town of Apex, Wake County, and State GPS mapping standards. However, the user of this map is encouraged to consult with the Public Works Director, authorized personnel, or other designated Town authority prior to its use.

Legend

- Utility Agreement Line
- Air Release Valves
- Manholes
- Pump Stations

Wastewater Lines

Install Year

- Before 1994
- 1995 - 2004
- 2005 - Present
- Railroads
- Proposed I-540
- Apex WRF
- Property Lines
- Apex Town Limits
- Apex ETJ

N

0 0.25 0.5 1 1.5

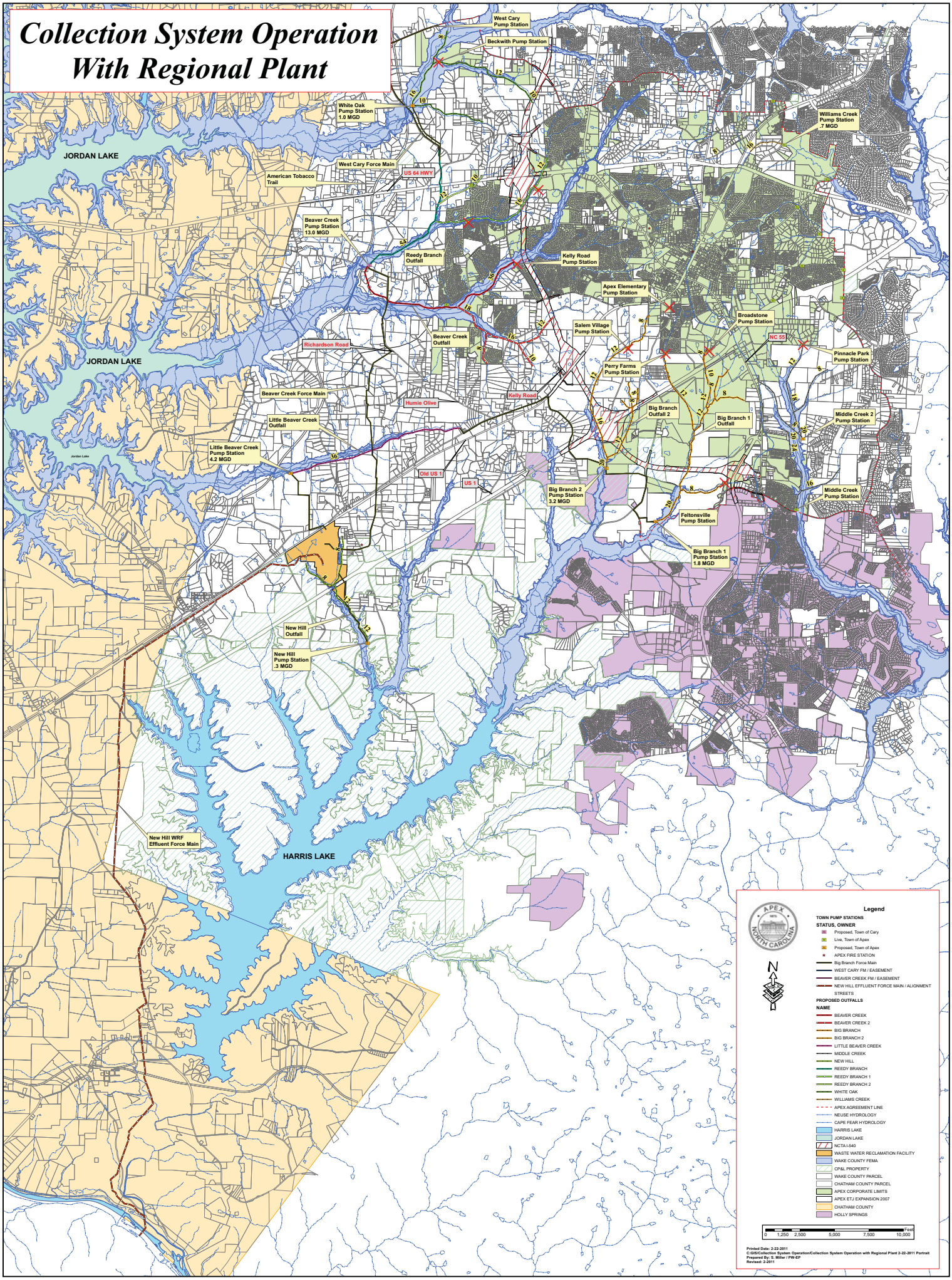
Miles

Wastewater Pump Station Locations

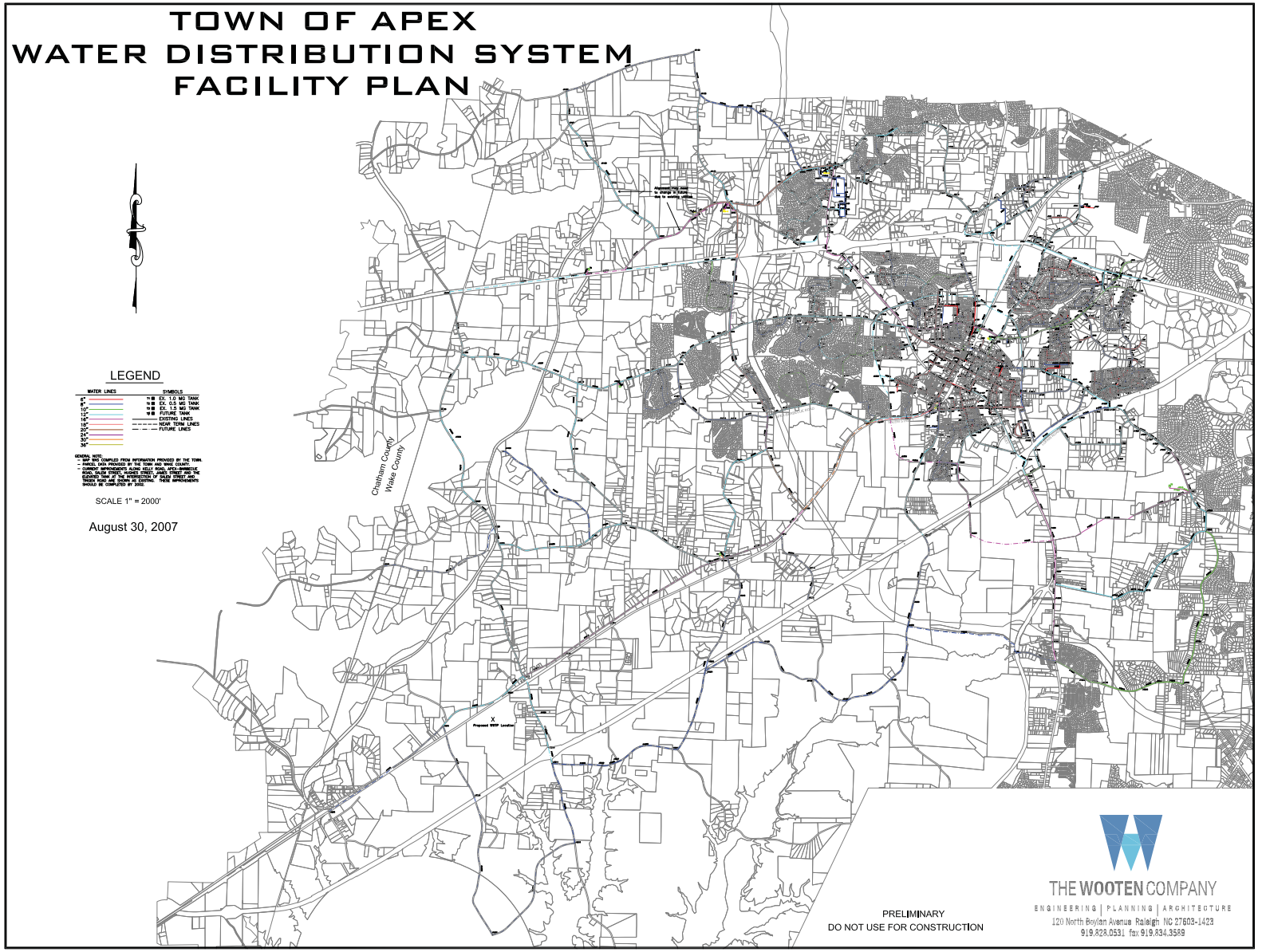
ID	NAME	ADDRESS	GPM	HP	OWNER	TYPE	STATUS	YEAR
1	FELTONSVILLE	5940 1/2 Old Smithfield Rd	180	25.0	TOA	Submersible	Fair	1981
2	PERRY FARMS	1232 1/2 Perry Rd	180	20.0	TOA	Suction Lift	Fair	1994
3	APEX ELEMENTARY	730 1/2 Tingen Rd	100	10.0	TOA	Submersible	Good	1997
4	SCHIEFFELIN ROAD	2499 1/2 Schieffelin Rd	220	5.0	TOA	Suction Lift	Fair	1997
5	BEAVER CREEK CROSSINGS	1599 Beaver Creek Commons Dr	700	15.0	TOA	Submersible	Good	2006
6	KELLY ROAD	1701 1/2 Kelly Rd	4000	300.0	TOA	Submersible	Good	1995
7	BROADSTONE STATION	1121 Broadstone Way	460	30.0	TOA	Submersible	Good	2009
8	SALEM VILLAGE	1791 Salem Village Dr	348	25.0	TOA	Suction Lift	Good	2012
10	PARKWAY POINT	2525 1/2 Laura Duncan Rd	100	20.0	TOA	Submersible	Fair	1995
11	WATERFORD GREEN #1	1016 1/2 Camberley Dr	400	20.0	TOA	Submersible	Fair	1993
14	SHEPHERDS VINEYARD	2131 1/2 Old Raleigh Rd	960	125.0	TOA	Submersible	Fair	1985
15	BUCKINGHAM	1000 1/2 East Sterlington Pl	110	10.0	TOA	Submersible	Fair	1987
16	WATERFORD GREEN #2	2422 1/2 Watersglen Dr	78	9.4	TOA	Submersible	Good	1995
17	AVALON PEAKS	1600 1/2 Nasturtium Way	225	5.0	TOA	Suction Lift	Fair	1997
18	SUMMIT LAKE	2525 1/2 Lake Pine Rd	188	10.0	TOA	Suction Lift	Fair	1996
19	MIDDLE CREEK - SUNSET HILLS	4251 1/2 Sunset Lake Rd	460	60.0	TOA	Submersible	Good	1996
20	HOLLAND CROSSINGS	411 1/2 Blushing Rose Way	580	33.5	TOA	Submersible	Fair	1996
21	HOMESTEAD PARK	620 1/2 Homestead Park Dr	380	33.5	TOA	Submersible	Good	1996
22	ABBINGTON	2731 1/2 US 64 Hwy	100	9.4	TOA	Submersible	Fair	1998
23	PINNACLE PARK	2025 1/2 Production Dr	400	28.0	TOA	Submersible	Good	1995
24	WILLIAMS CREEK	2080 Laura Duncan Rd	1035	125.0	TOA	Submersible	Good	2008

TOA-GIS
Printed October 2012

Collection System Operation With Regional Plant



TOWN OF APEX
WATER DISTRIBUTION SYSTEM
FACILITY PLAN



LEGEND

WATER LINES

6"	
8"	
10"	
12"	
16"	
20"	
24"	
30"	
36"	

SYMBOLS

- EX. 1.0 MG TANK
- EX. 0.5 MG TANK
- FUTURE TANK
- EXISTING LINES
- NEAR TERM LINES
- FUTURE LINES

GENERAL NOTE:
- WWP WAS COMPILED FROM INFORMATION PROVIDED BY THE TOWN.
- WWP WAS NOT AVAILABLE AS PROVIDED BY THE TOWN AND WAKE COUNTY.
- FUTURE IMPROVEMENTS ALONG KELLY ROAD, VICK-SIMPKINS ROAD, OLIVE STREET, HUGHES STREET, JAMES STREET AND THE ELEVATED TANK AT THE INTERSECTION OF SALEM STREET AND HUGHES STREET ARE CURRENTLY UNDER CONSTRUCTION. THESE IMPROVEMENTS SHOULD BE COMPLETED BY 2008.

SCALE 1" = 2000'

August 30, 2007

PRELIMINARY
DO NOT USE FOR CONSTRUCTION

THE WOOTEN COMPANY
ENGINEERING | PLANNING | ARCHITECTURE
120 North Boylan Avenue Raleigh NC 27603-1423
919.828.0531 fax 919.834.3589

National Register Historic District
Town of Apex, North Carolina



Original District (1994)					
ID #	STREET ADDRESS		ID #	STREET ADDRESS	
1	306	S SALEM ST	41	104	N SALEM ST
2	300	S SALEM ST	42	106	N SALEM ST
3	212	S SALEM ST	43	108-110	N SALEM ST
4	210	S SALEM ST	44	112	N SALEM ST
5	206	S SALEM ST	45	114	N SALEM ST
6	202	S SALEM ST	46	116-118	N SALEM ST
7	114	S SALEM ST	47	120	N SALEM ST
8	110	S SALEM ST	48	120	N SALEM ST
9	112	S SALEM ST	49	126	N SALEM ST
10	101-103	N SALEM ST	50	210	N SALEM ST
11	105	N SALEM ST	51	112-116	N SALEM ST
12	107-109	N SALEM ST	52	220	N SALEM ST
13	111-113A	N SALEM ST	53		CSX RAILROAD TRACKS
14	113	N SALEM ST	54	300	N SALEM ST
15	115	N SALEM ST	55	100	CENTER ST ON RR TRACKS
16	117	N SALEM ST	56	308	N SALEM ST
17	119	N SALEM ST	57	316	N SALEM ST
18	121-123	N SALEM ST	58	406	N ELM ST
19	125-127	N SALEM ST	59	205	CENTER ST
20	219	N SALEM ST	60	207	CENTER ST
21	221-223	N SALEM ST	61	209	CENTER ST
22	225	N SALEM ST	62	213	CENTER ST
23	235-237	N SALEM ST	63	301	CENTER ST
24	215	TEMPLETON ST	64	212	CENTER ST
25	305	N SALEM ST	65	300	CENTER ST
26	307-309	N SALEM ST	66	306	CENTER ST
27	311	N SALEM ST	67	104	W CHATHAM ST
28	317	N SALEM ST	68	106	W CHATHAM ST
29	323	N SALEM ST	69	108	W CHATHAM ST
30	401	N SALEM ST	70	200	W CHATHAM ST
31	405	N SALEM ST	71	202	W CHATHAM ST
32	409	N SALEM ST	72	206	W CHATHAM ST
33	207	S SALEM ST	73	210	W CHATHAM ST
34	203	S SALEM ST	74	218	W CHATHAM ST
35	201	S SALEM ST	75	201	W CHATHAM ST
36	115	S SALEM ST	76	205	W CHATHAM ST
37	111	S SALEM ST	77	207	W CHATHAM ST
38	107	S SALEM ST	78	209	W CHATHAM ST
39	103	S SALEM ST	79	211	W CHATHAM ST
40	100-102	N SALEM ST	80	215	W CHATHAM ST
			81	219	W CHATHAM ST
			82	106	HOLLEMAN ST
			83	108	HOLLEMAN ST

1st Expansion (1995)		
ID #	STREET ADDRESS	
84	203	E CHATHAM ST
85	209	E CHATHAM ST
86	215	E CHATHAM ST
87	301	E CHATHAM ST
88	216	E CHATHAM ST
89	202	S HUGHES ST
90	101	S HUGHES ST
91	105	S HUGHES ST
92	107	S HUGHES ST
93	111	S HUGHES ST
94	115	S HUGHES ST
95	201	S HUGHES ST
96	205	S HUGHES ST
97	209	S HUGHES ST
98	311	OLIVE ST
99	315	OLIVE ST
100	306	OLIVE ST
101	410	OLIVE ST
102	200	S MASON ST
103	302	S MASON ST
104	109	S MASON ST
105	115	S MASON ST
106	201	S MASON ST
107	205	S MASON ST
108	207	S MASON ST
109	211	S MASON ST
110	307	E MOORE ST
111	313	E MOORE ST

2nd Expansion (2002)		
ID #	STREET ADDRESS	
1	105	HUNTER ST
2	107	HUNTER ST
3	111	HUNTER ST
4	115	HUNTER ST
5	201	HUNTER ST
6	205	HUNTER ST
7	108	HUNTER ST
8	110	HUNTER ST
9	112	HUNTER ST
10	116	HUNTER ST
11	200	HUNTER ST
12	408	GROVE ST
13	406	GROVE ST
14	402	GROVE ST
15	411	GROVE ST
16	409	GROVE ST
17	403	GROVE ST
18	108	THOMPSON ST

3rd Expansion (2008)		
ID #	STREET ADDRESS	
1	305	CENTER ST
2	305	E CHATHAM ST
3	314	E CHATHAM ST
4	222	W CHATHAM ST
5	109	CUNNINGHAM ST
6	109	HOLLEMAN ST
7	203	HOLLEMAN ST
8	211	HUDSON AVE
9	301	S HUGHES ST
10	305	S HUGHES ST
11	307	S HUGHES ST
12	309	S HUGHES ST
13	313	S HUGHES ST
14	300	S HUGHES ST
15	302	S HUGHES ST
16	304	S HUGHES ST
17	308	S HUGHES ST
18	310	S HUGHES ST
19	312	S HUGHES ST
20	204	HUNTER ST
21	208	HUNTER ST
22	212	HUNTER ST
23	216	HUNTER ST
24	209	HUNTER ST
25	111	JONES ST & 216 HOLLEMAN ST
26	104	JONES ST
27	110	JONES ST
28	308	E MOORE ST
29	200	W MOORE ST
30	206	W MOORE ST
31	210	W MOORE ST
32	203	W MOORE ST
33	205	W MOORE ST
34	409	OLIVE ST
35	411	OLIVE ST
36	415	OLIVE ST
37	501	OLIVE ST
38	509	OLIVE ST
39	414	OLIVE ST
40	209	S SALEM ST
41	305	S SALEM ST
42	314	S SALEM ST
43	100	W WILLIAMS ST

0 500 1,000 Feet

1 inch = 200 feet

N W E S

Contributing (C) Structure

Noncontributing (NC) Structure

(NC) Primary Structure with Secondary (C) Structure

Historic Landmark Designation:

National Register, Wake County, & Apex

Wake County & Apex

Wake County

Apex

Town of Apex Planning Department, December 2010

The Town of Apex Geographic Information Services (GIS) shall not be held liable for any errors concerning the data contained in this product. Any person using this data assumes all responsibility for the primary sources from which the Town of Apex GIS compiled this product.

Small Town Character Area Plan
Overlay District



Adopted July 18, 2006
Amended February 20, 2007

Purpose

The purpose and intent of the Small Town Character Overlay District is to repeat the spirit of traditional character rather than imitate style. The Overlay identifies the architectural qualities that define the downtown character and proposes desi gn standards to maintain that character in new and infill projects. These standards emphasize existing patterns and include: building hierarchy, building site relationship, building massing and proportions, building height and roof type, façade patterns, street level facades, and window patterns.

Applicability

The requirements of the Small Town Character Overlay District shall apply to properties within the Overlay District which are proposing to develop or redevelop. Those lots that are split by the Ov erlay District line shall be considered to be wholly within the boundary of the Overlay District if the majority of the acreage is located within the Overlay District.

Development Approval

Within the Small Town Character Overlay District either an Administrative Approval, Site Plan Approval, or Subdivision Plan Approval is required in accordance with Article 2 *Administration* of the Apex Unified Development Ordinance.

Apex Peakway - Planned
Railroad
Parcel
Central Business District
Overlay District

0 500 1,000 2,000 3,000 Feet

N

Prepared by:
Town of Apex
Planning Department
March 2011

Town of Apex
Structural BMP Map

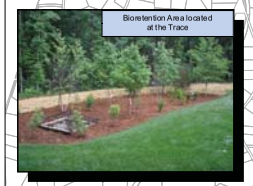














White Oak Basin

Crabtree Creek Basin

Williams Creek Basin

Beaver Creek Basin

Swift Creek Basin

Big Branch Basin

Middle Creek Basin

Apex / Cary Water Treatment Plant

Middle Creek WRF

BMP ID	BMP Site
1	HIBBARD TOYOTA
2	CAMDEN ATLANTIC PINE
3	WATERFORD GREEN
4	AVALON PEAKS
5	LAKE PINE PLAZA
6	WENDY'S
7	EVA PERRY LIBRARY
8	WINDING STATION
9	BRIGHT HORIZONS DAYCARE
10	OLDHOUSE RIDGE
11	OLDHOUSE RIDGE II
12	WOODRIDGE
13	OLD TRAIL
14	PINE PLAZA
15	SURREY MEADOWS
16	HADDEN HALL COMMONS
17	PINE STRAW PATIO
18	APEX CROSSING
19	CENTENNIAL PARK PHARMACY
20	OLD TOWN MALL
21	WALDEN (NEW TOWN HOMES
22	APEX GYMNASTICS
23	HOME DEPOT
24	WATERFORD EAST
25	PINK FITNESS
26	LAWYERS CROSSING - LOT 5
27	LAWYERS CROSSING - LOT 4
28	TOWN CENTER COMMONS
29	BEAVER DEER COMMONS
30	APEX FUNERAL HOME
31	APEX FARMERS MARKET
32	WINDSOR AT ARBINGTON
33	COLONIAL VILLAGE AT BEAVER CREEK(Formerly Shelby Lee)
34	GARLAND C. REEVES
35	OAK CHAPEL PARK
36	SAWMARK'S FARM
37	BRAMBERTE
38	PROMENADE AT BEAVER CREEK
39	ST MARY MAGDALENE
40	PRAIRIE VILLAGE
41	THE GROVES
42	BELLASARA Bridgehall
43	VILLAGE AT BEAVER CREEK'S RIDGE
44	HOLLAND FARM
45	KELLY ROAD SKYDIVE
46	WILLOWCREEK (Olive Chapel)
47	OLDE MILL VILLAGE PH I
48	OLDE MILL VILLAGE PH II
49	KOHL'S
50	GRAVELLI
51	WHITEOAK VILLAS
52	BEAVER DEER CROSSINGS
53	SAUNI CREEK TOWNHOMES
54	WHITEHALL MANOR BLDG PH 3&4
55	WAREHOUSE
56	SOUTHERN GRACE CHURCH
57	THE TRAIL
58	ROSU PROPERTY
59	MC PHERSON
60	APEX MIDDLE SCHOOL
61	VALLEY ROAD HOUSE
62	APEX BUSINESS CENTER
63	FRIELDEN BYPASS
64	BRADLEY'S CARPET
65	SAUNI CREEK COMMERCE CTR
66	TOWN AND COUNTRY ANIMAL CARE CENTER
67	BLOCKSMITH PROPERTY
68	THE HUNT AT GREENLEVEL CROSSING
69	KELLY ROAD
70	AMBASSADOR PRESBYTERIAN CHURCH
71	PRAIRIE VILLAGE TOWNHOMES
72	OLDE MILL VILLAGE LOT 3
73	WHITEHALL MANOR BLDG PH 1&2
74	KELLY ROAD RETAIL
75	APEX NATION PARK
76	POINTE AT BRAD DRIVE
77	APEX FARMERS MKT EXPANSION
78	EXPRESS TRUCK STORAGE
79	APEX MARKET CENTER
80	LOT 5 HERITAGE
81	SUTTON PLACE
82	HUNGRY JACK'S
83	THE ORCHARDS
84	WILLIAMSTON STATION
85	TRADED EARTH
86	VILLAGE D
87	HIBBARD PROPERTY
88	TRADITIONS SOUTH PHASE II
89	MANORS & COTTAGES @ BELLASARA (PH 3A 3C)
90	SAUNI BAPTIST CHURCH
91	WHITEOAK DEVELOPMENT
92	TRADITIONS SOUTH PHASE I
93	THALES ACADEMY
94	MANORS & COTTAGES @ BELLASARA (PH 1)
95	BEAVER DEER CROSSINGS (SENIOR)
96	CENTENNIAL INDUSTRIAL PARK
97	APEX FLEX STORAGE (BLDG 4-6)
98	JAMES STREET STATION
99	LUCHESEN (DOMINOS)
100	OLDE MILL VILLAGE LOT 1
101	KINGSWOOD CENTER
102	PETRO LAND
103	ELLINGTON PLACE
104	EASTERN SERVICES
105	MAGNOLIA REEVES
106	APEX PUBLIC SAFETY STATION #4
107	WILKINMET
108	MANORS & COTTAGES @ BELLASARA (PH 2)
109	CAMBRIDGE VILLAGE
110	KINGSWOOD SUITES HOTEL
111	APEX MINI STORAGE
112	PRIMITIVE METHODIST CHURCH
113	SAUNI VILLAGE PHASE 1
114	CITI DOE
115	SAUNI VILLAGE PHASE 3A
116	ESTATES AT BELLASARA
117	APEX UMC
118	WALGREENS (Olive Chapel)
119	APEX PEAKWAY
120	VILLAGE D MART
121	FIRESTONE
122	SEAGROVE'S FARM NEIGHBORHOOD PARK
123	PARKSIDE AT BELLASARA PHASE 1
124	MEARS HOMES
125	MOYES

Legend

BMP Type - SWPOI
- Bioretention Area
- Dry Pond
- Hydrodyn Separator
- Level Spreader
- Storm Water Wetland
- Undgrd Detention Sys
- Wet Pond

BMP Type - SWPDR
- Bioretention Area
- Dry Pond
- Hydrodyn Separator
- Level Spreader
- Storm Water Wetland
- Undgrd Detention Sys
- Wet Pond
- Jordan Lake Basin Line
- Cape Fear Neuse Basin Line
- Apex Peakway
- Middle Creek WRF
- Apex / Cary Water Treatment Plant
- Apex Community Lake parcels
- WW Express
- Beaver Creek
- Big Branch
- Crabtree Creek
- Middle Creek
- Swift Creek
- White Oak Creek
- Williams Creek
- Apex ETJ 2007

0 700 1,400 2,800 4,200 5,600 Feet

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Prepared by:
Steven Miller
Apex Public Works and Utilities Department
Revised April 2010
C:\GIS\Illustrator\Storm Water\BMPS\Structural BMP Map 4152010

Last Updated: 3/18/2014

Town of Apex Master BMP List

Site ID	BMP Site	BMP Type	Designed BMPs	Approved BMPs	Inspection Month	Contact Name	Address	Phone #
1	HENDRICK TOYOTA	Wet Pond	2	2	JUNE	Greg Clark, Hendrick Automotive Group	6000 Monroe Rd. Charlotte, NC 28212	704-566-3313 704-819-2823
		Level Spreader	2	2				
2	CAMDEN AT LAKE PINE	Wet Pond	3	3	AUGUST	Danny Duke, Camden Properties	2114 Summit Ridge Loop Morrisville, NC 27607	919-460-0101
3	WATERFORD GREEN	Wet Pond	1	1	SEPTEMBER	Sheri Fincher, R.S. Fincher & Co.	P.O. Box 1117 Apex, NC 27502	919-362-1460
		Dry Pond	1	1				
4	AVALON PEAKS	Wet Pond	1	1	SEPTEMBER	April Stockwell Avalon Peaks Apartments	2000 Kiftsgate Ln. Apex, NC 27539	919-363-0500
5	LAKE PINE PLAZA	Wet Pond	3	3	SEPTEMBER	Sanaa Tawaeel, Regency Centers	2068 Clark Ave. Raleigh, NC 27605	919-831-4902
6	WENDY'S	Wet Pond	1	1	NOVEMBER	Rick Fink, Wendy's International, Inc.	5700 Cleveland St., Suite 206 Virginia Beach, VA 23462	757-497-9677 x4019 919-624-7805
7	EVA PERRY LIBRARY	Wet Pond	1	1	APRIL	Wayne Owen, Wake County Field Services	401 Capital Blvd. Raleigh, NC 27603	919-538-6598
8	VINEYARD STATION	Wet Pond	1	1	AUGUST	Jim Cain Center Management Co.	P.O. Box 31827 Raleigh, NC 27612	919-847-2400
9	BRIGHT HORIZONS DAYCARE	Wet Pond	1	1	DECEMBER	Steve Shunk	2051 Shepherd's Vineyard Dr. Apex, NC 27502	919-696-2749
10	DOGWOOD RIDGE I	Wet Pond	1	1	OCTOBER	Ron Fincher, R.S. Fincher & Co.	P.O. Box 1117 Apex, NC 27502	919-362-1460
11	DOGWOOD RIDGE II	Wet Pond	3	3	OCTOBER	Ron Fincher, R.S. Fincher & Co.	P.O. Box 1117 Apex, NC 27502	919-362-1460
12	WOODRIDGE	Wet Pond	1	1	SEPTEMBER	Sue Fallwell, Omega Associates Management	1010 Buck Jones Rd. Raleigh, NC 27606	919-461-0102
13	SCOTTS MILL	Wet Pond	2	2	OCTOBER	Mike Smith, Omega Associates Management	1010 Buck Jones Rd. Raleigh, NC 27606	919-461-0102
14	PEAK PLAZA	Wet Pond	1	1	APRIL	Steven Alonzo, MCAVA Real Estate	406 Hillsborough St. Deerfield Beach, FL 33441	954-360-7444 x202
15	SURREY MEADOWS	Wet Pond	3	3	JUNE	Christina Cary, R.S. Fincher & Co.	P.O. Box 1117 Apex, NC 27502	919-362-1460
16	HADDON HALL COMMONS	Wet Pond	1	1	FEBRUARY	Dave Smith, Widewaters Group	5786 Widewaters Parkway DeWitt, NY 13214-0003	315-445-8614
17	PARKSITE (PPW)	Dry Pond	1	1	APRIL	Mary Holl	810 Center St. Apex, NC 27502	919-367-7707 919-624-9746
18	APEX CROSSING	Wet Pond	1	1	JULY	Barbara Beck, Brown Inv. Properties	P.O. Box 930 Greensboro, NC 27402	336-379-8771
19	CENTER STREET PHARMACY	Bioretention Area	1	1	JULY	Raj Polavaram *Gowrisankar Galla	2025 Giovanni Ct. Cary, NC 27518	c: 919-559-6141 w: 919-319-6610 919-650-1263
20	APEX TOWN HALL	Wet Pond	1	1	NOVEMBER	**(Town Responsibility)** Town of Apex	P.O. Box 250 Apex, NC 27502	919-249-3434
21	WALDEN TOWNES	Wet Pond	1	1	FEBRUARY	Ron Fincher, R.S. Fincher & Co.	P.O. Box 1117 Apex, NC 27502	919-362-1460
22	DAILYVITA	Wet Pond	1	1	MAY	Jean Sciacca	1013 Investment Blvd. Apex, NC 27502	919-349-8902 919-303-7976
23	HOME DEPOT	Wet Pond	1	1	JULY	Store #3644 Marilyn Combs	1000 Vision Dr. Apex, NC 27502	919-387-6554
24	WATERFORD EAST	Wetland	1	1	SEPTEMBER	Sheri Fincher, R.S. Fincher & Co.	P.O. Box 1117 Apex, NC 27502	919-362-1460
25	PEAK FITNESS	Bioretention Area	1	1	NOVEMBER	Kevin Bunn	P.O. Box 1710 Clayton, NC 27528	919-422-3384
26	LAWRENCE CROSSING	Wet Pond	2	2	AUGUST	Dr. Lee Toler	12408 Whartons Way Raleigh, NC 27613	919-454-8685
27	TOWN CENTER COMMONS	Wet Pond	1	1	JANUARY	Jim Baker, Beavers Condominium Assoc.	P.O. Box 33279 Raleigh, NC 27636	919-821-7890
28	BEAVER CREEK COMMONS	Wet Pond	1	1	MARCH	Bill Cheatham	3709 Cole Mill Rd. Durham, NC 27712	919-730-1550
29	APEX FUNERAL HOME	Dry Pond	1	1	JANUARY	Britt Paynter	550 W. Williams St. Apex, NC 27502	919-362-8233
		Hydrodynamic Separator	1	1				
30	APEX FLEA MARKET	Wet Pond	1	1	JANUARY	Mike Howington, Apex First Properties	56 Hunter St., Suite 100 Apex, NC 27502	919-363-0404
31	WINDSOR AT ABBINGTON	Wetland	2	2	JULY	Cathy Lemly, PPM, Inc.	6739 Falls of Neuse Rd. Raleigh, NC 27615	919-848-4911 x112
		Level Spreader	1	1				
32	COLONIAL VILLAGE AT BEAVER CREEK	Wetland	2	1	MARCH	Amber Fairbanks Colonial Properties Trust	1111 Metropolitan Ave., Suite 300 Charlotte, NC 28204	704-643-7942 c: 843-810-4085
		Bioretention Area	2	2				
33	GARLAND C. NORRIS	Wet Pond	1	1	DECEMBER	Jimmy King	P.O. Box 28 Apex, NC 27502	919-387-1059
		Bioretention Area	1	1				
		Level Spreader	1	1				
34	OLIVE CHAPEL PARK	Wet Pond	1	0	JULY	Matt Desvergers Greenhawk Corporation	1330 Sunday Dr. Raleigh, NC 27607	919-796-0947
		Bioretention Area	4	3				
		Level Spreader	1	1				
35	SEAGROVES FARM	Wetland	6	6	OCTOBER	Jeania Schaper, Charleston Management Corp.	P.O. Box 97243 Raleigh, NC 27624	919-847-3003
		Level Spreader	1	1				
36	MIRAMONTE	Wet Pond	5	4	JULY	Beverly McKernie, Talis Management	P.O. Box 99149 Raleigh, NC 27624	919-878-8787
		Hydrodynamic Separator	1	1				
37	PROMENADE AT BEAVER CREEK	Underground Detention	1	1	MARCH	Brooke Benton, DDR	1581 Beaver Creek Commons Dr. Apex, NC 27502	919-367-8096
		Hydrodynamic Separator	2	2				
38	ST. MARY MAGDALENE	Underground Detention	1	1	DECEMBER	Bob Cadrin	625 Magdala Place Apex, NC 27502	919-657-4800
39	PEAKWAY VILLAGE	Dry Pond	1	1	APRIL	Dr. Rob Seymour, Master Assoc. of Peakway Village	1515 Carr St. Raleigh, NC 27608	919-414-9957
		Wetland	1	1				
40	THE GROVES	Bioretention Area	2	2	MAY	Joey Iannone, JVI Construction	501 N. Salem St., Suite 105 Apex, NC 27502	919-387-8846
41	BELLA CASA	Wet Pond	1	1	JULY	Joey Iannone, JVI Construction	501 N. Salem St., Suite 105 Apex, NC 27502	919-387-8846
		Hydrodynamic Separator	1	1				
42	VILLAGES AT CROCKETT'S RIDGE	Wet Pond	1	1	AUGUST	David Robbins, Grand Chester Meadows	P.O. Box 37367 Raleigh, NC 27627	919-389-7944
		Dry Pond	1	1				
		Hydrodynamic Separator	3	3				
43	HOLLAND FARM	Wet Pond	1	1	SEPTEMBER	Rich Van Tassel, Royal Oaks Building Group	1210 Trinity Road, Suite 102 Raleigh, NC 27607	919-233-3886
44	KELLY ROAD DAYCARE	Wet Pond	1	1	MAY	Lee Singleton Williams Realty & Building Co., Inc.	3111 Glenwood Ave. Raleigh, NC 27612	919-881-1455
		Level Spreader	1	1				
45	WALGREENS (Olive Chapel)	Wet Pond	1	1	SEPTEMBER	Denice Fortenberry	1101 Woodridge Center Dr., Suite 120 Charlotte, NC 28217	(m) 336-695-4187
		Hydrodynamic Separator	1	1				
46	OLD MILL VILLAGE PH I	Wet Pond	1	1	NOVEMBER	Beverly McKernie, Talis Management	P.O. Box 99149 Raleigh, NC 27624	919-878-8787
		Level Spreader	1	1				
47	OLD MILL VILLAGE PH II	Wet Pond	1	0	NOVEMBER	Mike Howington, Apex First Development, LLC	P.O. Box 1197 Apex, NC 27502	919-363-0404
		Level Spreader	1	0				
48	KOHL'S	Underground Detention	2	2	OCTOBER	Tim Weidenbauer	W. 17000 Ridgewood Dr. Menomonee Falls, WI 53051	262-703-1888 262-443-8851
		Hydrodynamic Separator	2	2				
		Level Spreader	2	2				
49	GROVES II	Wet Pond	2	0	MAY	Joey Iannone, JVI Construction	501 N. Salem St., Suite 105 Apex, NC 27502	919-387-8846
		Grassed Swale	1	0				
50	WHITE OAK VILLAS	Wet Pond	1	0		Alonzo Wilson, White Oak Foundation	1621 White Oak Church Rd. Apex, NC 27507	919-362-6768
		Level Spreader	1	0				
51	BEAVER CREEK CROSSINGS	Wet Pond	6	3	MARCH	Brooke Benton, DDR	1581 Beaver Creek Commons Dr. Apex, NC 27502	919-367-8158
		Bioretention Area	2	2				
		Level Spreader	4	3				
52	SALEM CREEK TOWNHOMES	Bioretention Area	1	0		Mike Valla, Crown Builders	975 Walnut St. Cary, NC 27511	919-319-1500
		Wet Pond	1	0				
53	WHITEHALL MANOR PH 3 & 4	Wet Pond	1	1	JUNE	Rob Robertson, BRG Builders	101-B N. Salem St. Apex, NC 27502	919-303-7990 919-427-5943
		Bioretention Area	1	1				
54	WAKEMED	Wet Pond	1	1	JANUARY	WakeMed Property Services	3000 New Bern Ave.	919-350-7829

Last Updated: 3/18/2014

Town of Apex Master BMP List

Site ID	BMP Site	BMP Type	Designed BMPs	Approved BMPs	Inspection Month	Contact Name	Address	Phone #
[illegible]	[illegible]	Wetland	1	1		[illegible]	Raleigh, NC 27610	[illegible]
55	SOVEREIGN GRACE CHURCH	Wet Pond	1	1	DECEMBER	Mr. Phil Sasser	401 Upchurch St. Apex, NC 27502	919-362-4420
56	THE TRACE	Wet Pond	1	1	MAY	Jeania Schaper, Charleston Management	P.O. Box 97243 Raleigh, NC 27624	919-847-3003
		Bioretention Area	1	1				
57	ROSSI PROPERTY	Wet Pond	1	1	AUGUST	Bob Rossi	P.O. Box 1388 Apex, NC 27502	919-303-8600
58	MC PRECAST	Wet Pond	3	3	OCTOBER	Raymond Duchaine	P.O. Box 189 Apex, NC 27502	919-367-3636
59	APEX MIDDLE SCHOOL	Dry Pond	1	1	JUNE	Gary Haithcock, WCPSS	1551 Rocky Quarry Rd. Raleigh, NC 27610	919-856-3019
60	VALUE PLACE HOTEL	Dry Pond	1	1	JUNE	Steve Benos, Sunridge Raleigh Apex, LLC	900 N. Michigan Ave., Suite 1450 Chicago, IL 60611	312-915-2900
		Level Spreader	1	1				
61	APEX BUSINESS CENTER	Wet Pond	2	2	APRIL	Richard Moore, Apex Business Condos, Inc.	P.O. Box 18813 Raleigh, NC 27619	919-787-8812
62	FERGUSON ENTERPRISES	Wet Pond	1	1	FEBRUARY	Ferguson Enterprises Attn: Legal Real Estate	P.O. Box 2778 Newport News, VA 23602	757-874-7795
63	BRADLEY'S CARPET	Hydrodynamic Separator	1	1	AUGUST	Brad Zadell	910 Windy Rd. Apex NC 27502	919-362-6211 (m) 919-427-7106
64	LAURA DUNCAN CONVENIENCE CENTER	Dry Pond	1	1	MARCH	Millie Estep, Tri Properties	4309 Emperor Blvd. Durham, NC 27703	919-281-2327
65	TOWN & COUNTRY ANIMAL CARE CENTER	Wet Pond	1	1	MARCH	Gail Boyd	2010 N. Salem St. Apex, NC 27502	919-387-7833
66	BECKWITH PROPERTY	Wetland	6	0		Brad Nelson, Toll Brothers	2310 T.W. Alexander Dr., Ste G Raleigh, NC 27617	919-321-4800
67	THE HUNT @ GREEN LEVEL CROSSING	Wet Pond	6	0		Brad Nelson, Toll Brothers	2310 T.W. Alexander Dr., Ste G Raleigh, NC 27617	919-321-4800
		Level Spreader	7	0				
68	KELLY GROVE PH 1 & 2	Wet Pond	1	0		Jason Bertoncino		
69	AMBASSADOR PRESBYTERIAN CHURCH	Wet Pond	1	1	MAY	Steve Brown	1010 Schieffelin Rd. Apex, NC 27502	919-469-4092
70	PEMBERLEY	Level Spreader	1	0		Hampton Pitts		
		Wetland	4	0				
71	OLD MILL VILLAGE LOT 3	Wet Pond	1	0	NOVEMBER	Mike Howington, Apex First Properties	P.O. Box 1197 Apex, NC 27502	919-363-0404
		Level Spreader	1	0				
72	WHITEHALL MANOR PH 1 & 2	Bioretention Area	1	1	JUNE	Rob Robertson, BRG Builders	101-B N. Salem St. Apex, NC 27502	919-303-7990
		Wetland	1	1				
		Level Spreader	1	0				
		Underground Detention	1	1				
73	KELLY ROAD RETAIL	Wet Pond	1	0		Richard Kolsch, Miller Family Ltd Partnership	595 Route 25A, Ste 1 Miller Place, NY 11764	631-209-0919
74	APEX NATURE PARK	Wet Pond	3	0		**(Town Responsibility)** Town of Apex	P.O. Box 250 Apex, NC 27502	919-249-3427
		Level Spreader	1	0				
75	POINTE AT DAVIS DRIVE	Wet Pond	1	1	FEBRUARY	Blaine East	1009 Davis Dr. Apex, NC 27502	919-796-6203
76	APEX ELEMENTARY SCHOOL	Dry Pond	1	1	JUNE	Gary Haithcock, WCPSS	1551 Rock Quarry Rd. Raleigh, NC 27610	919-856-3019
77	EXTRA ATTIC SELF STORAGE	Wet Pond	1	1	APRIL	Roger Honbarrier	900 Windy Rd. Apex, NC 27502	919-362-1975 919-630-2806
78	APEX CABINET COMPANY	Wet Pond	1	1	AUGUST	Bob Howington, BHG Enterprises	P.O. Box 766 Apex, NC 27502	919-632-7979
79	SUTTON PLACE	Wetland	1	1	JUNE	Tammy Williams, PPM, Inc.	6739 Falls of Neuse Rd. Raleigh, NC 27615	919-848-4911 x126
		Wet Pond	1	1				
		Underground Detention	1	1				
80	HANDEE HUGO'S	Underground Detention	1	1	OCTOBER	Haddon Clark, United Energy	3309 Drake Circle Raleigh, NC 27607	919-785-1904
		Hydrodynamic Separator	1	1				
81	BOJANGLES	Underground Detention	1	1	FEBRUARY	Tommy Haddock, Tri-Arc Food Systems	4905 Waters Edge Dr. Raleigh, NC 27606	919-859-1131
		Hydrodynamic Separator	1	1				
82	THE ORCHARDS	Wet Pond	1	0			6912 Three Chopt Rd., Ste C Richmond, VA 23226	919-484-3242
83	BROADSTONE STATION	Wet Pond	1	0		Thomas McGowan, Kite Realty @ 55, LLC	30 S. Meridian St., Ste 100 Indianapolis, IN 46204	
84	VILLAGES OF APEX (North)	Wetland	7	0	DECEMBER	Mike Howington, Apex First Development, LLC	P.O. Box 1197 Apex, NC 27502	919-363-0404
		Wet Pond	1	0				
		Level Spreader	1	0				
85	VILLAGIO	Bioretention Area	1	0		Stacey Anfindsen, A+B Properties of NC, Inc.	1145-E Executive Circle Cary, NC 27511	919-345-4008
86	HINTON PROPERTY	Wet Pond	1	0		Bill McClung	P.O. Box 1542 Apex, NC 27502	
87	VILLAGES OF APEX (South ph. 2)	Wet Pond	1	0	DECEMBER	Mike Howington, Apex First Development, LLC	P.O. Box 1197 Apex, NC 27502	919-363-0404
		Hydrodynamic Separator	1	0				
		Underground Detention	1	0				
		Level Spreader	1	0				
88	TRADITIONS AT BELLA CASA (PHASES 3A-3E)	Wet Pond	3	2	JULY	Joey Iannone, JVI Construction	501 N. Salem St., Suite 105 Apex, NC 27502	919-387-8846
		Bioretention Area	1	1				
89	SALEM BAPTIST CHURCH	Wet Pond	1	1	JANUARY	Jeff Beckett	1200 Salem Church Rd. Apex, NC 27523	919-362-7327
90	WHITE OAK DEVELOPMENT	Underground Detention	1	0				
		Level Spreader	3	0				
		Bioretention Area	3	0				
		Sand Filter	1	0				
91	VILLAGES OF APEX (South ph. 1)	Wet Pond	2	0	DECEMBER	Mike Howington, Apex First Development, LLC	P.O. Box 1197 Apex, NC 27502	919-363-0404
		Underground Detention	1	0				
		Hydrodynamic Separator	1	0				
		Level Spreader	1	0				
92	THALES ACADEMY	Wetland	1	1	JULY	Robert Luddy	4641 Paragon Park Rd. Raleigh, NC 27616	919-882-2410 x302
93	MANORS & COTTAGES AT BELLA CASA (Phases 1&2)	Wet Pond	2	2	JULY	Joey Iannone, JVI Development	501 N. Salem St., Suite 105 Apex, NC 27502	919-387-8846
94	BEAVER CREEK CROSSINGS CONDOS	Wet Pond	1	0				
95	SCHIEFFELIN INDUSTRIAL PARK	Wet Pond	3	0				
96	APEX FLEX STORAGE	Wet Pond	1	1	JANUARY	Harold Nunn	320 N. Salem St., Suite 301 Apex, NC 27502	919-384-3630
97	JAMES STREET STATION	Wet Pond	3	0				
98	UPCHURCH COMMONS	Bioretention Area	2	0				
		Level Spreader	1	0				
99	OLD MILL VILLAGE LOT 1	Underground Detention	1	0	NOVEMBER			
		Hydrodynamic Separator	2	0				
100	KNOLLWOOD CENTER	Underground Detention	1	0				
		Hydrodynamic Separator	2	0				
101	PETROLIANCE	Bioretention Area	2	2	NOVEMBER	Heather Main	1009 Schieffelin Rd. Apex, NC 27502	919-290-1233 919-605-4377
102	ELLINGTON PLACE	Bioretention Area	1	1	JUNE	Dawn Hatcher Elite Mgmt Professionals, Inc.	4112 Blue Ridge Rd., Suite 100 Raleigh, NC 27612	919-233-7660
		Level Spreader	1	1				
		Wetland	4	1				
103	EASTERN SERVICES	Wet Pond	2	2	JANUARY	Paul Thomann	800 Lufkin Rd. Apex, NC 27539	919-859-3626
104	MAGNOLIA CREEK	Bioretention Area	1	0				
		Grassed Swale	1	0				
		Dry Pond	1	0				

Last Updated: 3/18/2014

Town of Apex Master BMP List

Site ID	BMP Site	BMP Type	Designed BMPs	Approved BMPs	Inspection Month	Contact Name	Address	Phone #
105	APEX PUBLIC SAFETY STATION #4	Wet Pond	1	1	NOVEMBER	**(Town Responsibility)** Town of Apex	P.O. Box 250 Apex, NC 27502	919-249-3434
106	WALMART	Wet Pond	1	1	NOVEMBER	Tammy Welch	2001 SE 10th St. Bentonville, AR 72716-0550	479-204-0660
		Level Spreader	1	1				
107	CAMBRIDGE VILLAGE	Wet Pond	1	1	JUNE	Kendall Oliver	6737 Falls of Neuse Rd., Suite 200 Raleigh, NC 27645	919-792-3750
		Level Spreader	1	1				
		Bioretention Area	1	0				
108	CANDLEWOOD SUITES	Wetland	1	1	FEBRUARY	Tarun Patel	401 Harrison Oaks Blvd., Suite 305 Cary, NC 27513	919-459-4590
109	APEX MINI STORAGE	Wet Pond	1	1	AUGUST	Scott Keller Apex Investors LLC	P.O. Box 130 Sanford, NC 27330	919-770-4258
110	PEAK UMC	Dry Pond	1	1	MAY	Kate Shoffner	100 S. Hughes St. Apex, NC 27502	919-362-7807 x229
111	SALEM VILLAGE PH 1	Wet Pond	4	0				
		Level Spreader	4	0				
112	CITISIDE	Wet Pond	1	1	JULY	Patrick Allen Beazer Homes	4509 Creedmoor Rd., Ste. 200 Raleigh, NC 27612	919-277-2411
113	SALEM VILLAGE PH 2A, 2B, 2C	Wet Pond	3	0				
		Bioretention Area	1	0				
		Level Spreader	2	0				
114	ESTATES AT BELLA CASA	Wet Pond	2	0	JULY			
		Level Spreader	1	0				
115	APEX UMC	Bioretention Area	12	12	MAY	Kate Shoffner	100 S. Hughes St. Apex, NC 27502	919-362-7807 x229
116	WALGREENS (Old Jenks)	Bioretention Area	1	1	SEPTEMBER	Denice Fortenberry	1101 Woodridge Center Dr., Suite 120 Charlotte, NC 28217	(m) 336-695-4187
117	APEX PEAKWAY	Level Spreader	6	6	NOVEMBER	**(Town Responsibility)** Town of Apex	P.O. Box 250 Apex, NC 27502	919-249-3434
118	VILLAGE SUMMIT	Wet Pond	1	1	DECEMBER	NC Apartments 1 LP	4000 Spotter Dr. Apex, NC 27502	919-267-5870
119	FIRESTONE	Sand Filter	1	1	DECEMBER	James Blecha, Bridgestone Retail Operations, LLC	333 East Lake St. Bloomingdale, IL 60108	630-259-9000
		Underground Detention	1	1				
120	SEAGROVES FARM PARK	Level Spreader	2	2	NOVEMBER	**(Town Responsibility)** Town of Apex	P.O. Box 250 Apex, NC 27502	919-249-3434
121	PARKSIDE AT BELLA CASA PH 1	Wet Pond	1	0	JULY			
122	MILANO AVENUE	Bioretention Area	1	0				
123	MOTIVA	Innovative BMP	1	1	JUNE	Tom Turner Motiva Enterprises, LLC	910 Louisiana St., OSP 2566 G Houston, TX 77002	713-241-4868
124	55 JAMES AT MIDTOWN	Wet Pond	1	0				
		Level Spreader	1	0				
125	TOWN CENTER COMMONS PH 4	Level Spreader	1	0	JANUARY			
		Wet Pond	1	0				
126	CROSSROADS INFINITI	Wet Pond	1	1	OCTOBER	Ryan Rowland Crossroads Holdings, LLC	P.O. Box 911 Henderson, NC 27536	252-492-0008
127	THALES HIGH SCHOOL	Wet Pond	1	0				
128	PARKSIDE AT BELLA CASA PH 3	Bioretention Area	2	0	JULY			
129	SHEETZ	Level Spreader	1	0				
		Wet Pond	1	0				
130	COLVIN PARK	Wet Pond	4	0				
		Level Spreader	4	0				
131	WEST APEX HIGH SCHOOL	Wet Pond	4	0				
		Bioretention Area	4	0				
		Dry Pond	1	0				
132	CALVARY CHAPEL	Bioretention Area	2	0				
133	COVINGTON	Level Spreader	1	0				
		Wet Pond	3	0				
134	EAGLE ROCK CONCRETE	Wet Pond	1	1	NOVEMBER	Adam Loftin Eagle Rock Concrete, LLC	8310 Bandford Way Raleigh, NC 27615	919-781-3744
		Level Spreader	1	1				
135	EDGEWATER TOWNHOMES	Wet Pond	1	0				
136	PARKSIDE AT BELLA CASA PH 2 & 4A	Wet Pond	1	0	JULY			
137	BRISTOL WALK	Wet Pond	1	0				
		Bioretention Area	2	0				
138	BRADLEY COMMONS	Bioretention Area	2	0				
139	MANORS & COTTAGES AT BELLA CASA (PH 5 & 6)	Wet Pond	1	0	JULY			
140	GERMAINE STREET SUBDIVISION	Wet Pond	1	0				
141	MARCO DRIVE EXTENSION	Level Spreader	1	0				

Constructed BMPs Due Annual Inspection	**193**
TRC Approved BMPs (not constructed)	165
Total BMPs	358

Bioretention Areas	32
Dry Ponds	10
Grassed Swale	0
HDS	14
Innovative BMP	1
Level Spreaders	26
Sand Filter	1
UDS	9
Wet Ponds	83
Wetlands	17
	193

