City of Wilson

Fall 2022 CWSRF

Stormwater AIA Grant Application

SUPPORT FOR NARRATIVE

September 27, 2022

Prepared by:

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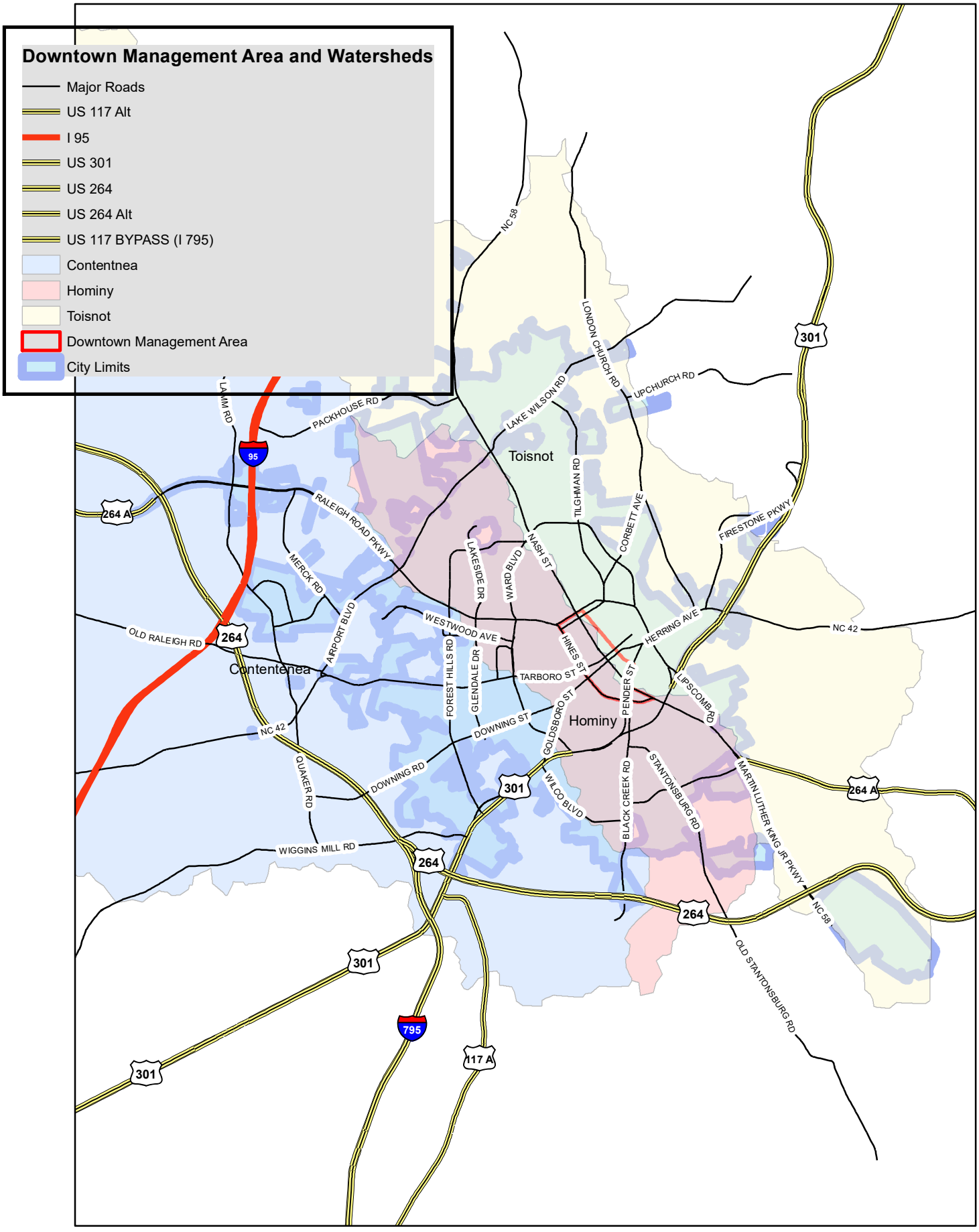
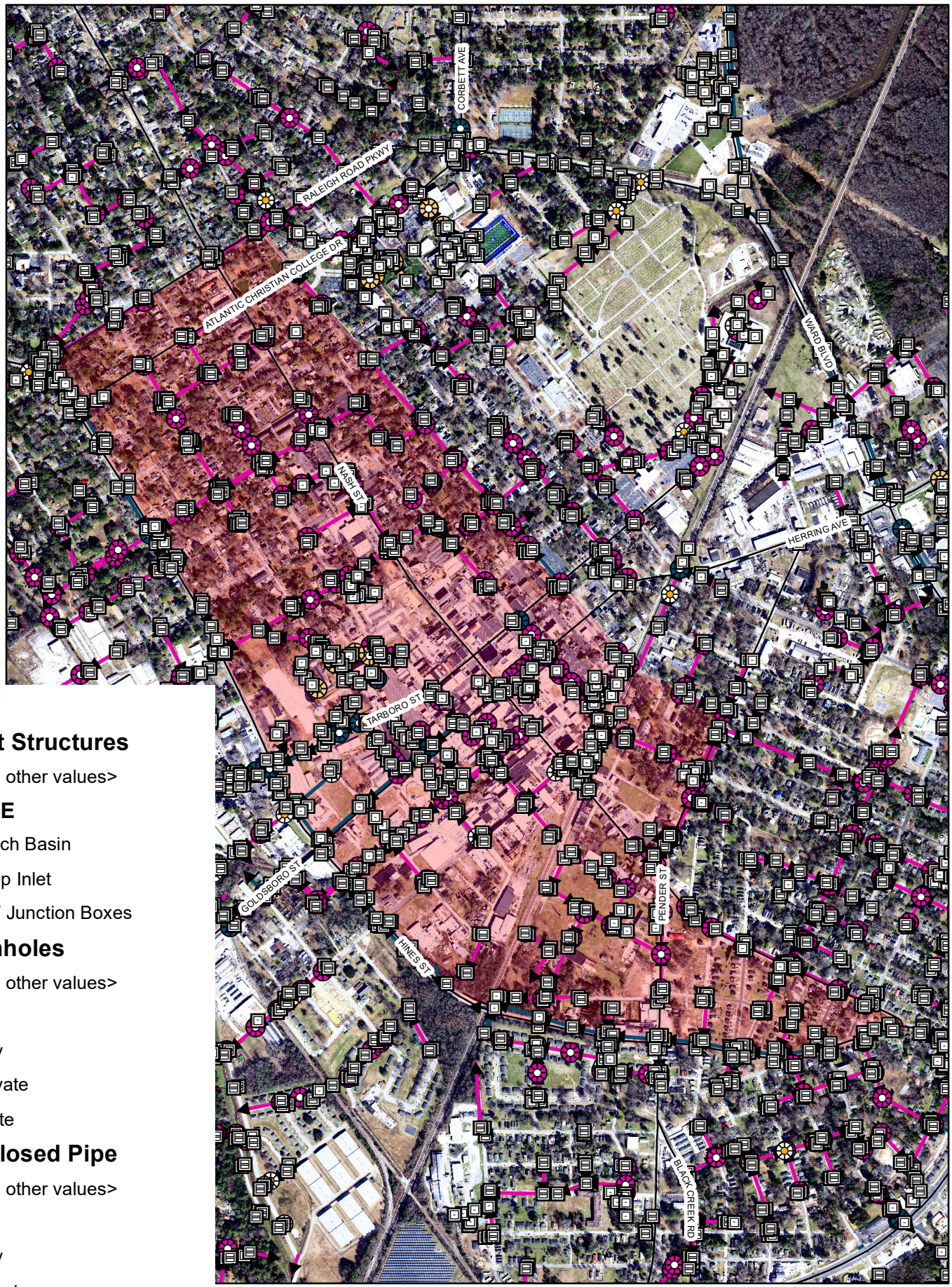
City of Wilson

Attachment 1

Area Map


Downtown Management Area and Watersheds
Major Roads
US 117 Alt
I 95
US 301
US 264
US 264 Alt
US 117 BYPASS (I 795)
Contentnea
Hominy
Toisnot
Downtown Management Area
City Limits
Toisnot
Contentnea
Hominy
NC 58
LONDON CHURCH RD
UPCHURCH RD
LAKE WILSON RD
LAMM RD
PACKHOUSE RD
TILGHMAN RD
CORBETT AVE
FIRESTONE PKWY
RALEIGH ROAD PKWY
MERCK RD
LAKESIDE DR
WARD BLVD
NASH ST
AIRPORT BLVD
WESTWOOD AVE
HERRING AVE
NC 42
OLD RALEIGH RD
FOREST HILLS RD
GLENDALE DR
HINES ST
TARBORO ST
PENDER ST
LIPSCOMB RD
DOWNING ST
GOLDSBORO ST
QUAKER RD
DOWNING RD
WILCO BLVD
BLACK CREEK RD
STANTONSBURG RD
MARTIN LUTHER KING JR PKWY
WIGGINS MILL RD
OLD STANTONSBURG RD
95
264 A
264
301
795
117 A

Stormwater Structures within DMA



Legend

SW Inlet Structures

- <all other values>

SUBTYPE

- Catch Basin
- Drop Inlet
- SW Junction Boxes

SW Manholes

- <all other values>

OWNER

- City
- Private
- State

SW Enclosed Pipe

- <all other values>

OWNER

- City
- Private
- State
- Downtown Management Area

Attachment 2

Category 4b Plan

Hominy Swamp Restoration Plan

Category 4b Plan

Hominy Swamp Restoration Plan

Wilson, North Carolina
November 7, 2018

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1 Impairment and Problem Statement

Hominy Swamp (NCDEQ Assessment Unit #27-86-8, HU #03020203020040) is located almost entirely within the city limits of Wilson, North Carolina (the City). Hominy Swamp is locally known as Hominy Creek given its current stream-like characteristics, but will be referred to as Hominy Swamp in this plan to be consistent with regulatory referencing. The water body is 9.85 miles long and has its confluence with Contentnea Creek downstream of Highway 264. It is located in the Neuse River Basin at the western limits of the coastal plain and has several surface water classifications as detailed in the following table.

Table 1-1 Surface water classifications

Classification	Surface Water Description
Class C	Waters protected for uses such as secondary recreation, fishing, wildlife, fish consumption, aquatic life including propagation, survival and maintenance of biological integrity, and agriculture. Secondary recreation includes wading, boating, and other uses involving human body contact with water where such activities take place in an infrequent, unorganized, or incidental manner.
Swamp (Sw)	Supplemental classification intended to recognize those waters, which have low velocities and other natural characteristics, which are different from adjacent streams.
Nutrient Sensitive Water (NSW)	Supplemental classification intended for waters needing additional nutrient management due to being subject to excessive growth of microscopic or macroscopic vegetation.

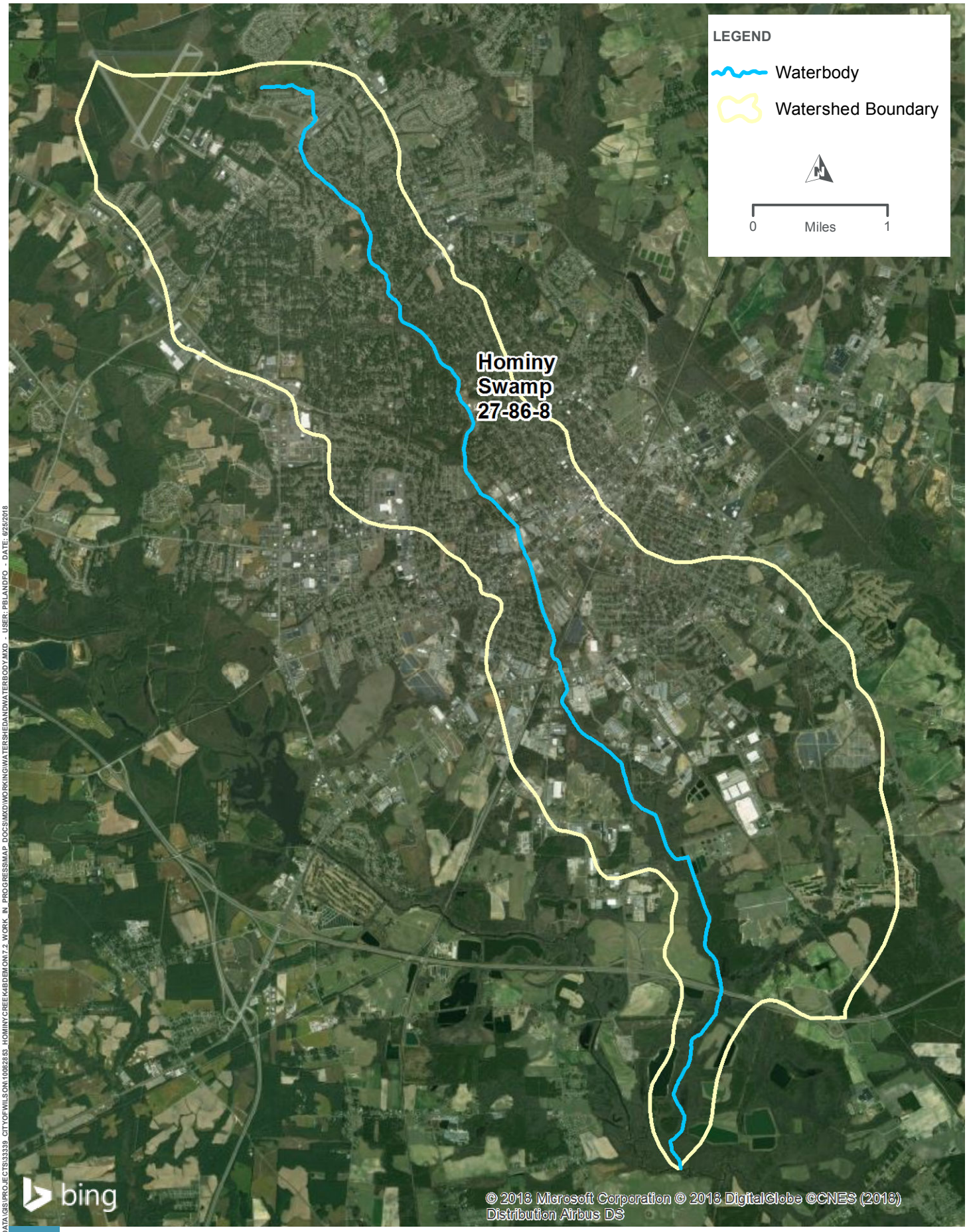
Macroinvertebrate data was collected at two locations in Hominy Swamp in March 2001. One location was in Hominy Swamp upstream of Black Creek Road (State Route 1606) and the other was 3,000 feet downstream. A bioclassification of “Poor” was determined for the two locations. The State’s narrative standard for benthos is a bioclassification of “Good-Fair” or better; therefore, Hominy Swamp is not supporting an aquatic life designated use. The entire length of Hominy Swamp was listed in Category 5 (i.e., 303(d) list) of the State’s Water Quality Assessment Report in 2004 for impairment of its biological integrity. It has remained in Category 5 since 2004 with no additional impairment.

The early version of the State’s Integrated Reporting stated that the cause of impairment was likely urban runoff or storm sewers. In December 2004, the Ecosystem Enhancement Program (currently NC DEQ Division of Mitigation Services) authored a report titled Hominy Creek Watershed Assessment and Restoration. In this report, a number of water body stressors were identified, including:

- Impervious area contributing to significant fluctuations from base flow to peak flow
- Loss of riparian buffers beyond minimal widths that provide beneficial function
- Channelization of the water body resulting in erosion, sedimentation, and decline in benthic habitat

The City of Wilson, North Carolina is seeking re-categorization of Hominy Swamp from Category 5 to Category 4b on the State’s Integrated Water Quality Assessment Report through a demonstration effort. The City desires to develop and implement a water body restoration plan

(Plan) as part of a demonstration effort composed of pollution control strategies. The pollution control strategies will be selected to deliver progress towards reducing sources of pollution, managing runoff in a way to treat pollution prior to entering the water body, and improving the resiliency of the riparian corridor and watershed landscape in mitigating the effects of pollution. It is the City's intention that progress on these objectives will provide a foundation for macorinvertebrate recovery. A map of the watershed boundary and water body for Hominy Swamp is provided on the next page.



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WATERSHED AND WATERBODY MAP

2 Recovery Goal

The Recovery Goal of this Plan will be to achieve a Good-Fair rating of the State's narrative standard for benthos. The foundation for the Recovery Goal is achieved by establishing conditions suitable for re-colonization of macroinvertebrates. The Plan proposes that these conditions, identified as the Plan objectives, will be improved through implementation of pollution controls. The following hierarchy figure provides a visual framework of how the Recovery Goal, Plan Objectives, and Pollution Controls support restoration.

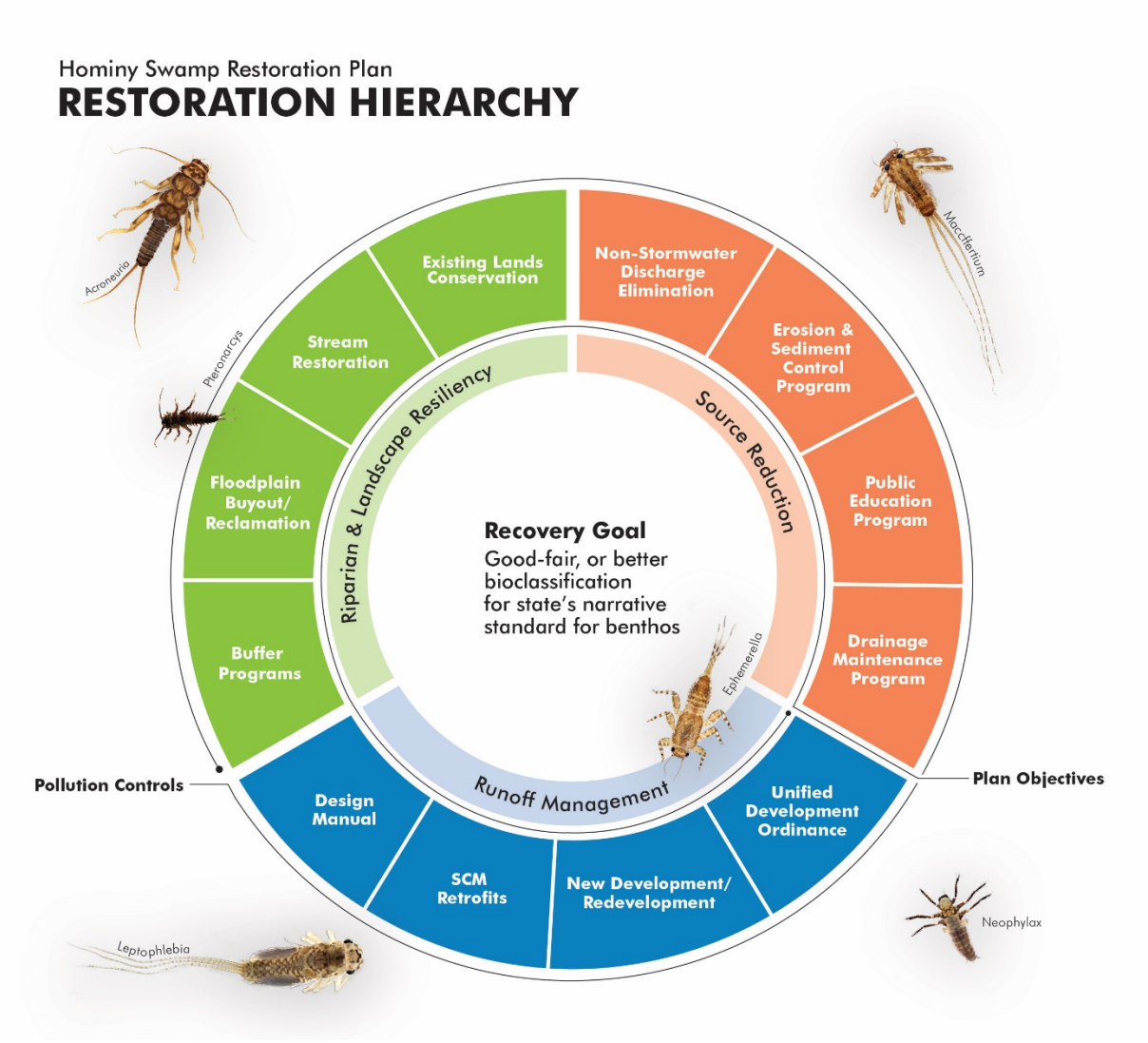

Figure 2-1 Restoration hierarchy

The Plan objectives include:

1. Source Reduction – The discrete discharge and mismanagement of pollution within the watershed has the potential to present toxic conditions that harm macroinvertebrate levels leading to short-term impairments. Historic and continual discharge of pollution in the watershed lead to chronic conditions that prohibit the re-colonization of the least

tolerant species evoking longer-term impairments. Reducing point source and non-point source pollution will protect existing macroinvertebrates and promote conditions conducive to improved macroinvertebrate taxa richness and abundance.

2. Runoff Management – Increases in the volume, rate, frequency, and non-point source pollution in runoff to streams affect the ability of macroinvertebrates to persist in suitable habitats for maintaining healthy colonies. Even with good water quality, frequent high energy runoff events can physically displace macroinvertebrates, destroy habitat and prevent the recovery of that habitat by natural processes. Stream bank erosion and subsequent sediment deposition resulting from elevated storm flows is particularly impactful to macroinvertebrate habitat. Better balancing of the stream energy through runoff management will minimize disruptions to macroinvertebrate ecology and improve the availability of suitable in-stream habitat.
3. Riparian and Landscape Resiliency – The watershed for Hominy Swamp is mostly developed and, as a result of that development, riparian corridors and floodplains have been modified. These modified landscapes, due to loss or degradation of natural features and processes, are less resilient in mitigating pollution and disruptions to macroinvertebrate ecology. Restoring the natural features and functions of these landscapes back to a more resilient condition should provide uplift for processes to recover and sustain.

Recovery of macroinvertebrates in disturbed or impaired system of this nature is subject to many variables, which make difficult the estimation of time to recovery. J. Bruce Wallace provides the following assessment on recovery steps and time to achieve recovery in the journal of Environmental Management (Volume 14, No 5, page 606).

> *Many studies of invertebrate recovery times from single event disturbances, such as toxic chemical spills, floods, pesticides, droughts, and organic pollution indicate recovery times of a few months to several years (e.g. Fisher and others 1982, Heckman 1983, Hynes 1960, Minshal and others 1983, Molles 1985). Other disturbances produce long-term changes in habitats and recovery will not occur until the natural habitat is restored. Such chronic disturbances may result in long-term changes in habitats and include contamination by toxic agents, physical changes in habitat, or changes in food resources available to consumers. When these variables are severely altered, changes in community structure may persist for decades.*
>
> *Furthermore, functional recovery (i.e. abundances, biomass, or production of functional feeding groups), and taxonomic recovery (individual taxa or species) will not necessarily give the same time frames for restoration.*

Considering this the degradation of Hominy Swamp has likely occurred as a result of “chronic disturbances” and “physical changes in habitat or food resources” more so than toxic events and therefore will take a commensurate or longer time to restore than that of the impairment. As such, the Plan proposes a time frame for meeting the Recovery Goal composed of two distinct phases. The first phase involves the implementation of pollution controls benefiting the Plan objectives of reducing source pollutants, managing runoff, and enhancing and preserving the

resiliency of the riparian and watershed landscape. The Plan proposes both short-term and long-term periods of implementation, which when established can be communicated as part of the progression towards the Recovery Goal; however, it is less known what period of time is needed to amass enough pollution control benefit for establishing conditions suitable for re-colonization. This understanding will be further refined with the adaptive management process.

The second phase involves the natural recovery process of macroinvertebrates (i.e. the period of macroinvertebrate re-colonization). Re-colonization is not well understood for Hominy Swamp at this point and is likely not to occur on its own volition until substantial progress has been made on Plan objectives. Even once pollution controls have been implemented and the Plan objectives have been progressed, the re-colonization period may take several years to decades to occur before it can be observed or measured for a positive trend. It is important to gain an understanding of the re-colonization process since re-colonization may occur in phases, such that recovery is in progress (e.g. functional recovery), leading up to the obtainment of a standard (e.g., taxonomic recovery). The City will develop an understanding of the re-colonization effort as part of the Plan implementation through a combination of periodic macroinvertebrate sampling, trend assessment in the biotic index, habitat score and taxa richness, and comparative analysis of non-impaired regional streams. This understanding will help to continually refine the time frame of meeting the Recovery Goal.

3 Pollution Controls Strategy

Implementing pollution control strategies will be an important component of restoring biological integrity in Hominy Swamp. The pollution control strategies identified in the sections below will help reduce the overall pollutant load, restore natural hydrology, or create more resilient systems that support ecological function. The pollution controls were selected from several existing programs, plans, and services provided by the City to its citizens either as part of a regulated program or provision of public services funded by the stormwater utility. The pollution controls provide a mixture of protective and restorative benefits towards the Plan objectives. Although Hominy Swamp does not exceed other water quality standards, the Recovery Goal will not be obtained by protective pollution controls alone, therefore, the City will adapt existing pollution controls and implement new pollution controls to have a restorative effect. The restorative pollution controls elicit action beyond regulatory requirements or typical level of services to create an uplift in water quality and macroinvertebrate habitat in pursuit of the Recovery Goal. Appendix A provides a summary of the supporting programs, plans, and services used for selection of pollution controls.

The following figure summarizes how the City evaluated pollution controls for implementation as part of this Plan with respect to the benefit it provides and course of implementation to be taken by the City.

- Pollution controls in the lower left quadrant are required as part of a regulatory program or current service of the stormwater program and may only maintain or protect the existing quality or condition of the Plan objectives. They will be continued as currently performed but will be evaluated for amendment periodically.

- Pollution controls in the lower right quadrant are currently in place and providing a protective benefit of the Plan objectives. They will be evaluated for enhancements to provide more restorative benefit either through improved implementation or application of the pollution control beyond regulatory limits.

- Pollution controls in the upper left quadrant do not currently exist in the context of this Plan so they will need to be developed. They will provide a protective benefit of the Plan objectives but require opportunistic implementation through land acquisition, partnerships, or special funding.

- Pollution controls in the upper right quadrant are a collection of existing and proposed controls that can provide restorative benefit when adapted or developed. They will also require opportunistic implementation.

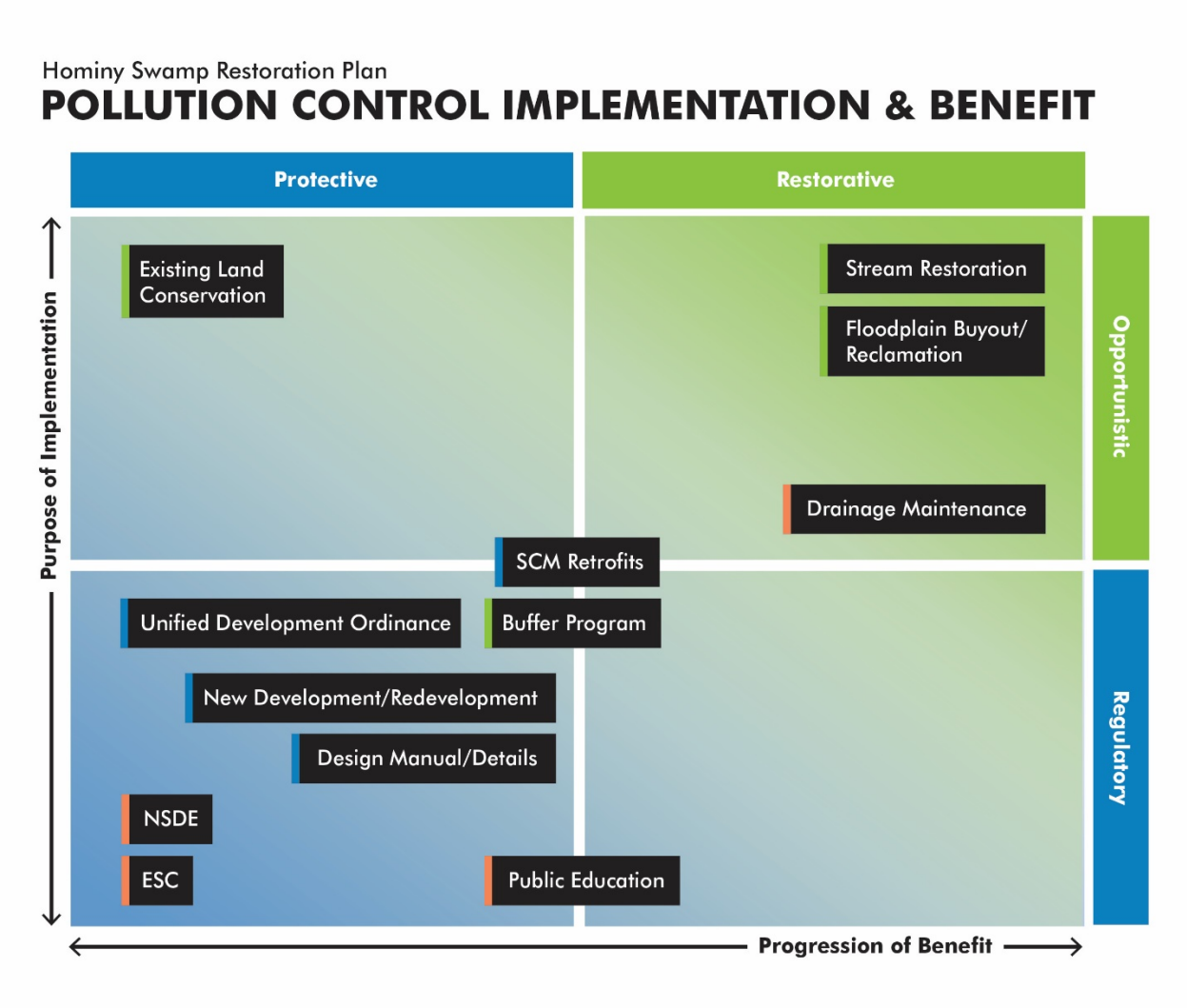

Figure 3-1 Pollution control implementation and benefit

3.1 Source Reduction

The following pollution controls limit the discharge of pollution into Hominy Swamp through the programmatic management of pollution sources, education of the public about pollution and its effect on the water quality and macroinvertebrates, and management of the drainage systems and its contribution to pollution. Benefits of these pollution controls mainly include protection and improvement of water quality. Most of the pollution controls are protective in nature while the Public Education and Drainage Maintenance Program will be adapted to support and provide restorative action to Hominy Swamp.

3.1.1 Non-Stormwater Discharge Elimination

The City performs a non-stormwater discharge elimination program in compliance with the Neuse River Water Quality Rules. The City will also administer a similar or the same program as an EPA Stormwater Phase II community pending future designation. Their current program is proactive in identifying and eliminating non-stormwater discharges. It includes dry weather

screening of outfalls across the City over a ten year period. The City maintains a procedure for the screening and inspection of the outfall and surrounding area, a dry weather screening report form, and an up-to-date GIS inventory of outfalls. In addition, the City receives citizen initiated requests where discharges have occurred or are occurring. The City's Stormwater Compliance Specialist responds to these requests and initiates enforcement proceedings when a non-stormwater discharge is present. The City will continue the program currently in place and will evaluate operating procedures for amendments.

3.1.2 Erosion and Sediment Control Program

The City administers an Erosion and Sediment Control program in which any land disturbance in excess of one acre requires an erosion and sediment control plan to be developed, reviewed, and approved by City staff. The program was developed to comply with the North Carolina Sedimentation and Pollution Control Act and provide a locally responsive environmental service. In 2009, the program was extended to single family and dual unit housing below the State and federally mandated one acre threshold. This extension of coverage provides for the program to be administered most all regulated development in the City. In addition, there is oversight of the implementation of the erosion and sediment control plan to ensure protective measures are carried out as the plans calls out. In order to reinforce this effort, the City's erosion control inspector inspects sites periodically during construction to ensure that the erosion and sediment control devices are functioning as they are intended, particularly for projects with extensive grading. The City will continue the program currently in place and will evaluate the erosion and sediment control practices formalized in the Unified Development Ordinance and Manual of Specifications, Standards, and Design for amendments.

3.1.3 Public Education Program

The City performs a public education program in compliance with the Neuse River Water Quality Rules. As part of this program the City has been educating its citizens about the sources and effects of nutrients on local water bodies, both through personal and distributed media communication. The program has been expanded to cover a variety of stormwater management issues and utilize a variety of educational media. By engaging with the public through the use of utility bill inserts, television commercials, advertisements, and workshops, the City has increased local knowledge on buffers, post construction management, stewardship and engagement, and retrofits. The City will also administer a similar or the same program as an EPA Stormwater Phase II community pending future designation. The City will enhance this program to support restorative efforts in the watershed by establishing core messaging and content about this Plan for Hominy Swamp.

3.1.4 Drainage Maintenance Program

The City has a drainage maintenance program focused on maintaining, repairing, and improving engineered and natural assets within the City limits. The program has nearly all assets mapped and is working to assess condition and address problems. As part of this program, the City has performed stream bank stabilizations where they partner with property owners to repair eroding banks on private property. In addition, to this program the City developed a Stomwater Master Plan for Hominy Swamp in 2006 that focused on addressing issues related to flooding, erosion, and water quality. Several alternatives within the Master Plan are recommended for

implementation and when constructed will improve the operation and maintenance of the drainage system. The improvements will attenuate peak discharges, reduce flooding and erosion, provide for pollution removal, and enhance aquatic passage within the drainage system. The Drainage Maintenance Program is in the process of transitioning into a more holistic asset management program that will enhance the available solutions to include restorative improvements and maintenance, such as natural channel stabilization or daylighting alternatives. Improvements associated with the Drainage Maintenance Program will reduce pollution entering the system as a result of stream bank erosion and urban runoff but also have the potential to re-establish buffers and develop macroinvertebrate habitat. The City will adapt the program to support more restorative solutions to improving and maintaining the City's headwaters and drainage infrastructure system.

3.2 Runoff Management

The following pollution controls manage runoff from impervious surfaces in Hominy Swamp through the programmatic management of new development and standards and retrofitting of redevelopment and existing development to current standards. Benefits of these pollution controls include protection and improvement of water quality and restoration of balanced hydrology for Hominy Swamp. Most of the pollution controls are protective but will be evaluated to enhance their level of protection while the Stormwater SCM Retrofit Program will be adapted to support restorative action for Hominy Swamp. Furthermore, due to the amount of unmanaged runoff from past development in the watershed, broad application of these mostly protective pollution controls will have a restorative impact on Hominy Swamp.

3.2.1 Unified Development Ordinance

The City enforces a Unified Development Ordinance that contains provisions for Erosion Control, Flood Damage Prevention, Stormwater Management and Water Supply protection. These provisions are critical in establishing a legal framework of processes and tools to assist City staff in reviewing and guiding land development in a manner protective of the citizens, infrastructure, and the environment. In addition, the ordinance includes a variety of development bonuses that support the protection of open space and trees as well as promote the inclusion of green infrastructure type improvements (e.g. recessed bioretention parking medians). Additional amendments to the ordinance may be considered to establish other protective measures. The City will administer the ordinance currently in place and will evaluate the ordinance for amendments.

3.2.2 New Development/Redevelopment Stormwater Control Measures (SCM) Program

The City administers a program to manage runoff from impervious surfaces created by new development and redevelopment in compliance with the Neuse River Water Quality Rules. The City will also administer a similar or the same program as an EPA Stormwater Phase II community pending future designation. The program includes performance criteria and requirements for SCMs in new developments and redevelopments and ensures that stormwater is treated from new developments for both quality and quantity. Neuse River Water Quality rules limit the amount of nitrogen to be exported offsite, while Phase II rules will require a primary water quality SCM. Furthermore, Phase II rules and a local peak flow regulation require volumetric control of stormwater and reduction of peak discharges at prescribed percentages

below pre-development rates. The City will continue the program currently in place and will evaluate the elements of this program for amendments.

3.2.3 Design Manual/Details

The City maintains a Stormwater Design Manual and Details as part of its Manual of Specifications, Standards, and Design to help developers interpret and clarify the stormwater design guidelines of the City. This comprehensive resource provides developers with methods for addressing runoff management in order to comply with the City's guidelines for quantity and quality of stormwater coming from newly developed and re-developed sites. To further the effort of reducing peak flow, increasing stormwater infiltration, and reducing the amount of directly connected impervious area. The City will administers the document currently in place and will evaluate the design manual and details for amendments.

3.2.4 Stormwater SCM Retrofit Program

The City administers a program to identify potential sites for new stormwater SCMs in compliance with the Neuse River Water Quality Rules. The current strategy for implementing the SCMs is to utilize grant funding that is targeted toward nitrogen control to meet targeted counts of SCM implementation. Since Hominy Swamp watershed has largely been developed with no SCMs, increasing the number retrofit SCM projects with a focus on the volume of stormwater and range of pollutants treated will be an important component for the restoration of Hominy Swamp. Therefore, the City will increase the level of SCM retrofit identification and prioritize implementation of identified SCMs within the Hominy Swamp watershed. By increasing the amount of stormwater being conveyed to SCMs, the amount of non-point source pollution entering Hominy Swamp will be reduced. In addition, peak discharges and the volume of water discharging to the stream will be reduced due to attenuation, evapotranspiration, and infiltration helping to balance hydrology. The City will adapt the program to identify new and retrofit SCMs at an increased level beyond regulatory targets and consider more holistic SCM designs thereby customizing the management of runoff to support restorative action for Hominy Swamp.

3.3 Riparian/Landscape Resiliency

The following pollution controls protect and restore the natural features of the riparian and watershed landscape that mitigate non-point source and in-stream pollution through programmatic management and the retrofitting of critical lands (e.g. riparian corridors and floodplains). Benefits of these pollution controls include improvement of water quality, restoration of a balanced hydrology, and creation and maintenance of macroinvertebrate habitat. The Buffer Program and Existing Lands Conservation pollution controls are protective actions but the Buffer Program and the remaining pollution controls will be adapted to support restorative efforts.

3.3.1 Regulated Floodplain Buyout Process

The City administers a buyout process to buy and remove structures within the floodplain, and restore it to a pre-built upon condition utilizing both Federal Emergency Management Agency funding as well as local funding. The City utilizes local funding to buyout properties not eligible for FEMA funding. Floodplains provide areas for stormwater to be conveyed at moderate velocities and attenuate peak discharge rates due to their relatively wide and flat landscape. In

addition to increased storage and a decrease in obstructed flow area, floodplains also provide a water quality benefit in the form of reducing the sediment load in the stream. By reducing velocity in the stream, the likelihood of the stream incising and eroding will decrease, and the lower velocities will cause macroinvertebrate habitat to persist. Also, by removing structures and restoring the functionality of the floodplain, direct discharges from impervious areas are reduced and the management of stream banks and riparian vegetation is performed by the City. The reclaimed floodplain provides for a more resilient landscape to environmental forces and allows for reduced pollutant loading and increased pollutant processing. The process allows for the restoration of Hominy Swamp to a more resilient landscape to resist the effects of unmanaged runoff and mitigate against uncontrolled pollution, both of which impact macroinvertebrates. The City will continue the buyout process currently in place and formalize existing practices to provide for restoration opportunities involving stream and buffer restoration. This and other floodplain management policies and procedures originate out of the City's 2015 Floodplain Mitigation Plan.

3.3.2 Stream Restoration and Riparian Corridor Improvement Projects

Stream restoration provides for the application of natural channel design principles to uplift the holistic function of streams and riparian corridors. A restored stream or channel has the potential to reduce its contribution of pollutant loading from bank erosion, mitigate the impacts of unmanaged stormwater through geomorphic modification that complement its current hydrologic conditions, and provide natural habitat for macroinvertebrates. The introduction of sustainable materials, stream structures, and natural channel design increases the resiliency of the stream to weather extreme flow events and mitigate uncontrolled pollution. The City's 2006 Stormwater Master Plan for Hominy Swamp recommends several alternatives that will improve the condition and performance of the Hominy Swamp and its tributaries by reducing upsizing systems, reducing erosion and providing more storage for attenuation of peak discharges. In addition to the 2006 Stormwater Master Plan, the City developed a comprehensive plan for the restoration of a significant portion of Hominy Swamp titled Hominy Creek Greenway and Water Quality Park Master Plan. The City will develop an implementation strategy that couples capacity improvements from the Stormwater Master Plan with stream restoration components of the Greenway and Water Quality Plan to restore Hominy Swamp to a more resilient system to resist the effects of unmanaged runoff and mitigate against uncontrolled pollution. While the Greenway and Water Quality Plan provides a comprehensive restoration of Hominy Swamp, the implementation for this Plan will focus on the upper and lower portions where land acquisition is likely to be more attainable.

3.3.3 Riparian Buffer Programs

The City currently administers a program to protect riparian buffers in compliance with the Neuse River Water Quality Rules. The program focuses on education and protection of existing buffers by communicating to the public what riparian buffers are and their contribution to the environment. The City will also administer a similar or the same program as an EPA Stormwater Phase II community pending future designation. Riparian buffers provide a multitude of benefits to support healthy and resilient streams. In regards to water quality chemistry and runoff management, riparian buffers infiltrate runoff, filter pollutants, and regulate water temperatures. In addition, riparian buffers provide a sustainable matrix of vegetation that not only supports

ecological habitat, including macroinvertebrates, but also allows the channel to weather extreme flow events and mitigate non-point source pollution. Riparian buffers are one of the few pollution controls in this Plan that support all three Plan objectives. With much of the watershed already developed, there is little opportunity to protect existing riparian buffers beyond current regulations; however, the City will pursue riparian buffer restoration on headwaters through the aforementioned Drainage Maintenance Program and restoration on the main stem through projects coupled with the City's floodplain buyout process and stream restoration efforts. The City will adapt the riparian buffer program (and other associated opportunities) to provide more restorative opportunities for riparian buffers through increased implementation and focused riparian buffer design.

3.3.4 Existing Lands Conservation

In conjunction with the North Carolina Department of Environmental Quality's (NCDEQ) Watershed Master Plan for the area, the City is working to conserve existing lands from development; however, given the built out condition of the watershed, those areas are limited. The City will work to develop strategies to preserve open space. Strategies may include forfeiture of land or land acquisition. Increasing the amount of land protected within the watershed will limit the amount of impervious area in the watershed, as well as, limit increased pollution from human influence. In addition, land allowed to exist in its natural state provides for a more resilient landscape. The City will develop amendments to the current policy to support the proactive conservation of land that provides protective benefits for Hominy Swamp.

4 Schedule for Implementation

Implementation will occur over two sequential phases. The timeframe for the first phase of pollution control implementation will consist of short-term actions related to pollution controls that are already in place, have dedicated funding, or are regulatory or current level of service driven. The City will primarily formalize the aspects of these pollution controls into the implementation of this Plan or evaluate current policies and practices to adapt or enhance them to provide a more restorative benefit to the Plan objectives. These actions will be implemented in the first four years of the Plan.

The subsequent phase involves longer-term actions that involve pollution controls that will need to be developed with City and public stakeholder support, implemented in a manner involving opportunity or partnerships with property owners, or utilizing excess program funding or grants. These actions will be initially evaluated leading up to and implemented after the fourth year and performed up to recovery. The period of long term implementation will occur over a couple decades but will be refined as part of the adaptive management strategy.

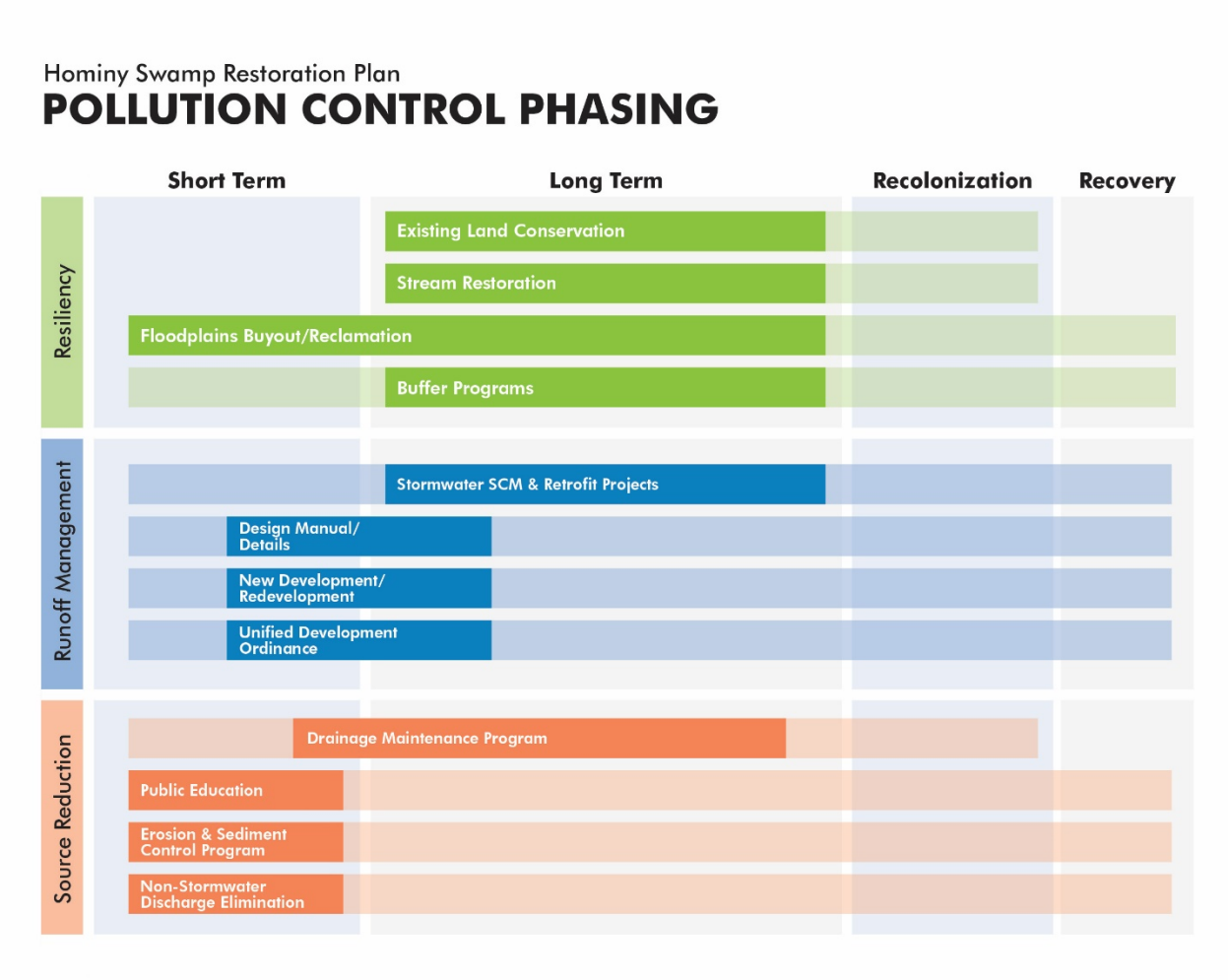

Figure 4-1 Pollution control phasing

Table 4-1 Source reduction pollution control strategy

	Pollution Control	Status	Goal	Implementation	Plan Objective	Benefit
Year 1	Non-stormwater Detection and Elimination	Existing	Continue for current benefit	Continue program currently in place but initially review for amendments	Source Reduction	Provides a protective benefit for benthic communities by identifying and eliminating non-stormwater discharges to receiving waters
	Erosion and Sediment Control Program	Existing	Continue for current benefit	Continue program currently in place but initially review for amendments	Source Reduction	Provides a protective benefit for benthic communities by reducing discharges of sediment to receiving waters
	Floodplain Buyout Program	Existing	Continue for current benefit	Continue program currently in place but initially review for amendments	Riparian and Landscape Resiliency	Provides a restorative benefit to benthic communities by reclaiming floodplain area for better management of high flows and reduces existing impervious area adjacent to stream corridors
	Public Education	Existing	Enhance for restorative benefit	Enhance public education content and messaging centered around restoration Plan	Source Reduction	Provides a protective benefit for benthic communities but enhancement will create greater community understanding, support, and involvement to implement the Plan for a restorative benefit.
Year 2	Unified Development Ordinance	Existing	Continue for current benefit	Continue administration of manual currently in place but initially review for amendments	Runoff Management	Provides a protective benefit for benthic communities by maintaining a variety of provisions to manage land development and protect natural features.
	New Development/Re-development Program	Existing	Continue for current benefit	Continue program currently in place but initially review for amendments	Runoff Management	Provides a protective benefit for benthic communities by requiring the management of runoff from new development and redevelopment.
	Stormwater Design Manual	Existing	Continue for current benefit	Continue administration of manual currently in place but initially review for amendments	Runoff Management	Provides a protective benefit for benthic communities by establishing standards of design to manage the impacts of runoff from developed land uses.
Year 3	Drainage Maintenance Program	Existing	Adapt for restorative benefit	Adapt program to provide for headwater drainage system improvements	Source Reduction	Provides a protective benefit for benthic communities but will be adapted to create solutions for improving headwater drainage systems to reduce pollution from streambanks and adjacent land uses for a restorative benefit.
Year 4	Stormwater Control Measures Retrofits	Existing	Adapt for restorative benefit	Adapt program to identify and implement more SCMs projects	Runoff Management	Provides a protective benefit for benthic communities but will be adapted to create more opportunities for SCM implementation and runoff management of existing developed areas for a restorative benefit
Year 5	Riparian Buffer Program	Existing	Adapt for restorative benefit	Adapt program to restore more buffers	Riparian and Landscape Resiliency	Provides a protective benefit for benthic communities but will be adapted to create more opportunities for riparian buffer implementation for a restorative benefit
	Stream Restoration and Corridor Improvements	Proposed	Develop for restorative benefit	Develop strategy to identify and construct stream restoration projects	Riparian and Landscape Resiliency	Provides a new restorative benefit through the implementation of stream restoration opportunities that provide more resilent natural system for supporting and maintaining benthic habitat
	Existing Lands Conservation	Proposed	Develop for protective benefit	Develop amendments to policy to support more land conservation	Riparian and Landscape Resiliency	Provides a new protective benefit through the conservation of existing lands in a natural or undeveloped condition.

5 Monitoring Strategy

The Plan will utilize a combination of monitoring strategies to assess the implementation and performance of pollution controls and their cumulative effect on meeting the overarching Plan objectives of source reduction, runoff management, riparian and landscape resiliency, and ultimately the Plan Recovery Goal. Effectiveness monitoring strategies will focus on documenting compliance in implementing pollution controls (if not quantifiable) and measuring their effectiveness (if quantifiable and not readily known). Effectiveness monitoring strategies may be utilized both in Hominy Swamp and its tributaries, as well as, offline on pollution controls and within the storm drainage system. They will be performed for short durations of time (i.e. synoptic) ranging from a single monitoring event up to about two years, and performed at a higher frequency throughout the Plan execution. Objective monitoring strategies will focus on establishing trends supporting progress towards meeting Plan objectives and the Recovery Goal. Objective monitoring strategies will be performed on Hominy Swamp and will be performed at lower frequencies than effectiveness monitoring, starting no sooner than a few years into the initiation of the Plan, up to meeting the Recovery Goal. NCDEQ's routine Biological Assessment and Ambient Monitoring programs provide a sufficient framework for meeting some of the long-term monitoring strategies.

5.1 Effectiveness Monitoring

5.1.1 Toolkit Compliance Statusing

Toolkit statusing will be used to demonstrate compliance in implementing pollution controls by indicating the simple performance or completion of them through the use of NC DEQ developed tools or City documentation**.** NC DEQ is in the process of developing a number of tools as part of a larger watershed restoration programming effort that may have relevance to this Plan. These tools will help Plan stakeholders identify issues within the watershed and document compliance towards addressing these issues with pollution controls in the Plan or actions inherent to resolving the issue**.** The City will utilize these tools to the extent they are relevant to addressing the impairment in Hominy Swamp and update online records with completed actions**.** NC DEQ will maintain an active accounting of the use of these tools through an online GIS portal for Hominy Swamp**.** The statusing will provide a snapshot of real-time Plan implementation for relevant pollution controls and can be used as part of the required annual reporting performed in an electronic manner.

5.1.2 Water Quality Sampling

The City will use water quality sampling or analytical sampling as an effectiveness monitoring strategy to provide a synoptic evaluation of the in-stream effects of a pollution control or determine the effectiveness of a pollution control with an unknown performance outcome**.** Sampling of water quality chemistry will establish that pollution controls for source reduction and runoff management are effective in reducing or eliminating a targeted constituent or surrogate constituent, such as total suspended solids.

The City will use water quality sampling where a pollution control's effectiveness is needed to demonstrate its continual use in the Plan or establish confidence that the pollution control

selected was effective in addressing the targeted constituent**.** For example, the City may perform water quality sampling in Hominy Swamp to gain confidence that a particular illicit discharge is the source of an observed concentration of constituent**.** Similarly, influent and effluent water quality sampling may be performed to establish the effectiveness of a new type of pollution control for runoff management**.** For each of these situations, the City will develop a brief water quality sampling plan document detailing the purpose and objective of the sampling.

5.2 Objective Monitoring

5.2.1 Flow Gauging

Flow gauging will provide a metric for capturing the benefit of the pollution control measures that focus on managing runoff and improving the resiliency of the riparian corridor and landscape, both in reducing or mitigating the pollutant loads, but also the volume and frequency of runoff. These pollution control measures through infiltration, volumetric retention and discharge attenuation, reduce the amount of runoff directly discharged or conveyed by Hominy Swamp, reduce stream energy, and balance storm flows with ambient flows.

The City of Wilson and the United States Geological Survey will be partnering to install a stream flow gauge on Hominy Swamp Creek. The gauge is being installed primarily to collect flow and stage data for the City's flood control program; however, storm and ambient flows provide a useful metric for evaluating the restored watershed's ability to emulate natural hydrologic function. This can be done by developing flow frequency duration curves that capture the frequency of the range of flows experienced in the water body. Despite not having a period of historic record on Hominy Swamp to evaluate progress, the Plan will focus on demonstrating positive trends away from the baseline curve to a more balanced curve. Flow gauging will primarily be used to evaluate long-term benefit of runoff management and riparian and landscape resiliency pollution controls.

5.2.2 Water Quality Sampling

The City will use water quality sampling or analytical sampling as an objective monitoring strategy to assess the drawn out benefit of more complex pollution controls or combinations of pollution controls**.** Sampling of water quality chemistry in this manner will establish that pollution controls from multiple Plan objectives are effective in providing benefit**.** This might entail monitoring dissolved oxygen or nutrients over a long period to demonstrate trends for improvement**.** For each of these situations, the City will complete a brief water quality sampling plan document detailing the purpose and objective of the sampling**.**

5.2.3 Macroinvertebrate Sampling

Macroinvertebrate sampling and analysis provides the only monitoring strategy for evaluating the Plan's performance in meeting the Recovery Goal. The State samples Hominy Swamp every other year for evaluating its use support in meeting surface water classification. The sampling is performed where Hominy Swamp passes under Black Creek Road (State Route 1606). Given the anticipated recovery schedule, the Plan will rely on the State's periodic macroinvertebrate sampling routine to evaluate trends in recovery. The City may at times perform macroinvertebrate sampling on smaller tributaries or the upper reaches of Hominy

Swamp to assess their condition in meeting the narrative standard. This may provide a means for reducing areas of implementation or evaluating the attained benefit of multiple pollution controls in meeting the Recovery Goal.

Data collection and habitat assessment towards meeting the State's narrative standard are subject to the swamp collection method given Hominy Swamp's Sw surface water classification. This method is required due to the probable occurrence of low or no flow during periods of the year. As such, data collection is performed in late winter (February to early-March) when flows are anticipated to be the highest. Data collection and habitat assessment to support intermediate evaluation of the implementation of the Plan or to demonstrate obtainment of the recovery goals shall be performed consistent with North Carolina's Department of Environmental Quality's Standard Operating Procedures for the Collection and Analysis of Benthic Macroinvertebrate (February 2016 Version 5.0 and future versions).

6 Adaptive Management and Commitment Statement

6.1 Adaptive Management Strategy

The City will utilize an adaptive management strategy to evaluate the Plan's performance in meeting the Recovery Goal for the purpose of revising pollution controls. The Plan has been developed with the following framework to support adaptive management.

1. Definition of Problem (Section 1 - Impairment Problem Statement)
2. Establish of Goals and Objectives (Section 2 - Recovery Goal)
3. Link Objectives with Selected Actions (Section 3 - Pollution Controls Strategy)
4. Implement Actions (Section 4 - Schedule for Implementation)
5. Perform Monitoring (Section 5 – Monitoring Strategy)
6. Analyze, Communicate Current Understanding, and Adjust (Section 6 – Adaptive Management)

As part of Step 6, the City will convene at two separate frequencies for two evaluation purposes. Annually, City staff involved in the implementation of the Plan will meet to discuss the City's performance in further refining pollution controls and implementing them. The City will mostly rely on the Effectiveness Monitoring program of Toolkit Compliance Statusing and Water Quality Sampling to 1) determine how effective they are in implementing pollution controls, and 2) how effective certain pollution controls are at meeting Plan objectives. The purpose of this meeting will mostly focus on lessons learned from the year of implementation, refinement of pollution control strategies, and forecasting the upcoming year's implementation and opportunities. It is not anticipated that amendments to the Plan will be performed as part of this meeting, particularly early on in the short-term period. Furthermore, this effort will support the development of the required annual report and communication of the current understanding of the problem.

City staff involved in the implementation of the Plan will meet first five years after the acceptance of the Plan and then meet every three years thereafter to evaluate progress towards Plan objectives and the Recovery Goal. The City will evaluate the Objective Monitoring program data sets for long term trends supporting the Plan objectives, as well as, perform a more comprehensive review of the Toolkit Compliance Statusing results to identify trends in implementation efforts. The City will also compare the Plan performance with data from the North Carolina Department of Environmental Quality monitoring programs. The purpose of this meeting will result in decisions to continue, revise, or stop the implementation of certain pollution controls and consider the re-balancing of effort as it relates to Plan objective results and Plan phasing. Decisions will be recorded with justification and communicated as part of the annual report as well as archived with the Plan.

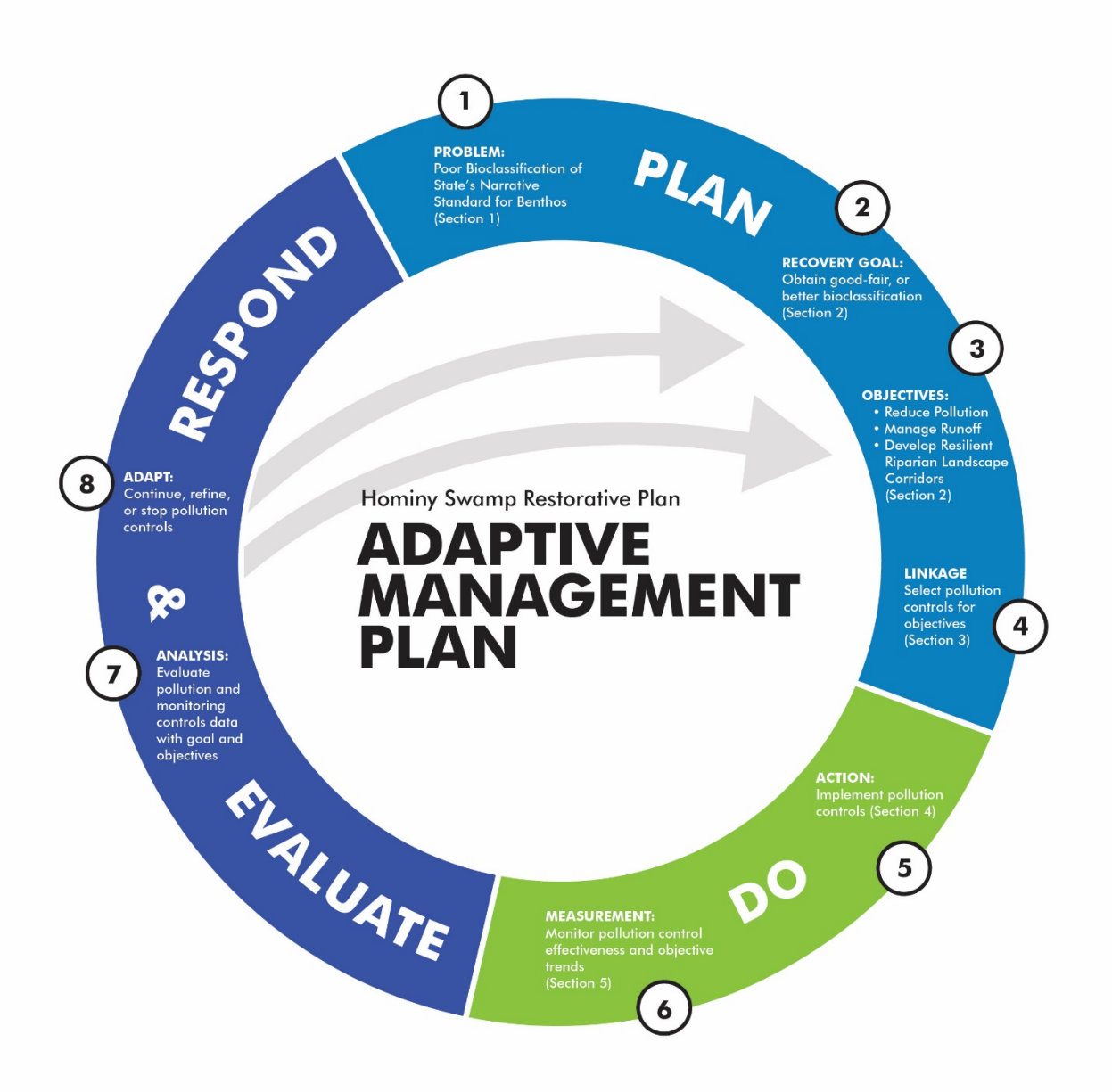

Figure 6-1 Adaptive management plan

6.2 Plan Legacy and Reporting

The City intends to align with trends towards electronic reporting and the elimination of redundancy in reporting. In doing so, the Plan will be minimally amended except for significant deviations and adjustments. Instead, the City will issue separate electronic reporting of Plan decisions to be archived with the original or recently updated version of the Plan.

It is the responsibility of the City to provide to the North Carolina Department of Environmental Quality an annual report demonstrating their conformance to this Plan. The City intends to leverage reporting technologies and consolidation afforded by the Department, including online and cloud-managed Toolkit Compliance Statusing consolidation of annual reporting for Neuse

River Nutrient Strategy and NPDES Phase II MS4 (when required) where practical. The City will coordinate with NCDEQ staff to set up the reporting protocols.

6.3 Commitment Statement

This Plan outlines a strategy to meeting the water quality standard of a Good-Fair or better rating of the State's narrative standard for benthos for Hominy Creek Swamp (i.e. Recovery Goal). The Plan and implementation of it provide a demonstration effort on behalf of the City towards meeting the Recovery Goal, as an alternative to Total Maximum Daily Load (TMDL) development. The Clean Water Act affords agencies the deferment of TMDL development where "other pollution control requirements (e.g., best management practices) required by local, state or federal authority" are stringent enough to implement applicable water quality standards within a reasonable period of time (40 CFR 130.7(b)(1)). It's the City's intention that this Plan be considered under this clause and that Hominy Swamp be categorized from Category 5 to Category 4b on the State's Integrated Water Quality Assessment Report, with approval from the North Carolina Department of Water Resources and Region 4 of the United States Environmental Protection Agency.

In April 2016, the City's Stormwater Advisory Board presented to the City's Council several recommendations regarding the City's stormwater program in support of increased stormwater utility revenue. One of these recommendations was the request by the Advisory Board to pursue a Category 4b demonstration project for Hominy Swamp. The development and ongoing implementation costs of the plan and schedule for development were discussed with the City Council. As part of the overall program and funding discussion, the Council subsequently approved the Advisory Board's request for funding. Stormwater staff acted in 2017 to secure a consultant to develop this Plan as a Category 4b demonstration project. The implementation of the Plan is supported by the programs and projects currently developed or under-development and funded by revenue generated by the City's stormwater utility.

A letter of commitment from the City Manager accompanies this Plan.

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A

Appendix A – Supporting Documents and Programs

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Supporting Documents and Programs

Neuse River Nutrient Sensitive Waters Program for Stormwater

In 1997, the North Carolina Department of Environmental Quality (NCDEQ) set the Neuse nutrient strategy into place to reduce the pollution from nutrient runoff. The goal of the strategy is to remove the Neuse estuary from the North Carolina 303(d) list of impaired waterbodies by regulating the nutrient loading in the wastewater, stormwater and agricultural runoff. The strategy also outlines protection of riparian buffers and training for applying fertilizer to land. With the implementation of this strategy, the state hopes to reduce nitrogen by 30% based on the levels in 1995. A component of the strategy includes a model Stormwater Program for Nitrogen Control, which is codified in the Neuse River Rules. This program includes elements of new development runoff management, illegal discharges, retrofits, and public education.

Hominy Swamp Master Plan

In 2006, the City of Wilson (the City) prepared a Stormwater Master Plan (SWMP) to identify flooding, erosion and water quality issues in the Hominy Swamp watershed. The purpose of the plan was to identify and provide recommendations for addressing problems in the watershed associated with flooding, erosion, and water quality. Various watershed modelling was performed for the plan to support assessment of issues and development of solutions. The SWMP came up with a list of alternatives to mitigate the present stormwater issues. The alternatives included increasing pipe capacity, modifying outlet control, and incorporating additional floodplain storage. While these improvements were mostly focused on reducing the risk of flooding to roadways and structures, the improvements involve components or have beneficial impacts to the riparian corridor. These improvements will reduce stream velocities and erosion, attenuate peak discharges, and provide floodplain storage or retention time, which all have an effect on reducing the short term impact associated with storm events. It is also anticipated that replacement of culverts and other structures will be evaluated for water quality and aquatic habitat and passage considerations. In addition, a water quality analysis was performed that identified subbasin level pollutant loading for nitrogen, phosphorus, lead, and zinc.

Hominy Creek Greenway and Water Quality Plan

In 2016, Wilson City Council adopted the Hominy Creek Greenway and Water Quality Park Master Plan. The goal of this plan is develop a greenway along Hominy Swamp Creek and incorporate stream restoration and water quality best management practices (BMPs) as part of the implementation in order to better manage stormwater runoff into the creek and create habitat for macroinvertebrates with the creek. By doing these actions, City hopes to further the restoration of benthic communities in Hominy Swamp Creek and remove it from the 303(d) list of impaired waterbodies. This conceptual plan maps out recommendations for City to reach this goal. These include protection of riparian buffers, additional BMP implementation, analysis of roadway crossings, and protection of natural resources. This plan also proposes a recreational and educational aspect to showcase Hominy Swamp Creek and the City of Wilson.

Floodplain Mitigation Plan

In 2015, the City of Wilson adopted a Floodplain Management Plan. This plan identifies actions that will help to prevent future flooding, stream bank erosion, and dam failures. This plan was made up of four goals: 1) protection of health and safety; 2) reduction of flood damage through flood resilient strategies and measures; 3) reduction of damage to insurable buildings and frequently flooded areas; and 4) protection of critical and essential facilities from flood damage. With these four goals in mind, the plan mapped out potential remedies to the existing concerns and prevention strategies for future issues. Property acquisition in the floodplain is considered to be critical strategy of the plan, which provides the City the opportunity to reclaim these areas and retrofit them back to natural or improved conditions to support local goals.

NPDES MS4 Phase II Program

The NCDEQ Municipal Separate Storm Sewer System (MS4) Phase II Program began in 2006 to provide regulatory administration of the 2006 stormwater bill and the federal promulgation of the NPDES MS4 stormwater program. The purpose of the program is to regulate stormwater discharges from MS4s by permit to the maximum extent practicable. The federal government established a framework of six minimum measures to do this: 1) Public Education and Outreach, 2) Public Involvement and Participation, 3) Illicit Discharge Detection and Elimination, 4) Construction Site Runoff Control, 5) Post Construction Runoff Management, and 6) Pollution Prevention/Municipal Housekeeping. North Carolina, through the MS4 permit, requires BMPs to be performed for these six minimum measures. The City is not subject to these regulations at this time but anticipates to be designated as their population increases.

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Charlotte, NC 28202-2075
704.338.6700

hdrinc.com

Attachment 3

5-Year Stormwater CIP

EXCERPT OF MINUTES OF THE
SEPTEMBER 15, 2022 MEETING OF THE CITY COUNCIL
OF THE CITY OF WILSON, NORTH CAROLINA

Certification

I, Tonya A. West, City Clerk of the City of Wilson, North Carolina, do hereby certify that the foregoing is an excerpt of the minutes of the September 15, 2022 meeting of the City Council of the City of Wilson, North Carolina, as prepared by the City Clerk.

Consent Agenda

Mayor Stevens moved Agenda Items 6-11 to the Consent Agenda

Item 11. Consideration of Approval of Adoption of a 5-Year CIP for Stormwater Infrastructure

Mayor Stevens called for a motion. Councilmember Evans made a motion to approve the Consent Agenda. Councilmember Morgan seconded the motion, which passed unanimously.

WITNESS MY HAND AND THE SEAL OF THE CITY OF WILSON, NORTH CAROLINA, this the 19th day of September, 2022.

CITY OF WILSON INCORPORATED 1849 WILSON COUNTY, N.C.

Tonya A. West, City Clerk
Wilson, North Carolina

Project Number	Project Funding and Capital Outlay Breakdown Future Funding -		2023	2024	2025	2026	2027	Funding Balance
SW-01	Barton Roundtree SCM		$400,000	$0	$0	$0	$0	$400,000
SW-02	Country Club Dam/Culvert		$60,000	$550,000	$0	$0	$0	$610,000
SW-03	Elizabeth Street Culverts & Water Quality Park		$950,000	$3,000,000	$3,000,000	$3,000,000	$500,000	$10,450,000
SW-04	Op Center: Gas Tanks Containment & Oil/Water Separator		$0	$550,000	$0	$0	$0	$550,000
SW-05	Gold & Pine Streets Storm Drain Improvements		$75,000	$750,000	$0	$0	$0	$825,000
SW-06	Hominy Water Quality Retrofit		$75,000	$300,000	$0	$0	$0	$375,000
SW-07	Katharine Ct. Drainage Improvements		$250,000	$0	$0	$0	$0	$250,000
SW-08	Elizabeth Street Regional SCMs		$200,000	$200,000	$2,000,000	$2,000,000	$0	$4,400,000
SW-09	Jackson Street - Rebuild w/ Infrastructure		$50,000	$100,000	$1,350,000	$0	$0	$1,500,000
SW-10	Monitoring & Pumps for Park/Mercer		$100,000	$0	$0	$0	$0	$100,000
SW-11	SCM Flood Control Sensors		$287,000	$0	$0	$0	$0	$287,000
SW-12	Parkwood Project		$0	$850,000	$500,000	$0	$0	$1,350,000
SW-13	Hines Fire Department Flood Reduction Project		$100,000	$100,000	$800,000	$0	$0	$1,000,000
SW-14	Knollwood-Rollingwood Relocation Project		$300,000	$0	$0	$0	$0	$300,000
SW-15	MLK Stormwater Project		$0	$250,000	$250,000	$0	$0	$500,000
SW-16	Randolph Street - Re-route Project		$0	$400,000	$0	$0	$0	$400,000
SW-17	Sandy Creek - Culvert Replacement		$560,000	$0	$0	$0	$0	$560,000
SW-18	Stantonsburg Circle - Stormwater Replacement Project		$0	$750,000	$0	$0	$0	$750,000
SW-19	Toisnot Reservoir Dredging		$0	$0	$500,000	$125,000	$125,000	$750,000
SW-20	Toisnot Reservoir Forebay		$0	$75,000	$150,000	$525,000	$0	$750,000
SW-21	The Village Trenchless Pipelining		$0	$120,000	$0	$0	$0	$120,000
SW-22	Operation Center Treatment SCM		$0	$0	$0	$45,000	$450,000	$495,000
SW-23	Condition Survey & Asset Inventory		$50,000	$200,000	$200,000	$50,000	$50,000	$550,000
	Capital Fund Reserve - Rolling Projects		**$3,457,000**	**$8,195,000**	**$8,750,000**	**$5,745,000**	**$1,125,000**	**$27,272,000**

Attachment 4

NC 2022 Integrated Report

AU Name	AU Number	Classification	AU LengthArea	AU Units
Turkey Creek	27-86-3-(1)a2	C;NSW	2.0	FW Miles

AU ID: 8552 Description: From Old Middlesex Road to SR 1101

2022 Water Quality Assessments

PARAMETER	IR CATEGORY	CRITERIA STATUS
Dissolved Oxygen (4 mg/l, AL, FW)	5	Exceeding Criteria
pH (6 su, AL, FW)	3a	Data Inconclusive
Water Temperature (32ºC, AL, LP&CP)	1	Meeting Criteria
pH (9.0, AL, FW)	1	Meeting Criteria
Turbidity (50 NTU, AL, FW miles)	1	Meeting Criteria
Fecal Coliform (GM 200/400, REC, FW)	1	Meeting Criteria

AU Name	AU Number	Classification	AU LengthArea	AU Units
Beaverdam Creek	27-86-3-8	C;NSW	5.6	FW Miles

AU ID: 8567 Description: From source to Turkey Creek

2022 Water Quality Assessments

PARAMETER	IR CATEGORY	CRITERIA STATUS
Benthos (Nar, AL, FW)	1	Meeting Criteria

AU Name	AU Number	Classification	AU LengthArea	AU Units
Hominy Swamp	27-86-8	C;Sw,NSW	9.9	FW Miles

AU ID: 8580 Description: From source to Contentnea Creek

2022 Water Quality Assessments

PARAMETER	IR CATEGORY	CRITERIA STATUS
Benthos (Nar, AL, FW)	4b	Exceeding Criteria
Fish Community (Nar, AL, FW)	3b	Data Inconclusive

Neuse River Basin **03020204** **Lower Neuse**

Attachment 5

Hominy Swamp Creek Watershed Assessment and Restoration Plan

Hominy Swamp Creek Watershed Assessment And Restoration Plan

Submitted to
Region 4 US Environmental Protection Agency

Submitted by

Ecosystem Enhancement Program
North Carolina Department of Environment
and Natural Resources
December 2004

Hominy Swamp Creek Watershed Assessment and Restoration Plan

Submitted to Region 4 Environmental Protection Agency,
in Partial Fulfillment of Cooperative Agreement # CD984622-99
Contentnea Watershed Wetland and Riparian Area Restoration and Plan, Neuse River Basin

Submitted by

Jocelyn Elliott, Watershed Planner, Eastern Region
Kristin Miguez, Project Manager, Eastern Region

Ecosystem Enhancement Program
North Carolina Department of Environment
and Natural Resources
December 2004

Acknowledgements

This plan could not have been accomplished without the help of Kristin Miguez, with EEP, and the advisory group who met at the City of Wilson, NC, during the course of project. Many thanks to Jennifer Derby with EPA Region 4, for her continued support, and who graciously shepherded the project along to completion. And with grateful appreciation to various staff at NC State University for their support and assistance in providing services for the plan.

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Hominy Swamp Creek Watershed Assessment and Restoration Plan

1 Introduction

1.1 Background

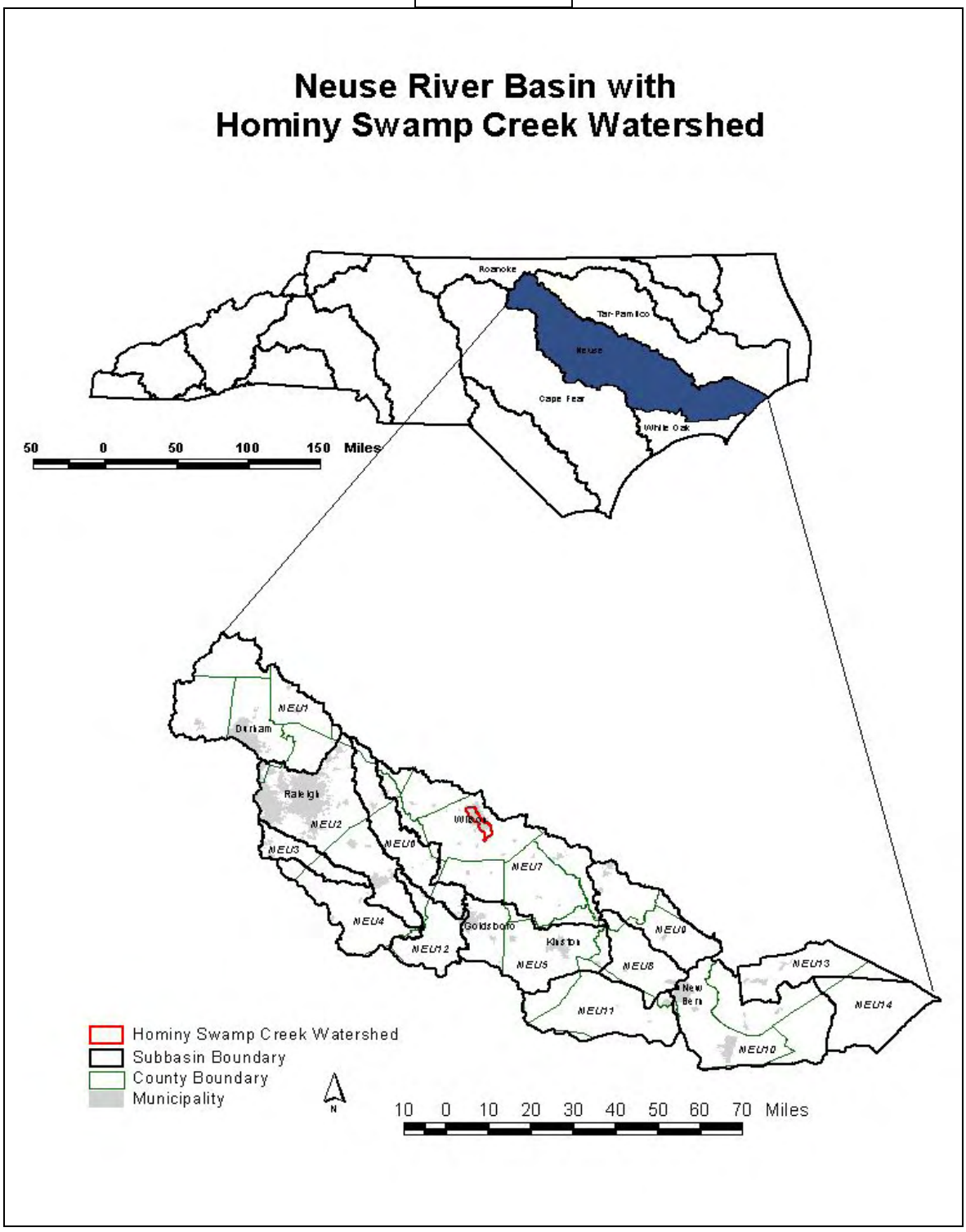
The North Carolina Department of Environment and Natural Resources Ecosystem Enhancement Program (EEP; formerly the NC Wetlands Restoration Program) received a grant from the U.S. Environmental Protection Agency (EPA) in 1999 to develop a watershed assessment and restoration plan for one or more 14-digit hydrologic units within the Contentnea Creek watershed (Subbasin 7 of the Neuse River Basin). Hominy Swamp Creek (HU # 03020203020040; Figure 1.1), in Wilson, NC, was selected for the study in part because there were obvious nonpoint source water quality problems, the watershed appeared to have need and opportunity for watershed restoration planning, and there were noted concerns about flooding and associated resource and financial impacts in the City. Natural resource agencies in the community (federal, state, and local) expressed a willingness to participate in the watershed planning process; a summary of local participation and watershed goals is presented in Appendix A. Components of the grant were developed between 1999-2004 and are incorporated in this assessment and restoration plan. Other elements and deliverables for the grant are summarized in Appendix C.

1.2 Project History

Earlier studies: The EPA grant was used to develop a watershed assessment and management plan for the upper portion of Hominy Swamp Creek (KCI, 1999), and a stream restoration project was implemented in Recreation Park (Figures 1.2, 1.3, 1.4) as a result of that assessment. Funding from the grant was also used to develop a land use/land cover characterization using high resolution satellite imagery (Center for Earth Observation, North Carolina State University, 2000). Further analysis on land use/land cover has been developed, through other funding, focusing specifically on the riparian corridor of Hominy Swamp Creek (Center for Earth Observation, North Carolina State University, 2003).

An advisory group was convened in 2003 to solicit input and assistance from local area natural resources agency staff. A number of issues were discussed during meetings with the advisory group, and a list of goals was developed, including water quality and habitat improvements, education, land use and open space planning, and identifying funding sources for projects. Some of these goals are being addressed by the local agencies, and can be enhanced through application of additional resources. A summary of the advisory group effort is provided in Appendix A; an analysis of funding sources is provided in Appendix B.

Figure 1.1


Neuse River Basin with
Hominy Swamp Creek Watershed
Roanoke
Tar-Pamlico
Neuse
Cape Fear
White Oak
50 0 50 100 150 Miles
NEU1
Durham
Raleigh
NEU2
NEU3
NEU6
Wilson
NEU7
NEU4
Goldsboro
NEU12
Kinston
NEU5
NEU8
NEU9
NEU13
New Bern
NEU11
NEU14
NEU10
Hominy Swamp Creek Watershed
Subbasin Boundary
County Boundary
Municipality
N
10 0 10 20 30 40 50 60 70 Miles

1.3 Watershed Overview

Hominy Swamp Creek is located in the City of Wilson, North Carolina. The City was founded in 1849 in a primarily agricultural region of the coastal plain, a local hub for several railway lines that transect the state. The population in the City since 1900 is summarized in Table 1.1.

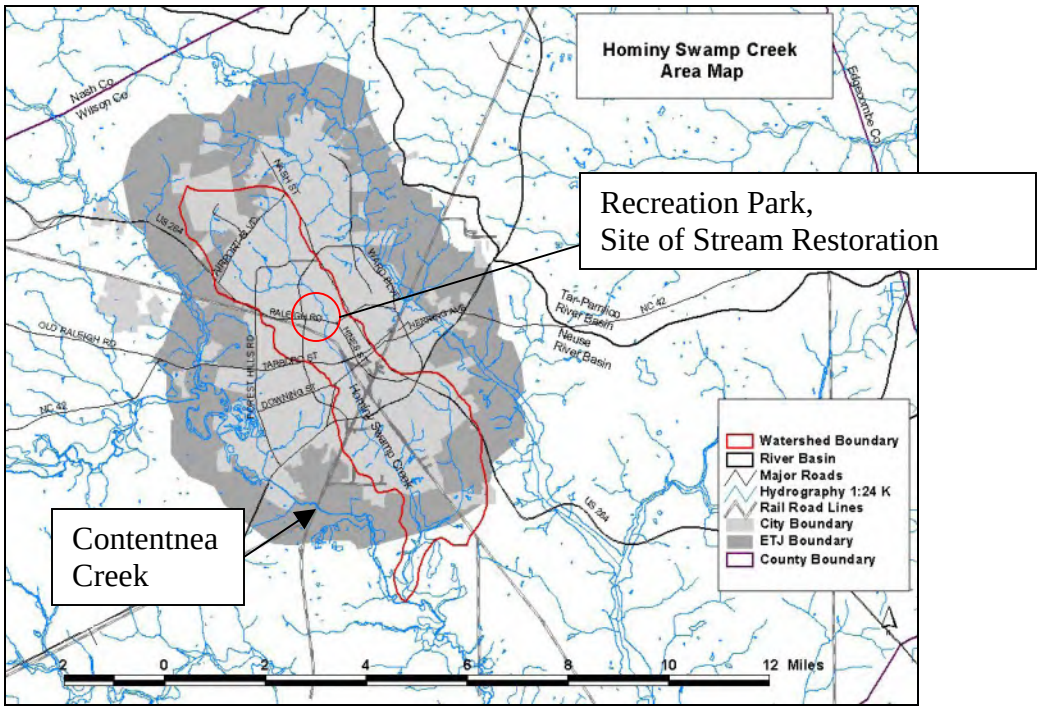
Table 1.1 Summary of Population, City of Wilson, 1900-2000

Year	Population
1900	3,500
1950	23,00
1970	29,000
2000	44,000

The watershed area is comprised of approximately 15 square miles of land area that drains into the larger Contentnea Creek at the southern reaches of the watershed (Figure 1.2).

The stream system that makes up Hominy Swamp Creek has been extensively channelized over the past 50 years, and now serves mainly as storm water conveyance through the urbanized mid-portion of the watershed. Most headwater streams of the system are relatively undisturbed at present, but there is additional development pressure in the city as new residential and commercial developments encroach from the east and west. The mid and upper portions of the watershed have been largely built-out over the past fifty years, and there are many complaints of residential flooding as the creek attempts to access its historical floodplain.

Figure1.2



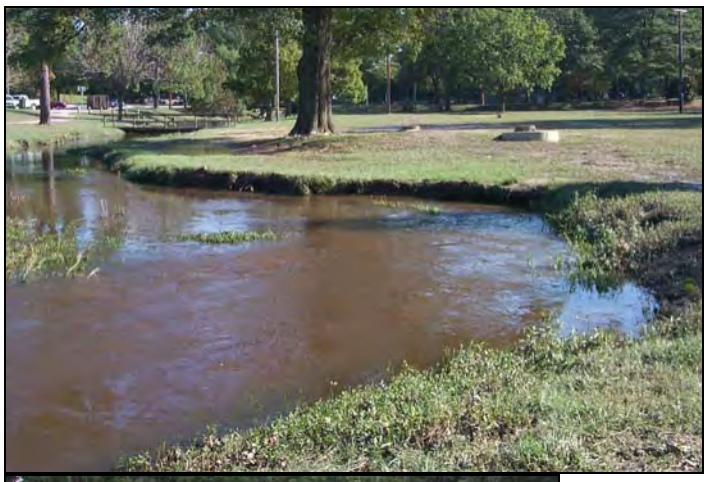


Figure 1.3
Stream Restoration Site,
Before Restoration, 1999

Figure 1.4
After Restoration,
2003

1.4 Stakeholder Process

An advisory group was developed to help give guidance for the planning process. Three meetings were held during 2003 to solicit input and assistance from local area natural resources agency staff. The following groups participated in the meetings:

City of Wilson Stormwater Services
City of Wilson Public Services/Engineering
Wilson County Cooperative Extension Service
USDA Natural Resources Conservation Service (Wilson County)
Neuse River Foundation
Green Engineering (a local engineering contractor)

NC State University's Watershed Education for Communities and Local Officials (WECO) facilitated the meetings. The purposes of these meetings were to review assessment data and gather additional information, gather insight into local program priorities, to help set goals for the planning effort, and to assist in site visits. A public meeting was held in December 2003, to solicit input from the community. Meeting minutes are available on WECO's website at: www.ces.ncsu.edu A summary of goals discussed is presented in Appendix D.

Goals of Watershed Planning

There were a number of problems discussed during meetings with local resource agency staff. There was a rather exhaustive list of goals to work towards, including water quality and habitat improvements, education, land use and open space planning, and identifying funding sources for projects. Some of these goals are being addressed by the local agencies, and can be enhanced through application of additional resources. Below are listed objectives for this Local Watershed Planning Group, as discussed at meetings in 2003 :

1) Improve Water Quality
2) Restore Physical Habitat
3) Engage and Educate the Public & Government
4) Implement Land Use Planning
5) Encourage Community Stewardship
6) Develop Implementation Strategy
7) Identify Potential Funding Sources

2 Natural Resources

Wilson County lies mainly in the Inner Coastal Plain physiographic province of Eastern North Carolina. The terrain is dominated by gently sloping and flat coastal plain uplands, narrow to wide floodplains, and nearly level stream terraces (USDA, 1983).

2.1 Local Soils

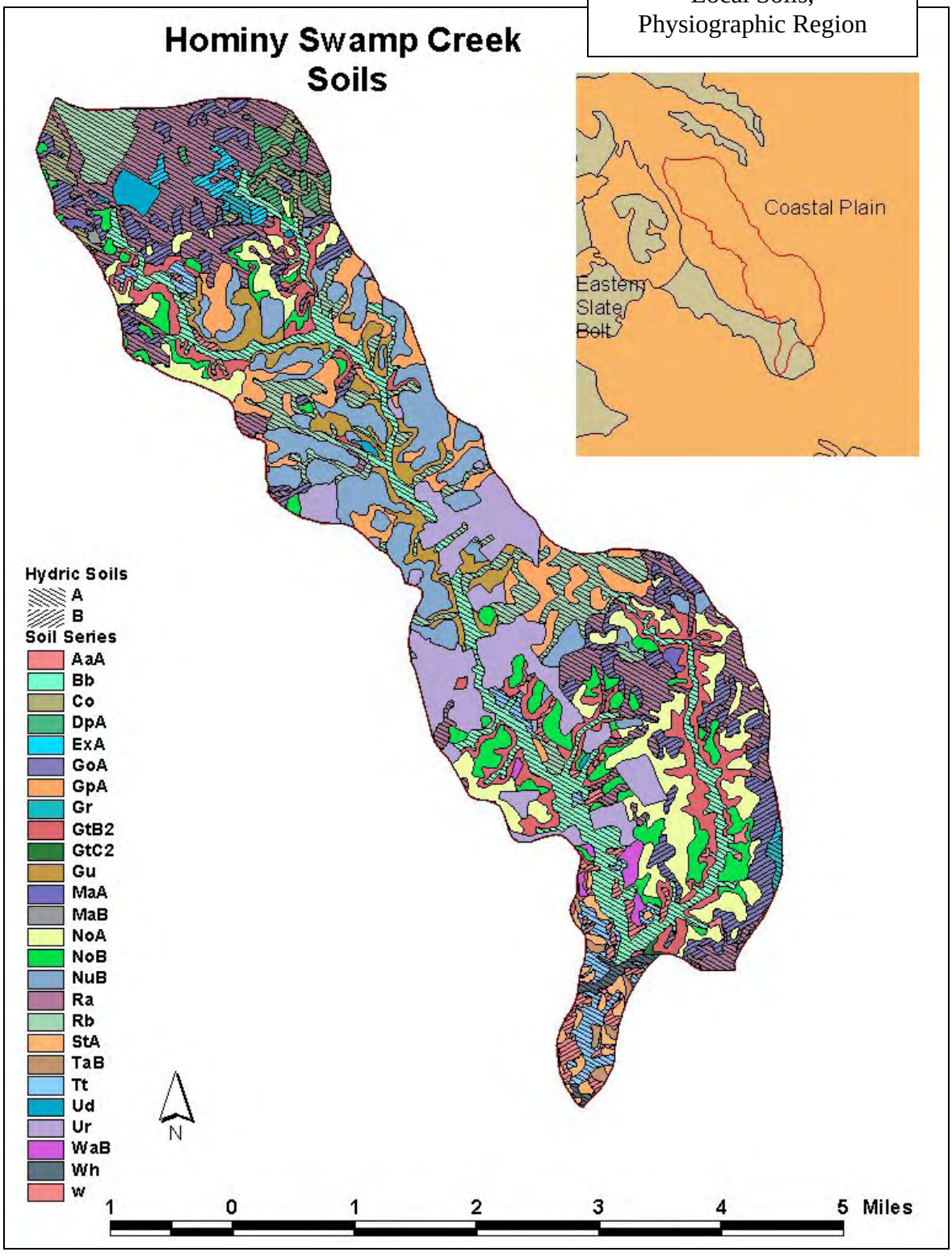
Soils within the watershed are predominantly represented by nine soil series, further defined into thirteen separate mapping units as presented in Table 1.2. More than half of the dominant soils are classified as hydric; these soils exhibit characteristics of wetland and flood-prone soils. Hydric soils within the Hominy Swamp drainage are often poorly or somewhat poorly draining, subject to frequent flooding, and often have a seasonal high water table at or near the surface, or down to 18" below the surface. These soils likely formed in and are indicative of the swamp-like conditions under which this stream system functioned in the past, with the stream having easier access to a more extensive floodplain than now exists. Remnant hydric soils are one major factor indicating previous wetland areas, as well as potential wetland restoration and enhancement opportunities.

Table 2.1 Soils of Hominy Swamp Creek Watershed

Mapping Units *Hydric*:	% present in watershed
Bibb loam (Bb)	6
Goldsboro sandy loam, 0-2% slopes (GoA)	7
Rains sandy loam (Ra)	15.5
Rains urban land complex (Rb)	7
Tomotley fine sand loam (Tt)	7
Wehadkee & Chewacla loams (Wh)	11
total	53.5%
Non-Hydric:	
Goldsboro urban land complex, 0-2% slopes (GpA)	5
Gritney sandy loam, 2-5% slopes, eroded (GtB2)	5
Gritney urban land complex, 2-12% slopes (Gu)	2.5
Norfolk sandy loam, 0-2% slopes (NoA)	7
Norfolk sandy loam, 2-6% slopes (NoB)	4
Norfolk urban land complex, 2-6% slopes (Nu)	7.5
Ur urban land	8
total	39%

The majority of upland, non-hydric soils are Goldsboro, Norfolk and Gritney sandy loams and those representing an urban land complex (disturbed or modified, with some areas now impervious).

Figure 2.1
Local Soils,
Physiographic Region



2.2 Habitat and Endangered Species

No known rare or endangered terrestrial or aquatic species occur within the Hominy Swamp Creek watershed (NHP, 2004). This does not indicate definitively that no such species exist in the watershed, but instead indicates that no studies have shown the presence of such species. There is one rare species known to have historical habitat outside of the watershed (but within Wilson County), as indicated by the NC Natural Heritage Program. This amphibian is the Neuse River Waterdog (Necturnus lewisi), a species of State Concern.

While much of the watershed has been altered, mainly through channelization and increasing land development over time, there are still several highly functional wetland areas that bear consideration for protection. These areas have been identified through GIS analysis and site visits to be relatively unaltered, particularly in the headwaters and further down the mainstem, as indicated in the next section describing wetlands.

2.3 Wetlands

Analysis of current and historic wetlands features in the Hominy Swamp watershed were identified as the best means to look at watershed functions, addressing impacted functions and functions that merit protection. Data made available through the NC Division of Coastal Management (DCM) were used to assess existing wetlands (using wetland type data set) and the functions performed, represented as "ecological significance" (using NCCREWS data) as well as lost or degraded wetlands features (using potential wetlands restoration data). These facets of the data are examined in the following subheadings. *Note*: The data provided is for planning purposes only and not for jurisdictional determinations; further field assessments are recommended as necessary.

Existing Wetlands:
As seen in Figure 2.2, the watershed currently contains approximately 32% of its land area in wetlands. The majority of existing wetlands are riverine swamp forest (1,686 ac.), managed pine (704 ac.), and bottomland hardwood (443 ac.). The areas representing "managed pine" may be over estimated in this watershed and may more truly represent degraded wetlands (that have been transformed primarily into residential areas), retaining less capacity to function in biogeochemical cycling and floodwater retention than they may have in the past.

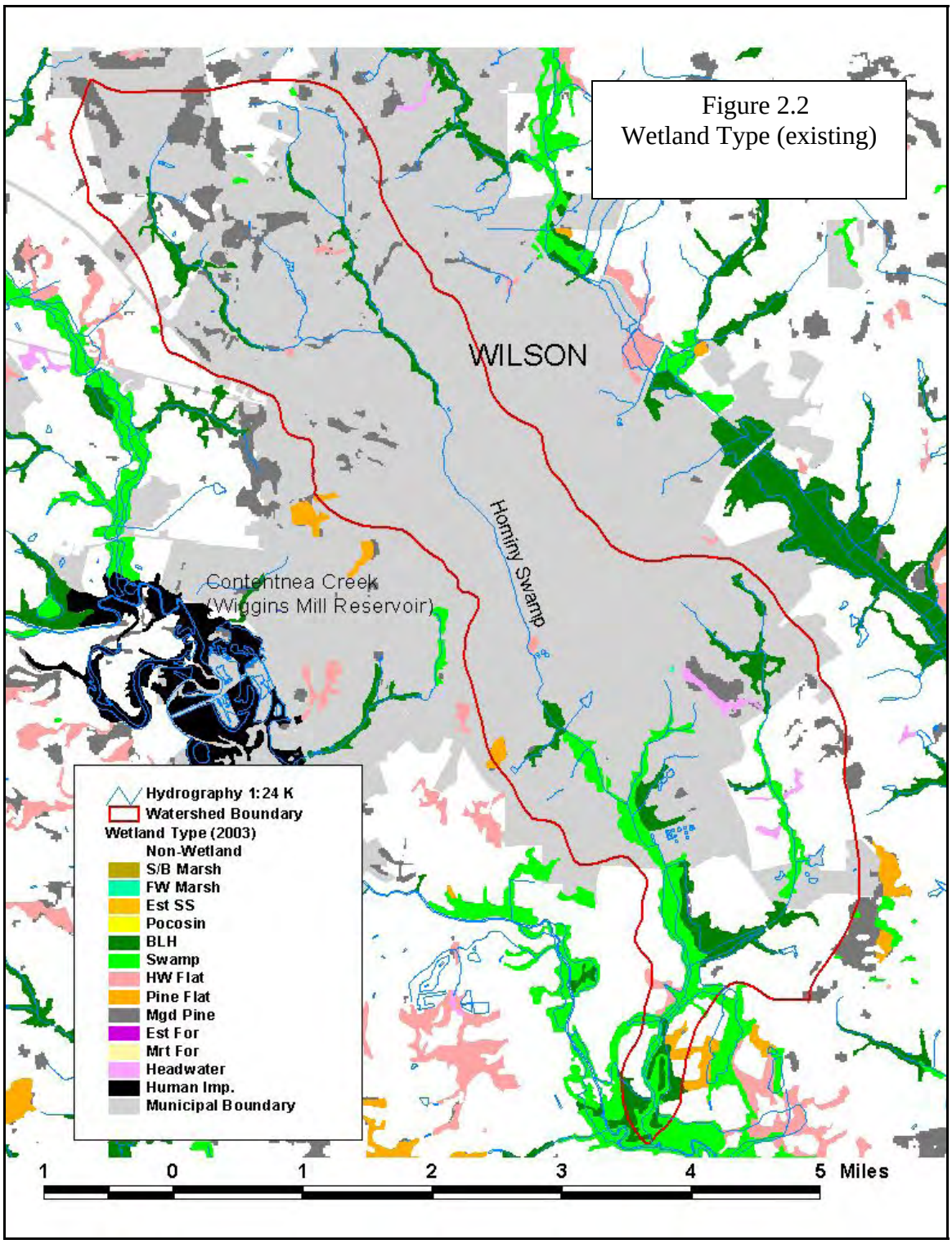


Figure 2.2
Wetland Type (existing)
WILSON
Hominy Swamp
Contentnea Creek
(Wiggins Mill Reservoir)
Hydrography 1:24 K
Watershed Boundary
Wetland Type (2003)
Non-Wetland
S/B Marsh
FW Marsh
Est SS
Pocosin
BLH
Swamp
HW Flat
Pine Flat
Mgd Pine
Est For
Mrt For
Headwater
Human Imp.
Municipal Boundary
1 0 1 2 3 4 5 Miles

Table 2.2 Existing Wetland Type

Wetland type	acres
Bottomland Hardwood	443.7
Cleared Bottomland Hardwood	13.1
Cleared Depressional Swamp Forest	0.2
Cleared Hardwood Flat	4.2
Cleared Headwater Swamp	0.6
Cleared Pine Flat	0.3
Cleared Riverine Swamp Forest	1.2
Cutover Bottomland Hardwood	31.7
Cutover Depressional Swamp Forest	0.1
Cutover Hardwood Flat	6.0
Cutover Headwater Swamp	3.9
Cutover Pine Flat	51.9
Cutover Riverine Swamp Forest	14.8
Depressional Swamp Forest	13.6
Drained Bottomland Hardwood	40.1
Drained Hardwood Flat	4.7
Drained Riverine Swamp Forest	27.2
Freshwater Marsh	0.6
Hardwood Flat	16.6
Headwater Swamp	38.1
Managed Pineland	705.0
Pine Flat	19.3
Riverine Swamp Forest	1686.1
Total wetland acres	3122.9
Total watershed acres	9600

The NC CREWS data can be used to look at the ecological significance of existing wetlands and the roles they play in water quality, habitat, and hydrologic functions in the watershed (additional maps of NC CREWS data are provided in Appendix D). As stated in the DCM documents available for use with this data, "The Overall Wetland Rating (OWR) for wetlands is based on each wetland's ability and opportunity to provide (1) Water Quality, (2) Hydrologic, and (3) Wildlife Habitat functions.

Exceptional Functional Significance: A wetland is rated exceptional for its overall functional significance when it performs water quality, hydrologic and/or wildlife habitat functions at well above normal levels. Specifically, a wetland is rated Exceptional when any two of the primary wetland functions (water quality, hydrology, and habitat) are rated Exceptional. Salt or Brackish marshes, estuarine scrub-shrub wetlands; estuarine forested wetlands; unique natural ecosystems or special wildlife habitat areas, wetlands located adjacent to primary nursery areas, and wetlands that contain threatened or endangered species are also rated Exceptional.

Substantial Functional Significance: A wetland is rated Substantial when the wetland performs the three primary wetland functions at normal or slightly above normal levels. A wetland is also rated Substantial if it is a buffer to a wetland rated Exceptional.

Beneficial Functional Significance: A wetland is rated Beneficial when it performs the three primary wetland functions at below normal levels or, in some cases, not at all. Although most wetlands perform a variety of wetland functions, all wetlands do not provide all functions. A wetland is rated Beneficial when any two of the primary wetland functions are rated low and none are rated high. Some jurisdictional wetlands may not perform some functions due to degradation or alteration, but may provide other functions at below normal levels." (DCM, 2003)

As represented on Figure 2.3, wetlands of exceptional function, incorporating water quality, hydrologic, and habitat qualities, are present in this watershed, as well as areas of substantial functional capacity. Several areas with highly functional, intact wetlands systems are within the headwaters and in the lower reaches of the drainage area. Preservation of existing wetlands features is a main goal of this planning effort, as many wetlands features have been compromised over time, and development too close to and in the floodplain has caused major flooding events and heightened awareness of flood potential.

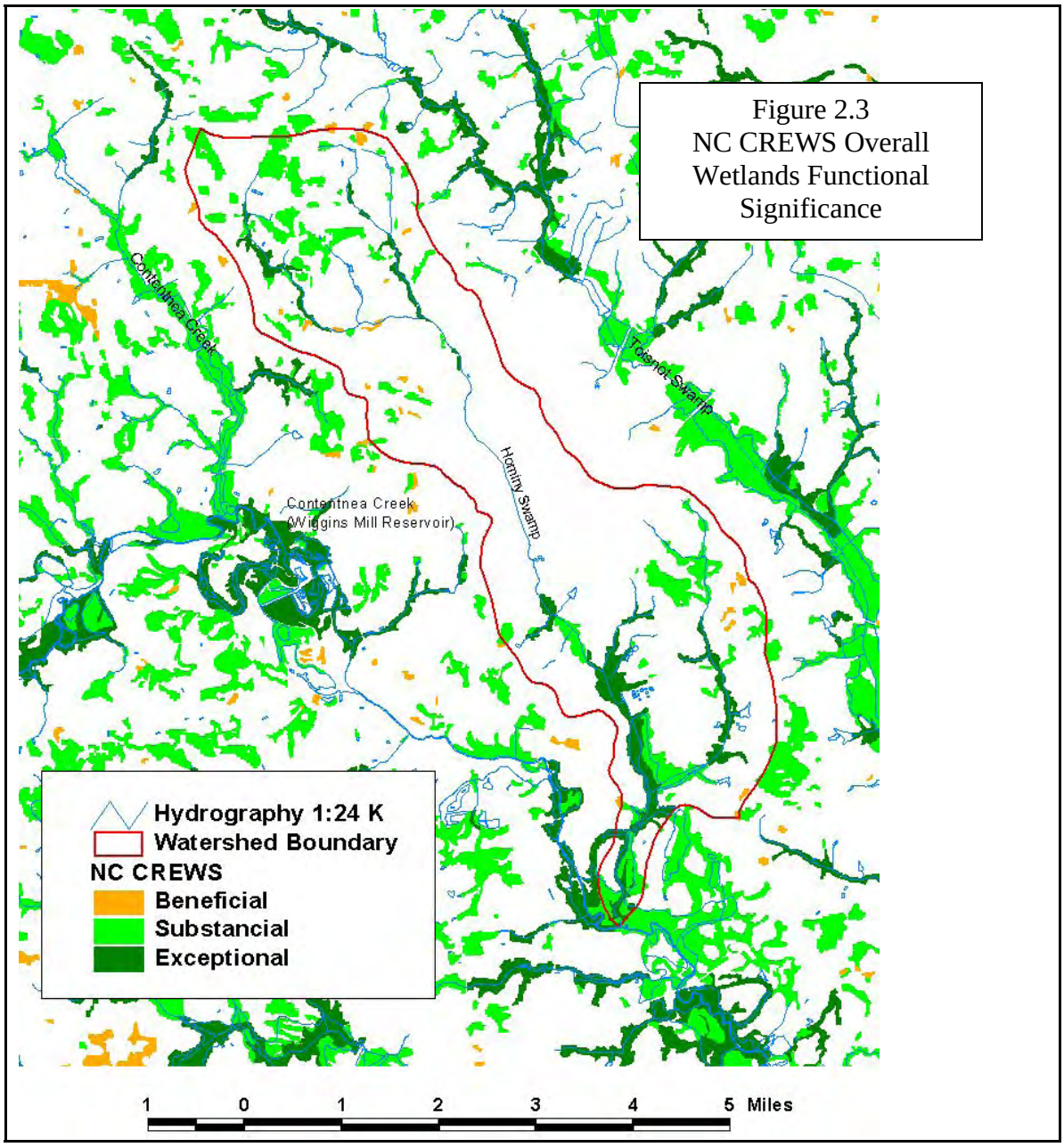


Figure 2.3
NC CREWS Overall
Wetlands Functional
Significance
Contentnea Creek
Trenton Swamp
Hominy Swamp
Contentnea Creek
(Wiggins Mill Reservoir)
Hydrography 1:24 K
Watershed Boundary
NC CREWS
Beneficial
Substancial
Exceptional
1 0 1 2 3 4 5 Miles

Lost and Degraded Wetland Features:
There are many ways of using the DCM Wetland Type and Potential Restoration and Enhancement data sets to look at historic wetlands loss (Figure 2.4). The potential wetlands restoration data set represents areas that were historically functioning as wetlands and have either been degraded to the point that they no longer provide wetland benefits to the watershed, or those functions have been partially compromised. Three potential wetlands restoration and enhancement types exist in this watershed, as summarized in Table 2.3.

Table 2.3 Potential Restoration and Enhancement Types

Potential Restoration Type	acres
Swamp/Bottom Land Hardwood	157.6
BLH/Headwaters	130.1
Wet Flatwoods	2022.3
total	2309.9

In accordance with guidance documents for these data, disturbance types are represented as drained, ditched, and managed pine. Drained and cleared wetlands and managed pine areas make up the majority of disturbance type within this watershed; type of disturbance is summarized in Table 2.4. Disturbance classes represent either restoration or enhancement potential; disturbance classes 4,5, and 9 represent enhancement potential, other classes represent restoration potential.

Table 2.4 Disturbance Classes

Type of Disturbance	Disturbance Class	acres
Drained and cleared	1	1393.4
Drained and cleared	2	3.1
Drained and cleared	3	6.7
Ditched, not cleared	4	72.9
Managed Pinelands	5	705.0
Drained, not cleared	8	50.0
Ditched, not cleared	9	79.0
total		2310.0

Several conclusions have been drawn from these data sets, as represented in summary:

Watershed area:	9,600 ac.
Existing Wetlands:	3,122 ac.
Historic Wetlands:	4,575 ac.
Potential Restorable Wetlands:	1,453 ac.

Existing Wetlands, as % of Historic wetlands	68%
Wetlands functional area lost, as % of historic wetlands acreage:	31%
Wetlands functional area degraded or lost, as % of historic wetlands acreage:	50%

With nearly half the functional wetlands lost or degraded over time, it should be no surprise that watershed functions have been compromised. While it may appear intuitive that the loss in hydrologic function of historic wetland areas would greatly affect the ability of the watershed to effectively assimilate floodwaters, it is a difficult proposition to restore that function in a natural manner in a developed watershed. For this reason, consideration was given to replacement of lost functions in the most appropriate methods given the constraints of current land use.

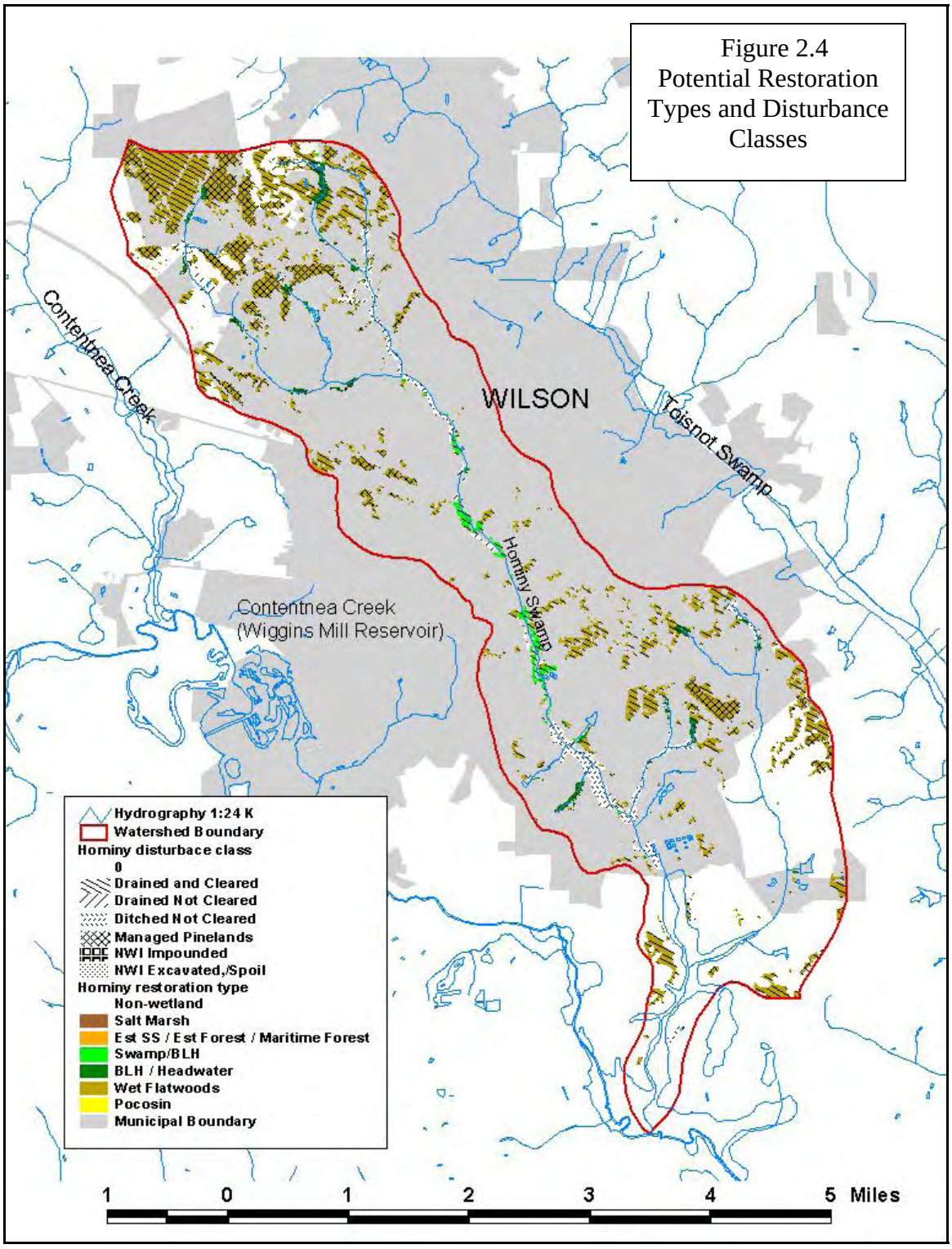


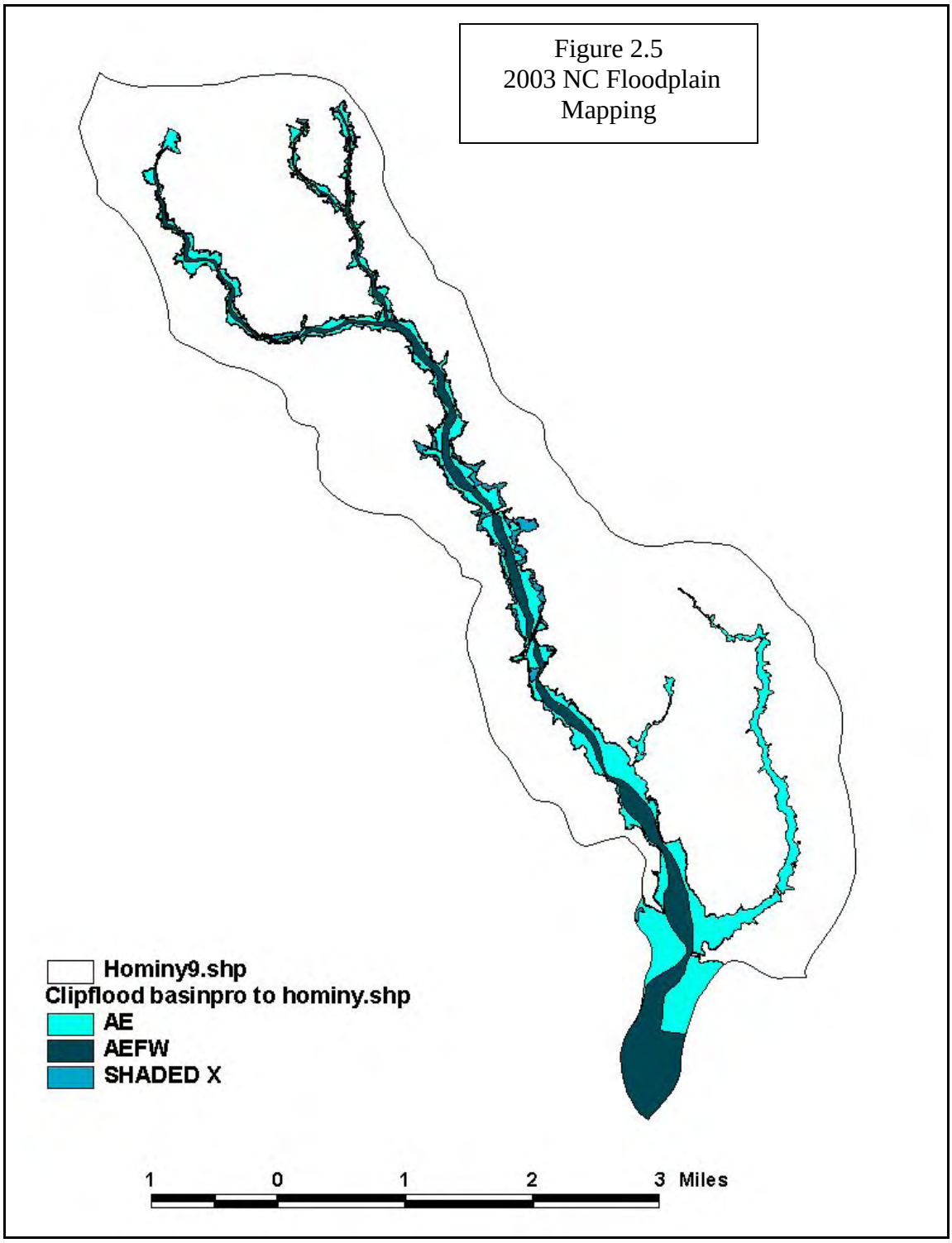
Figure 2.4
Potential Restoration Types and Disturbance Classes
WILSON
Contentnea Creek
Hominy Swamp
Taisnot Swamp
Contentnea Creek
(Wiggins Mill Reservoir)
Hydrography 1:24 K
Watershed Boundary
Hominy disturbace class
0
Drained and Cleared
Drained Not Cleared
Ditched Not Cleared
Managed Pinelands
NWI Impounded
NWI Excavated,/Spoil
Hominy restoration type
Non-wetland
Salt Marsh
Est SS / Est Forest / Maritime Forest
Swamp/BLH
BLH / Headwater
Wet Flatwoods
Pocosin
Municipal Boundary
1 0 1 2 3 4 5 Miles

2.4 Floodplains

New floodplain maps were adopted by the City of Wilson in 2003 (Figure 2.5). This was part of a statewide re-mapping effort undertaken by the State of North Carolina in an effort to provide more up-to-date information to the Federal Emergency Management Agency (FEMA) and local governments (NC Floodplain Mapping, 2004). FEMA Flood Insurance Rate Maps (FIRMs) are developed for use in floodplain management, determination of flood insurance requirements, and in the regulation of new development and redevelopment in flood-prone areas.

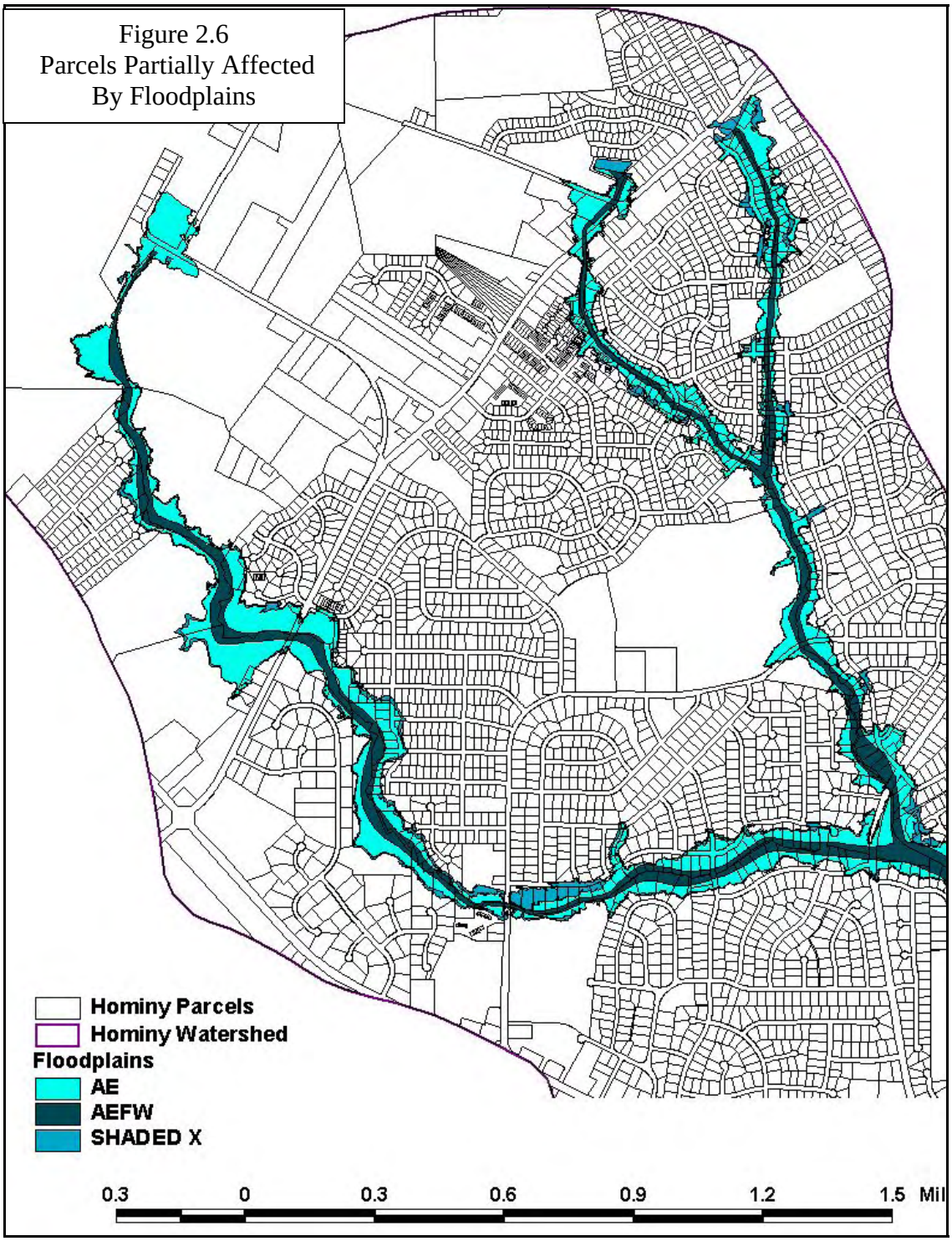
Within the project watershed, the floodplain areas are mapped **Special Flood Hazard Areas (SFHAs)** subject to inundation by the 1% annual chance of flood (i.e., 100-year event): **Zone A** (areas inundated by 1% annual chance flood for which no based flood elevations (BFEs) have been determined), **Zone AE** (areas inundated by 1% annual chance flood for which BFEs have been determined), and **Floodway Areas in Zone AE** (**AEFW**; floodway area is the channel of stream plus floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increase in flood heights). **Other Flood Areas** are marked as **Zone X** (areas of 0.2% (i.e., 500-year event) annual chance of flood; 1% annual chance of flood with average depths less than one foot or drainage area less than one square mile). Additional mapped areas include **non-floodplain Other Areas X** (areas outside the 0.2% annual chance of floodplain).

The encroachment of (primarily existing) residential land use into the floodplain is apparent in using the new floodplain maps (Figure 2.6). As a result of this recent mapping effort, portions of a number of previously undesignated properties within the City limits were now designated as floodprone and subject to additional flood insurance protection measures. One of the major challenges in dealing with flooding problems in the City, as in many urban areas, is the fact that property lines are often drawn to the centerline of a stream, and streams change their courses over time. While it is a natural process for unstable streams to find a new path in an attempt to establish stability, in a developed watershed this can exacerbate existing channel and floodplain problems.



New topographic data was developed for the Neuse River Basin as part of the floodplain mapping program (NC Floodplain Mapping, 2004). High resolution LIDAR (Light Detection and Ranging) elevation data are currently available, but were not used in this plan. USGS Topographic maps are provided in Appendix B.

Figure 2.6
Parcels Partially Affected
By Floodplains



3 Land Use and Historic Trends

Historical Aerial Photos:
In assessing the character of the watershed as seen through aerial photography (from 1938, 1964, and 1998), it is clear that there has been fairly substantial growth throughout the upper and middle portions of the watershed since the earliest aerials were flown. Many structural features are present in the early photos, and infill has occurred over time, indicating that there has been a well-established community for years in Wilson that continues growing today. The road network has become more complex over time, and more development (in residential, commercial, institutional and industrial) has proliferated across the City.

Land Use/Land Cover:

Three land use/land cover data sets were developed at increasingly higher resolution over the past eight years. The first data set is part of the statewide analysis of land use produced in 1996, the only such study of the state's full geographic extent (CGIA, 1996; figure 3.1). The land use/land cover developed in this effort was at 30 m resolution, using 1993-1995 satellite imagery. Table 3.1 represents the breakdown in land use types in the Hominy Swamp Creek watershed developed in the 1996 study.

Table 3.1 1996 Land Use/Land Cover, Hominy Swamp Creek Watershed

Land Cover Class	**% Land Area of Watershed**
Agriculture	22%
Developed	27%
Forested	49%
Water	4%
Total	**100%**

There have been concerns that the resolution of this data set does not allow for a high degree of certainty in the quantification of land cover types, compounded by the effects of more recent and rapid land use change, especially in urban areas.

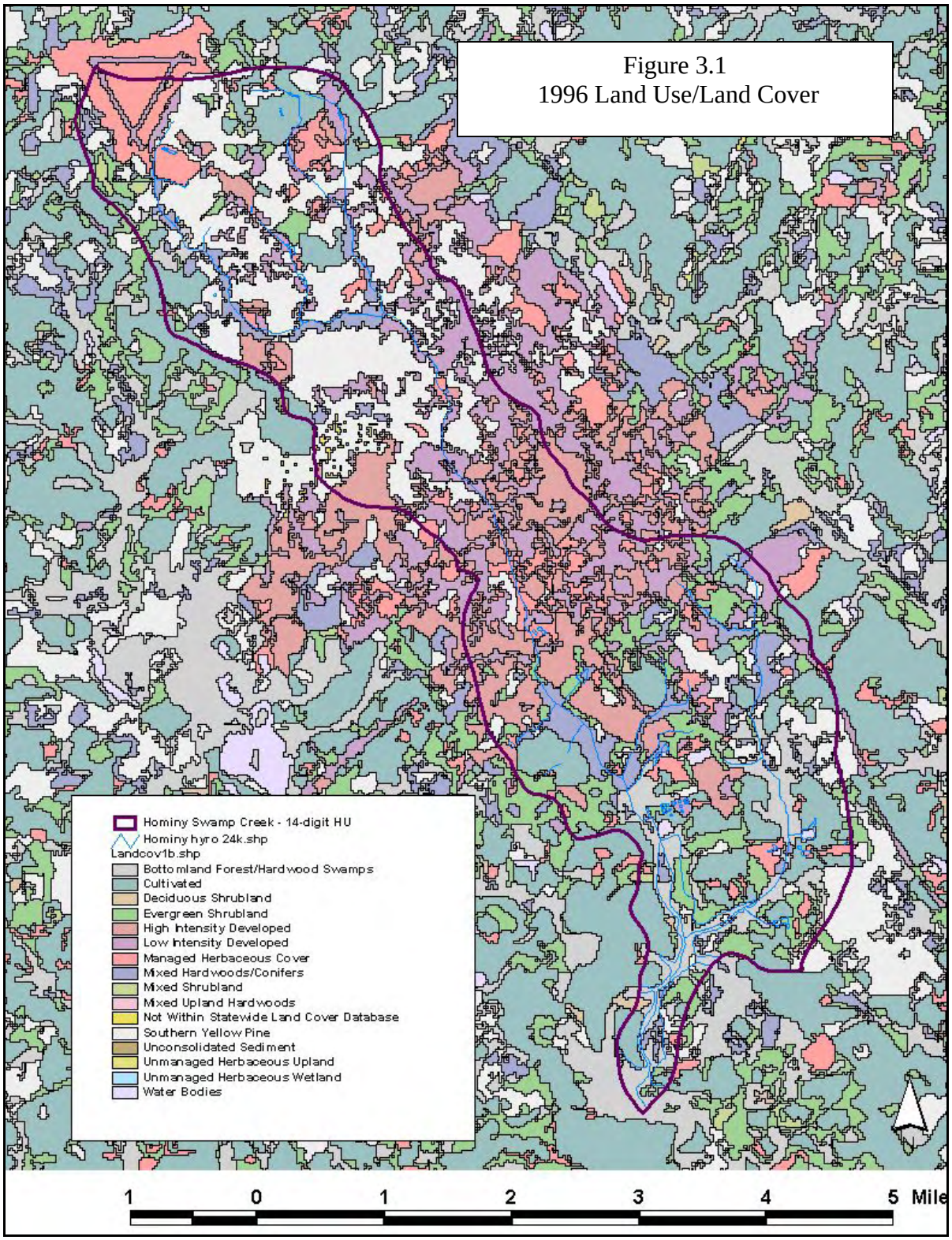


Figure 3.1
1996 Land Use/Land Cover
Hominy Swamp Creek - 14-digit HU
Hominy hyro 24k.shp
Landcov1b.shp
Bottomland Forest/Hardwood Swamps
Cultivated
Deciduous Shrubland
Evergreen Shrubland
High Intensity Developed
Low Intensity Developed
Managed Herbaceous Cover
Mixed Hardwoods/Conifers
Mixed Shrubland
Mixed Upland Hardwoods
Not Within Statewide Land Cover Database
Southern Yellow Pine
Unconsolidated Sediment
Unmanaged Herbaceous Upland
Unmanaged Herbaceous Wetland
Water Bodies
1 0 1 2 3 4 5 Mile

Fortunately, recent studies of land use/land cover in the Hominy Swamp Creek watershed have produced two new analytical procedures developed by the NC State University (NCSU) Center for Earth Observation. The first of the recent methodologies, developed in 1999, produced a 1 meter (target) resolution interpretation using digitized NAPP 1:40,000 aerial photographs (Figure 3.2). This study determined the Hominy Swamp watershed to have the following land cover classes:

Table 3.2 1999 Land Use/Land Cover, Hominy Swamp Creek Watershed

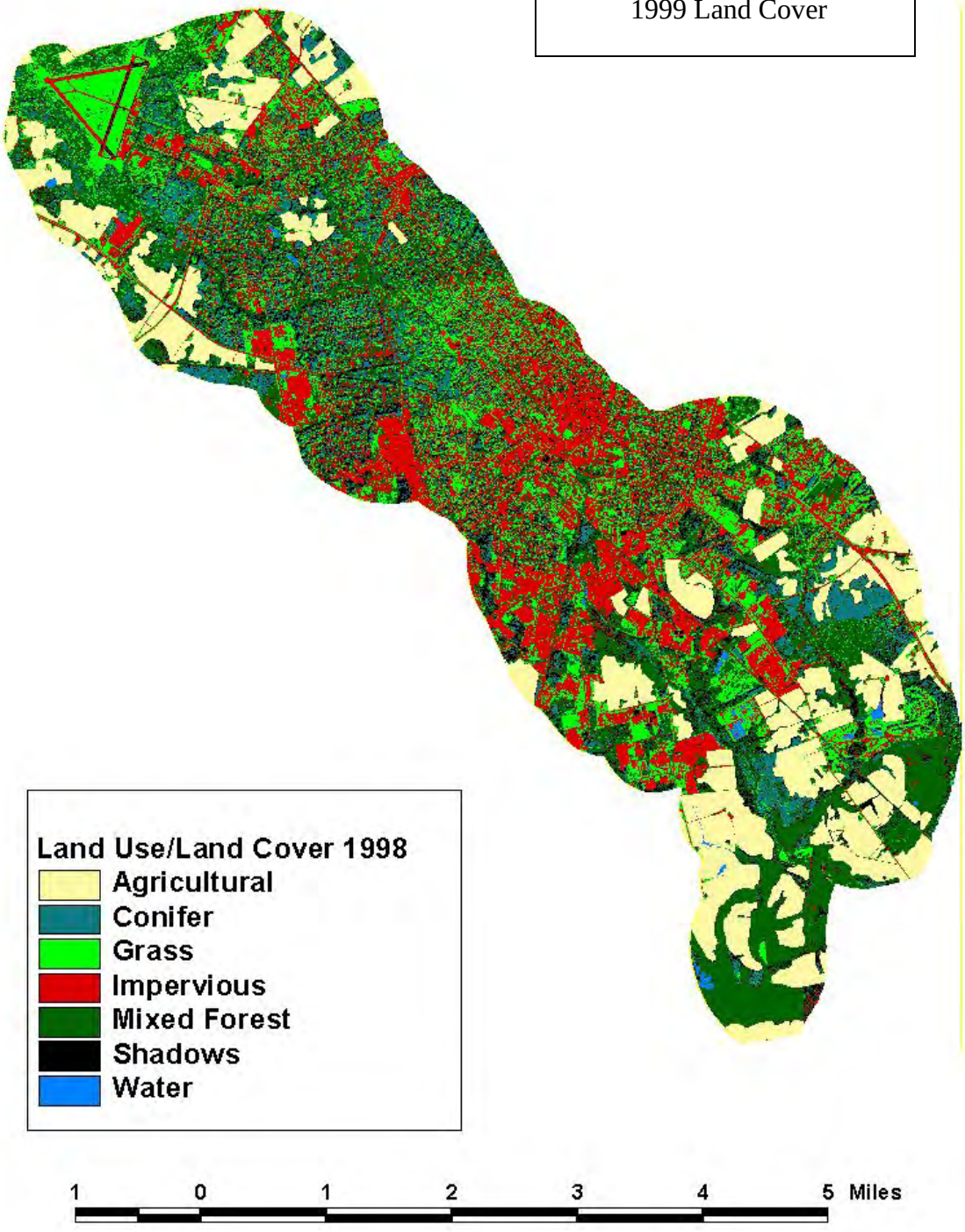
Land Cover Class	**% Land Area of Watershed**
Urban	22.5
Forest	32.2
Grassland	17.3
Agriculture	17.8
Bare Soil	0.4
Shadow	9.2
Total	**99.4**

The third process, developed in 2003, looked at the whole watershed as well, but in addition, focused in on the riparian corridor. This classification methodology was developed using a new technique to fuse 4 meter multi-spectral and 1meter panchromatic satellite imagery, with a target resolution of 4 m (figure 3.3). This study determined the Hominy Swamp watershed to have the following land cover classes:

Table3.3 2003 Land Use/Land Cover, Hominy Swamp Creek Watershed

Land Cover Class	**% Cover, Entire Watershed**	**% Cover, 50' Stream Buffer**	**% Cover, 100' Stream Buffer**	**% Cover, 300' Stream Buffer**
Water	0.6	1.5	1.1	0.7
Impervious Surfaces	21.4	5.0	6.8	11.5
Agriculture, Fallow	7.9	0.8	1.1	2.0
Agriculture, Cover	6.8	4.0	4.1	4.7
Grass/Open Space	24.1	15.8	16.7	20.4
Forest	32.5	72.4	69.4	59.0
Bare/Disturbed Soil	3.3	0.4	0.7	1.8
Clouds/Shadow	3.5	?	?	?

Figure 3.2
1999 Land Cover



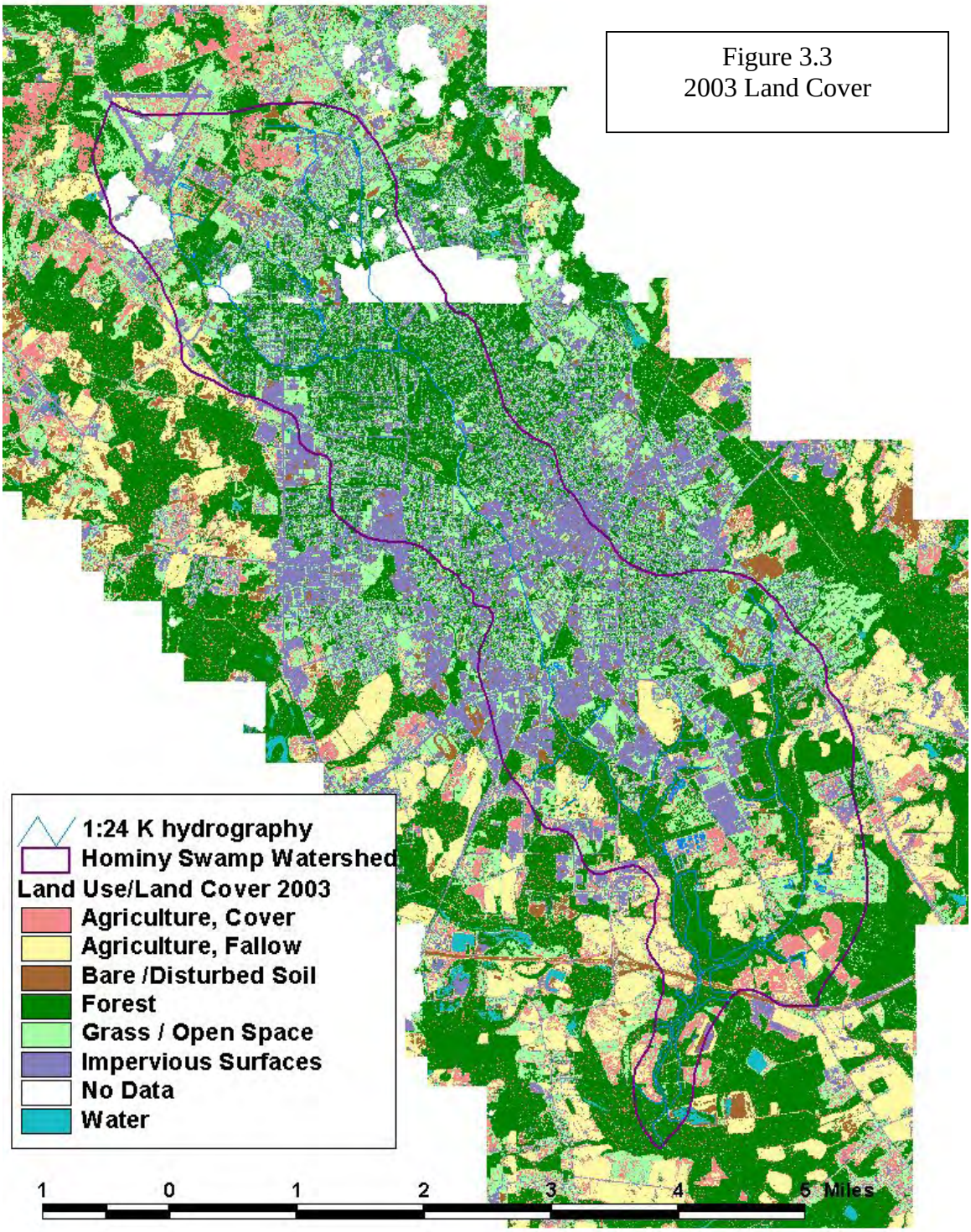


Figure 3.3
2003 Land Cover

Several conclusions may be drawn from these data. Impervious surface, as seen through application of both later methodologies, exceeds 21% for the watershed as a whole. Many current studies regarding stream water quality and habitat in urban areas indicate that downward trends (increase in erosive forces and sedimentation, decline in benthic habitat, etc.) begin at 10-11% impervious cover (Center for Watershed Protection, 2000). By all accounts these trends are evident in the Hominy Swamp Creek watershed, as seen during site visits to "hot spots" recommended for further investigation by natural resource professionals in Wilson, serving in an advisory capacity during the development of this assessment.

Other conclusions include greater than 25% of the 50' riparian buffer and 30% of the 100' are no longer maintained in a forested condition. It is widely recognized that a 50' forested riparian buffer (and preferably wider) serves many beneficial functions, including assimilating certain nonpoint source pollutants carried in overland flow, slowing such flows and allowing for infiltration, and benefits of riparian corridor habitat.

4 Existing Water Quality:

Hominy Swamp Creek is classified by the NC Division of Water Quality (DWQ) as Class C Nutrient Sensitive Waters (NSW) Swamp Waters (SW). Most of the waters in the larger subbasin of Contentnea Creek (Neuse 07, 700 sq. mi.) are similarly classified, barring those designated as public water supply watersheds. The mainstem of Hominy Swamp Creek becomes perennial at the confluence of two intermittent tributaries north of Forest Hills Road; most others waters within the watershed are intermittent according to USGS maps. At base flow, Hominy Swamp Creek is a slow moving swamp waters system, impacted by channelization over time that has caused it to function in many segments primarily as drainage and stormwater conveyance. Precipitation averages 48" a year in the area, and common rainfall events can cause high peak, erosive storm flow.

Point-Source Dischargers:
There are two minor National Pollution Discharge Elimination System (NPDES) point source dischargers in the Hominy Swamp watershed, operated by local businesses. The one major NPDES within City limits, the Wilson wastewater treatment plant, discharges to Contentnea Creek. The City of Wilson received a grant of $803,000 from the NC Clean Water Management Trust Fund to help upgrade this facility.

Review of Existing Monitoring Data
Very little routine and methodical water quality or geomorphic monitoring has occurred in the Hominy Swamp Creek watershed to date. No ambient water quality monitoring has been pursued by the state; however, the Division of Water Quality performed a special study as part of the basinwide biological assessment in 2001, involving the collection and analysis of 2 benthic samples (Fig. 4.1). These samples indicated "poor" benthic classifications (DWQ, 2001), which led then to an "impaired" use support status in 2002

(DWQ, 2002). Subsequently, the mainstem of Hominy Swamp Creek is listed on the 2004 Draft 303(d) List of impaired waters (DWQ, 2004).

There was no funding allocated during this study for additional water quality sampling. While there has been frequent newspaper documentation of flood events (Hurricane Floyd caused extensive flooding in Wilson, but smaller rainfall events cause neighborhood flooding and road closures, and subsequent damage to infrastructure and personal property), there has been little in the way of stormflow sampling or flow measurement. A new USGS gaging station has been installed in the watershed, but data has only been available for one month.

During the course of this planning effort, the City has allocated resources to purchase sampling equipment and dedicate staff resources for collection of water quality samples. A systematic monitoring program addressing water quality, hydrologic influence, and instream habitat would pave the way for watershed improvements, by documenting the need for and the benefits that could be realized through restoration efforts. Through discussion with local programs during this planning effort, it has been discerned that citizen involvement in the collection of water quality data would benefit stewardship efforts in the watershed.

Nutrient management is an issue throughout the Neuse River Basin. Nitrogen control is of particular interest, and is the primary focus of the Neuse River Basin Nutrient Sensitive Waters Strategy, adopted in 1997 (see referenceciting DWQ website link for further information on the strategy and rules). This strategy is a means to equitably distribute requirements for nitrogen reduction among several key sources, including wastewater dischargers, urban stormwater, and agriculture, with concomitant requirements for protection of riparian buffers and development of nutrient management plans for businesses performing routine land application of fertilizers. The “Neuse Rules” were developed and many state and local programs were created or enhanced to address components of the strategy.

In reviewing programs and tools developed to implement the strategy, the far-reaching nature of this effort becomes apparent. If one were to look solely at agricultural and stormwater influences in the Hominy Swamp Creek watershed, indications are that nitrogen loading is definitely a concern, as urban and agricultural land uses contribute the highest nitrogen loading rates of commonly categorized land use classes.

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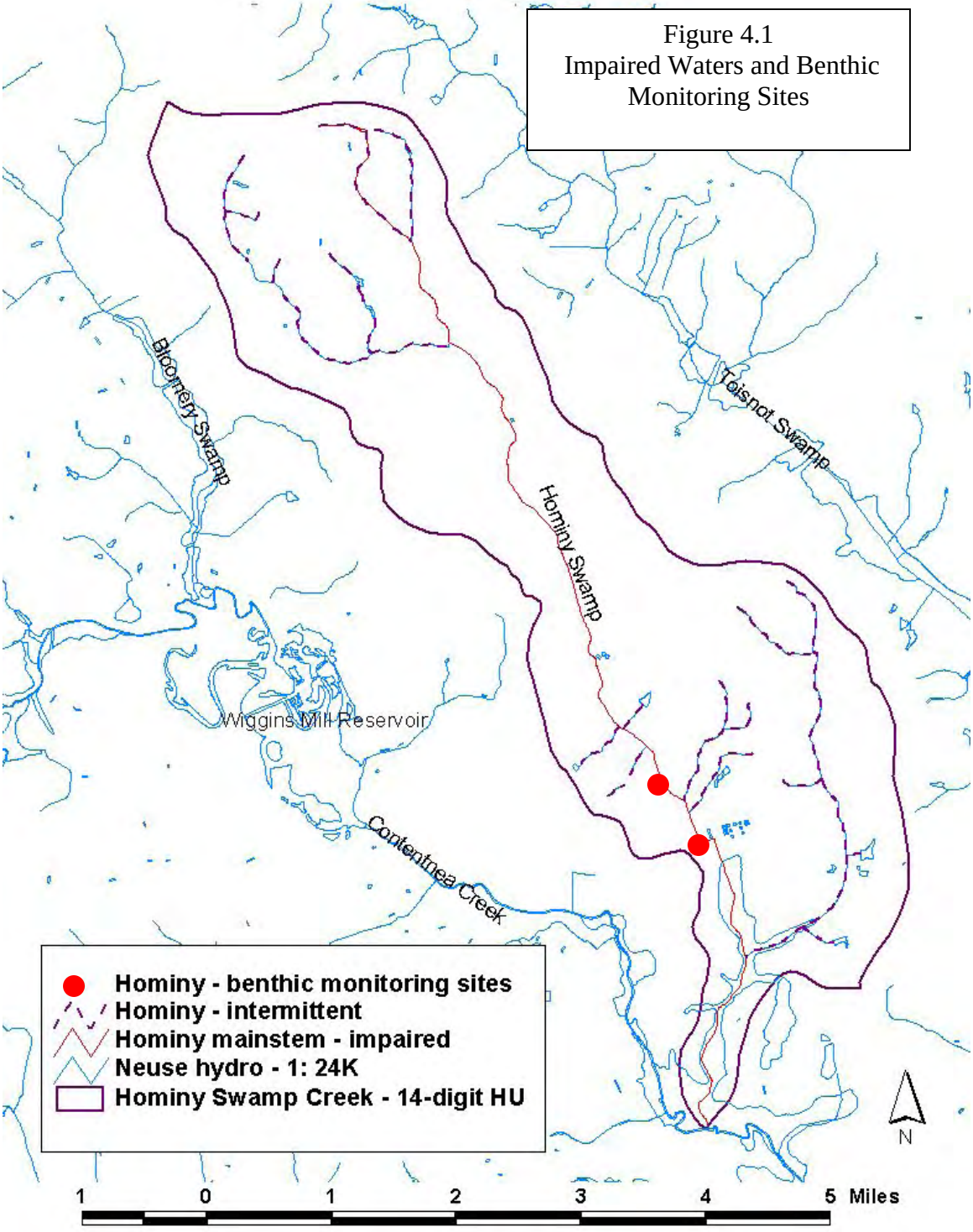


Figure 4.1
Impaired Waters and Benthic Monitoring Sites
Bloomery Swamp
Hominy Swamp
Toisnot Swamp
Wiggins Mill Reservoir
Contentnea Creek
Hominy - benthic monitoring sites
Hominy - intermittent
Hominy mainstem - impaired
Neuse hydro - 1: 24K
Hominy Swamp Creek - 14-digit HU
N
1 0 1 2 3 4 5 Miles

5 Local Ordinances, Rules, and Programs

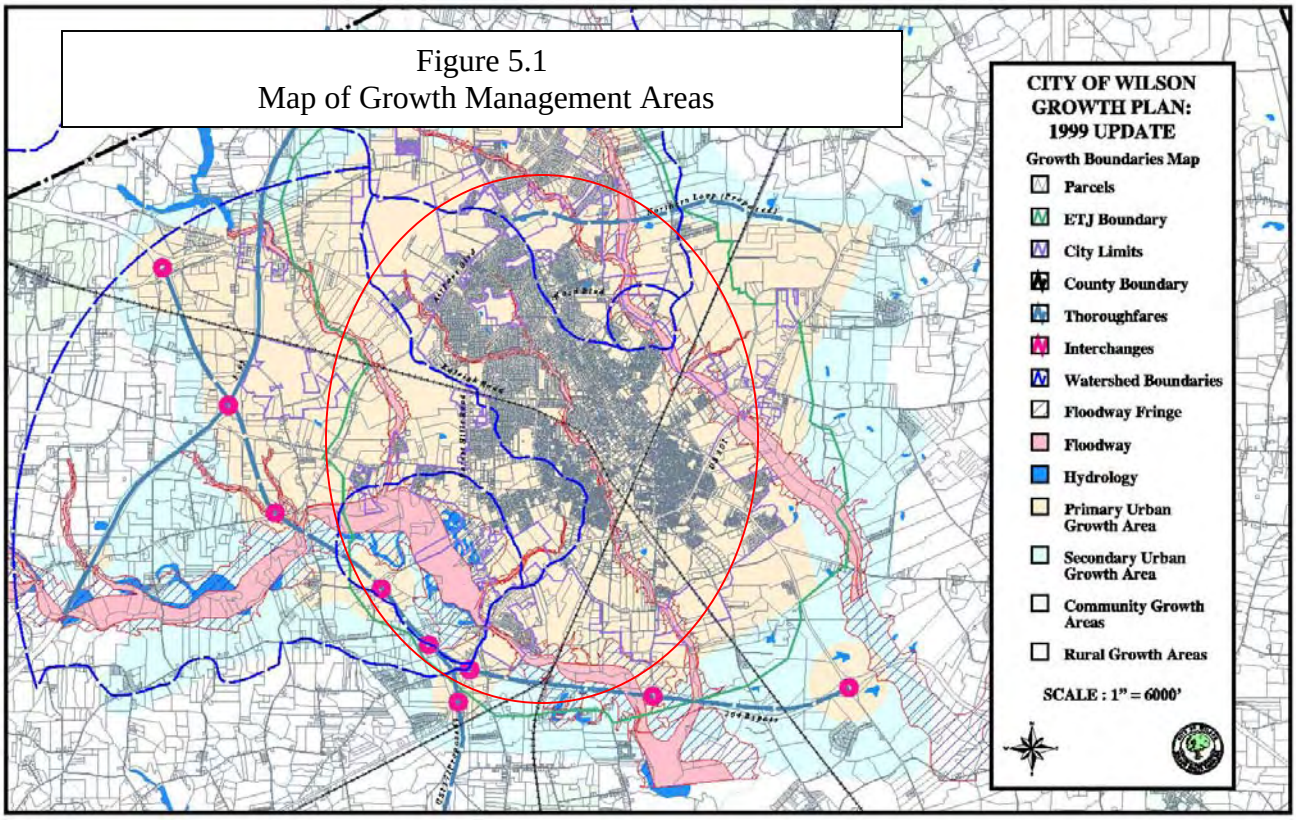
As part of the Neuse River Basin Nutrient Sensitive Waters strategy, the City of Wilson enacted a state-approved Stormwater Plan in 2002. The strategy requires achieving 30% reduction in nitrogen export, maintaining pre-development runoff flows, and maintaining existing riparian buffers. Through this plan, the City is responsible for new development plan review and approval, illegal discharge identification, removal, and prevention, retrofit location identification, and public education on stormwater issues. The City is also responsible for maintenance of the stormwater drainage system.

In 2003 the City established a Stormwater Utility, which provides funding for operation of the City Services Stormwater Program. This program has developed an admirable array of local efforts, ranging from stormdrain labeling to public advertisements regarding stormwater issues, and participates in NCSU's Stormwater Academy and BMP Tour.

The City participates in the State's Erosion and Sedimentation Control Program, requiring plans to be filed with the State for land disturbances greater than 1 acre. The City also has zoning and planning programs (zoning maps included in Appendix D), as well as a Growth Management Plan updated in 1999. Lands containing highly functioning wetlands areas in the headwaters of the stream system are currently zoned to allow agriculture, office and retail, and residential development. The majority of the Hominy Swamp Creek watershed (all except the lowest portion, outside City limits) is within the primary urban growth area established by the local Growth Management Plan (Figure 5.1).

The City of Wilson Hazard Mitigation Plan, developed in 2003, describes critical floodplain and flooding issues. At present, local ordinances do not allow new development within the floodway, the most critical part of the floodplain; however, the ordinance does not fully restrict development within the 100-year floodplain and floodway fringe. New residences may be constructed with the first floor elevation 2.5' above base flood. This was shown to be inadequate protection, when in 1999 Hurricane Floyd, a 500-year flood event in Hominy Swamp Creek, swept through with major property damage due to flooding. More restrictive floodplain development requirements were recently proposed, and partially approved for the City.

Figure 5.1
Map of Growth Management Areas



6 Site Assessments

Establishing an advisory group to help identify watershed planning goals and objectives and to help with site identification was a major part of plan development (as summarized in Appendix A). Local agency staff identified concerns including alleviating problems associated with high peak flow, flooding, and resulting sedimentation in the stream channel. There is abundant anecdotal evidence of excessive sedimentation, experienced particularly through the Stormwater Program responsible for culvert maintenance. Flooding, stormwater retention, and nutrient management are widely acknowledged as major problems for local programs and citizens alike. Because the upper half of the watershed is largely developed, it is a challenge to locate available sites for stormwater Best Management Practices (BMPs) to provide adequate storage for floodwaters or provide water quality improvements.

Efforts were made throughout the site assessment process to identify areas that exhibit impacts to hydrologic, water quality and/or habitat functions, as well as present need and opportunity for improvement of these functions. Each of the sites identified represented some facets of impacts to functions as well as potential for improvement measures.
As a rough overview, the watershed is broken down into 3 areas: upper, middle and lower Hominy Swamp. The upper and middle portions are entirely within the city's municipal boundaries, and in the lower portion, lower stream reaches are outside of the city limits but within Wilson County. For the purposes of this assessment and restoration plan, these three distinct areas will be referenced:

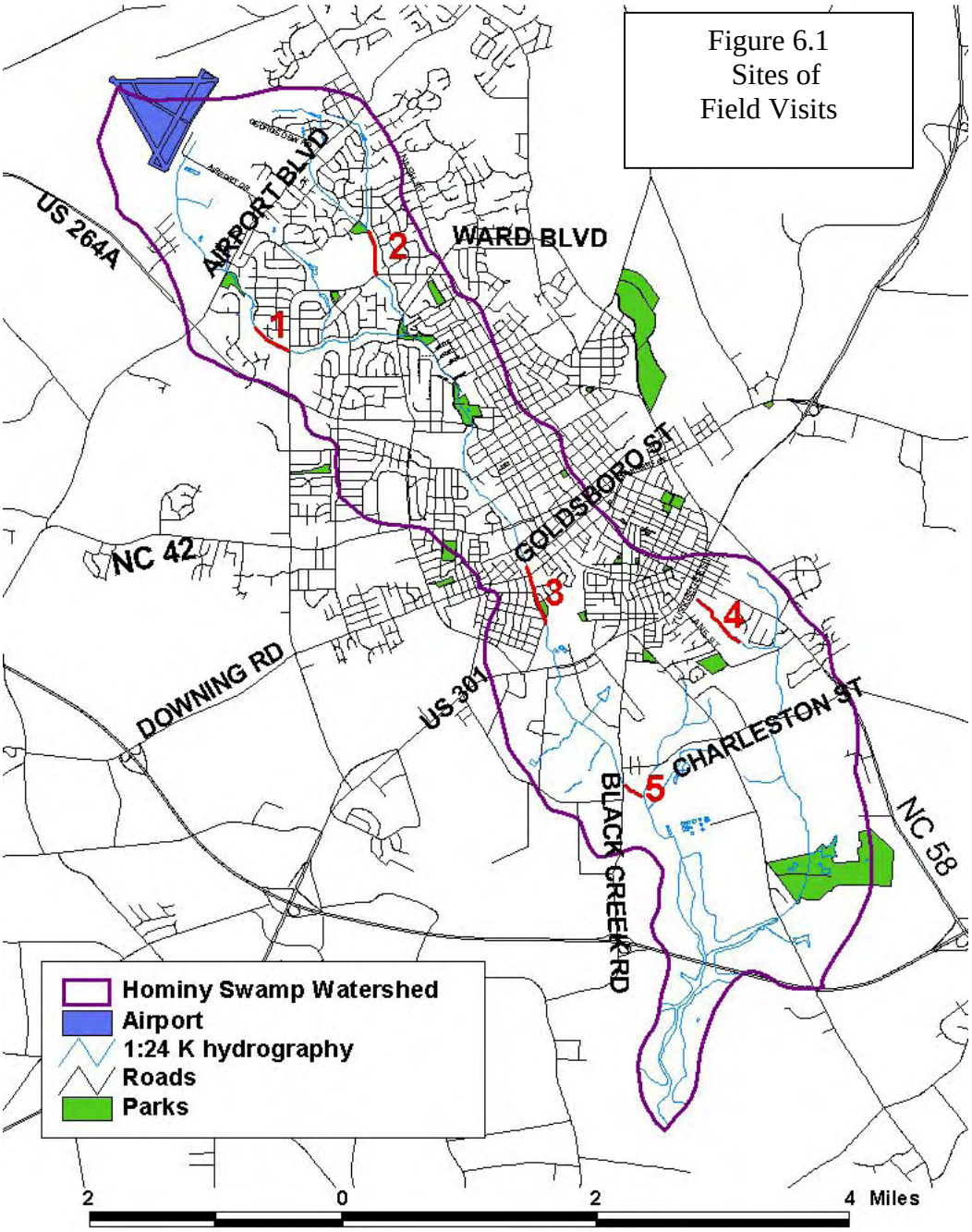
Upper Hominy is dominated by medium to high density, primarily older residential (mid-1950's to mid-1980's), with newer high density residential proliferating in the higher reaches (headwaters areas). The regional airport and a closed landfill facility are located in the very headwaters of the watershed, with land in the area zoned residential, business, agricultural, and institutional.

Middle Hominy Swamp Creek is primarily medium to high-density residential, industrial, and urban core. The stream system throughout this reach of the watershed is maintained primarily as a canal to transport water off-site. Straightening of the channel occurred in the early 1930's, and routine dredging of the channel has occurred over time. There are residential, commercial, institutional, industrial land uses within this portion of the watershed.

Lower Hominy transitions from a well-established commercial strip with mixed low density residential and scattered industrial land uses to primarily agricultural land use at the lower reaches of the watershed.

Several site visits were in initiated during the summer and fall of 2003 (Figure 6.1). While no formal riparian area assessment methodology was employed during site visits (such a methodology is under development as part of this grant), efforts were made to

identify areas that represent characteristics present throughout the watershed (severe channel erosion, excessive sediment deposition, impacted riparian buffer), as well as exhibiting potential for stream and riparian buffer restoration and stormwater management (summary sheets are provided in Appendix E). Field assessments indicate that there are obvious problems that need addressing throughout the watershed, as anticipated through the GIS analysis.



Figures 6.2 a, b: Site #1: Upper Watershed: vegetated riparian area with major erosion and headcut

Figures 6.3 a, b, c: Site #2: Upper watershed: major erosion on both banks of channel, downcutting; evidence of very high flows depositing heavy sediment load; impending property damage.

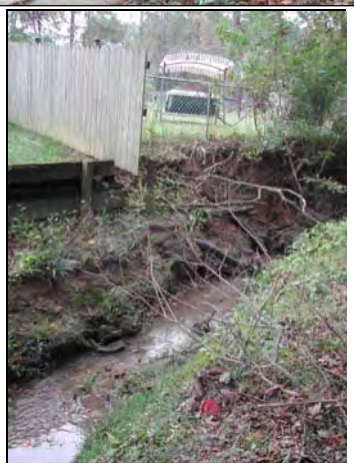


Figure 6.4 a,b: Site #3: Mid-watershed, mainstem: channel straightened and dredged; minimal riparian vegetation and instream habitat; evidence of heavy sediment load

Figure 6.5: Site #4: Lower Tributary; lack of riparian buffer; major erosion of channel downstream

Figure 6.6: Site #5: Invasive vegetation; channel erosion

7 Potential Restoration Opportunities

Several potential restoration opportunities were identified through the process of developing the watershed assessment and through the involvement of local natural resource professionals. In this context, restoration is not intended as a strict regulatory definition, but more generally to include stream channel enhancement and stabilization measures, as well as riparian buffer restoration and enhancement.

It was agreed that three major functions (hydrologic, water quality, and habitat) have been compromised through watershed changes and wetlands loss and degradation over time, and that restoration, enhancement, and protection efforts should be matched as closely as practicable to replace and preserve those functions, within the context of the current watershed status.

Figures 7.2-7.15 represent a range of opportunities for improvement of watershed functions. There is no assumption that these opportunities may be feasible for project implementation, but were identified as priority areas within this planning effort.

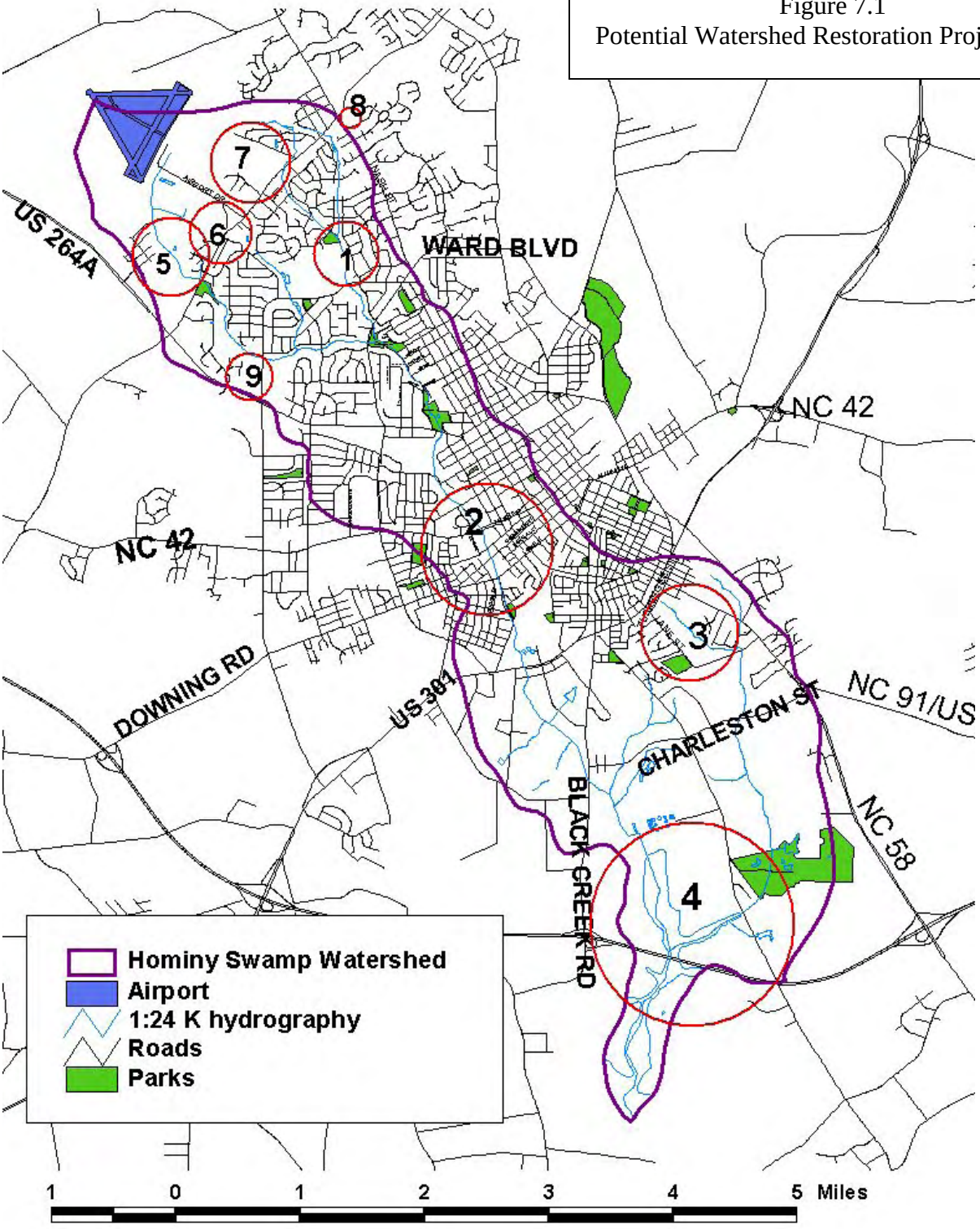
Potential Project Types:

Preservation of Watershed/Riparian Function:
Protection of those areas identified as exceptionally significant for hydrologic processes, water quality and habitat functions was identified as a key objective in the planning process. Several areas of interest have been identified, particularly in the headwaters area (Figure 7.9), as well as in the lower reaches of the watershed (Figure 7.8). If resources allow for preservation of these areas, landowner identification and contact should be pursued. Efforts should be made to promote protective strategies on high priority preservation parcels.

Restoration and Enhancement of Riparian Corridor:
Many reaches within the study area are candidates for some level of stream enhancement or restoration. Riparian buffer restoration in the central portion of the watershed is promising, where land has been purchased by the City through the FEMA buy-out program (Figure 7.3). These areas may provide good opportunities for restoration practices, since they are public properties within the floodplain, and contain no existing structures. Management of exotic species should be integrated into corridor improvement projects as necessary. While funding is available through EEP for buffer restoration projects, no specific EEP funds for use in channel restoration have been identified at this time.

Existing and Potential BMP Implementation:
Multiple opportunities for BMP implementation, both agricultural and stormwater, were identified during site visits with local resource professionals. NRCS and SWCD have been actively cataloging benefits of agricultural BMPs throughout the county. Within City limits, retrofit opportunities on publicly-owned or unbuildable lots are of primary interest. Focusing on small-scale retrofits in the headwaters and mid-watershed would provide needed water quality improvement (particularly nutrient removal) while utilizing existing EEP in-lieu fee financial resources earmarked for riparian buffer restoration and nitrogen control. Stormwater wetlands are one type of BMP that may receive high priority for use of EEP in-lieu fee resources (i.e., nutrient offset payments received by EEP).

Figure 7.1
Potential Watershed Restoration Project Sites



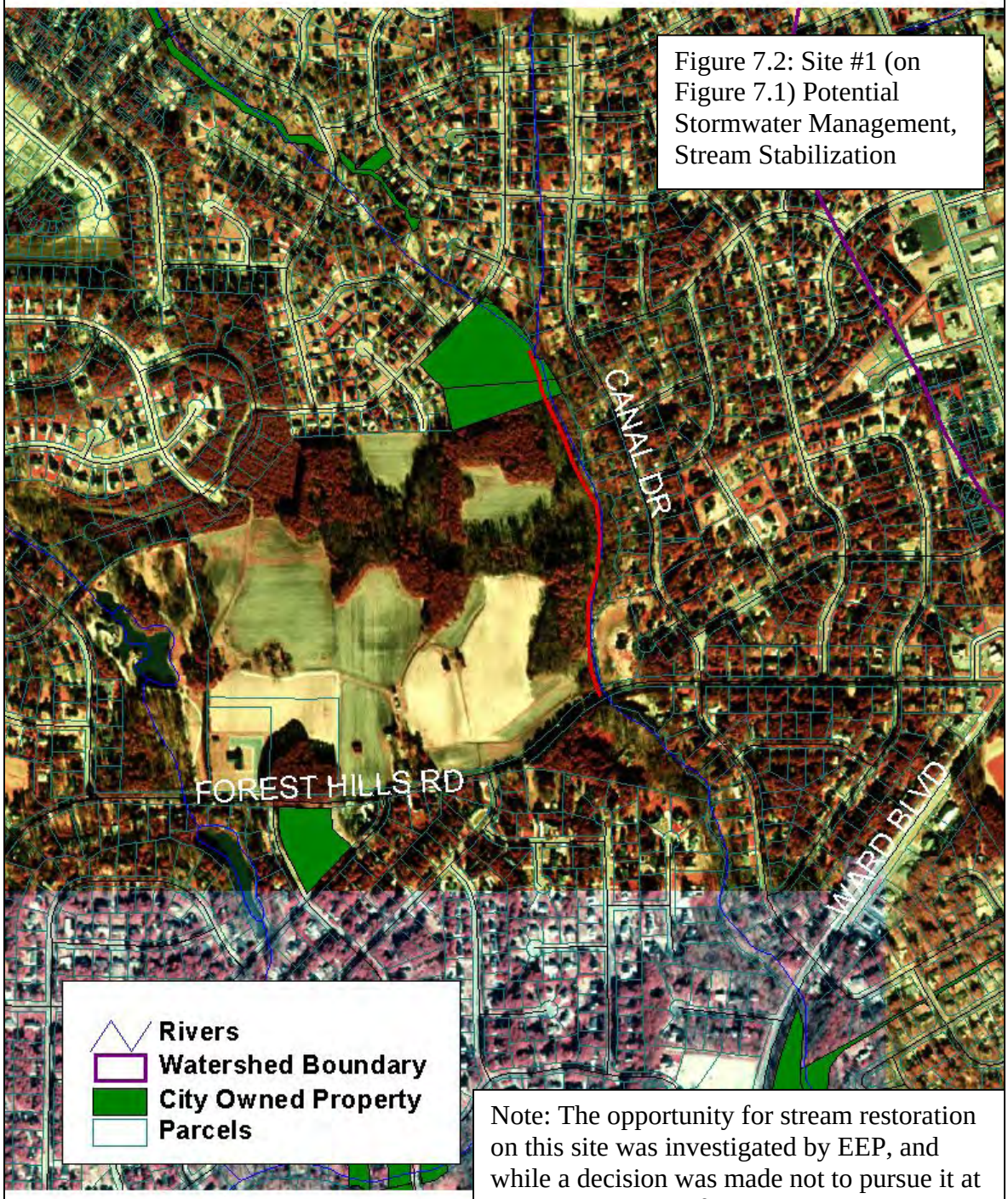


Figure 7.2: Site #1 (on Figure 7.1) Potential Stormwater Management, Stream Stabilization

Note: The opportunity for stream restoration on this site was investigated by EEP, and while a decision was made not to pursue it at this time, the need for other restoration measures is evident.

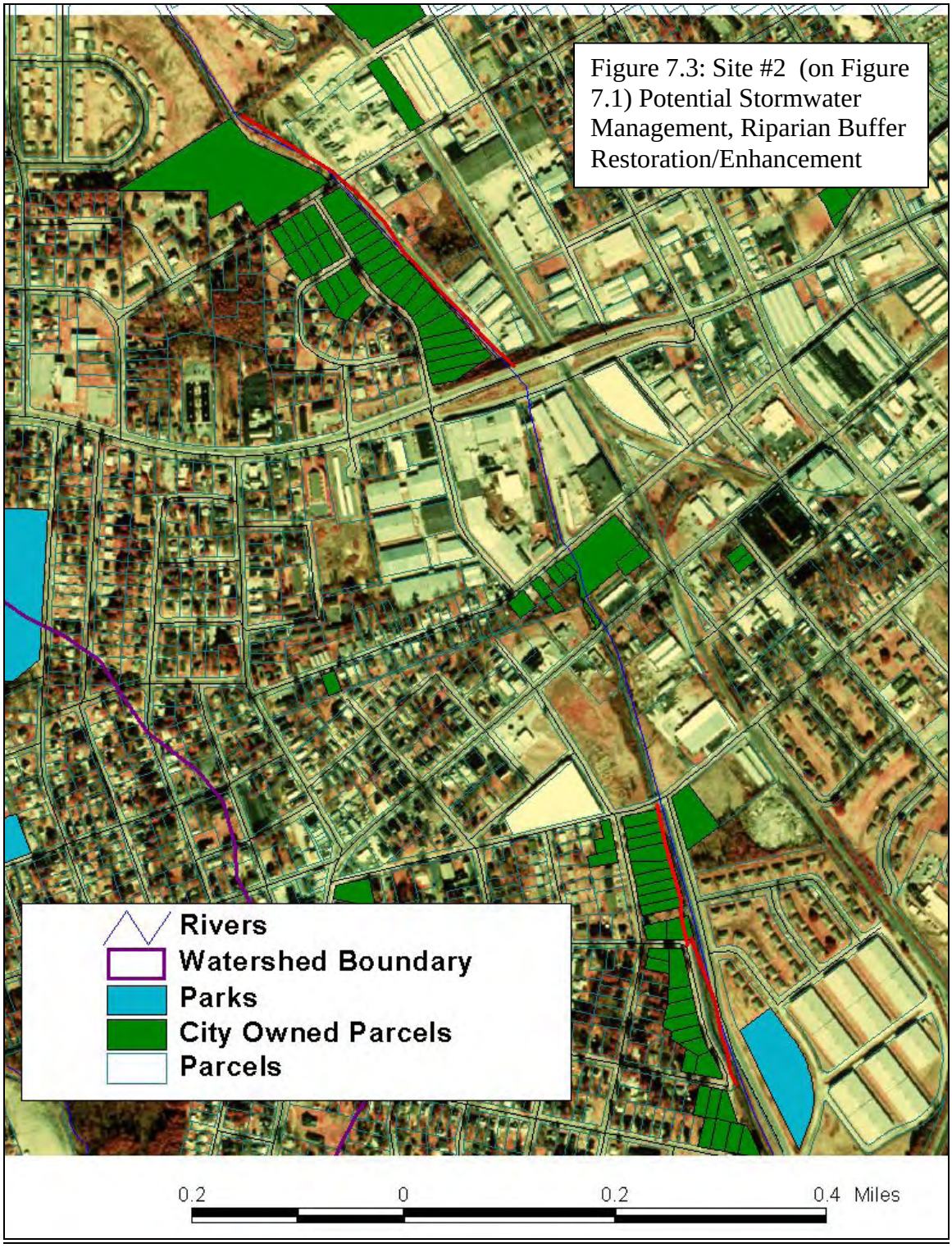


Figure 7.3: Site #2 (on Figure 7.1) Potential Stormwater Management, Riparian Buffer Restoration/Enhancement

Figure 7.4: Site #2 (on Figure 7.1) Buy-Out Area, Meadow Street

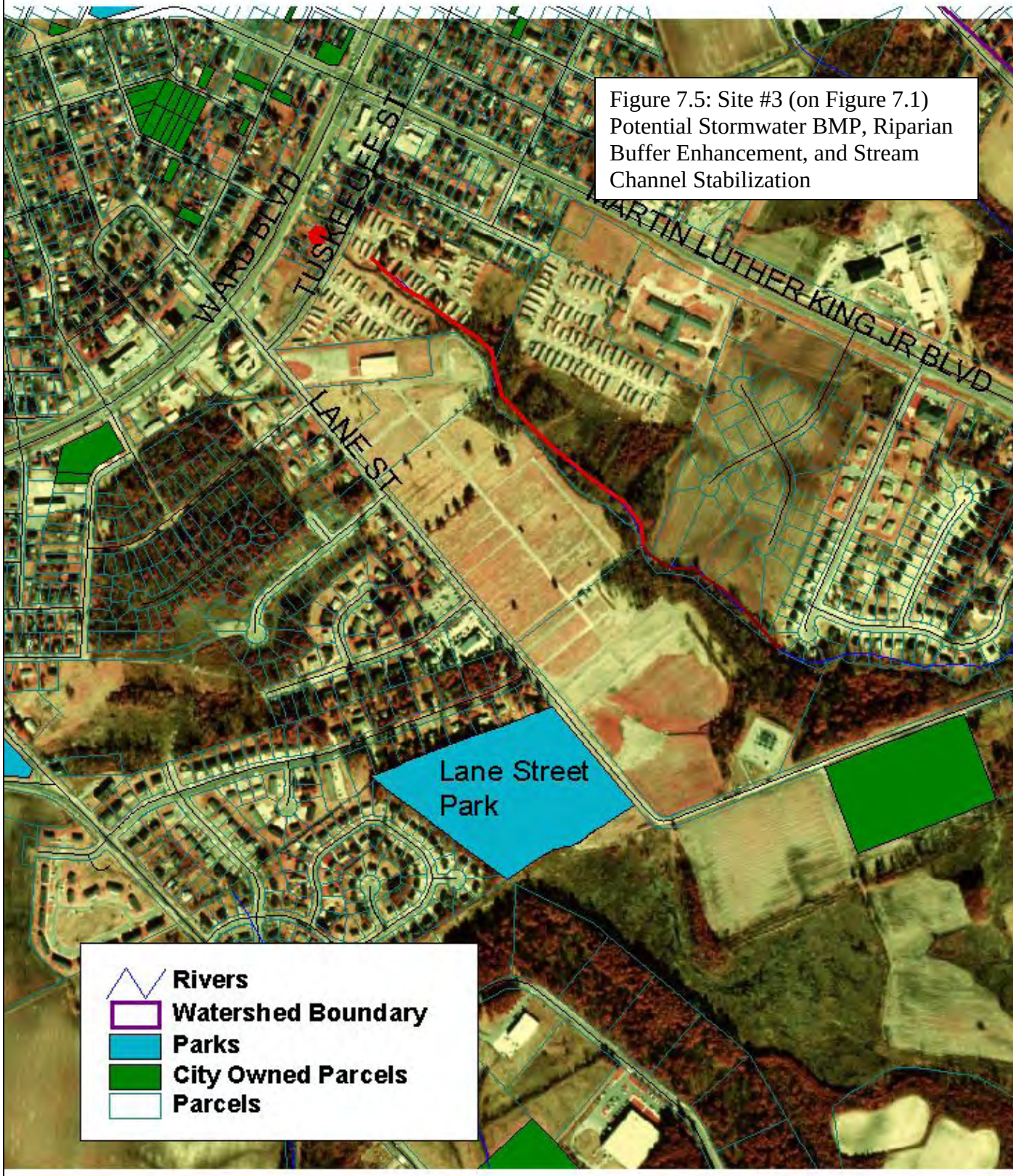


Figure 7.5: Site #3 (on Figure 7.1) Potential Stormwater BMP, Riparian Buffer Enhancement, and Stream Channel Stabilization

Figure 7.6: Site #3 (on Figure 7.1) Site for Potential Stormwater BMP

Figure 7.7: Site #3 (on Figure 7.1) Potential Riparian Buffer Enhancement

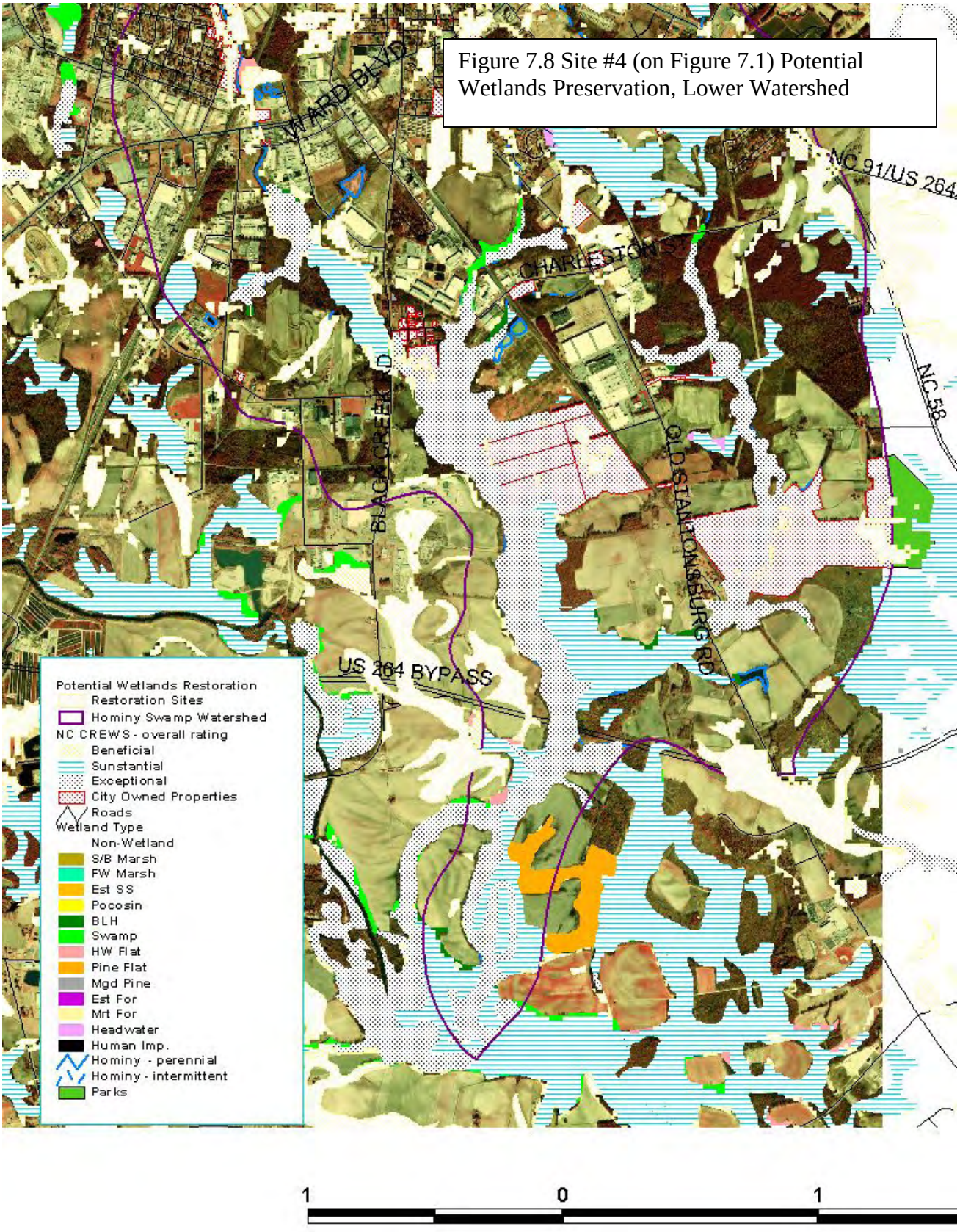


Figure 7.8 Site #4 (on Figure 7.1) Potential Wetlands Preservation, Lower Watershed

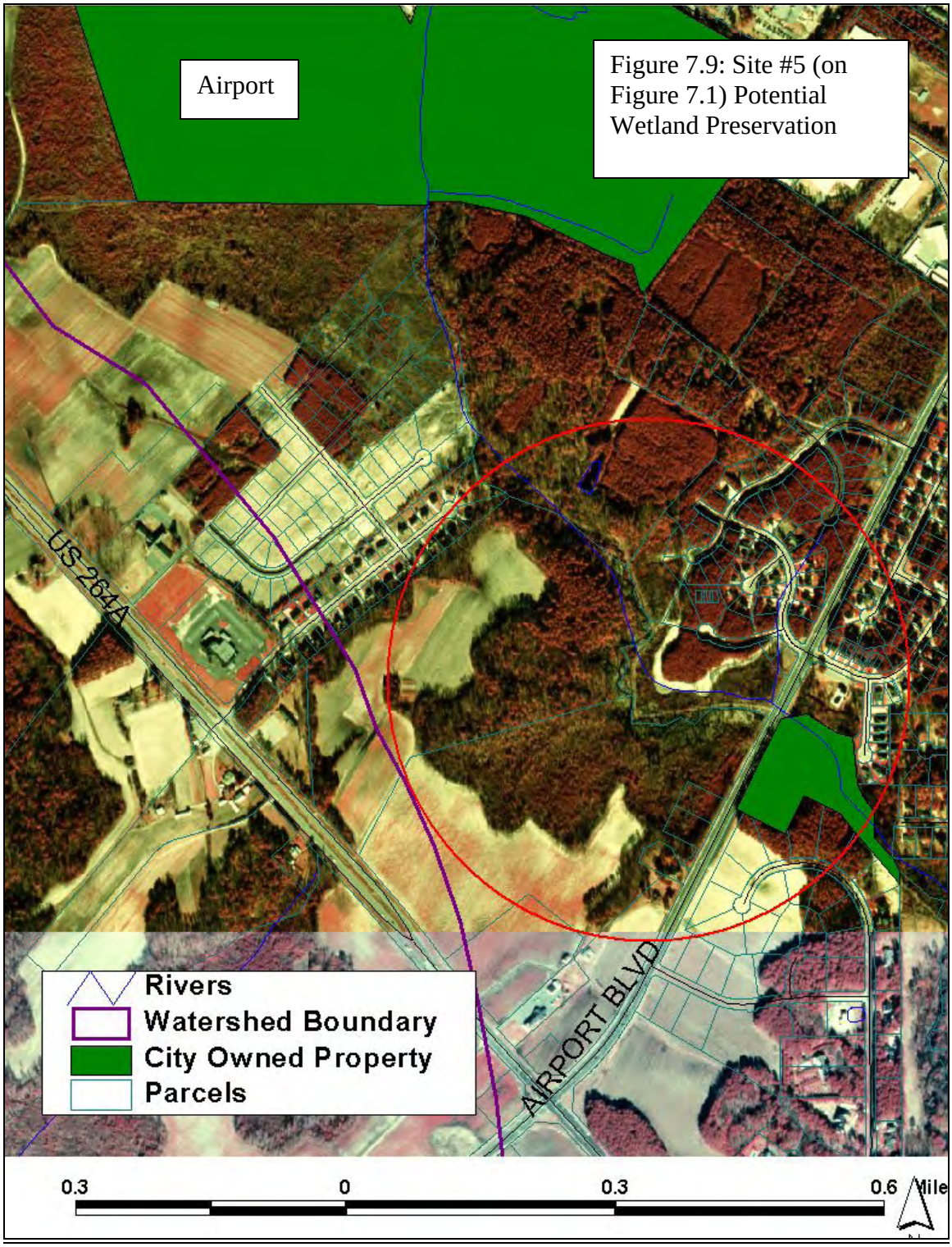
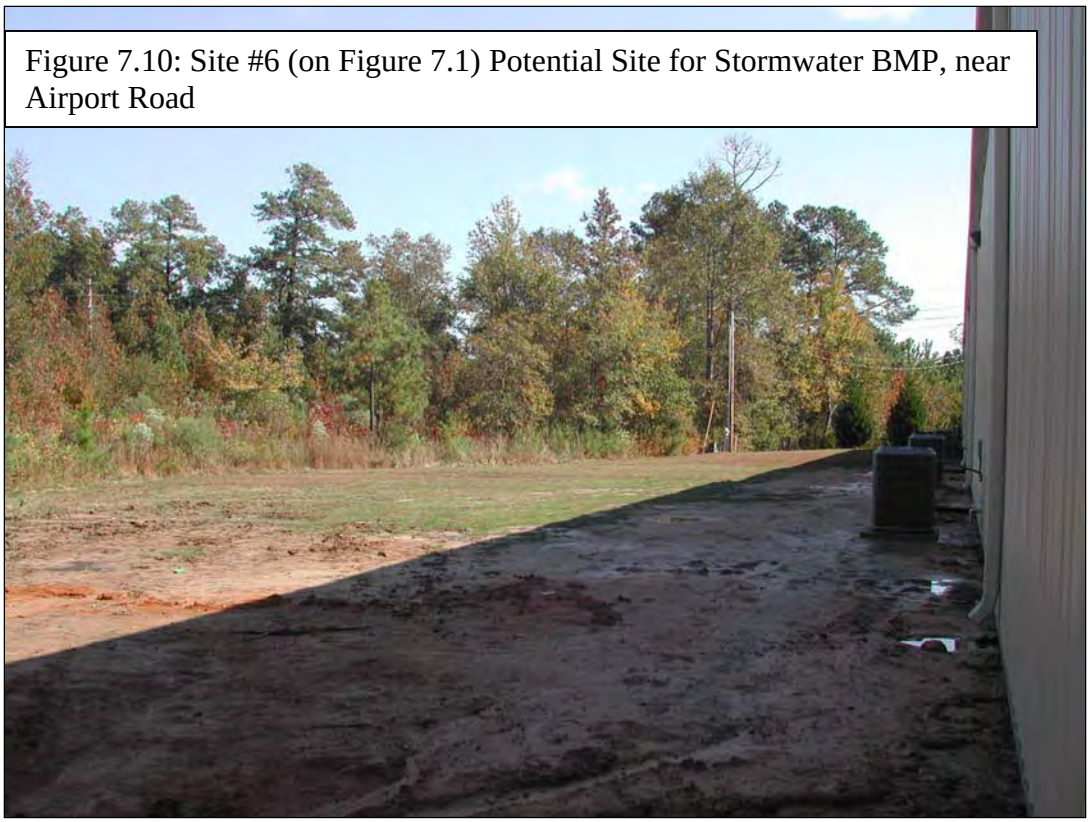

Airport
Figure 7.9: Site #5 (on Figure 7.1) Potential Wetland Preservation
US 264A
AIRPORT BLVD
Rivers
Watershed Boundary
City Owned Property
Parcels
0.3
0
0.3
0.6
Mile

Figure 7.10: Site #6 (on Figure 7.1) Potential Site for Stormwater BMP, near Airport Road



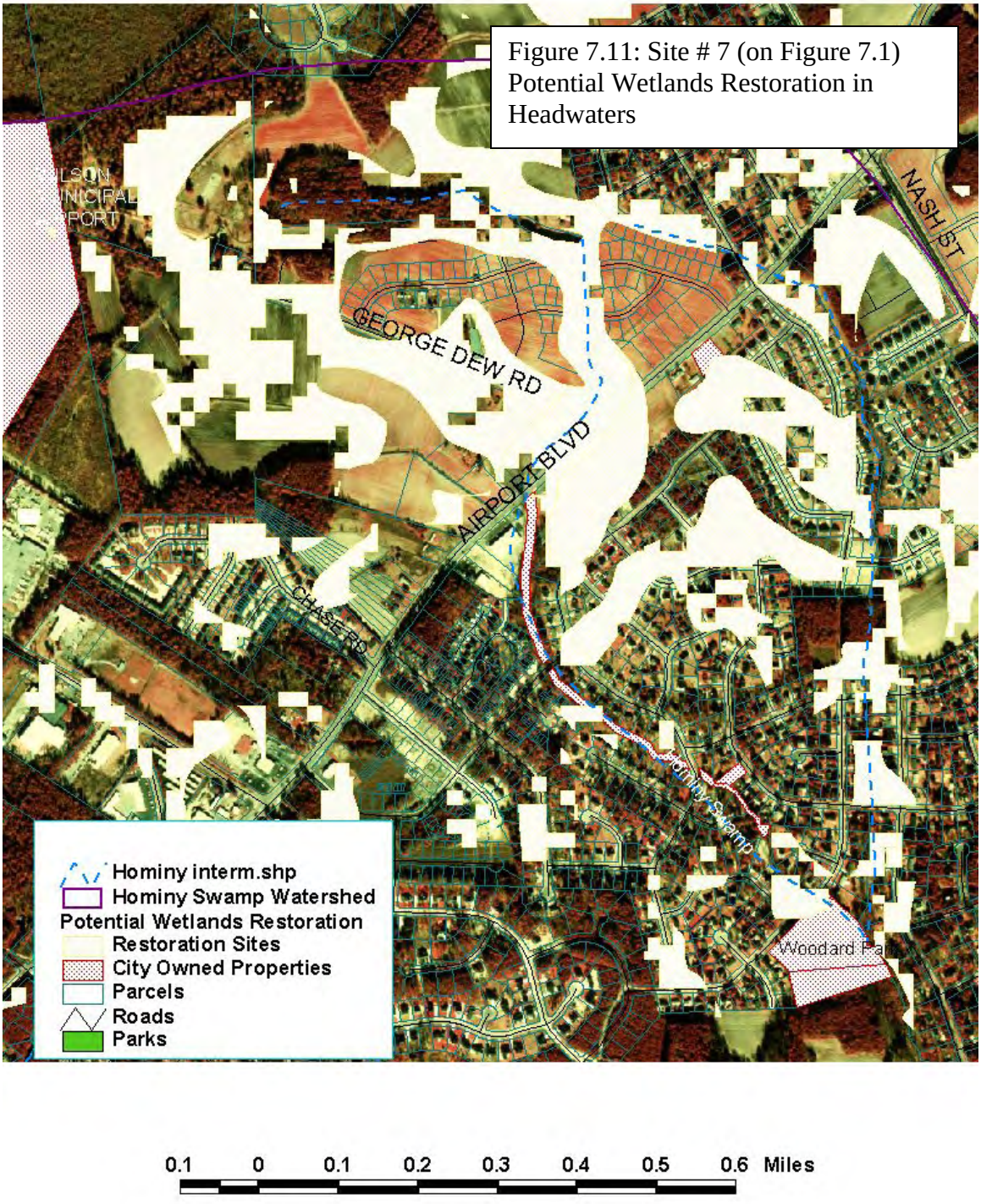


Figure 7.11: Site # 7 (on Figure 7.1) Potential Wetlands Restoration in Headwaters

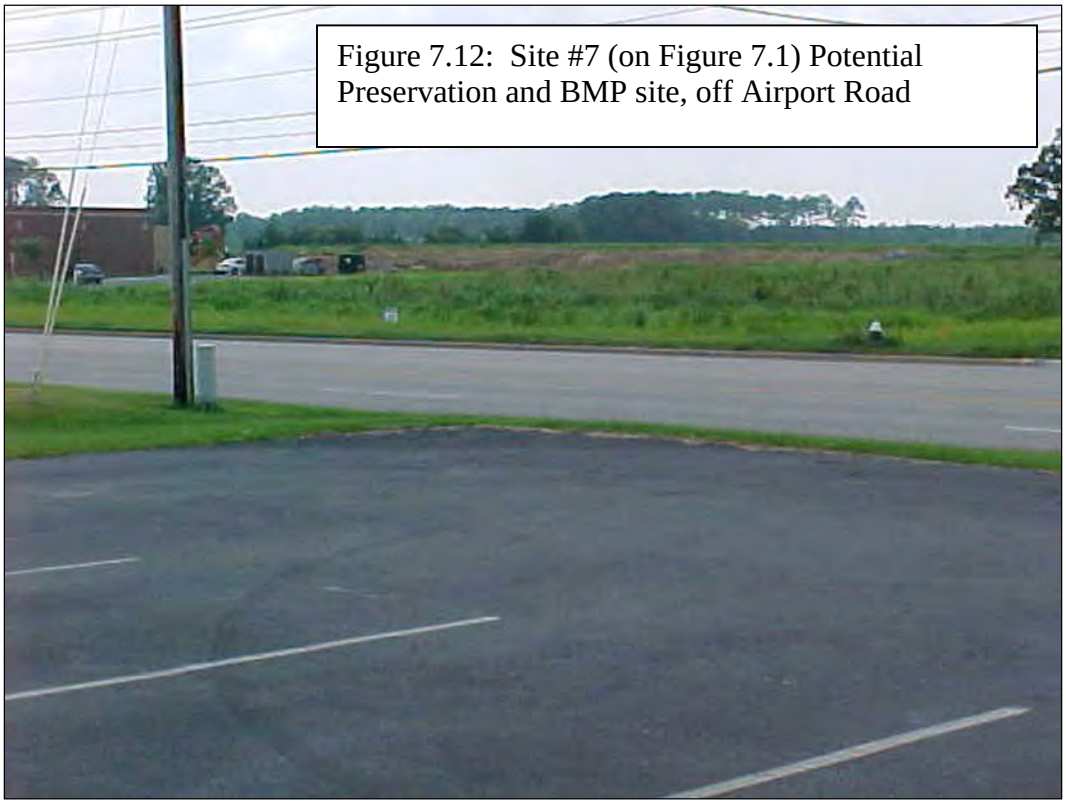


Figure 7.12: Site #7 (on Figure 7.1) Potential Preservation and BMP site, off Airport Road

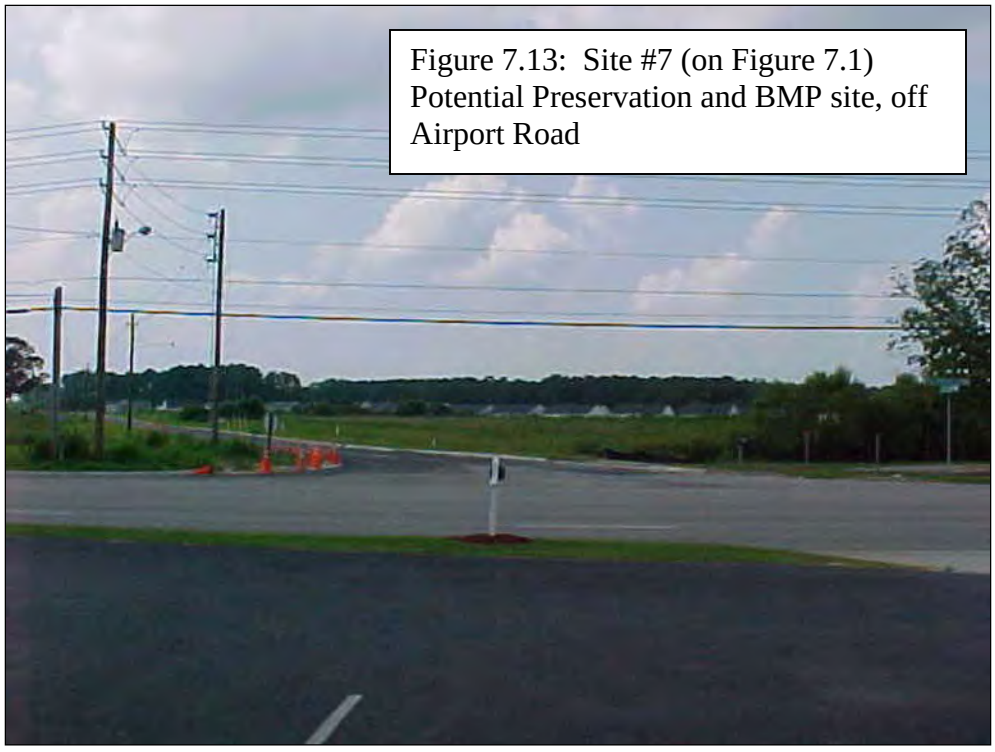


Figure 7.13: Site #7 (on Figure 7.1) Potential Preservation and BMP site, off Airport Road

Figure 7.14: Site :#8 (on Figure 7.1) Example of Bioretention Installed , Toisnot Creek Watershed, near Airport Road

Figure 7.15: Site # 9 (on Figure 7.1) Potential Site for BMPs, off Raleigh Road

8 Implementation Strategy

1) Several sites have been identified herein for further investigation as potential stormwater wetlands and other BMPs. Additional site assessment work will allow for the evaluation of sites for project implementation. All projects should incorporate preconstruction and post-construction monitoring to demonstrate improvements to water quality and benthic habitat. Funding is presently available through EEP for project design, construction, and monitoring for BMPs that meet the 30% nitrogen reductions required by the Neuse River Basin Nutrient Sensitive Waters Management Strategy.

2) Work with EEP to establish riparian buffer restoration and BMP implementation on city-owned properties vacated through the FEMA buy-out program. Funding is currently available for applicable projects through EEP's in-lieu fee program. Continued pursuit of funding by the City for the purchase of flood-prone structures and properties is a considerable effort, but long-term benefits would be significant.

3) Continue and expand public education for citizens and local officials regarding watershed management practices including stormwater management and more protective development strategies (low impact design, conservation and restoration of existing natural features, especially in headwaters). Hands-on workshops sponsored through resource programs (NRCS, Cooperative Extension) are recommended to encourage citizen stewardship.

4) Evaluate recommendations from funding analysis (Appendix B). Additional funding opportunities may be appropriate, though past applications have not been successful (particularly for Section 319 funding). Recent 303(d) listing may now provide added incentive for grant funding. This plan may serve as the basis for additional, more detailed assessments of subwatersheds, particularly if Section 319 funding is desired, considering the recent emphasis for proposed projects to demonstrate improvements in nonpoint source abatement through monitoring within the context of watershed planning.

Recommended Actions

Project Implementation and Monitoring: Both project site-specific and watershed-wide monitoring for water quality and habitat parameters will help document current impacts and provide support for improvement efforts. Pre- and post-construction and reference site water quality, benthic macro-invertebrate, and geomorphic monitoring should be integrated into any physical restoration activities.

Preservation: Protect high quality wetland and stream features to support beneficial watershed functions and recreational benefits. Highly functioning wetland areas have been identified in both the upper and lower watershed; protection of these areas will aid in maintaining current hydrologic, water quality, and habitat functions.

Outreach: Continued community outreach and education regarding stormwater and watershed management practices will help foster understanding of natural and human-influenced processes at work in this challenging watershed. Build upon existing (required) local stormwater program and (voluntary) school programs. Efforts to integrate more restrictive floodplain development requirements into local ordinances have not yet been successful, but through continued education the likelihood of passing such recommendations may prevail.

Further Analysis: A comprehensive stormwater retrofit analysis of at least one subwatershed area would help local programs and funding agencies to better justify expenditure of resources and document benefits of implemented projects. The City is required by the Neuse Stormwater Rules to identify several BMP sites; a systematic approach to project identification and prioritization for implementation would encourage funding participation by outside sources.

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http://h2o.enr.state.nc.us/nps/

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Data for this study were made available through DENR Center for Geographic Information and Analysis (downloaded in 2003), Division of Coastal Management (publication dates 2003, downloaded from the web May 2004), and Natural Heritage Program (April 2004);
NCSU Center for Earth Observation (November 2003);
City of Wilson, Department of Public Services, Geographic Information System (September 2003).
Floodplain mapping and elevation data are available for download at:
www.ncfloodmaps.com
USGS Topographic Maps (1998), Wilson and Winstead Crossroads, NC.

A separate data list and compendium of GIS shapefiles will be available as part of the final report submitted.

Historical aerial photos were available for viewing at the Wilson County NRCS offices.

Appendix A

Advisory Group
Three meetings were held during 2003 to solicit input and assistance from local area natural resources agency staff. The following groups participated in the meetings:

City of Wilson Stormwater Services
City of Wilson Public Services/Engineering
Wilson County Cooperative Extension Service
USDA Natural Resources Conservation Service (Wilson County)
Neuse River Foundation
Green Engineering (a local engineering contractor)

NC State University's Watershed Education for Communities and local Officials (WECO) facilitated the meetings. The purposes of these meetings were to review assessment data and gather additional information, gather insight into local program priorities, to help set goals for the planning effort, and to assist in site visits. A public meeting was held in December, 2003, to solicit input from the community. Meeting minutes are available on WECO's website at: www.ces.ncsu.edu

Goals of Watershed Planning

There were a number of problems discussed during meetings with local resource agency staff. There was a rather exhaustive list of goals to work towards, including water quality and habitat improvements, education, land use and open space planning, and identifying funding sources for projects. Some of these goals are being addressed by the local agencies, and can be enhanced through application of additional resources. Below are listed objectives for this Local Watershed Planning Group, as discussed at meetings in 2003:

1. Improve Water Quality

Objectives:
Reduce sediment input
Improve floodplain function
Incorporate water quality BMPs into residential development (new & retrofits)
Identify specific pollutant concerns in subwatersheds (nutrients, sediments)
Develop monitoring for watershed, to aid in determining extent of current problems and as basis for improvements
Storm flow and peak flow reductions
Maintain/upgrade sanitary sewer collection and treatment systems
Identify optimal sites for traditional and non-traditional watershed restoration projects

2. Restore Physical Habitat
Objectives:
Restore riparian buffers, channelized streams, impacted wetlands, instream & riparian habitat
Restore and construct additional wetlands
Permanently protect threatened streams

3. Engage and Educate the Public & Government
Objectives:
Provide greater awareness of development impacts
Educate public on why change is needed

4. Implement Land Use Planning
Objectives:
Prioritize areas with greatest need for action
Establish land uses to protect creeks
Open space protection
Enhance Recreation & Open Space Planning

5. Encourage Community Stewardship
Objectives:
Establish/enhance riparian buffers throughout the watershed
Initiate wetlands preservation
Preserve greenway/wildlife corridors
Litter abatement

6. Develop Implementation Strategy
Objectives:
Develop watershed monitoring program, education sites
Support integrated resource planning

7. Identify Potential Funding Sources
NC DENR EEP, CWMTF, 319, Stormwater Utility, Resource Cons. & Dev. grants

While it was not possible to accomplish all of the goals and objectives discussed by the advisory team, the meetings did provide a forum to identify needs and ideas for future efforts.

Appendix B

Hominy Swamp Creek Watershed Assessment and Restoration Plan
Analysis of Funding Sources

There are several major components of a watershed restoration plan. A complete plan should include an assessment of the watershed's existing conditions, note changes occurring in the watershed, identify causes of watershed degradation, make strategic recommendations that address how to achieve watershed improvements, and locate specific areas to implement those strategies. One of the most important factors to consider once a watershed restoration plan has been completed is to decide how to finance the implementation of the recommendations developed in the planning process. The goal of this funding analysis is to identify potential federal, state, local and/or private funding sources that are available for implementing the recommendations of the Hominy Swamp Creek Watershed Assessment and Restoration Plan (Plan). The funding sources identified and discussed below are examples of the many funding opportunities that are available for watershed improvement projects, though not a summary of all potential funding avenues for watershed projects. Funding opportunities discussed in this analysis include those that are deemed to be appropriate to address the watershed needs and opportunities specifically identified in this Plan, such as flooding, stormwater retention, nutrient management, and protection of existing high quality natural resources. These funding programs include North Carolina's Ecosystem Enhancement Program and Clean Water Management Trust Fund; the US Environmental Protection Agency's Clean Water State Revolving Fund and Clean Water Section 319 grants; the United States Department of Agriculture's Watershed Protection and Flood Prevention Program; and the Conservation Reserve Enhancement Program.

This analysis also explores the ability to combine available funding from several potential sources in order to implement as many of the recommendations as possible. For example, if a local government is able to obtain and pool funding from several programs, there may be an opportunity to address several identified watershed concerns (nonpoint

source pollution, flooding, etc.) through the implementation of more comprehensive watershed restoration and improvement projects. Therefore, this analysis will also discuss ways to combine available funds in order to implement a comprehensive watershed improvement project.

North Carolina Ecosystem Enhancement Program

The Ecosystem Enhancement Program (EEP, formerly the Wetlands Restoration Program) is established within North Carolina's Department of Environment and Natural Resources. The mission of the program is to "restore, enhance, preserve and protect the functions associated with wetlands, streams and riparian areas, including but not limited to those necessary for the restoration, maintenance and protection of water quality and riparian habitats throughout North Carolina." EEP administers several distinct programs to mitigate for impacts to North Carolina's natural resources. Each of these programs, as discussed below, is a source of funding for watershed improvement projects including those that address degraded streams, wetlands and riparian buffers, stormwater, flooding and general water quality issues.

In-Lieu Fee Program

Through a 1998 Memorandum of Understanding with the United States Army Corps of Engineers (USACE), Wilmington District, the EEP funds, plans, implements and manages restoration projects that compensate for development-related impacts to streams and wetlands. EEP is not a grant program; EEP manages a repository of funds [Wetlands Trust Funds (for Wetland Restoration, Compensatory Mitigation, or Riparian Buffers)] that can be used for the restoration, enhancement, preservation and creation of wetlands and riparian areas in accordance with the program's Watershed Restoration Plans. The funds in the repository are a combination of state government appropriations, donations of property, grants, and payments made to satisfy mitigation requirements (NCDENR/USACE, 1998). The EEP In-Lieu Fee program has implemented numerous stream and wetland enhancement and restoration projects throughout the state and continues to serve as potential funding source for watershed-based restoration projects.

EEP funded projects are implemented in an effort to improve a multitude of watershed conditions. By reshaping and stabilizing eroded banks and reestablishing and/or maintaining a riparian buffer, one can expect a reduction in the amount sediment input into the stream. Meandering altered or straightened stream channels to a more natural pattern can reduce the velocity of high stream flows. Properly locating and constructing appropriate stormwater best management practices (BMPs) can result in increased flood storage, reduced hydrological peaks and increased pollutant removal. Each of the scenarios above have been identified as both existing watershed concerns and potential watershed improvement projects in the Plan, and are suitable for funding by the EEP. EEP evaluates any potential project based on specific criteria. Additional merit is granted to projects that are located in targeted watershed areas and that have the potential to improve impaired waters (such as Hominy Swamp Creek). Integrating wetland or riparian area restoration components with Section 319-funded projects (or those funded by other programs) will often improve the overall water quality benefits of the project (NCDENR DWQ, 2002). In an effort to ensure long-term protection, it should be noted that any project that is implemented by EEP for the purpose of compensatory mitigation must be protected in perpetuity by either fee simple acquisition or through a permanent conservation easement (NCDENR, 1999).

Riparian Buffer Restoration Program

Effective August 1, 2000, the North Carolina Environmental Management Commission permanently adopted rules to protect 50-foot vegetative buffers along waterways in the Neuse River Basin (as well as more recently in the Tar-Pamlico River Basin and the main stem and major lakes of the Catawba River Basin; however, since the Plan addresses the Hominy Swamp Creek watershed within the Neuse River Basin, this funding analysis will refer only to those rules applicable to the Neuse River Basin). The purpose of the riparian buffer rule is to maintain the nutrient removal function of natural riparian areas along stream corridors (15A NCAC 2B .0233). Development-related impacts to buffers directly adjacent to surface waters (intermittent and perennial streams, lakes, ponds) in the Neuse River basin can, with approval from the Division of Water Quality (DWQ) and EEP, be offset via payment to the Wetlands Trust Fund (Riparian Buffer Restoration

Fund) administered by EEP. EEP uses money from the fund to restore riparian buffer areas by planting native vegetation along riparian corridors and protecting those planted areas by either fee simple acquisition of the land, acceptance of donated land, or through conservation easements. Buffer restoration projects should include a minimum 50-foot buffer adjacent to both sides of the stream (from top of bank) and EEP can provide funding for the protection of up to three hundred feet from the stream. Riparian buffer projects often complement stream restoration projects, but can also be implemented as stand-alone projects.

The Hominy Swamp Creek Watershed Assessment and Restoration plan concludes that "greater than 25% of the 50' riparian buffer and 30% of the 100' buffer are no longer maintained in a forested condition" in this watershed. The Plan further states that it "is widely recognized that a 50' forested riparian buffer (and preferably wider) serves many beneficial functions, including assimilating certain nonpoint source pollutants carried in overland flow, slowing such flows and allowing for infiltration and riparian corridor habitat" (NCDENR EEP, 2004). Based on the statistics above, there appears to be ample opportunity and need for buffer restoration in this watershed.

Nutrient Offset Program

As required by the *Nutrient Sensitive Water Management Strategy: Basinwide Stormwater Requirements* (15A NCAC 2B .0235), fifteen local governments within the Neuse River basin in North Carolina are required to implement a plan to address nitrogen reduction for existing and new development. The City of Wilson (within the Hominy Swamp Creek watershed) enacted their state-approved plan in 2002, which requires a 30% reduction in nitrogen export, no net increase in peak flow leaving a new development site from the predevelopment conditions for the one year-24 hour storm event and maintaining existing riparian buffers (NCDENR WRP, 2003). In order to meet the 30% reduction goal, developers can implement various stormwater BMPs. They also have the option of partially offsetting their nitrogen loads by making payment to the EEP's Wetland Restoration Fund. Monies paid to this fund pursuant to [the] Rule shall be targeted towards restoration of wetlands and riparian areas within the Neuse River

Basin (NCDENR DWQ, 2003). EEP is presently working with local governments (including the City of Wilson as part of this Plan) to identify proposals for projects that will result in reduced nitrogen loadings to surface waters. Using the money available in the Fund, EEP can provide assistance to subject local governments to implement nitrogen removal projects, such as stormwater BMPs and constructed wetlands.

Clean Water Management Trust Fund

In 1996, the North Carolina General Assembly established the Clean Water Management Trust Fund (CWMTF) to help local governments, state agencies and conservation non-profit groups finance projects to protect and restore surface water quality (CWMTF, 2004). The CWMTF is a voluntary incentive-based water quality program. Projects funded by the CWMTF are intended to specifically address water pollution problems and focus on upgrading surface waters, eliminating pollution and protecting and conserving unpolluted surface waters (North Carolina General Statutes § 113-145.1). Program funding has historically been granted for projects such as land acquisition of riparian buffers and greenways, restoration of degraded lands, stormwater control projects, wastewater improvement projects, and water quality planning (NCDENR, 1999).

Those interested in obtaining funding from the CWMTF must submit an application, which may be obtained from the program's web site at www.cwmtf.net. Applications are accepted and reviewed twice per year, in June and December. The applicant is not required to provide a funding match, though a match is recommended. The funding match may be satisfied by means such as a cash value match, fee simple donation of land to a public or private nonprofit conservation organization, or in-kind services ("sweat equity") (CWMTF, 2004).

By rule, grants obtained from the CWMTF may not be used to satisfy compensatory mitigation requirements [NCGS § 113-145.4(c)]. However, as part of the application review and ranking process, the CWMTF may assign a higher priority to projects that are linked to *other conservation projects* in the region or watershed (CWMTF, 2004). The

rule does not state that the *other conservation projects* may not be compensatory mitigation projects. Additionally, CWMTF has adopted a Resolution stating, in summary, that lands previously acquired by CWMTF may be used for complimentary mitigation projects as long as the project improves water quality and the sponsor of the mitigation project reimburses CWMTF for their (CWMTF's) original investment in the acquired land (CWMTF, 2002). Preference is also given for projects that target impaired waters identified by the Division of Water Quality and that appear on the 303(d) list, as does Hominy Swamp Creek (DWQ, 2004).

In the case of this Plan, it may be feasible to apply for and receive CWMTF monies for wetland systems that are contained within the headwaters of the watershed. Downstream of these protected areas, another funding source (such as EEP or EPA 319 grants) may be pursued for implementation of stream channel restoration or stormwater BMP implementation along Hominy Swamp Creek. Combining funding sources and linking complementary conservation projects will not only make a potential project more appealing to an agency or group that is reviewing an application for funding, but will also likely result in measurable watershed improvements by addressing multiple watershed concerns.

US Environmental Protection Agency Clean Water State Revolving Fund

The US Environmental Protection Agency's (EPA) Clean Water State Revolving Fund (SRF) was created by Congress as part of the 1987 Clean Water Act Amendments. The funding is available to all 50 states, and each states manages their own program according to the state's water quality priorities (USEPA, 1997). The program works by primarily offering low-interest loans for agricultural, rural, and urban runoff control, wet weather (stormwater) flow control, and alternative treatment technologies. As those who have received funding repay loans, the money is reused (revolved) to provide assistance for future water quality projects. Examples of projects that have been funded by the SRF program include stormwater management facilities (sediment basins and constructed

wetlands), purchase of easements for wetland conservation/protection, and rehabilitation of streambanks, riparian corridors and buffers (USEPA, 2003).

The SRF is an appropriate potential funding source for protecting the Hominy Swamp Creek watershed's headwater wetlands either by fee-simple purchase or easement acquisition of these areas. Permanent protection of these headwater areas is "a main goal of this planning effort, as many wetland features have been compromised over time, and development too close to and in the floodplain has caused major flooding events and heightened awareness of flood potential" (NCDENR, 2004). The SRF may also be used to support the recommendations of this plan by funding the construction of stormwater BMPs and agricultural BMPs that address agricultural runoff, erosion control and chemical or nutrient use reduction (USEPA, 2003). By implementing these strategies, an expected reduction in pollutant loading can be achieved in the Hominy Swamp Creek watershed.

Funding from the SRF is not only available to government organizations, but also non-profit organizations, businesses, farmers, homeowners and watershed groups. In order to be eligible for funding, the project must help implement the state's Nonpoint Source Management Plan (319 Plan) under the Clean Water Act (USEPA, 2003). No match is required, and loans can cover up to 100% of the project cost. Loans issued to any one local government under this program may not exceed $7,500,000 per fiscal year and the maximum maturity on any loan under this program is 20 years (NCDENR, 1992). Options for repayment of the loan including assessing utility fees, stormwater management fees, dedicated portions of taxes, developer fees, etc. (USEPA, 2003).

US Environmental Protection Agency Section 319 Grant Program

The Environmental Protection Agency (EPA) Section 319 Grant Program (319 Program) is a national program to address and reduce nonpoint source pollution (USEPA, 2003). In North Carolina, the NCDENR Division of Water Quality's (DWQ) NonPoint Source Planning Unit administers the 319 program. Projects eligible for consideration for 319

funding associated with this Plan include public education of nonpoint source concerns (e.g. stormwater runoff), demonstration projects related to controlling nonpoint source pollution (e.g. stormwater or agricultural BMPs), and monitoring to assess the success of specific nonpoint source projects. State and local governments, as well as public and private nonprofit organizations and institutions are eligible to apply for and receive 319 funds.

There are two types of funding currently available from the 319 program in NC: base and incremental. Base Funding can be used for on-the-ground type projects as well as broader educational and regulatory programs related to water quality protection or pollution prevention activities. Incremental Funding can be applied to projects whose goal is to restore waters that are listed as impaired (such as Hominy Swamp Creek) (NCDENR DWQ, 2004). Examples of previously funded 319 projects include installation of BMPs for animal waste; design and implementation of BMP systems for stream, lake and estuary watersheds; and basinwide landowner education programs (USEPA, 2004).

A funding match is required in order to be eligible for a 319 grant. The federal match of any project may not exceed 60%. Proposals that offer non-federal match funding above the required 40% receive additional credit when the proposals are evaluated. The reviewing agency encourages that proposals show a strong sense of collaboration and partnership with other state or local agencies for measurable nonpoint source reduction. For the purpose of this plan, pursuing partnership projects in conjunction with the State's Clean Water Management Trust Fund or the Ecosystem Enhancement Program is recommended. For example, either CWMTF or EEP could fund the acquisition of lands for preservation or restoration activities as well as the design and implementation of those activities. The 319 program could be used to fund monitoring the project in support of demonstrating measurable water quality improvements and public education of how to prevent further watershed degradation. Since both the CWMTF and EEP are nonfederal programs, the funding provided by those programs could serve as the funding match to the federal 319 grant. Again, collaborative efforts from several funding agencies can

result in a comprehensive watershed improvement project. In order assure long-term protection, on-the-ground projects should include establishment of conservation easements or other instruments (NCDENR NPS, 2003).

USDA Natural Resources Conservation Service - Watershed Protection and Flood Prevention Program

The Watershed Protection and Flood Prevention Program, also known as the "Small Watershed Program," provides technical and financial assistance (cost sharing) to address resource and related economic problems on a watershed basis (USEPA, 2004). Those eligible to apply for assistance include state agencies, municipalities, soil and water conservation districts, tribal organizations and certain nonprofit agencies. The program funds many types of projects, including those being implemented and related to watershed protection, flood prevention, water supply, water quality, erosion and sediment control, wetland creation and restoration.

Projects are limited to watersheds containing $\leq$ 250,000 acres, therefore, the Hominy Swamp Creek watershed qualifies based on its size of 15 square miles, or approximately 9,600 acres. Since one of the concerns noted in the Hominy Swamp Creek Plan is flooding and the associated resource and financial impacts caused by flooding, an opportunity exists to obtain partial funding for projects (via cost sharing) or technical assistance to address those concerns. This program also serves as a potential source for funding the acquisition of conservation easements to "perpetuate, restore and enhance the natural capability of wetlands and floodplains to retain excessive floodwaters" (USDA NRCS, 1990). The program will fund up to 50% of the cost of acquiring those easements.

Conservation Reserve Enhancement Program

The Conservation Reserve Enhancement Program (CREP) is a federal and state partnership that began in 1999. It is a voluntary program committed to riparian protection and wetland restoration of up to 100,000 acres within four designated Nutrient

Sensitive Waters Basin in North Carolina, including the Neuse River Basin (NCDENR DWQ, 2000). Partners in the program include the North Carolina Division of Soil and Water Conservation, the NC Clean Water Management Trust Fund, the Ecosystem Enhancement Program, and the United States Department of Agriculture. The goal of the program is to preserve up to 85,000 acres of active riparian area and 15,000 acres of wetland that are currently under active agricultural production. The program was created in part for the enhancement of water quality by reduction of sediment and nutrients, which also falls in line with two of the goals of the Hominy Swamp Creek Plan, sediment and nutrient management (CREP Agreement, 1999; NCDENR EEP, 2004).

The CREP program works by providing rental payments to landowners for removing environmentally sensitive land from agricultural production (NCDENR WRP, 1999). It is estimated that approximately 22% of the land included in the Hominy Swamp Creek watershed is agricultural land (NCDENR EEP, 2004). Eligible land can be enrolled in the CREP program via 10-year, 15-year, 30-year or permanent conservation agreements. Under the agreements, landowners agree to remove the lands from agricultural production and plant and maintain long-term, resource conserving vegetative covers. Payments are based on the duration of the agreement and the soil rental rate as calculated by the Farm Service Agency, and bonus incentives are awarded to those producers who enroll in permanent conservation agreements and those who plant trees (USDA, 1999). Cost sharing is also available from the Federal government for the installation of conservation practices. This program would be an appropriate source for funding to support protection efforts in areas of the Hominy Swamp Creek watershed such as sensitive headwater wetland and/or riparian areas that may be affected by agricultural production. Conservation practices such as grassed filter strips, riparian buffers and wetland restoration are allowable for receipt of funding from CREP. Since programs such as the EEP, CWMTF, and others previously discussed can also provide funding for these practices, here exists another opportunity to look at combining funding sources in support of achieving the goals of this Plan.

In summary, there are numerous funding sources available for watershed protection and improvement initiatives from local, state, federal and private organizations and alternative sources of funding are becoming important options for implementing environmental protection measures. While some of the funding sources listed above may require adherence to strict criteria in order to receive funding (i.e. permanent easements or funding match requirements), it should be noted that with creative thinking, funds received may be able to be combined, as several funding sources may be applicable to a particular project. It is recommended that any project that is constructed be permanently protected, whether by fee-simple acquisition, easements, or other methods. As repeated throughout this analysis, combining funding sources from several groups allows for the implementation of comprehensive watershed improvement projects that have the ability to achieve greater environmental benefits. Many other factors, not covered as part of this analysis, need to be considered when seeking funding for projects, such as capital and operating costs; cost-effectiveness; legal, administrative and political impacts of the alternatives; and costs for the on-going management of both funds received and projects implemented. However, it is hoped that this analysis will be used as a tool for identifying potential funding opportunities to pursue as part of the implementation of the Hominy Swamp Creek Watershed Assessment and Restoration Plan.

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Appendix C

Grant Description and Deliverables

EPA Wetlands Development Grant "Contentnea Watershed Wetlands and Riparian Area Restoration and Plan, Neuse River Basin"

Cooperative Agreement Number : CD984622-99

Beginning Date: September 1, 1999
End Date: December 31, 2004

Deliverables:

1. Watershed Assessment of one 14-digit hydrologic unit within the Contentnea Creek watershed : Comprehensive wetland and functional assessment maps, indicating use support status of streams, presence/absence of riparian buffers, land use/land cover data, natural resource data, and areas of concern due to anticipated changes in future land use (submitted herein).

2. Provide Assistance with the Development of Assessment Procedures to Determine Wetland Function (submitted separately by East Carolina University/EEP)

3. Watershed Restoration Plan (submitted herein):
    a) Perform GIS investigation of watershed problems including potential problems associated with future development
    b) Field verification of sources and potential restoration sites
    c) Identification of needed solutions to current and future problems
    d) Identification of key actions that can be taken by local government to address future land use threats and ensure the long term success of restoration projects
    e) Identification of programs and funding sources that can address each needed solution
    f) Public outreach and education materials to build support for implementation of watershed restoration plan

4. Monitoring and Assessment Program (submitted separately by East Carolina University/EEP)

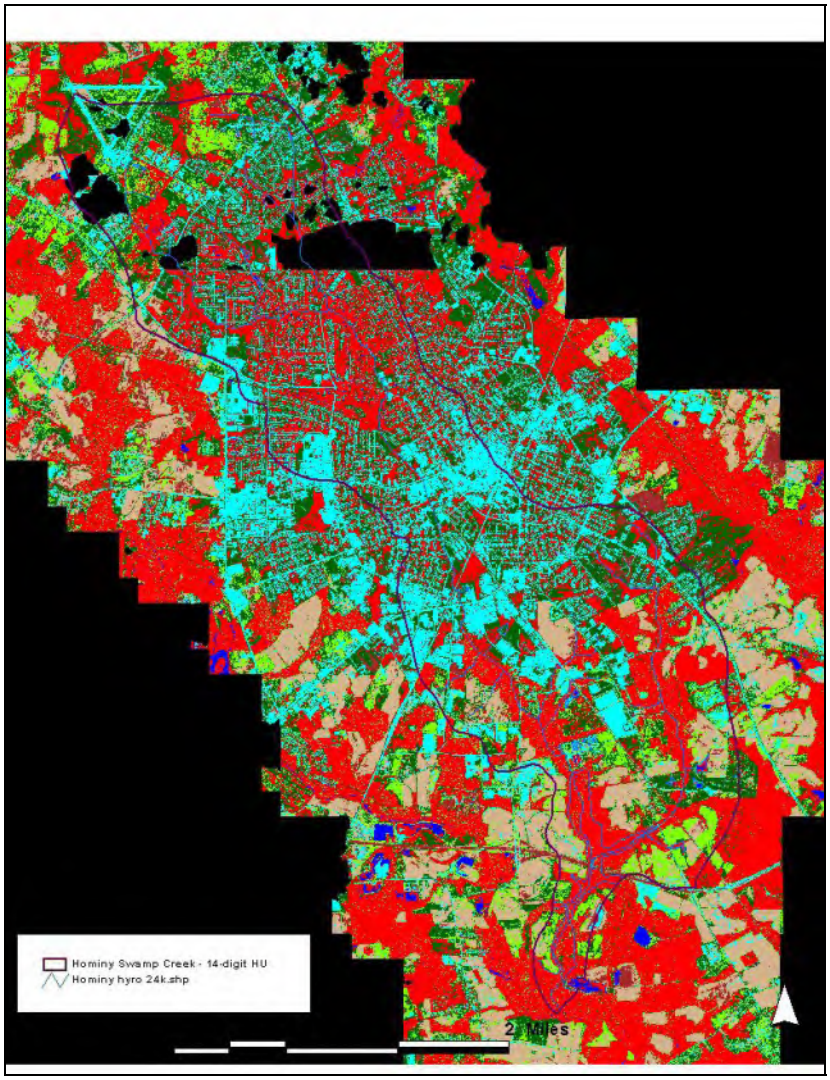
5. Analysis of Funding Sources (submitted herein)

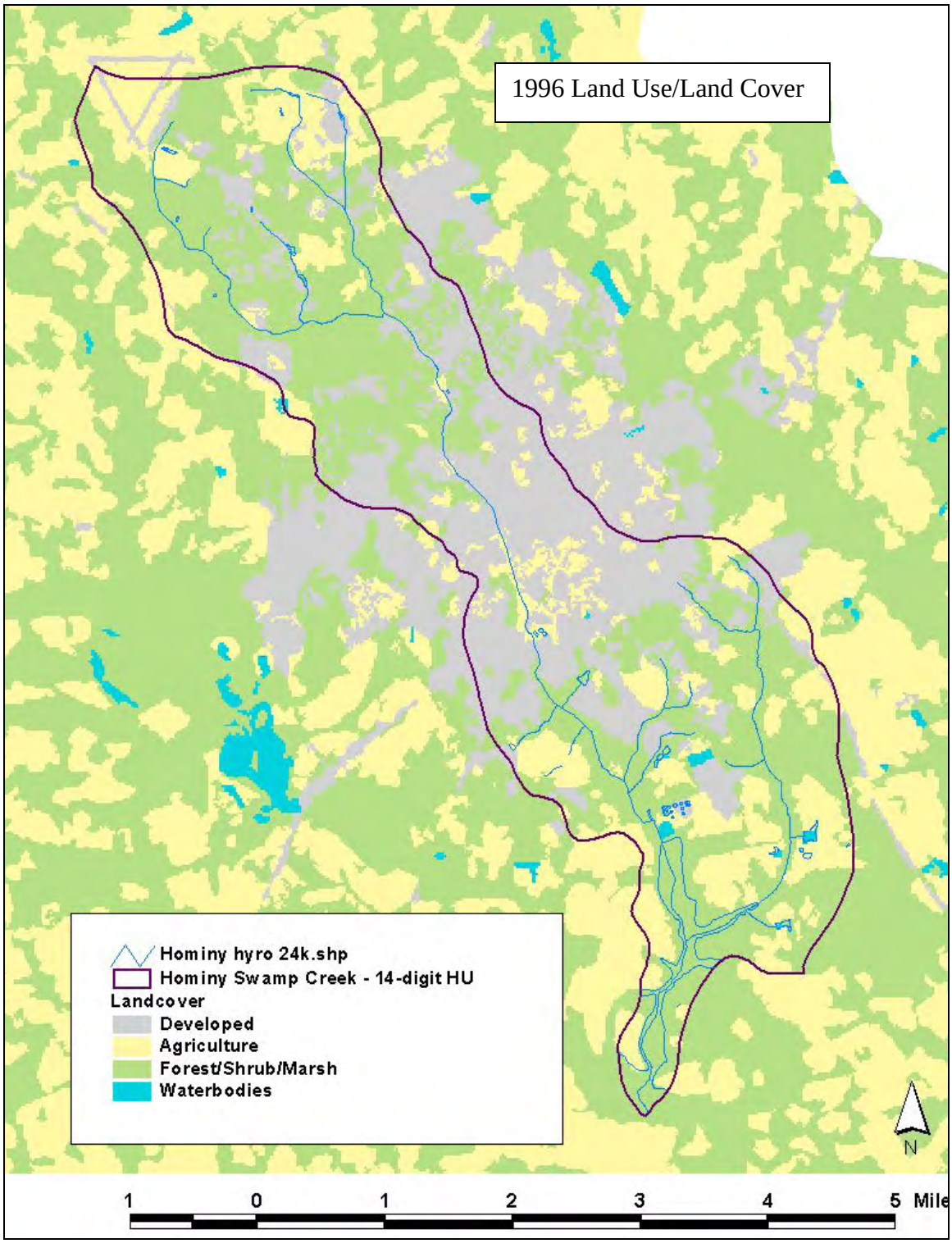
6. Implementation of Watershed Restoration Plan (stream restoration project implemented in 2001 in accordance with earlier plan developed by KCI; implementation of additional plan components underway)

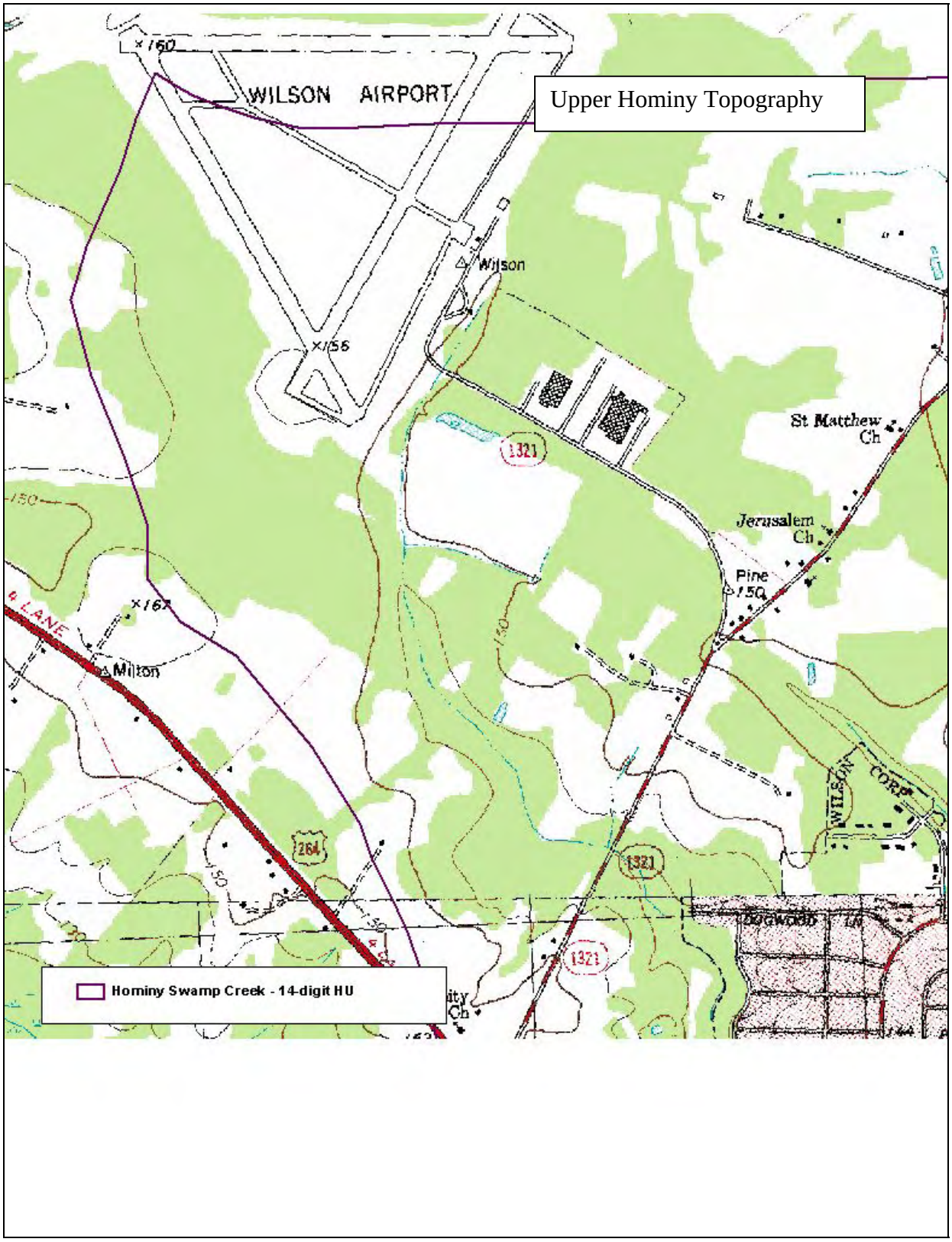
Appendix D

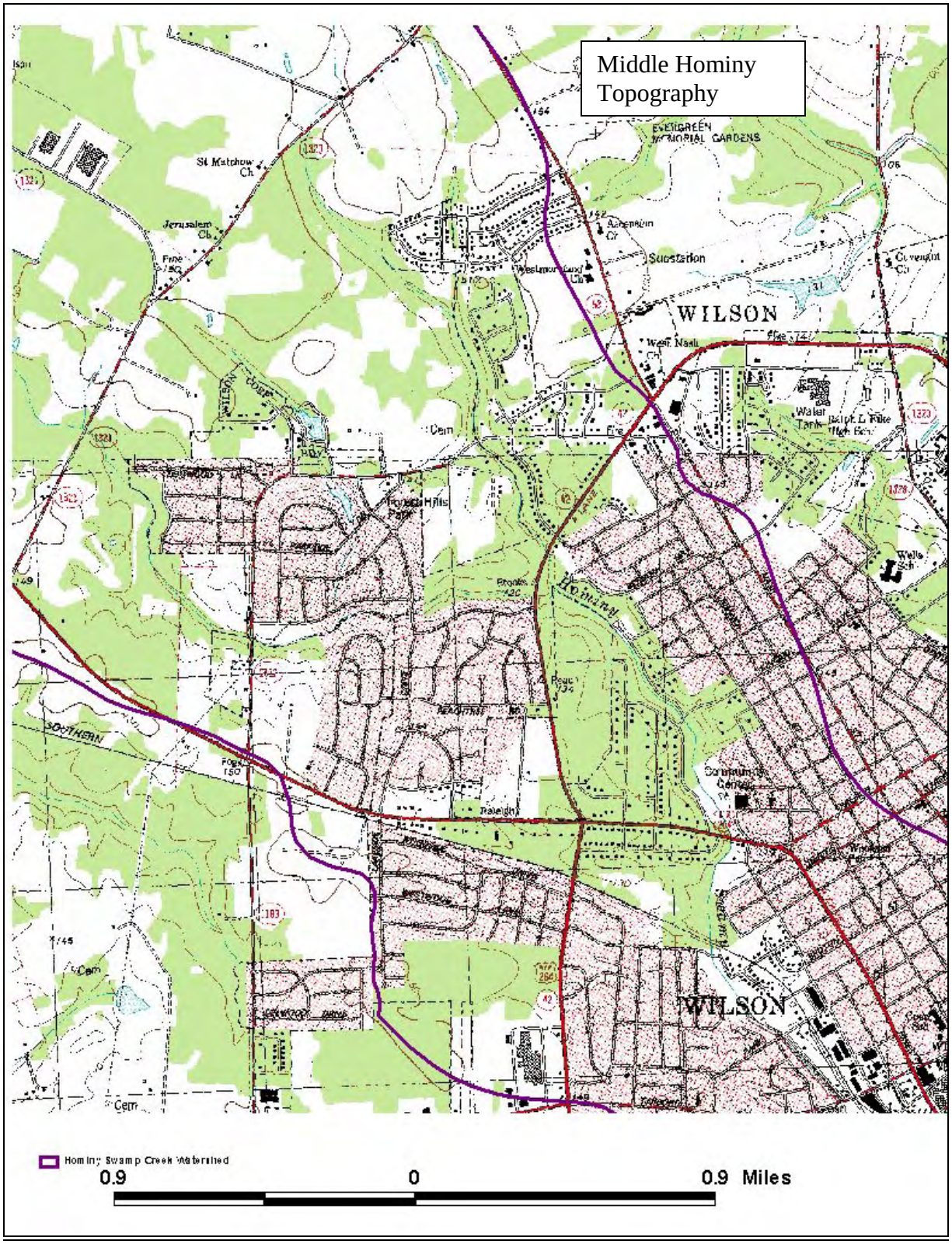
Additional Mapping Products

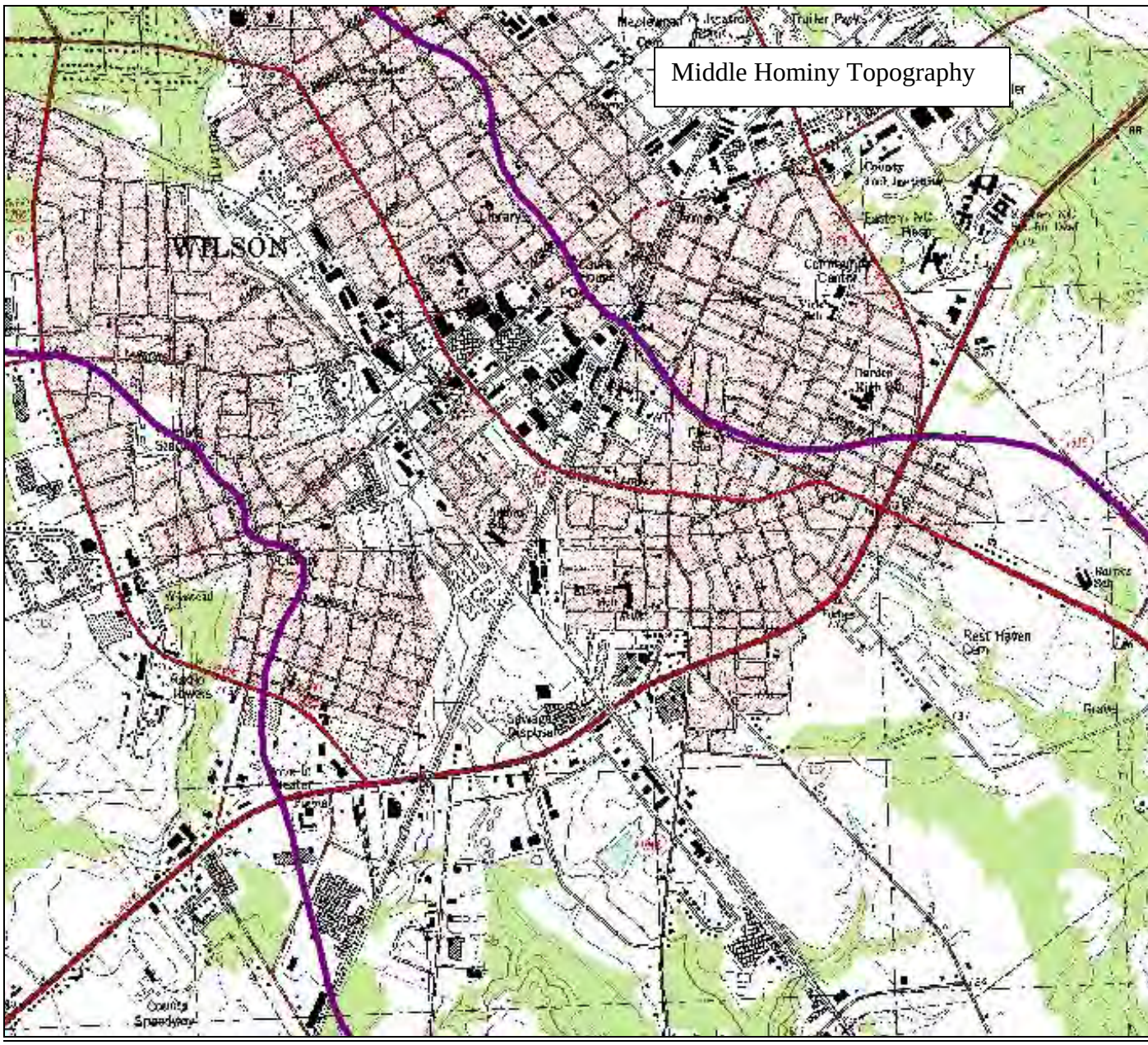
2003 Land Cover, developed by NC State University, Center for Earth Observation

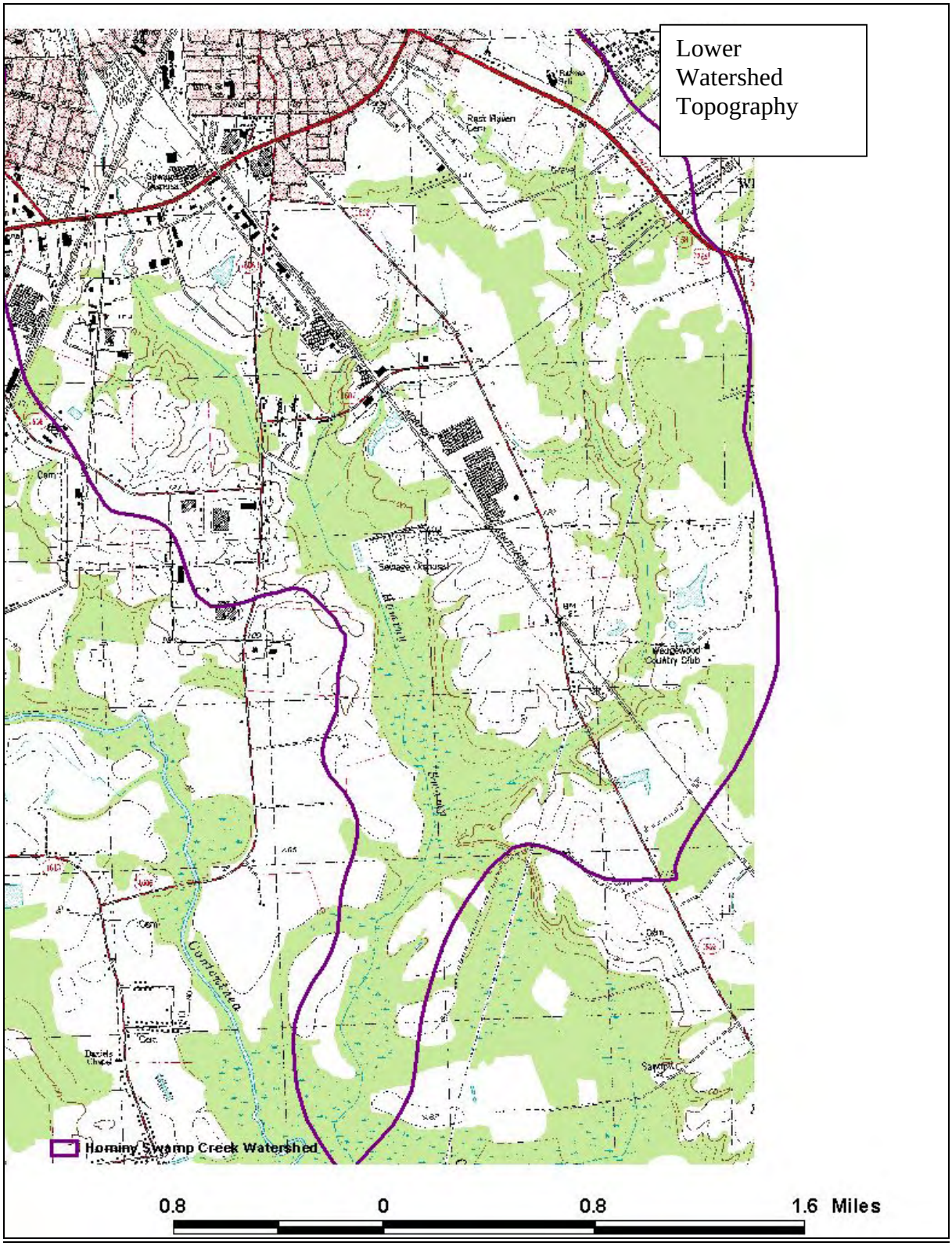


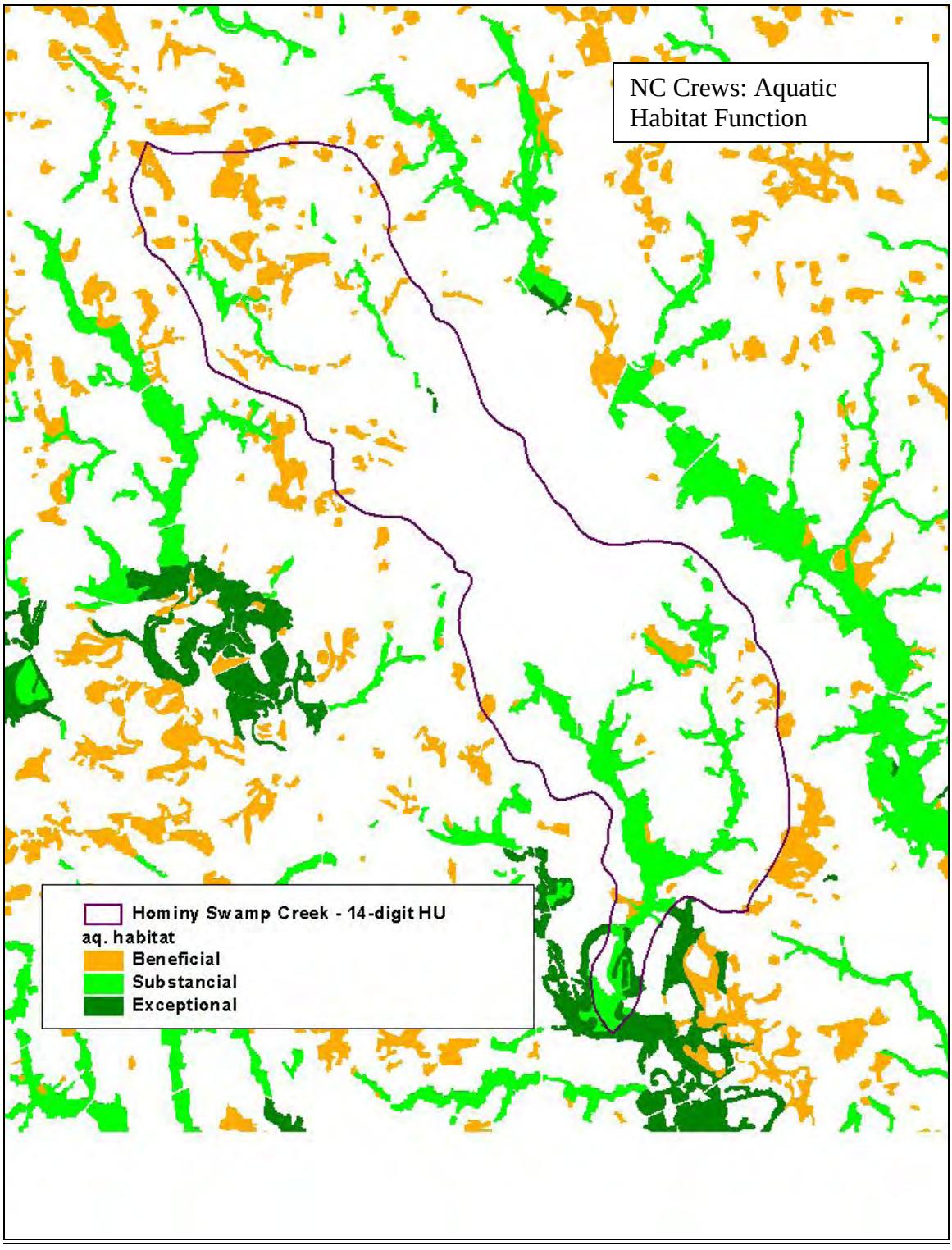

1996 Land Use/Land Cover
Hominy hyro 24k.shp
Hominy Swamp Creek - 14-digit HU
Landcover
Developed
Agriculture
Forest/Shrub/Marsh
Waterbodies
N
1 0 1 2 3 4 5 Mile

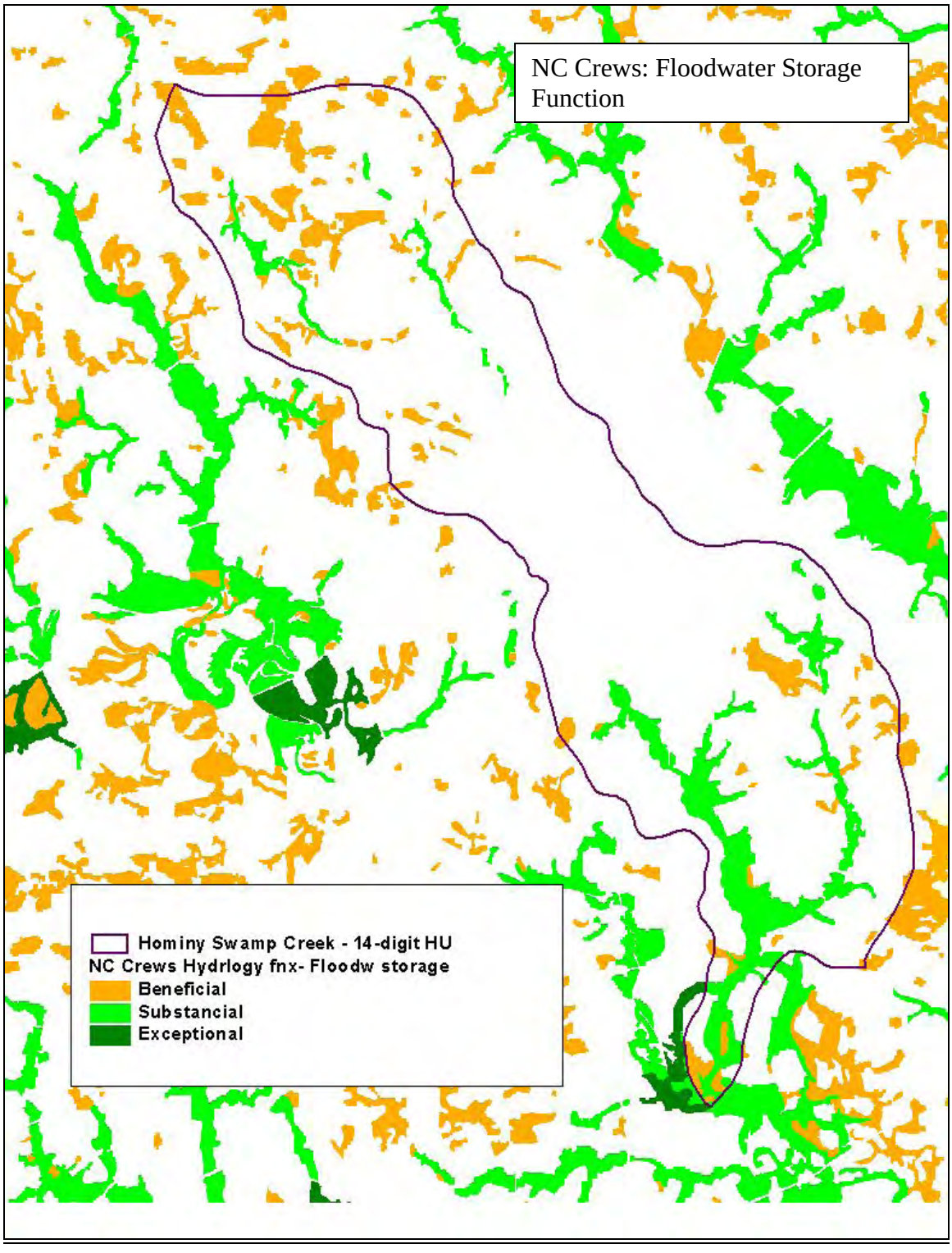

Upper Hominy Topography
WILSON AIRPORT
Wilson
St Matthew Ch
Jerusalem Ch
Pine
Milton
1321
264
Hominy Swamp Creek - 14-digit HU

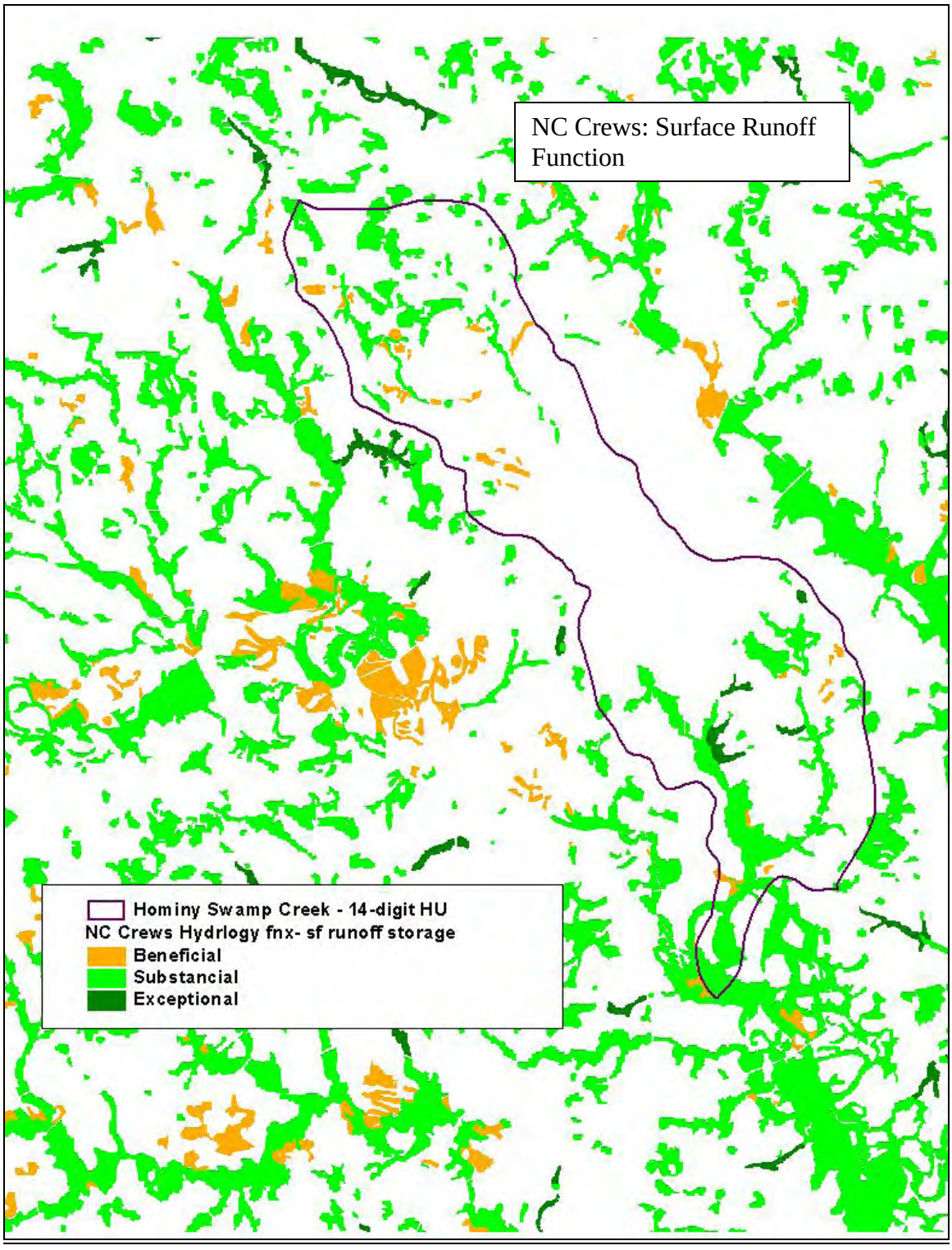

Middle Hominy
Topography
WILSON
WILSON
Hominy
Hominy Swamp Creek Watershed
0.9
0
0.9 Miles

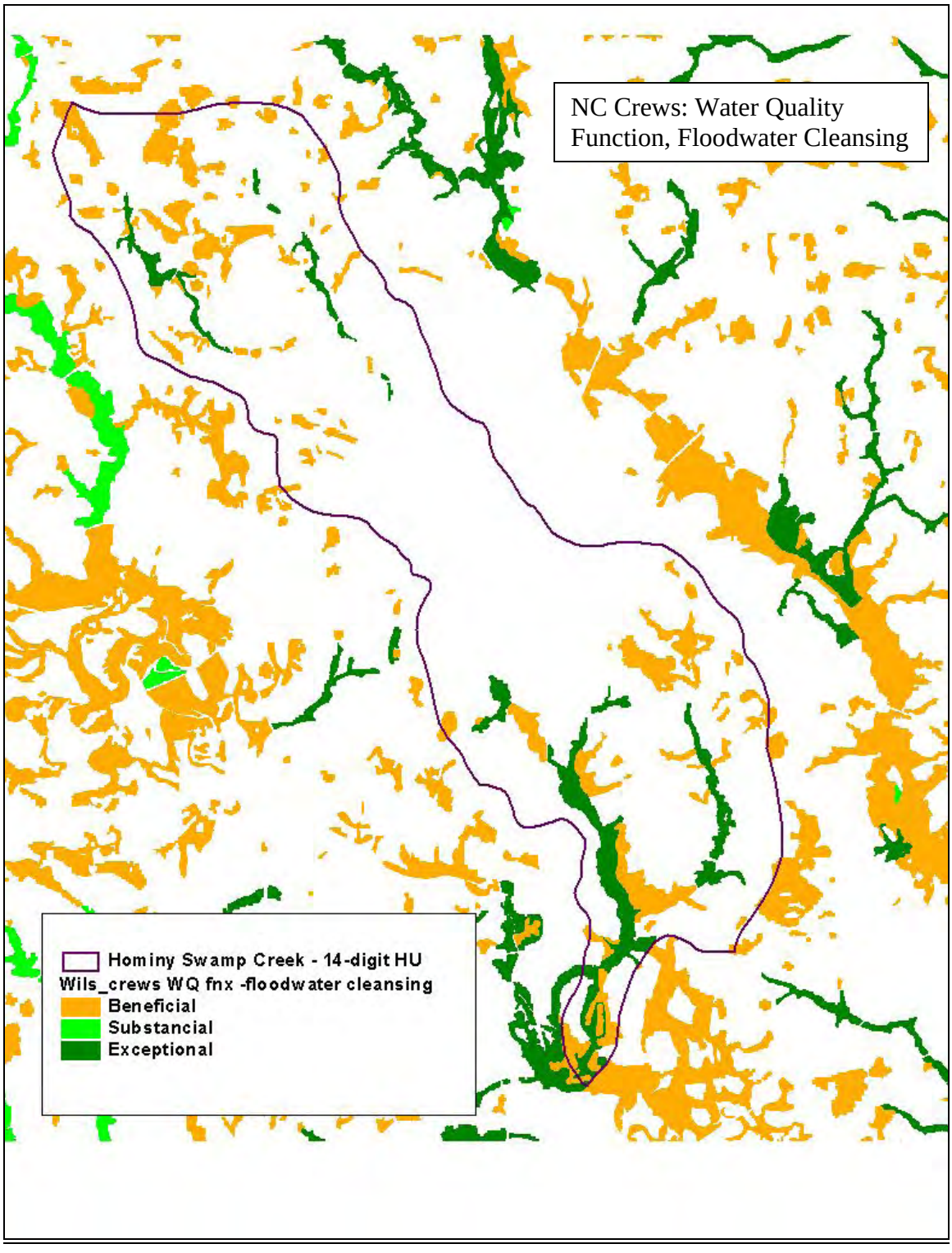

Middle Hominy Topography
WILSON
Rest Haven

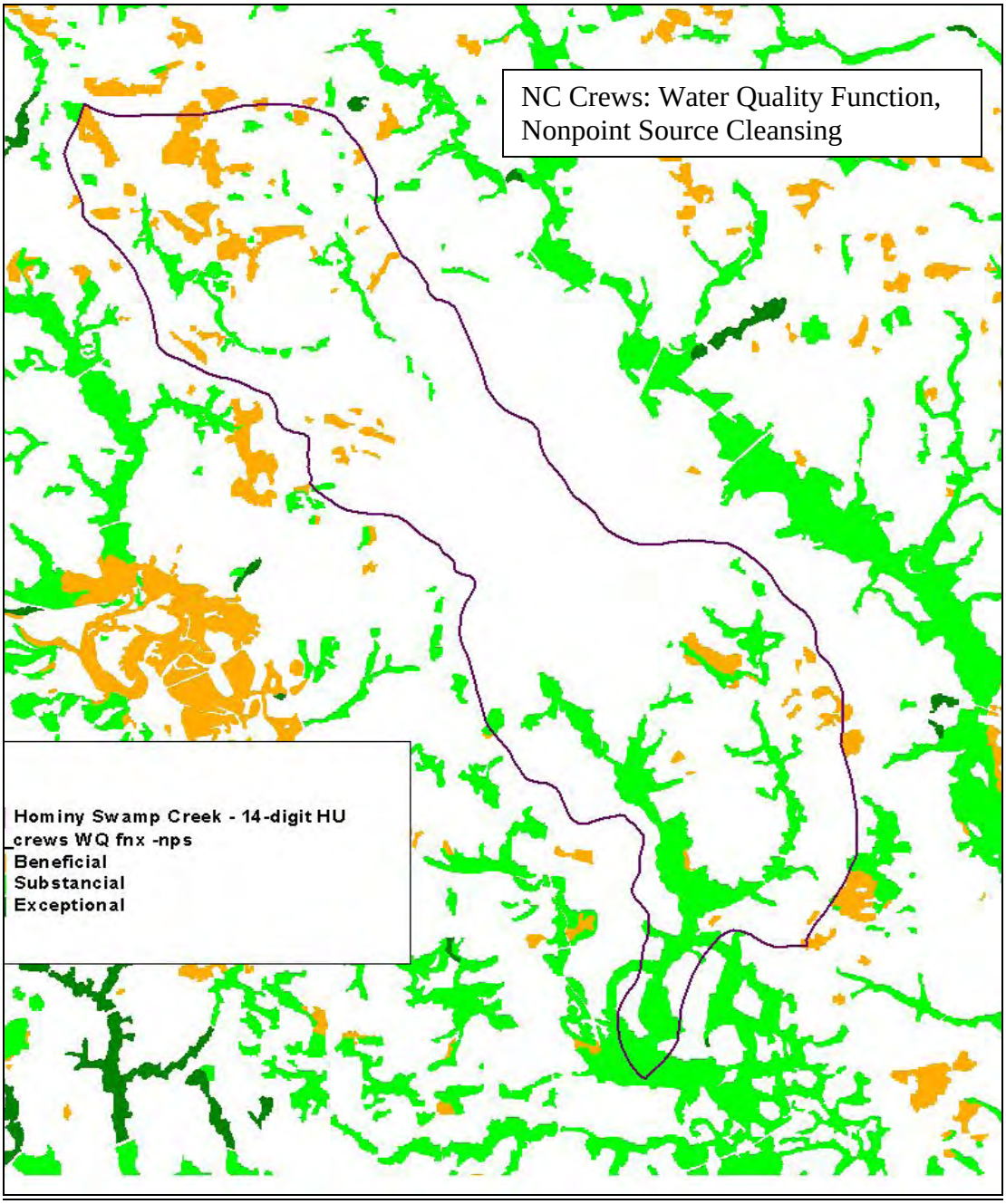

Lower
Watershed
Topography
Hominy Swamp Creek Watershed
0.8
0
0.8
1.6 Miles

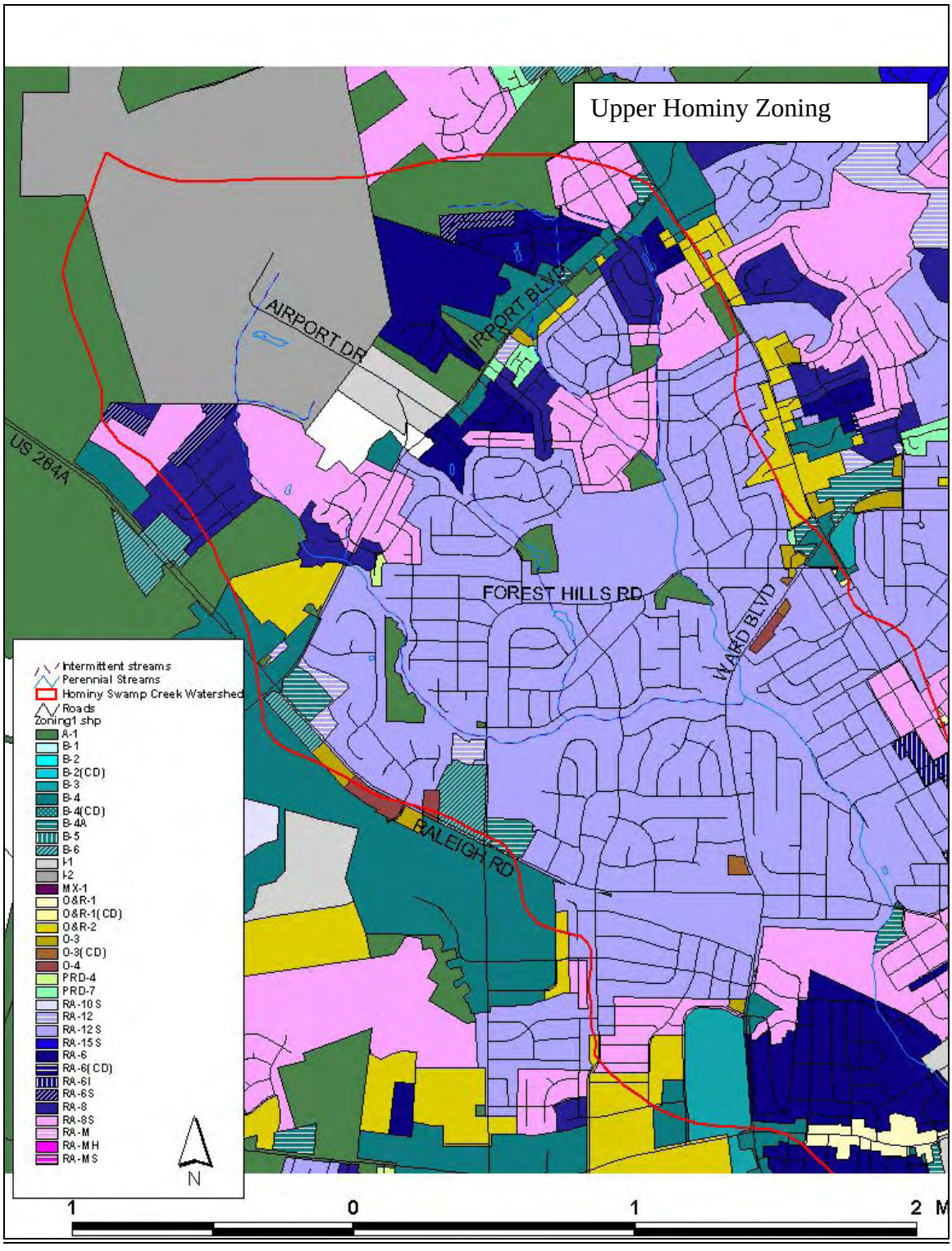

NC Crews: Aquatic Habitat Function
Hominy Swamp Creek - 14-digit HU
aq. habitat
Beneficial
Substancial
Exceptional

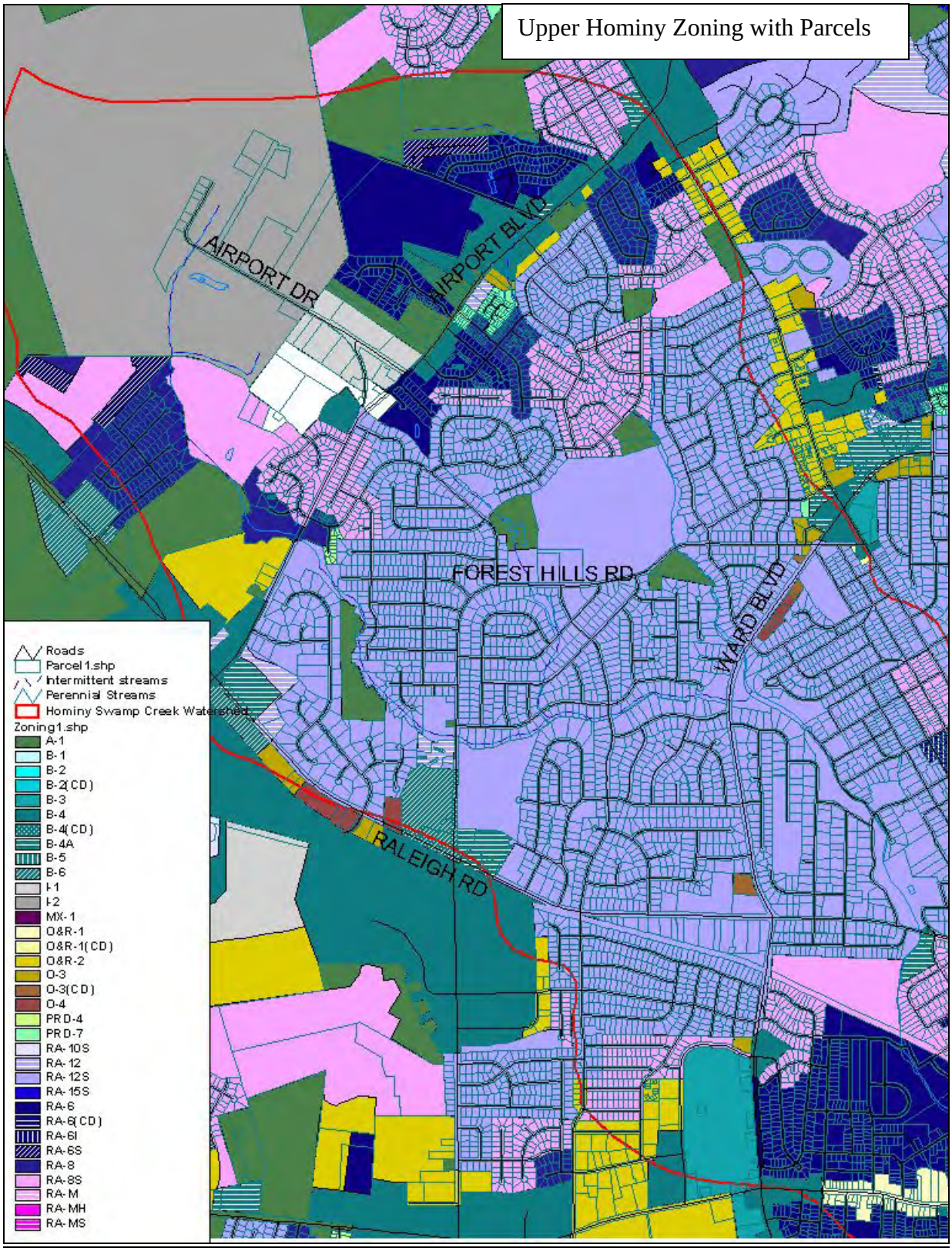

NC Crews: Floodwater Storage Function
Hominy Swamp Creek - 14-digit HU
NC Crews Hydrlogy fnx- Floodw storage
Beneficial
Substancial
Exceptional


NC Crews: Surface Runoff Function
Hominy Swamp Creek - 14-digit HU
NC Crews Hydrlogy fnx- sf runoff storage
Beneficial
Substancial
Exceptional


NC Crews: Water Quality Function, Floodwater Cleansing
Hominy Swamp Creek - 14-digit HU
Wils_crews WQ fnx -floodwater cleansing
Beneficial
Substancial
Exceptional


NC Crews: Water Quality Function, Nonpoint Source Cleansing
Hominy Swamp Creek - 14-digit HU
crews WQ fnx -nps
Beneficial
Substancial
Exceptional


Upper Hominy Zoning
AIRPORT DR
AIRPORT BLVD
US 264A
FOREST HILLS RD
WARD BLVD
RALEIGH RD
Intermittent streams
Perennial Streams
Hominy Swamp Creek Watershed
Roads
zoning1.shp
A-1
B-1
B-2
B-2(CD)
B-3
B-4
B-4(CD)
B-4A
B-5
B-6
I-1
I-2
MX-1
O&R-1
O&R-1(CD)
O&R-2
O-3
O-3(CD)
O-4
PRD-4
PRD-7
RA-10S
RA-12
RA-12S
RA-15S
RA-6
RA-6(CD)
RA-6I
RA-6S
RA-8
RA-8S
RA-M
RA-MH
RA-MS
N
1
0
1
2 M


Upper Hominy Zoning with Parcels
AIRPORT DR
AIRPORT BLVD
FOREST HILLS RD
WARD BLVD
RALEIGH RD
Roads
Parcel1.shp
Intermittent streams
Perennial Streams
Hominy Swamp Creek Watershed
Zoning1.shp
A-1
B-1
B-2
B-2(CD)
B-3
B-4
B-4(CD)
B-4A
B-5
B-6
I-1
I-2
MX-1
O&R-1
O&R-1(CD)
O&R-2
O-3
O-3(CD)
O-4
PRD-4
PRD-7
RA-10S
RA-12
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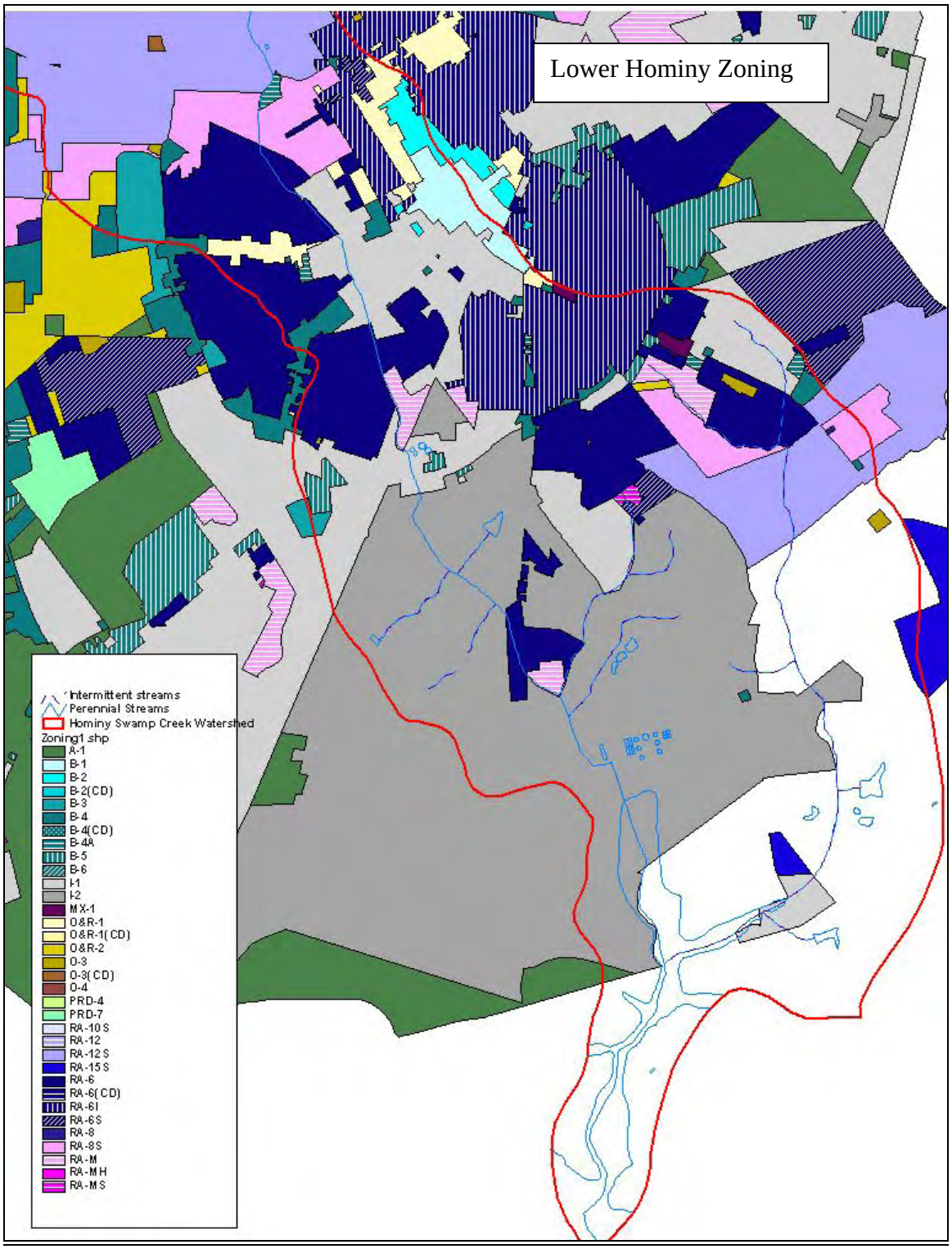
RA-8
RA-8S
RA-M
RA-MH
RA-MS


Lower Hominy Zoning
Intermittent streams
Perennial Streams
Hominy Swamp Creek Watershed
Zoning1.shp
A-1
B-1
B-2
B-2(CD)
B-3
B-4
B-4(CD)
B-4A
B-5
B-6
I-1
I-2
MX-1
O&R-1
O&R-1(CD)
O&R-2
O-3
O-3(CD)
O-4
PRD-4
PRD-7
RA-10S
RA-12
RA-12S
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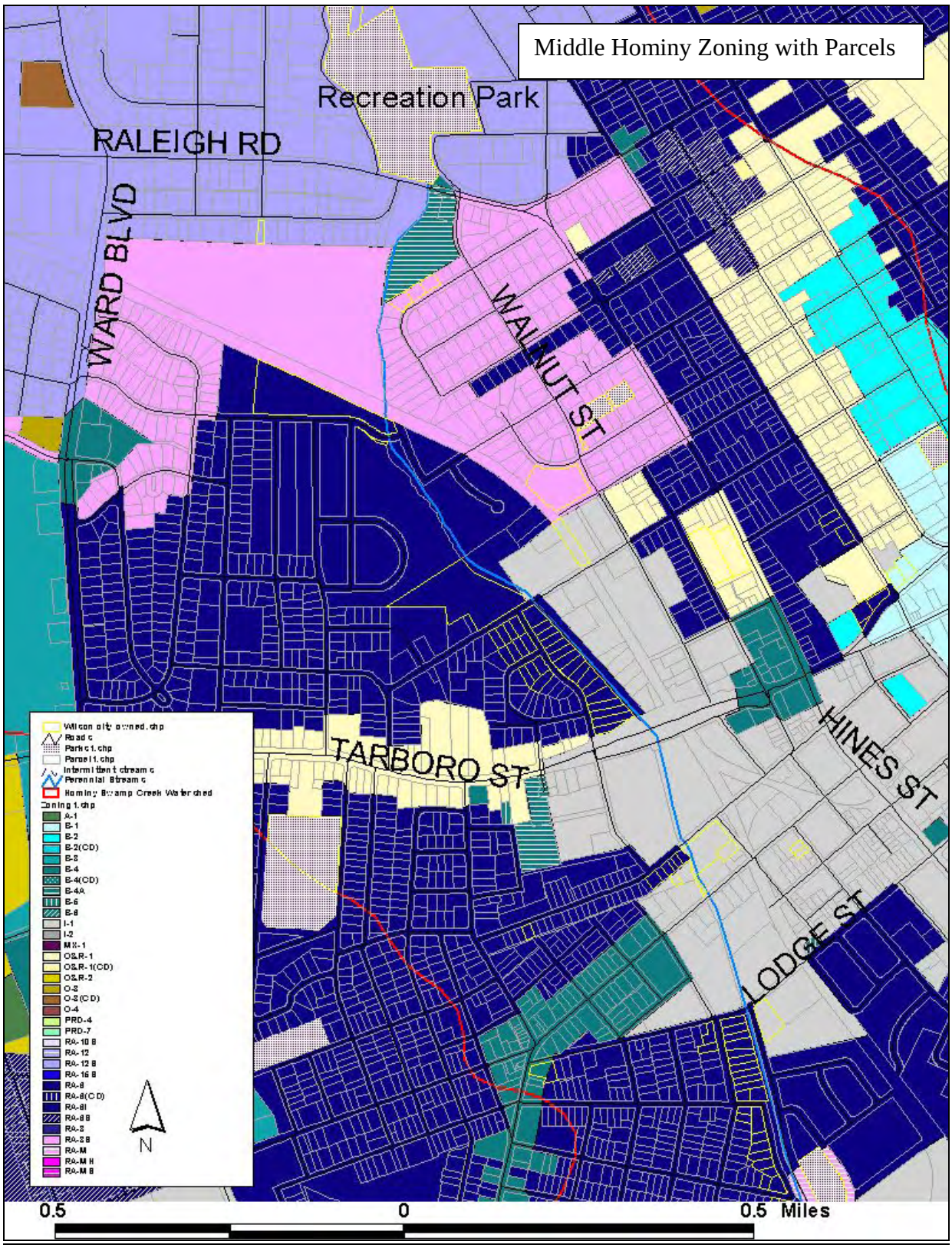
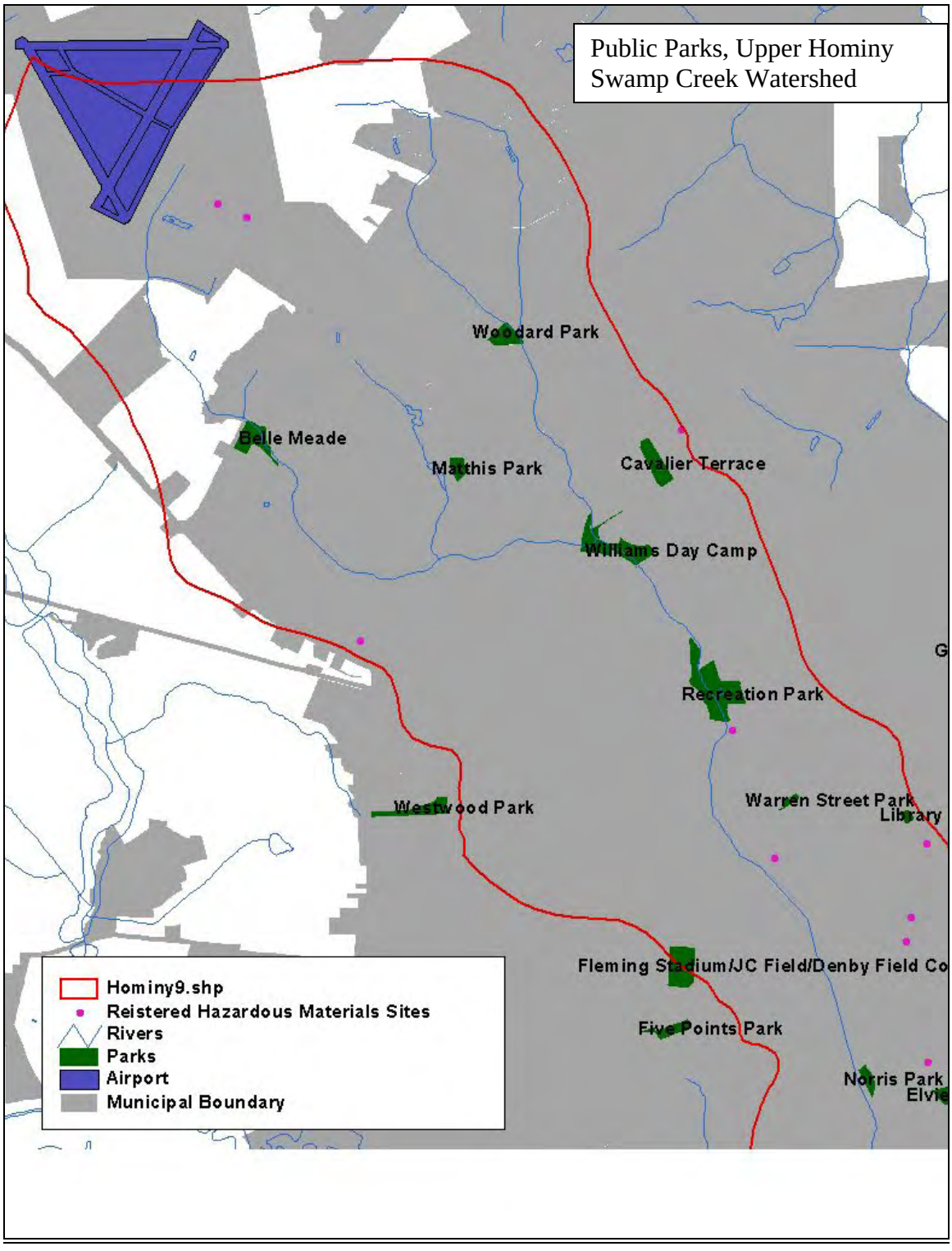
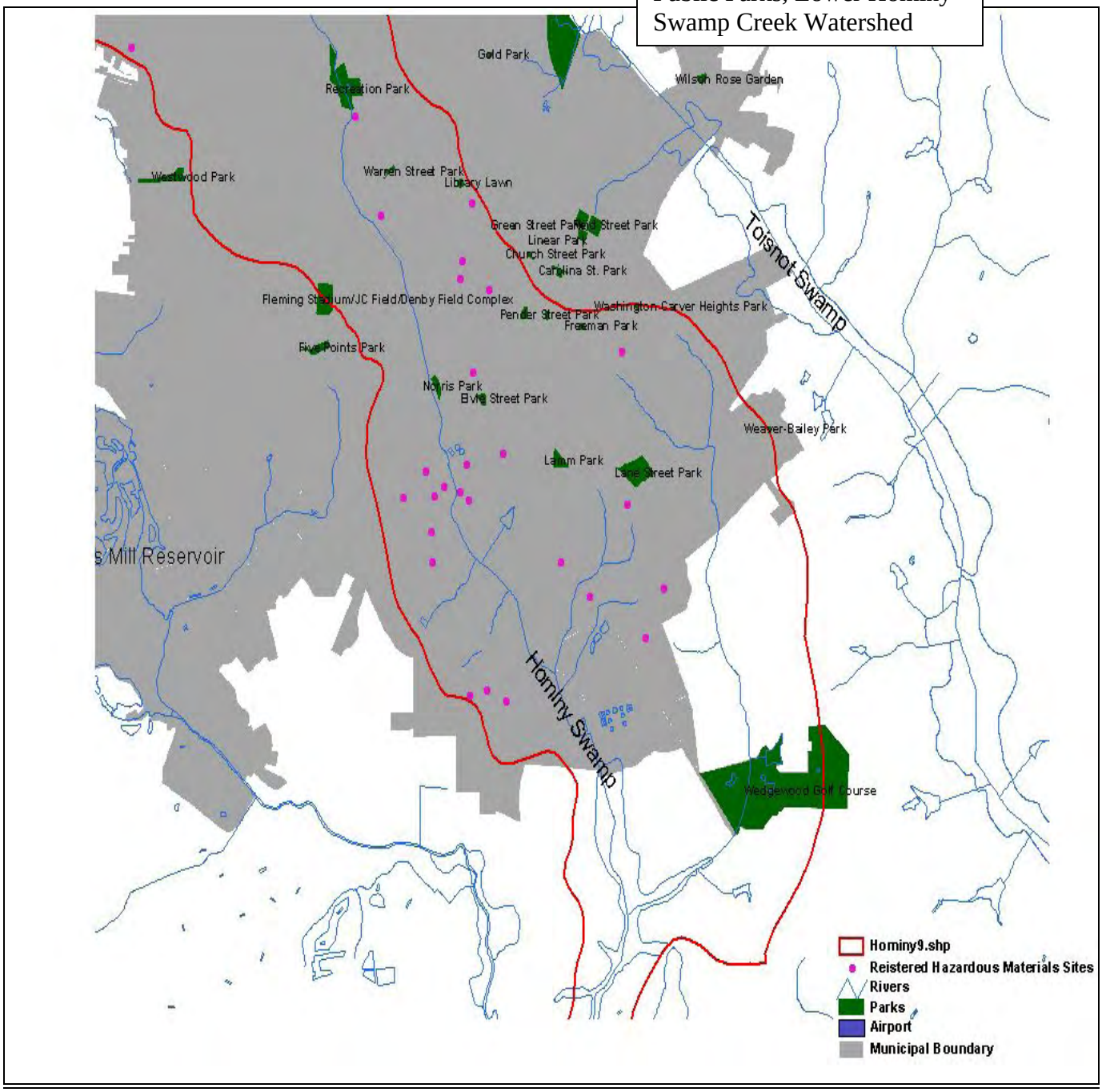
RA-8
RA-8S
RA-M
RA-MH
RA-MS


Middle Hominy Zoning with Parcels
Recreation Park
RALEIGH RD
WARD BLVD
WALNUT ST
TARBORO ST
HINES ST
LODGE ST
Wilson city owned.shp
Roads
Parks1.shp
Parcel1.shp
Intermittent streams
Perennial Streams
Hominy Swamp Creek Watershed
Zoning1.shp
A-1
B-1
B-2
B-2(CD)
B-3
B-4
B-4(CD)
B-4A
B-5
B-6
I-1
I-2
MX-1
O&R-1
O&R-1(CD)
O&R-2
O-3
O-3(CD)
O-4
PRD-4
PRD-7
RA-10 B
RA-12
RA-12 B
RA-16 B
RA-6
RA-6(CD)
RA-6I
RA-6 B
RA-3
RA-3 B
RA-M
RA-M H
RA-M B
N
0.5
0
0.5 Miles


Public Parks, Upper Hominy Swamp Creek Watershed
Woodard Park
Belle Meade
Matthis Park
Cavalier Terrace
Williams Day Camp
Recreation Park
Westwood Park
Warren Street Park
Library
Fleming Stadium/JC Field/Denby Field Co
Five Points Park
Norris Park
Hominy9.shp
Reistered Hazardous Materials Sites
Rivers
Parks
Airport
Municipal Boundary

Public Parks, Lower Hominy Swamp Creek Watershed



Appendix E

Site Assessment Summary Sheets

All sites were visited during Summer and Fall 2003.

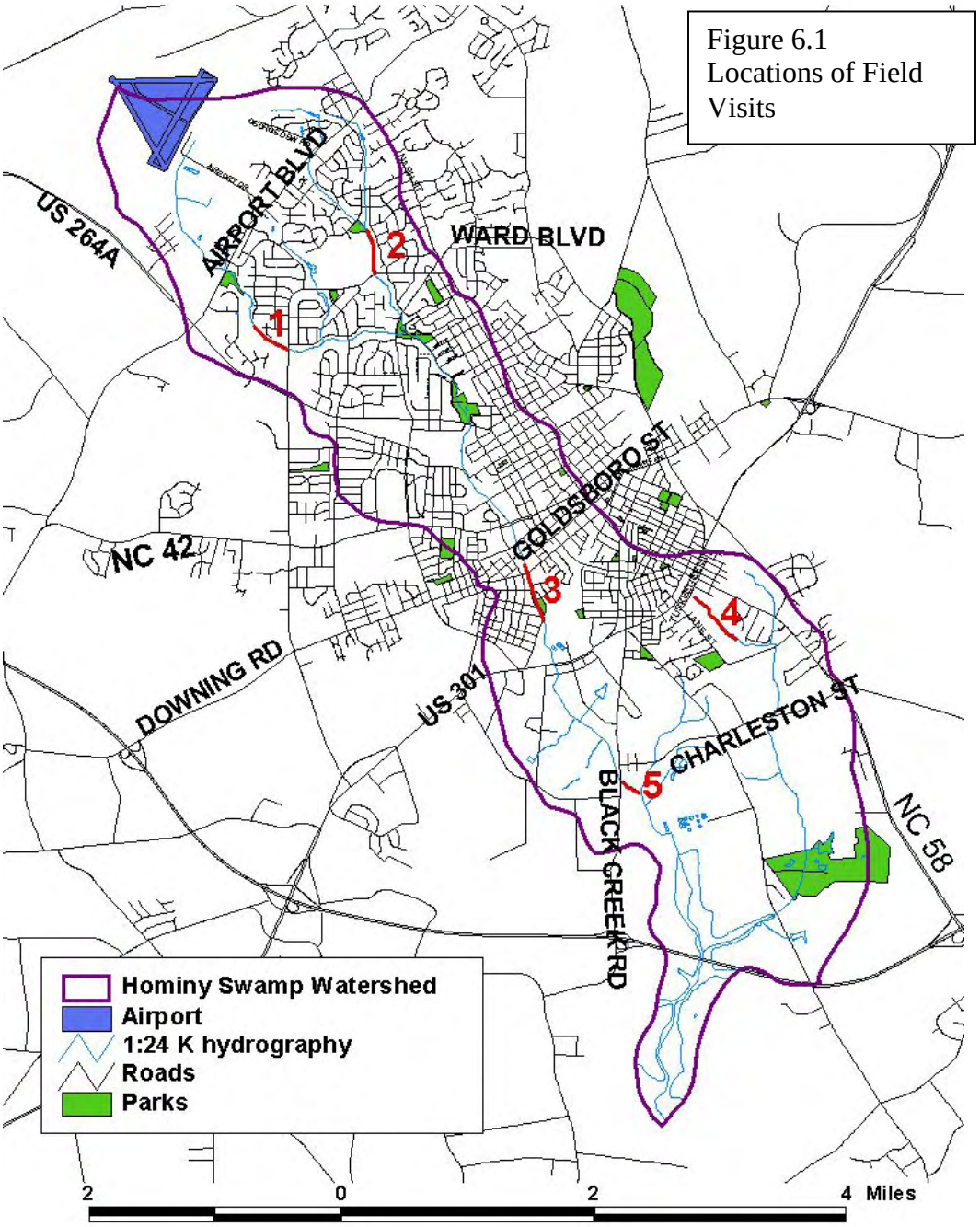


Figure 6.1
Locations of Field Visits

Site #1 Visual Assessment
Hominy Swamp Creek (HU 03020203020040)
Wilson, NC Neuse River Basin
Tributary behind Forest Hills Baptist Church, at Forest Hills Road
Primary Municipal Jurisdictions: Wilson, NC
Receiving Water Body: Contentnea Creek
300' section of stream with 150' buffer on each side of channel

Comments:
Headcuts present; heavy sedimentation and erosion evident; forested buffer with many felled trees; heavy commercial areas with associated impervious cover within 500' of channel

Primary Land Use		Upland Buffer		Floodplain-Channel	
X	Forested	60%	Forested (% Cover)		Connection: Overbank Flooding
	Agricultural		Agricultural	X	Evident
	Residential	X	Managed Grass		Absent
X	Open Space/Vacant		Developed/Impervious		
	Industrial/Commercial		Vegetation Absent		Condition:
		X	Invasive Vegetation		Fair to Poor; Bank Instability Evident; Heavy Erosion and Incision Evident
					Encroachment:
	Adjacent Land Use:			X	Evident
	Residential, Commercial				Absent

Water Quality		Man-Made Features		Wetlands		Channel Blockages	
X	Cloudy, Turbid	U, D	Road Crossings	X	Present	X	Debris
	Obvious Odor	X	Utilities		Absent		Beaver Dam
	Residue Visible	X	Outfalls, Ditches				Other
			Pipes				
			BMPs				
			Dams				

Site #1 Visual Assessment

Site #2 Visual Assessment
Hominy Swamp Creek (HU 03020203020040)
Wilson, NC Neuse River Basin
Mainstem, at Canal Drive near Runnymeade Road
Primary Municipal Jurisdictions: Wilson, NC
Receiving Water Body: Contentnea Creek

Comments:
Headcuts present; heavy sedimentation and erosion evident; forested buffer with many felled trees; heavy residential areas with associated impervious areas within 500' of channel

300' section of stream with 150' buffer on each side of channel

Primary Land Use		Upland Buffer		Floodplain-Channel	
	Forested	60%	Forested (% Cover)		Connection: Overbank Flooding
	Agricultural		Agricultural	X	Evident
X	Residential	X	Managed Grass		Absent
	Open Space/Vacant	X	Developed/Impervious		
	Industrial/Commercial		Vegetation Absent		Condition:
			Invasive Vegetation		Fair to Poor; Bank Instability Evident; Heavy Erosion and Incision Evident
					Encroachment:
	Adjacent Land Use:			X	Evident
	Residential, Park				Absent

Water Quality		Man-Made Features		Wetlands		Channel Blockages	
X	Cloudy, Turbid	U, D	Road Crossings	X	Present	X	Debris
	Obvious Odor		Utilities		Absent		Beaver Dam
	Residue Visible	X	Outfalls, Ditches				Other
			Pipes				
			BMPs				
			Dams				

Site #3 Visual Assessment
Hominy Swamp Creek (HU 03020203020040)

Wilson, NC Neuse River Basin
Mainstem, at Meadow and Lodge Streets
Primary Municipal Jurisdictions: Wilson, NC
Receiving Water Body: Contentnea Creek
300’ section of stream with 150’ buffer on each side of channel

Comments:
Heavy sedimentation evident; forested buffer absent; channelized; residential structures removed from floodplain

Primary Land Use		Upland Buffer		Floodplain-Channel	
	Forested	0	Forested (% Cover)		Connection: Overbank Flooding
	Agricultural		Agricultural	X	Evident
	Residential	X	Managed Grass		Absent
X	Open Space/Vacant		Developed/Impervious		
	Industrial/Commercial		Vegetation Absent		Condition:
			Invasive Vegetation		Fair to Poor; Heavy Sedimentation Evident; Herbaceous & Shrub Veg. only
					Encroachment:
	Adjacent Land Use:			X	Evident (roads, no dev.)
	Vacant				Absent

Water Quality		Man-Made Features		Wetlands		Channel Blockages	
	Cloudy, Turbid	U, D	Road Crossings		Present		Debris
	Obvious Odor		Utilities	X	Absent		Beaver Dam
	Residue Visible	X	Outfalls, Ditches				Other
			Pipes				
			BMPs				
			Dams				

Site #4 Visual Assessment Observation Location
Hominy Swamp Creek (HU 03020203020040)
Wilson, NC Neuse River Basin
Black Creek Road, near Charleston Street
Primary Municipal Jurisdictions: Wilson, NC
Receiving Water Body: Contentnea Creek
300' section of stream with 150' buffer on each side of channel

Comments:
Heavy sedimentation and erosion evident; forested buffer on one bank; access to floodplain on forested side

Primary Land Use		Upland Buffer		Floodplain-Channel	
	Forested	40%	Forested (% Cover)		Connection: Overbank Flooding
X	Agricultural		Agricultural	X	Evident
	Residential		Managed Grass		Absent
X	Open Space/Vacant		Developed/Impervious		
	Industrial/Commercial		Vegetation Absent		Condition:
		X	Invasive Vegetation		Fair; Bank Instability Evident; Vacant area adj. floods frequently
					Encroachment:
	Adjacent Land Use:			X	Evident
	Ag., Vacant				Absent

	Water Quality		Man-Made Features		Wetlands		Channel Blockages
X	Cloudy, Turbid	U	Road Crossings		Present		Debris
	Obvious Odor	X	Utilities	X	Absent		Beaver Dam
	Residue Visible	X	Outfalls, Ditches				Other
			Pipes				
			BMPs				
			Dams				

Site #5 Visual Assessment
Hominy Swamp Creek (HU 03020203020040)

Wilson, NC Neuse River Basin
Main Tributary to Hominy, at Tuskeegee Street
Primary Municipal Jurisdictions: Wilson, NC
Receiving Water Body: Contentnea Creek
300’ section of stream with 150’ buffer on each side of channel

Comments:
Heavy sedimentation evident; forested buffer absent; residential areas with associated impervious areas within 500’ of channel; trash in channel; highly eroded area downstream

Primary Land Use		Upland Buffer		Floodplain-Channel	
	Forested	0	Forested (% Cover)		Connection: Overbank Flooding
	Agricultural		Agricultural	X	Evident
X	Residential	X	Managed Grass		Absent
X	Open Space/Vacant		Developed/Impervious		
	Industrial/Commercial		Vegetation Absent		Condition:
		X	Invasive Vegetation		Fair; Bank Instability Evident; Heavy Erosion and Incision Evident
					Encroachment:
	Adjacent Land Use:			X	Evident
	Residential, Commercial				Absent

	Water Quality		Man-Made Features		Wetlands		Channel Blockages
X	Cloudy, Turbid	U	Road Crossings		Present		Debris
	Obvious Odor		Utilities	X	Absent		Beaver Dam
	Residue Visible	X	Outfalls, Ditches				Other
			Pipes				
			BMPs				
			Dams				

Attachment 6

Hominy Creek Greenway and Water Quality Park Master Plan

Wilson, North Carolina

HOMINY CREEK GREENWAY *and* WATER QUALITY PARK

MASTER PLAN

ACKNOWLEDGEMENTS

Thanks to the local residents, business leaders, community leaders, and government staff who participated in the development of this project through meetings, events, volunteering, interviews, and review.

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Adopted by Wilson City Council July 2016

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Section 1

PROJECT BACKGROUND

CONTEXT

The City of Wilson has identified a stream corridor named Hominy Swamp Creek that includes opportunities for recreation, education, stormwater quality improvement, and flood control. Like many other American cities, the City of Wilson suffers from health ailments related to lack of exercise and active transportation. A greenway will be the first facility in Wilson County that citizens can access safely from a neighborhood. Opportunities exist along Hominy Creek to reduce flooding and improve water quality using best management practices, while also rehabilitating wildlife habitat. The Hominy Creek Greenway and Water Quality Park Master Plan identifies a preferred alignment and concept for creating a recreational facility in tandem with flood control solutions. This document summarizes existing conditions, opportunities and constraints for such a project.

HISTORY AND SETTING OF WILSON

The City of Wilson is a small historic city in the coastal plain of North Carolina. It is the county seat located in Wilson County. Wilson is easily recognized for its outstanding quality of life, southern charm, historical importance, welcoming community, and its desire to progressively plan for the future.

The City of Wilson has a population approaching 50,000 people, and is clearly the economic, social, educational, governmental, and cultural center of Wilson County. It is a regional economic center for agriculture, manufacturing, commercial, and service businesses jobs, services, and retail trade.

Hominy Swamp Creek is a prominent feature in Wilson's landscape, roughly bisecting the city north to south. Roads cross the creek 10 times in the project area, representing a substantial historic capital investment. The waters of Hominy Swamp Creek were once used to power grist mills, and as Wilson grew and development increased, the topography of the stream basin lent itself to use as a major stormwater drainageway. Continued development resulted in occasional flooding and the degradation of the natural resources of the stream corridor.

The project corridor will connect to historic downtown Wilson.

A major step in the rehabilitation of the stream occurred in 1999, when the Wetland Restoration Program of the North Carolina Division of Water Quality used an Environmental Protection Agency grant to fund a stream restoration project on approximately 2,230 feet of channel adjacent to the Recreation Center facility, between the Kincaid Avenue and Raleigh Road crossings.

The community has much heritage and history, with significant ongoing preservation, utilization, and celebration including festivals, outdoor concerts, historic walking tours, porch tours and events. Wilson is also home of the internationally known folk artist Vollis Simpson and his elaborate Whirligigs. The Hominy Creek Greenway and Water Quality Park corridor will extend from Williams Dazy Camp and connect to Ridgewood Park, totaling approximately 3.8 miles. This Master Plan was based on previous stream restoration work in 2001. The majority of the Hominy Creek Greenway and Water Quality Park corridor is located within the 100-year floodplain along Hominy Creek. The City of Wilson acquired lands along the corridor from FEMA's Hazard Mitigation land buyout monies and these properties will be considered for public space improvements within the master plan. Map 1.1 depicts the project study area and adjacent connections.

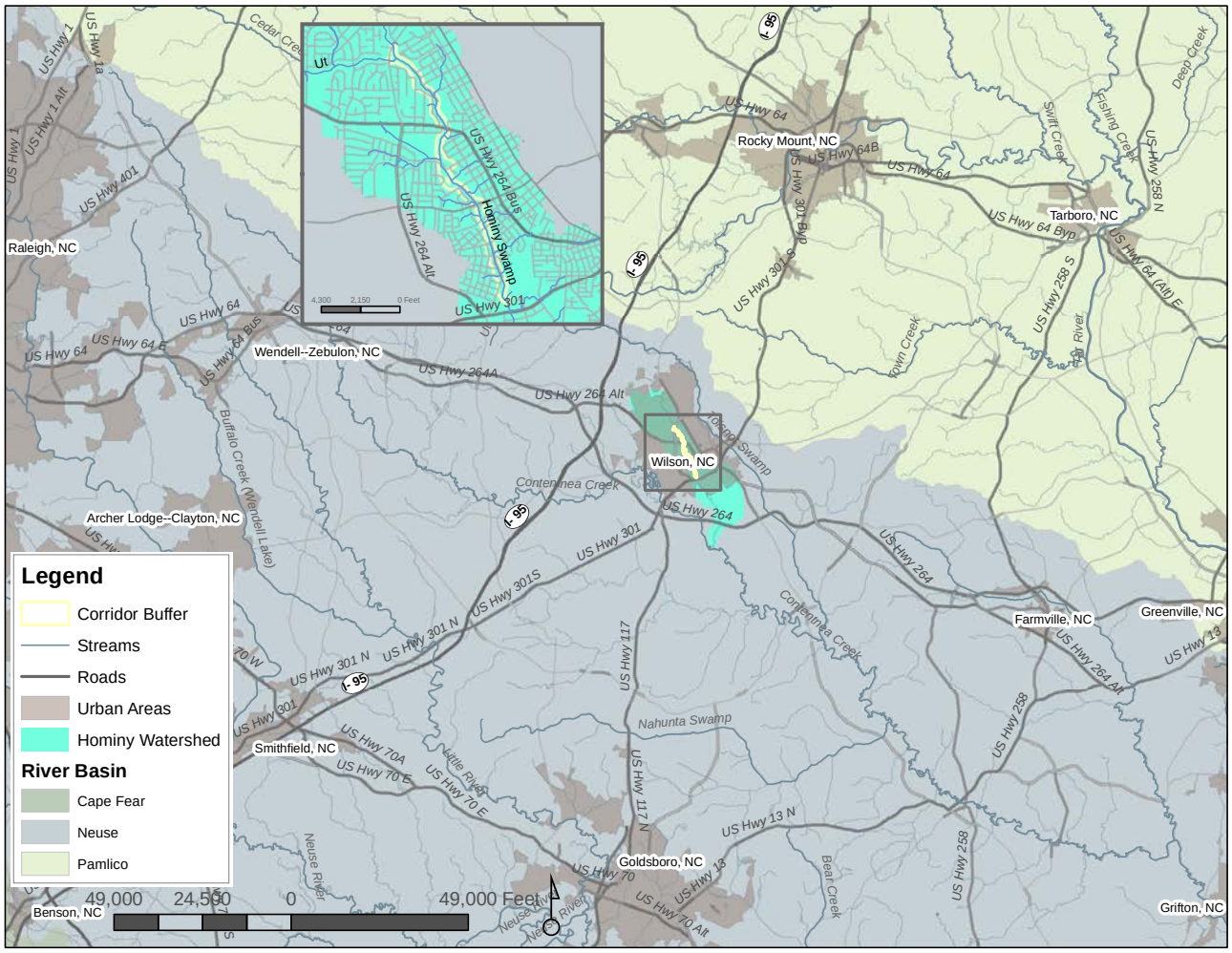
PROJECT PURPOSE AND GOALS

The Hominy Greenway is identified in the 2008 City of Wilson Comprehensive Bicycle Plan, 1993 Wilson Parks and Recreation Master Plan, and the City of Wilson 2030 Comprehensive Plan. These plans call for the greenway to run south to the Hackney Industrial Park and North to the Airport area and surrounding neighborhoods. When built, the entire greenway will be nearly seven miles long and the first greenway in the County or City of Wilson. For its initial phase, the greenway runs approximately three miles identified from the Cavalier neighborhood/Recreation Park area down to the Five Points neighborhood. In addition to providing a greenway trail facility for transportation and recreational use, it is desired that the greenway will impart outlets for education and stewardship with a focus on stream ecology, stormwater management, water quality, and healthy lifestyles.

The City of Wilson has the opportunity to attract and retain businesses and residents by providing quality of life elements, like this greenway and stormwater quality park. Developing trails and parks is an important and cost-effective part of a quality-of-life and economic development strategy for the City, and ultimately, the region. Additional master plan goals include using best management practices to reduce flooding and improve water quality, enhancing habitat along the stream corridor and delisting Hominy Swamp Creek from the 303(d) Impaired Waterbodies list. The preparation of this illustrative master plan will allow project stakeholders and potential funders in the Wilson region to establish a shared vision for completion of the Hominy Creek Greenway and Water Quality Park.

The master plan will provide a conceptual framework for developing the Hominy Creek Greenway and Water Quality Park. It will help prioritize and coordinate future investments and efforts to improve active lifestyles and enhance

MAP 1.1: PROJECT STUDY AREA



well-being in Wilson. The recommendations aim to:

- Showcase the Hominy Creek Greenway corridor to increase its value as a local educational and recreational resource
- Provide best practices for routing the Hominy Creek Greenway and Water Quality Park around sensitive riparian areas
- Use best management practices to reduce flooding and improve water quality in stormwater runoff
- Enhance and protect riparian buffer areas
- Improve water quality and aquatic habitat and achieve delisting of Hominy Swamp Creek from the 303(d) Impaired Waterbodies list
- Analyze roadway intersections and include safe, effective crossing treatments
- Provide connections to existing and future recreational, cultural, and historic areas of Wilson
- Improve quality of life through trails by encouraging opportunities for community, exercise, and connection to nature
- Maintain and protect natural resources and reduce greenway construction impacts

Hominy Swamp Creek was placed on the 303(d) list in 2004 due to a Poor bioclassification rating at two sites in 2001. The low rating is likely due to a combination of factors common in urban streams- flashy, erosive stormwater flows, chemical pollutant loads in stormwater runoff, high stream flow sediment loads, and deteriorated aquatic habitat. This master plan identifies stream reaches within the project area where riparian buffer restoration and stormwater control measures can be utilized to ameliorate these factors, and improve water quality and aquatic habitat.

PUBLIC AND STAKEHOLDER INPUT

The process began in spring 2015 and has been a cross collaboration of consultants, City Staff, and the general public. Aside from City staff input, the planning process included several other important methods of public outreach and involvement. Two public open houses were scheduled in combination with staff meetings, the first to introduce the project to the general public, and the second to present the recommendations of the illustrative master plan.

Citizens commented on areas they would like to see greenway connections, and areas that experience flooding along the project corridor.

Section 2

INVENTORY *and* ANALYSIS

OVERVIEW

The project team conducted a thorough in-field evaluation of the Hominy Creek project study area . Prior to entering the field, the team evaluated existing conditions using Geographic Information Systems (GIS) to determine land uses and resources adjacent to the study area. In the field, the team evaluated natural features (water, floodplains, wetlands, geology, and sensitive habitat), existing utilities (water, sewer, electrical, gas, telephone, etc.) roadway intersections, stream crossings, and circulation. Links to other trails, local parks, schools, local government buildings and private sector lands were also evaluated. Following fieldwork and inventory, opportunities and constraints were identified which could have impacts on trail development and stormwater controls.

GREENWAY DESTINATIONS

The following greenway destinations are listed as significant trip attractors for future users of the Hominy Creek Greenway. From parks and recreation to service centers, educational facilities, or major employers, each destination is less than a mile from the greenway and reachable by bicycle or on foot.

PARKS & RECREATION

Williams Day Camp

Owned by the City of Wilson and managed by its Parks and Recreation Department, Williams Day camp operates as an outdoor summer camp for children ages 5-12. This is Wilson County's only outdoor camps camp and it features hands on activities with insects, fish, reptiles and various other outdoor wildlife. This park also is the location of a disc golf course that is available from sunrise to sunset all year except for in the summer because of the summer camp.

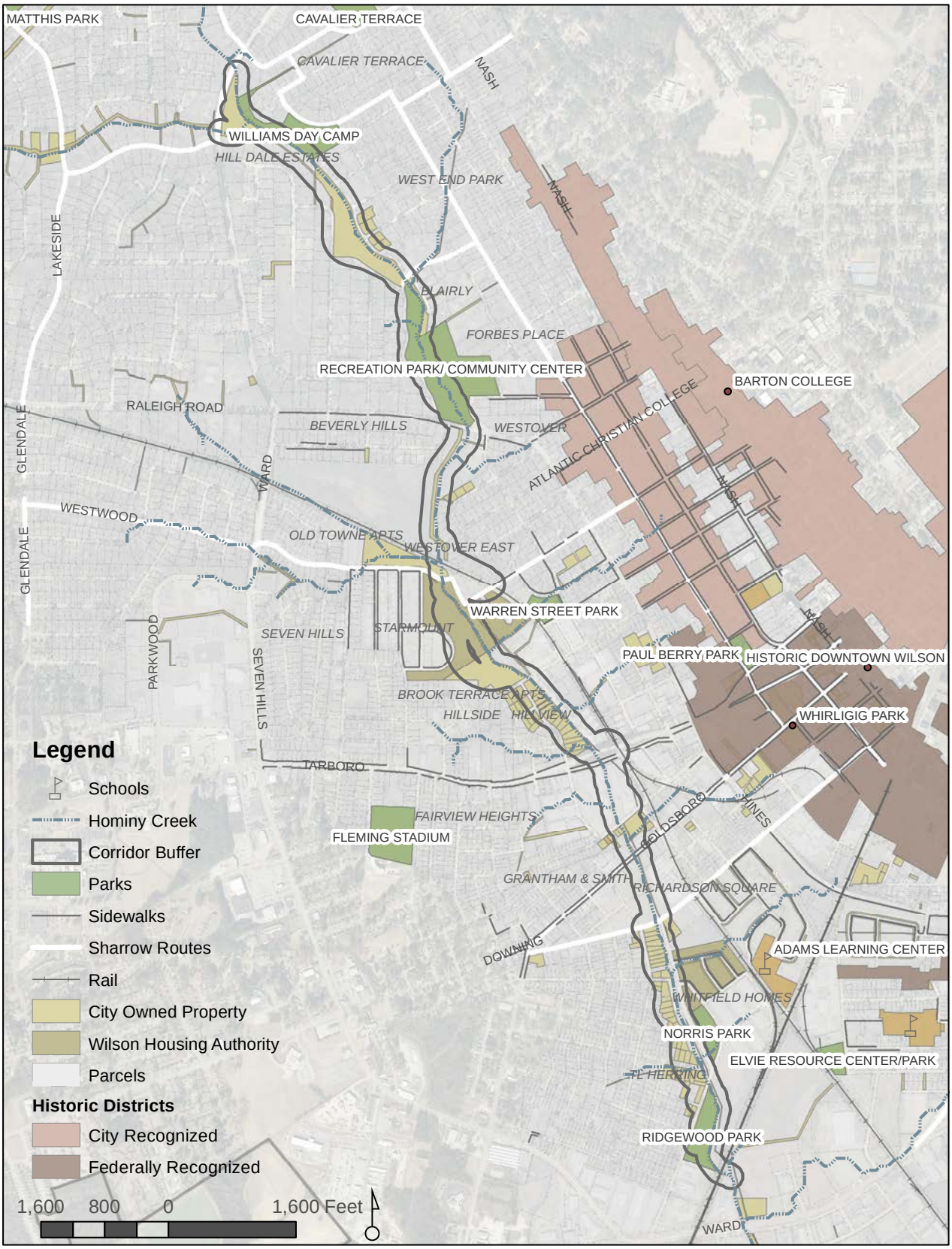
Recreation Park and Community Center

The Recreation Park Community Center, another property of the city of Wilson's Parks and Recreation Department, hosts a public pool, ten tennis courts, and basketball and futsal games. It is also the location where one can find schedules for park district sports game and clubs as well as information pertaining to local trails and parks.

Fleming Stadium Field

This site is home to the Historic Fleming Stadium that was built in 1939 for the first coastal Plain 'D' league baseball team; the Wilson Tobs. Today the stadium still hosts the Wilson Tobs of the Coastal Plain League, as well as the Post 14 American Legion Program and the North Carolina Baseball Museum. Showing over 100 baseball games a year, the site also hosts the Conference Carolinas Baseball tournament and the NCISA's spring single A Baseball championships.

MAP 2.1: PROJECT CORRIDOR



Warren Street Park, Norris Park, and Ridgewood Park

The proposed greenway alignment will also pass through a number of small parks that contain either a playground, a shelter, or open space. Warren Street Park contains a playground, walking trail, and basketball court. Norris Park contains a playground, basketball court, and open space. Ridgewood Park is primarily open space.

Whirligig Park

While assessing the strengths of the City of Wilson, it came to be apparent that the number one tourist attraction is the Vollis Simpson's "Whirligig Farm." In this realization the City decided to relocate the late artist's whirligigs to the federally-recognized historic downtown district in order for the public to have better access to these alluring artistic pieces and to entice visitors downtown. A Whirligig Park, designed by the landscape architecture firm Lappas + Havener, is scheduled for construction and will contain a central amphitheater, a park shelter for farmers markets, a water feature, seating, and gardens for public enjoyment.

SERVICE CENTERS

Historic Downtown Wilson

Historic Downtown Wilson features more than 25 historic buildings, churches and homes listed on the National Register of Historic Places. In April 15, 2010 a 2030 Comprehensive Plan for Wilson was adopted. The Comprehensive Plan analyzed the City's potential and demonstrated how Downtown Wilson can grow into a prospering city center through a focus on their historical architecture, thriving art culture, and current growing economy.

The drawing of the proposed downtown illustrates an emphasis on creating a pedestrian-friendly atmosphere with tree lined streets and a centralized green space. The Hominy Creek Greenway has the potential to connect many neighborhood residents to the historic downtown area via a scenic trail that is separated from busy roadway traffic. This increase in pedestrians and cyclists in

the downtown area will help to bring economic vitalization to the shops and businesses located in the area.

EDUCATIONAL FACILITIES

Barton College

Barton College is a four-year private liberal arts college, located in the city-recognized historic district. Established in 1902, the college became accredited in 1995 by the Southern Association of Colleges Schools Commission on Colleges. Approximately 1,000 students are enrolled in the school and there is about 200 faculty and staff. It is nationally recognized for its programs in education, deaf education, nursing, and social work. The college campus is 65-acres and contains athletic buildings, residence halls, the W.N. Hackney Library, the Kennedy Recreation & Intramural Center, and other state-of the art facilities.

Adams Learning Center and Daniels Learning Center

The Hominy Creek Greenway will be located nearby two schools with children under 16, allowing them the option to bike or walk to school. Located near the end of the proposed greenway along Walnut Street, Adams Learning Center is a public Grade School teaching kindergarten to 5th grade. Daniels Learning Center is a public Middle School teaching grades 6-8 and is just South of Adams Learning Center on Elvie Street.

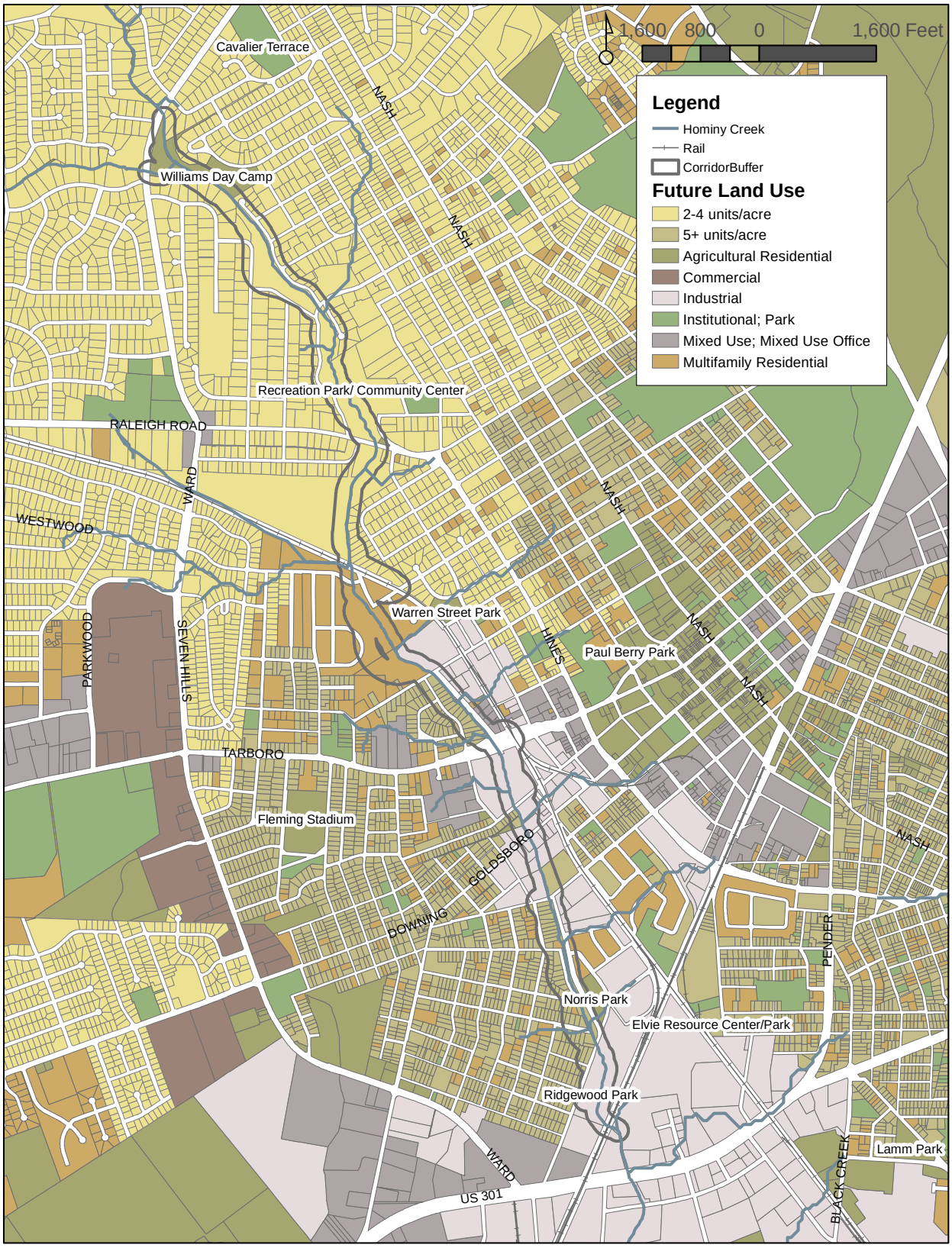
MAJOR EMPLOYERS

Previously known as "The World's Greatest Tobacco Market", today Wilson has a healthy mix of agriculture, manufacturing, commercial and service business. According to the City's 2011 Comprehensive Annual financial Report the following companies are major employers in Wilson:

- BB&T (Branch Banking & Trust) — Financial Services
- Wilson County Schools — Education
- Bridgestone — Auto and Truck Parts Manufacturer
- Wilson Medical Center— Hospital
- S.T. Wooten — Construction Services and Materials, specifically paving

Connectivity to these recreational, educational, and economic destinations was a key factor used to evaluate potential trail alignments. Roadways, creek corridors, and utility easements, all provide opportunities for connectivity between destinations throughout the Hominy Creek Greenway and Water Quality Park.

MAP 2.2: LAND USE INVENTORY



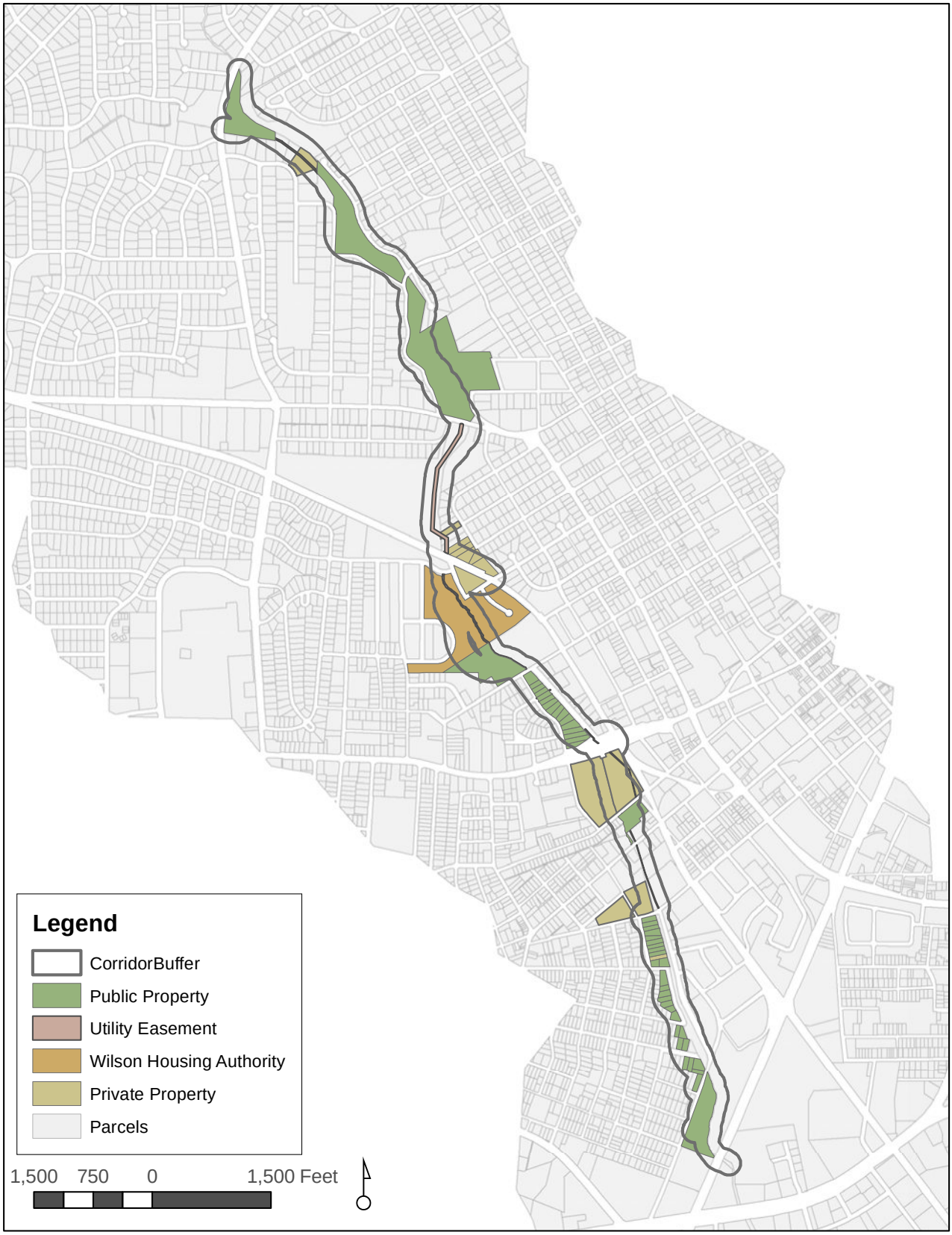
LAND USE

The corridor's study area intersects 243 parcels. Over 80% of the parcels are designated as residential land use, with 40% of the parcels designated as high-density residential, 35% as low-density residential, 6% as multifamily residential, and 3% as agricultural residential. The rest consists of Industrial at 13%, and mixed use office at 2%.

Sections 1-2 of the corridor is located primarily in a low-density residential area with 2-4 units per acre and agricultural residential. It crosses 91 parcels, 86 parcels with the land use designation of residential with 2-4 units /acre and 5 parcels designated as agricultural residential. A greenway could be easily implemented through this section of the trail as long as there is sufficient public involvement and conversation with the nearby residences and neighborhoods. The greenway will fit in nicely with this land use offering a scenic and natural experience while also allowing residential connection to a recreational and transportation amenity.

After crossing the Carolina Coastal Rail Line in section 3 of the proposed trail alignment the study corridor becomes a mix of multifamily residential, high density residential at 5+ units per acre, industrial and mixed use. The southern half of the corridor's study area contains 152 parcels with 97 as residential at 5+ units /acre and 15 as multifamily. The rest of the land use is industrial or mixed use office with 32 parcels designated industrial and 5 designated mixed use office. Section 4 is primarily industrial and mixed use. A greenway may not appear to blend into this space as readily as the residential areas. Currently many of the industrial spaces are unused and a trail passing by them could rejuvenate the area and cause them to be retrofitted for other uses as long as the zoning can be adapted to allow for it. These spaces could also be renovated as park or stormwater retention areas, since they are located in the floodway. Sections 5-6 are located in high density residential with 5+ units per acre. This area would be most easily incorporate a greenway and because of the density of the residences it will allow more people access to the greenway.

MAP 2.3: PARCELS AND OWNERSHIP



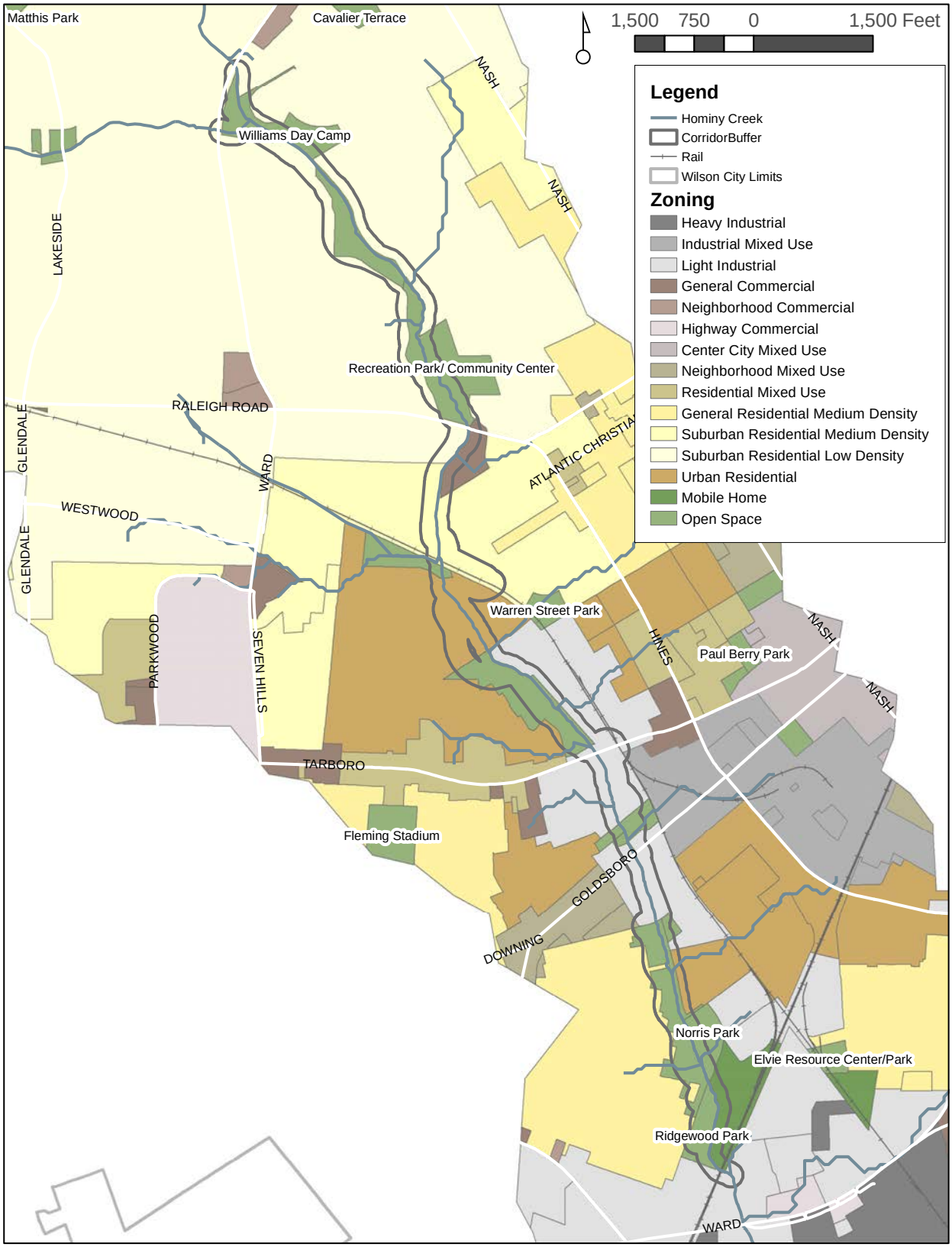
PARCELS AND OWNERSHIP

The Hominy Creek Greenway begins at Williams Day Camp and extends for 3.8 miles until Ridgewood Park. The construction of the Hominy Creek Greenway will generate significant connections for the residents of Wilson primarily due to its proximity to a number of neighborhoods and parks.

The proposed alignment of the greenway along with its trail connectors intersects 73 parcels. A majority of the parcels are city-owned property with the rest being residential, housing authority, or commercial property. Below is a breakdown of the property type of the intersected parcels along with length of the alignment, number of parcels, and percent of the trail.

Easements must be obtained when the trail alignment extends through residential or commercial property. Trail spurs to nearby neighborhoods and proposed trailheads connect through several unacquired residential or commercial properties.

MAP 2.4: ZONING



ZONING

According to the map on page 18, the study area is zoned for open space, residential (ranging in densities from low to medium and urban), and light industrial. Sections 1-3 of the study area are zoned primarily open space surrounded by low density residential, easily allowing for a greenway to be located. Section 4 is mostly zoned as light industrial. Most of what is zoned industrial is vacant and/or under utilized buildings that have redevelopment potential. Sections 5-6 of the study area returns to open space until it ends at Ward Blvd.

The 2030 Comprehensive Plan for the City of Wilson outlines the goal of protecting valuable environmental resources in their proposal for future land use. According to the plan this involves protecting critical environmental resources such as floodplain areas and wetlands, and using these opportunities for public use such as greenways, parks, and recreational areas.

The Hominy Creek Greenway will follow the action goals of the Comprehensive Plan and create an open space buffer that will enhance the water quality of the Hominy Creek as well as its wildlife and plant habitats. The greenway will also provide connectivity and a value-added amenity to commercial and residential properties.

GREEN INFRASTRUCTURE – STREAM & RIPARIAN ZONE

Existing Conditions

From the Hominy Swamp Creek Watershed Assessment and Restoration Plan, in 1999, the North Carolina Department of Environment and Natural Resources Ecosystem Enhancement Program (EEP; formerly the NC Wetlands Restoration Program) received grant funding from the U.S. Environmental Protection Agency (EPA) to develop a watershed assessment and restoration plan for Hominy Swamp Creek. It was selected for the study in part because there were obvious nonpoint source water quality problems, the watershed appeared to have need and opportunity for watershed restoration planning, and there were noted concerns about flooding and associated resource and financial impacts in the City.

The EPA grant was used to develop a watershed assessment and management plan for the upper portion of Hominy Swamp Creek (KCI, 1999), and a stream restoration project was implemented adjacent to the Recreation Park/Community Center as a result of that assessment. An advisory group was convened in 2003 to solicit input and assistance from local area natural resources agency staff. A number of issues were discussed during meetings with the advisory group, and a list of goals was developed, including water quality and habitat improvements, education, land use and open space planning, and identifying funding sources for projects.

The watershed assessment and management plan (KCI 1999) states: “The stream system that makes up Hominy Swamp Creek has been extensively channelized over the past 50 years, and now serves mainly as storm water conveyance through the urbanized mid-portion of the watershed. Most headwater streams of the system are relatively undisturbed at present, but there is additional development pressure in the city as new residential and commercial developments encroach from the east and west. The mid and upper portions of the watershed have been largely built-out over the

past fifty years, and there are many complaints of residential flooding as the creek attempts to access its historical floodplain."

The current project stream corridor is surrounded by built-out areas that send large amounts of stormwater runoff to the creek. There is intact riparian forest present, especially in the upper reaches of the project area, however, there are many areas downstream that support little to no trees or woody vegetation. Invasive species such as privet (Ligustrum spp.), multi-flora rose (Rosa multiflora), mimosa tree (Albizia jullibrissen) and wisteria vine (Wisteria spp.) are common throughout.

Before development and channelization occurred there likely were large areas of wetlands adjacent to the stream, which meandered in a forest/swamp complex through the project area. Development, large stormwater flows and channelization have caused channel incision throughout the project area. Stream bank heights range from approximately 5 to 12+ feet. While scattered wetlands occur along the project reach, the incision caused by erosion from high stormwater flows and the resulting lower channel elevation or invert has effectively lowered the adjacent riparian zone water table, similar to how a drainage ditch would, and drained many of the pre-disturbance wetlands that likely existed.

CURRENT CONDITIONS, STREAM EVALUATION, PROCESS, & RESULTS

In order to evaluate the project corridor based on the scope, Biohabitats performed a field survey and characterized existing conditions on Hominy Swamp Creek and the riparian zone using an adaptation of the Unified Stream Assessment: A User's Manual Version 2.0 (2005). The Unified Stream Assessment is a rapid visual assessment technique developed by the Center for Watershed Protection, to locate and evaluate problems and restoration opportunities within an urban stream corridor.

For the purposes of this survey, the Hominy Swamp stream was divided into 11 sections or reaches, with origins and endpoints as follows:

1. From the project origin, at the confluence of the two branches just downstream from Ward Boulevard to the downstream property line of Williams Day Camp,
2. From Williams Day Camp to the upstream point where the restored reach begins, at Kincaid Avenue,
3. From Kincaid Avenue to Raleigh Road (restored reach),
4. From Raleigh Road to Elizabeth Road,
5. From Elizabeth Road to Park Avenue,
6. From Park Avenue to Tarboro Street,
7. From Tarboro Street to Mercer Street,
8. From Mercer Street to Goldsboro Street,
9. From Goldsboro Street to Lodge Street,

10. From Lodge Street to Aycock Street,
11. From Aycock Street to the end of project at the railroad trestle crossing.

Stream Stability and Stormwater Retrofit Field Survey

The methodology used for stream stability assessment was adapted from the Unified Stream Assessment: A User's Manual Version 2.0 (2005). It is a rapid visual assessment technique developed by the Center for Watershed Protection, to locate and evaluate problems and restoration opportunities within an urban stream corridor. The USA assesses the eroding banks along the survey reach, particularly at places where valuable infrastructure is threatened. The protocol facilitates the identification of potential stream restoration or repair opportunities such as bank stabilization or grade control. Specifically, components of the Bank Erosion protocol were incorporated in the field project field survey. The criteria and point system used in the field survey are below.

POINTS 5	4	3	2	1
ACTIVE DOWNCUTTING; TALL BANKS ON BOTH SIDES OF THE STREAM ERODING AT A FAST RATE; EROSION CONTRIBUTING SIGNIFICANT AMOUNT OF SEDIMENT TO STREAM; OBVIOUS THREAT TO PROPERTY OR INFRASTRUCTURE.		DOWNCUTTING EVIDENT, ACTIVE STREAM WIDENING, BANKS ACTIVELY ERODING AT A MODERATE RATE; NO THREAT TO PROPERTY OR INFRASTRUCTURE		GRADE AND WIDTH STABLE; ISOLATED AREAS OF BANK FAILURE/EROSION; LIKELY CAUSED BY A PIPE OUTFALL, LOCAL SCOUR, IMPAIRED RIPARIAN VEGETATION OR ADJACENT USE.

The point system assigns more points for actively eroding, unstable stream reaches, and less points for less erosive or more stable bank conditions, to characterize the degree of erosion taking place.

After field review and reconnaissance, each reach was assigned a score based on the composite or overall condition of the reach. Factors taken into consideration when visually assessing each reach were drawn from fluvial geomorphologic (stream geometry) indicators of stream stability/instability including:

- Presence and elevation of apparent bankfull indicators,
- Degree/ apparent depth of channel incision, based on the top of bank elevation,
- Bank stability including bank height, bank angle, degree of vegetative bank protection, evidence of mass wasting,
- Excessive sediment deposits in stream bed
- Mid-stream bars,
- Apparent high width/depth ratio and,
- Evidence of recent disturbance

When evaluating each individual stream reach, in many instances stream channel characteristics were observed that varied between the "Point" values in the assessment technique. As an example, a portion of a reach may have been evaluated as having 5 points, with actively eroding banks 7-8 feet tall, but the remainder of the reach was evaluated as having 4 points with actively to moderately eroding banks 5-6 feet tall. In such cases, an average of the two point totals was assigned to the reach, or in this example, 4.5 points.

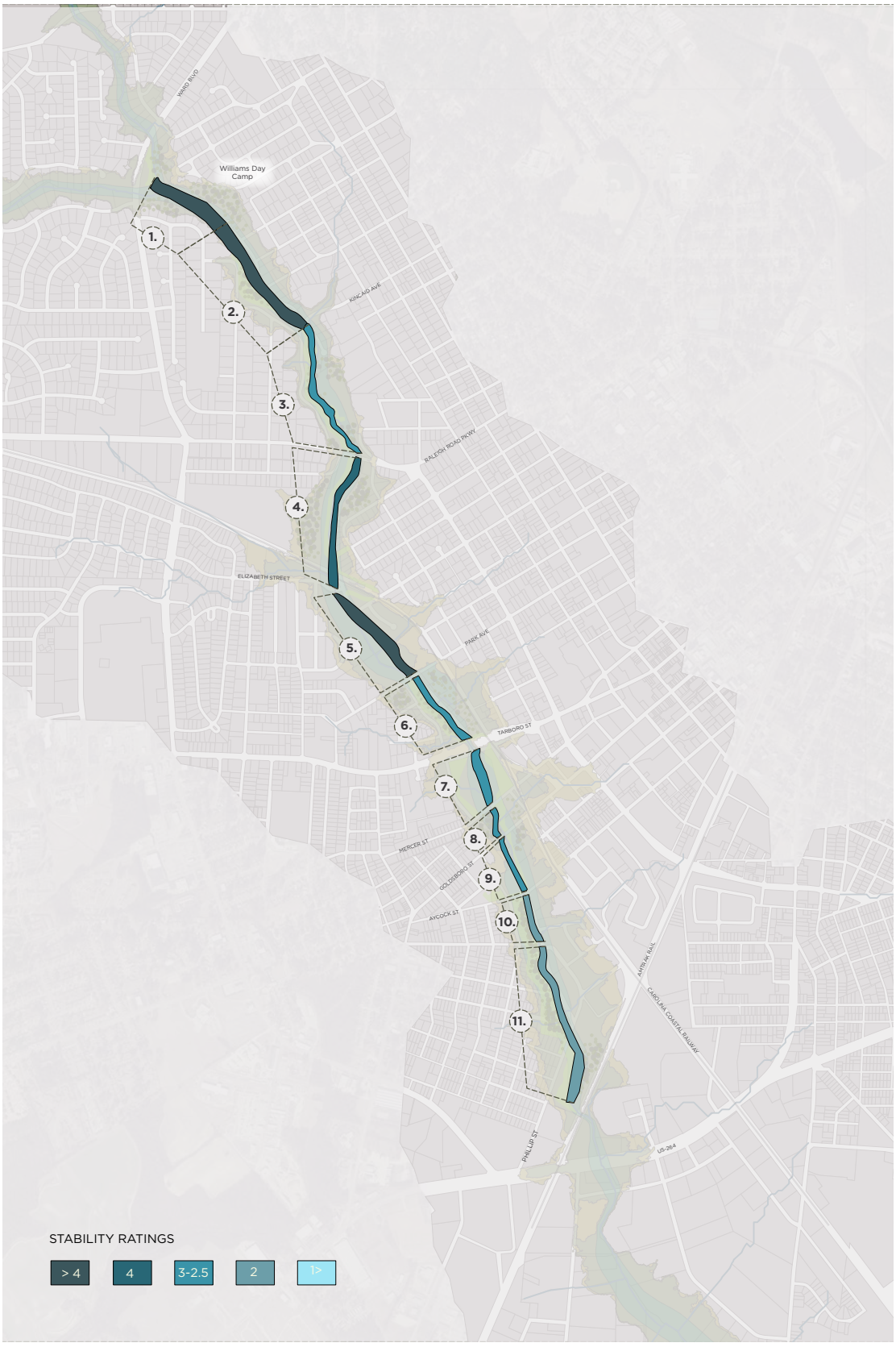
The scores for the individual reaches are included in Table 2.1, and a map illustrating the reaches is shown on the facing page.

More detailed comments about the stability of each reach, its suitability for stream restoration, and stormwater retrofit opportunities follow. When reference is made to a left bank or right bank, the convention is facing downstream.

TABLE 2.1: STABILITY RATINGS BY REACH

Stream Reach	Reach Location	Reach Score
1	Project origin to Williams Day Camp	4.5
2	Williams Day Camp to Kincaid Avenue	5
3	Kincaid Avenue to Raleigh Road	3
4	Raleigh Road to Elizabeth Road	4
5	Elizabeth Road to Park Avenue	4.5
6	Park Avenue to Tarboro Street	2.5
7	Tarboro Street to Mercer Street	2.5
8	Mercer Street to Goldsboro Street	2.5
9	Goldsboro Street to Lodge Street	3
10	Lodge Street to Aycock Street	2
11	Aycock Street to project end at railroad crossing	2

MAP 2.5: STREAM REACHES



Reach 1: Project Origin to Williams Day Camp

The upstream point of the project, and of this reach, is at the confluence of two channels that flow under Ward Boulevard to the north and west, and then to the confluence, each approximately 400 and 500 feet respectively. Channel incision has resulted in banks averaging 5-6 feet through this reach. Banks are steep, almost vertical in places, and eroding throughout the reach. A sewer main parallels the stream on the right bank starting at the confluence, then crosses over the stream to the left bank further downstream. The location of the sewer line and the presence of large riparian trees present challenges to stream restoration or stabilization activities, however, they do not preclude those activities entirely.

The stability rating of 4.5 reflects the vertical, eroding banks and the channel incision in this reach.

The City of Wilson Stormwater Department has identified a potential stormwater retention, water quality BMP site just upstream of the confluence of the two tributaries mentioned.

Looking downstream from the confluence of the two channels, at the project origin

Reach 2: Williams Day Camp to Kincaid Avenue

The stream is bordered on the left bank by Canal Drive, and on the right bank by the sanitary sewer and sewer easement. The depth of channel incision (and the resultant bank heights throughout this reach) are also 5-6 feet. The channel appears overwide, from stream bank erosion. Steep to vertical, eroded banks are common throughout the reach. There are areas where stream bank erosion may threaten the integrity of the Canal Drive road bed in the future. This reach is a candidate for stream stabilization, where the road bed is proximal to the eroding stream banks. Challenges to stream bank stabilization are large trees and the road/sewer infrastructure itself.

The lowest stability rating of 5 reflects the steep, eroding banks that are threatening Canal Drive, and the channel incision in this reach.

There are two parcels on the east side of Canal Drive that are owned by the City where stormwater BMP retrofits have been proposed by the City. These are relatively large lots, with approximately 300’ of frontage on Canal Drive between Pinewood Drive and Clyde Avenue and approximately 250’ of frontage south of Clyde Avenue.

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Stormwater outfall from Canal Street emptying into the creek in Reach 2

Reach 3: Kincaid Avenue to Raleigh Road

This reach has been restored previously by the State of North Carolina and there is a conservation easement on the stream and buffer areas. This precludes stream restoration and stabilization and stormwater BMP retrofits within 50 feet of the top of bank of the stream.

The stability rating of 3 reflects the presence of vertical, moderately eroding banks in some places along this reach.

Reach 4: Raleigh Road to Elizabeth Road

Channel incision downstream of the Raleigh Road crossing has created bank heights of 10-12 feet. A sanitary sewer line and easement is on the right bank for most of this reach, until just upstream of the railroad crossing, where the sewer crosses over to the left bank. There are mature trees on the left bank on most of this reach, to the point where the sewer alignment crosses the stream, near the Deans Street access, and the maintained sewer easement continues on the left bank to Elizabeth Road. There is a fenced area on the right bank for approximately 500 feet downstream of Raleigh Road. There is a narrow riparian buffer on the right bank with mature trees, adjacent to the fenced area, which has held that bank in place reasonably well during high flows. Approximately 175 feet downstream of the fenced area, trees apparently have been removed from the bank, and mass wasting is occurring in multiple locations farther downstream, to the location where the sewer crosses over to the left bank. This area is actively eroding and will continue to erode until it is stabilized and woody vegetation is reestablished.

The low stability rating of 4 reflects the presence of nearly vertical, actively eroding banks in some places along this reach, and the high degree of incision observed.

Looking upstream, approx. 175 feet downstream of the fenced area- eroding banks

Reach 5: Elizabeth Road to Park Avenue

This reach varies in depth of incision, from 8-12 feet. The banks on both sides are steep, with bank angles greater than or equal to 75 degrees in places. Riparian vegetation is mowed along most of this reach, and woody vegetation is lacking. There is a wide, undeveloped floodplain, with room to restore or stabilize the channel, however, with the depth of incision, restoration of sinuosity would require extensive excavation and earth removal.

The stability rating of 4.5 reflects the presence of vertical, moderately eroding banks in some places along this reach and the high degree of channel incision observed.

This reach has been identified by the City of Wilson as a site for a large-scale BMP complex, where excavation could create multiple stormwater wetland/retention areas on both sides of the floodplain and stream restoration, conceptually along the entire reach. This multipurpose concept would potentially combine water quantity and quality benefits, along with recreational opportunities created by park areas and greenway alignments

Looking downstream from Elizabeth Street crossing

Reach 6: Park Avenue to Tarboro Street

The right bank is City-owned property, with mature trees and mowed maintenance from top of bank landward. The channel is incised approximately 10 feet throughout. Dense willow and elderberry vegetation on both banks support bank stability, however, mid-channel bars created by excessive sediment loads threaten bank stability under high flows. Under current conditions, stream restoration or BMP retrofit opportunities are limited, due to lack of working space lateral to the channel, especially on the left bank. Woody species could be added to the buffer, however, the existing vegetation has stabilized this reach to a great extent, and resources could be used more beneficially elsewhere.

The City has identified properties on the left bank for acquisition which would create lateral space for stormwater BMP retrofits and stream/buffer restoration.

The stability rating of 2.5 reflects the presence of vertical, moderately eroding banks in some places along this reach, and the presence of mid-channel bars.

Looking downstream from the Park Avenue bridge.

Reach 7: Tarboro Street to Mercer Street

In this short reach, both banks are built out, constraining stream restoration, buffer restoration and BMP opportunities under the current conditions.

The City has identified properties on this reach for acquisition which would create lateral space for stormwater BMP retrofits and stream/buffer restoration.

The stability rating of 2.5 reflects the presence of generally less steep, moderately eroding banks in some places along this reach, and the presence of mid-channel bars.

Looking upstream from the Mercer Street bridge.

Reach 8: Mercer Street to Goldsboro Street

This is a very short reach relative to the project scale, with substantial development, limiting the scope of stream or buffer restoration under current conditions.

However, a City-owned vacant lot on the left bank just upstream of the carwash on Goldsboro Street has been identified as a potential site for a BMP that could treat runoff and mediate high flows from downtown by daylighting a stormwater pipe that traverses the site.

The stability rating of 2.5 reflects moderately eroding banks, especially at the toe of slope, the depth of incision (8-12 feet), and the presence of mid-channel bars. The stability rating would be higher but for extensive native elderberry and willow stands on the banks, which increase overall bank stability.

Looking downstream towards Goldsboro Street from the Mercer Street bridge.

Reach 9: Goldsboro Street to Lodge Street

This reach is characterized by development on the upstream end, and impacted buffers on the downstream end. Under present conditions, stream restoration is limited due to lack of space, but buffer restoration/bank stabilization is feasible on the lower end of the reach.

Under current conditions, no stormwater retrofit opportunities were identified on this reach.

The stability rating of 3 reflects moderately eroding banks, the steepness of the banks, the depth of incision (8-12 feet), and the presence of mid-channel bars.

Looking upstream from the Lodge Street bridge towards Goldsboro Street.

Reach 10: Lodge Street to Phillips Street

This is a relatively long reach, where the riparian buffer is periodically maintained by mowing. As a result, full sun produces vigorous regrowth, but the regular maintenance does not allow woody vegetation to mature and extend its stabilizing roots along the banks. Under current conditions, stream restoration and stormwater retrofit opportunities are limited along this reach due to the presence of Norris Boulevard on the left bank of the stream and Malpass Drive along much of the right bank. Also, under current conditions, allowing the woody vegetation in the buffer to mature will help with streambank stability.

The City owns much of the property on the right bank along Malpass Drive and some of the property on the left bank along Norris Boulevard. This area has been identified as a site for a large-scale stormwater BMP retrofit/stream restoration/buffer restoration complex.

The stability rating of 2 reflects the presence of toe of slope erosion occurring in some places along this reach, and the presence of mid-channel bars. Stream banks are generally 8-10 feet high, but they are not as steep as in upstream reaches, and erosion is not as widespread.

Looking downstream from the Lodge Street bridge.

Reach 11: Phillips Street to Project Terminus

This reach is similar in bank height, bank slope, and channel geometry to Reach 10. Periodic cutting of the riparian vegetation along this downstream reach limits mature woody vegetation development. There is a power line easement along the left bank that is somewhat of a constraint to stream restoration, but the City owns the parcel on the right bank, which would allow for realigning the stream channel and restoring sinuosity, if needed, for stream restoration A stormwater BMP retrofit may could be possible under the power line, in the easement.

No apparent stormwater retrofit opportunities were identified for this reach.

The stability rating of 2 reflects the presence of less vertical, moderately eroding banks in some places along the reach, and the presence of mid-channel bars.

Looking downstream from the Phillips Street bridge.

RIPARIAN ZONE EVALUATION PROCESS, & RESULTS

Generally, riparian zones in natural, undisturbed stream systems in the coastal plain physiographic region support woody vegetation in the form of native trees and shrubs. Mature trees and shrubs have extensive root systems that provide important stabilization structure to soil. Also, research has shown that mature native woody vegetation enhances nutrient uptake in stormwater flows. The shade from a forest canopy provides beneficial cooling of stream waters, and the organic matter from leaves, roots, branches and even trunks of trees supplies food for stream insects, which are foundational aquatic ecology species. Riparian buffers, especially those that are 50 feet wide or wider, are recognized as being very important to water quality, aquatic ecological health and aesthetics.

As should be expected in a highly developed watershed, the riparian buffer zone of Hominy Swamp Creek has been impacted, an accumulation of disturbance over decades, if not hundreds of years. One major impact to this system has been the alignment of sanitary sewer lines next to the stream and the common maintenance practice of mowing them to facilitate access, which prevents trees and shrubs from gaining beneficial size. Increasing stormwater flows due to impervious surface increases in the watershed are another more subtle and gradual impact that development has had on the riparian buffers. As increasing storm flows caused the channel bed to erode vertically, bank heights increased, and bank angles became steeper. Even with established mature trees in some locations of the riparian zone, channel incision and consequent bank failures have resulted in increased sediment loads being delivered to the stream and loss of existing vegetation to bank erosion and mass wasting. And finally, a third major impact to riparian buffers are invasive species such as privet, wisteria and multiflora rose, to name a few, that crowd out native tree species, provide little shade, and degrade wildlife habitat.

Some of the parameters for buffer evaluation were taken from the Unified Stream Assessment: A User's Manual Version 2.0

(2005). Other were developed based on site and watershed-specific characteristics. Riparian buffer widths were categorized based on the following criteria:

1. >50' width
2. <50' width
3. <25' width
4. no forested width

Riparian buffers were scored based on the following criteria:

1. *minimal impacts, at least 50 feet of wooded buffer that provides shade for channel, few if any invasives, basically undisturbed, no land use conflicts*
2. *marginal impacts, at least 50 ft. of wooded buffer, with minimal exceptions, small interruptions of shade for channel, few invasives, few if any land use conflicts*
3. *moderate impacts, at least 50 ft. of wooded buffer for ≥ 50% of length, interruptions of shade on channel common, invasive percent cover < 30%, light to moderate land use conflicts*
4. *substantial impacts, buffer has significant interruptions for over 50% of length, marginal shade on channel, invasive cover higher than 25%, up to 50% of area has land use conflicts*
5. *severe impacts, buffer has significant interruptions over most or all of its length, little to no shade on channel, invasive % cover greater than 30%, > 50% of area has land use conflicts*

Table 2.2 summarizes the results of the field riparian buffer survey.

A buffer width (left bank or right bank) less than 50 feet (category 2 or more, highlighted) or a riparian buffer score of 3 or more (highlighted) indicates a buffer that is a candidate for enhancement or restoration.

The field evaluation results serve to illustrate that buffers throughout the project area would benefit from enhancement or restoration. This is not uncommon or unexpected, in a highly developed watershed. If buffers are considered alone (without consideration of potential stream restoration or stabilization projects), the most accessible and cost efficient buffers to rehabilitate are in the lower reaches of the project area, specifically reaches 6-11, where mowing maintenance is practiced, at the expense of allowing native volunteer woody vegetation such as willow (Salix nigra), red maple (Acer rubrum), sycamore (Platanus occidentalis) to grow and mature on the stream banks. If mowing is discontinued, many areas, over the course of 5-10 years, may vegetate themselves naturally and provide greater stability to the existing stream banks.

TABLE 2.2 BUFFER WIDTH AND SCORE SUMMARY

Stream Reach	Reach Location	Left Bank Forested Width	Left Bank Buffer Score	Right Bank Forested Width	Right Bank Buffer Score
1	Project origin to Williams Day Camp	3	2	1	3
2	Williams Day Camp to Kincaid Avenue	3	1	2	2
3	Kincaid Avenue to Raleigh Road	2	2	2	2
4	Raleigh Road to Elizabeth Road	1	3	1-3	1-2
5	Elizabeth Road to Park Avenue	3	4	3	4
6	Park Avenue to Tarboro Street	4	5	2	3
7	Tarboro Street to Mercer Street	4	5	4	5
8	Mercer Street to Goldsboro Street	4	3	2	3
9	Goldsboro Street to Lodge Street	3	4	3	4
10	Lodge Street to Aycock Street	4	4	3	4
11	Aycock Street to project terminus	4	4	4	4

Many residents are already using the sewer easements for walking.

Literature Cited:

- KCI Inc. 1999. Hominy Swamp Creek Watershed Management Plan. KCI Inc. Raleigh, NC.
- Kitchell, A. and T. Schueler. 2004. Unified Stream Assessment: A User's Manual. Version 1.0. Urban Subwatershed Restoration Manual Series: Manual 10. Center for Watershed Protection. Ellicott City, MD.

Section 3

RECOMMENDATIONS

HOMINY CREEK GREENWAY & WATER QUALITY PARK MASTER PLAN

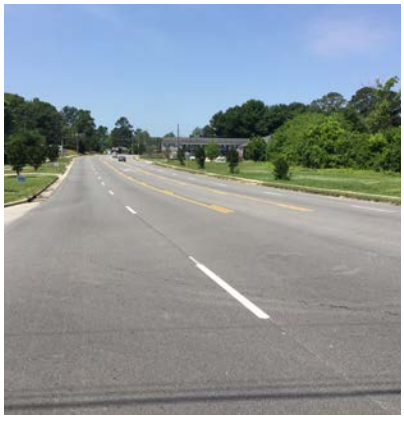
The purpose of the Hominy Creek Greenway & Water Quality Park Master Plan is to articulate a vision for a shared-use greenway and water quality park along the Hominy Creek.

The water quality park and greenway will fulfill multiple goals of providing a recreational amenity, wildlife habitat, improving water quality, and reducing stormwater quantity. The resulting master plan (Map 3.1) provides the greatest number of connections and benefits to trail users while meeting goals to reduce flooding and improve water quality in Hominy Creek. The proposed master plan is also successful in providing peripheral benefits to its users such as opportunities for economic development and adaptive re-use to otherwise undervalued floodplain property, environmental education, connection to and awareness of the environment, and maintenance and visibility of this valuable public facility.

The greenway will connect to existing uses, including neighborhoods, parks, and recreation facilities in Wilson.

PROJECT OPPORTUNITIES

- The corridor offers numerous connections to adjacent existing parks and public use
- Many stormwater retention possibilities exist along both sides of Hominy Creek
- South of Warren St., there are opportunities for the greenway to loop
- There is opportunity for a rail with trail beneath Tarboro Rd. due to the short track that is seldom used
- Tobacco flavoring industrial site at Tarboro Rd. floods often, and a land swap with the City is a possibility
- Large stormwater retention possibilities exist east of Hominy Creek between Norris Park, Ridgewood Park, and the existing storage facility
- Existing public housing will be relocated with in areas with flooding potential which opens opportunities for public parkland
- Much of the corridor and adjacent lands exist along publicly owned property
- The banks of Hominy Creek offer wide shoulders for greenway development, which will minimize grading, disturbance, and impacts



Tarboro Rd. is a significant barrier for the greenway. Alternatives to crossing this roadway are recommended.

PROJECT CONSTRAINTS

- Floodplain development permits will be necessary for much of the project study area
- The majority of the corridor is located in 100-year floodplain, and seasonal flooding along the greenway should be anticipated in the future
- Ward Blvd. is high volume roadway, requiring extra measures for greenway access facilities

- Tarboro Rd. is a very dangerous high volume road, and crossing safely will be very challenging
- Easements from private property owners will be necessary near Warren St. neighborhood
- Stormwater facilities along the corridor will require substantial funding and permitting
- While much of the corridor is publicly owned, there are areas that will require acquisition for the project to be fully executed in its recommended form

HOMINY CREEK GREENWAY & WATER QUALITY PARK CONCEPTS

This section presents recommendations for the concept design of the Hominy Creek Greenway and Water Quality Park. Special attention is given to how users will perceive the built and natural environments surrounding the proposed greenway, how citizens will use it, and how greenway use and stormwater improvements will impact the surrounding built and natural environments. The proposed Hominy Creek Greenway and many of the stormwater features extend along public lands and rights-of-way whenever possible. The greenway alignment is contingent upon stormwater and flood control design and construction. Where possible, the greenway should be constructed in tandem with stormwater improvements.

The illustrative master plan (shown on the following maps) is conceptual in nature and is not intended to be an exclusive design. When the project enters the design and construction phase, additional study will be required of each phase to determine actual stormwater and greenway design. A professional land survey will reveal information not available during the course of this study, and changes are inevitable as a result. Additional coordination and negotiation with adjacent property owners and regulatory agencies will also be necessary prior to final design.

Once constructed in the recommended form, the Hominy Creek Greenway and Water Quality Park will connect neighborhoods, seven parks, Hominy Creek, and downtown Wilson services, including retail, restaurants, and accommodations. The alignment totals 4.4 miles.

Stream Restoration, Stormwater BMP's, and Buffers

A summary of present conditions in the project area include a highly developed watershed, that generates erosive, high volume, flashy stormwater flows during larger precipitation events, a stream characterized by channelization, low streambed elevations due to channel incision, high, steep and eroding banks, and buffers impacted by disturbance, development, and invasive species. While these challenging conditions are pervasive throughout the project area, there are many opportunities for stream restoration, stream stabilization, stormwater BMP retrofits and buffer rehabilitation. For the purposes of these recommendations, stream restoration is defined as reconfiguring all three aspects or parameters of channel geometry- plan (sinuousity based on an undisturbed, reference stream's meanders), profile (channel bed elevations, restoring

natural riffle/pool sequences) and dimension (proper channel cross-sectional dimensions based on an undisturbed reference stream and modeling of stormwater flows associated with high precipitation events). Restoration in highly developed watersheds is often constrained by infrastructure and the lack of lateral available space to create natural meanders in a stream that has been previously channelized and straightened.

Stream stabilization is defined as repairing 2 of the 3 channel geometry parameters, which in urban stream settings is usually profile and dimension, given the usual lack of available lateral space to create meanders mentioned above.

Stormwater BMP retrofits are defined as structural stormwater practices, such as those typically found in State and Municipal level stormwater manuals, which control water quantity and improve water quality by removing excess nutrients, sediment and other pollutants

Buffer restoration is defined as planting woody vegetation beside the stream equal to or greater than 50 feet in width. Buffer enhancement is defined as planting woody vegetation in areas where the total available width beside the stream is less than 50 feet, or eradicating or controlling invasive species in the buffer area.

Based on the results of the field survey, every reach is a candidate for some form of buffer restoration or enhancement, if the only work done is to control invasive species.

Table 3.1 is a summary of stream restoration, stream stabilization, stormwater retrofit and buffer restoration and enhancement opportunities for the project area. Highlighted cells indicate good opportunities for work that can improve water quality (Moderate to High).

TABLE 3.1: STREAM RESTORATION/STABILIZATION, STORMWATER BMP RETROFIT AND BUFFER RESTORATION/ ENHANCEMENT OPPORTUNITY POTENTIAL BY REACH– LOW, MODERATE (MOD) OR HIGH

Stream Reach	Reach Location	Restoration	Stabilization	BMP	Buffer
1	Project origin to Williams Day Camp	Low	Low-Mod	High	High
2	Williams Day Camp to Kincaid Avenue	Low	Moderate	High	High
3	Kincaid Avenue to Raleigh Road	None	None	Low	High
4	Raleigh Road to Elizabeth Road	Low	Moderate-High	Low	High
5	Elizabeth Road to Park Avenue	Mod-High	High	High	High
6	Park Avenue to Tarboro Street	Mod-High	High	High	High
7	Tarboro Street to Mercer Street	Low	Low	High	Low
8	Mercer Street to Goldsboro Street	Low	Moderate	High	Moderate
9	Goldsboro Street to Lodge Street	Low	Moderate	Low	Moderate
10	Lodge Street to Aycock Street	Mod-High	Mod-High	High	High
11	Aycock Street to project terminus	Mod-High	Mod-High	High	High

In the following recommendations, the stormwater concepts developed by the City and this master planning process are presented and estimates of stormwater best management practice capacities and performance are presented. The capacity and performance data is intended to provide the reader with generalized, concept-level capacity and performance numbers. As the design of each of the BMP concepts progresses and develops in the future, the capacity and performance information will become more refined and accurate.

SECTION 1: GREENWAY RECOMMENDATIONS

Starting at Ward Blvd, **the propsed trail will run through Cavalier Terrace and Hill Dale Estates Neighborhoods connecting 3,758 people.** The trail winds through wooded areas followigng the creek and **connecting residences to William's Day Camp** and ending at Kincaid Road.

From the north, the greenway is proposed on the west side extending into the sewer easement southward. Because this is the northern terminus of the project, a **small parking area for 10-12 vehicles is recommended** which will provide access to the greenway. Due to the location in the floodplain, and to accommodate the widest range of users, a 10-foot-wide concrete tread is recommended for the proposed Hominy Creek Greenway. In areas where the trail meanders out of the floodplain asphaltic concrete may be used. A trail spur using an existing pedestrian bridge will connect users to Williams Day Camp. Another spur is recommended to connect with Hilldale Estates neighborhood to the west.

IMPACTS:

DEMOGRAPHICS

Overall Population: **3,758**

Households without Cars: **20**

Youth Under 18: **866**

Low-Income Households: **77**

Minorities:**232**

CONNECTIONS

Williams Day Camp

Hill Dale Estates

Cavalier Terrace Neighborhood

COST CONSIDERATIONS:

Approximate Length: **0.5 miles**

2,842 feet Asphalt Greenway: **$200** per linear foot

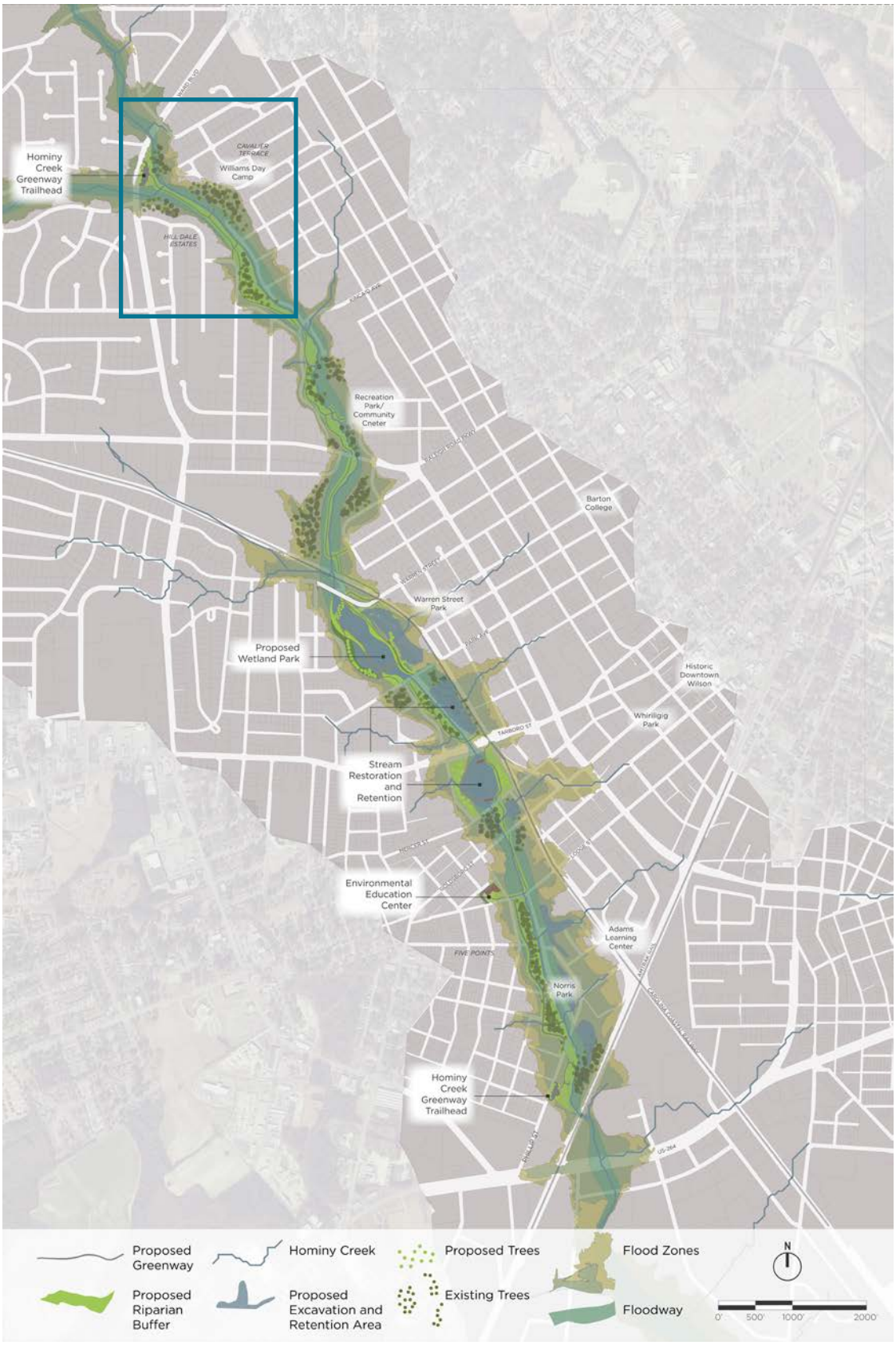
3 Pedestrian Bridge Upgrades: **$75,000** per bridge upgrade

1 Trailhead with 10 Parking Spaces:**$60,000-$75,000**

Design and Engineering: **12%** of construction cost

2016 Budget Estimate :$750K- $945K

SECTION 1: OVERVIEW MAP



SECTION 1: WATER QUALITY RECOMMENDATIONS

The riparian buffer is limited on the west bank by an existing sewer easement. The presence of the sewer line and large, mature trees in the buffers present probable regulatory and logistical constraints to stream restoration and to an extent, stream stabilization. However, buffer enhancement through control of invasive species is possible. The City has identified an area upstream of the confluence at the project origin, which is a potential site for a stormwater BMP.

The riparian buffer is limited on the east bank by Canal Drive, and the existing sewer easement and Ripley Drive on the west bank. Existing roads and utilities are constraints to stream restoration, and to a lesser extent, stream stabilization. However, stream bank erosion may threaten the structural integrity of Canal Drive at some point in the future, dictating stabilization efforts. Buffer enhancement through the control of invasive species is possible throughout the reach.

The City of Wilson has identified a location, near the proposed parking lot, for a stormwater BMP. Approximately 18 acres in the 144 acre watershed for this point in the creek drain to the proposed BMP location. Using estimates from the N.C. Stormwater BMP Manual, a portion of the runoff from the 18 acres, to be determined by future design steps, can be treated, reducing suspended solids by 85%, and nitrogen (N) and phosphorus (P) by 40%.

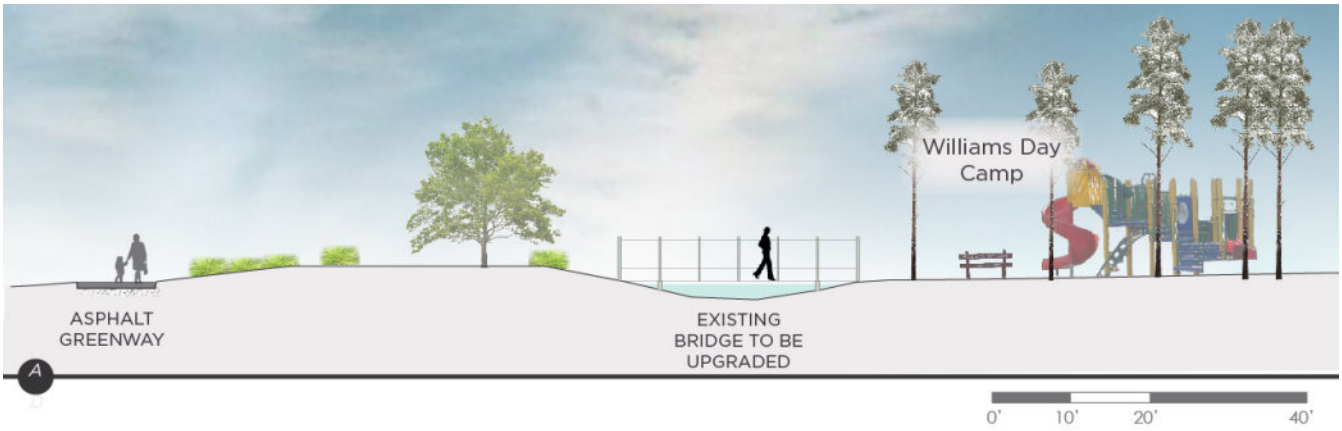
The City has also acquired 3 parcels along Canal Drive, between Pinewood Drive and Kincaid Avenue, where a BMP could be located. Approximately 143 acres drain to this point, approximately 18 acres in Section 1 and approximately 125 acres in Section 2. Based on potential future design, a BMP can treat a portion of the runoff from this 143 acre area, reducing suspended solids by 85%, and nitrogen (N) and phosphorus (P) by 40%.

COST CONSIDERATIONS:

Urban stream restoration **$300-$500/LF**

Riparian buffer restoration **$1.11/square foot**

Stormwater BMP's: **$5-$15/square foot**



SECTION 1: CONCEPT ENLARGEMENT MAP

SECTION 2: GREENWAY RECOMMENDATIONS

Section 2 starts at Kincaid Avenue and moves along the west side of Hominy Creek, passing through residential areas and connecting 6,984 people to destinations such as the Recreation Park and Community Center, Raleigh Rd Parkway and the convenience shops that line the street, and First Presbyterian Church. In order to strengthen these connections to destinations on the eastern side of the creek, two bridges are recommended to be upgraded. Intersection upgrades are also recommended to enable safe crossing of the street and to create better on road connections.

IMPACTS:

DEMOGRAPHICS

Overall Population: **6,984**

Households without Cars: **293**

Youth Under 18: **1,566**

Low-Income Households: **572**

Minorities:**2,776**

CONNECTIONS

Recreation Park and Community Center

Convenience Shops off of Raleigh Rd Parkway

First Presbyterian Church

COST CONSIDERATIONS:

Approximate Length: **0.6 miles**

3,089 feet Asphalt Greenway: **$200** per linear foot

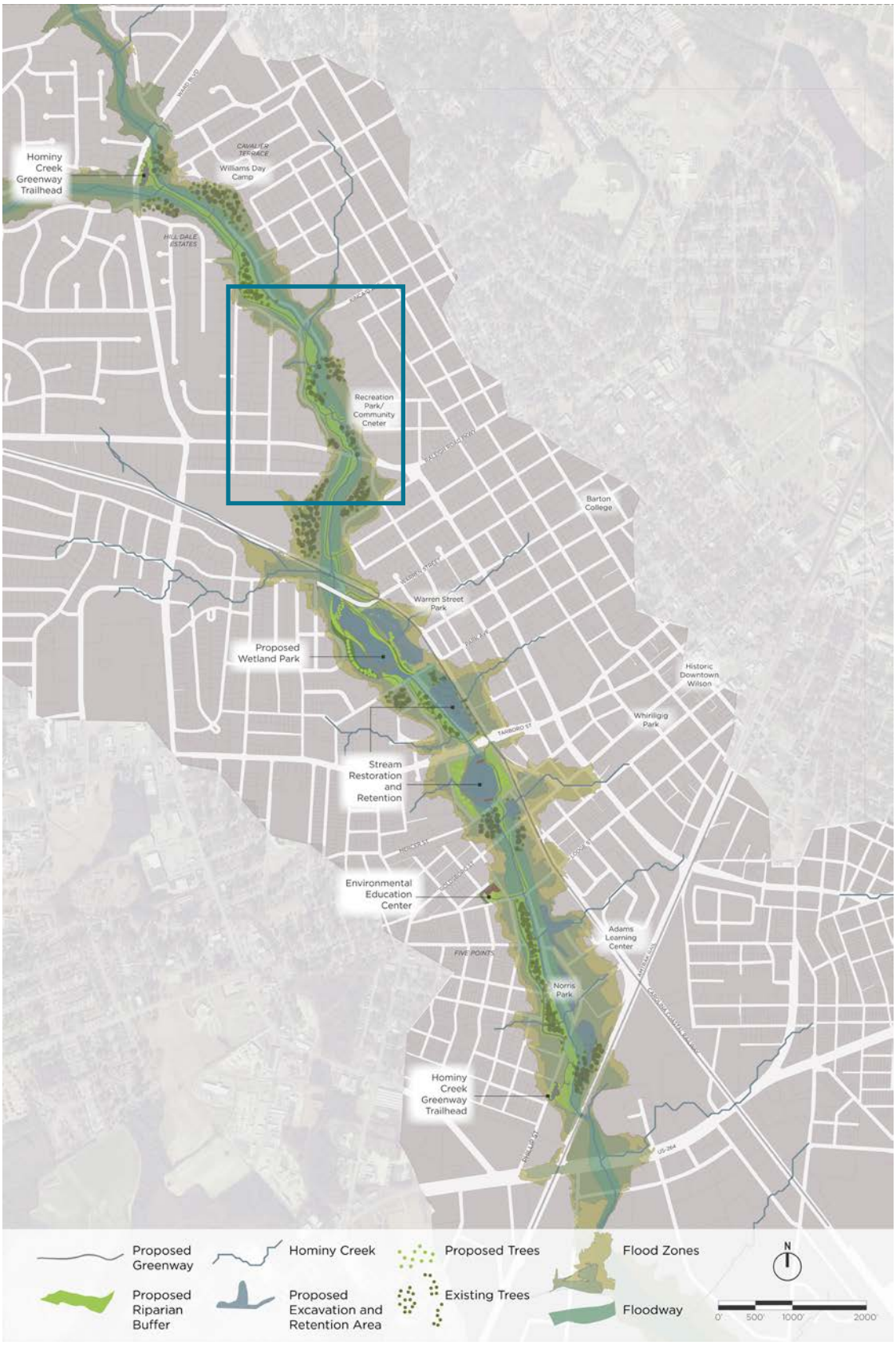
2 Pedestrian Bridge Upgrades: **$75,000** per bridge upgrade

2 at-grade intersection treatments: **$26,000** per intersection

Design & Engineering: **12%** of construction cost

2016 Budget Estimate : $850K - $930K

SECTION 2: OVERVIEW MAP



SECTION 2: WATER QUALITY RECOMMENDATIONS

Continuing along the sewer easement, the greenway approaches the first roadway intersection at-grade at Ripley Rd. where a high visibility crosswalk is proposed. The greenway extends along the west side of Hominy Creek, where a low water bridge is recommended at the tributary crossing. The greenway will spur to the Recreation Park/Community Center at the two existing bridge crossings. This area floods regularly and treatment areas are recommended between the creek and trail to retain stormwater. Where possible, existing vegetation will be retained.

Several options were studied for safely crossing Raleigh Rd. Because of the existing grades, an underpass is not recommended. And while not as desirable, the most visible and feasible location for the at-grade crossing is at the mid-block location just west of the Recreation Park entrance. High visibility crosswalk and a median refuge island is recommended for this higher volume roadway.

An alternative greenway route is proposed on the east side of Hominy Creek south of Raleigh Road Pkwy. An eastern route would require a culvert extension on the south side of Raleigh Rd. To avoid a culvert extension the trail would need to narrow to 8-feet to use the existing headwall to cross the creek. This would also avoid the need for an additional pedestrian bridge.

Stream and buffer restoration has already been performed on this reach. No stormwater BMP retrofit opportunities were identified in the field survey for this reach.

COST CONSIDERATIONS:

Urban stream restoration **$300-$500/LF**

Riparian buffer restoration **$1.11/square foot**

Stormwater BMP's: **$5-$15/square foot**

SECTION 2: CONCEPT ENLARGEMENT MAP

SECTION 3: GREENWAY RECOMMENDATIONS

In the event that the western alignment is pursued, a pedestrian bridge will be required to cross the creek to the east side of the creek to connect to the at-grade railroad crossing on Warren St. Crossing beneath the rail line is not feasible at the railroad bridge. There are conflicts with drainage, the creek, and existing railroad bridge abutments. The at-grade crossing also eliminates the need to coordinate a new crossing with the railroad. Once the trail is east-side, there are several privately owner residential lots that will require easements and discussions with property owners. Alternatively, if easements could be negotiated with the far reach of the railroad easement, that is also an option, however far less feasible.

A spur to the Westover neighborhood will connect residents to the greenway. In addition, an alternative on-road option is given if easements cannot be obtained along private property. Sharrows would provide a bicycle connection to Warren St., while pedestrians would walk along low-volume neighborhood roads within Westover. A sidewalk would be required along Warren St. until the greenway continues south.

IMPACTS:

DEMOGRAPHICS

Overall Population: **4,264**

Households without Cars: **377**

Youth Under 18: **1,021**

Low-Income Households: **694**

Minorities:**3,443**

CONNECTIONS

Warren Street Park

Westover Neighborhood

Barton College

COST CONSIDERATIONS:

Approximate Length: **0.8 miles**

4,373 feet Asphalt Greenway: **$200** per linear foot

1 50-foot Pedestrian Bridge: **$100,000**

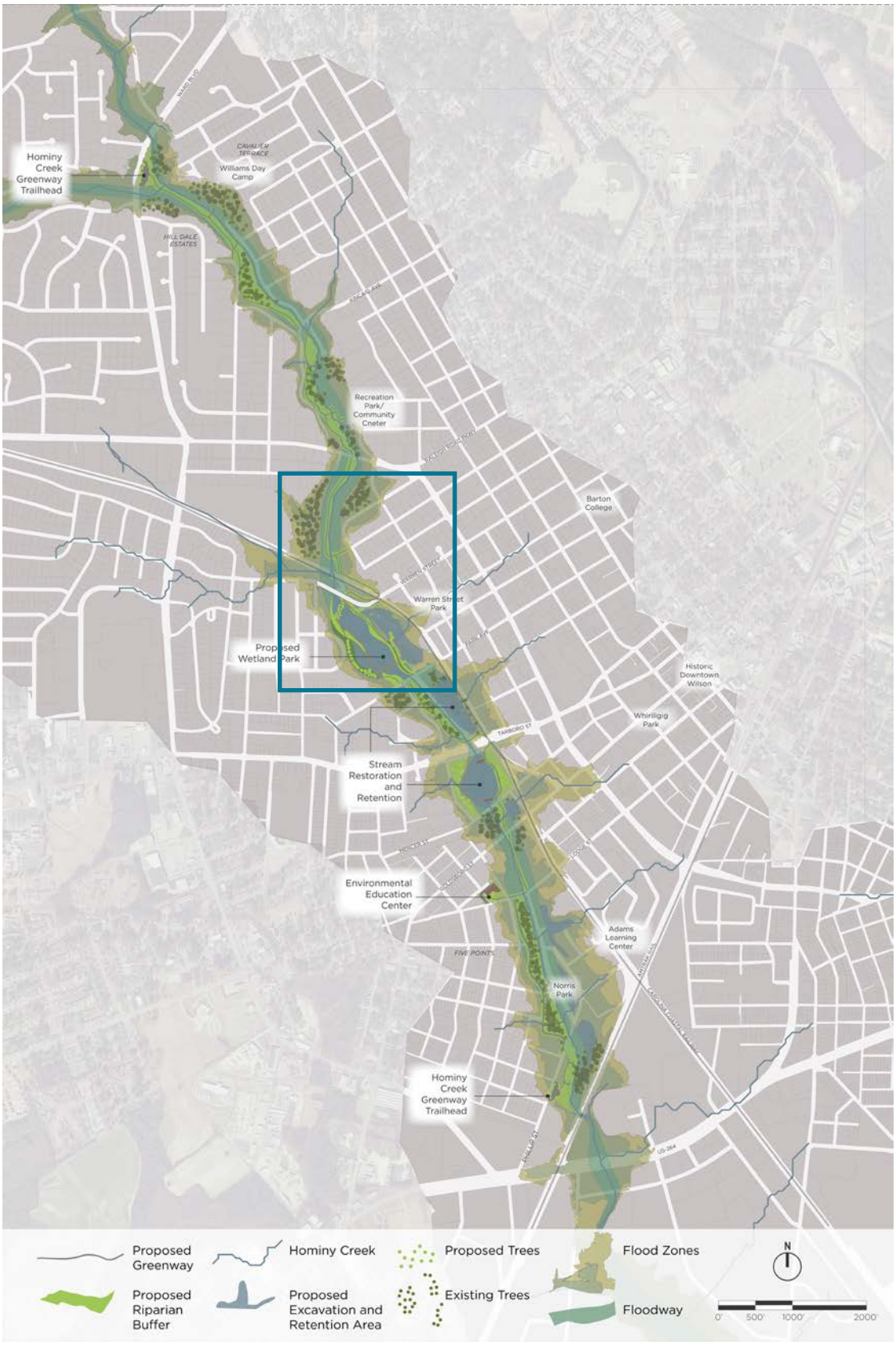
At grade intersection treatment: **$26,000** per intersection

Proposed Wetland Park:**$800K - $1M**

Design & Engineering: **12%** of construction cost

2016 Budget Estimate: $2.2M - $3M

SECTION 3: OVERVIEW MAP



SECTION 3: WATER QUALITY RECOMMENDATIONS

South of the railroad, from Elizabeth Rd. to Park Ave., the public property in this area is subject to frequent flooding. The City has plans to relocate the existing housing. If the housing is relocated the remaining land will become park space. This master plan builds on concepts the City has developed in this area for a large stormwater wetland BMP, stream and buffer restoration and a park with a looped trail system, educational signage, and boardwalk.

The creek channel is incised an average of approximately 9 feet throughout this section. The stormwater wetland BMP will require excavation down to the approximate elevation of the creek channel, and the creation of a low-elevation floodplain that storm flows can access during precipitation events. The floodplain will be separated from the stream channel by a levee, which captures higher stream flows for treatment in the created floodplain. Using this basic design concept, and the footprint shown in the Section 3 graphic, it is estimated that the BMP/park area is approximately 18 acres, with approximately 14 acres of area for floodwater storage and treatment. The storage and treatment volume is approximately 28 acre-feet, assuming an average depth of 2 feet of storage. The floodwater storage/treatment area proposed represents floodplain area that is not currently accessible. Using estimates from the N.C. Stormwater BMP Manual, a substantial portion of the runoff from the upstream watershed, to be determined by future design steps, can be treated, reducing suspended solids by 85%, and nitrogen (N) and phosphorus (P) by 40%.,

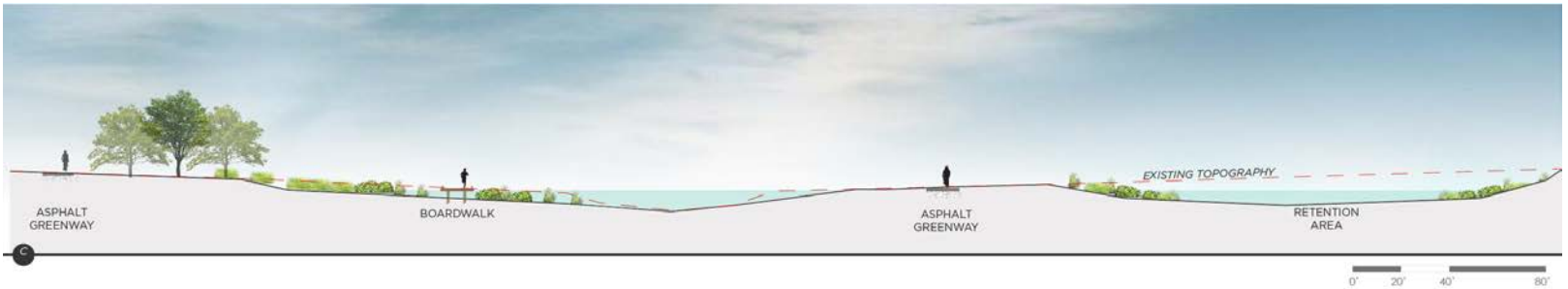
Stream and buffer restoration along the approximately 1,650 feet of stream in this section associated with this work would also contribute to the reduction in these pollutants. The proposed concept would remove 26 buildings from the 100 year floodplain, remove approximately 2.7 acres of impervious surface from the watershed, and reduce flooding frequency and severity. The proposed project will combine stormwater quality improvements, storm flow reduction, stream restoration, buffer restoration, greenways and recreational and educational opportunities through this section.

COST CONSIDERATIONS:

Urban stream restoration **$300-$500/LF**

Riparian buffer restoration **$1.11/square foot**

Stormwater BMP's: **$5-$15/square foot**



SECTION 3: CONCEPT ENLARGEMENT MAP

SECTION 4: GREENWAY RECOMMENDATIONS

At Park Ave., an at-grade crossing is proposed. The greenway is recommended to continue south on the west side of the creek along city-owned property, however an alternative should be explored in the event the city acquires the regularly flooded parcel on the east side of the creek between Beacon St. and the railroad. If the alternative is pursued, Beacon St. could be permanently closed and the adjacent space used for retention. A western alignment also provides more feasible routing beneath Tarboro St.. If property is not obtained at this location, a pedestrian bridge across the creek and extensive grading will be necessary north of Tarboro St.

Based on the on the infrequent use of the rail line and ample width of the easement, a rail-with-trail option should be considered to route users beneath Tarboro St. This eliminates the need to cross at-grade and mid-block at an otherwise very dangerous roadway. Discussions and negotiations with the railroad are recommended if this option is pursued.

The City owns property along the entire west bank and has identified the parcels along the east bank as potential acquisitions. If the properties on the east bank are acquired, the corridor will be sufficiently wide to restore the stream, create stormwater BMP's on either/both sides of the stream, and restore the riparian buffer on this reach. Should this property get turned over to the city, large stormwater BMP's could be incorporated beside the stream, with a meandering greenway. The existing access road at the north side of the property should be closed and retention areas maximized.

The greenway continues south with at-grade crossings proposed at Mercer St. and Goldsboro St. along public land. Alternatively, if the rail-with-trail option is accepted, the trail could extend within rail right-of-way until crossing Goldsboro St. The greenway would rejoin paralleling the creek to the south.

IMPACTS:

DEMOGRAPHICS

Overall Population: **12,386**

Households without Cars: **969**

Youth Under 18: **2,736**

Low-Income Households: **1,345**

Minorities: **7,777**

CONNECTIONS

Fleming Stadium

NC Baseball Museum

Historic Downtown Wilson

Whirligig Park

COST CONSIDERATIONS:

Approximate Length: **0.7 miles**

3,504 feet Asphalt Greenway: **$200** per linear foot

1 80-foot Pedestrian Bridge: **$200,000**

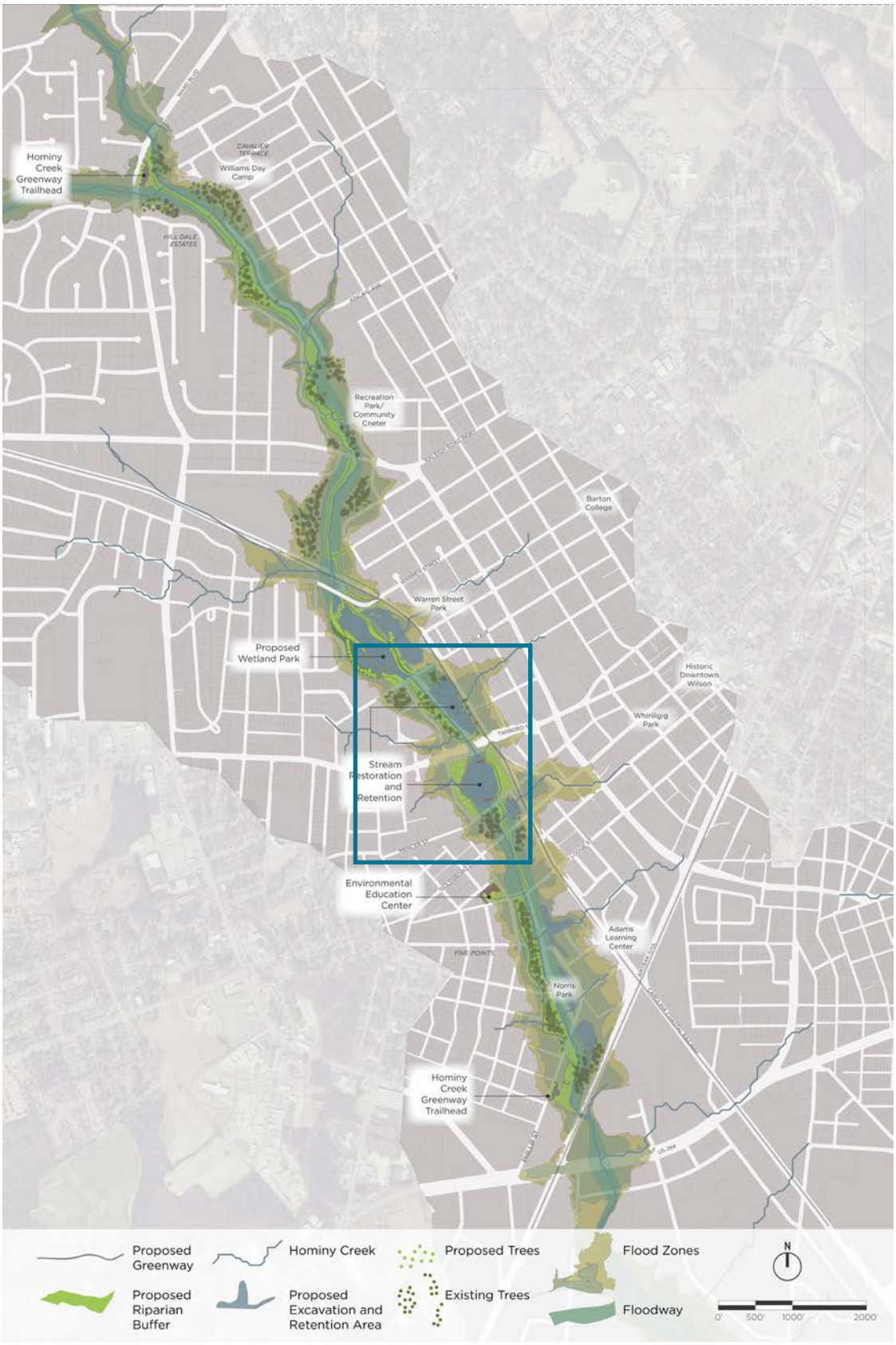
2 At-grade intersection treatments :**$26,000** per intersection

Proposed Wetland Park: **$975,000 - $1.2M**

Design & Engineering: **12%** of construction cost

2016 Budget Estimate: $2.2M - $3.5M

SECTION 4: OVERVIEW MAP



SECTION 4: WATER QUALITY RECOMMENDATIONS

The creek channel is incised approximately 8-12 feet throughout this section. Assuming property acquisitions, three stormwater BMP's are proposed between Park Avenue and Tarboro Street, Tarboro Street and Mercer Street and Mercer Street and Goldsboro Street. The stormwater wetland BMP's along the creek will require excavation down to the approximate elevation of the creek channel, and the creation of a low-elevation floodplain that storm flows can access during higher stream flow events. The floodplain will be separated from the stream channel by a levee, which captures higher flows for treatment in the created floodplain. Using this basic design concept, and the footprints shown in the Section 4 graphic, the following BMP attributes are estimated, in Table 3.2.

TABLE 3.2: SECTION FOUR BMP CALCULATIONS

Streets Bracketing BMP Location	BMP Total Area (ft^2/ac)	BMP Storage volume (ft^3)	BMP Storage (acre-feet)	Stream Restoration/ Stabilization (ft)
Park-Tarboro	125,915 / 2.9	149,330	3.4	1,250
Tarboro-Mercer	323,178 / 7.4	558,981	12.8	750
Mercer-Goldsboro	93,525 / 2.1	166,575	3.8	390
Total:	542,618 / 12.4	874,886	20	2,390

The proposed BMP's range in size from just over 2 acres to approximately 7.5 acres, and total approximately 12.4 acres. The storage and treatment volume is approximately 20 acre-feet, assuming an average depth of 2 feet of storage. Except for the Mercer-Goldsboro reach, the floodwater storage/ treatment area proposed represents floodplain area that is not currently accessible. Using estimates from the N.C. Stormwater BMP Manual, a substantial portion of the runoff from the upstream watershed, to be determined by future design steps, can be treated, reducing suspended solids by 85%, and nitrogen (N) and phosphorus (P) by 40%., Stream and buffer restoration along the approximately 2,400 feet of stream in this section would also contribute to the reduction in these pollutants.

The proposed concept would remove 6 buildings from the 100 year floodplain, remove approximately 11.5 acres of impervious surface from the watershed, helping to reduce flooding frequency and severity. Buffer enhancement by removal of invasive species is possible on this reach. The City owns property on the bank that is a proposed site for a stormwater BMP retrofit to treat flows originating in the downtown area.

COST CONSIDERATIONS:

Urban stream restoration **$300-$500/LF**

Riparian buffer restoration **$1.11/square foot**

Stormwater BMP's: **$5-$15/square foot**

SECTION 4: CONCEPT ENLARGEMENT MAP

SECTION 5: GREENWAY RECOMMENDATIONS

An environmental education center is proposed north of Lodge St. on one of the few properties along the corridor outside of the 100-year floodplain. This facility would connect to the greenway along Lodge St. South of Lodge, public housing in this area is subject to frequent flooding. The City has plans to relocate the existing housing. If the housing is relocated the remaining land will become park space and retention areas can be excavated for flood control. The greenway should extend to the west as much as possible to maximize storage and provide access to the Five Points neighborhood.

Because Norris Blvd. and Malpas Dr. are located in the 100-year floodplain and are not necessary for roadway circulation, they are recommended to be closed to maximize park space and retention opportunities. Access spurs will provide safe connections to adjacent residents if the east end of Aycock, Jordan, and Briggs St. become greenway access only. Stream restoration measures could also be pursued in this location to meander the creek and provide a more naturalized hydrology.

Under present conditions, stream restoration/ stabilization is limited by private ownership and lack of lateral space due to infrastructure, but buffer restoration/bank stabilization is feasible on the lower end of the reach if the land could be acquired.

The City has owns property on both sides of the stream, and has identified additional properties on this reach for acquisition in the future. The City has developed a concept to create a large-scale stormwater BMP retrofit/stream restoration/ buffer restoration/greenway complex on this reach.

IMPACTS:

DEMOGRAPHICS

Overall Population: **11,006**

Households without Cars: **717**

Youth Under 18: **2,479**

Low-Income Households: **998**

Minorities:**6,871**

CONNECTIONS

Norris Park

Adams Learning Center

Proposed Environmental Education Center

Five Points Neighborhood

COST CONSIDERATIONS:

Approximate Length: **0.5 miles**

2,640 feet Asphalt Greenway: **$200** per linear foot

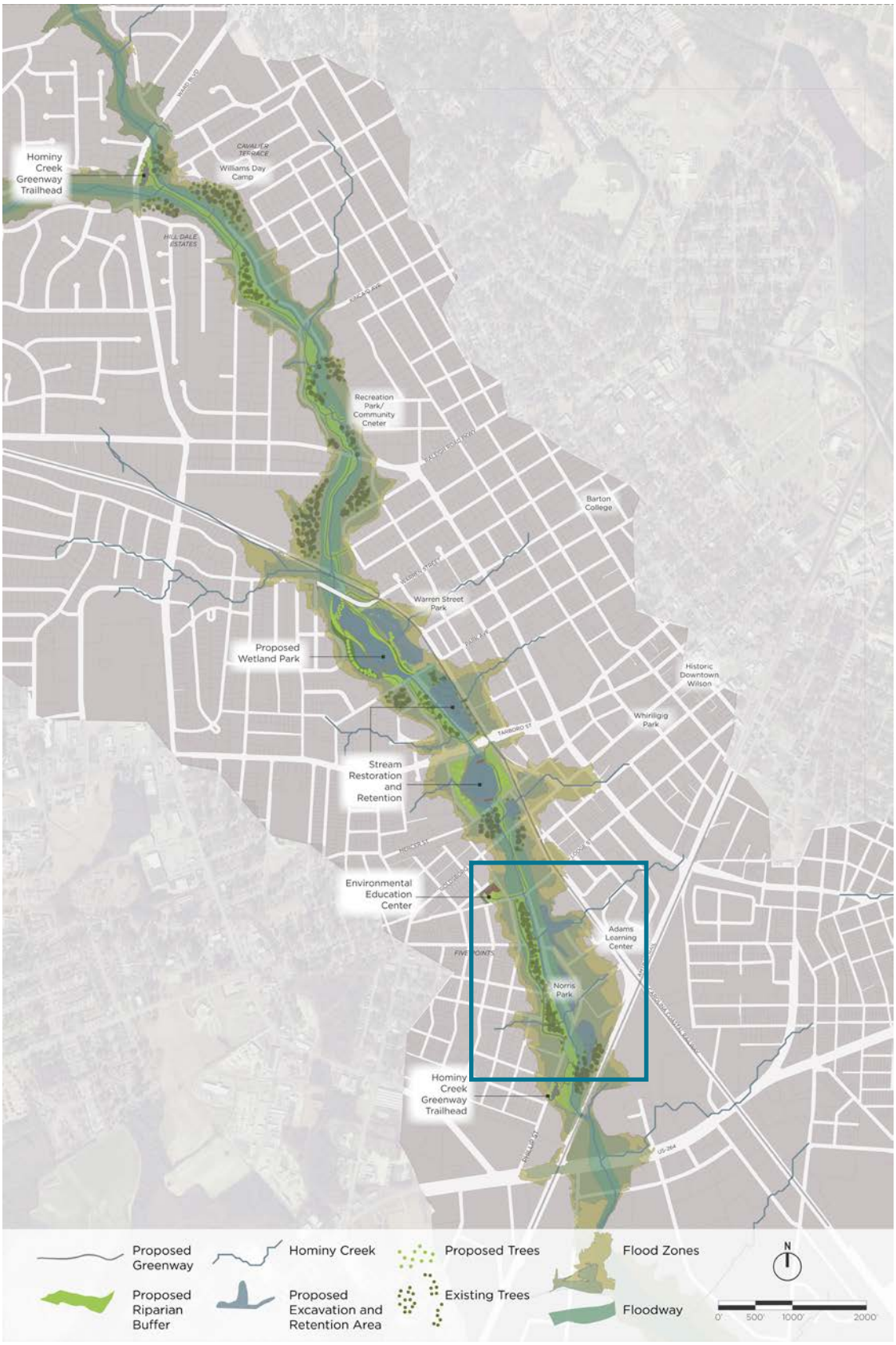
2 At-grade intersection treatments:**$26,000** per intersection

Proposed Stormwater Retention Area:**$300K - $350K**

Design & Engineering: **12%** of construction cost

2016 Budget Estimate: $1M - $1.2M

SECTION 5: OVERVIEW MAP



SECTION 5: WATER QUALITY RECOMMENDATIONS

The creek channel is incised approximately 8-12 feet throughout this section. Assuming property acquisitions, three stormwater BMP's are proposed between Lodge and Phillip Streets, at Norris Park, and at Ridgeway Park. The stormwater wetland BMP's along the creek will require excavation down to the approximate elevation of the creek channel, and the creation of a low-elevation floodplain that storm flows can access during precipitation events. The floodplain will be separated from the stream channel by a levee, which captures higher flows for treatment in the created floodplain. Using this basic design concept, and the footprints shown in the Section 4 graphic, the following BMP attributes are estimated, in Table 3.3.

TABLE 3.3: SECTION FIVE BMP CALCULATIONS

Streets Bracketing BMP Location	BMP Total Area (ft^2/ac)	BMP Storage volume (ft^3)	BMP Storage (acre-feet)	Stream Restoration/ Stabilization (ft)
Lodge-Phillip	283,315 / 6.5	460,415	10.6	730
Norris-Park	110,997 / 2.6	204,970	4.7	117
Ridgewood Park	128,814 / 3	257,628	5.9	
Total:	542,618 / 12.4	923,014	21	847

The proposed BMP's range in size from approximately 2.5 acres to approximately 6.5 acres, and total approximately 12 acres. The storage and treatment volume is approximately 21 acre-feet, assuming an average depth of 2 feet of storage. Using estimates from the N.C. Stormwater BMP Manual, a substantial portion of the runoff from the Section's watershed, to be determined by future design steps, can be treated, reducing suspended solids by 85%, and nitrogen (N) and phosphorus (P) by 40%., Stream and buffer restoration along the approximately 850 feet in this section would also contribute to the reduction in these pollutants.

The proposed concept would remove 35 buildings from the 100 year floodplain, remove approximately 5.7 acres of impervious surface from the watershed, helping to reduce flooding frequency and severity. A fraction of the proposed Ridgewood Park BMP extends into Section 6, however the BMP description is in Section 5.

COST CONSIDERATIONS:

Urban stream restoration **$300-$500/LF**

Riparian buffer restoration **$1.11/square foot**

Stormwater BMP's: **$5-$15/square foot**

SECTION 5: CONCEPT ENLARGEMENT MAP

SECTION 6: GREENWAY RECOMMENDATIONS

When the greenway reaches Philip St. an at-grade crossing is proposed to connect to Ridgewood Park. This attractive open are provides views of the creek. Overlooks with educational signage, a parking area, and open passive space make a nice southern terminus for the greenway. A pavilion or shade structure should be considered for user comfort.

The City owns property on the west bank of the reach, and has identified property for acquisition on the upstream east bank which would provide lateral space for a proposed stream restoration/ stabilization, buffer restoration, and stormwater BMP retrofit complex on this reach.

IMPACTS:

DEMOGRAPHICS

Overall Population: **2,884**

Households without Cars: **125**

Youth Under 18: **764**

Low-Income Households: **347**

Minorities:**347**

CONNECTIONS

Ridgewood Park

Putt-Putt Fun Center

Wilson Botanical Gardens

Retail along Ward Blvd.

COST CONSIDERATIONS:

Approximate Length: **0.2 miles**

1,096 feet Asphalt Greenway: **$200** per linear foot

1 At grade intersection treatment :**$26,000** per intersection

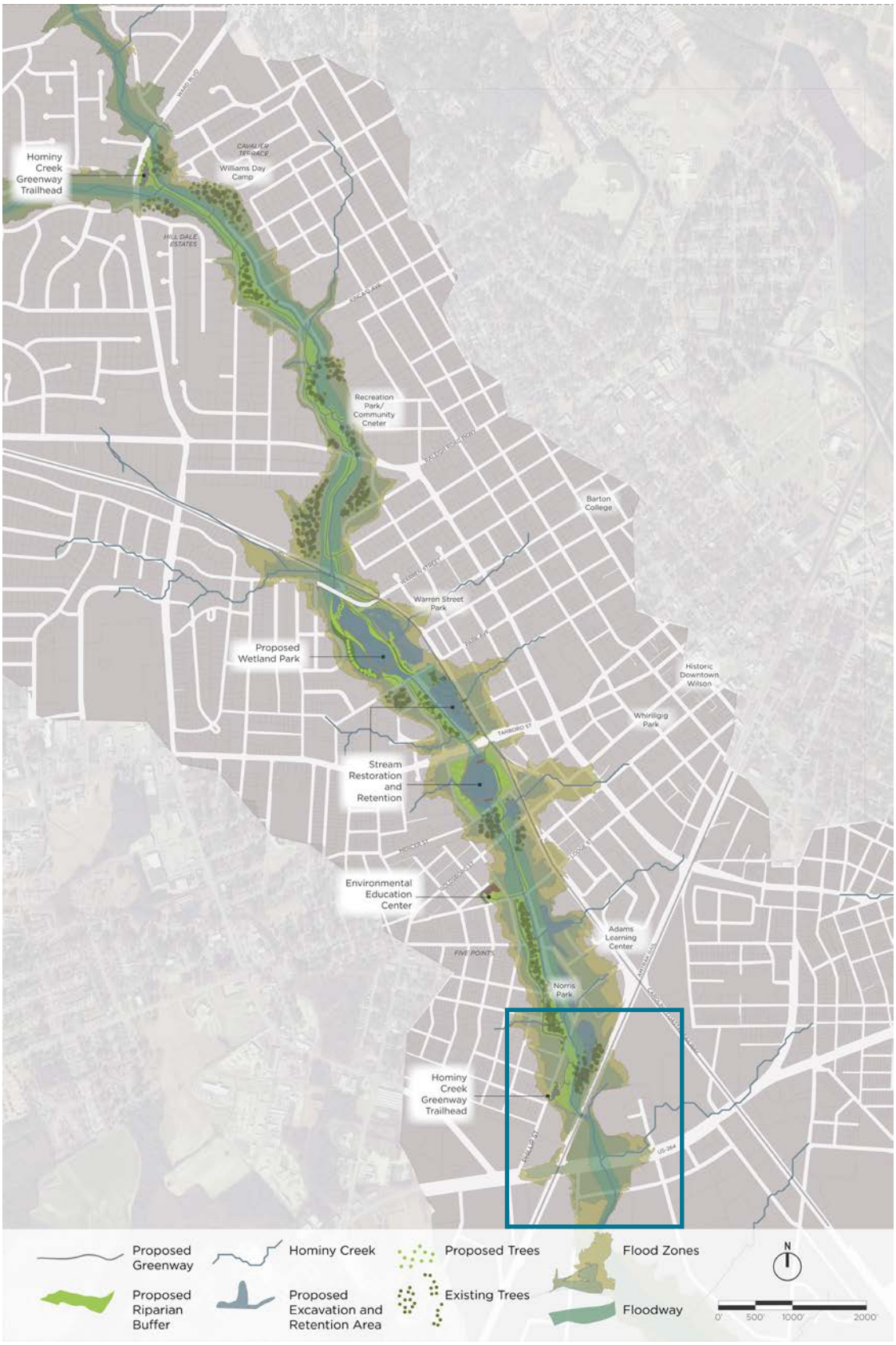
1 Trailhead with 8 Parking Spaces:**$50,400**

Open Space with 2 Overlooks: **$185K - $250K**

Design & Engineering: **12%** of construction cost

2016 Budget Estimate : $580K - $725K

SECTION 6: OVERVIEW MAP



SECTION 6: WATER QUALITY RECOMMENDATIONS

None for Section 6.

SECTION 6: CONCEPT ENLARGEMENT MAP

PHASING PLAN

This recommendations in this study consider the Hominy Creek Greenway and Water Quality Park as one complete, linear project with multiple access points and associated stormwater treatment facilities. While the desired outcomes and anticipated benefits of trail and stormwater development will not be fully realized until the project is complete, impacts can begin to be felt by the community as soon as construction commences even for portions of the project. While significant cost savings can be gained by designing, permitting, and constructing the project in as minimal sections as possible, funding and permitting limitations will very likely preclude stormwater and greenway facilities from being constructed as a unit project.

The Hominy Creek Greenway extends a total of 4.4 miles as recommended, including spurs and boardwalk splits. The phasing strategy proposed represents realistic goals for project implementation, assuming there is local support and cooperation.

Point-to-point connections were considered for all phases to avoid "dead-ends," as well as existing service areas and population density in Wilson. Also considered was overall connectivity, improved safety, public support, public lands, location upstream, and flood control needs. Those sections that fulfilled multiple criteria were given higher priority. The following map indicates a suggested phasing plan.

Phase 1: Hominy Creek Greenway from Ridgewood Park to Lodge St.

The first phase includes construction of the Hominy Creek Greenway, trailhead parking area, and two creek overlooks from Ridgewood Park north to Lodge St.

PHASING MAP


1.
9.
4.
3.
5.
6.
7.
2.
8.
1. PHASE 1: HOMINY CREEK GREENWAY AND TRAILHEAD CONSTRUCTION
2. PHASE 2: HOMINY CREEK GREENWAY AND TRAILHEAD CONSTRUCTION
3. PHASE 3: WETLAND PARK CONSTRUCTION
4. PHASE 4: BOARDWALK AND HOMINY CREEK GREENWAY CONSTRUCTION
5. PHASE 5: STORMWATER RETENTION EXCAVATION
6. PHASE 6: HOMINY CREEK GREENWAY CONSTRUCTION
7. PHASE 7: STORMWATER RETENTION EXCAVATION
8. PHASE 8: STORMWATER RETENTION EXCAVATION
9. PHASE 9: HOMINY CREEK GREENWAY CONSTRUCTION

Phase 2: Hominy Creek Greenway from Ward Ave. to Raleigh Road Pkwy.

Phase 2 includes construction of the Hominy Creek Greenway, trailhead parking area, trail connections to adjacent neighborhoods, the installation of a low water bridge/clear span bridge structure across a creek tributary, and the rehabilitation of two existing bicycle/pedestrian bridges.

Phase 3: Wetland Park Excavation

Phase 3 involves the relocation of public housing and subsequent demolition, the realignment of Warren Street, and retention pond excavation in preparation for the future wetland park.

Phase 4: Wetland Park Boardwalk, Trail, and Amenities

Once Phase 3 has been completed, Phase 4 work would begin and include the installation of boardwalk, the greenway, viewing platforms, educational signage, and landscape to complete the Wetland Park.

Phase 5: Stormwater Retention from Park Ave. to Tarboro St.

Phase 5 includes the closing and demolition of Beacon St., demolition of existing structures in the floodway, stream restoration, and excavation for stormwater retention ponds.

Phase 6: Hominy Creek Greenway from Lodge St. to Park Ave.

Once stormwater facilities are installed from Park Ave. to Tarboro St., greenway construction would complete the corridor for this section of Phase 6. All project finishing and trail amenities would be included in this phase.

Phase 7: Stormwater Retention from Tarboro St. to Goldsboro St.

Phase 7 would involve the demolition of existing buildings and roadways, and the uncapping of Hominy Creek. Stream restoration, excavation of stormwater retention areas, installation of boardwalk, and project phase finishing items would conclude this phase.

Phase 8: Stormwater Retention from Ridgewood Park to Lodge St.

Once the greenway is installed, stormwater BMP's would be constructed in this phase, including excavation for retention. Malpas Dr. and Norris Blvd. would be closed, as well as several streets near the storage buildings to accommodate the proposed retention areas.

Phase 9: Hominy Creek Greenway from Raleigh Road Pkwy. to Warren St.

Phase 9 will require the acquisition of several trail easements from private properties. Because there are several alternatives for this phase it is recommended that this section be completed at the end of the project. This phase includes the construction of the greenway, coordination with the railroad for an at-grade crossing, and installation of a bicycle/pedestrian bridge across Hominy Creek.

Potential Greenway Benefits

Trails Generate Economic Activity and Benefit Local Businesses

Tourism is a major economic driver for North Carolina. The 6th most visited state in the United States, **visitors spend as much as $18 billion a year,** many of whom partake in activities related to walking, hiking, or biking.[1] Cities and towns receive an economic boost from visitors each year. In North Carolina's Outer Banks alone, the attraction of **bicycling on vacation is estimated to have an annual economic impact of $60 million and support 1,407 jobs.**[2] The annual return to local businesses and state and local governments on bicycle facility development in the Outer Banks is approximately **nine times higher than the initial investment.**[2]

Trails Increase Real Property Values

Greenway trails are popular community amenities that **add value to properties nearby.** According to a 2002 survey by the National Association of Realtors and the National Association of Homebuilders, homebuyers rank **trails as the second-most important community amenity** out of 18 choices, above golf courses, ball fields, parks, security, and others.[3] This preference for trails is reflected in property values around the country:

- The report, "Walking the Walk: How Walkability Raises Housing Values in U.S. Cities", analyzed data from 94,000 real estate transactions in 15 major markets provided by ZipRealty and found that in **13 of the 15 markets, higher levels of walkability, as measured by Walk Score, were directly linked to higher home values.**[4]
- In the Shepard's Vineyard residential development in Apex, North Carolina, **homes along the regional greenway were priced $5,000 higher** than other residences in the development – and these homes were still the first to sell.[5]
- A study of home values along the Little Miami Scenic Trail in Ohio found that **single-family home values increased by $7.05 for every foot closer a home is to the trail.**[6]

These higher prices reflect how trails and greenways add to the desirability of a community, attracting homebuyers and visitors alike.

Trails Offer Transportation Cost Savings

When looking at the returns on investment noted above, it is also important to put into perspective the massive differences in costs inherent in the transportation decisions we make, both as individuals and as a community. Consider the individual costs associated with different forms of transportation: **Walking is virtually free, while the average annual cost of operating a bicycle is $308.**[7] Compare these to the average annual operating cost for a car, which the American Automobile Association reports as $8,876 for financing, insurance, gas, maintenance and repairs, registration, taxes, and depreciation.[8]

On a community scale, consider the high cost of our transportation infrastructure investments. According to the Federal Highway Administration, the cost of a single mile of urban, four-lane highway is between $20 and $80 million.[9] By contrast, a mile of greenway trail ranges from $500,000 to rarely more than $1 million, depending on construction materials, design, and local circumstances. **Bicycling and walking are affordable forms of transportation, and trails provide a low cost, high return option for transportation investments.**

Trails Improve Bicycle and Pedestrian Transportation Options

According to the 2011 Bicycle and Pedestrian Safety Survey, **at least 70 percent of North Carolinians would walk or bike more for daily trips if walking and bicycling conditions were improved.**[10] Moreover, a national transportation poll found that Americans **would like to see 22 percent of transportation funding invested in walking and bicycling facilities,** but current budget allocation sets aside only one percent of all transportation funding to walking and bicycling.[11] With improved accommodations, walking and bicycling can provide alternatives to driving for commuting to work, running errands, or making other short trips.

More than one quarter of all trips (commute and non-commute) taken by Americans each and every day are less than one mile, equivalent to a walking trip of 15 minutes or a 6-minute bike ride; however, just 13 percent of all trips are made by walking or bicycling nationwide.[12] To put these numbers into perspective, 34 percent of all trips are made by walking or bicycling in Denmark and Germany, and 51 percent of all trips in the Netherlands are by foot or by bike.[13] Germany, Denmark, and the Netherlands are wealthy countries with high rates of automobile ownership, just like the United States. Yet an emphasis has been placed on providing quality walking and bicycling environments, which has alleviated the reliance on motor vehicles for short trips.

Trails Improve Access to Destinations

Many North Carolinians do not have access to a vehicle or are unable to drive. According to US Census 5-Year (2008-2012) American Community Survey estimates, 6.5 percent of North Carolina households do not have access to an automobile.[14] A well-connected trail throughout Wilson would **provide safe, low-cost, convenient transportation options for those who are unable to drive or would prefer to not drive, and would help to minimize the disadvantage of not having access to a motor vehicle.** These improvements can increase access to important destinations for the young, the elderly, low-income families, and others who would otherwise have limited and less convenient travel options.

Trails Improve Health through Active Living

The Hominy Creek Greenway would **contribute to the overall health of residents** by offering people attractive, safe, and accessible places to

bike, walk, hike, jog, skate, and socialize. In short, **trails improve opportunities for active lifestyles.** The design of our communities today -- including our towns, subdivisions, transportation systems, parks, trails, and other facilities -- affect our ability to be active in communities. **The Centers for Disease Control and Prevention (CDC) recommend at least 30 minutes of moderate physical activity each day for adults, and 60 minutes per day for youth,** but many people are unable to reach these targets due to a lack of opportunities for physical activity. According to the CDC, "Physical inactivity causes numerous physical and mental health problems, is responsible for an estimated 200,000 deaths per year, and contributes to the obesity epidemic."[16]

The CDC determined that creating and improving places in our communities to create more physically active opportunities could generate as much as a **25 percent increase in the percentage of people who exercise at least three times per week.**[17] This is significant considering that for people who are inactive, even small increases in physical activity can bring measurable health benefits. A December 2010 article published by the Mayo Clinic reported that:

"Walking, like other exercise, can help you achieve a number of important health benefits such as:

- Lowered low-density lipoprotein (LDL) cholesterol (the "bad" cholesterol),
- Elevated high-density lipoprotein (HDL) cholesterol (the "good" cholesterol),
- Lowered blood pressure,
- Reduced risk of or managed Type 2 diabetes,
- Improved mood, and
- Increased feelings of strength and fitness."[18]

A separate study found that these personal health benefits also translate into health cost savings. **Every one dollar invested in pedestrian and bicycle trails saves as much as three dollars in direct medical expenses** due to the positive health effects of increased physical activity.[19]

Many public health agencies are teaming up with foundations, universities, and private companies to launch a new kind of health campaign that focuses on improving healthy lifestyle options. The National Let's Move! Campaign, Eat Smart Move More NC, and similar campaigns are examples of **promoting physical activity to help improve individual and community health.** The Rails-

to-Trails Conservancy puts it simply: "Individuals must choose to exercise, but communities can make that choice easier."[20]

Trails Support Environmental Stewardship

Trails, greenways, and open spaces provide a multitude of environmental benefits by preserving the natural functions of ecosystems. Greenways serve as buffers in developed areas that **protect and link fragmented habitats** and provide opportunities for protecting native plant and animal species. This buffer also helps to **improve water quality** by providing a natural filter for pollutants generated by agricultural and road runoff, keeping them out of local streams, rivers, and lakes.

Trails and greenways also **reduce air pollution** by two significant means. First, they provide enjoyable and safe transportation alternatives to the automobile, which can help to reduce the burning of fossil fuels and local pollution. Second, they provide large swaths of green space where plants can create oxygen and filter out air pollutants, such as ozone, sulfur dioxide, carbon monoxide, and airborne particles of heavy metal.

Greenways can also serve as an **educational tool,** providing opportunities for trail users to learn about the local landscape and environment. Interpretive signage along the trail could be designed to inform trail users about local wildlife, habitats, water quality issues, and other environmental education topics. Similarly, **greenways can serve as hands-on environmental classrooms** for people of all ages to experience natural landscapes, conduct creek clean-ups, and raise environmental awareness.

CONCLUSION

The Hominy Creek Greenway and Water Quality Park has the opportunity to transform into a public amenity that will increase adjacent property values, fulfill a need for outdoor recreation opportunities, offer a safe route for bicycle commuting as an alternate to driving, revitalize neighborhoods, and improve the overall quality of life in Wilson. The water quality improvements will reduce flooding, improve water quality using best management practices, and provide environmental education and stewardship while rehabilitating wildlife habitat.

A summary of project investment costs and associated benefits are listed below. This information provides guidance that will lead to the next steps of design and construction. The recommendations included in this master plan should not be substituted for a more thorough engineering analysis, which is necessary for both greenway and water quality .

Water Quality Recommendations Summary Information

Table 3.4 summarizes the attributes of the BMPs and stream restoration/stabilization proposed in Sections 3-5. It does not contain information on the 3 BMP's proposed in Section 1, which are smaller and were not developed to the level of detail as those in Sections 3-5, per the scope of this master planning effort. However, the proposed benefit of the BMP's in Section 1 should not be overlooked.

In total, the water quality concepts presented in this plan describe a potential for approximately 42 acres of stormwater BMP's (not including potential BMP's in Section 1), that would retain and treat approximately 70 acre-feet of stormwater. In addition, there are stormwater quality and quantity benefits available from the restoration/ stabilization of any of the approximately 4,900 feet of stream deemed feasible for that work within the project boundaries.

TABLE 3.4: TOTAL BMP CALCULATIONS

Streets Bracketing BMP Location	BMP Total Area (ft^2/ac)	BMP Storage volume (ft^3)	BMP Storage (acre-feet)	Stream Restoration/ Stabilization (ft)
Park-Tarboro	125,915 / 2.9	149,330	3.4	1,250
Tarboro-Mercer	323,178 / 7.4	558,981	12.8	750
Mercer-Goldsboro	93,525 / 2.1	166,575	3.8	390
Lodge-Phillip	283,315 / 6.5	460,415	10.6	730
Norris-Park	110,997 / 2.6	204,970	4.7	117
Ridgewood Park	128,814 / 3	257,628	5.9	
Total:	1,834,918 / 42	3,016,881	69	4,887

Greenway Recommendations Summary Information

Table 3.5 summarizes the total anticipated greenway impacts from all sections as well as the aggregate greenway development cost items. Because water quality recommendations (retention areas, stream restoration, and buffer restoration) are so difficult to estimate, those were not included in the budget estimates.

TABLE 3.5: TOTAL GREENWAY IMPACTS & BUDGET ESTIMATE

Total Population	Household without Cars	Youth under 18	Low-Income Households	Minorities
19,028	1,114	4,366	1,769	10,546

Unit	Unit Cost AVG.	Budget Estimate
17,544 feet of asphalt greenway	$200	$3,000,000-$4,000,000
5 bridge upgrades	$75,000	$300,000-$400,000
2 bridges	$150,000	$300,000-$350,000
2 trailheads	$60,000	$100,000-$200,000
8 at-grade intersection treatments	$26,000	$200,000-$300,000
2 wetland parks	$900,000	$1,800,000-$2,000,000
2 storm water BMP's	$300,000	$600,000-$800,000
Design and engineering cost	20%	$1,240,000-$1,600,000
Subtotal Budget Estimate:		$7,500,000- $9,600,000
CONTINGENCY	10%	$750,000 - $960,000
TOTAL 2016 BUDGET ESTIMATE		$8,250,000 - $10,560,000

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Attachment 7

City Council Resolution

ORDINANCE O-026-02

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF WILSON TO AMEND THE CODE OF THE CITY OF WILSON, NORTH CAROLINA, TO INCORPORATE REQUIREMENTS FOR A STORMWATER MANAGEMENT UTILITY

WHEREAS, the City Council makes the following findings:

(1) The management and regulation of stormwater runoff and sediment is necessary to reduce pollution, siltation, sedimentation, local flooding and stream channel erosion, all of which impact adversely on land and water resources and the health, safety, property and welfare of the residents of the City; and,

(2) While no one controls the amount and timing of precipitation which falls on the City, development of real property alters the quality and quantity of stormwater runoff from real property such that generally runoff volumes are increased, runoff rates are accelerated and runoff quality is degraded; and,

(3) The City maintains a system of stormwater management facilities, including but not limited to inlets, conduits, manholes and certain drainage features and easements; and,

(4) The stormwater management facilities and components of the City need to be regularly rehabilitated, upgraded or expanded, and additional stormwater management facilities and measures need to be installed throughout the City; and,

(5) The City needs to upgrade its capability to maintain existing and future stormwater management facilities and measures; and,

(6) All parcels of real property in the City, particularly those with improvements, both use and benefit from the stormwater management system and program; and the improvement of existing facilities and construction of additional facilities in the system will directly or indirectly benefit the owners of all real estate; and,

(7) Continued growth in the City will contribute to the need for improvements in and maintenance and regulation of the stormwater management system; and,

(8) The extent of use of the stormwater management system by all parcels of real property depends on factors that influence runoff, such as land use, intensity of development, amount of impervious surface, and location in a particular watershed or basin; and,

(9) The State and Federal governments have imposed regulations on the City of Wilson to manage various aspects of stormwater runoff quantity and quality, without providing funding to accomplish such management; and,

(10) The City can best manage and regulate the control of stormwater by a policy which regulates the use of real property, both private and public, and which takes reasoned, measured steps to involve the City in additional methods of participation and regulation; and,

(11) Owners of real property should finance the stormwater management system and program to the extent they and the persons they permit to utilize their property contribute to the need for the system, and all fees therefore should bear a substantial relationship to the cost of the service; and,

(12) It is in the best interests of the citizens of this city and, most specifically, the owners of real property, that a stormwater management utility and stormwater management utility fee system be established by ordinance and implemented as part of the City's utility special revenue fund, by whatever name designated.

THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF WILSON:

SECTION 1. That a new Article be added to "Chapter 46. Stormwater Management" entitled Article III. STORMWATER MANAGEMENT UTILITY to read as follows:

Sec. 46-42 – 46-50. Reserved.

ARTICLE III. STORMWATER MANAGEMENT UTILITY

Sec. 46-51. Authority.
Sec. 46-52. Definitions.
Sec. 46-53. Stormwater management utility established, administration, powers and duties.
Sec. 46-54. Boundaries and jurisdiction.
Sec. 46-55. Stormwater utility service fees, rates and fee schedule
Sec. 46-56. Exemptions and credits
Sec. 46-57. Billing methods, responsible parties
Sec. 46-58. Backbilling
Sec. 46-59. Complaints regarding a bill
Sec. 46-60. Appeal.
Sec. 46-61. Use of revenue, investment of finds, and borrowing

ARTICLE III. STORMWATER MANAGEMENT UTILITY

Sec. 46-51. Authority.

Pursuant to Article 16 of Chapter 160A of the North Carolina General Statutes, the City of Wilson hereby creates a stormwater utility and establishes a schedule of stormwater utility service fees to fund a stormwater management program and a structural and natural stormwater and drainage system.

Sec. 46-52. Definitions.

The following words, terms and phrases, when used in this Article III, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Developed property means real property which has been altered from its natural state by the addition and attachment of any improvements such as buildings, structures or other impervious area. For new construction, property shall be considered developed property upon final approval of site improvements by the City.

Single family residential property means developed property which serves the primary purpose of providing a permanent dwelling unit, regardless of the zoning district in which such property is located, for single-family detached units, and which may or may not have accessory uses related to the purpose of providing permanent dwelling facilities.

Equivalent residential unit (ERU) means the total impervious area of a typical single-family residential property, and is determined as the median impervious area of a representative sample, as determined by the City, of all developed residential properties in the single-family residential category.

Stormwater utility service fee means the monthly monetary amount charged each parcel of real property for the services provided by the stormwater utility system and program as set forth in the city schedule of rates and fees, a copy of which is located in the office of the city clerk and is incorporated by reference herein.

Impervious surface area means a surface which, because of its composition or compacted nature, impedes or prevents natural infiltration of water into the soil, including but not limited to: roofs, decks, driveways, patios, sidewalks, parking areas, tennis courts, streets, or compacted gravel surfaces.

Property owner of record means the person identified as owner by county tax records.

Revenues means all fees, assessments or other income received by the stormwater utility, including but not limited to amounts received from the investment or deposit of monies in any fund or account, and all amounts received as gifts or donations, and the proceeds from the sale of bonds to finance the stormwater management program, or any other type of funds derived from grants, fees or loans which by purpose or effect relate to stormwater management activities.

Sec. 46-53. Stormwater management utility established; administration; powers and duties.

The City Council hereby establishes a stormwater management utility to carry out the purposes, functions and responsibilities set forth in this division. The governing body of the stormwater management utility shall be the City Council. The City Manager shall administer the stormwater management utility through the Public Services Department or such other departments and divisions as the City Manager shall designate. The stormwater management utility shall have the following powers and duties, subject to available Revenues, which powers and duties are not necessarily exclusive to the stormwater management utility:

(1) Stormwater management planning and preparation of comprehensive watershed master plans for stormwater management.

(2) Regular inspections and maintenance of public stormwater management facilities and measures for the construction thereof, as well as regular inspections of private stormwater management facilities.

(3) Maintenance and improvements of stormwater management facilities that have been accepted by the City for purposes of stormwater management.

(4) Plan review and inspection of sediment control and stormwater management plans, measures and practices.

(5) Retrofitting designated watersheds to reduce existing flooding problems or to improve water quality.

(6) Acquisition of interests in land, including easements, upon prior approval by City Council.

(7) Design and construction of stormwater management facilities and measures and acquisition of equipment.

(8) Water quantity and water quality management, including monitoring activities.

(9) Compliance with State and Federal regulations for stormwater management and submission of mandatory and non-mandatory reports related thereto, except those regulations which require approval by City Council.

(10) Any and all powers and duties delegated or granted to it as a local government implementing agency under the laws and regulations of the state and the ordinances of the City.

Sec. 46-54. Boundaries and jurisdiction.

The boundaries and jurisdiction of the stormwater management utility shall extend to the corporate limits of the City, as they may exist from time to time, and such areas lying outside the corporate limits of the City as shall be approved by the City Council.

Sec. 46-55. Stormwater utility service fees, rates and fee schedule.

Stormwater utility service fees will be determined and modified from time to time by the City Council so that the total revenues generated by said fees will be used to pay such expenses as are reasonably necessary or convenient in the management, administration, planning, regulatory compliance, public education, construction, operation, and maintenance of the stormwater system and to pay principal of and interest on the debt incurred for stormwater purposes. The fee system must be reasonable and equitable so that users pay to the extent they contribute to the need for the stormwater management utility, and so that fees bear a substantial relationship to the cost of service. The City Council recognizes that these benefits while substantial, in many cases cannot be measured directly.

(a) Stormwater utility service fees shall accrue on the date determined by City Council and set forth in the city schedule of rates and fees. Stormwater utility service fees shall apply to all land as presented in Section 46-54, whether public or private. Exemptions shall not be allowed based on age, tax exemption, or other status of an individual or organization, except as set forth in Section 46-56.

(b) Stormwater utility service fees shall be based on a commonly accepted rate unit for stormwater utilities, the equivalent residential unit (ERU.) The ERU is used to relate a base rate fee charged to a single-family residential property to that which is charged to a non-single family residential property. The City of Wilson's ERU is two thousand five hundred eighty five (2,585) square feet of impervious surface area. The ERU is determined by analyzing digital photographs and performing field checks for verification purposes of a representative sample of single-family residences within the city limits. The City Engineer (or his designee) shall determine the amount of impervious area on each non-single family residential property using aerial photographs, building plans, and/or field checks where necessary. Upon application, a stormwater utility customer shall be provided a written determination of the amount of impervious area for which a fee has been established and charged to that customer.

(c) The City Council shall set a base rate fee for single-family residential properties and each non-single family residential property stormwater utility service fee shall be calculated utilizing the equivalent residential unit. Non-single family residential properties shall be charged the base rate fee for each ERU contained on the property. The number of ERUs shall be rounded up to the nearest whole number. The minimum stormwater utility service fee for non-single family residential properties shall not be less than the base rate fee.

(d) The base rate fee shall be contained in the city schedule of rates and fees, a copy of which is located in the office of the City Clerk and is incorporated by reference herein.

Sec. 46-56. Exemptions and credits.

Except as provided in this section, no property shall be exempt from stormwater utility service fees or receive a credit against such fees. Only non-single family residential use properties subject to stormwater utility service fees may be granted credits against the fees in accordance with a credit policy manual developed by the City Engineer or their designee and referenced in the City of Wilson schedule of rates and fees. Any credit allowance shall be conditional on continuing compliance with applicable standards, including requirements for

operation and maintenance. Subject to approval in accordance with the credit policy, any credits shall be effective on the date the credit is approved by the City Engineer or their designee.

Sec. 46-57. Billing method, responsible parties.

(a) Bills for stormwater utility service fees shall be sent at regular, periodic intervals. Stormwater utility service fees may be billed on a combined utility bill that also contains fees for other utilities. Stormwater utility service fees that are shown on a combined utility bill may be for a different service period than that used for other utilities. For properties not having otherwise active utility accounts, stormwater utility service fee only accounts, the fee shall be billed to the owners or other persons listed on the real property tax records. These accounts may be billed at different intervals than the accounts receiving combined utility billings.

(b) Stormwater utility bills for a property that receives other city-provided utilities shall be sent to the customer receiving such service. However, where multiple utility accounts exist for a single parcel, the stormwater utility bill will be sent to the property owner unless the property qualifies for per account billing as set forth in subsection (c).

(c) Where multiple utility accounts exist for a single parcel, the property owner may apply for per account stormwater fee billing by completing a form provided by the City Engineer or their designee. The application shall include the proposed division of the stormwater fee between the utility accounts for the property. The applicant shall provide notice of the application to each affected utility customer. The City Engineer or their designee shall approve the per account billing for the parcel unless the billing plan (1) will result in a fee for less than one ERU for one or more accounts, and/or (2) does not equitably allocate the fee between accounts. The property owner is ultimately responsible for payment of the stormwater utility service fee for property for which the party billed has not paid the stormwater fee. The approval of per account billing pursuant to this subsection does not relieve the owner from liability for stormwater utility service fees if they are not paid by the party billed.

(d) Townhouse and condominium developments and other similar properties containing impervious surface in common ownership shall be charged a stormwater utility service fee for the total impervious surface of all commonly-owned and individually-owned property within the development. The stormwater utility bill shall be sent to the homeowners' association or, upon official request of the association reflecting a vote in accordance with the association's bylaws, may be billed on a per account basis in compliance with subsection (c).

(e) Stormwater utility service fees shall be due and payable as set forth in the city schedule of rates and fees, a copy of which is located in the office of the city clerk and is incorporated by reference herein.

Sec. 46-58. Backbilling.

Failure to receive a stormwater utility service fee bill is not justification for nonpayment. The owner of each parcel of land shall be ultimately obligated to pay such fee. If a customer is under-billed or if no bill is sent, the City may backbill up to two years.

Sec. 46-59. Complaints regarding a bill.

(a) A customer having a grievance or complaint that a bill is excessive must file written notice with the City of Wilson's Business Office or Customer Service Representative. If it is determined that the bill is in error, an adjustment will be made according to the schedule of rates and fees.

(b) No adjustment will be made for more than a two-year period.

Sec. 46-60. Appeal.

Any customer who believes the provisions of this article have been applied in error may appeal in the following manner:

(1) An appeal of a stormwater utility service fee must be filed in writing with the City Engineer or their designee. In the case of stormwater utility service fee appeals related to the amount of impervious surface on a parcel, the appeal shall include a surveyed map of the parcel prepared by a registered land surveyor or professional engineer and showing all impervious areas as defined in Section 46-52 of this Code. The map shall be submitted in digital and hard copy form and shall contain a table summarizing total parcel area, impervious surface area, and any other features or conditions related to impervious area.

(2) Using information provided by the appellant, the City Engineer or their designee shall conduct a technical review of the conditions on the property and respond to the appeal in writing within 30 days. The City Engineer may adjust the fee or credit as long as the adjustment is in conformance with the intent of this article. At the conclusion of the review, the City Engineer shall issue a written determination stating whether an adjustment to the stormwater utility service fee or credit is appropriate, and if so the amount of such adjustment.

(3) All decisions of the City Engineer shall be served on the customer by mailing to the address provided in the notice of appeal.

(4) The City Engineer may make no adjustment to a customer's bill for more than the two-year period immediately preceding the date that the customer's appeal is received by the City Engineer.

(5) No provision of this article allowing for administrative appeal shall be deemed to suspend the due date of the stormwater utility service fee with payment in full. Any adjustment in the stormwater utility service fee for the person pursuing an appeal shall be made by refund of the amount affected.

Sec. 46-61. Use of revenue; investment of funds; borrowing.

Funds generated for the stormwater management utility from fees, bond issues, other borrowing and other sources shall be utilized only for those purposes for which the stormwater management utility has been established. Such funds shall be invested and reinvested pursuant to the same procedures and practices established by the City for investment and reinvestment of funds. The City Council may use any form of borrowing authorized by law to fund capital acquisitions or expenditures for the stormwater management utility.

SECTION 2. That any person violating the provisions of this ordinance shall be subject to the penalties set forth in this chapter. If the violation is continued, each day's violation shall be a separate offense.

SECTION 3. That any violation of this ordinance shall subject the offender to a civil penalty to be recovered by the City in a civil action in the nature of a debt if the offender does not pay any penalty called for hereunder within the prescribed period of time after being cited for violation of the ordinance.

SECTION 4. That this ordinance may be enforced by an appropriate, equitable remedy such as injunction or order of abatement issued from any court of competent jurisdiction.

SECTION 5. That this ordinance may be enforced by any one, all, or a combination of the remedies authorized and prescribed above.

SECTION 6. That all ordinances or parts of ordinances in conflict with this ordinance are hereby repealed to the extent of such conflict.

SECTION 7. That if any section, subsection, paragraph, sentence, clause, phrase or portion of this ordinance is for any reason held invalid or unconstitutional by a court of competent jurisdiction, such portion shall be deemed severable and such holding shall not affect the validity of the remaining portions hereof.

SECTION 8. That this ordinance shall become effective immediately upon its adoption.

DULY ADOPTED this 6th day of June, 2002.

CITY OF WILSON

C. Bruce Rose, Mayor

ATTEST:

Ana I. Heder, City Clerk

CITY OF WILSON INCORPORATED 1849 WILSON COUNTY, N. C.

Attachment 8

Funding Eligibility

***** This Entity Eligibility Certification Form MUST be included in the Application Package for Stormwater Funding from LASII *****

Local Assistance for Stormwater Infrastructure Investments (LASII) Fund Entity Eligibility Certification Form (Stormwater Eligibility Form)

North Carolina General Assembly Session Law 2021-180 Section 12.14 established the Local Assistance for Stormwater Infrastructure Investments (LASII) fund to provide grants to eligible entities for projects that will improve or create infrastructure for controlling stormwater quantity and quality. Section 12.14.(d) defines an eligible entity as: "a city[1] or county that (i) documents in a form and manner as the Department may specify a stormwater quality or quantity issue and (ii) demonstrates that it would experience a significant hardship raising the revenue necessary to finance stormwater management activities within its jurisdiction based on income and unemployment data, population trends, and any other data determined relevant by the Department. A regional council of government created pursuant to Part 2 of Article 20 of Chapter 160A of the General Statutes or a nonprofit entity is also an eligible entity under this section if the regional council of government or nonprofit entity partners with a city or county."

An applicant seeking grant funding from LASII for a stormwater construction project, stormwater planning grant, or to develop and implement a new stormwater utility must document the following items on this LASII Entity Eligibility Certification Form. Failure to adequately document the following items or to certify and include this form in the application package will result in the application being considered ineligible for funding.

1. Document a Stormwater Quality or Stormwater Quantity Issue

(Required by Session Law 2021-180 Section 12.14.(d)(i))

A. Provide a narrative that describes the stormwater quality issue and/or stormwater quantity issue, based on historic or projected precipitation, and how the proposed project will be used to address the issue.

The primary focus of the Stormwater Asset Inventory and Condition Assessment Grant (AIA) will go towards an asset and condition assessment of the stormwater structures in and around downtown Wilson in the area identified as the City of Wilson Downtown Management Area (DMA). There are approximately 780 known stormwater structures and 65,901 LF of stormwater pipe located within the DMA. The condition of each of the structures and pipes are unknown. Additionally, assets within approximately 1,000 LF of the DMA will also be inventoried and a condition assessment will be provided. There are approximately 1,526 known structures within the expanded DMA. A majority of the expanded DMA include areas identified as potentially underserved. Further, the expanded DMA is almost exclusively located in the Hominy Creek watershed. The Hominy Creek watershed is currently under a 4b plan with the state of NC as it was previously 303(d) listed.

The stormwater AIA will allow the City of Wilson to better understand the existing conditions of assets located in the expanded DMA. This will facilitate capital improvement projects to potentially include the addition of stormwater features which would assist with increasing water quality and decreasing flood potential.

[1] "City" means municipality and includes cities, towns, and villages.

B. Provide a map and/or narrative that identifies the location of the stormwater quality and/or stormwater quantity issue. The map and/or narrative must show or describe the watershed upstream of the location, and if possible, identify the acreage, percentage of impervious area and land use cover in the watershed upstream of the location. If providing a map, attach the map to this Certification Form.

Two maps attached. The first map indicates the DMA in relation to the Contentnea, Hominy, and Toisnot watersheds within the City of Wilson. The second map shows an aerial of the DMA with known stormwater structures and pipes identified. It is expected that several of these structures are in disrepair and additional structures are likely to be identified during the AIA process.

C. If available, provide photographs of the stormwater quality and/or stormwater quantity issue and identification of the amount of rainfall that caused the issue, based on the nearest reliable rain gauge, news articles about the issue, or other information that clearly demonstrates the issue. Attach this information to this Certification Form, if available.

AND

2. Demonstrate that the Applicant would Experience a Significant Hardship raising the Revenue Necessary to Finance Stormwater Management Activities within its Jurisdiction. (Required by Session Law 2021-180 Section 12.14.(d)(ii))

Select the method to demonstrate significant hardship below:

☒ Applicant Will Rely on Item 2.A: LGU Indicators or Benefits to Disadvantaged Areas,

OR

☐ Applicant Will Rely on Item 2.B: Develop and Implement a New Stormwater Utility

➢ **Item 2.A: For applications for Stormwater Construction (LASII) and Stormwater Planning Grants (LASII).** Does not apply to applications to Develop and Implement a New Stormwater Utility.
An applicant must demonstrate eligibility by meeting either of the two criteria below (Criterion 1 or Criterion 2):

Criterion 1: At least one (1) of the five (5) five Local Government Unit (LGU) Indicators for the applicant are worse than the state benchmarks shown in the table below. The values for the LGU Indicators for all municipalities and counties in North Carolina are provided in tables on the Division application webpage.

Local Government Unit Indicator		State Benchmarks for Fall 2022 Applications	Enter Value of Local Government Unit Indicator of Applicant [2,3]
1. Population Change	< =	4.5%	-0.50%
2. Poverty Rate	> =	14.0%	23.2%
3. Median Household Income	< =	$56,642	$43,126
4. Unemployment Rate	> =	7.1%	8.6%
5. Per Capita Appraised Value of Property	< =	$125,015	$88,067

OR

Criterion 2: The City or County as a whole does not meet Criterion 1 but is applying for stormwater projects that primarily benefit disadvantaged areas within the City's or County's jurisdiction. To be eligible, 75 percent or more of the project construction costs (as delineated in the Project Budget) must be used to directly benefit disadvantaged areas.

Disadvantaged areas may be subsections or pockets of a City's or County's jurisdiction, rather than the entire City or County. For instance, disadvantaged areas may be census block groups that meet qualifying characteristics. The targeted project area will be determined a "disadvantaged area" based on factors that shall include:

- Median household income, poverty rates, per capita appraised property values of property, and/or employment rates of the targeted project area,
- Additional factors that may qualify the targeted project area as disadvantaged, such as but not limited to demographic, historical, cultural, linguistic, socioeconomic stressors, or cost-of-living stressors may also be considered.

[2] If two or more eligible applicants are working together on the proposed project and the collaboration is necessary in order to accomplish the construction project or to accomplish the goals of the study, enter the LGU Indicator values for the most distressed of the municipalities or counties.

[3] Please use the Local Government Unit Parameters (which supplies values for population change, poverty rate, median household income, unemployment rate, and property valuation per capita for all cities and counties in North Carolina) available on the Division application webpage.

Use of federal or state-generated maps to demonstrate that a targeted project area is disadvantaged is encouraged. For instance, using screenshots or printouts of NC DEQ's Community Mapping System, labeling and identifying on the map the targeted project area overlapping "Potentially Underserved Block Groups" and/or "Tribal Boundaries" that appear on the online map as shaded areas (these are considered disadvantaged areas).

For Criterion 2, the proposed project is not required to be located *within* a disadvantaged area, but the project *must result in* water quality improvements within the disadvantaged area and/or reduce water quantity impacts within the disadvantaged area. Over 75 percent of the project's construction costs must be used to provide these benefits to the disadvantaged areas to qualify under Criterion 2.

For Criterion 2, to document that the direct beneficiaries of the project are disadvantaged, provide:

A. A narrative, with or without a map, describing the project location, areas in which project benefits are anticipated, and disadvantaged area(s).
   - Example Map Documentation: Screenshots or printouts of NC DEQ's Community Mapping System, or similar federal or state-generated map, with project location and areas in which project benefits are anticipated overlayed on top of Potentially Underserved Block Groups and/or Tribal Boundaries. Attach screenshots or printouts of maps to this Certification Form.
   - Narrative Documentation: Narrative must sufficiently describe disadvantaged factors of the areas where the project benefits will accrue, including median household income, poverty rates, per capita appraised property values of property, and/or employment rates of the targeted project area. Additional factors that may qualify the benefiting areas as disadvantaged, such as but not limited to demographic, historical, cultural, linguistic, socioeconomic stressors, or cost-of-living stressors.

N/A. Using Criterion 1.

B. For Criterion 2, demonstrate that 75 percent or more of the project's construction cost (as shown in the Project Budget) will be used to benefit disadvantaged areas. Complete the Project Budget in the application and clearly label and shown costs that benefit disadvantaged areas separately from other costs.

In this Certification Form, provide the following summary:

Cost Estimated in the Project Budget	**Division Funding Requested (Total, from Project Budget)**	**Portion that Benefits Disadvantaged Areas**	**Portion that Does Not Benefit Disadvantaged Areas**
Construction Costs			
N/A	N/A	N/A	N/A
Contingency (10% of construction costs):			
Construction Subtotal:			

C. For Criterion 2, provide a description of how the proposed project will reduce the impact(s) of the described stormwater quality issue and/or stormwater quantity issue within the disadvantaged area. **If the proposed project will address both stormwater quality and stormwater quantity issues, provide a separate description for each issue.**

N/A

- **<u>Item 2.B</u>: For applications to Develop and Implement a New Stormwater Utility (LASII).** Does not apply to applications for stormwater construction and stormwater planning grants.

If the city or county does not have a stormwater utility with a Stormwater Enterprise Fund and the project purpose described in Part 1.A of this Entity Eligibility Certification Form is to develop and implement a new Stormwater Utility, the city or county will have met the requirement to demonstrate that there is a significant hardship in raising the revenue necessary to finance stormwater management activities within its jurisdiction. The grant amount for which a city or county will be eligible will be capped at different levels based on the number of LGU Indicators (from Criterion 1) that are worse than the state benchmarks.

For Item 2.B, include a Resolution by the Governing Body stating that the city or county does not currently have a Stormwater Utility with a Stormwater Enterprise Fund, but will develop and implement a stormwater utility and Stormwater Enterprise Fund during the project. See the Division's application webpage for a template resolution. The resolution must be included as part of the application package. Please also attach it to this Certification Form, or provide a statement here that the Resolution for Developing and Implementing a Stormwater Utility with a Stormwater Enterprise Fund is included with the application package. N/A.

AND, IF APPLICABLE

3. Documentation that the Applicant is a Regional Council of Government created pursuant to Part 2 of Article 20 of Chapter 160A of the North Carolina General Statutes or the Applicant is a Nonprofit Entity, and that the Regional Council of Government or Nonprofit Entity is Partnering with an Eligible City or County.

If applicable, provide the following information below:

A. Name and address of regional council of government or nonprofit entity

B. Name, title, and contact information for the person with the entity named above that will be the primary contact for this project

C. Name, title, and contact information for the person with the eligible city or county that will be the primary contact for this project

D. Copy of the executed instrument used to establish the partnership arrangement between the entity named above and the eligible city or county

Certification by Authorized Representative

The above statements and all attached exhibits are hereby made part of this LASII Entity Eligibility Certification Form, and the undersigned representative of the Applicant certifies that the information in this Form and the statements and exhibits are true, correct, and complete to the best of his/her knowledge and belief.

LASII Entity Eligibility Certification Form Signature

Please Note: Original signatures are required for each Certification Form

W. T. Bass II , Director of Public Works , 9/26/22

SIGNATURE OF AUTHORIZED REPRESENTATIVE

TYPED NAME **TYPED TITLE** **DATE**