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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
CWEP	Clear Water Education Partnership
CWMTF	Clean Water Management Trust Fund
DDT	dichlorodiphenyltrichloroethane
DO	dissolved oxygen
EA	environmental assessment
EEP	Ecosystem Enhancement Program
EIS	environmental impact statement
EMC	Environmental Management Commission
EPT	ephemeroptera, plecoptera, and trichoptera
ESA	Endangered Species Act of 1973
ETJ	extraterritorial jurisdiction
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FSC	Federal species of concern
GAP	Gap Analysis Project
GIS	geographic information system
LI	limited impact
LID	Low Impact Development
LMP	Land Management Plan
LRUSA	Long Range Urban Service Area
MG	million gallons

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

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

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Executive Summary

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

Typically, an EA or an EIS is developed separately for every infrastructure project undertaken. Each individual EA or EIS prepared includes summaries of the direct, secondary, and cumulative impacts. Inefficiencies from developing documents in this manner include 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 very similar.
- **Review Inefficiencies**—Regulatory agencies review similar information on SCI and the local programs in place to mitigate them for various infrastructure projects for a given municipality. Those agencies and local government officials therefore often have to devote considerable time to similar comments and negotiations on a number of projects.
- **Governing Board and Capital Planning**—Typically, Town departments develop environmental documents to support permitting decisions. If the permitting agency includes specific permit conditions to addresses impacts from a given project, the utility department may not be able to address those conditions. For example, if requirements for ordinance changes are included in permit conditions, these must be approved by the town's governing board. Reviewing SCI and proposed mitigation in one holistic document, the SCIMMP, helps streamline this process.

These inefficiencies result in frustration for both the regulatory agencies and regulated community. The Town of Holly Springs (Town) therefore proposes to develop a SCI Master Management Plan (SCIMMP) that will address the SCI for all of its planned infrastructure. Evaluation of the SCI from all

SCI Master Management Plan Process

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

infrastructure plans in one document allows a holistic review of the Town's growth projections and the infrastructure being designed to support that growth. When EAs or EISs are developed for individual projects to examine the direct impacts of the projects, these documents reference the SCIMMP for SCI, avoiding redundancy.

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

The study area for the SCIMMP 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 boundary and urban service area agreements with the Town of Apex. The Town's Planning Area is approximately 61 square miles in size and is located in the Neuse and Cape Fear River basins.

Infrastructure—The Town has developed a Vision Holly Springs Comprehensive Plan (2013) that includes long-range plans for providing services to its citizens in a manner that will protect the natural environment. Currently the Town's Utley Creek Water Reclamation Facility (WRF) discharges to Utley Creek in the Cape Fear River basin. The Town plans to continue treating its wastewater at this WRF and is currently evaluating options to move the outfall, in accordance with the current permit requirements. The Town also has planned improvements to its water system and is examining opportunities for expanding its reclaimed water system.

The Town recently updated its Transportation Plan, which indicates the locations of existing and proposed main roads. In addition, both existing and future segments of NC 540 extend through the Town. The Town also has a plan for sidewalks and greenways to promote alternative modes of transportation.

Existing Conditions—Within the Planning Area, existing natural 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. Within Wake County, Federally listed species include the bald eagle (*Haliaeetus leucocephalus*), dwarf wedgemussel (*Alasmidonta heterodon*), and Michaux's sumac (*Rhus michaux*). One bald eagle nesting area, which is protected by the Bald and Golden Eagle Protection Act, is known near Harris Lake. Michaux's sumac, according to the most recent database provided by the Natural Heritage Program, is present near the Shearon Harris Longleaf Pine Forest Significant Natural Heritage Area. The Northern long-eared bat (Myotis septentrionalis) is proposed for listing; to date it has not been recorded in the Planning Area. A survey of freshwater mussel species in the Middle Creek and Swift Creek watersheds, conducted in summer 2004, found no individuals, live or relic, of Federally endangered mussels.

Secondary and Cumulative Impacts—Table ES-1 summarizes potential SCI to the Planning Area, the likelihood of impacts, and the mitigation measures in place to address them. These mitigation measures will offset environmental impacts associated with growth that are likely to occur with or without planned infrastructure projects. The Town is taking progressive steps to protect its environmental heritage by developing many programs to balance growth with 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—Numerous measures are currently in place to limit SCI as growth occurs in the Town. For example, the 2013 Vision Holly Springs Comprehensive Plan serves to guide the location of development. In addition, the Unified Development Ordinance and Town Code of Ordnances protect open space, stream buffers, floodplains, and wetlands and require stormwater controls to limit impacts to water resources. These efforts protect the Town's natural resources and quality of life for its citizens. Table ES-1 presents a summary of these mitigation measures and their applicability to each of the natural and cultural resources analyzed under SEPA guidelines.

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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 SCI	Mitigation Programs
Topography and Floodplains	LI	Potential for minimal impacts from commercial development, resulting in reduced water storage capacity, habitat, surface water filtration, and infiltration	Vision Holly Springs Comprehensive Plan
			Open Space Preservation in the Unified Development Ordinance (UDO) to preserve additional corridors along required riparian buffers
		Isolation of floodplain from stream by channel entrenchment; loss of nutrient exchange capabilities	Floodplain Protection—No residential development or fill in floodplain; both 100-year and 500-year floodplains restricted; local floodplain designation in addition to Federal Emergency Management Agency (FEMA) designation; commercial development rarely occurs in the floodplain
			Erosion and Sediment Control
			Stormwater Programs
			Infrastructure Design Requirements – deters installation of sewer lines in riparian buffers
Soils	LI	Soil erosion and compaction	Vision Holly Springs Comprehensive Plan
			Open Space Preservation
			Parks, Recreation, Greenways, and Open Space Planning
			Land Use Planning – deters sprawl and encourages strategic development
			Riparian Buffers and Floodplain Protection
			Erosion and Sediment Control
			Stormwater Programs
Land Use	PI	Conversion of agricultural and forested land uses to mainly residential land uses	Vision Holly Springs Comprehensive Plan
			Open Space Preservation
			Parks, Recreation, Greenways, and Open Space Planning
			Land Use Planning to encourage development around Town Village District, selected corridors, and mixed use developments
			UDO
			Riparian Buffers and Floodplain Protection – restricts development in riparian buffer zones and prohibits nearly all floodplain encroachment

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

Environmental Resource	Potential for SCI	Types of SCI	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 Vision Holly Springs Comprehensive Plan Open Space Preservation Parks, Recreation, and Greenways, and Open Space Planning Land Use Plans and UDO to set aside natural open space and encourage strategic development Riparian Buffers and Floodplain Protection Erosion and Sediment Control Stormwater Programs to reduce pollutant loads and limit stormwater impacts to wetlands
Prime or Unique Agricultural Land	PI	Potential conversion to other uses	Vision Holly Springs Comprehensive Plan Open Space Preservation Parks, Recreation, Greenways, and Open Space Planning Land Use Planning to control uses allowed Wake County Voluntary Agricultural Districts Wake County Tax Incentive Program
Public Lands and Scenic, Recreational, and State Natural Areas	LI	Potential conversion of adjacent land uses	Vision Holly Springs Comprehensive Plan Open Space Preservation Parks, Recreation, Greenways, and Open Space Planning UDO—dedication or fee-in-lieu
Areas of Archaeological of Historical Value	LI	Potential conversion of adjacent land uses Structural damage due to acid rain and vibrations	Vision Holly Springs Comprehensive Plan Parks, Recreation, Greenways, and Open Space Planning Land Use Planning to control uses allowed

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

Environmental Resource	Potential for SCI	Types of SCI	Mitigation Programs
Air Quality	PI	Reduction in air quality due to increased vehicular traffic Negative impacts to human health (such as asthma); acid rain; reduced visibility	Wake County Air Quality and Sustainability Task Force Comprehensive Transportation Plan Vision Holly Springs Comprehensive Plan Parks, Recreation, Greenways, and Open Space Planning Land Use Planning UDO connectivity requirement and open space preservation Riparian Buffers Protection Tree Protection Ordinance
Noise Level	PI	Increase in overall noise level in Planning Area Negative impacts to human health	Comprehensive Transportation Plan Vision Holly Springs Comprehensive Plan Parks, Recreation, Greenways, and Open Space Planning Land Use Planning UDO connectivity requirement and open space preservation Riparian Buffers Protection – development buffers Tree Protection Ordinance
Surface Water Resources	PI	Water quality degradation; increase in stormwater runoff Alteration of natural hydrograph (magnitude, timing, frequency, duration, rate of change); lower and more frequent low-flow conditions; alteration of channel morphology	Coordinate and work with agencies to identify restoration projects and funding to improve water quality in 303(d) listed streams Vision Holly Springs Comprehensive Plan Parks, Recreation, Greenways, and Open Space Planning UDO, Land Use Plans, and open space preservation Riparian Buffers and Floodplain Protection – no residential development or fill in the floodplain Erosion and Sediment Control Stormwater Programs Water Conservation and Water Reuse Programs Fisheries and Wildlife Programs Infrastructure Design Requirements: sewers at stream crossings encased and installed using directional boring

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

Environmental Resource	Potential for SCI	Types of SCI	Mitigation Programs
Groundwater Resources	LI	Reduction in use for drinking water; potential to become contaminated Groundwater inflow (which provides base flow in streams and supports life during droughts) potentially reduced	Vision Holly Springs Comprehensive Plan UDO, Land Use Plans, and open space preservation Riparian Buffers and Floodplain Protection – allowing for natural infiltration Stormwater Programs – sponsoring education programs Failing septic systems taken offline as infrastructure is developed Water Conservation and Water Reuse Programs
Forest Resources	PI	Potential conversion to other uses Reduction in air quality; increase in near-surface air temperature; habitat fragmentation and reduction	Vision Holly Springs Comprehensive Plan Open Space Preservation UDO and Land Use Planning to encourage development around Town Village District, selected corridors, and mixed use developments Parks, Recreation, Greenways, and Open Space Planning Riparian Buffers and Floodplain Protection
Shellfish or Fish and their Habitat	PI	Possible aquatic habitat degradation and hydrology alteration Disruption of food chain; reduction in aquatic insect number and diversity through loss of riffle habitat; reduction in potential for long-term population sustainability	Wetland Protection through CWA Section 404 and Section 401 Endangered Species Act (ESA) Vision Holly Springs Comprehensive Plan Open Space Preservation Parks, Recreation, Greenways, and Open Space Planning UDO and Land Use Planning encourage clustered development and natural space conservation Riparian Buffers and Floodplain Protection Erosion and Sediment Control Stormwater Programs Fisheries and Wildlife Programs – Bass Lake restoration Infrastructure Design Requirements – sewers at stream crossings encased and installed using directional boring

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

Environmental Resource	Potential for SCI	Types of SCI	Mitigation Programs
Wildlife and Natural Vegetation	PI	Reduction in available habitat	ESA
		Habitat fragmentation; reduction in genetic diversity; reduction of pollution-intolerant species; increased dispersal distance to suitable habitat; reduction in potential for long-term population sustainability	Vision Holly Springs Comprehensive Plan
			Open Space Preservation
			Parks, Recreation, Greenways, and Open Space Planning - important habitat areas prioritized for protection
			UDO and Land Use Planning to encourage clustered development and natural space conservation
			Riparian Buffers and Floodplain Protection
			Erosion and Sediment Control
			Stormwater Programs
			Tree Protection Ordinance
			Fisheries and Wildlife Programs including protection of eastern tiger salamander habitat
Introduction of Toxic Substances	LI	Increase in likelihood of contamination	Land Use Planning to control uses and likely exposure
		Negative impacts to human health	Stormwater education programs
			Infrastructure Design Requirements – Sewer Use Ordinance to limit potential for sewer blockages and overflows

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)