



**Wake Forest Board of Commissioners Work Session
Meeting Agenda
April 02, 2024 at 6:00 PM**

1. Presentations

- 1.1. Presentation of the Horse Creek Watershed Study
[Attachment_A_03052024_Summary.docx](#)
[Attachment_B_Watershed_Report.pdf](#)
- 1.2. Unified Development Ordinance (UDO) Comprehensive Update - Work Session #6
[UDO Comprehensive Update Work Session #6 Agenda Summary](#)
- 1.3. Presentation of CEI Scope for FY22 Bond Project Dunn Creek Greenway Phases 3 and 4.
[Agenda Summary_04022024.pdf](#)
[Attachment A_Proposed CEI Scope and Fee.pdf](#)

2. Discussion of Monthly Financial Report

- 2.1. February Monthly Financial Summaries
[Monthly Financial Report_summary.pdf](#)
[February 29, 2024 Financial Summaries.pdf](#)

3. Review of Draft Agenda for Upcoming Regular Meeting

- 3.1. Review of Draft Agenda for Upcoming Regular Meeting
[DraftBOCAgenda_Apr202416.pdf](#)

4. Other Business

- 4.1. Closed Session: NCGS 143-318.11(5) -To establish, or to instruct the public body's staff or negotiating agents concerning the position to be taken by or on behalf of the public body in negotiating (i) the price and other material terms of a contract or proposed contract for the acquisition of real property by purchase, option, exchange, or lease

5. Commissioner Reports

6. Adjournment



Board of Commissioners Work Session Agenda Item Report

Agenda Item No.: 2024-38-
Submitted by: Steven Meyer
Submitting Department: Engineering
Meeting Date: April 2, 2024

SUBJECT

Presentation of the Horse Creek Watershed Study

Recommendation:

Approval

Item Summary:

ATTACHMENTS

- [Attachment_A_03052024_Summary.docx](#)
- [Attachment_B_Watershed_Report.pdf](#)

Agenda Item: Horse Creek Watershed Study

Summary: The Horse Creek Watershed is one of the watersheds within the Town of Wake Forest. KCI Technologies has developed a water quality model that can be utilized to support the watershed management plan. The model will be used in tracking compliance with the Falls Lake Nutrient Sensitive Waters (NSW) requirements, and in specifically with the UNRBA's Interim Alternative Implementation Approach (IAIA) to the Neuse Sensitive Waters (NSW) strategy. The watershed plan will serve as a guide for efforts to manage nutrient pollution in the Horse Creek Watershed going forward.

Attachments: Attachment_A_04022024_Summary
 Attachment_B_Watershed_Report



Horse Creek Watershed Plan

DEVELOPED FOR THE TOWN OF WAKE FOREST, NORTH CAROLINA



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Appendix A – WTM Model Methodology

Appendix B – Implementation Plan Methodology

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Executive Summary

Falls Lake, in the Piedmont of North Carolina, is classified as a Nutrient-Sensitive Water (NSW) by the North Carolina Department of Environmental Quality (DEQ). The Upper Neuse River Basin Association (UNRBA) developed an Interim Alternative Implementation Approach (IAIA) to the NSW strategy so that communities with land draining to the lake may take actions to reduce nutrient loading. A portion of the land within the Horse Creek Watershed, which drains to Falls Lake, lies within the jurisdiction of the Town of Wake Forest (TOWF). As such, the Town has developed a watershed plan supported by an empirical water quality modeling framework that examines existing and future pollutant loading conditions within the watershed. The plan identifies and prioritizes projects that the TOWF may implement to comply with the IAIA and reduce nonpoint sources of nutrients to Falls Lake. The work conducted to produce this plan was funded through the American Rescue Plan Act (ARPA).

1.0 Introduction

1.1 Background, Purpose, and Need

As a member of the Upper Neuse Basin Association (UNRBA), it is in the interest of the Town of Wake Forest (TOWF) to have a watershed plan developed for the Horse Creek watershed, and to have that watershed plan supported by an empirical water quality modeling framework that will allow for examination of existing and future pollutant loading conditions, specifically nutrient loading, within the watershed. The watershed plan and supporting model framework will be used in tracking compliance with the Falls Lake Nutrient Sensitive Waters (NSW) requirements (discussed below), and in specifically with the UNRBA's Interim Alternative Implementation Approach (IAIA) to the NSW strategy. Rather than continuing to rely on hard numeric targets for nutrient load reduction to improve water quality in the lake, the IAIA stipulates that each member government meet a financial spending target annually toward the development and implementation of water quality improvement projects. The North Carolina Department of Environmental Quality (DEQ) approved the IAIA within a context of adaptive management, such that as long as water quality monitoring data showed improvement in the Lake, the IAIA would continue to stand in lieu of the numeric loading targets.

In this case, the watershed modeling framework developed to support this watershed plan relies on the well-established, Watershed Treatment Model (WTM), originally developed by the [Center for Watershed Protection](#). The WTM and associated methods and results specific to the Horse Creek Watershed are described at length in Chapter 3 and Appendix A. This watershed plan and supporting model framework are intended to help guide the town by identifying a suite of project opportunities, such as implementation of new stormwater structural control measures (referred to in this document as BMP Retrofits) within existing, already developed landscapes, or stream restoration projects, and to illustrate the nutrient load reductions resulting from those projects. The plan also seeks to prioritize projects by factors such as ease of implementation (feasibility) and cost-effectiveness in order to assist decision-makers in setting priorities and making meaningful investments in water quality improvement going forward.

The model will be developed for the closest approximation of the Wake County portion of the Horse Creek watershed that is consistent with the subwatersheds utilized for the UNRBA's Watershed Analysis Risk Management Framework (WARMF) watershed model in maintain consistency with that larger assessment and management effort. The Wake County portion of the Horse Creek Watershed was also selected as the study area because it represents a likely westward growth area for the TOWF.

1.1.1 Falls Lake Impairment

The Falls Lake Reservoir (“Lake”) is a 12,400-acre impoundment that was created by the US Army Corps of Engineers to provide flood control and recreation on the Neuse River. Work began on the Falls Lake dam in 1978. It was completed in 1981 and impounds an average volume of 114,740 acre-feet. The Lake is also a major local water supply to surrounding communities. In Wake County, it supplies 41 million gallons per day in drinking water for approximately 500,000 people.

The Falls Lake contributing watershed (**Figure 1**) drains 770 square miles across six counties (Durham, Franklin, Granville, Orange, Person, and Wake counties) in the north-central portion of North Carolina. The watershed is currently 59% forested, 16% agriculture, and 15% developed, with approximately 90,000 residents. However, the area is rapidly developing, given its proximity to the cities of Raleigh, Durham, and Chapel Hill.

In recent years shallow upper portions of the Lake have experienced frequent violations of water quality standards for chlorophyll *a*, an indicator of algal productivity and blooms which is used to measure the impact of nutrient pollution. The Lake has exceeded the State’s chlorophyll *a* standard since 2008 and continues to exceed standards. Although the Lake has recently experienced fewer violations since a peak during the 2005-2007 monitoring period, some segments are still on DEQ List of Impaired Waters.

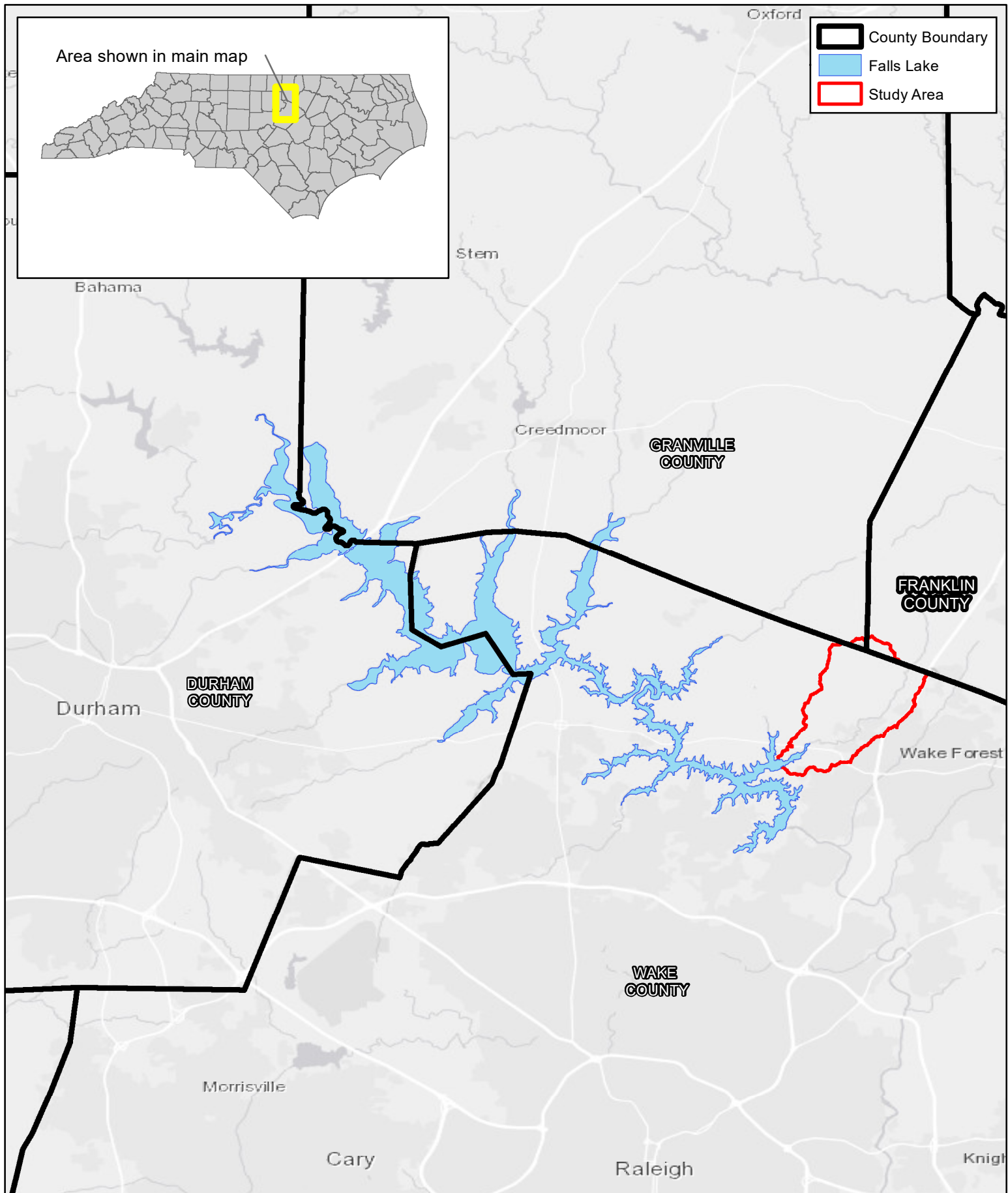
Primary Surface Water Classifications are designations applied to surface water bodies by the DEQ Division of Water Resources (DWR) to define the best uses to be protected within these waters, and as a tool that state and federal agencies can use to manage and protect all streams, rivers, lakes, and other surface waters. Supplemental classifications are sometimes added by DWR to the primary classifications to provide additional protection to waters with special uses or values. The waters within Falls Lake have been assigned a primary classification of Class C, WS-IV, and a supplementary classification of Nutrient Sensitive Waters (NSW), which is intended for waters needing additional nutrient management due to being subject to excessive growths of microscopic or macroscopic vegetation.

1.1.2 Falls Lake Nutrient Management Strategy

To address the NSW designation and improve the water quality of the Lake without discouraging development within the contributing watershed, the NC General Assembly implemented the Falls Lake Nutrient Management Strategy in 2011. Also known as the Falls Lake Rules (“Rules”), the Rules are a nutrient management strategy designed to restore water quality in the Lake by reducing the amount of pollution entering upstream.

The Rules require nutrient load reductions related to all potential sources within the watershed, including wastewater discharges, agriculture, and new and existing development. They establish nutrient loading levels from 2006 as the baseline year. Phase 1 of the Rules targets an overall 20% reduction in nitrogen and a 40% reduction in phosphorous from baseline. Phase 2 targets will eventually require a 40% reduction in nitrogen loading and a 77% reduction in phosphorous.

To help achieve these reductions, the Rules place strict requirements on new development within all areas of the watershed. The Rules also require DEQ to report on the lake’s status every five years. The most recent report was completed in 2021. It indicated that both agriculture and wastewater segments have achieved reductions greater than those required in the rules. Successful reductions allowed DEQ to



consider alternative compliance/implementation strategies to address loading from existing development.

1.1.3 UNRBA and Interim Alternative Implementation Approach

The Upper Neuse Basin Association is an association of communities in the upper Neuse River Basin. In 2018, UNRBA started working on ideas for communities to comply with the Falls Lake Rules, which will be up for re-adoption in 2025. As a result of this work, member communities developed an Interim Alternative Implementation Approach (IAIA) strategy to address NSW. The IAIA is a voluntary approach for communities to take steps to reduce nutrient loads so that additional restrictions on existing land use and new development are not put into place. Through the IAIA, member communities can demonstrate commitment to addressing NSW by implementing water quality projects in their respective portions of the Falls Lake Watershed on an annual basis. Financial commitments for each community were determined by the relative percentage of contributing area to Falls Lake that lies within jurisdictional boundaries. **Table 1** shows the TOWF annual financial commitment to funding water quality projects under the IAIA, respective to funding levels of neighboring communities.

Table 1. Local Government Financial Commitment Levels for Members that Choose to Participate in the Stage I ED IAIA

Member	Annual Funding Level	Member	Annual Funding Level
Town of Butner	\$23,393	Town of Hillsborough	\$34,221
City of Creedmoor	\$16,926	Orange County	\$161,943
City of Durham	\$337,587	Person County	\$114,394
Durham County	\$133,300	City of Raleigh	\$466,081
Franklin County	\$19,058	Wake County	\$88,968
Granville County	\$100,453	Town of Wake Forest	\$13,692
Town of Stem	\$11,605		

1.2 Watershed-Based Plan

Watershed planning is an effective method of documentation for community efforts to maintain, protect, or restore the natural resources within a watershed while also enhancing the quality of life for residents. It is in the best interest of the TOWF to have a localized water quality model that can be utilized to support a watershed plan for Horse Creek. A local model will help pinpoint potential sources of nutrients within the Horse Creek Watershed, both under current and projected future land use conditions. It can also be used to estimate the benefits of a variety of potential practices and structural control measures the TOWF could implement to reduce nutrient loads within the watershed.

The TOWF has elected to complete the Horse Creek Watershed Study (“Study”) to document existing conditions within the watershed via the results of the local watershed model, and to identify and prioritize potential activities that the Town can implement to track compliance with the Falls Lake NSW requirements, and specifically with the UNRBA’s IAIA to the NSW strategy. The results of the Study are documented within this watershed plan.

1.3 Study Goals and Objectives

The goals of the Horse Creek Watershed Study are to:

- Identify opportunities for new stormwater management practices or retrofits within the TOWF-managed portion of the Horse Creek Watershed that drains to Falls Lake.
- Identify degraded stream reaches and stream restoration opportunities within the Horse Creek Watershed.
- Provide a tool to help manage future change within the Watershed.

The Watershed Treatment Model (WTM), developed by the Center for Watershed Protection, is a relatively low-cost method that can be used to estimate pollutant loads from existing land uses. WTM requires basic land use information and calculates surface runoff loads. Pollutants modeled include total nitrogen (TN), total phosphorus (TP), total suspended solids (TSS) and fecal coliform.

The TOWF elected to use WTM for the Horse Creek Watershed Study due to the scale of the study watershed, available existing data for modeling, and the capabilities within the model to evaluate the benefits of a variety of activities to improve water quality, including implementation of Stormwater Control Measures (SCMs) and nature-based solutions such as stream restoration. The watershed and subwatershed boundaries of the individual WTMs established in the Horse Creek Watershed Study were established to coincide with the subwatershed and catchment boundaries utilized in the UNRBA WARMF model, to maintain consistency with that collaborative study sponsored by the UNRBA.

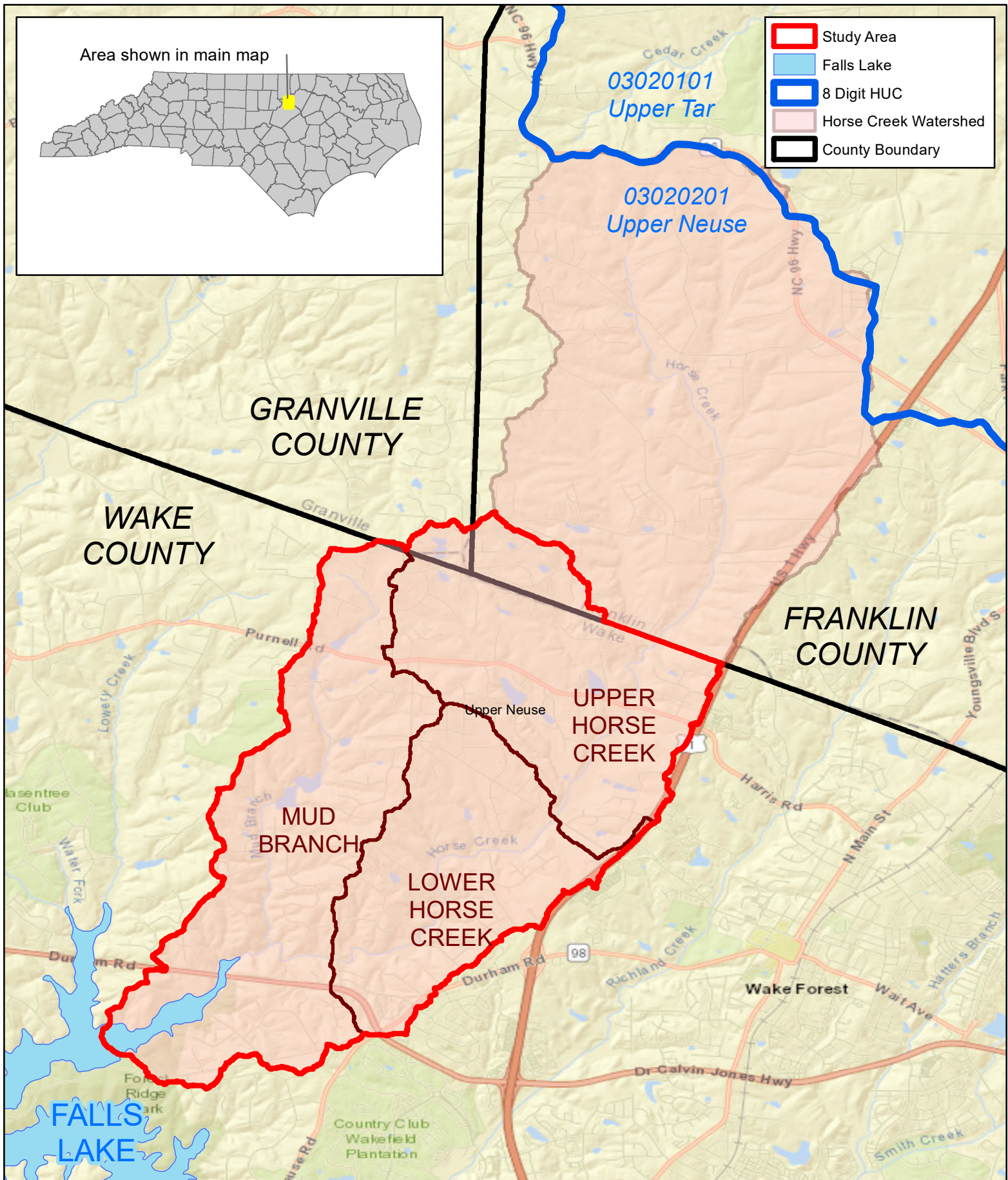
2.0 Analysis of Watershed Conditions

2.1 Location and Boundaries

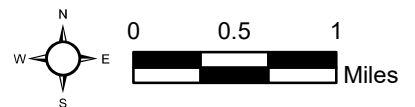
The Horse Creek Watershed is located at the western edge of the TOWF, and spans the intersection of Wake County, Franklin County, and Granville County. The watershed is drained by two named tributaries, Horse Creek to the east, and Mud Branch to the west. The two tributaries join just upstream of Highway 98/Durham Road and flow south into the lower portion of Falls Lake near Forest Ridge Park.

The entire Horse Creek Watershed is 15.6 square miles (9,984 acres). This study will focus on the 8.9 square mile portion of the lower watershed that is mostly located within Wake County, referred to as the Study Area, and shown in **Figure 2**. The upper portion of the Study Area includes small areas within Franklin and Granville counties. Information and analysis in subsequent sections of this report apply to the Study Area portion of the greater Horse Creek Watershed. As such, model results will not reflect actual in-stream nutrient loading, but rather, the fraction of in-stream nutrients contributed by the portions of the watershed within the Study Area. Appendix B contains additional information on how the Study Area was determined.

To facilitate WTM analysis, the Study Area was further subdivided into three sections. The portion of Horse Creek upstream of the confluence with Mud Branch was divided into two subwatersheds, Upper Horse Creek and Lower Horse Creek. The Upper Horse Creek subwatershed begins at the northern boundary of the Study Area and extends downstream to where Horse Creek crosses Jenkins Road. The Lower Horse Creek subwatershed extends from this point downstream to the confluence with Mud Branch. A third subwatershed includes the Mud Creek drainage to the west and the portion of the Horse Creek drainage downstream of the confluence with Mud Branch. These Study Area subwatersheds are shown in **Figure 2**.



**Horse Creek Watershed
Figure 2. Watershed Map**



Map Created: February 2023
Image Source: NC Statewide
Orthoimagery, 2015

2.2 Climate

Climate influences soil formation and erosion processes, stream flow patterns, vegetation coverage, and a significant part of the geomorphology of a watershed. Precipitation not only provides water to streams and vegetation, but the intensity, frequency, and amount of rainfall can greatly influence watershed characteristics. Wake County, where the Horse Creek Watershed is located, is in the southeastern climatic region of the U.S. and has a temperate climate with a mean annual temperature of 61.5°F and a mean annual rainfall of 47.3 inches (NCEI.NOAA.gov), as summarized in **Table 2**. The mean annual rainfall is the precipitation value utilized by the WTM for the water quality analysis.

Table 2. Monthly mean climate data for Wake County, NC (Source: NOAA NOWData)

Month	Mean Temperature (F)	Mean Maximum Temperature (F)	Mean Minimum Temperature (F)	Mean Precipitation (inches)
January	41.6	51.7	31.6	3.7
February	45.2	56	34.4	3.4
March	52.3	63.8	40.9	4.3
April	61	73	49.1	3.2
May	69	80.1	58	4
June	77	87.9	66.2	4.3
July	80.4	90.7	70.1	4.6
August	79.2	89.1	69.3	4.6
September	72.8	82.8	62.9	4.6
October	62.1	73.3	51	3.8
November	51.6	63.3	39.9	3.2
December	44.9	55.1	34.7	3.6
Annual	61.5	72.3	50.7	47.3

2.3 Physiography and Land Use

The Horse Creek Watershed and the TOWF are in the Piedmont physiographic province, an area in the geographic center of North Carolina that is characterized by gently rolling, well-rounded hills and long, low ridges with a few hundred feet of elevation difference between the hills and the valleys. Specifically, the watershed lies in the Northern Outer Piedmont level IV ecoregion, an area of dissected irregular plains with low rounded hills. Within the Northern Outer Piedmont, potential natural vegetation includes mixed oak forest or oak-hickory-pine forest, comprised mainly of white oak (*Quercus alba*), southern red oak (*Quercus falcata*), black oak (*Quercus velutina*), mockernut and pignut hickories (*Carya tomentosa* and *Carya glabra*), with some shortleaf pine (*Pinus echinata*) and loblolly pine (*Pinus taeda*) (Griffith et al). The average elevation within the Horse Creek watershed is 416 feet, with a range from 251 feet at the average water surface level of Falls Lake, to 555 feet. The higher areas are generally located along the eastern and western watershed boundaries in the northern area of the watershed.

Land use within the Study Area may be characterized as low-to-medium density development within the eastern half of the watershed, with areas of mixed forest dispersed with more rural development in the

western half of the watershed (**Figure 3**). Most of the land within the Study Area is privately owned. There are no large areas of agricultural or livestock production. **Table 3** details land use classes within each subwatershed.

Table 3. Study Area Land Cover Data

Category	Upper Horse Creek	Lower Horse Creek	Mud Branch
Residential - LDR (<1 du/acre)	14%	13%	8%
Residential - MDR (1-4 du/acre)	2%	4%	1%
Residential - HDR (>4 du/acre)	<1%	1%	<1%
Commercial	34%	25%	16%
Roadway	0%	<1%	<1%
Forest	45%	50%	61%
Rural	4%	6%	10%
Open Water	1%	<1%	4%

2.4 Surface Water Resources

Northern Outer Piedmont streams tend to have low to moderate gradient, with beds comprised mostly of cobble, gravel, and sandy substrates (Griffith et al).

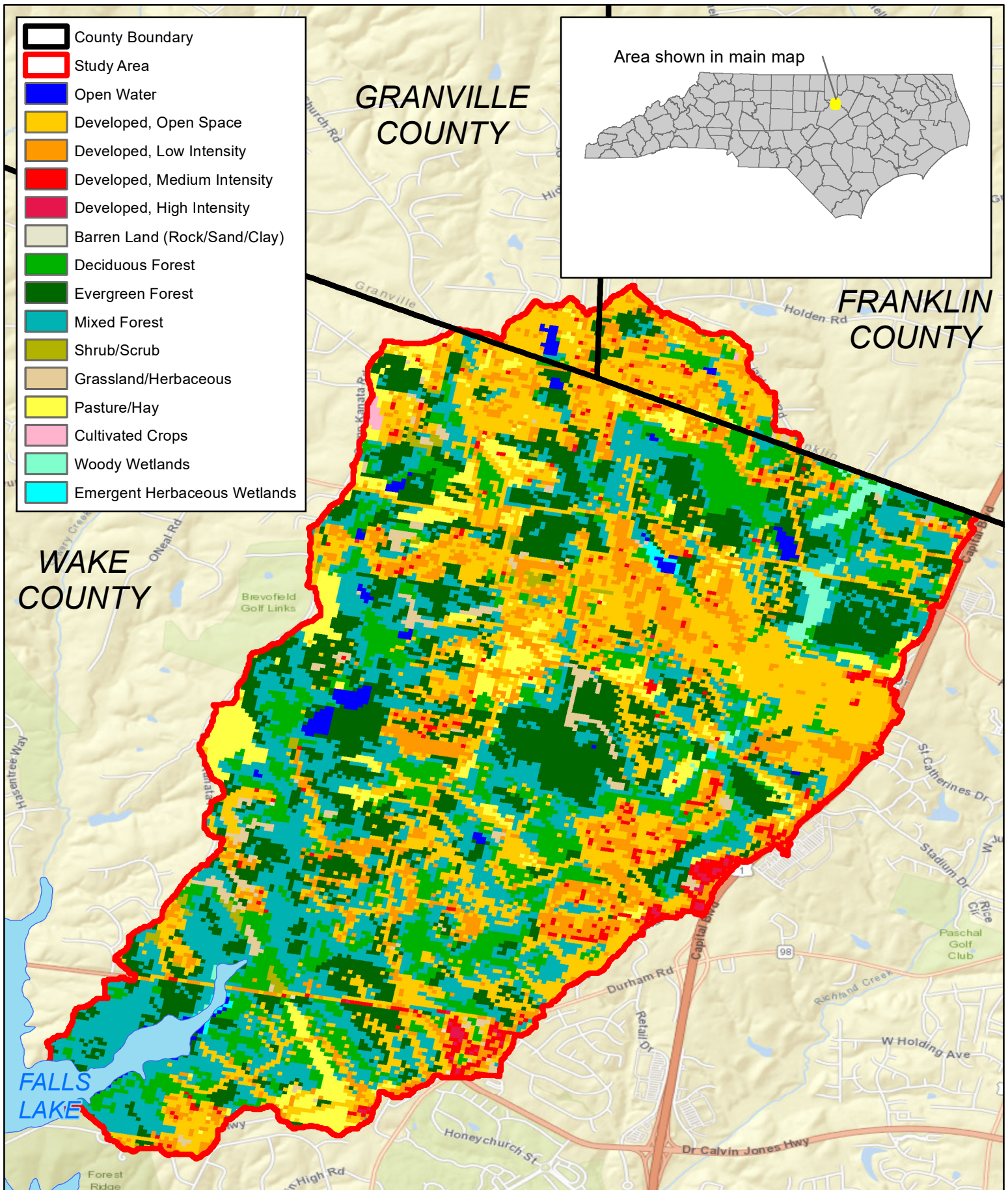
NCDOT ATLAS stream and waterbody data were used to spatially represent surface water features within the Study Area (**Figure 4**). This dataset was developed by the North Carolina Department of Transportation and is described in **Appendix A**. Horse Creek, the largest stream within the Study Area, is an 5th order stream where it flows into Falls Lake. One other named stream, Mud Branch, drains the western portion of the Study Area and flows into Horse Creek just upstream of where it enters Falls Lake. **Table 4** details the miles of stream within the Study Area.

The largest waterbody in the Study Area is Falls Lake. There are several other small impoundments within the study area, which can generally be classified as either small farm ponds, flood control ponds, or amenity/water quality ponds (for stormwater management) within subdivisions. Most occur along upper first- and second-order unnamed tributaries; however, several ponds are also located on the main stem of Mud Branch. The two largest ponds occur just upstream of Purnell Road, on an unnamed Tributary to Horse Creek, and south of Purnell Road, along Fairlake Drive on a separate unnamed tributary to Horse Creek.

Table 4. Study Area Streams

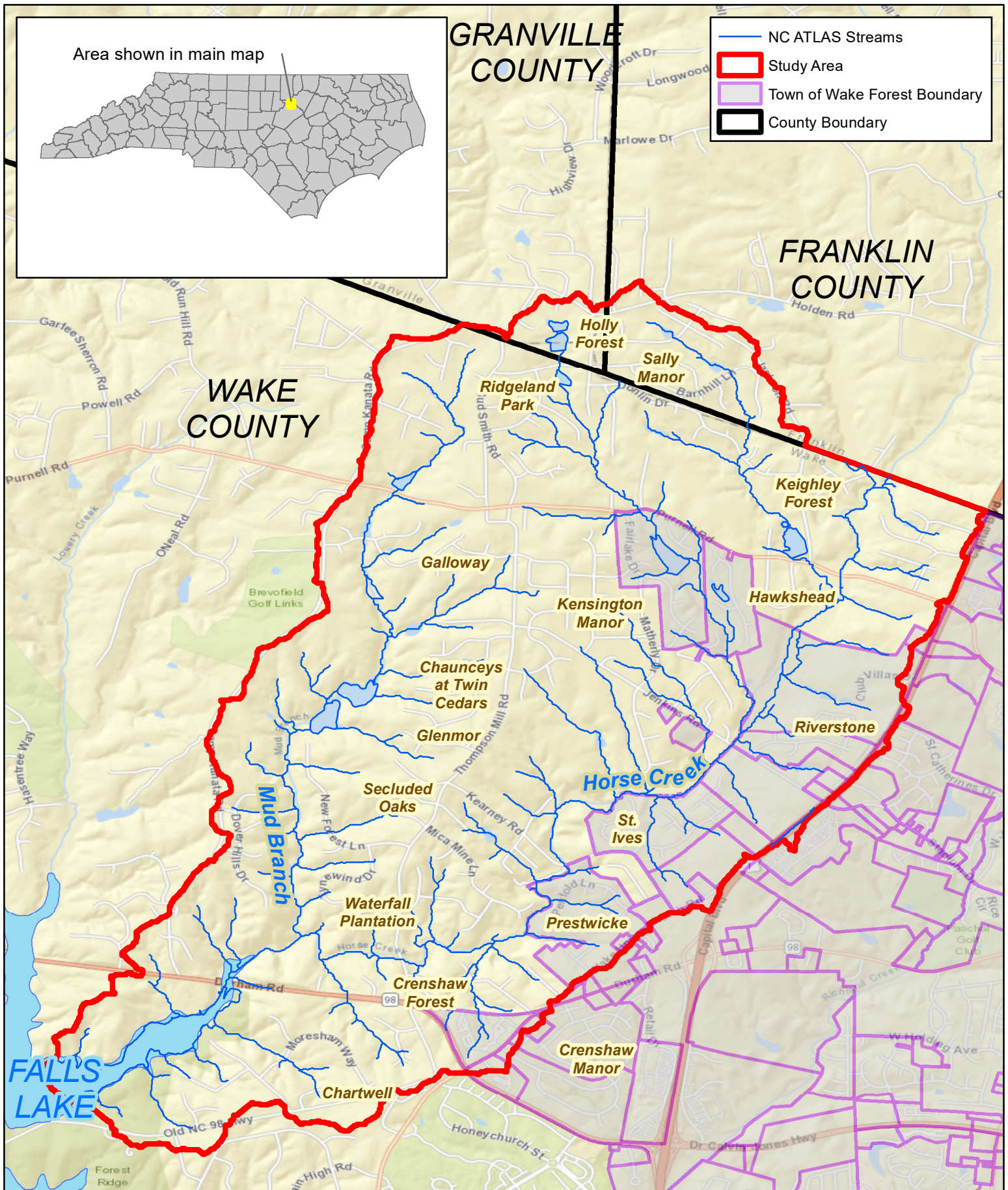
Stream Name	Length (miles)
Horse Creek and Tributaries	30.02
Mud Branch and Tributaries	10.73
Unnamed Tributaries to Falls Lake	2.58

There are few areas of intact and contiguous wetlands within the Study Area. The largest areas are within the floodplain of Horse Creek, particularly upstream of Purnell Road. These areas can be seen on **Figure 3**.



Horse Creek Watershed Study
Figure 3. Land Cover Map

Map Created: Decemeber 2023
 Image Source: NC Statewide
 Orthoimagery, 2015



2.5 Geology and Soils

Wake County lies within the Raleigh belt, a geologic region primarily composed of granite, gneiss, and schist. The eastern portion of the Horse Creek falls within the Crabtree terrane, and the western portion lies within the Falls Lake terrane. Terranes are crust fragments formed on a tectonic plate and accreted or "sutured" to crust lying on another plate. The crustal block or fragment preserves its distinctive geologic history, which is different from the surrounding areas. In general, the Crabtree terrane contains more foliated metamorphosed rocks such as gneiss, and the Falls Lake terrain contains more schist. Both geologic formations erode to form soils with sandy clay interspersed with sandy saprolite and rock outcrops.

Soils within the Study Area are predominantly Chewacla and Wehadkee loam within the Upper and Lower Horse Creek subwatersheds, and Pacolet Sandy Loam in the Mud Branch subwatershed. Chewacla and Wehadkee loams are somewhat poorly to poorly drained soils typically found within alluvial floodplains of the Piedmont. Pacolet soils tend to be well drained and are more typical of forested pine and mixed hardwood hillslopes.

WTM utilizes the Hydrologic Group soil classification to assign infiltration potential and runoff properties in its calculations. Soils within the Study Area are distributed by hydrologic group as shown in **Table 5**.

Table 5. Soil Hydrologic Groups within Study Area subwatersheds

Hydrologic Soil Group	Upper Horse Creek	Lower Horse Creek	Mud Branch
Group A: Soils having a high infiltration rate (or low runoff potential) when thoroughly wet. These consist mainly of deep, well-drained sands or gravelly sands. These soils have a high rate of water transmission.	46%	50%	40%
Group B: Soils having a moderate infiltration rate when thoroughly wet	36%	35%	48%
Group C: Soils having a slow infiltration rate when thoroughly wet. These soils typically have a layer that impedes the downward movement of water.	1%	<1%	1%
Group D: Soils that have a very slow infiltration rate (or high runoff potential) when thoroughly wet. Generally, these are soils that have a clay layer at or near the surface; soils that have a high water table; and/or soils that are shallow over nearly impervious material.	14%	11%	7%

2.6 Political Jurisdictions / Relevant Authorities

The Study Area contains land within the limits of the TOWF, as well as land in unincorporated areas of Wake, Franklin, and Granville Counties.

Several areas within the Study Area that are surrounded by areas of incorporated Wake Forest, but which are technically outside the current jurisdictional town limits, are governed by the Town through the establishment of an Extra-Territorial Jurisdiction (ETJ) agreement between the TOWF and Wake County.

These ETJ areas enable the Town to better ensure that development patterns and associated infrastructure will allow the efficient provision of urban services as the Town grows into that area.

2.7 Growth and Development Patterns

Land cover indicates the physical land type, such as forest or open water. Land use describes how people are managing the landscape, such as for development or conservation. Different types of land cover can be managed or used differently, such as rural versus residential areas. For the purposes of the Horse Creek Watershed Study, the project team evaluated both current and future land use.

All properties located within the Wake Forest Town Limits or ETJ are subject to the requirements of a specified zoning district and associated zoning and building regulations. Wake County also has a Unified Development Ordinance (UDO) to guide development in areas outside of the jurisdiction of municipalities. The County is in the process of implementing a new intentional growth framework called PLANWake, which was adopted in 2021, and is intended to guide growth for the next 10 years. PLANWake specifies minimum standards for development within unincorporated areas and may outline a plan to transition county jurisdiction to municipal jurisdiction in the future within areas experiencing rapid growth. Granville and Franklin Counties also have their own development guidance.

Zoning and development guidelines from the four governmental units within the study area were used to determine the area of land eligible for development under maximum buildout conditions within each subwatershed, as documented in **Appendix A. Table 6** documents the acres of land in each subwatershed that were found to be eligible to be developed and modeled as such under the Future Conditions modeling scenario. By virtue of this process, parcels of land that were not currently developed to the maximum built-upon density were simulated at the maximum developed density under Future Conditions.

Table 6. Acres of Land for Future Development

Category	Upper Horse Creek	Lower Horse Creek	Mud Branch
	Additional Development (acres)		
Residential - LDR (<1 du/acre)	-	22.94	55.53
Residential - MDR (1-4 du/acre)	238.00	113.81	573.04
Residential - HDR (>4 du/acre)	198.19	65.56	-
Multifamily	4.88	-	-
Commercial	-	74.12	2.00

2.8 MS4 and Stormwater

The National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Program is mandated under the federal Clean Water Act. In North Carolina, the EPA has delegated MS4 Program oversight to DEQ. The TOWF is a 2000 census designee. As such, the US Environmental Protection Agency designated the Town for inclusion in the Phase II stormwater program because its municipal boundary intersects a US Census-defined Urbanized Area. As a NPDES community, the Town is required to follow the six minimum control measures (MCM's) established by the EPA:

- 1) Public Education and Outreach;
- 2) Public Participation/Involvement;

- 3) Illicit Discharge Detection and Elimination;
- 4) Construction Site Runoff Control;
- 5) Post Construction Runoff Control; and
- 6) Pollution Prevention/Good Housekeeping.

The Town of Wake Forest utilizes the NCDEQ Stormwater Design Manual for design criteria regarding Phase II stormwater regulations. The Town's Unified Development Ordinance (Chapter 12) and Manual Specifications, Standards & Design (Chapter 2) detail stormwater design requirements for new development within the municipal boundaries and ETJs.

The NPDES Phase II requirements ensure that all SCMs have an associated Operations and Maintenance Agreement. This agreement requires the SCMs to be inspected annually to make sure they are functioning properly to prevent flooding and keep our waterways clean. The Town requires owners of SCMs to submit their annual inspection reports completed by a qualified inspector to the Stormwater Engineer and should have a record for the past 5 years of inspection, maintenance, and repairs available for the Town.

2.9 Sanitary Sewer Providers

The City of Raleigh provides sanitary sewer service to a portion of the Study Area, including the Kensington Manor, Prestwicke, Riverstone, and St. Ives neighborhoods along Jenkins Road. Most parcels in the Study Area, including those outside areas with existing sewer service, were assumed to be on septic systems. Appendix A details the methodology used to determine the waste disposal service associated with each parcel.

2.10 Recreational Uses

As mentioned in Section 2.3, much of the land within the Study Area is privately owned. Access to Falls Lake provides the dominant recreational uses within the Study Area. A portion of Forest Ridge Park, owned by Wake County, falls within the lower portion of the Study Area, adjacent to the Lake. A former golf course, located adjacent to Horse Creek off Club Villas Drive, ceased operation in the early 2000s. While the site is privately owned and has not been redeveloped, there is a conservation easement associated with a compensatory mitigation stream site, which is administered by NCDEQ, along Horse Creek within the former golf course property. YMCA Camp Kanata, which serves as a regional destination for YMCA youth activities and summer camps, is also located along the western edge of the Study Area.

2.11 Stakeholder Input

To better capture the full spectrum of watershed issues, and to tailor solutions to address those issues, the TOWF conducted several community outreach efforts in conjunction with the Horse Creek Watershed Study. The Town created a public-facing website that detailed the purpose and goals of the Study. The website featured a link to an online survey, where community members could provide the location and details of potential



Erosion at dam in the Fairlake neighborhood, identified as a stakeholder concern.

water quality and quantity issues, such as flooding, erosion, and potential sources of nutrients and contaminants. The survey also collected information on stakeholder preferences and priorities.

The Town also held an online community meeting, where stakeholders could ask questions about the purpose and goals of the study, contribute ideas for water quality needs and improvements, and make comments about other watershed issues. A detailed summary of priorities that were identified for the watershed by stakeholders, as well as potential sources of nutrient and sediment inputs identified by stakeholders, are included in **Appendix C**.

3.0 Watershed Treatment Model Results

This section contains a summary of the modeling results for the Horse Creek Watershed Study. For a full description of data sources and methods, see **Appendix A**.

3.1 Existing Conditions

WTM models were produced to simulate loading estimates (total nitrogen, total phosphorous, Total Suspended Solids (TSS, a proxy for sediment), and Fecal Coliform bacteria (FC) for each of the three subwatersheds of the Study Area under the current land use and BMP conditions. **Table 7** details the existing loads and loads per acre computed by WTM for the three subwatersheds, as well as the total loads delivered to Falls Lake from the Study Area portion of the Horse Creek watershed. While it is recognized by the study team that nutrient loading is the primary focus of this watershed plan, the loading numbers for TSS and FC are provided for the benefit of readers and decision makers because WTM provides those load estimates with no additional effort once all the model inputs are in place.

Table 7. Existing Conditions Nutrient, Sediment, and Bacteria Loads

Subwatershed	Upper Horse Creek	Lower Horse Creek	Mud Branch	Total Study Area
TN (lb/year)	10,950	7,189	9,125	27,264
TN (lb/yr/acre)	6.0	4.9	3.8	4.8
TP (lb/yr)	1,496	1,010	1,020	3,525
TP (lb/yr/acre)	0.8	0.7	0.4	0.6
TSS (lb/yr)	530,858	372,992	533,535	1,437,385
TSS (lb/yr/acre)	290.8	253.6	223.0	252.7
FC (bil/yr)	366,642	236,286	150,093	753,020
FC (bil/yr/acre)	200.8	160.6	62.8	132.4

Upper Horse Creek contributes the largest portion of existing nutrient loads from the Study Area and contributes the largest load per acre of TSS. All three subwatersheds currently contribute loads that exceed the Falls Lake nutrient load limits for new development, which are 2.2 lb/acre/year of total nitrogen, and 0.33 lb/acre/year of total phosphorous. However, these numbers need to be viewed within the context of the capabilities of the WTM modeling framework. WTM results have errors associated with them and should not be taken as a prediction of the quantified actual pollutant loads from the watershed. Reliable predictions of actual pollutant loads would require a calibrated watershed model, which would be a much more expensive and time-consuming endeavor. WTM is an un-calibrated steady-state model

that allows the user(s) to compare the relative benefits of various management options and pollutant control measures to optimize management strategies going forward. These results should be taken merely as a statement that opportunities for pollutant load reductions exist in this watershed.

3.2 Future Conditions

Future development conditions, assuming buildout according to current zoning with adherence to existing load limits for new development, were also modeled in WTM. More specifically, when areas of new development were implemented within WTM, the appropriate stormwater SCMs were also input in conjunction with those new developed lands according to the requirements of the jurisdiction in which they were located. A detailed description of the WTM methodology associated with the future conditions scenario for the three study subwatersheds is detailed in Appendix B. Results of the future conditions model are detailed in **Table 8**.

Table 8. Predicted Loading under Future Conditions

Subwatershed	Upper Horse Creek	Lower Horse Creek	Mud Branch	Total Study Area
TN (lb/year)	13,628	9,012	13,077	27,544
TN (lb/yr/acre)	7.5	6.1	5.5	4.8
TP (lb/yr)	2,070	1,300	1,863	3,122
TP (lb/yr/acre)	1.1	1	1	1
TSS (lb/yr)	629,009	455,409	639,515	1,719,318
TSS (lb/yr/acre)	344.6	309.6	267.4	302.2
Fecal Coliform (bil/yr)	450,987	301,103	265,544	1,017,634
FC (bil/yr/acre)	247.0	204.7	111.0	178.9

Notably, the future conditions model predicts that all three subwatersheds will continue to produce nutrient loads that exceed NSW loading limits, even with the implementation of BMPs associated with new development under the Falls Lake Rules. Additionally, sediment and bacteria loading are predicted to increase for all three subwatersheds.

3.3 Retrofit Scenarios

Methods for locating potential new and retrofit structural stormwater, stream restoration, and riparian buffer restoration opportunities within the Study Area are described in **Appendix A**.

The retrofit modeling scenario applies all the new structural stormwater measures, improvements to existing BMPs, and stream/buffer projects that were identified within the Study Area to the Existing Conditions scenario, to predict the potential loading reductions achieved from within existing developed areas.

Table 9. Existing Conditions with Proposed New Projects

Subwatershed	Upper Horse Creek	Lower Horse Creek	Mud Branch	Total Study Area
TN (lb/year)	9,832	6,715	9,109	26,631
TN (lb/yr/acre)	5.4	4.6	3.8	4.7
TP (lb/yr)	1,222	936	1,017	3,427
TP (lb/yr/acre)	0.7	0.6	0.4	0.6
TSS (lb/yr)	527,450	364,947	533,240	1,426,185
TSS (lb/yr/acre)	288.9	248.1	222.9	250.7
Fecal Coliform (bil/yr)	361,776	219,772	149,485	731,033
FC (bil/yr/acre)	198.2	149.4	62.5	128.5

Only one proposed project is in the Mud Branch subwatershed. As such, the Existing Conditions with retrofits model reflects limited change in loading values for Mud Branch. Minimal reductions in nutrient, sediment, and bacteria loading were achievable through implementation of multiple projects identified in the Upper and Lower Horse Creek subwatersheds. These potential projects are detailed in Section 4.

4.0 Implementation Plan

4.1 Strategies to Address Nonpoint Sources of Nutrient Pollution

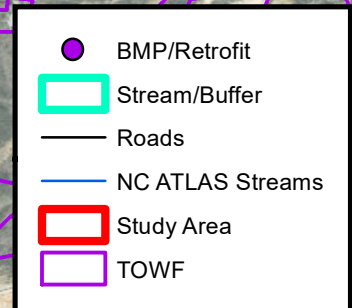
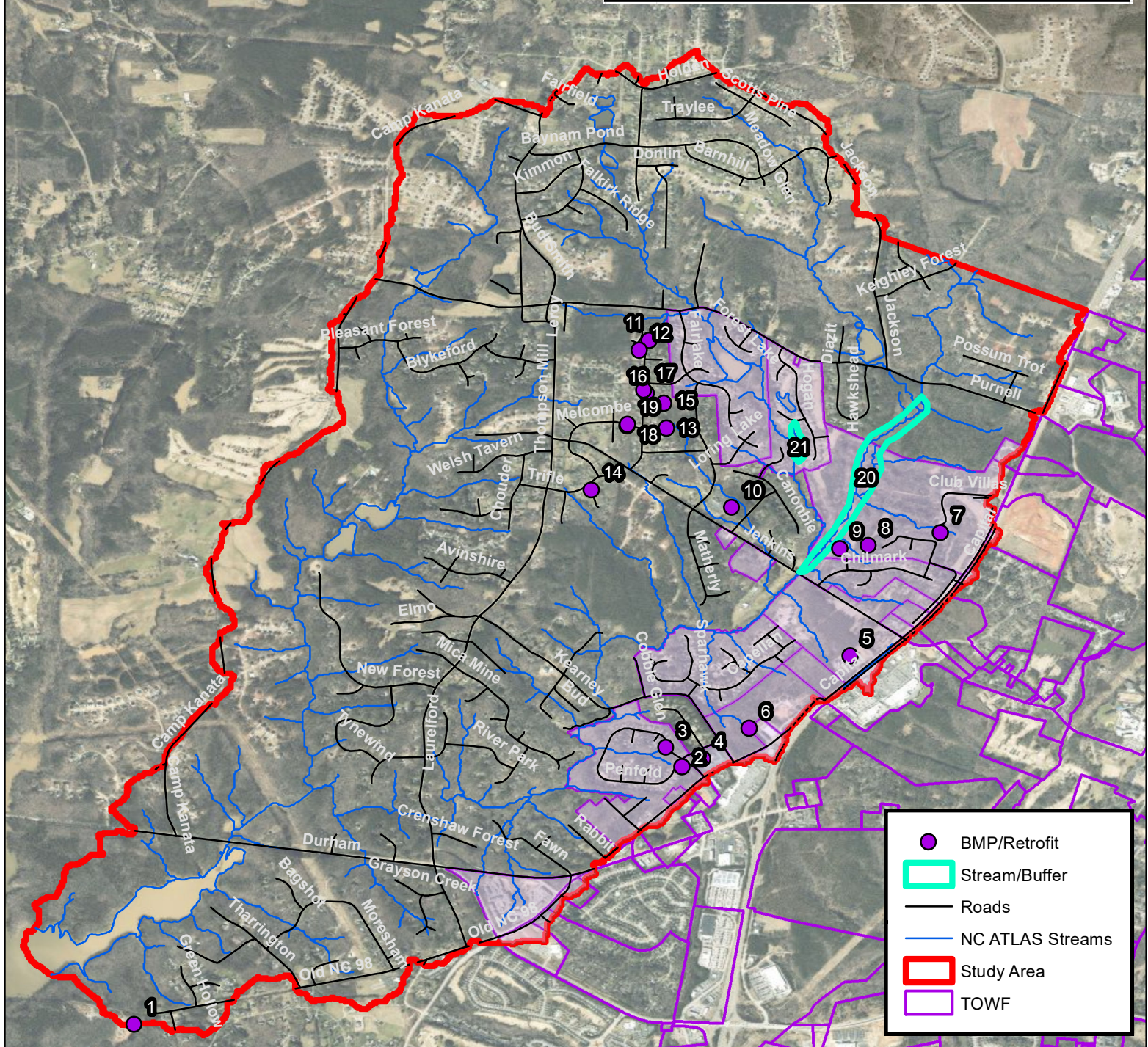
Opportunities for retrofit of existing structural stormwater best management practices (BMPs) within the watershed were evaluated using methodologies detailed in **Appendix A**. Additional opportunities for new BMPs and potential stream and buffer restoration projects were also identified through a combination of desktop and field evaluations. **Figure 5** shows the locations of the 19 BMPs identified within the Study Area. **Table 10** lists the number and types of strategies identified within each Study Area subwatershed. A complete table of all 19 proposed projects is included in **Appendix B**. Two potential improvements to existing stormwater structures were identified; the remaining strategies are new opportunities for BMPs.

Table 10. Strategies to Address Nonpoint Sources of Nutrient Pollution

BMP Type		Upper Horse Creek	Lower Horse Creek	Mud Branch
New BMPs	Biofiltration Conveyance	1	1	-
	Bioretention cell	5	3	1
	Bioswale	2	-	-
	Bioswale with check dams	1	1	-
BMP improvements	Bioretention cell	-	1	-
	Bioswale into bioretention cell treatment train	-	1	-
Stream Restoration		2	-	-
Total		11	7	1

FID	Type
1	Bioretention Cell @ Forest Ridge Park
2	Pot. BMP/Wetland/Bioretention @ Prestwickle HOA prop.
3	BFC @ Prestwicke stream
4	Pot. Bioretention cells/Bioswales @ PD building
5	Bioretention cell/Bioswales @ WF Preb. Church
6	Redo BMP @ Clarion Hotel
7	BFC/Wetland/Bioretention @ CC Dr.
8	SW Wetland or Bioretention Cell @ CC Dr.
9	SW Wetland or Bioretention Cell @ Middlestone Dr.
10	SW Wetland or Bioretention Cell @ Mormon Church

FID	Type
11	Bioretention Cell
12	BFC
13	Bioswale with check dams @ End of Melcombe Way cul de sac
14	Bioswale with check dams @ Micklewaithe Ct.
15	Bioretention Cell @ Alveston Circle
16	Bioretention Cell off of Kensington Manor Lane
17	Bioswale off of Kensington Manor Lane
18	Bioswale on Melcombe Way Road
19	Bioswale on Melcombe Way Road
20	Stream Restoration @ CC
21	Buffer Restoration on Hogan Creek



The potential for nutrient reduction associated with all identified strategies for each subwatershed is detailed in Section 3.3. Each opportunity was also evaluated separately for its individual contribution to subwatershed nutrient reduction using WTM. The magnitude of potential nutrient reduction associated with each structural stormwater practice was used to rank and prioritize strategies for implementation, as discussed in Section 4.2.

Two potential opportunities for stream restoration were identified within the Upper Horse Creek subwatershed. One site is within the former Wake Forest Country Club property, and the other is along an unnamed tributary to Horse Creek along Hogan Drive within the Country Club Downs subdivision. WTM does not consider stream restoration as an urban BMP, and thus does not have mechanisms to estimate the uplift associated with this practice. Methods to estimate the potential nutrient reductions associated with these stream restoration projects were calculated per Doll et al (2018) and are documented in **Appendix B**.

During the 2023 public meeting, two sources of potential water quality impairments within the watershed received multiple comments from stakeholders. The first was the former Wake Forest Country Club golf course property; the second was erosion near a dam in the Fairlake neighborhood. As mentioned above, a stream restoration opportunity was identified within the Wake Forest Country Club property as a result of this watershed study. This project was evaluated and ranked alongside the other potential projects. More information on the project, including potential nutrient reductions, site history, and project constraints, is available in **Appendix B**.

The second opportunity identified through public outreach, at the Fairlake Dam (also known as Lewis Dam), involves a multifaceted set of issues on land owned by private landowners and under the legal jurisdiction of a private homeowners association, including structural issues with the dam and spillway that resulted from storm damage in 2017. In 2018, homeowners within the neighborhood commissioned a separate focused analysis that yielded a complete set of recommended actions to repair issues at the Fairlake Dam. Detailed assessment of the current sediment and nutrient storage provided by the lake, and analysis of how a repair could impact nutrient loading to Falls Lake, is outside the scope of this watershed study. If interested parties choose to pursue funding to repair the dam, an analysis of how the repair could affect nutrient loading is recommended in order to assess potential applicability of IAIA funding toward this project.

4.2 Implementation Priorities

Potential projects were assigned additional criteria to facilitate ranking and prioritization. Prioritization metrics are summarized in Table 11. Each project was assigned values on an 0-1 scale for each ranking metric, with 0 being least desirable and 1 being most desirable. Methodologies associated with the determination of each metric, along with a table of values for each metric for each project, are detailed in **Appendix C**. Opportunities were ranked using two methods: 1) Cost-effectiveness defined as cost of implementation per pound of nitrogen reduction, and 2) The sum of the community acceptance and feasibility scores.

The top five ranking opportunities according to cost per pound of nitrogen reduction are:

- 1) Clarion Point Hotel Bioretention Cell Retrofit (\$6,707/lb N/year)
- 2) Kensington Manor Place BFC (\$9,448/lb N/year)
- 3) Penfold Lane BFC (\$9,569/lb N/year)

- 4) Wellons, Inc. Bioretention Cell (\$10,092/lb N/year)
- 5) Preswicke Property Owners Association Bioretention Cell (\$10,219/lb N/year)

The highest possible value for the sum of the community acceptance and feasibility scores was 2; the following five opportunities received this top score:

- 1) Clarion Point Hotel Bioretention Cell Retrofit
- 2) The Church of Jesus Christ of Latter-day Saints Bioretention Cell
- 3) Wake Forest Presbyterian Bioswale into a Retrofit Bioretention Cell
- 4) Forest Ridge Park Bioretention Cell
- 5) Micklewaithe Court Bioswale with Check Dams

The Clarion Point Hotel opportunity is in the Lower Horse Creek subwatershed. There is an existing dry detention basin adjacent to the parking lot in the rear side of the hotel property, which appears to be maintenance-neglected. The proposed retrofit project would improve the current structure by capturing additional drainage area and treating additional runoff appropriately. This project also happens to have the lowest overall cost of all the projects proposed in this study. However, it is acknowledged that investing public money to improve the function of a required private stormwater SCM may be setting a difficult precedent.



Dry detention basin at the Clarion Point Hotel

4.3 Community Engagement

BMPs are easiest to implement on public land. However, the Horse Creek Watershed Study Area encompasses a small watershed where nearly all the land is privately owned. It will be necessary to cultivate partnerships with private landowners to facilitate implementation of priorities identified within this study. The TOWF should prioritize efforts to reach out to individual private landowners who own properties identified in this study as being suitable sites for potential BMP retrofits. Engagement with existing neighborhood associations or homeowners' associations (HOAs) could also benefit future efforts to address nutrient loading. In particular, the Kensington subdivision is identified as having potential for multiple new BMPs and/or BMP retrofits, mainly due to the age of the development, in that it was developed during a period when stormwater management requirements were not as rigorous as those in the current day.

4.4 Schedules, Milestones, and Measures of Success

The TOWF is committed to spend \$13,692 annually toward implementing NSW goals as a condition of the UNRBA IAIA (**Table 1**). As such, the Town has flexibility regarding the implementation of recommendations of this study. The Town may choose to implement the most feasible opportunities, or opportunities that are most cost effective with respect to nitrogen reduction. Project phasing could potentially be utilized as

an approach to allow individual projects to address multiple years of funding – for example, design and permitting could apply to one year, construction the next, and maintenance to a future year.

5.0 Recommendations

Just as with the overarching Falls Lake NSW Strategy, this watershed management plan should be viewed and utilized within a context of adaptive management. The Falls Lake Rules require that DEQ report on the condition of the Lake and any improvements or declines in water quality every five years. These reports may lead to adaptive adjustments in the overall NSW Strategy and the IAIA. By the same token, as the regular reports and other new information and technologies emerge, the TOWF should update this watershed plan and revisit the management options and priorities set forth herein every five years.

Retrofitting new BMPs to already-built landscapes is a challenging and sometimes expensive undertaking. Retrofitting within the study area watershed is particularly challenging in that almost the entirety of the watershed land area is under private ownership, whereas lands that are already under public ownership are typically the easiest on which to implement such retrofits. In addition, the vast majority of land developed in the watershed is developed in single-family housing, which makes for limited spaces for new BMPs to be implemented (in comparison to places like schools and public parks, which often have significant open spaces and make for excellent partners in such endeavors).

The team that developed this watershed plan identified as many retrofit opportunities as possible within the timeframe and resources allotted, but this plan should not be taken as the final enumeration of such opportunities. The search for viable BMP retrofit opportunities should be an ongoing effort within the cycle of adaptive management and updates to this plan. In addition, one of the most important keys to the successful implementation of this Plan will be the ongoing outreach to and communication with the private landowners where possible retrofit opportunities exist to cultivate their willingness to partner with the Town in this endeavor. To ensure successful and ongoing implementation, the TOWF will need to devote time and resources to this element of the overall effort.

Lastly, one of the key strengths of WTM is that once all the input data is assembled and the model(s) is properly built, exercises such as updating land uses to account for changing conditions and/or inputting new BMPs are relatively simple. With minimal training Town Staff could readily take full ownership of the model and have a readily adaptable tool for use within the adaptive management cycle to test new retrofit opportunities and “what if” management scenarios. As such, the WTM that support this Plan will be a great tool to track and optimize the Town’s compliance with the IAIA going forward.

6.0 References

Caraco, D. 2013. Watershed Treatment Model (WTM) 2013 Documentation. Center for Watershed Protection, Ellicott City, MD.

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Appendix A – WTM Model Methodology

Appendix B – Implementation Plan Methodology

Appendix C – Survey of Stakeholder Priorities

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Appendix A: Horse Creek WTM Methodology

Sources and Existing Conditions in Watershed Treatment Model (WTM)

KCI selected the Watershed Treatment Model (WTM) from the Center for Watershed Protection to create water quality models for the Horse Creek Watershed study area to determine baseline nitrogen and phosphorus loads for three separate conditions: 1) existing land use conditions and mean annual precipitation with existing BMPs (best management practices); 2) future land use, incorporating future growth, and incorporating future BMPs that are currently required by Wake County zoning codes that apply to the Falls Lake watershed; and 3) existing conditions with retrofit scenarios, in which the BMPs available within the WTM framework were applied to existing developed areas to reduce pollutant loads below current existing conditions. Individual WTM runs were developed for each of three delineated sub-watersheds. These sub-watersheds subdivide the Horse Creek watershed study area to best match the catchments utilized in the WARMF model recently developed for the entire Falls Lake watershed on behalf of the Upper Neuse Basin Association to support re-examination of the nutrient management strategy for the lake. Close approximation of the WARMF catchments will better allow for future comparison of the pollutant load predictions from the separate modeling platforms.

WTM is a steady state spreadsheet modeling tool best utilized for the rapid assessment and quantification various watershed treatment options and management measures. While this study is focused primarily on nutrient loading and protecting and improving water quality in Fall Lake, it should be noted that WTM estimates pollutant loads for sediment, nitrogen, phosphorus, bacteria, and runoff volume. WTM calculates pollutant loading on an annual basis and will not simulate seasonal loads or the short-term variability of pollutant loads due to shorter periods of climate variability. The Pollutant Sources component of WTM estimates the load from a watershed without treatment measures in place. The Treatment Options component estimates the reduction in this uncontrolled load from a wide suite of treatment measures (structural and non-structural) for both existing and future conditions. Finally, the Future Growth component allows the user to account for future development in the watershed, assuming a given level of treatment for that development (Caraco, 2013).

Pollutant sources were modeled in the three unique watershed WTM scenarios by inputting information on the existing (or future) land use conditions, streams, annual rainfall, soils, riparian buffer conditions, sanitary sewer system lengths, and on-site septic systems. Point sources (wastewater treatment plant discharges), nutrient concentration in stream channels, combined sewer overflows, illicit connections, marina runoff, and road sanding were not considered in the models because none of these potential pollutant sources are applicable within the Horse Creek watershed. Existing stormwater management practices (structural and non-structural) and riparian buffers were included in the existing conditions models. The WTM model accounts non-structural management practices such as pet waste education programs, erosion and sediment control, street sweeping, catch basin cleanouts, and marina pump outs. However, these management practices were not accounted for in the WTMs that were built for this project, as no such measures have been applied within the watershed.

The following sections describe the data sources and pre-processing steps that were utilized to develop the Existing, Existing with Retrofits, and Future Conditions models.

Existing Land Use

Land use data was downloaded from the 2019 National Land Cover Dataset (Dewitz, J., and U.S. Geological Survey, 2021, National Land Cover Database (NLCD) 2019 Products (ver. 2.0, June 2021): U.S. Geological Survey data release, <https://doi.org/10.5066/P9KZCM54>) and was then clipped to each of the sub watersheds within Horse Creek. NLCD land use types were mapped to the 11 different land use categories recognized in WTM according to the table below. The NLCD code of 11 was associated to the WTM category of Open Water. The NLCD code of 21 was associated to the WTM category of Commercial. The NLCD code of 22 was associated to the WTM category of residential LDR. The NLCD code of 23 was associated to the WTM category of residential MDR. The NLCD code of 24 was associated to the WTM category of residential HDR. The NLCD code of 31 was associated to the WTM category of Roadway. The NLCD codes 41-43, 52, 71, 90, and 95 were all grouped in the WTM category forest. The NLCD codes of 81 and 82 were associated with the WTM category of Rural.

NLCD Land Cover Codes	WTM Land Use Category
11 Open Water	Open Water
21 Developed, Open Space	Commercial
22 Developed, Low Intensity	Residential - LDR (<1 du/acre)
23 Developed, Medium Intensity	Residential - MDR (1-4 du/acre)
24 Developed, High Intensity	Residential - HDR (>4 du/acre)
31 Barren Land (Rock/Clay/Sand)	Roadway
41 Deciduous Forest 42 Evergreen Forest 43 Mixed Forest 52 Shrub/Scrub 71 Grassland/Herbaceous 90 Woody Wetlands 95 Emergent Herbaceous, Wetlands	Forest
81 Pasture/Hay 82 Cultivated Crops	Rural

Rainfall

Annual rainfall was assumed to be 42.88 inches in all WTM runs (North Carolina State Climate Office, Station 312993 – Falls Lake).

Soils

GIS-based soils data were obtained from the USDA Web Soil Survey (<https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>) and mapped for the entire Horse Creek Study Area. The soils data layer was intersected with subwatershed boundaries and the percentages of

soils in each hydrologic group were calculated for each subwatershed. The percentages of soils within each of the groundwater depth categories stipulated by WTM (< 3 feet, 3-5 feet, >5 feet) were also determined using the USDA soils data. The tabular soil data includes a data table called “MUAGGATT” with a field named “WTDEPANMIN” which stipulates the groundwater depth for each mapped soil unit in centimeters.

GIS Inventory of Drainage Infrastructure

By utilizing the most recent QL2 LiDAR (North Carolina Risk Management Office - Quality Level 2 (2014) and Level 3 (2015) LIDAR Data <https://sdd.nc.gov/> (accessed June 2023)), aerial photography, and other remote data sources in a desktop analysis, the KCI Team developed a preliminary GIS Geodatabase, called “HorseCreek_Drainage_Study”, of drainage swales and ditches within public lands and rights-of-way throughout the Wake County Portion of the watershed. Also using the LiDAR, KCI documented the flow path direction of each drainage swale and ditch and included that in the attribute table of the feature class called “drain lines”. Areas that could not be determined by the desktop study were field-verified and then added into the feature class.

Structural Stormwater Management Practices (Existing and Future)

GIS data on the locations of existing structural stormwater measures within Town limits and the ETJ were available from the Town of Wake Forest. Additional BMPs were located by performing a desktop study of the watershed and then adding them to the KCI Geodatabase under the feature class “BMPs and Ponds”. These existing BMP types were input into the subwatershed WTM where they were located along with size of the drainage area they effectively treated. When necessary, BMP types and location were field verified.

For locating new potential retrofit BMPs, KCI examined LiDAR, contours, and parcel data to locate where BMPs could feasibly be located. The drainage area of each new location was determined by StreamStats to help determine what type of BMP would be most ideally suited to each location. Once the BMP location and selections were QA/QCed, KCI then conducted thorough field reconnaissance of each of these locations within the Horse Creek Watershed to verify that the selected BMP would be a feasible option. While examining each location KCI was considering the elevation, utilities that could be a constraint, land availability, land ownership, and the drainage area the BMP would be treating. The BMP options deemed feasible were then put into the WTM.

On-Site Sewage Disposal Systems

The Town of Wake Forest provided data on sanitary sewer services within the Study Area. The numbers of dwellings served by on-site septic systems within each subwatershed were determined by conducting a desktop GIS analysis of Wake County Tax Parcels in conjunction with a GIS data layer for the Town of Wake Forest’s sanitary sewer collection network. Tax parcels not located coincident with a sewer collection line were assumed to be served by on-site septic systems.

Streams

The ATLAS streams, developed by NCDOT, were used because they better characterize the extent of streams within the watershed, and were developed at a higher resolution than the existing USGS high

resolution streams layer. ATLAS streams were developed by the Department of Transportation (DOT) and can be obtained through their ATLAS program. The stream length for each sub watershed was determined by clipping the “Atlas Streams” layer to each sub watershed. The level of accuracy was used more specifically for the section below for the riparian buffers.

Potential Stream Restoration/Buffer Sites

KCI conducted a thorough search throughout the watershed to identify potential stream and buffer restoration sites within each sub-watersheds. The search began with a desktop analysis utilizing ArcGIS to examine land cover data and aerial photography along riparian corridors to identify stream reaches having little to no vegetation remaining within riparian buffers on either side. If vegetated buffers were degraded or if streams appeared heavily eroded, KCI staff then conducted field reconnaissance at the potential sites identified in the desktop analysis.

Two viable stream restoration sites were identified. The first site is on the Horse Creek mainstem on the former Wake Forest Country Club property. This section of Horse Creek was previously restored under the auspices of the predecessor agency to the North Carolina Department of Mitigation Services (DMS). The second potential restoration site identified was along Hogan Creek that runs behind Hogan Drive in Country Club Downs subdivision. Both sites are in the Upper Horse Creek sub-watershed. These two sites were then input into the WTM. WTM models do not populate the nitrogen or phosphorous removed, so that was manually calculated using the methodology described in “Evaluation of Nutrient Reduction Crediting Strategies for Stream Restoration” (Doll, Barbara et al. "Evaluation of Nutrient Reduction Crediting Strategies for Stream Restoration" (2018)). Protocol one from Doll et al. was used to determine the pollutant removal for nitrogen, phosphorus, and sediment for both potential stream restoration projects.

Riparian Buffers

KCI staff conducted a spatial analysis to determine the width and length of existing riparian buffer widths for each stream reach and assigned each reach to a category reflecting a buffer width of < 50 feet, 50-100 feet, or > 100 feet. WTM will not accept buffer width inputs as ranges; therefore, the three categories of buffers were assumed to have widths of 25 feet, 75 feet or 100 feet wide, respectively. In WTM, riparian buffers have a design and maintenance discount factor to reflect any buffer disturbance. For existing riparian buffers, the maintenance and design factor were assumed to be 0.4, meaning that the buffer ordinance has no restrictions on activities within the buffer, or no ordinance in place and that the buffers are not maintained (Caraco, 2013). KCI assumed all municipalities had an existing ordinance to establish riparian buffers and the ordinance had no restrictions on activities within the buffers, and no public education programs on riparian buffers were being conducted.

Livestock

WTM can account for Livestock within the watershed, however this was not applied in the WTM that were built because no livestock operations of consequential size were identified within the study area.

Future Conditions

GIS parcel data for Wake County were obtained from the County GIS Website. Existing land use data (as developed and described in a previous section) was intersected with the county parcel data to create a

land use by parcel layer for each sub-watershed, which facilitated comparison between existing and potential future land use. Parcels that were fully developed to the limits of their existing zoning were identified and captured to be reclassified for the future conditions model build out. For the future land use scenario, it was assumed that such parcels would be subdivided in the future and developed to the maximum density allowed by the current zoning. The table below shows how the applicable Wake County zoning classifications were mapped to WTM land use categories for input into each WTM subwatershed model.

Wake County Zoning Codes	WTM Land Use Category
R-40W – Residential-40W District	Residential LDR
GR3 – General Residential 3	Residential MDR
GR5 – General Residential 5	Residential HDR
NB – Neighborhood Business	Commercial
RMX – Residential Mixed Use	Multifamily
HB – Highway Business	Commercial

SOURCES:

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Appendix B: Opportunity Ranking Methodology

Table 1. Attributes used for implementation priorities

Ranking Attribute	Ranking Value		
Nitrogen	Reductions in pounds per year, actual values		
Phosphorous			
TSS			
Cost per pound N reduction	Actual values, ranked low to high		
Cost of implementation	Under \$150k (1)	\$150 - \$499k (0.75-0.25)	Over \$500k (0)
Average lifespan	20 years or less (0-0.25)	20-30 years (0.5-0.75)	More than 30 years or in perpetuity (1)
Maintenance	Existing level of maintenance or none (1)	Slightly more frequent than existing maintenance or once every few years (0.75-0.5)	Annual or need to contract out (0.25-0)
Community Acceptance	Requires coordination with more than 3 landowners or public education measures (public meeting, etc.) (0-0.25)	Requires coordination with 3 or fewer landowners (0.5 - 0.75)	Out of public sight, on public land, or natural-looking (1)
Feasibility	More than a few constraints/potential challenges (0-0.25)	Mostly ideal conditions with a few constraints (0.5-0.75)	Ideal conditions for implementation (1)

Measures of Uplift Associated with Opportunities (Nitrogen, Phosphorous, TSS)

Structural Stormwater BMPs: WTM models potential load reductions for N, P, and TSS that may be attributed to structural stormwater BMPs. For N, P, and TSS reductions under the existing conditions with retrofits modeling scenario, the values of predicted reductions were assessed for each subwatershed, as well as individually for each proposed BMP opportunity (both new BMPs and retrofits). Values are presented as total (absolute) reductions, as well as reductions per unit of upstream area treated.

Stream restoration projects: WTM does not consider stream restoration as an urban land use BMP; therefore, measures of uplift were estimated using methods outlined in Protocol 1 in Doll et al (2018):

Step 1: Estimate stream sediment erosion rate

- Use BANCS and NBS, BSTEM, or appropriate method to calculate annual erosion rates
- Calculate annual sediment load as,

$$S = \frac{\Sigma(cAR)}{2000} \quad (1)$$

where,

S = annual sediment load (tons/yr)

c = bulk density of streambank (lb/ft³)

A = area subject to erosion (ft²)

R = erosion rate (ft/yr)

Step 2: Calculate nutrient load by multiplying nutrient concentrations and sediment load estimate

- Multiply sediment load (Equation 1) by soil nitrogen and phosphorus concentrations (lb/ton).
 - Soil N and P concentrations either measured directly via onsite sampling, or with Tetra Tech (2013) proposed concentrations (TP = 0.46 lb/ton; TN = 1.78 lb/ton).

Proposed stream restoration project on Horse Creek at Wake Forest Country Club:

- The coefficient “c” is the bulk density of streambank which was determined by identifying the soils in the watershed (Cm soil series); the bulk density of that soil series is 81.16 lb/ft³.
- The coefficient “A” is the area subject to erosion which was about 50% of the DMS easement and that equaled to 1,412.5 ft which is 28250 ft².
- The coefficient “R” is the erosion rate which was taken from guidance from the EPA’s Pollutant Loading Estimation Tool (PLET), a watershed modeling platform similar to WTM. The ranges are from 0.3-0.5; the average, 0.4, was used for this part of the equation.

$$S = \frac{\Sigma(81.16 \times 33750 \times 0.4)}{2000}$$

$$S = 547.83 \text{ tons/yr}$$

$$TN = (547.83 \times 1.78) = 975.13 \text{ lb/ton}$$

$$TP = (547.83 \times 0.46) = 252.00 \text{ lb/ton}$$

- WTM input for nutrients of TSS, TN, and TP are in lb/ft so the results were converted from tons/yr and lb/ton to lb/ft.

$$S = 0.19 \text{ ft/lb}$$

$$TN = 0.35 \text{ ft/lb}$$

$$TP = 0.09 \text{ ft/lb}$$

Proposed stream restoration project on Unnamed Tributary to Horse Creek at Hogan Drive:

- The coefficient “c” is the bulk density of streambank which was determined by identifying the soils in the watershed (Cm soil series); the bulk density of that soil series is 81.16 lb/ft³.

- The coefficient “A” is the area subject to erosion which was 2948.6 ft².
- The coefficient “R” is the erosion rate which was taken from guidance from the EPA’s Pollutant Loading Estimation Tool (PLET), a watershed modeling platform similar to WTM. The ranges are from 0.3-0.5; the average, 0.4, was used for this part of the equation.

$$S = \frac{\Sigma(81.16 \times 2948.6 \times 0.4)}{2000}$$

$$S = 47.86 \text{ tons/yr}$$

$$S = 47.86 \text{ tons/yr}$$

$$TN = (47.86 \times 1.78) = 85.19 \text{ lb/ton}$$

$$TP = (47.86 \times 0.46) = 22.02 \text{ lb/ton}$$

- WTM input for nutrients of TSS, TN, and TP are in lb/ft so the results were converted from tons/yr and lb/ton to lb/ft.

$$S = 0.05 \text{ ft/lb}$$

$$TN = 0.09 \text{ ft/lb}$$

$$TP = 0.02 \text{ ft/lb}$$

Other Opportunity Ranking Metrics

Construction Cost:

- Methodologies from Wossink and Hunt (2003) were used to compute potential construction costs for most BMP types. The costs projected by the methods set forth in Wossink and Hunt were adjusted for inflation on the basis of the increase in the Construction Analytics (CA) non-building infrastructure composite index of construction costs (Zarenski 2024). CA Infrastructure composite index reflect an average of six established infrastructure construction cost indexes. In 2003, when Wossink & Hunt was published, the CA Infrastructure composite stood at 55.2, whereas in 2024, the index is projected to be 137, reflecting a 148% increase in infrastructure construction costs across that period.
 - Bioretention Cells:
 - Took 2.5% of the drainage area of each bioretention cells and multiplied it to the cost per sf ranging from \$12-15. If the utility constraints were on the higher end, the \$15 sf price was applied. If the utility constraints were on the medium end, \$13.5 sf price was applied. If the utility constraints were on the low end, then the \$12 sf price was applied. From there that number was increased by 148% to account for inflation as described above.
 - Bioswales:
 - The same method was used as above for bioretention cells but 10% was added to the cost per sf to account for the outlet structure for the bioswales.
 - Bioswales with check dams:
 - The same method was used as above for bioretention cells but 12.5% was added to the cost per sf to account for the outlet structure for check dams/outlet structures for the bioswales.
- BFC construction costs were based on actual construction costs acquired from NCDOT because they have contracted the construction of three BFC application across the state in Brunswick,

Alamance, and Iredell Counties. Given that the BFCs were constructed within a timespan from 2012 to 2017, construction costs were adjusted to account for inflation from the median year of the construction time and, 2014, forward to 2024. The increase was calculated at 48% based on the CA non-building infrastructure composite index just as described above.

- For the BFC that was sized for a drainage area of 6.9 acres, used the Alamance County Rest Area price of \$101,500 since the drainage area was around the same as the Alamance County Rest Area.
- For the BFC that was sized for the drainage area of 10 acres, used the Alamance County Rest Area and increased the price to \$150,000 because the drainage area for that Rest Area was for a drainage area of about 6 acres.
- Stream restoration project costs were estimated to be roughly \$650/linear foot. This was determined using an average of recent urban stream projects and the current NC DEQ Division of Mitigation Services statewide stream mitigation fee.

Annual Maintenance Level of Effort: Based on recommendations for BMP type.

Annual Maintenance Cost: % of implementation cost per BMP type, per Price et al 2021.

Cost per unit N reduction: Implementation cost/pounds per year of N reduced.

Community Acceptance: Based on combination of how “natural” the BMP will look & the amount of potential coordination with landowners. Notes for factors related to individual opportunities are found in **Table 2**.

Feasibility: Combines potential challenges that may be associated with the project. Includes factors such as potential permitting requirements, utility coordination, and site suitability for the proposed practice. Notes for factors related to individual opportunities are found in **Table 2**.

Ease of Implementation = Community Acceptance + Feasibility

Table 2: Opportunities for Nonpoint Source Nutrient Reductions

BMP Name	Watershed	Drainage Area (Ac)	SCM Type	Cost-JD	Cost Score	Maint Level	Maint Score	Lifespan	Lifespan Score	Comm Accept Score	Nitrogen Reduction (lbs/yr)	Nitrogen (\$/lbs)	N (lb/yr/acre)	Phos Reduction (lbs/yr)	Sediment Reduction (lbs/yr)	FC Reduction	Feasibility Score	Feasibility Notes	Implementation
Clarion Point Hotel	Lower Horse Creek	2.3	Redo Bioretention cell	\$62,372	1	Low	1	20 years	0.5	1	9.3	\$6,707	4.0	1.5	170.7	350.1	1	There is a bioretention cell in the back of the hotel parking lot that is in need of maintenance so redoing the BMP here will help with capturing more drainage and treating the runoff appropriately. Can use the back corner of the parking lot as a staging area.	2
Forest Ridge Park	Mud Branch	3.5	Bioretention Cell	\$98,487	1	Low	1	20 years	0.5	1	7	\$14,070	2.0	1.1	128.7	265.8	1	There is enough room here to place a bio cell and the county/Army Corps are on board to implement a BMP here. Could block off part of the parking lot for a staging area to implement the bio cell.	2
Wellons Inc.	Lower Horse Creek	4.2	Bioretention Cell	\$120,095	1	Low	1	20 years	0.5	0.5	11.9	\$10,092	2.8	1.9	218.6	448.6	0.75	Adding an additional bio cell here or redoing the one that is already here to capture a larger drainage area. Should not be hard to get the business owners here on board since there is already one here. Could use the parking lot as a staging area too.	1.25
Kensington Manor Place	Upper Horse Creek	6.9	BFC	\$150,220	0.75	Low	1	20 years	0.5	0.75	15.9	\$9,448	2.3	2.5	313.3	494.6	0.75	This area where the BMP would be placed is owned by the Kensington Manor HOA, which means would have to get them on board. Shouldn't be too hard of a sell to them considering this is an older neighborhood without any existing BMPs there. Placing the BCF here will help catch the runoff in this section of Kensington Manor. Staging area could be the same area as the above BMP.	1.5
Melcombe Way	Upper Horse Creek	5.3	Bioswale	\$170,151	.75	Low	1	20 years	0.5	0.75	12.3	\$13,833	2.3	1.9	240.6	379.9	0.75	This bioswale would be placed within the DOT right of way on Melcombe Way to capture the run off the this section of the neighborhood. I think this would be easy to implement considering DOT would be on board. Staging area could be tricky but could possibly block off half the road to allow for traffic to get through during implementation.	1.5
Preswicke Property Owners Association	Lower Horse Creek	6.5	Bioretention Cell	\$193,144	0.75	Low	1	20 years	0.5	0.5	18.9	\$10,219	2.9	3	347.1	712.1	0.5	More than enough room to implement a bio cell in the open lot of Preswicke Neighborhood, it is in the open space owned by the HOA so would need to get them on board. There are some utilities running here which may cause issues with implementation... a pipe is coming from the business lot and going UG across the empty lot. Staging may be a little tricky due to the roads not really having a shoulder to block off but could use the business park to the right of the entrance of the neighborhood as an area for staging.	1
Micklewaithe Court	Lower Horse Creek	6.4	Bioswale with check dams	\$218,400	0.75	Low	1	20 years	0.5	1	14.9	\$14,658	2.3	2.5	290.5	451.6	1	This BMP would be placed within the DOT right of way on Micklewaithe Court to capture the run off the this section of the neighborhood. I think this would be easy to implement considering DOT would be on board. Staging area could be on at the end of the cul de sac on this road during implementation.	2
Penfold Lane	Lower Horse Creek	10	BFC	\$222,000	0.75	Low	1	20 years	0.5	1	23.2	\$9,569	2.3	3.9	453.9	705.6	0.5	This BFC is in the same neighborhood as the BMP above, Preswicke and owned by the HOA there. There is enough slope and area to implement this BMP, just need to get the HOA on board. There is a water pressure line running parallel to the area where we want to place the BMP, so need to take that into account and make sure that is not effected during implementation of this BMP. Staging could be on Penfold Lane, on either side of where the BMP would be implemented.	1.5
Kensington Manor Lane	Upper Horse Creek	9.41	Bioretention Cell	\$288,866	.5	Low	1	20 years	0.5	0.75	27.1	\$10,659	2.9	4	501	1042.2	0.75	This area where the BMP would be placed is owned by the Kensington Manor HOA, which means would have to get them on board. Shouldn't be too hard of a sell to them considering this is an older neighborhood without any existing BMPs there. Placing the bio cell here will catch the swales running south and treat it in even more from this section of Kensington Manor. Staging area could be tricky since this area is right off the road but could possibly block off one half of the road to allow traffic to get through.	1.5
Blue Ravine Road	Upper Horse Creek	9.41	Bioswale	\$317,753	.5	Low	1	20 years	0.5	0.75	21.7	\$14,643	2.3	3.4	427.2	674.5	0.75	This bioswale would be placed within the DOT right of way on Blue Ravine Road to capture the run off the this section of the neighborhood. I think this would be easy to implement considering DOT would be on board. Staging area could be tricky but could possibly block off half the road to allow for traffic to get through during implementation.	1.5
Wake Forest Presbyterian	Lower Horse Creek	10.4	Bioswale into a redone bioretention cell	\$322,080	0.5	Low	1	20 years	0.5	1	24.2	\$13,309	2.3	4.1	472	733.9	1	There is a rip rap swale that is leading into a bio cell in the back of the church that can be turned into bioswales and redo/clean out the existing bio cell to capture more drainage in this area/lot. The parking lot could be used as a staging area for the implementation of these two BMPs.	2
Middlestone Court	Upper Horse Creek	12.3	Bioretention Cell	\$386,587	.25	Low	1	20 years	0.5	0.5	36	\$10,739	2.9	5.3	665.9	1385.2	0.5	To place the BMP at the end of the cul de sac / behind houses, will have to get those landowners on board. It will help treat the drainage/run off in the part of this neighborhood, so can use that to try and get them on board. Would have to use the end of the cul de sac as a staging area which means blocking it off for some time during implementation.	1
The Church of Jesus Christ of Latter-day Saints	Lower Horse Creek	12.5	Bioretention Cell	\$393,431	.25	Low	1	20 years	0.5	1	36.5	\$10,779	2.9	5.8	667.4	1369.5	1	Place BMP in the front lot of church to capture runoff. Could use the parking lot as a staging are for implementation.	2
Country Club Drive	Upper Horse Creek	12.7	Bioretention Cell	\$400,285	.25	Low	1	20 years	0.5	0.5	36.6	\$10,937	2.9	5.4	676.2	1406.6	0.5	Would have to get the landowner that owns the old country club on board to allow us to place this BMP here. Staging will be a bit tricky since there is no real entrance point to this area from the old CC and to access it from Country Club drive, you would have to use the end of the cul de sac which means getting those landowners on board for that.	1
Alveston Circle	Upper Horse Creek	13.89	Bioretention Cell	\$441,256	.25	Low	1	20 years	0.5	0.75	40	\$11,031	2.9	5.9	739.6	1538.4	0.75	This area where the BMP would be placed is owned by the Kensington Manor HOA, which means would have to get them on board. Shouldn't be too hard of a sell to them considering this is an older neighborhood without any existing BMPs there. Placing the bio cell here will help catch the runoff in this section of Kensington Manor. Staging area could be at the end of the cul de sac of Alveston Circle.	1.5
Shorrey Place	Upper Horse Creek	18.7	Bioretention Cell	\$609,810	0	Low	1	20 years	0.5	0.75	53.8	\$11,335	2.9	7.9	995.7	2071.2	0.75	This area where the BMP would be placed is owned by the Kensington Manor HOA, which means would have to get them on board. Shouldn't be too hard of a sell to them considering this is an older neighborhood without any existing BMPs there. There is a sewer line that runs down between two houses that the BMP would be placed behind so need to make sure that is not effected by the implementation of this BMP. Could use the end of the cul de sac as a staging area.	1.5
Melcombe Way Cul de sac	Upper Horse Creek	24.66	Bioswale with check dams	\$947,583	0	Low	1	20 years	0.5	0.75	56.9	\$16,653	2.3	8.9	1119.6	1767.6	1	This area where the BMP would be placed is owned by the Kensington Manor HOA, which means would have to get them on board. Shouldn't be too hard of a sell to them considering this is an older neighborhood without any existing BMPs there. Placing the bioswale with check dams here will help catch the runoff in this section of Kensington Manor. Staging area could be at the end of the cul de sac of Melcombe Way.	1.75
Wake Forest Country Club	Upper Horse Creek	6150.4	Stream Restoration	\$2,193,750	0	Low	1	> 30 years	1	.5	975.1	\$2,250	94.1	252	547.8	N/A	0.25	There is already a DMS conservation easement on this land so would have to get both the IRT and the land developer on board in order to do this restoration project. Staging area would not be difficult as this land is in flux with the developer, so before the land gets developed could potentially do the project that way construction of the stream would not be in conflict with the construction/development of the land.	0.75
Hogan Drive	Upper Horse Creek	30.4	Stream Restoration	\$35,750	1	Low	1	> 30 years	1	0.5	85.2	\$420	19.4	22.02	47.9	N/A	0.25	12 landowners would need to get on board for this project to happen which makes the feasibility a bit hard. The staging area for this project would also be a bit tight, could potentially be at the end of the cul de sac of Hogan Drive.	0.75

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Appendix C: Survey of Stakeholder Priorities

The Horse Creek Watershed Study was initiated to identify and address current issues within the Horse Creek Watershed related to water quality, inadequate drainage conveyances, stormwater infrastructure problems, and erosion. The study will help the Town of Wake Forest to develop compliance measures to meet the pollution reduction requirements in the Falls Lake Rules, and to comply with the Upper Neuse River Basin Association (UNRBA) Interim Alternative Implementation Approach (IAIA). The Town will use the Study to develop a watershed plan that will serve as a guide for efforts to manage water quality in the Horse Creek Watershed and help reduce the incidence of harmful algal bloom in Falls Lake in the future.

As a part of the Study, the Town is engaging with the public in several ways, including public meetings, an informational web page about the Study, and an online survey which solicited feedback from the public about the watershed and potential issues related to water quality and quantity. This document summarizes the results of the online survey.

The survey was live from April 20 to June 20, 2023. The survey was advertised on the Engage Wake Forest web page, the Horse Creek Watershed Study web page, and on signs advertising a public meeting that were placed within communities in the watershed. The survey was also recommended and preliminary results discussed at the public meeting on June 13. There were 126 legitimate responses out of a total of 128 (the first two responses were KCI tests). The following information summarizes the results. The full survey results should be consulted to match any specific response or issue to an individual.

General User Information Questions

The majority of respondents are long-term (more than 10 years) residents of both the Horse Creek Watershed and the Town of Wake Forest. Almost half of the residents have onsite septic systems. Most respondents have never participated in a watershed study. Residents were most interested in wildlife and water quality; the most common write-in issue of concern was overdevelopment, which was often expressed along with concerns about land use change.

Which best describes you?

NOT a resident of Wake Forest, but live in Wake County	32
Resident of Wake Forest	93
Both	1
Total	126

Check which best describes you:

I live in the Horse Creek Watershed	111
I work in the Horse Creek Watershed	0
Both	11
Neither	4
Grand Total	126

How long have you lived/worked in the Horse Creek Watershed?

5 or less	31
6 to 10 years	22
11 to 20 years	27
21 to 30 years	37
more than 30 years	6
not selected	3
Total	126

Do you own a business in the Horse Creek watershed?

No	122
Yes	4
Total	126

Do you have an onsite septic system?

No	64
Yes	62
Total	126

Have you participated in a watershed study before?

No	121
Yes	5
Total	126

The Following Topics are Important to Me *(select all that apply):*

Wildlife	118
Land Use Change	88
Public Spaces (parks, greenways, gardens, etc.)	102
Water Quality	123
Water-based recreation (fishing, boating, swimming, kayaking, etc.)	54
Overdevelopment	7
Other	14
Total	506

Watershed Observations

I Have Observed These Issues <i>(select all that apply)</i>:	Count
Excessive Eroding and/or Unstable Stream or Ditch Banks	69
Accumulation of Sediment in the Roadway	36
Beaver Activity	21
Changes in Water Quality or Quantity	24
Damaged Catch Basin or Other Drainage Structures	16
Damaged or Non-Functioning Stormwater Ponds	20
Excessive Erosion at Pipe Outlets	20
Stormwater Runoff Covering All or Part of the Road	58
Dam/stormwater pond issues	3
None of These	22
Other	6
Total	295

This survey question included a follow-up text-entry question that allowed users to comment on specific locations and/or frequency of observations. The full survey results should be consulted to match specific responses to issues. The additional information is also discussed in the additional information/comments section of this report.

Collaboration

Survey Question:

Some areas of the Town of Wake Forest and Wake County portions of the Horse Creek Watershed were developed before the implementation of modern stormwater control standards. By installing stormwater control devices (such as rain gardens, bioswales, and stormwater ponds) in those communities to bring them up to modern standards, runoff can be captured and treated to reduce harmful pollution to Falls Lake downstream. Please note your level of willingness to provide the Town access and/or easements to facilitate these types of projects: I would likely cooperate with the Town to facilitate a stream project impacting my property under the following circumstances:

Stormwater project participation willingness:

For a project with the overall objective of capturing untreated runoff and improving water quality	98
For a project with the overall objective of capturing untreated runoff and improving water quality, but only if that project is small (like a residential rain garden or installation of rain barrels)	10
I am not interested in collaborating with the Town on stormwater projects	7
Only if stream improvements are needed to protect my property and/or preserve its value	11
Grand Total	126

Survey Question:

Many of the natural drainage channels in the Horse Creek watershed are along and between the back yards of residential properties. Repairing and improving the streams will require construction access, probable loss of some trees, and up to a couple of months of construction activity. Please note your level of willingness to provide the Town access and/or easements to facilitate these types of projects: I would likely cooperate with the Town to facilitate a stream project impacting my property under the following circumstances:

Stream project participation willingness:

For a project with the overall objective of stabilizing the streambanks to prevent further erosion and enhancing water quality	91
I am not interested in collaborating with the Town on stream projects	9
If stream improvements are needed to protect my neighbors' property and generally preserve neighborhood property values	20
Only if stream improvements are needed to protect my property and/or preserve its value	6
Grand Total	126

Additional Information and Comments

The most common themes were flooding (specifically, Horse Creek at Jenkins and Purnell Roads, and in the Fairlakes neighborhood), concerns about general rates and methods of development, concerns about specific development projects (most frequently, the former Wake Forest Country Club property), concerns about a sewage overflow associated with townhomes/apartments, concerns about the safety of the Lewis Dam in the Fairlakes neighborhood, and concerns about water quality (sediment, sewage, and potential chemicals from the former Wake Forest Country Club and Schrader sites). There is a perception that flooding is becoming more frequent, and water quality is at risk. There were several specific issues mentioned that are outside the Horse Creek Watershed.

Fairlake/Lewis Dam

I live in Fairlake on the lake built by Lewis dam. Lewis dam had issues and we had to keep the lake level lowered and the creek that feeds it is in my back yard and trees have grown in. Heavy rains lead to a significant amount of water entering the creek from runoff and the HOA refuses to address the issue even though we have been ordered by the DEQ. This has been an issue for 7 years.

Fairlake/Lewis Dam outlet and spillway needs repair. Severe erosion putting dam at risk.

Fairlake spillway is damaged and eroding.

Is there any help that you can offer to help resolve the Lewis Dam in Fairlake?

Please repair the Lewis lake earthen dam.

I live in the Fairlake subdivision. The Lewis Dam has been damaged since Hurricane Matthew in 2016 and has not been repaired since. I would like to see some assistance from this grant in fixing the dam so the lake can continue to do the job of being a retention pond.

Wake Forest CC

I reside on the Wake Forest golf course and have personally observed over the last 17 years several issues. We are most concerned about future development on this property with known toxic chemical contamination. We know there will be runoff and want to have the soil tested as phase 2 testing in order to determine if remediation is needed prior to development. Flooding is another concern.

Over the years, Horse Creek river banks are changing. I walk these banks on the former WFGC property. There is significant sand and debris that has topped the banks. There is a beaver dam on the ponds flowing into the creek. There is severe backup of logs and debris on Horse Creek within the WFGC property which has damaged the small bridges and water flows further into the surrounding flood plain. (more below)

Horse Creek often cannot handle the amount of runoff. Development Plans (Jenkins/Capital) (Old WF Golf Course Property) will only add to the problem. Impervious zones will be eroded to

minimal amounts resulting in less absorption of water and even more runoff. I think WF is a bit out of control. Developers are going after rezoning of these properties to allow even MORE dense development on these parcels of land. Horse Creek and the water shed appear to be after thoughts for this town.

The Joyner property (Old WF Golf Course) if developed, will also result in hazardous chemicals runoff into Horse Creek. It is an old golf course that has been treated with fertilizers, weed control, pest control, etc..... for decades. Concerned citizens have brought this concern forward but the town has either (1) not allowed them to speak at public meetings or (2) totally disregarded the info. With this type of reception it's difficult to believe that the Town is serious about protecting the watershed.

Residential development of the former wake forest country club will severely harm this water shed and negate the benefits you are trying to accomplish.

The irony of this survey is palpable. Based on the recent developments around the rezoning of the Old Wake Forest Golf Course, it is clear that the only motivation of the town is to satisfy the priorities of a few greedy developers (Jim Adams), a corrupt mayor who has once received (and never again will receive) my vote, and an unqualified and unscrupulous commissioner Nick Swalinski, who was elected to represent those in the watershed opposed to the development of the golf course but let down his entire constituency, presumably under pressure from the developers and the town. This is an environmental issue, and a political one. I am one of the residents (Kings Way Court) who has paid the high taxes for more than a decade to make this town what it is. I kayak and fish in Falls Lake. Will you cause the catfish I pull from the lake to be inedible simply for the financial gain of Mr. Joyner, Mr. Adams, Vivian Jones, and a few of the corrupt elite? There is still time to undo the damage, but Wake Forest is about to become "Cary Jr.", and you'll lose another resident who made this town what it is. DON'T DEVELOP THE GOLF COURSE!

Development of former Wake Forest Club will create MANY problems for area residents and those living downstream.

Sewage

Raw sewage smell in horse creek, excessive water flow in creek and flooding since apartments built. Road erosion over the creek.

Odor throughout our neighborhood and foam on the water and on the banks of the creek.

Flooding of small tributary to Horse Creek whenever there is much rain caused by large apartment complex. Same complex has suffered breakdown of septic systems or pipes.

There appears to be a sewage overflow at the apartments on the corner of Durham Rd and 98. Was reported to several agencies by my husband and nothing done and no apparent follow up with us or any residents on Fawn Drive to explain what happened or if even investigated. The sewage smell lasted for >2 weeks!

There was a serious sewer failure at the legacy apartments which allowed raw sewage to enter the creek upstream. This caused odor throughout the neighborhood. There was nasty yellow brown foam on the water and along the sides of the creek bed. Which still today appears in the pooling areas. The odor and foaming continued for about 25 days. I called every department in the state and was shuffled and run around for months. The City of Raleigh were the only ones that came here, walked the creek and found the source at legacy apartments. But they couldn't help because it wasn't their jurisdiction. Department of water quality was a huge waste of time too. I have requested the required reports to at least ensure the problem has been properly repaired. No one will help. Not the city, not the county, not the state. It was actually pretty sad that no one showed any interest in investigating this problem. We have kids in our neighborhood that chase frogs in the creek and homes the creek flows behind. Not to mention the wildlife living in and around the creek. Also not to mention the lye that was spread at the spill sight. That also came downstream. If the next big rain brings more literal crap and more lye downstream again, I will be calling WRAL.

We had a problem in recent months involving very foul smelling apparently human waste pollution of a small creek adjacent to our property which was sewage from a nearby apartment complex. When it was reported to Wake County health department authorities they did nothing for several weeks until a second report was made to another branch of Wake County government. Should we have reported to Wake Forest instead.

Road Flooding

After storms I have noticed runoff partially covering Purnell Road many times.

Both Purnell and Jenkins Road have had issues with flooding in the past. We have all kinds of wonderful wildlife, trees and plants in the Horse Creek Watershed. Please keep this watershed protected from more development. Don't allow rezoning for developers planning to max their profits by building as many units as they can. We need to keep some forest in Wake Forest.

During heavy rains (~ monthly), water in our neighborhood drains to the road in front of our house (7825 Fairlake Dr) and pools on the road and in our driveway,

I don't live directly on the creek, but RiverStone backs up to the creek. Access to the creek is via a utility road behind our neighborhood. The culverts along Chilmark collect so much water in the big storms, forcing water to run over our driveways about 3x per. This has been particularly noticeable the past 5 years. Debris from overflowing Horse Creek happens about once a year along Jenkins.

I have seen the entire area of Jenkins Rd. completely flooded and have seen the 2 ponds that have been constructed in the flood plain washed away.

I've lived in Wake Forest for 30 years and in the Horse Creek watershed for the past 3. I've noticed water running over Purnell Rd more and more with heavy rains. Seems to cause wrecks and dangerous driving. Seems to only be a matter of time before it washes out a section of road or the bridge.

Monthly we have water on the road (Fairlake Drive)

Stream and ditch banks are being destroyed without adequate knowledge of the impact on water runoff and damage. Horse Creek completely over ran Jenkins Rd in 2022 and I was nearly swept away in my car. Property owners need knowledgeable help to do the correct thing when they are changing ravine, stream and ditch banks. Landscapers are removing plants from streams causing more runoff. Educate on over use of fertilizers, pesticides and lawn spray treatments.

When there are strong storms, which are not infrequent, Horse Creek watershed will overwash Purnell

Runoff, Sediment and Erosion

Daily walks in Joyner Park i see run off from the new housing development and i see the pond a red muddy disaster. Its obvious all over that theres a problem. New development is going to ruin the environment if it hasnt already.

Every time it rains the stream turns red from construction runoff. It seems as if the stream banks have been eroding excessively in the last few years with the increase in new construction.

New construction often causes runoff and sediment on the roads

Occurs often with heavy or frequent rains. Stream is eroding towards my house. Pipes and wires have been exposed. Stream banks are getting higher and steeper.

Run off from properties as well as through running streams creates flooding conditions in fields and erodes yards monthly. Prevents me from accessing, let alone using my property.

Seems like this is closing the barn door after the horses have gotten out! The problem is all the clear-cutting with new construction. Every million dollar-plus home behind us has clear-cut their entire lots leading to increased erosion and run-off! Where are the common-sense rules and regulations that would have prevented some of this? I know there are rules about keeping a certain amount of trees- why are developers being allowed to skirt those rules?

since the development behind me - good ole Devon Square- I now have so many water issues in my backyard that I was promised I wouldn't. Slow down development.

Heavy thunderstorms often are too much for existing stormwater management systems. Too much development (rooftops and pavement) add to this problem. We do not have sufficient vegetation buffers around streams, channels, and rivers.

The Town engineer needs to closely inspect all storm water control measures proposed for adequacy and then inspect on site for proper construction and follow-up with the annual inspections. The town houses on Sienna Drive and highway 98 have non-functioning drainage that has created a ravine in the neighborhood of Pine Ridge Ct. This type of thing needs to be prevented--not just corrected. Want to see stronger measures in the updated UDO.

There is a large hole on Purnell that is an erosion hole close to the bridge. The storm water run off goes here and there is a potential for this to undermine the road at some point. We have

already reported erosion holes under the road and DOT has not patched one of them. I do not walk on the golf course anymore, but when I did, there was evidence of beaver activity in sapling stumps and trails down to the stream. This was several years ago.

Water Quality

Given the history of the leaking sand pits from the former Schrader plant & purposely pouring out of harmful toxins in groundwater supply areas as told by former employees of the plant & given a large number of cancer cases within surrounding neighborhoods testing for contaminants is the most concerning for this particular watershed study.

My home and community is on well water and it's very important to me that we keep our streams, trees and any other natural resources in place to preserve the cleanest water possible.

Water quality is all important! The impact on Falls Lake must be addressed. It must be prioritized above all development projects.

We are interested in the watershed project but want to make sure no retention ponds are placed near our home due to chemical contamination concerns from the golf course.

We are willing to give more feedback in general. We do NOT want a stormwater containment pond due to chemical concerns, we are more than willing to continue to provide feedback and help in any way to make this a better situation for all and for the safety of the community. - Gina

Miscellaneous Comments

All of the above at least once/year in strong torrential storms. Flooding occurs multiple times/year

Altering runoff, muddying creeks, and pushing wildlife (including copperheads) into neighborhoods that responsibly preserve mature trees / underlying forest habitat throughout

Developing the property at a minimum on the west side of Horse Creek will impact water quality, increase run-off from installed roads and driveways and loss of trees and drive off wildlife which is abundant in the watershed. The town is getting in a critical position by not saving enough natural wet areas for future generations water supply. Development around Horse Creek will add polluted and tainted water into Falls Lake which provides all of Raleigh's water supply. Horse Creek dates back hundreds of years and is there for a purpose. Save it.

Dun Loring subdivision. The wooded area behind my property includes a dry streambed protected by a streambed set-aside. The woods with large trees is often home to hawks, pileated woodpeckers, Summer Tanagers, fox, and many other species.

Heavy beaver activity has increased size of storm water ponds and damaged surrounding natural habitat and banks on ponds

I am very concerned about developments at Capitol Blvd and Jenkins Rd and how they may impact water quality at the creek, wildlife nearby, and other issues not related to this survey.

I feel strongly about protecting the watershed and the wildlife around it. The wildlife around Horse creek has expanded exponentially since the construction across the highway at Joyner Park. The runoff from that development seems to have adversely affected the water/streams within that park. Very sad to see all the development around the watershed. Please protect our water by preserving the land and wildlife/trees around and within the watershed. I have lived in Wake Forest for 6 years and would like to see more thoughtful development that does not clearcut fields of trees.

I have been in communications with the engineers dept already

I would be very interested and supportive of having access to Falls Lake or Forest Ridge park via a greenway or public access along horse creek. This would also allow easier access for construction and/or repair and monitoring of horse creek.

I would like to see Horse Creek watershed maintained for its contribution to the water quality of Wake Forest and its wildlife habitat.

It appears the Town & County have severely compromised the watershed by allowing over development in and around Falls Lake. Re- Zoning properties is the exact opposite of what needs to be done to protect the fragile water supply.

Relevant to other area water concerns raised prior to a recent re-zoning action, because of space limitations and proximity, any widening of Purnell Road to accommodate traffic increases contributed to by new construction in the Wake Forest corporate limits and near Purnell would without question adversely affect the value of our home. Accordingly, although it would not be our preference, any attempt at "imminent domain" could be met with an ongoing legal action which could trigger renewed examination of recent actions taken by the town relative to re-zoning which in our opinion will be affecting other watershed issues beside Horse Creek as well.

Residents on west side of a capital are a PART of town too....consider our needs with ALL plans and concerns

Stop trying to develop everything. You are ruining the spirit of our town.

Thanks for work on the streams in our area!

The increase in construction is too much for the current storm water design

The largest pine tree recorded in central NC is located on the Holding property that is currently being considered for a giant housing project. The published plan does not address any protection for this important tree.

We need a moratorium on development

Why does this construction/development issue continue to be brought up to the Town Board after the Army Corps of Engineers long ago cleaned out the creek, may have rerouted it, and stated that NO ONE OR ANY TOOL, etc. could be used to enter the creek to retrieve absolutely anything!! It is such a waste of everyone's time.

Would qualify as mild. Work has been done before and has helped.

Wake Forest Country Club Mitigation Project

Location: Wake Forest, NC

Long-term Steward: [NC DEQ Stewardship Program](#)

Additional Project Documents and Information:

<https://www.deq.nc.gov/about/divisions/mitigation-services/project-documents>

Definitions/Acronyms:

DEQ = North Carolina Department of Environmental Quality

DMS = Division of Mitigation Services, a division of DEQ (formerly known as the Ecosystem Enhancement Program, or EEP)

IRT = North Carolina Interagency Review Team, the regulatory agency for mitigation projects. Headed by the US Army Corps of Engineers.

KCI = KCI Technologies, Inc., consulting firm that conducted the Horse Creek Watershed Study under direction of the Town of Wake Forest in 2023-2024.

MY = Monitoring Year; typically, 5-7 years of monitoring and reports are required following mitigation project construction

UT = Unnamed Tributary

Project Timeline:

2002: Restoration plan established with the following original site goals:

- restore riparian buffer.
- reconnect Horse Creek and UT to floodplain.
- increase sinuosity/dissipate instream energy.
- reduce erosion, downstream sedimentation, and property loss within the golf course property.
- improve aquatic habitat; and
- N reductions to Falls Lake / source water protection

2003: Conservation easement (7.98 acres) enacted; contains provisions for active golf course including maintenance of several golf cart crossings, 1 culverted road crossing on Horse Creek, and paved golf cart paths within the easement. The landowner is responsible for maintaining infrastructure within the easement, and the easement and its responsibilities and restrictions transfer with the land upon sale.

2005: Site was constructed under design-build contract using Priority 1 restoration. The MY00 (as-built) report noted several major areas of concern:

- 7 of 18 vegetation plots met 75% survival rates; 2 of 10 had 0% survival; only 5 of 18 had 80% survival. "Vegetative problem areas" were identified in MY00 report but no corrective actions were recommended.
- The MY00 report identifies stream "Problem areas," already showing instability, likely to require maintenance (3), "Areas of concern," - currently stable but showing signs of change that might lead to future instability (6), and "Areas of Difference," that differ from the design (2). The MY00 surveyed cross sections were all larger than the design cross sections.

2006: Design firm performed MY01 monitoring and issued MY01 report:

- 6 of 18 veg plots met 75% survival criteria; 6 of 18 had 0% survival; most problem areas were within the floodplain and were attributed to landowner actions: “Large portions of the riparian buffer have been denuded of the native woody and herbaceous species originally planted there and replaced only by maintained lawn grass.”
- 15 problem areas identified within the Horse Creek stream channel – mainly aggradation in the upstream reaches and degradation in the downstream reaches. No corrective actions were identified but it was noted that intervention would likely be necessary in the future.

2007: The golf course was permanently closed in the fall. Ownership was retained until 2010.

2008: A new firm assumed monitoring duties for MY02 – MY05.

2010: The MY05 report documents multiple failing structures along T1 and southern reach of Horse Creek. It identifies 8% of stream banks as “unstable”; the site was scheduled for invasives treatment and supplemental planting in 2011, but there is no documentation that this took place. Report notes beaver dams along Horse Creek. UT largely dry, with veg growing in lower portion of channel; 3 of 7 (*what happened to the original 18?*) veg plots met survival thresholds.

2010 – 2011: A bank assumed ownership of the property in 2010. The property was put up for sale in 2011.

2012: Property sold to E. Carroll Joyner; New landowner inherited all responsibilities associated with the conservation easement.

2012 to 2019: The new landowner appealed to the IRT to dissolve the conservation easement, which was denied. DMS did not visit the site during this time.

2019: Site closed out by the IRT. It appears that no structural repairs were made, and the site was not replanted; there are no public records of what was agreed upon to close out the site. DMS took approximately 50% credit loss with the IRT to get the site closed out. The conservation easement is now legally enforced by State Property through the DEQ Stewardship program.

2022: The landowner unsuccessfully appealed to the IRT to add an additional crossing within the UT in April. The landowner also attempted to gift the undevelopable land within the floodplain to the Town of Wake Forest for the creation of a park; this fell through partially because the Town was wary of taking control of the conservation easement, and partially because an adjacent parcel that would have provided access was purchased by an HOA.

2023: KCI staff visited the southern half of the project, which is failing. The banks of the lower portion of the project are sparsely vegetated. Multiple cross vane structures appear to have been designed or constructed incorrectly (not tied in to bankfull, stones are too small, etc.) KCI observed at least 3 structures where the stream was eroding out the bank around the tie-in, where structure materials have been mobilized by peak flows and were in the channel downstream, and where the channel was actively eroding and adjusting planform. Additionally, the two corrugated culvert pipes at the road crossing have become blocked by debris and the crossing is in the process of failing. Horse Creek has undermined the pavement, which is partially collapsed on the bank-left side of the crossing. There was evidence that the debris jam in the culvert has caused Horse Creek to flood the right bank of the project near the UT during peak flows.

Future events may result in complete crossing failure, mobilization of the culvert structure materials, downcutting, widening, and a potential migration of the channel.

Discussion

It is likely that the site's failure is due to a combination of factors, including inadequate design or construction that did not achieve the original design objectives, site constraints adjacent to the original project, including utility easements and maintained golf course fairways that limited the design, failure to achieve successful riparian corridor revegetation following construction, potential encroachments associated with golf course maintenance, and a lack of maintenance of the crossings and culverts once the golf course closed.

As it exists now, the site is not providing adequate riparian buffer to mitigate the effects of potential adjacent land use changes. Additionally, the unstable channel appears to be a source of both sediment, and potentially stored nutrients from within former golf course soils, into Falls Lake via Horse Creek. The project is not achieving its intended goals and will likely become more unstable as the instream structures continue to deteriorate and the proposed development of adjacent lands takes place.

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Board of Commissioners Work Session Agenda Item Report

Agenda Item No.: 2024-103-
Submitted by: Kari Grace
Submitting Department: Planning
Meeting Date: April 2, 2024

SUBJECT

Unified Development Ordinance (UDO) Comprehensive Update - Work Session #6

Recommendation:

Item Summary:

ATTACHMENTS

- [UDO Comprehensive Update Work Session #6 Agenda Summary](#)

Agenda Item: Unified Development Ordinance (UDO) Comprehensive Update - Work Session #6

Summary: The Town hired Houseal Lavigne Associates as consultants for the comprehensive update of the UDO. The project kickoff, initial public engagement, and UDO analysis and preliminary recommendations phases have been completed. UDO and MSSD sections are now in development. In the spring of 2023, Houseal Lavigne staff presented proposed zoning district and use regulation standards, and a public open house and online survey were conducted to collect community feedback.

In the fall of 2023, Houseal Lavigne staff presented proposed development standards related to general standards, building design, access and mobility, tree protection, landscaping, buffers, and lighting. The presentation highlighted proposed standards with emphasis on new and revised regulations stemming from Comprehensive Plan recommendations and community feedback.

At the January 19, 2024 Commissioner Retreat, Houseal Lavigne staff presented a summary of the topics shared to date along with proposed standards pertaining to Planned Unit Developments (PUDs), subdivision and lot standards, and open and community space standards.

At this work session, Houseal Lavigne staff will present proposed standards related to street design, natural resources, signage, nonconformities, and administrative processes.

The purpose of the work session is to gather feedback from the Board of Commissioners; no voting items are part of the work session. As the project continues, there will be additional work sessions on specific topic areas as well as ongoing public engagement opportunities. All work session presentations are published on the project webpage.

Attachments: None



Board of Commissioners Work Session Agenda Item Report

Agenda Item No.: 2024-107-

Submitted by: Nick Nolte

Submitting Department: Engineering

Meeting Date: April 2, 2024

SUBJECT

Presentation of CEI Scope for FY22 Bond Project Dunn Creek Greenway Phases 3 and 4.

Recommendation:

Item Summary:

ATTACHMENTS

- [Agenda Summary_04022024.pdf](#)
- [Attachment A_Proposed CEI Scope and Fee.pdf](#)

Agenda Item: Presentation of CEI Scope for Dunn Creek Greenway Phases 3 and 4

Summary: The Engineering Department is requesting approval of \$854,285.82 to Kimley-Horn and Associates, Inc. to provide CEI services for Phases 3 and 4 of the Dunn Creek Greenway. The proposed scope and fee provides Construction Inspection and Materials Testing, performed by Summit Design and Engineering, and project administration, performed by Kimley-Horn and Associates. The Engineering Department has reviewed the provided scope and fee and recommend Board approval.

Phase 3 will link with the Downtown Connector and extend the greenway 1.9 miles north to East Juniper Avenue. Phase 4 will connect Flaherty Park to the greater Dunn Creek Greenway system, tying into portions of greenway developed by private development in the Traditions/ Del Webb communities. Both phases 3 and 4 are planned to go to bid for construction in May 2024.

Attachments: Attachment A_Proposed CEI Scope and Fee

INDIVIDUAL PROJECT ORDER NUMBER 5

Describing a specific agreement between Kimley-Horn and Associates, Inc. (the Consultant), and The Town of Wake Forest (the Client) in accordance with the terms of the Master Service Agreement for On-Call Professional Engineering Services dated March 6, 2023, which is incorporated herein by reference.

Identification of Project:

Project Name: Dunn Creek Greenway Phase 3 & 4 Construction Phase Services

Consultant Project Manager: Caleb Lowman

Project Number: 011311071

Specific scope of basic Services:

Kimley-Horn and Associates, Inc. (“Consultant” or “Consultant”) is pleased to submit this Individual Project Order (IPO) to the Town of Wake Forest (“Town” or “the Client”) for providing professional engineering services for the above referenced project (the “Project”). Our project understanding, scope of services, schedule, and fee are below.

Project Understanding

The purpose of this IPO is for the Consultant and team to provide bid phase services, full-time Project administration, full-time construction inspection, and materials testing for Dunn Creek Greenway Phase 3 & 4. The consultant will utilize the services of Summit Design and Engineering Services (Subconsultants) for daily inspection, field reporting, and materials testing as outlined in their scope of work. Consultant understands that the construction schedule for Dunn Creek Greenway Phase 3 & 4 is 480 calendar days. Consultant assumes that the total duration of the Construction Phase Services will be a total of 69 weeks, which includes startup and project closeout. The plans and specifications have been designed and provided to the Town as a part of previous IPOs. Services included in this IPO are listed below.

Scope of Services

Consultant will provide the services specifically set forth below.

Task 1 – Construction Inspection and Materials Testing (Summit Design and Engineering)

See Summit Design and Engineering Scope of Work November 29, 2023 (Attachment A).

Task 2 – Project Administration

Bid Phase Services - The Town will be responsible for developing and issuing the bid advertisement on the Town website and in the local newspaper, making copies of the signed plans and specifications available to interested parties, maintaining a bidder’s log, conducting the bid opening, and evaluating the compliance of the bids received with the bidding documents. Consultant will be responsible for providing project plans and specifications to the local plan rooms for review by Contractors, attending one Pre-Bid Conference, responding to Contractors’ questions, and issue up to one (1) formal addendum. The provided addenda will include minutes to the Pre-Bid

Conference. Consultant will tabulate the bids received and evaluate general compliance of bids with the bidding documents. Consultant will provide a summary of this tabulation and evaluation.

If bid phase services are required in addition to those listed above due to project readvertisement or other bid phase complications, then those services shall be considered Additional Services outside of the intended scope of this Contract.

Bi-Weekly Meetings - Once construction begins, Consultant will administer bi-weekly meetings with the contractor, Town, and other stakeholders. Consultant will compile meeting minutes and distribute to all stakeholders. The consultant will produce meeting minutes and provide to the Town. Consultant will coordinate and meet with utility companies in conjunction with the selected contractor. The contractor is ultimately responsible for this task per the contract specifications; however, to expedite this process, the consultant will assist as needed with this task. *Consultant assumes (35) Bi-weekly Meetings and (2) Utility Meetings.*

Meetings at Town Request - Consultant, if requested by the Town, will meet to discuss miscellaneous issues related to the project. *Consultant assumes (5) meetings if requested by the Town.*

Project ShareFile Site – Town will setup and maintain a project site (e-builder). Consultant will upload all project information such as, RFI's, pay applications, and other documents as necessary. Consultant will notify team members when new information is uploaded to the website.

Project Contact List - Consultant will set up and maintain project contact list. This process will begin at the preconstruction meeting and conclude at the end of the project. The contact list will include but not be limited to the construction phase team, Town personnel, contractor and subcontractor personnel.

Pre-Construction Meeting - Consultant will administer pre-construction meeting with the contractor, Town, and other stakeholders before the start of construction. Consultant will compile meeting minutes and distribute to all stakeholders. The consultant will produce meeting minutes and provide to the Town. *Consultant assumes (1) pre-construction meeting.*

Pre-Installation Meetings - Consultant will administer pre-installation meetings for major contract items with the contractor, Town, and other stakeholders. Consultant anticipates meeting for traffic control installation, pedestrian route changes, and pedestrian bridge installation. Consultant will compile meeting minutes and distribute to all stakeholders.

Engineers Bi-Weekly Summary - Consultant will compile data from the project on a bi-weekly basis, such as field and testing reports, schedule status, and any outstanding items. This information will be placed into an Engineers Bi-Weekly Summary and distributed to the Town. *Consultant assumes 35 bi-weekly summaries.*

Site Visits and Construction Observation - Consultant will make visits to observe the progress of the work. Observations will not be exhaustive or extend to every aspect of Contractor's work but will be limited to spot checking and similar methods of general observation. Based on the site visits, Consultant will evaluate whether Contractor's work is generally proceeding in accordance with the Contract Documents and keep Town informed of the general progress of the work.

Consultant will not supervise, direct, or control Contractor's work, and will not have authority to stop the work or responsibility for the means, methods, techniques, equipment choice and use, schedules, or procedures of construction selected by Contractor, for safety programs incident to the Contractor's work, or for failure of Contractor to comply with laws. Consultant does not guarantee Contractor's performance and has no responsibility for Contractor's failure to perform in accordance with the Contract Documents. Consultant is not responsible for any duties assigned to it in the construction contract that are not expressly provided for in this Agreement. *Consultant assumes 35 site visits will be required; site visits are to be incorporated with bi-weekly meetings. It is anticipated that up to 10 additional (non-bi-weekly meeting) site visits will be required. It is anticipated that 5 sites visits will be required during the pedestrian bridge boardwalk construction by the Engineer of Record.*

Recommendations with Respect to Defective Work - Consultant will recommend to Town that Contractor's work be disapproved and rejected while it is in progress if Consultant believes that such work will not produce a completed project that generally conforms to the Contract Documents.

Review Requests for Information - Consultant will respond to reasonable and appropriate Contractor requests for information made in accordance with the Contract Documents and issue necessary clarifications and interpretations. Any orders authorizing variations from the Contract Documents will be made only by the Town. *Consultant assumes 20 requests for information submitted for review.*

Review of Supplemental Agreements - Consultant will review Supplemental Agreements submitted by the contractor on behalf of the Town. Consultant will review any supplemental agreement submitted by the contractor with the approved Contract Documents and make a recommendation to Town. Our review will involve coordination with the Town to include all stakeholders in the process. *Consultant assumes 5 supplemental agreements.*

Review Pay Applications - Based on its observations and on review of applications for payment and supporting documentation, Consultant will recommend amounts that Contractor be paid. Recommendations will be based on Consultant's knowledge, information, and belief, and will state whether in Consultant's opinion Contractor's work has progressed to the point indicated, subject to any qualifications stated in the recommendation. Consultant's recommendations will not be a representation that its observations to check Contractor's work have been exhaustive, extended to every aspect of Contractor's work, or involved detailed inspections.

Consultant will review, approve, and make recommendation for payment to Town. The submitted pay application will be reviewed with Subconsultant and cross-checked with submitted field reports. Consultant will also review to determine if all information that is required is included, such as material tickets, supplier list, W-9 forms, DBE-IS for subcontractors, subcontractor approval forms, sales tax, certified payroll, and an updated schedule. *Consultant assumes 16 monthly and 1 final pay application.*

Review Subcontract Approval Forms - Consultant will review subcontract approval forms for compliance for Town. The submitted subcontract approval forms will be cross-checked against the pay applications and daily field reports. These subcontract forms will be approved and submitted with the pay application. *Consultant assumes 10 subcontract approval forms will be submitted for the project.*

Review of Wage Interviews - Consultant will review all wage interviews in accordance with Town/NCDOT guidelines. Subconsultant will be conducting the interviews quarterly and submitting to Consultant for review. Consultant will review the interviews against the certified payroll submitted by the contractor, as well as the daily reports submitted by Subconsultant. *Consultant assumes 10 wage interviews.*

Review of Shop Drawings and Approved Products List - Consultant will review and take appropriate action with respect to Shop Drawings and Samples and other data that Contractor is required to submit, but only for general conformance with the Contract Documents. Such review and action will not extend to means, methods, techniques, equipment choice and usage, schedules, or procedures of construction or to related safety programs. Any action in response to a shop drawing will not constitute a change in the Contract Documents, which can be changed only through the Change Orders. Consultant will review the shop drawing submittals with the NCDOT Approved Products for compliance with the plans and specifications. *Consultant anticipates approximately 150 items will require review and approval. We also anticipate that these would be compiled into 50 larger packages and submitted for review.*

Substitutes and "or-equal." - Consultant will evaluate and determine the acceptability of substitute or "or-equal/equivalent" materials and equipment proposed by Contractor in accordance with the Contract Documents.

Periodic Town Reviews - Consultant will set up periodic reviews with Town to verify that the material and information are in compliance. It is anticipated that these reviews will be part of a bi-weekly meeting. *Consultant assumes 2 reviews with Town.*

Substantial Completion - When requested by Contractor and Town, Consultant will conduct a site visit to determine if the work is substantially complete. Work will be considered substantially complete following satisfactory completion of all items with the exception of those identified on a final punch list.

Final Notice of Acceptability of the Work - Consultant will conduct a final site visit to determine if the completed Work of Contractor is generally in accordance with the Contract Documents and the final punch list so that Consultant may recommend final payment to Contractor.

Project Closeout - Consultant will work with Town to close out the project. This process will include a pre-punch list, punch list walk through, follow-up punch list walk through, Internal audit, and Materials and Testing Audit.

Disputes between Town and Contractor - Consultant will, if requested by Town, render written decision on all claims of Town and Contractor relating to the acceptability of Contractor's work or the interpretation of the requirements of the Contract Documents. In rendering decisions, Consultant shall be fair and not show partiality to Town or Contractor and shall not be liable in connection with any decision.

Record Drawings - Consultant will assemble record drawing package showing significant changes reported by the Contractor or made to the design by Consultant. Record drawing information will be provided by the Contractor per the contract specifications. Record drawing information will be assembled per the NCDOT construction manual and City of Raleigh requirements. Record drawings are not guaranteed to be as-built but will be based on information made available.

Kimley-Horn will upload the storm drain record drawing provided by the contractor to the Towns IDT site.

Record Retention. The Consultant will retain the project records for 3 years or as required by NCDOT.

Additional Services

Any services not specifically provided for in the above scope will be considered additional services and can be performed at our then current hourly rates. Additional services include, but are not limited to, the following:

- Plan revisions/meetings resulting from adjacent site requests
- Plan revisions based on unforeseen or changed site conditions
- Services beyond anticipated construction schedule

Schedule

It is anticipated that the total project construction schedule will be 480 days from Notice to Proceed, plus startup and closeout.

Fee and Expenses

Consultant will perform the services described in the Scope of Services for a lump sum fee of **\$ 896,721.23**. Fees broken down by individual tasks are as follows:

<u>Task No.</u>	<u>Design Tasks</u>		<u>Estimated Fee</u>
1	Construction Inspection and Materials Testing	\$	618,385.82
2	Project Administration	\$	233,900.00
	Expenses	\$	2,000.00
	Total	\$	854,285.82

Kimley-Horn will not exceed the anticipated labor and expense fee shown without authorization from the Town. Individual task amounts are provided for budgeting purposes only. Kimley-Horn reserves the right to reallocate amounts among tasks as necessary.

Payment will be due within 25 days of your receipt of the invoice and should include the invoice number and Kimley-Horn project number. Monthly invoices will include employee's time sheets which will detail the location of the employee's work, time spent on location, and work performed to support the billing.

Very truly yours,

KIMLEY-HORN AND ASSOCIATES, INC.



By: Caleb D. Lowman, P.E.
Project Manager



Jeffrey W. Moore, P.E.
Senior Vice President



Attachment A – Summit Design and Engineering Scope and Fee
Attachment B – Kimley-Horn Fee



Attachment I Scope Clarifications for Dunn Creek Phases 3&4

Provide Soil & Materials Testing

- 1.) Provide ABC sampling, borrow pit sampling, and conventional densities.
 - a. Liquid limits
 - b. Classification
 - c. Sieve analysis
- 2.) Concrete testing.
 - a. Concrete slump - field
 - b. Air & chase test – field
 - c. Compression tests 7 day & 28 day
- 3.) Asphalt Tests
 - a. Nuclear gauge density test
 - b. Specific gravity of asphalt cores
 - c. Asphalt Extraction Gradation
- 4.) Embankment Densities, Subgrade Densities and Proof rolling Tests

Planning and Design Services

- 1.) Attending construction meetings.
- 2.) Attend any other meetings as requested.

Special Inspections

- 1.) Bridge inspection
- 2.) Boardwalk inspection
- 3.) Multi-use path inspection
- 4.) Erosion and sedimentation control inspections

Additional Special Inspections

- 1.) Verifying pay record books, pay apps, MRR's, daily reports, ticket books, CM Testing Logs.
- 2.) Verification of NPDES forms are completed and reported as required by Land Disturbing Permit.
- 3.) Verify what has been installed is correct.
- 4.) Trace as-builts by contractor.

CMT Assumptions/Clarifications

- Summit will provide Construction Materials Testing as the main consultant to the Town of Wake Forest and Kimley-Horn.

Raleigh Office

3301 Benson Drive, Suite 400, Raleigh, NC 27609

919.322.0115 // www.summitde.com

- Construction Materials Testing will be provided in accordance with the prevailing agency's testing guidelines (NCDOT). For clarity, the 2024 NCDOT Standards and Specifications testing requirements will be adhered to and include the Town's Standards & Design.
- The following Construction Materials Testing will be provided per 2024 NCDOT Standards Specifications.

1. SOILS AND FOUNDATIONS

Summit will periodically check soil compaction (density) to verify that the Project specifications and 2024 NCDOT Standard Specifications are being followed. This will apply to mass grading, pipe backfill, and undercut backfill. Subgrade testing will utilize test sections appropriate for the quantity of multi-use paths constructed. Summit will also include observation of proof rolling the grade once subgrade is prepared prior to placement of sub ballast or pavement structure.

The required foundation tests for the drilled shafts will be performed to verify that the drilled shafts meet the requirements of the specifications.

2. STRUCTURAL STEEL REINFORCEMENT

Reinforcement inspection shall be performed prior to placement of structural concrete. Reinforcement steel will be sampled in accordance with NCDOT's Minimum Sampling Guidelines and Protocols and Procedures.

3. CONCRETE AND GROUT

Construction requires Summit to monitor concrete placement for roadway, incidental, structure, substructure concrete. Summit will test fresh concrete for air content, slump, and temperature and cast cylinders for laboratory compressive strength testing.

4. ASPHALT PAVEMENT

Construction requires Summit to monitor asphalt placement. The Construction Contractor shall perform NCDOT QMS Quality Control and Summit shall provide Quality Assurance. Summit will test for density and verify that the asphalt placement is in accordance with plans, specifications, and NCDOT policy and procedures.

5. INDEPENDENT ASSURANCE

As part of the Materials Certification process, Summit shall coordinate with NCDOT's Independent Assurance technicians to schedule the performance of their Quality Assurance sampling and testing as required.

Summit will bill their efforts to Kimley-Horn on a T&M basis according to the Unit Rate Schedule provided by the Professional in the Fully Executed Master Agreement.

Additional Clarifications:

- 1.) All labor for Summit will be invoiced monthly on a T&M basis from the date of notice to proceed, through completion to be mutually defined by the Kimley-Horn and Summit at a future date.
- 2.) Payment from the Kimley-Horn is due net thirty (45) days of receipt of Summit's invoice.
- 3.) Summit will bill their efforts to the Kimley-Horn on a T&M basis according to the Unit Rate Schedule provided by the Professional in the Fully Executed Master Agreement.

Documents/ Deliverables:

1.) Summit will continue using Kimley-Horn's Box for project documentation. Summit will compile and maintain uniform filing system pursuant to the NCDOT Construction Manual for Records and Reports. These records will be updated monthly to the Kimley-Horn's Box Folder by Michael Sciortino or Summit technician.

Inspections and CEI Work:

1.) Should additional testing or other work be required, Summit notify the Town of Wake Forest and Kimley-Horn of any additional or extra work in writing.

2.) Summit will assist the Town of Wake Forest using Summit's CMT for Dunn Creek projects by providing the following items:

A) Verification of quantities on the pay application:

- i) Summit will ensure the Town has not over or under paid the contractor prior to the final pay application.
- ii) Summit will use a Field Technician for measuring and computing payment quantities and verify all quantities measured computed and paid to date by other consultants.
- iii) Summit will conduct wage reviews quarterly or every time a new subcontractor shows up onsite.

B) Summit will use CEI staff will provide verification to make sure what has been installed is correct vertically and/or horizontally in comparison to the approved plans for all roadway appurtenances. This be accomplished as follows:

- i) Field Technician will check lines, grades, slopes, etc using the contractor surveyor's stakes.
- ii) Field Technician will check and verify all pipe crossings including inverts, pipe lengths, box inverts, box depths box dimensions and all headwalls to make sure they are correct and will identify discrepancies to the Owner/Kimley-Horn.
- iii) Field Technician will review and check curb and gutter, sidewalk, concrete trail path, pavements, wheelchair ramps and all other associated flatwork to ensure positive drainage, slopes, lines, grades, offset and quantity verifications.
- iv) Field Technician will check and verify all bridge crossings including boardwalks to make sure they are correct and will identify discrepancies to the Owner/Kimley-Horn.

CEI Services

- 1) Summit will provide CEI services as outlined herein including the scope defined in the contractor's bid proposals for Dunn Creek Phase 3 &4, between Summit and Kimley-Horn titled Attachment I attached herein.
- 2) Summit will work with other consultants on the measuring, computing, and recommending payment for partial payment estimates including current and future pay applications to the Owner.
- 3) Summit will investigate and provide recommendations regarding contractor claims for time or compensation.
- 4) Summit will review and provide recommendations to the Owner and Kimley-Horn on what work is available however not being pursued by the Contractor. In this review and activity Summit will also concurrently track work that has been left incomplete or inaccurate to the lines and grades and slopes on the approved plans.

- 5) Summit will attend all meetings project related to help address unresolved issues or actions needed for owner/Kimley-Horn to act. This activity is necessary to address claims and provide recommendations to the Owner/Kimley-Horn.
- 6) Summit anticipates the project will need two full-time techs based on 480 days. Summit will only charge for time worked on the project. Transportation Tech V 480 days, Transportation Tech II 300 days.

Fee:

- 1) On-Call Inspection Services/ Materials Testing Services: \$618,385.82.

PROJECT DIRECT EXPENSES			
TOTAL DIRECT EXPENSES	\$	66,157.84	
AGREEMENT COSTS AND FEES SUMMARY			
Direct Salary Cost CEI Technicians	\$	535,165.41	
Direct Salary Cost Project Management/Contract Administration	\$	16,565.71	
Project Direct Expenses	\$	66,157.84	
TOTAL AGREEMENT COSTS AND FEES	\$	617,888.96	
Summit Design and Engineering Servi Facilities Cost of Capital (Prime Contractor TECHNICIANS) FIELD	0.250%	\$	482.85
Summit Design and Engineering Servi Facilities Cost of Capital (Prime Contractor PROJECT MANAGER) HOME	0.250%	\$	14.01
SUBCONTRACTOR1 NAME	Facilities Cost of Capital (Subcontractor 1 TECHNICIANS) FIELD	\$	-
SUBCONTRACTOR1 NAME	Facilities Cost of Capital (Subcontractor 1 PROJECT MANAGER) HOME	\$	-
SUBCONTRACTOR2 NAME	Facilities Cost of Capital (Subcontractor 2 TECHNICIANS) FIELD	\$	-
SUBCONTRACTOR2 NAME	Facilities Cost of Capital (Subcontractor 2 PROJECT MANAGER) HOME	\$	-
SUBCONTRACTOR3 NAME	Facilities Cost of Capital (Subcontractor 3 TECHNICIANS) FIELD	\$	-
SUBCONTRACTOR3 NAME	Facilities Cost of Capital (Subcontractor 3 PROJECT MANAGER) HOME	\$	-
TOTAL Non-DIRECT SALARY COST CEI TECHNICIANS & PMICA	\$	496.86	
TOTAL DIRECT and NON-DIRECT SALARY COST CEI TECHs & PMICA	\$	552,227.98	
Gentingency			
TOTAL AGREEMENT AMOUNT	\$	618,385.82	
FOR STAND-ALONE PURCHASE ORDERS ONLY -- ADDITIVE:			
STAND-ALONE PO WILL BE WRITTEN FOR THIS AMOUNT:			
MANHOURS TECHNICIANS 4721 MANHOURS PROJECT MANAGEMENT 80 TOTAL MANHOURS 4801			
LABOR COSTS	\$	552,227.98	
DIRECT EXPENSES	\$	66,157.84	
TOTAL COSTS:	\$	618,385.82	

Total Labor Cost
\$201,956.15

ENGINEERING AND INSPECTION - TECHNICIANS
DIRECT LABOR COST SUMMARY
Description
Summit Design and Engineering Services

CALENDAR YEAR 2024												
Personnel Classification / Employee Name	Regular Hours ¹	Overtime Hours ²	Total Hours	Regular Rate ³	Regular Labor Cost	Overtime Hours	Overtime Rate	Overtime Labor Cost	Shift Premium Hours	Shift Premium Rate	Shift Premium Labor Cost	Total Labor Cost
			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
Ben Layton	1155	116	1271	\$ 45.90	\$ 58,338.90	116	\$ 22.95	\$ 2,662.20		\$ 4.59	\$ -	\$ 61,001.10
TTII	1155	116	1271	\$ 32.93	\$ 41,854.03	116	\$ 16.47	\$ 1,910.52		\$ 3.29	\$ -	\$ 43,764.55
			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
June - December (7 months)			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
TOTALS	2310	232	2542		\$ 100,192.93	232		\$ 4,572.72	0		\$ -	\$ 104,765.65

NOTES:

¹ Estimated 165 hours / month

² Estimated 10% of Regular Hours

³ Rates shown are Maximum Allowable Rates for purposes of establishing the Project CEI budget.

Actual Reimbursable Rates will be approved by the DEPARTMENT for each technician and shall not exceed the maximum allowable rates established for the classification.

TOTAL PREMIUM LABOR \$ 4,572.72

ENGINEERING AND INSPECTION - TECHNICIANS
DIRECT LABOR COST SUMMARY
Description
Summit Design and Engineering Services

CALENDAR YEAR 2025												
Personnel Classification / Employee Name	Regular Hours ¹	Overtime Hours ²	Total Hours	Regular Rate ³	Regular Labor Cost	Overtime Hours	Overtime Rate	Overtime Labor Cost	Shift Premium Hours	Shift Premium Rate	Shift Premium Labor Cost	Total Labor Cost
			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
Ben Layton	1485	149	1634	\$ 45.90	\$ 75,000.60	149	\$ 22.95	\$ 3,419.55		\$ 4.59	\$ -	\$ 78,420.15
TTII	495	50	545	\$ 32.93	\$ 17,946.85	50	\$ 16.47	\$ 823.50		\$ 3.29	\$ -	\$ 18,770.35
		0	0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
January - September (9 Months)			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
			0		\$ -	0	\$ -	\$ -		\$ -	\$ -	\$ -
TOTALS	1980	199	2179		\$ 92,947.45	199		\$ 4,243.05	0		\$ -	\$ 97,190.50

NOTES:

¹ Estimated 165 hours / month

² Estimated 10% of Regular Hours

³ Rates shown are Maximum Allowable Rates for purposes of establishing the Project CEI budget.

Actual Reimbursable Rates will be approved by the DEPARTMENT for each technician and shall not exceed the maximum allowable rates established for the classification.

TOTAL PREMIUM LABOR \$ 4,243.05

Total Labor Cost
\$ 5,605.60

Robert J. Stroup:
Overtime is not allowed for
PROJECT MANAGERS.

ENGINEERING MANAGEMENT/CONTRACT ADMINISTRATION
DIRECT LABOR COST
Description
Summit Design and Engineering Services

CALENDAR YEAR 2024									
Personnel Classification / Employee Name ¹	Regular Hours	Overtime Hours	Total Hours	Regular Rate	Regular Labor Cost	Overtime Hours	Overtime Rate	Overtime Labor Cost	Total Labor Cost
Michael Sciortino PE	32		32	\$ 70.07	\$ 2,242.24	0	\$ 35.04	\$ -	\$ 2,242.24
			0		\$ -	0	\$ -	\$ -	\$ -
June- December			0		\$ -	0	\$ -	\$ -	\$ -
			0		\$ -	0	\$ -	\$ -	\$ -
TOTALS	32	0	32		\$ 2,242.24	0	\$ 35.04	\$ -	\$ 2,242.24

¹ One Management visit for prime firm is reimbursable every quarter
One Management visit from subcontractors is reimbursable two times per year

Robert J. Stroup:
Overtime is not allowed for
PROJECT MANAGERS.

ENGINEERING MANAGEMENT/CONTRACT ADMINISTRATION
DIRECT LABOR COST
Description
Summit Design and Engineering Services

CALENDAR YEAR **2025**

Personnel Classification / Employee Name ¹	Regular Hours	Overtime Hours	Total Hours	Regular Rate	Regular Labor Cost	Overtime Hours	Overtime Rate	Overtime Labor Cost	Total Labor Cost
Michael Sciortino PE	48		48	\$ 70.07	\$ 3,363.36	0	\$ 35.04	\$ -	\$ 3,363.36
			0		\$ -	0	\$ -	\$ -	\$ -
January - September			0		\$ -	0	\$ -	\$ -	\$ -
			0		\$ -	0	\$ -	\$ -	\$ -
TOTALS	48	0	48	\$ 70.07	\$ 3,363.36	0	\$ 35.04	\$ -	\$ 3,363.36

¹ One Management visit for prime firm is reimbursable every quarter
One Management visit from subcontractors is reimbursable two times per year

Version: 2024.01.04.RJS

CONTRACT ENGINEERING AND INSPECTION
DIRECT EXPENSES

FIELD EQUIPMENT AND SUPPLIES FURNISHED BY

Description

TOTAL DIRECT COSTS: \$ 66,157.84

* Vehicle Base Rates per "MAXIMUM ALLOWABLE NON-SALARY DIRECT COSTS" (latest version) -- Maximum Allowable Non-Salary Direct Costs.pdf located at:
https://connect.ncdot.gov/business/consultants/_layouts/download.aspx?SourceUrl=/business/consultants/Roadway/Maximum%20Allowable%20Non-Salary%20Direct%20Costs.pdf

Phones, Computers, iPads, Data Plans, Wifi, ...etc. are in Overhead.

** Nuclear Gauge monthly reimbursement rate per M. L. Sylvester, PE memo dated May 13, 2019 entitled "Reimbursement for Private Engineering Firm Furnished Nuclear Gauge".

Item No.	Description	Months	Quantity	Unit	Unit Price	Unit Tax	Total Unit Cost	Salvage Value	Total Cost
1	Project Vehicles - 2 wheel drive - # Vehicles *			veh-mo	\$1,074.00		\$ 1,074.00		\$ -
2	Gas Reimbursement: 2-WD @ \$0.XX per mile Gas reimbursement based on \$/gal/16 mpg.			miles	\$0.28				\$ -
3	Project Vehicles - 4 wheel drive - # Vehicles *	16	2	veh-mo	\$1,140.00		\$ 1,140.00		\$ 36,480.00
4	Gas Reimbursement: 4-WD @ \$0.XX per mile Gas reimbursement based on \$/gal/14mpg.	16	1218	miles	\$0.23				\$ 4,482.24
5	Project Vehicles - Survey Vehicle - # Vehicle			veh-mo			\$ -		\$ -
6	Gas Reimbursement: Survey Vehicle @ \$TBD per mile Gas reimbursement based on \$TBD/gal/TBD mpg			miles					\$ -
7	Communication (# mobile phones). -- -- RECOVERED THROUGH FIRM'S OVERHEAD.			mo			\$ -		\$ -
8	Survey Equipment			Actual Cost (Not-to-Exceed)			\$ -		\$ -
9	Troxler 3450 Thick Nuclear Gauges (Rent/Purchase) -- MONTHLY REIMBURSEMENT RATE = \$400/month. **	1	2	gauge-month	\$ 400.00		\$ 400.00		\$ 800.00
10	Leak Test, Calibration, Cleaning and Lubrication -- INCLUDED IN MONTHLY REIMBURSEMENT RATE ABOVE. **			yr			\$ -		\$ -
11	Yearly NCDENR License Fee of -- INCLUDED IN MONTHLY REIMBURSEMENT RATE ABOVE. **			yr			\$ -		\$ -
12	Quarterly Testing of 10 Badges per test -- INCLUDED IN MONTHLY REIMBURSEMENT RATE ABOVE. **			yr		\$ -	\$ -		\$ -
13	Mounted Transportation Box -- INCLUDED IN MONTHLY REIMBURSEMENT RATE ABOVE. **			Actual Cost (Not-to-Exceed)		\$ -	\$ -		\$ -
14	Safety Harness w/ 2 Lanyards			Actual Cost (Not-to-Exceed)		\$ -	\$ -		\$ -
15	Field Office(Rent Monthly)			mo		\$ -	\$ -		\$ -
16	Field Office Set up			Actual Cost (Not-to-Exceed)		\$ -	\$ -		\$ -
17	Utilities (Monthly)			mo		\$ -	\$ -		\$ -
18	Office Furniture			Actual Cost (Not-to-Exceed)		\$ -	\$ -		\$ -
19	Monthly Office supplies (\$50 per month) --IF PEF PROVIDES A FIELD OFFICE, -- -- RECOVERED THROUGH FIRM'S OVERHEAD.			mo		\$ -	\$ -		\$ -
20	Computer (LAPTOP) -- HAS-A-\$399.99 SALVAGE VALUE (CALCULATED AUTOMATICALLY); -- -- RECOVERED THROUGH FIRM'S OVERHEAD.			Actual Cost (Not-to-Exceed)		\$ -	\$ -	\$ -	\$ -
21	Concrete Air Pot		1	Actual Cost (Not-to-Exceed)	\$ 827.80	\$ 64.15	\$ 891.95		\$ 891.95
22	Concrete Slump Cone		1	Actual Cost (Not-to-Exceed)	\$ 176.40	\$ 13.67	\$ 190.07		\$ 190.07
23	Conventional Density Equipment Set		1	Actual Cost (Not-to-Exceed)	\$ 2,668.00	\$ 206.77	\$ 2,874.77		\$ 2,874.77
24	Copier			Actual Cost (Not-to-Exceed)		\$ -	\$ -		\$ -
25	Copier Maintenance (yearly)			Actual Cost (Not-to-Exceed)		\$ -	\$ -		\$ -
26	Fax			Actual Cost (Not-to-Exceed)		\$ -	\$ -		\$ -
27	Trips by Project Management								
28	PEF Prime = 4 trips per year @ ____ miles (Total # of Trips)		640	mi	\$ 0.670		\$ 0.670		\$ 428.80
29	PEF Subconsultant1 = 2 trips per year @ ____ miles (Total # of Trips)			mi	\$ 0.670		\$ 0.670		\$ -
30	PEF Subconsultant2 = 2 trips per year @ ____ miles (Total # of Trips)			mi	\$ 0.670		\$ 0.670		\$ -
31	PEF Subconsultant3 = 2 trips per year @ ____ miles (Total # of Trips)			mi	\$ 0.670		\$ 0.670		\$ -
32	-- Miscellaneous Direct Costs, etc. --								\$ -
33	Concrete Cylinder Breaks	2	50	EACH	\$ 18.00	\$ -	\$ 18,000		\$ 1,800.00
34	Specific Gravity / Asphalt Core Densities	2	27	EACH	\$ 35.00	\$ -	\$ 35,000		\$ 1,890.00
35	Dynamic Cone Penetration in Pavement	1	20	EACH	\$ 85.00	\$ -	\$ 85,000		\$ 1,700.00
36	Asphalt Extraction Gradation (ASTM D6951)	1	18	EACH	\$ 350.00	\$ -	\$ 350,000		\$ 6,300.00
37	Standard Proctor (For Soil Classification of Borrow) ASTM D 698	2	6	EACH	\$ 150.00	\$ -	\$ 150,000		\$ 1,800.00
38	Atterberg Limits	2	9	EACH	\$ 70.00	\$ -	\$ 70,000		\$ 1,260.00
39	ABC Stone Gradation	2	9	EACH	\$ 70.00	\$ -	\$ 70,000		\$ 1,260.00
40	Plans	2	1	EACH	\$ 1,250.00	\$ -	\$ 1,250,000		\$ 2,500.00
41	Miscellaneous	1	1	EACH	\$ 1,500.00	\$ -	\$ 1,500,000		\$ 1,500.00
42	Miscellaneous					\$ -	\$ -		\$ -

TOTAL DIRECT COSTS: \$ 66,157.84

FEF ESTIMATE

Attachment B

MANHOURS BY CLASSIFICATION							TOTAL		PROJECT PHASE
SENIOR PROF II	SENIOR PROF I	PROF	ANALYST	SENIOR TECH	TECH	SUPPORT STAFF	MANHOURS	MANDAYS	Task 2 - Project Administration
		12	10		2		24	3.00	Bid Phase Services
		236	118				354	44.25	Precon, Weekly, Monthly Meetings and Site Visits
		10	10				20	2.50	Engineers Weekly Summary
		8					8	1.00	Recommendations with Respect to Defective Work
		60	40				100	12.50	Review Pay Applications and Schedule Review
		60	20				80	10.00	Requests for Information (RFI)
		30	10				40	5.00	Review Subcontract Approval Forms
		80	50				130	16.25	Review of Shop Drawings and Approved Projects List
		10					10	1.25	Substitute and Or Equals
		30	10				40	5.00	Supplemental Agreements
			10				10	1.25	Review of Wage Interviews
		2	7				9	1.13	Project Contact List
	8		4				12	1.50	Periodic Internal Reviews
		40	80				120	15.00	Materials Received and Ticket Book Documentation
		8	8				16	2.00	Substantial Completion
		22	22				44	5.50	Project Closeout
		20	18				38	4.75	Coordination with Subcontractors
		16	16				32	4.00	Miscellaneous Coordination with Contractor/Town
		4					4	0.50	Final Notice of Acceptability of the work
		10					10	1.25	Disputess between Town and Contractor
		30	54				84	10.50	Record Drawings
							0	0.00	
0	8	688	487	0	2	0			
							1185	148.13	



Board of Commissioners Work Session Agenda Item Report

Agenda Item No.: 2024-122-

Submitted by: Aileen J. Staples

Submitting Department: Administration

Meeting Date: April 2, 2024

SUBJECT

February Monthly Financial Summaries

Recommendation:

Item Summary:

ATTACHMENTS

- [Monthly Financial Report_summary.pdf](#)
- [February 29, 2024 Financial Summaries.pdf](#)

Agenda Item: Monthly Financial Report

Summary: Staff prepares monthly financial reports for each of the respective operating funds for which an annual budget is authorized by the Board of Commissioners. The reports are accompanied by highlights during respective month for each fund.

Attachments: Financial reports

Town of Wake Forest

February 29, 2024

GENERAL FUND HIGHLIGHTS:

- Total year-to-date revenues are at 71.21% of annual budgeted amounts.
- Current year ad valorem taxes are ahead of prior YTD by over \$2.8 million.
- Total year-to-date expenditures are at 68.15% of appropriations (includes encumbrances).
- Net increase YTD (*increase in fund balance*) is **\$8.5 million**.
 - Increased collections in current year ad valorem taxes - \$7.5 million for the month.
 - **Please keep in mind that this will level out the remainder of the year.**
 - Capital purchases and debt service will occur in March-June.

DEBT SERVICE FUND HIGHLIGHTS:

- \$587,054 in debt service payments made in February.
- Net increase YTD (*increase in fund balance*) is **\$2,679,554**.

WF BIP:

- Other financing sources represents transfer from General Fund.
- Expenditures are below expected guideline (67%).

DMSD HIGHLIGHTS:

- Transfers to Debt Service fund and General Fund (façade improvements) made in December.

WFRH HIGHLIGHTS:

- Expenditures are at 60.11% which is below the guideline (67%).
- Other financing sources represents transfer from General Fund for personnel costs.

February 29, 2024 - Financial Summaries – page 2

ELECTRIC FUND HIGHLIGHTS:

- Total year-to-date revenues are at 71.88% of budgeted amounts.
- Total expenses are at 92.45% (includes encumbrances) – **without inventory encumbrance – 69%.**
 - Purchase for resale – power for February (**\$956,348**) is paid in March and not reflected in the attached.
- Net gain YTD is **\$708,174**

AMERICAN RESCUE PLAN ACT (ARPA):

- Report is a “life to date” (LTD) meaning everything reported is cumulative from the beginning – July 2021.
- Due to reporting and accounting requirements, funds received to date are shown as “deferred revenue” and is recorded as revenue as we incur expenditures over the next few years. For monthly reporting purposes, it is shown that all funds have been received.
- Funds must be encumbered (or under contract/obligated) by December 31, 2024, and expended (paid) by December 31, 2026.

GENERAL FUND
February 29, 2024

Monthly Target Percentage

67.00%

Department	Amended Budget	YTD Actual	Encumbrances	Remaining Budget (including encumbrances)	% Budget Used (includes encumbrances)	PY YTD Actuals
REVENUES						
Ad Valorem Taxes	\$ 38,078,440	\$ 38,148,577	-	\$ (70,137)	100.18%	\$ 35,334,811
Other Taxes	55,000	35,885	-	19,115	65.25%	32,310
Unrestricted Intergovernmental	18,435,300	7,556,924	-	10,878,376	40.99%	7,284,974
Restricted Governmental	2,297,540	1,692,692	-	604,848	73.67%	1,278,927
Permits and Fees	2,590,300	1,984,756	-	605,544	76.62%	1,853,021
Other Revenue	1,903,470	1,313,943	-	589,527	69.03%	1,140,711
Sales and Services	5,103,750	2,742,894	-	2,360,856	53.74%	2,370,679
Investment Earnings	850,000	1,146,606	-	(296,606)	134.89%	565,922
Other Financing Sources	12,509,850	3,640,705	-	8,869,145	29.10%	589,919
General Fund Total	\$ 81,823,650	58,262,982	-	23,560,668	71.21%	\$ 50,451,273

Department	Amended Budget	YTD Actual	Encumbrances	Remaining Budget (including encumbrances)	% Budget Used (includes encumbrances)	PY YTD Actuals
EXPENDITURES						
410 Board of Commissioners	\$ 470,885	\$ 224,895	\$ -	\$ 245,990	47.76%	\$ 159,867
412 Legal Services	472,600	283,228	-	189,372	59.93%	261,619
420 Town Manager's Office	896,750	603,437	117,930	175,383	80.44%	572,866
421 Town Clerk	250,500	160,011	-	90,489	63.88%	-
422 Organizational Performance	499,180	308,887	3,500	186,793	62.58%	-
423 Budget Management	232,785	91,668	-	141,117	39.38%	-
425 Communications	1,302,800	803,459	54,347	444,994	65.84%	712,194
430 Human Resources	1,182,910	767,204	15,838	399,867	66.20%	772,471
431 Risk Management	483,730	396,426	400	86,904	82.03%	-
435 Downtown Development	526,785	309,793	-	216,992	58.81%	238,336
440 Financial Services	1,319,185	1,000,379	2,758	316,048	76.04%	1,264,556
445 Information Technology	2,281,575	1,458,077	138,482	685,016	69.98%	1,134,731
480 Inspections	2,411,175	1,410,916	49,298	950,962	60.56%	1,265,601
490 Planning	4,319,425	2,042,693	720,173	1,556,559	63.96%	1,518,412
500 Public Facilities	4,553,085	2,111,801	1,579,400	861,884	81.07%	1,827,665
510 Police	16,369,175	10,931,618	302,691	5,134,866	68.63%	9,606,139
520 Fire	12,703,150	7,763,999	406,534	4,532,617	64.32%	7,021,931
530 Public Works Administration	354,565	194,875	41,445	118,245	66.65%	195,451
535 Urban Forestry	530,750	323,771	10,070	196,909	62.90%	265,395
540 Engineering	1,780,185	1,021,932	165,030	593,223	66.68%	1,002,899
545 Stormwater Management	796,560	264,527	34,504	497,529	37.54%	-
550 Fleet Maintenance	653,895	382,054	4,219	267,622	59.07%	322,829
560 Streets	3,902,780	2,030,606	886,201	985,974	74.74%	1,640,614
580 Solid Waste	5,986,800	2,997,778	317,842	2,671,180	55.38%	2,592,146
620 Parks and Recreation	9,340,780	6,231,308	1,151,666	1,957,806	79.04%	2,577,797
999 Transfers	8,201,640	5,642,081	-	2,559,559	68.79%	4,768,714
General Fund Total	\$ 81,823,650	49,757,421	6,002,328	26,063,901	68.15%	\$ 39,722,231

General Fund - Net Gain (Loss)

\$ 8,505,561

\$ 10,729,042

Debt Service Fund
February 29, 2024

Monthly Target Percentage

67.00%

Department	Amended Budget	YTD Actual	Remaining Budget (including encumbrances)	% Budget Used (includes encumbrances)	PY YTD Actuals
REVENUES					
Restricted Governmental	\$ 1,290,595	1,522,633	(232,038)	0.00%	1,286,484
Permits and Fees	707,610	454,685	252,925	0.00%	409,504
Investment Earnings	30,520	18,159	12,361	0.00%	21,475
Other Financing Sources	6,078,775	4,074,183	2,004,592	67.02%	3,476,553
General Fund Total	\$ 8,107,500	6,069,661	2,037,839	74.86%	\$ 5,194,017

Department	Amended Budget	YTD Actual	Remaining Budget (including encumbrances)	% Budget Used (includes encumbrances)	PY YTD Actuals
EXPENDITURES					
440 Financial Services	\$ 762,870	\$ 8,380	\$ 754,490	-	\$ 1,536
445 Information Technology	397,135	393,604	3,532	99.11%	402,234
480 Building Inspections	54,455	50,920	3,535	93.51%	100,158
490 Planning	12,595	6,296	6,299	49.98%	-
500 Public Facilities	617,190	456,427	160,763	73.95%	833,599
510 Police	673,215	412,329	260,886	61.25%	364,448
520 Fire	290,355	279,712	10,643	96.33%	269,086
535 Urban Forestry Division	8,555	4,273	4,282	49.95%	4,272
540 Engineering	6,985	3,523	3,462	50.44%	3,523
550 Fleet Maintenance	20,715	10,348	10,367	0.00%	4,273
560 Streets	1,620,525	264,683	1,355,842	16.33%	625,869
570 Powell Bill	1,522,590	585,034	937,556	38.42%	436,034
580 Solid Waste	235,605	117,783	117,822	49.99%	53,952
620 Parks and Recreation	1,884,710	796,796	1,087,914	42.28%	616,455
General Fund Total	\$ 8,107,500	3,390,107	4,717,393	41.81%	\$ 3,715,439

Debt Service Fund - Net Gain (Loss)

\$ 2,679,554

\$ 1,478,578

Wake Forest Business and Industry Partnership Fund (BIP)
February 29, 2024

Monthly Target Percentage

67.00%

Department	Amended Budget	YTD Actual	Encumbrances	Remaining Budget (including encumbrances)	% Budget Used (includes encumbrances)	PY YTD Actuals
REVENUES						
Sales and Services	\$ -	\$ -	\$ -	\$ -	0.00%	\$ -
Other Revenue	2,500	10,414	-	(7,914)	416.55%	-
Other Financing Sources	550,700	316,800	-	233,900	57.53%	243,510
WFRC Fund Total	\$ 553,200	327,214	-	225,986	59.15%	\$ 243,510

Department	Amended Budget	YTD Actual	Encumbrances	Remaining Budget (including encumbrances)	% Budget Used (includes encumbrances)	PY YTD Actuals
EXPENDITURES						
415 Economic Development	\$ 553,200	\$ 264,209	\$ -	\$ 288,991	47.76%	\$ 103,626
WFRC Fund Total	\$ 553,200	264,209	-	288,991	47.76%	\$ 103,626

WFBIP Fund - Net Gain (Loss) **\$ 63,005** **\$ 139,884**

DMSD Special Revenue Fund
February 29, 2024

Monthly Target Percentage

67.00%

Department	Amended Budget	YTD Actual	Encumbrances	Remaining Budget (including encumbrances)	% Budget Used (includes encumbrances)	PY YTD Actuals
REVENUES						
Ad Valorem Taxes	\$ 155,570	\$ 156,551	-	\$ (981)	100.63%	\$ 145,681
Investment Earnings	9,430	13,484	-	(4,054)	142.99%	6,025
Other Financing Sources	-	-	-	-	0.00%	-
DMSD Special Revenue Fund Total	\$ 165,000	170,034	-	(5,034)	103.05%	\$ 151,706

Department	Amended Budget	YTD Actual	Encumbrances	Remaining Budget (including encumbrances)	% Budget Used (includes encumbrances)	PY YTD Actuals
EXPENDITURES						
Transfers In (Out)	\$ 165,000	\$ 83,300	-	\$ 81,700	50.48%	\$ 65,000
DMSD Special Revenue Fund Total	\$ 165,000	83,300	-	81,700	50.48%	\$ 65,000

Downtown District - Net Gain (Loss)

86,734

86,706

Wake Forest Renaissance Centre
February 29, 2024

Monthly Target Percentage

67.00%

Department	Amended Budget	YTD Actual	Encumbrances	Remaining Budget (including encumbrances)	% Budget Used (includes encumbrances)	PY YTD Actuals
REVENUES						
Sales and Services	\$ 249,710	\$ 113,227	\$ -	\$ 136,484	45.34%	\$ 99,254
Other Revenue	140,700	95,982	-	44,718	68.22%	94,412
Other Financing Sources	757,785	482,523	-	275,262	63.68%	382,604
WFRC Fund Total	\$ 1,148,195	691,732	-	456,463	60.25%	\$ 576,270

Department	Amended Budget	YTD Actual	Encumbrances	Remaining Budget (including encumbrances)	% Budget Used (includes encumbrances)	PY YTD Actuals
EXPENDITURES						
626 Wake Forest Renaissance Centre	\$ 1,148,195	\$ 684,676	\$ 5,500	\$ 458,019	60.11%	\$ 562,231
WFRC Fund Total	\$ 1,148,195	684,676	5,500	458,019	60.11%	\$ 562,231

WFRC Fund - Net Gain (Loss) **\$ 7,057** **\$ 14,039**

WAKE FOREST POWER (ELECTRIC FUND)
February 29, 2024

Monthly Target Percentage

67.00%

Department	Amended Budget	YTD Actual	Encumbrances	Remaining Budget (including encumbrances)	% Budget Used (includes encumbrances)	PY YTD Actuals
REVENUES						
Charges for Services	\$ 22,616,900	\$ 16,650,730	-	\$ 5,966,170	73.62%	\$ 14,206,156
Sales Tax - Utility	1,567,350	1,158,210	-	409,140	73.90%	985,019
Other Revenue	412,500	276,253	-	136,247	66.97%	294,607
Investment Earnings	31,250	36,817	-	(5,567)	117.82%	33,289
Other Financing Sources	582,000	-	-	582,000	0.00%	149,500
Electric Fund Total	\$ 25,210,000	18,122,010	-	7,087,990	71.88%	\$ 15,668,571

Department	Amended Budget	YTD Actual	Encumbrances	Remaining Budget (including encumbrances)	% Budget Used (includes encumbrances)	PY YTD Actuals
EXPENDITURES						
840 Electric - Billing & Collections	\$ 575,820	\$ 386,631	\$ -	\$ 189,189	67.14%	\$ -
850 Electric - Operations	\$ 24,015,635	16,611,523	5,892,156	1,511,957	93.70%	12,208,646
860 Electric - Tree Trimming	618,545	415,682	-	202,863	67.20%	204,501
Electric Fund Total	\$ 25,210,000	17,413,837	5,892,156	1,904,008	92.45%	\$ 12,413,147

Electric Fund - Net Gain (Loss) \$ - **708,174** **3,255,424**

AMERICAN RESCUE PLAN ACT (ARPA)
02/29/2024 (Cumulative - Life to Date)

Monthly Target Percentage

N/A

							N/A
Department	Amended Budget	LTD Actual	Encumbrances	Remaining Budget	% Budget Used	PY YTD Actuals	
REVENUES							
Restricted Governmental	\$ 14,541,000	14,541,846	-	(846)	100.01%	-	
Investment Earnings	-	688,009	-	(688,009)	0.00%	-	
Other Financing Sources	-	-	-	-	0.00%	-	
General Fund Total	\$ 14,541,000	15,229,854	-	(688,854)	104.74%	\$ -	
Department	Amended Budget	LTD Actual	Encumbrances	Remaining Budget	% Budget Used	PY YTD Actuals	
EXPENDITURES							
445 Information Technology	\$ 1,030,000	\$ 178,571	\$ 266,140	\$ 585,289	43.18%	\$ -	
525 Public Safety (ARPA)	2,800,000	1,284,047	1,654,000	(138,047)	104.93%	-	
540 Engineering	6,325,000	815,112	564,242	4,945,646	21.81%	-	
638 Other Improvements	4,386,000	2,408,444	679,245	1,298,311	70.40%	-	
General Fund Total	\$ 14,541,000	4,686,174	3,163,627	6,691,200	53.98%	\$ -	
ARPA Fund - Net Gain (Loss)		\$ 10,543,681					
						\$ -	



Board of Commissioners Work Session Agenda Item Report

Agenda Item No.: 2024-126-

Submitted by: Terry Savary

Submitting Department: Administration

Meeting Date: April 2, 2024

SUBJECT

Review of Draft Agenda for Upcoming Regular Meeting

Recommendation:

Item Summary:

ATTACHMENTS

- [DraftBOCAgenda_Apr202416.pdf](#)



Wake Forest Board of Commissioners

Draft Meeting Agenda

April 16, 2024 at 6:00 PM

All items listed are for discussion and possible action.

Call to Order

Pledge of Allegiance

1.Approval of Agenda

2.Approval of Minutes

- 2.A. March 5, 2024 Work Session
March 19, 2024 Regular Meeting

3.Presentations

- 3.A. Proclamation Recognizing May as "Building Safety Month"
- 3.B. Proclamation Recognizing May 2024 as "National Bike Month"
- 3.C. Proclamation Recognizing May 1, 2024 as "Global Love Day" in the Town of Wake Forest, NC
- 3.D. Proclamation Commemorating the 30th Anniversary of Six Sundays in Spring
- 3.E. Proclamation Recognizing May 4, 2024 as "St. Baldrick's Day"
- 3.F. Proclamation Recognizing April 22, 2024 as Earth Day in the Town of Wake Forest
- 3.G. Proclamation Recognizing April 26, 2024 as Arbor Day in the Town of Wake Forest
- 3.H. Proclamation Recognizing May 5 through 11, 2024 as the "55th Annual Professional Municipal Clerks Week"
- 3.I. Proclamation Recognizing May 2, 2024 as "National Day of Prayer"

4.Public hearings / Public Comment

- 4.A. Public Hearing on a contiguous annexation submitted by property owners Elizabeth Hunt Holding and SW Capital LLC for property associated with the rezoning request RZ-22-07, located at 12621 and 12631 Capital Blvd being Wake County PINs 1831-85-3681 and 1831-85-5861 being approximately 5.54 acres.
- 4.B. Public Comment: If anyone would like to address the Board of Commissioners on an item other than a public hearing item during the time of public comment, please sign up with the Town Clerk prior to the meeting. Each speaker is asked to limit comments to 3 minutes. Please provide the clerk with copies of any handouts you have for the Board. Although the Board is interested in hearing your concerns, speakers should not expect Board action or deliberation on subject matter brought up during the Public Comment segment. Topics requiring further investigation will be referred to the appropriate Town Staff and may be scheduled for a future agenda. Thank you for your consideration of the Board of Commissioners, staff and other speakers.

5.Consent Agenda

(A Consent Agenda is a group of items passed with a single motion and vote. These matters are of a generally routine nature. No debate is allowable on any item included on the Consent Agenda. If a Commissioner or any citizen of Wake Forest or its ETJ wants separate consideration of any item, it may be removed from the Consent Agenda by request.)

- 5.A. Approval of Budget Ordinance Amendment # 3 for FY 2023-2024
- 5.B. Approval of resolution authorizing installment purchase agreement (FY 24 Equipment and Vehicles)
- 5.C. Approval of resolution authorizing approval of renewal of five year agreement with Cherry Bekaert LLP for audit services
- 5.D. Approval of Award of J. B. Flaherty Park Dam Improvement Construction to Morgan Corp.
- 5.E. Approval of a resolution to schedule the public hearing and certify the sufficiency for a petition requesting contiguous annexation submitted by property owners Eunice M Rogers Heirs for property associated with the rezoning request RZ-22-09, located at 3133 Burlington Mills Road and 8993 Ligon Mill Road being Wake County PINs 1749-00-7207 and 1749-00-6732 being approximately 9.55 acres.
- 5.F. Approval of CEI Scope for Dunn Creek Greenway Phases 3 and 4
- 5.G. Approval of a resolution to formally designate Nick Nolte as the Town of Wake Forest's representative to the Upper Neuse River Basin Association (UNRBA)

- 5.H. Approval of Award of J. B. Flaherty Park Dam Improvement Construction to Morgan Corp.

6.Legislative Items

7.Planning Items

- 7.A. Consideration of a petition requesting contiguous annexation submitted by property owners Elizabeth Hunt Holding and SW Capital LLC for property associated with the rezoning request RZ-22-07, located at 12621 and 12631 Capital Blvd being Wake County PINs 1831-85-3681 and 1831-85-5861 being approximately 5.54 acres.

8.Administration and Financial Items

9.Public Services Items

10.Parks and Recreation Items

11.Public Safety Items

12.Other Business

- 12.A. Department Monthly Report
- 12.B. Commissioner Reports

13.Adjournment



Board of Commissioners Work Session Agenda Item Report

Agenda Item No.: 2024-133-

Submitted by: Terry Savary

Submitting Department: Administration

Meeting Date: April 2, 2024

SUBJECT

Closed Session: NCGS 143-318.11(5) -To establish, or to instruct the public body's staff or negotiating agents concerning the position to be taken by or on behalf of the public body in negotiating (i) the price and other material terms of a contract or proposed contract for the acquisition of real property by purchase, option, exchange, or lease

Recommendation:

Item Summary:

ATTACHMENTS

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