Request for Qualifications
Design-Build Services
For City of Greenville, NC

Design, Engineering, and General Contracting Services for the

COREY ROAD REGIONAL DETENTION
AND STREAM RESTORATION PROJECT

Issued By:
City of Greenville Engineering Department
1500 Beatty St.
Greenville, NC 27834

Date of Issue: October 27, 2023

Due Date: December 5, 2023, 4:00 PM EST

1. INTRODUCTION

Pursuant to N.C.G.S. § 143-128.1A, the City of Greenville is soliciting proposals from qualified design-build teams that are interested in providing design, engineering, and general contracting services for the Corey Road Regional Detention and Stream Restoration Project. The intent of this RFQ is to select a design-build team, by Qualifications-Based Selection (QBS), to provide design and construction services for this project. The City is requiring a General Contractor (GC) lead the team. The GC and the Engineer are one "team", but the contract will be between the City and the GC and will utilize the contract template titled "Agreement Between Owner and Design-Builder for Progressive Design-Build", document #D-512, as issued by the Engineers Joint Contract Documents Committee (EJCDC).

This Request for Qualifications ("RFQ") describes the required scope of work for the selected design-build team, selection process, evaluation criteria and the minimum information that must be included in the RFQ. Failure to submit information in accordance with these requirements and procedures may be cause for disqualification. This RFQ is for ONE agreement to cover all the work described in the RFQ. Qualifications are due by December 5, 2023, 4:00 PM EST.

2. PROJECT BACKGROUND AND DESCRIPTION

This project will provide design and construction services to create a new, nature-based stormwater control measure in the form of a wet-detention pond with floating wetland islands and culvert improvements under Corey Road (see Attachment C for location map). This pond will be designed and constructed to adhere to the NC Stormwater Design Manual Part C: Minimum Design Criteria and Recommendations for Stormwater Control Measures. It will meet the NC statutory definition of nature-based solutions as it weaves natural features such as vegetated shelfs and wetland islands and processes such as denitrification, infiltration, and evapotranspiration to store, infiltrate, and treat stormwater, promoting resilience, reducing flood risks, and improving water quality. The types of stormwater control measures included in this project are:

- Wet Detention Pond
- Floating Wetland Islands
- Restored Riparian Buffer

At Corey Road, adding twin 48" pipes to the existing culverts and new headwalls is anticipated. This will allow the tailwater elevations to be lowered for the upstream Trafalgar neighborhood, reducing street, yard, and structure flooding. By sizing the proposed improvements to account for future land uses, it ensures that increased runoff will be managed so that the additional runoff will not cause new or increased flooding or exacerbate flood risks downstream or water quality issues in the watershed or river basin.

Per the approved Engineering Report included as Attachment D, the specific objectives of this project will be to:

1. Protect private property and public infrastructure from flooding by lowering water surface elevations upstream of Corey Road during heavy rain events;
2. Provide sufficient water quantity storage and control to offset upstream improvements without passing along additional impacts to properties downstream;
3. Provide water quality treatment through the implementation of stormwater control measures and riparian restoration;

4. Provide public education through social media, webpage, and targeted mailings to the adjacent neighborhoods detailing the elements, functions, and purpose of stormwater control measures and riparian areas.

This project was selected to receive partial funding from NCDEQ through the Local Assistance for Stormwater Infrastructure Investments Program (LASII) which includes federal funds from the American Rescue Plan Act (ARPA) and is subject to federal guidance and timelines. Funds must be encumbered by December 2024 and spent by December 2026.

3. GENERAL INFORMATION

City of Greenville is requesting qualifications, which shall address at a minimum the tasks outlined in this RFQ. The City intends to award the design, engineering, and general contracting services for this project as a single Master Service Agreement encompassing the following specialty services: Streambank restoration, roadway culvert installation, and stormwater pond excavation. All work shall comply with the requirements of federal, state, and local laws, professional engineering standards, and other regulations that may apply.

4. ESTIMATED PROJECT BUDGET

The budget for the Corey Road Detention Project is $8,026,000 including design, permitting, acquisition, construction, and management.

5. PROJECT SCHEDULE:

Event	Date
RFQ Release – Posted to City Website	October 27, 2023
Qualifications Submittals Due	December 5, 2023, 4 PM (EST)
Shortlist Interviews (if needed)	December 14-15, 2023
Council Award	February 5, 2024, estimated
Construction Complete	June 30, 2026

6. SCOPE OF SERVICES

The Scope of Services shall be comprehensive including programming, schematic design, design development, cost estimates, development of construction documents, permitting, right-of-way and/or easement services, and general contracting services. Work is a combination of new construction and upgrade of existing stormwater infrastructure. The specific scope of services for the selected Design-Build Team will be defined in the Design-Build agreement. Selected firm(s) will coordinate meeting(s) with City staff to gain insight on

project needs and changes during the design and construction process.

As a part of the assigned scope, services of the Design-Build Team will include but not be limited to:

- Develop a schematic, engineered plan for the detention facility and associated stormwater infrastructure. Periodic updates to City staff will be required.
- Develop a complete project cost estimate to include all required services, costs and contingencies.
- Complete the plan and development drawings and specifications for the project that meet all federal, state, and local code requirements. Plans must be sealed by a design professional licensed in the State of North Carolina.
- Provide a total project phasing plan for consideration.
- Provide construction management and general contracting services.
- Coordinate with partners (NCDOT, NCDEQ, GUC, etc.)
- Perform grant administration services, including but not limited to preparation of reports and reimbursement packages.

7. CONTENTS OF QUALIFICATIONS

The following shall be included in the proposal:

1. Cover letter.
2. Name of legal entity to enter into design-build contract with the City and location of company headquarters, local office location, type of business (sole proprietorship, partnership, corporation, etc.), state of incorporation or organization and Federal Employer Identification Number, and name, title, and contact information of primary contact person for submittal.
3. Year in which the firm was established and any former names under which the firm operated.
4. Organizational chart including name and office location of all personnel who will be assigned to this project, including general contractor, consultants, or subcontractors. Pursuant to N.C.G.S. §143-64.31 and 143-128.1A, provide project team description (with resumes and detailed background information) to include the General Contractor for the Design-Build Team, emphasizing experience and capabilities of key personnel and clearly delineating roles and responsibilities of various team members. List any professional registrations and certifications (with applicable states), each team member's years of service with the team, and role in past projects.
5. Proposed project team's experience, capabilities, and unique qualifications in the areas outlined in this RFQ.
6. Track record of completing projects on time and within budget.
7. Describe the firm's approach to cost control and project scheduling.
    - Current workload and percentage of availability
    - Quality control and assurance process
8. List of previous projects performed by firm and any contractors or subcontractors for projects similar in size or type to this project. Include a brief description of each project, with the dates services were performed, owner's contact information (name, phone number, email address and physical address), total project dollar value, and total time period involved. Also

list any Errors and Omissions on each project in dollars and total construction cost percentage. If key personnel's involvement was with another firm, list that firm.

9. Conceptual and technical project approach and work methodology, expanding or revising the scope of services provided if necessary. Any deviations from the scope shall be clearly designated in the proposal. Include and describe all necessary sub-consultant services. Include discussion of plan for possible public involvement and engagement.
10. Proposed schedule for completing the work.
11. Firm's proximity to and familiarity with the area where the projects are located.
12. Litigation history: list of any pending or settled lawsuits or professional liability claims in which the firm was involved during the past ten (10) years. Please explain each occurrence and the circumstances with the outcome.
13. State any conflicts of interest any Design-Build team member may have with the City.
14. Additional information the respondent believes to be relevant to the selection efforts.
15. Contractors subject to this RFQ, as a preference, should have a NC Contractor's license with a minimum of 5 years in business.
16. The City will require a bond pursuant to Article 3 – Chapter 44A, for 100% of the contract price.

8. SELECTION PROCESS

Selection of the Design-Build Team will be based on the proposal contents, prior experience, and specific experience and capabilities of the designated team members. Staff reserves the flexibility to select contractor(s) or subcontractor(s) through the initial RFQ process or a subsequent RFQ process. After contract award, the design-builder can only substitute key personnel (the contractors, subcontractors, and design professionals identified in the design-builder's response to the RFQ) after obtaining written approval from the City. The team, and in particular the project manager, must be fully capable in all areas outlined under the scope of work above. Key personnel shall have the professional license(s) issued by the State of North Carolina as required for these services. A selection team will evaluate the RFQ's based on the criteria noted herein and recommend a firm to City Council for award of contract. If several firms appear to have similar qualifications the City may request those firms attend an interview and provide a brief presentation.

The City reserves the right to obtain clarification of any item in a teams' proposal or to obtain additional information.

Please do not contact any other City staff member other than the designated contact person regarding the project contemplated under this RFQ while this RFQ is open and a selection has not been finalized. Any attempt to do so may result in disqualification of the team's submittal from consideration.

9. QUALIFICATIONS PACKAGE EVALUATION CRITERIA

Qualifications Packages will be evaluated on the team's ability to meet the requirements of this RFQ. Some specific weighted evaluation criteria will include, but may not be limited to, the following:

	Evaluation Criteria	Points
1.	Design-Build Team: Evaluation of Design Professionals ▪ Engineer's experience with Design-Build Process. ▪ Engineer's experience with Team's GC. ▪ Engineering firm's litigation and/or arbitration records. ▪ Engineering firm's reputation, references and referrals. ▪ Engineering firm's creativity and imagination in stormwater infrastructure and stormwater control measure design providing water quality and quantity controls. ▪ Specialty Design Contractor(s)' experience with successfully constructed projects of similar scope and size.	30
2.	Design-Build Team: Evaluation of lead Design-Builder and Design Builder's General Contractor/Builder (If different) ▪ GC experience with Design-Build Process. ▪ GC experience with successfully constructed projects of similar scope and size. ▪ GC track record of "on-time and on-budget" projects. ▪ GC litigation, legal action, and safety records. ▪ GC reputation, references, and referrals ▪ GC methodology/approach to accomplish objectives of this project	30
3.	Disciplines, qualifications, certifications, and demonstrated abilities of all team members.	20
4.	Introduction: Company Information ▪ Firm's name and business address, including telephone, email address, website address. ▪ The type of firm (individual, partnership, corporation, etc.) and list the names of all partners, principals, etc. ▪ Year established. Include former firm/company name(s) and year(s) established, if applicable. ▪ The name, title, address, and telephone number of the firm's authorized negotiator. The person identified must be empowered to make binding commitments for the firm. ▪ Letter of Interest	5
5.	Experience with State, Municipal, or City facility projects. Public involvement experience.	15
	Total	100

10. SUBMITTAL REQUIREMENTS

Proposals shall be limited to a maximum of twenty (20) pages, excluding resumes, minimum 11-point font. Proposals exceeding the page limit shall not be considered. The following information shall be included in the submittal:

- Information described in Section 7 above
- Statement regarding team's possible conflict of interest for the work
- Attachment A: Certification Regarding Lobbying
- Attachment B: Supplemental Vendor Information

Detailed approaches, scopes, and fees will be developed during contract negotiations with the selected team prior to contract execution. Fees shall not be submitted with this RFQ.

11. REQUIREMENTS OF SELECTED TEAM

The selected team must be able to begin work immediately upon award of contract, must attend and/or make proposals to staff and must be able to maintain the required level of effort to meet the project schedule.

Insurance

The City of Greenville requires the selected team to maintain at its own expense (a) Commercial General Liability Insurance in an amount not less than $1,000,000 per occurrence for bodily injury or property damage; City of Greenville, North Carolina, 200 W. Fifth St. Greenville, NC 27834 shall be named as additional insured. (b) Professional Liability insurance in an amount not less than $1,000,000 per occurrence-if providing professional services; (c) a minimum of $1,000,000 of professional errors and omissions insurance; (d) Workers Compensation Insurance as required by the general statutes of the State of North Carolina and Employer's Liability Insurance not less than $500,000 each accident for bodily injury by accident, $500,000 each employee for bodily injury by disease, and $500,000 policy limit; (e) Commercial Automobile Insurance applicable to bodily injury and property damage, covering all owned, non-owned, and hired vehicles, in an amount not less than $1,000,000 per occurrence as applicable; (f) other as referenced elsewhere herein. Certificates of Insurance shall be furnished prior to the commencement of Services. Depending on the type of services to be provided, cyber liability insurance or increased limits may be necessary. Based on the nature of the Agreement and project delivery method, other insurance and/or bond requirements may apply as the project progresses.

Title VI Nondiscrimination

The City of Greenville, North Carolina in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 US.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all respondents that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit proposals in response to this advertisement and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

Acceptance of Terms

Submission of a proposal shall constitute acknowledgment and acceptance of all terms and conditions hereinafter set forth in the RFQ unless otherwise expressly stated in the proposal.

Right of Rejection by the City
The City reserves the right to accept the proposal that best fits the Scope of Services as defined by the City of Greenville and is deemed to be in the best interest of the City; or the City can reject all proposals.

Financial Responsibility
The firm making the proposal understands and agrees that the City shall have no financial responsibility for any costs incurred by the firm in responding to this RFQ prior to the issuing of an agreement. This includes but is not limited to costs related to site visit(s) and estimate preparation(s) for contract negotiations.

Conditions and Reservations
The City expects to select and contract with one (1) lead Design-Build team, but reserves the right to request substitutions of consultants, contractors, or subcontractors. The City reserves the right to reject any or all responses to the RFQ, to advertise or solicit for new RFQ responses, or to accept any RFQ response deemed to be in the best interest of the City. The City reserves the right to waive technicalities and informalities.

A response to this RFQ should not be construed as a contract, nor indicate a commitment of any kind. This RFQ does not commit the City to pay for costs incurred in the submission of a response to this RFQ or for any cost incurred prior to the execution of a final contract. No recommendations or conclusions from this RFQ process concerning your firm shall constitute a right (property or otherwise) under the Constitution of the United States or under the Constitution, case law or statutory law of North Carolina. Neither binding contract, obligation to negotiate, nor any other obligation shall be created on the part of the City unless the City and your firm execute a contract.

12. SPECIAL CONDITIONS: FEDERAL REQUIREMENTS

This Contract will be funded in whole or in part with federal funding. As such, federal laws, regulations, policies and related administrative practices apply to this Contract. The most recent of such federal requirements, including any amendments made after the execution of this Contract shall govern the Contract, unless the federal government determines otherwise. This section identifies the federal requirements that may be applicable to this contract. The Vendor is responsible for complying with all applicable provisions, updates or modifications that occur in the future relating to these clauses.

The federal requirements contained in the most recent version of the Uniform Administrative Requirements for federal awards (Uniform Rules) codified at 2.C.F.R., Part 200, including any certifications and contractual provisions required by any federal statutes or regulation referenced therein to be included in this contract are deemed incorporated into this contract by reference and shall be incorporated into any sub-agreement or subcontract executed by the Vendor pursuant to its obligations under this Contract. The Vendor and its sub-contractors, if any, hereby represent and covenant that they have complied and shall comply in the future with the applicable provisions of the original contract then in effect and with all applicable federal, state, and local laws, regulations, and rules and local policies and procedures, as amended from time to time, relating to Work to be performed under this contract.

No Obligation by Federal Government
The Federal Government is not a party to this contract and is not subject to any obligations or liabilities to the non-Federal entity, contractor, or any other party pertaining to any matter resulting from the contract.

Program Fraud and False or Fraudulent Statements or Related Acts
The contractor acknowledges that 31 U.S.C. Chap. 38 (Administrative Remedies for False Claims and Statements) applies to the contractor's actions pertaining to this contract.

Access to Records
The following access to records requirements apply to this contract:

(1) The contractor agrees to provide the City of Greenville, the Comptroller General of the United States, or any of their authorized representative's access to any books, documents, papers, and records of the Contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts, and transcriptions.
(2) The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.
(3) The contractor agrees to provide City access to construction or other work sites pertaining to the work being completed under the contract.

Changes
Any change in the contract cost, modification, change order, or constructive change must be allowable, allocable, within the scope of its funding, grant or cooperative agreement, and reasonable for the completion of project scope. All changes and/or amendments to the contract will be outlined in detail, formalized in writing, and signed by the authorized representative of each party. A Contractor's failure to do so shall constitute a material breach of the contract.

Termination for Convenience (General Provision)
The City may terminate this contract, in whole or in part, at any time by written notice to the Contractor when it is in the Government's best interest. The Contractor shall be paid its costs, including contract close-out costs, and profit on work performed up to the time of termination. The Contractor shall promptly submit its termination claim to the City to be paid the Contractor. If the Contractor has any property in its possession belonging to the City, the Contractor will account for the same, and dispose of it in the manner the City directs.

Termination for Default [Breach or Cause] (General Provision)
If the Contractor does not deliver supplies in accordance with the contract delivery schedule, or, if the contract is for services, the Contractor fails to perform in the manner called for in the contract, or if the Contractor fails to comply with any other provisions of the contract, the City may terminate this contract for default. Termination shall be effected by serving a notice of termination on the contractor setting forth the manner in which the Contractor is in default. The contractor will only be paid the contract price for supplies delivered and accepted, or services performed in accordance with the manner of performance set forth in the contract.
If it is later determined by the City that the Contractor had an excusable reason for not performing, such as a strike, fire, or flood, events which are not the fault of or are beyond the control of the

Contractor, the City, after setting up a new delivery of performance schedule, may allow the Contractor to continue work, or treat the termination as a termination for convenience.

Opportunity to Cure (General Provision)
The City in its sole discretion may, in the case of a termination for breach or default, allow the Contractor ten (10) calendar days in which to cure the defect. In such case, the notice of termination will state the time period in which cure is permitted and other appropriate conditions.

If Contractor fails to remedy to the City's satisfaction the breach or default of any of the terms, covenants, or conditions of this Contract within ten (10) calendar days after receipt by Contractor of written notice from the City setting forth the nature of said breach or default, the City shall have the right to terminate the Contract without any further obligation to Contractor. Any such termination for default shall not in any way operate to preclude the City from also pursuing all available remedies against Contractor and its sureties for said breach or default.

Waiver of Remedies for any Breach
In the event that the City elects to waive its remedies for any breach by Contractor of any covenant, term or condition of this Contract, such waiver by the City shall not limit the City's remedies for any succeeding breach of that or of any other term, covenant, or condition of this Contract.

Equal Opportunity
"During the performance of this contract, the contractor agrees as follows:

(1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
(2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, or national origin.
(3) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, 3 and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
(4) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
(5) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules,

regulations, and orders.

(6) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions as may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(7) The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency the contractor may request the United States to enter into such litigation to protect the interests of the United States."

Suspension and Debarment

This Contract is a covered transaction for purposes of 49 CFR Part 29. As such, the Contractor is required to verify that none of the Contractor, its principals, as defined at 49 CFR 29.995, or affiliates, as defined at 49 CFR 29.905, are excluded or disqualified as defined at 49 CFR 29.940 and 29.945.

The Contractor is required to comply with 49 CFR 29, Subpart C and must include the requirement to comply with 49 CFR 29, Subpart C in any lower tier covered transaction into which it enters.

Suspension and Debarment Certification

By signing and submitting its bid or proposal, the bidder or proposer certifies as follows:

The certification in this clause is a material representation of fact relied upon by the City. If it is later determined that the bidder or proposer knowingly rendered an erroneous certification, in addition to remedies available to the City, the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment.

The bidder or proposer agrees to comply with the requirements of 49 CFR 29, Subpart C while this offer is valid and throughout the period of any Contract that may arise from this offer. The bidder or proposer further agrees to include a provision requiring such compliance in its lower tier covered transactions.

Byrd Anti-Lobbying Amendment, 31 U.S.C. § 1352 (as amended)

Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, officer or employee of Congress, or an employee of a Member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31

U.S.C. § 1352. Each tier shall also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the recipient who in turn will forward the certification(s) to the awarding agency.

13. MINORITY BUSINESS ENTERPRISES AND WOMEN'S BUSINESS ENTERPRISES

The City of Greenville is committed to an annual goal of 4% for Minority Business Enterprises (MBE) and 4% for Women's Business Enterprises (WBE) participation for all professional services contracts. Firms demonstrating a commitment to assist the City in attaining these goals by designating a percentage of the contract to be assigned to qualified MBE/WBE firms will be given priority consideration. See Attachment B for additional information. This form shall be completed and submitted with your proposal.

14. SUPERVISION OF CONSULTANT

The Consultant will be under the supervision of the Director of Engineering for the City of Greenville or her designee.

15. PROPOSAL SUBMISSION DEADLINE

Interested firms are invited to submit one (1) electronic copy, in searchable PDF format, and six (6) hard copies of its response to this RFQ no later than 4:00 pm, December 5, 2023, to the following address:

Mr. James Lynn Raynor, PE
Corey Road Regional Detention and Stream Restoration Project
City of Greenville
Engineering Department
1500 Beatty Street
Greenville, NC 27834

Each team is solely responsible for the timely delivery of its Proposal. No Proposals or Qualifications Packages will be accepted after the deadline. Teams accept all risks of late delivery of Qualifications regardless of fault.

For questions regarding this Request for Qualifications, contact James Lynn Raynor, PE, at lraynor@greenvillenc.gov and (252) 329-4620. All questions shall be submitted 8 days prior to the submission date. The question deadline will allow an addendum to be issued to clarify the project, if need be. All requests for clarification/information shall be in writing; no verbal correspondence is considered binding. Clarifications or revisions to this Request for Qualifications will be made only by an addendum. All addenda will be posted on the City's web site www.greenvillenc.gov. It is the Proposer's responsibility to monitor the website for addenda.

ATTACHMENT A: CERTIFICATION REGARDING LOBBYING (Submit with Proposal)

Certification for Contracts, Grants, Loans, and Cooperative Agreements

The undersigned [Contractor] certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal Contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal Contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for making lobbying contacts to an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal Contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form--LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions [as amended by "Government wide Guidance for New Restrictions on Lobbying," 61 Fed. Reg. 1413 (1/19/96). Note: Language in paragraph (2) herein has been modified in accordance with Section 10 of the Lobbying Disclosure Act of 1995 (P.L. 104-65, to be codified at 2 U.S.C. 1601, *et seq.*)]

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subContracts, subgrants, and Contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31, U.S.C. § 1352 (as amended by the Lobbying Disclosure Act of 1995). Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

[Note: Pursuant to 31 U.S.C. § 1352(c)(1)-(2)(A), any person who makes a prohibited expenditure or fails to file or amend a required certification or disclosure form shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such expenditure or failure.]

The Contractor, _____, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. A 3801, *et seq.,* apply to this certification and disclosure, if any.

_____Signature of Contractor's Authorized Official

_____Name and Title of Contractor's Authorized Official

_____Date

ATTACHMENT B: SUPPLEMENTAL VENDOR INFORMATION (Submit with Proposal)

MWBE AND ELIGIBLE LOCAL BIDDERS

Minority and Women Business Enterprises (MWBEs) consist of minority, women and disabled business firms that are at least fifty-one percent owned and operated by an individual(s) of these categories. Also included are disabled business enterprises and non-profit work centers for the blind and severely disabled. Eligible Local Bidders consist of firms located within the Greenville city limits or ETJ that meet other criteria as outlined in Resolutions 031-15, 020-16.

Pursuant to G.S. 143-128.2, 143-48, 143-128.4, and the City of Greenville MWBE Plan along with Resolutions 031-15 and 020-16, the City invites and encourages participation in this procurement process by businesses owned by minorities, women, disabled business enterprises and non-profit work centers for the blind and severely disabled and local bidders. This includes utilizing subcontractors to perform the required functions in this solicitation.

Any questions concerning MWBE or Local Bidder status, contact the MWBE Coordinator, Tish Williams, at 252.329.4462.

The Vendor shall respond to the questions below.

a) Are you an MWBE firm? ☐ **Yes** ☐ **No**

b) Are you certified with North Carolina as a Historically Underutilized Business (MWBE)? ☐**Yes** ☐ **No**

c) Are you a certified Disadvantaged Business Enterprise (DBE) with the Department of Transportation?

☐**Yes** ☐ **No**

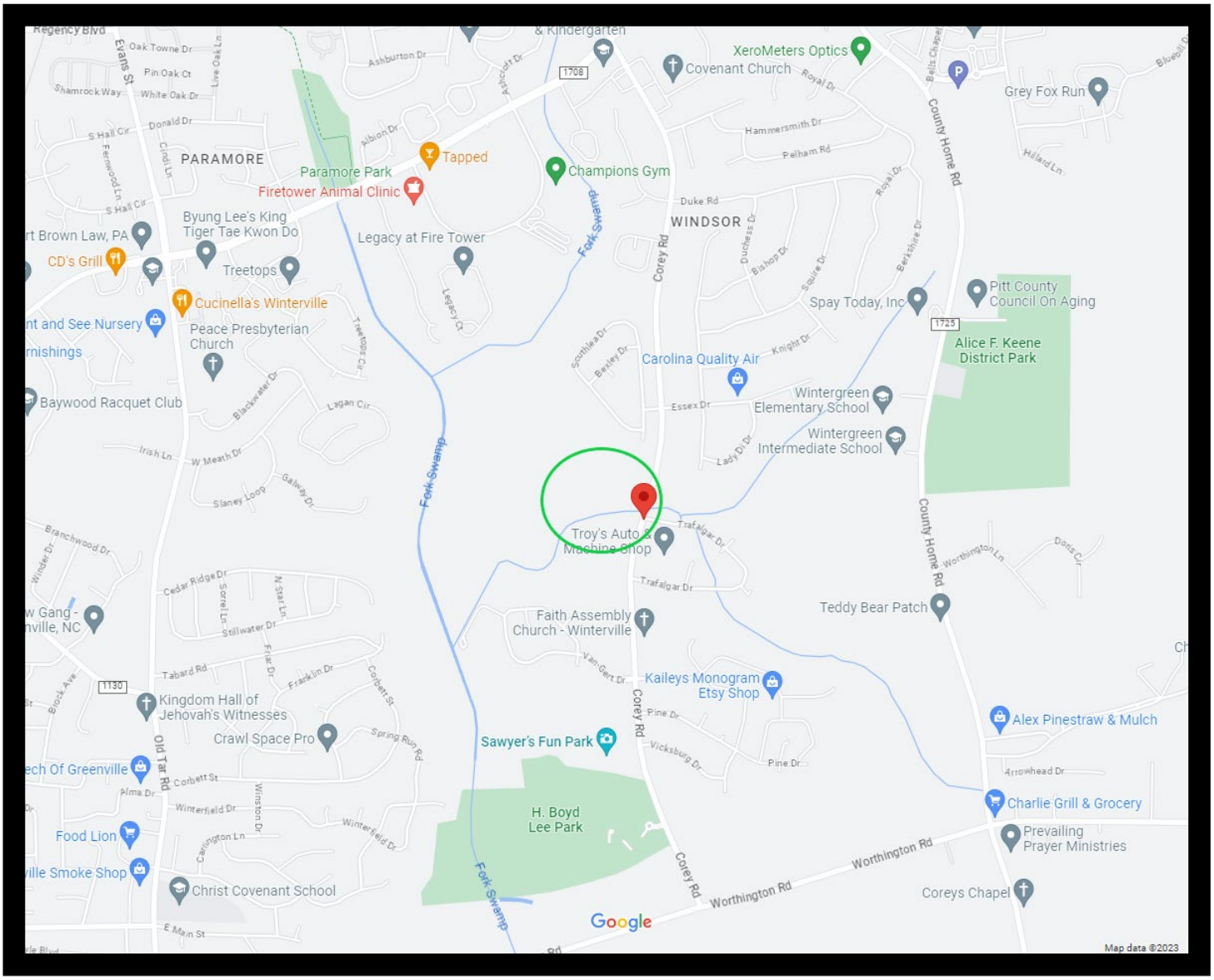
d) Are you a local bidder? ☐ **Yes** ☐ **No**

Please provide complete *physical* address of firm:

_____

_____

Attachment C
Vicinity Map
General Project Location (Circled in Green)



Attachment D

Corey Road Regional Detention & Stream Restoration

Engineering Report

June 2023

SRP-SW-ARP-0020

Corey Road Regional Detention & Stream Restoration

Engineering Report

June 2023

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Section 1: Executive Summary:

This project will be for design and construction to create a new, nature-based stormwater control measure in the form of a wet-detention pond with floating wetland islands and culvert improvements under Corey Rd. This pond will be designed and constructed to adhere to the NC Stormwater Design Manual Part C: Minimum Design Criteria and Recommendations for Stormwater Control Measures and meets the NC statutory definition of nature-based solutions as it weaves natural features such as vegetated shelfs and wetland islands and processes such as denitrification, infiltration, and evapotranspiration to store, infiltrate, and treat stormwater, promoting resilience, reducing flood risks, and improving water quality. The types of stormwater control measures included in this project are:

- Wet Detention Pond
- Floating Wetland Islands
- Restored Riparian Buffer

At Corey Rd adding twin 48" pipes to the existing culverts and new headwalls are proposed. This will allow the tailwater elevations to be lowered for the upstream Trafalgar neighborhood, reducing street, yard, and structure flooding. By sizing the proposed improvements to account for future land uses, it ensures that increased runoff will be managed so that the additional runoff will not cause new or increased flooding or exacerbate flood risks downstream or water quality issues in the watershed or river basin.

Goal: To improve health and safety for our citizens and protect private property and public infrastructure through water quality treatment, water quantity detention, and stream and buffer restoration.

Objectives: The specific objectives of this project will be to:

1. Protect private property and public infrastructure from flooding by lowering water surface elevations upstream of Corey Rd during heavy rain events
2. Provide sufficient water quantity storage and control to offset upstream improvements without passing along additional impacts to properties downstream
3. Provide water quality treatment through the implementation of stormwater control measures and riparian restoration.
4. Provide public education through social media, webpage, and targeted mailings to the adjacent neighborhoods detailing the elements, functions, and purpose of stormwater control measures and riparian areas.

Upon analysis of these various components and the interdependency among them, it was selected that the most beneficial and advantageous alternative for this project is Alternative 2 which consists of Components 3, 6, 7, & 9 collectively. The City has implemented the 25-year regulations in Component 6 allowing the proposed detention pond to reduce in size to 8 acres. The culvert upgrade at Corey Rd (Component 3) is a critical component that must be completed first before any additional benefits will be realized upstream. Component 7, the floating wetland islands, and Component 9, the riparian buffer restoration, take advantage

of the opportunity to provide water quality treatment while implementing water quantity controls. This combination achieves all 4 identified Objectives.

This project was selected to receive partial funding ($5,000,000) from NCDEQ through the Local Assistance for Stormwater Infrastructure Investments Program (LASII) where it was ranked #9 out of 83 project applications. Application has also been submitted to the NC Environmental Enhancement Grant program for $500,000 of matching funds. The remaining funds will come from the City of Greenville Stormwater Management Fund.

Sections 2: Current Situation:

Geographic Location: The project is located along Fork Swamp Unnamed Tributary in Eastern North Carolina within the coastal plain in the Neuse River Basin Watershed. The project is specifically located at the intersection of Corey Road and Trafalgar Drive (north and south) near and within a residential neighborhood that leads downstream to agricultural fields, wooded areas, and additional residential neighborhoods. The Corey Road culvert is located at Latitude 35.5430388889 Longitude -77.3636916667, the culvert at Trafalgar Drive North is located at Latitude 35.542258333 Longitude -77.3616527778, and the culvert at Trafalgar Drive South is located at Latitude 35.5400666667 Longitude -77.3607666667. The Fork Swamp tributary flows from east to west into Fork Swamp less than 1 mile downstream.

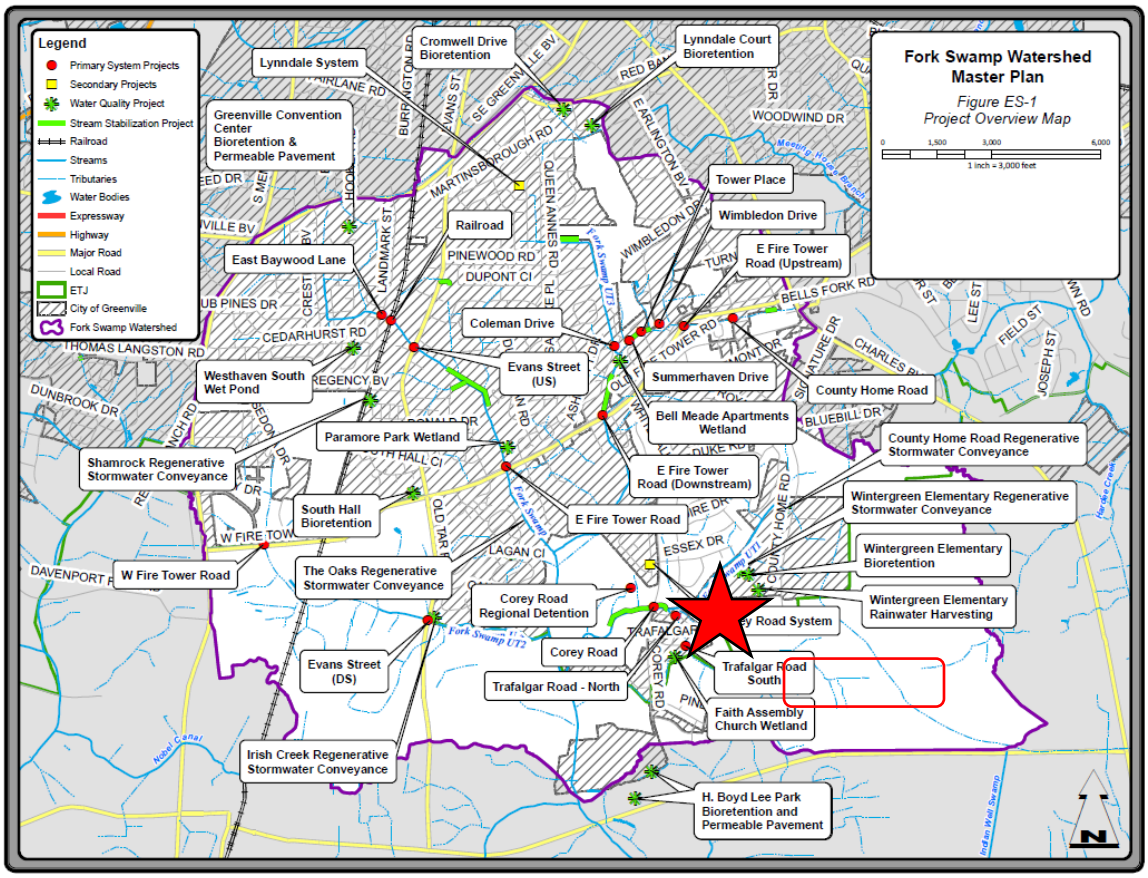


Figure 1. Fork Swamp Watershed Master Plan Proposed Capital Improvements Project Map (WSMP Figure ES-1)

The project is located in the Neuse River Basin which is listed as Nutrient Sensitive Waters. The stream name is Unnamed Tributary of Fork Swamp, index # 27-97-4 and classification of C;Sw,NSW.

Source of the Stormwater Issue: The source of the stormwater causing the issue for this project is a combination of the rain that falls directly on the project area as well as up and downstream areas. Upstream of the project is a residential neighborhood that experiences flooding around structures and roadways. This is caused in part by limited capacity of the stream culverts, but also affected by the tailwater effect from the water surface elevations downstream.

The existing twin 13' x 4.5' corrugated metal arch pipes under Corey Rd are relatively new and meet the desired 25-year level of service. However, the WSEL at the upstream Trafalgar Drive – North is impacted by the tailwater from Corey Road. There are four properties (1203, 1205, 1209, and 1215 Trafalgar Drive) upstream of Corey Road located in the existing conditions 25- and 100-year floodplain. The resident located at 1209 Trafalgar Drive has reported storage building flooding.

Goal: To improve health and safety for our citizens and protect private property and public infrastructure through water quality treatment, water quantity detention, and stream and buffer restoration.

Objectives: The specific objectives of this project will be to:

1. Protect private property and public infrastructure from flooding by lowering water surface elevations upstream of Corey Rd during heavy rain events
2. Provide sufficient water quantity storage and control to offset upstream improvements without passing along additional impacts to properties downstream
3. Provide water quality treatment through the implementation of stormwater control measures and riparian restoration.
4. Provide public education through social media, webpage, and targeted mailings to the adjacent neighborhoods detailing the elements, functions, and purpose of stormwater control measures and riparian areas.

Section 3: Design Basis/Future Situation:

Corey Rd is classified as a minor thoroughfare and owned by NCDOT. The desired level of service for culverts under this classification of roadway is to safely pass a 25 yr / 24 hr storm event without overtopping.

Hydraulics: (Objective #1) The purpose of the hydraulic analysis is to determine an existing level of flooding for the storm drainage network and to develop proposed solutions to mitigate flooding. The USACE HEC- RAS was selected to model the primary systems to remain consistent with the existing FEMA modeling. HEC-RAS calculates water surface

profiles for steady, gradually varied flow in channels and floodplains. The standard backwater analysis for sub-critical flow was modeled for the Fork Swamp Watershed. The model calculates the effect of obstructions, such as culverts, and building structures in the channel and floodplain on the water surface profile. The hydraulic computations are based on the solution of a one-dimensional energy equation with energy loss due to friction evaluated by Manning's equation. Input data for HEC-RAS include the following:

- Cross-section geometry of the channel and floodplain;
- Roughness coefficients to describe characteristics of the channel and floodplain;
- Size, shape, and characteristics of culverts and roadways along the stream reach; and
- Energy loss coefficients for flow in the channel and at roadway crossings.

Channel cross sections utilized in the HEC-RAS model were based on the existing FEMA cross sections and WK Dickson surveyed cross sections. The channel cross sections were merged with State LiDAR data to develop cross sections spanning the entire floodplain area.

For the Fork Swamp UT1 (FSUT1) HEC-RAS model, the starting water surfaces elevations was set based on values calculated in the Fork Swamp Main Branch HEC-RAS model.

Figure 2. (Left) Trafalgar Drive – North Culvert – Downstream Face &
Figure 3. (Right) Corey Road Culvert – Upstream Face

Hydrology: (Objective #2) The purpose of the hydrologic analysis is to estimate the magnitude of selected frequency floods for the Fork Swamp Watershed. The United States Army Corps of Engineers (USACE) HEC-HMS was selected to model the primary systems. HEC-HMS simulates the surface runoff response to precipitation for an interconnected system of surfaces, channels, and ponds. Input data for the HEC-HMS model was developed using topographic, land use, and soils maps in GIS to delineate and calculate the basin areas and Natural Resources Conservation Service (NRCS) hydrologic parameters. Detailed descriptions of the model parameters can be found in Appendices A and B. The HEC-HMS model offers a variety of methods for simulating the rainfall-runoff response, hydrograph development, channel and pond routing. The selection of methods for the analyses is based on the study objectives, data availability, and watershed characteristics. The precipitation data for the 24-hour duration, Type III storm was used to represent the synthetic rainfall event. The Type III storm was selected based on the location of the City of Greenville. The geographic boundaries for the different NRCS rainfall distributions are

shown on Figure B- 2 of NRCS document Urban Hydrology for Small Watersheds, dated June 1986 and commonly referred to as TR-55 (See Appendix A). As shown in TR-55 for the coastal regions of North Carolina including Greenville, a Type III storm is more characteristic. The NRCS curve number approach was selected to calculate runoff volumes from the precipitation data, and the sub- basin unit hydrographs for these flood volumes were developed using the NRCS lag times. Peak flows for the primary systems were developed for the 2-, 10- , 25- , 50- and 100-year storm events

Storage routing was modeled just upstream of the culverts listed above because of the large storage volume available behind the pipe's entrance. The culverts that have not been included provide little to no accessible storage volume in the area upstream of its respective crossing. The results of the hydrologic model used as input for HEC-RAS are summarized in Table 3-1. A hard copy of the HEC-HMS output is included as Appendix H. The CD found in Appendix J contains this digital information.

Table 3-1: Existing Conditions Flows from HEC-HMS for Fork Swamp Watershed

HEC-HMS Node	Road Name / Location	HEC-RAS Station	Storm Event				
			2-year (cfs)	10-year (cfs)	25-year (cfs)	50-year (cfs)	100-year (cfs)
FORK SWAMP UT1							
U/S Limit FSUT1	Upstream Limit of FSUT1/Trafalgar Drive – South	5103	107	223	309	387	474
Trafalgar Drive	Trafalgar Drive – North	4235	111	231	319	399	490
Corey Road – FSUT1	Corey Road	3380	195	410	577	719	897

During a field inspection, there were several potential site restrictions and utility conflicts that were identified. Overhead power lines are located along Corey Road, which may need to be temporarily relocated based on where the contractor accesses the site. In order to gain access and to install the proposed regional detention facility, tree removal would be required. Tree removal in the upstream portion of the facility nearest Corey Road will require minimal tree removal since it is located in an open, agricultural field as shown in Picture 4-7. It should be noted that the proposed regional detention facility is located on private property therefore an easement will be required to complete this project and maintain the facility in the future. The installation of construction staging areas and entrances will require additional tree removal and temporary construction easements.

Future Conditions: The future land use was accounted for during the development of the proposed improvements. The hydrologic parameters including curve numbers were adjusted for the future conditions and alternatives models. Peak flows for the primary systems were developed for the 2-, 10-, 25-, 50-, and 100-year storm events considering the future conditions and proposed alternatives. The future conditions peak flows for the project area subbasin in the 25yr storm are modeled as an increase of 8-12% over existing conditions. By

sizing the proposed improvements to account for future land uses, it ensures that increased runoff will be managed so that the additional runoff will not cause new or increased flooding or exacerbate flood risks downstream or water quality issues in the watershed or river basin.

Water Quality: (Objective #3) Traditional stormwater management has typically been designed to reduce flooding, but at times has neglected water quality by collecting runoff directly from impervious surfaces into a closed drainage system. Runoff from impervious areas collects high concentrations of pollutants and nutrients that if left untreated can cause negative impacts to water quality in the receiving waters. Negative impacts may include less biodiversity, hazards to the health of fish and wildlife, as well as human health hazards. Many communities in North Carolina now require some form of water quality treatment for new development; however existing developments typically have little or no water quality treatment. The City of Greenville developed a Stormwater Management Program (September, 2004) to outline its water quality requirements. Best management practices (BMPs) can be constructed to treat runoff prior to being discharged to the stormwater conveyance system and ultimately the receiving waters of the system. Retrofitting BMPs can be difficult due to limited space and other constraints. For several reasons, there is no one SCM that is best for every site. First, different SCMs are better suited for different aspects of stormwater management (sediment removal, nutrient removal, peak runoff reduction, and volume control). One particular SCM might not provide all of the required stormwater management goals of the regulations that apply to a site. Additionally, each site has unique features, such as slope, soils, size, and development density that encourage the use of some types of SCMs and eliminate the use of other types of SCMs.

The NCDEQ Stormwater Design manual recommends the following process for selecting the appropriate SCM.

1. *Determine the treatment capability (TSS removal, nutrient removal, volume reduction, and peak flow control) that is required of the SCM based on the applicable regulatory requirements for the site.* Because this is a retrofit, there aren't specific regulatory requirements, but maximizing nutrient reductions, specifically nitrogen and phosphorus, sediment reductions, and peak flow control are desired outcomes for this project.
2. *Determine which SCMs will meet the treatment capability requirements and create a "short list."* To provide the necessary volume for peak flow controls, SCM's with large storage capacity such as wet ponds or wetlands are considered. To maximize nutrient reductions, primary SCM's with high denitrification processes are considered.
3. *Evaluate which of the "short listed" SCMs will be appropriate for the physical site characteristics.* This is discussed further in the alternatives analysis section.
4. *Consider other factors such as construction cost, maintenance effort, community acceptance, site compatibility, and wildlife habitat.* This is also discussed further in the alternatives analysis section.

Public Education: (Objective #4) Successful implementation of the Fork Swamp Watershed Master Plan and stormwater as a whole requires extensive public education and outreach.

Important factors in designing educational components for this project specifically are the accessibility to the public, potential visibility, target audience, and target message. The target audience would be nearby neighborhood residents. The messaging can be focused to highlight the functionality and purpose of stormwater control measures and riparian buffers and their short-term and long-term impacts to the watershed, river basin, and overall water quality.

Methodology: Addressing flooding concerns and implementing nature-based solutions is a top mitigation and resiliency priority for the City of Greenville. Furthermore, the city has demonstrated success in implementing large-scale flood mitigation and stream restoration projects on time, and within budget. The City of Greenville's Engineering Department will manage the proposed project and implementation of the grant. The city will contract with a qualified design engineer and construction contractor through an open procurement process that meets 2 CFR 200 requirements. The City of Greenville Grants Coordinator and Financial Services will support grant implementation and monitoring with contributions from the City's Attorney's Office. The City's Engineering Department will manage and complete the mitigation activity with support from third-party design and construction firms. The city, and specifically the Engineering department, has prior experience with projects of similar scope and scale.

The City of Greenville proposes implementing the project using a Design-Build delivery Method. Pursuant to N.C.G.S. § 143-128.1A, The City will solicit proposals from qualified design-build teams that are interested in providing design, landscape architectural, engineering, and general contracting services for the project. The intent of this RFQ is to select a design-build team, by Qualifications-Based Selection (QBS), to provide design and construction services for this project. The City is requiring a General Contractor (GC) lead the team. The GC and the Engineer are one "team" but the contract will be between the City and the GC.

Permits will be obtained from all appropriate local, state, and federal agencies for construction activity, stormwater discharges, floodplain management, land disturbance, drainage review and approval, and environmental quality reviews.

The design-build delivery is a collaborative, multi-phased process using primarily a qualifications-based selection, followed by a process whereby the City then progresses toward a design and contract price with the team. This provides the ability to implement a flexible procurement and delivery approach that emphasizes collaboration on the project on scope, schedule and cost as early as feasible. The design-builder delivers the project in three phases as described below:

1. Validation Services (Phase 1). At the beginning of the initial phase of the contract, the parties enter into a validation and program exercise wherein the design-build team collaborates with the City and its consultants to verify or validate the project's program, scope, schedule and budget. In addition, this process includes verifying baseline project

requirements such as geotechnical information, existing conditions, potential issues with permitting, supply chain and other major risks on the project. The purpose of the validation exercise is to gather the best information as early in the project as practicable so that decisions made by the parties are based on the most accurate, reliable information available. The end result of the validation exercise is a realistic estimate of the project budget for a reasonable project scope and within an achievable schedule, all of which takes into account known variables and risks on the project. Once the parties agree on realistic parameters for the project, the validated scope, schedule and budget can then be used with collaborative design and construction tools such as design to budget or pull planning to further the design and schedule and develop an accurate maximum cost in the next phase of the project. Some projects start with fixed program requirements and have a flexible maximum cost, and some projects have a fixed maximum cost with flexible program requirements. Progressive design-build allows for both situations, provided that either the program needs or the budget are flexible. This method will allow for the Objectives 1-4 to be met within the fixed LASII grant schedule and budget.

2. Design and Preconstruction (Phase 2). After successful conclusion of the project validation phase, the City and design-build team then collaboratively develop the design and other project decisions based on cost, schedule, quality, operability, lifecycle and other considerations. During this phase, the design-builder provides to the City real-time, frequent and transparent cost estimates to ensure that the City's budgetary requirements are being achieved. The design-builder is also frequently updating the project schedule. At the point in time where the design has been advanced to an appropriate level of definition that aligns with Objectives 1-4 and the City's requirements, approximately 40% complete, the design-builder will provide a formal proposal (including the overall contract value and project schedule) for the Final Design and Construction Phase services. The City and design-builder will negotiate the terms of the proposal and enter into an agreement.

3. Final Design and Construction (Phase 3). Once the City and design-builder agree upon terms (including the project's price, final scope and schedule), the design-builder will complete the design and construction of the project in accordance with those terms. The project may allow the design-builder to proceed on "early work" packages for discrete elements of the physical work (e.g., procurement of long lead items, demolition or site work) before authorization to proceed with the next phase or to start construction on one portion of the project while the design is still being completed on a separate, segregable portion of the project. The goal is to allow for maximum flexibility within the parameters allowed by the City and any applicable permitting authority.

Project Milestones: Project Milestones under this method are proposed as:

- Submit Engineering Report to NCDEQ — July 3, 2023
- Approval of Engineering Report — August 31, 2023
- Phase 1 & 2 Submittal (40% Design) — September 30, 2024
- NCDWR Approval of 40% Design — November 29, 2024
- Execute Phase 3 (Final Design & Construction) — March 31, 2025
- Construction Complete — June 30, 2026
- Final Closeouts and last Reimbursements — December 31, 2026

At each milestone, the City will be in communication with NCDEQ about the current status, schedule, budget, and any modifications to the project description. This Engineering Report will be amended as necessary during the design-build process for specific changes, but the Goal and Objectives will remain as proposed within the scoring criteria of the LASII funding.

Prior Experience: The City, and specifically the Engineering department, has prior experience with projects of similar scope and scale. For example, the City of Greenville successfully completed the $33-million Town Creek Culvert project in October 2020, on-time and under-budget. The project addressed drainage issues along a 250-acre downtown corridor caused by the undersized, failing culvert system. The daylighting project included many green infrastructure components, such as wetland restoration, creation of bioretention cells, and stream stabilization. By coordinating with utility plans and accounting for future development, the City believes the project will be able to handle additional stormwater runoff for years to come. In terms of timing, project planning began in Fall 2013 and was approved by City Council in October 2017. Construction spanned two and a half years.

Ongoing Maintenance: The City of Greenville will perform long-term maintenance. Pipes and culverts will be inspected annually with internal staff, costs are from the general fund and Stormwater Enterprise Fund. The City's Engineering Department will be responsible for the long-term maintenance of the project. The city currently maintains the unnamed stream and has a budget for major repairs and annual inspections through the City's overall stormwater asset management and maintenance program. Nevertheless, the city expects that additional maintenance costs will be needed for vegetation control; approximately $3,500 per year. This assumes a 4-person crew will work for 4 hours per month to maintain the stream segment. Future maintenance needs may include occasionally removing blockages and debris, repairing eroded areas (which should be reduced by the proposed project), trash and debris removal, and vegetation management.

Section 4: Need for Project:

Located in eastern North Carolina, the city of Greenville serves as the county seat of Pitt County in the zip code 27834. Over 91,000 people reside in Greenville across 36 square miles, most of which is residential. Located less than 60 miles from North Carolina's coastline, Greenville is considered a frontline community which are communities who experience the first and worst impacts of the climate crisis. As indicated in the North Carolina Climate Science Report, Greenville is vulnerable to severe storms and climate-driven disasters because of its proximity to the coast. The City is committed to taking proactive measures to protect residents from infrastructure failure, erosion risks, and climate change. The Corey Road Regional Detention & Stream Restoration Project represents an important opportunity to protect property, transportation corridors, water quality and prepare Greenville for future severe storm events and the impacts of climate change.

Along FSUT1, one out of the three crossings is meeting its desired level of service. The desired level of service for Trafalgar Drive – South, Trafalgar Drive – North, and Corey Road is the 25- year storm. As shown in Table 3-3, Trafalgar Drive – South is providing a 2-year level of service while Trafalgar Drive – North is providing a 10-year level of service. The new culvert at the Corey Road crossing is performing at the desired 25-year level of service.

Table 3-3: Hydraulic Performance for Existing Conditions Roadway Flooding

Location	Minimum Elevation at Top of Road (feet NAVD)	Desired Level of Service (Year)	Calculated Water Surface Elevations (feet NAVD)				
			2-year flood	10-year flood	25-year flood	50-year flood	100-year flood
FORK SWAMP UT1							
Trafalgar Drive – South (Culvert)	55.81	25-year	53.69	**55.95**	**56.29**	**56.48**	**56.63**
Trafalgar Drive – North (Culvert)	54.35	25-year	53.05	**54.67**	**55.14**	**55.43**	**55.78**
Corey Road (Culvert)	54.81	25-year	52.31	53.39	54.26	**55.05**	**55.43**

In addition to evaluating the roadway crossings, an evaluation was performed to determine the residences along the primary system streams that are at risk of flooding during the 25- and 100- year storm event. The existing 25- and 100- year floodplains for these streams are shown in Figure 4. The mapped floodplains are based on model results obtained as part of the Master Plan and may differ from the published FEMA floodplains. For flood insurance purposes, the effective FEMA floodplain should be referenced. For structures outside of the 100-year effective FEMA floodplain, property owners must determine if purchasing flood insurance is necessary. The City is in no way responsible for determining if flood insurance is required or for notifying property owners of the potential risk of flooding.

Table 3-5 lists the lowest adjacent grade elevations along with the existing 25- and 100-year water surface elevation for those properties at risk of flooding. The lowest adjacent grade (LAG) elevations shown in the table are not surveyed and are estimated based on the State of North Carolina's LiDAR data. LAG flooding shown in the tables may not result in actual LAG or finished floor flooding, but it is indicative of structures being at risk of flooding.

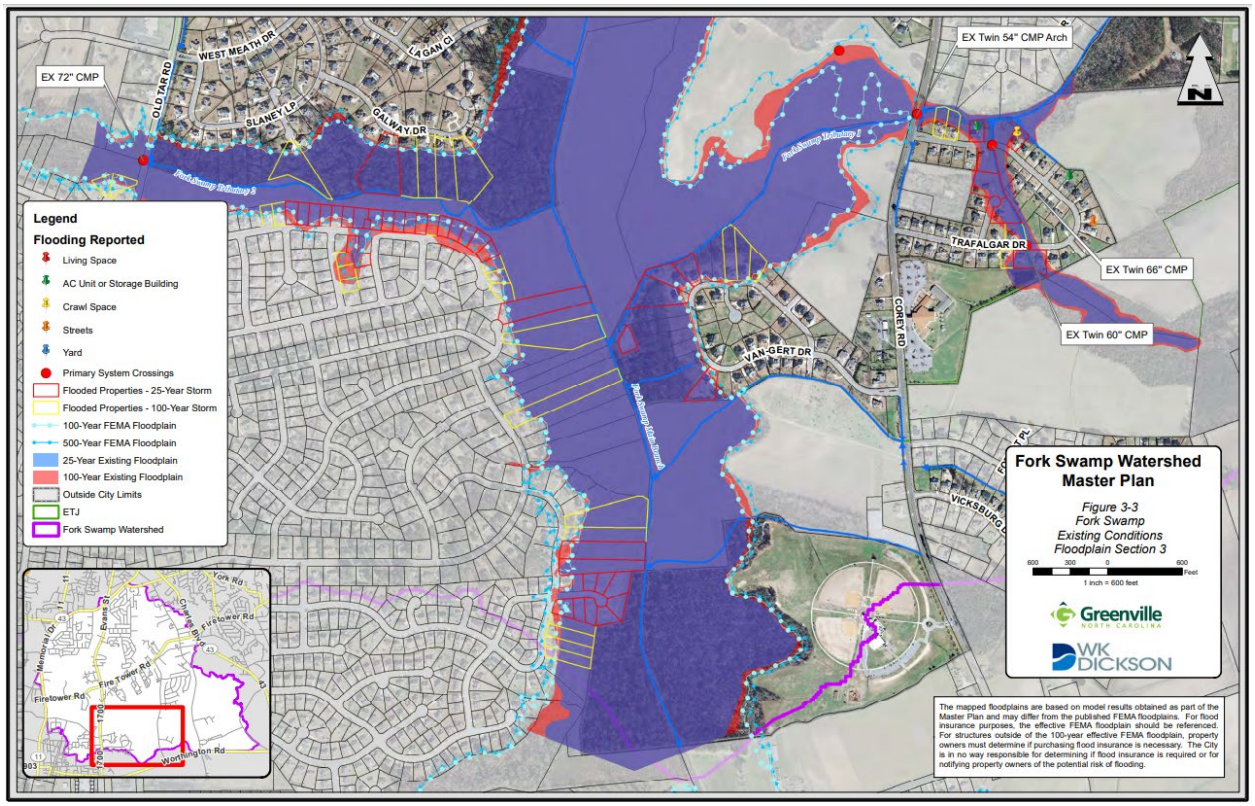


Figure 4. Fork Swamp Watershed Master Plan Existing Conditions Floodplain Section 3 (WSMP Figure 3-3)

Table 3-5: Existing Conditions At-Risk Properties/Structures – FSUT1

Address	LAG (feet NAVD)	Calculated Water Surface Elevations (feet NAVD)	
		25-year flood	100-year flood
1203 TRAFALGAR DR	55.30	54.70	**55.78**
1205 TRAFALGAR DR	54.84	54.79	**55.86**
1209 TRAFALGAR DR	52.98	**55.10**	**55.90**
1210 TRAFALGAR DR	54.40	**55.25**	**55.96**
1214 TRAFALGAR DR	55.80	55.14	**55.99**
1215 TRAFALGAR DR	52.55	**55.14**	**55.93**
1404 TRAFALGAR DR	54.25	**55.38**	**56.16**
1405 TRAFALGAR DR	54.17	**56.36**	**56.76**
1407 TRAFALGAR DR	55.86	**56.33**	**56.71**
1409 TRAFALGAR DR	55.86	**56.29**	**56.70**
4800 TREVVETT CI	54.00	**55.30**	**56.01**
4801 TREVVETT CI	54.82	**55.36**	**56.08**
812 VAN GERT DR	51.56	**53.47**	**54.62**
816 VAN GERT DR	50.51	**53.47**	**54.62**
820 VAN GERT DR	50.51	**53.46**	**54.61**

*Bold text indicates LAG flooding.

As shown in Table 3-5, twelve (12) properties along FSUT1 were identified for being at risk of flooding in the 25-year storm event and an additional three (3) properties were identified for the 100-year event. Residents along this stream reach have provided feedback indicating that they are experiencing yard, crawl space and AC/storage building flooding. These conditions indicate the need for Objectives #1 & 2.

Since the 1980s, nutrient-related pollution has created water quality problems in the Neuse estuary. Excess amounts of nutrients like nitrogen and phosphorus have caused problems including low oxygen levels, extensive fish kills and harmful algal blooms. In response to these issues, North Carolina developed the Neuse nutrient strategy, a set of rules designed to equitably regulate sources of nutrient pollution in the basin including wastewater, stormwater, and agricultural nutrient sources. The rules also protect riparian buffers and mandate training for professionals that apply fertilizer. The rules went into effect in 1997 and seek to reduce nitrogen levels in the estuary by 30% from a 1991-1995 baseline. The ultimate goal of the strategy is the removal of the Neuse estuary from North Carolina's impaired waters list. Objective #3 to improve water quality is one small, but important, step of this river basin level strategy.

As part of the Neuse and Tar-Pam Nutrient Sensitive Waters program and requirements in Greenville's NPDES Municipal Separate Storm Sewer Permit, the City has developed a Public Education Plan to gain support from citizens for water quality improvement projects and help them understand the impacts of their actions and how to respond with appropriate

management measures. The public education program aims to inform individuals and households about the steps they can take to reduce storm water pollution, such as ensuring proper septic system maintenance, ensuring the proper use and disposal of landscape and garden chemicals including fertilizers and pesticides, protecting and restoring riparian vegetation, and properly disposing of used motor oil and household hazardous wastes. EPA recommends that the program inform individuals and groups how to become involved in local stream restoration activities and support City improvement projects that benefit water quality. EPA recommends that the public education program be tailored, using a mix of locally appropriate strategies, to target specific audiences and communities. Examples of strategies include distributing brochures or fact sheets, sponsoring speaking engagements before community groups, providing public service announcements, implementing educational programs targeted at school age children, and conducting community-based projects such as storm drain stenciling and watershed and beach cleanups. In addition, EPA recommends that some of the materials or outreach programs be directed toward targeted groups likely to have significant storm water impacts. This Public Education Plan includes a variety of activities directly related to this project such as, SCM demonstration sites, brochures and targeted mailings, educational and project websites, and use of social media.

Section 5: Alternatives Analysis and Project Cost:

This project is multifaceted and several alternatives were analyzed with varying purposes and benefits. Alternatives consist of varying components that may be required to be implemented with other components to achieve the desired benefit. Components 1-6 specifically focus to address Objectives 1-2.

Component 1: Upsize culverts at Trafalgar Drive South. As determined by the existing conditions analysis, the twin 60" CMPs at this crossing are undersized and not meeting the desired 25- year level of service. The culverts are in good condition. To provide the 25-year level of service and reduce the frequency and severity of flooding for the residents adjacent to the Trafalgar Drive – South culvert crossing, the installation of a 60" floodplain culvert with a new headwall would be proposed. The existing CMPs shown in Figure 5 would be left in place.

Figure 5. Trafalgar Drive – South Culverts

There are three (3) downstream properties in the 100-year existing conditions floodplain, that have the potential to experience yard, LAG, or structural flooding. These properties are as follows: 1405, 1407, and 1409 Trafalgar Drive. The proposed improvements will reduce the water surface elevations for the 25-year storm by 0.56 to 0.67 feet upstream of Trafalgar Drive – South. The water surface elevation will be reduced for all of these properties, only 1405 and 1407 Trafalgar Drive will be removed from the 100-year floodplain.

The property at 1409 Trafalgar Drive will remain in the floodplain and continue to be subject to yard, LAG, or structural flooding but at reduced depths and likely reduced duration.

There are several potential site restrictions and utility conflicts that were identified at this project location. There appears to be sanitary sewer, electric, and gas lines that may need to be replaced or relocated. Impacts to traffic flow during construction were considered. Trafalgar Drive is a two-lane residential roadway. It is anticipated that a road closure or a flagged two- way one-lane operation will be required.

Component 2: Upgrade Culverts at Trafalgar Drive North.

As determined by the existing conditions analysis, the 60" and 66" CMPs at this crossing are not meeting the desired 25-year level of service. In order to provide a 25-year level of service at this crossing, this component is to replace and upsize the culverts at Trafalgar Drive – North.

As part of this component, the existing CMPs will be replaced with twin 8' x 5' RCBCs. The upsized culvert will provide the desired 25-year level of service with 0.16 feet of freeboard. Figure 7 summarizes the improvements proposed at Trafalgar Drive – North.

There are three (3) properties in the existing conditions 25-year floodplain and two (2) additional properties in the 100-year floodplain, that have potential to experience LAG or structural flooding. These properties are as follows: 1210, 1214, 1404 Trafalgar Drive and 4800, 4801 Trevvett Circle. The water surface elevation will be reduced for all of these properties. The property at 1210 Trafalgar Drive and 4801 Trevvett Circle will be removed from the 25-year floodplain while 1404 Trafalgar Drive and 4800 Trevette Circle will be removed from the 100- year floodplain with the implementation of this component. The remaining property at 1214 Trafalgar Drive will continue to be exposed to LAG or structural flooding, although depth will be reduced.

However the resulting upstream water surface elevations will be reduced by as much as 0.95 feet in the 25-year storm event, only if improvements are also completed at Corey Road as described in Component 3.

There are several potential site restrictions and utility conflicts that were identified at this project location. There appears to be sanitary sewer, electric, and gas lines that may need to be replaced or relocated. Impacts to traffic flow during construction were considered. Trafalgar Drive is a two-lane residential roadway. It is anticipated that a road closure or a flagged two- way one-lane operation will be required.

Component 3: Upgrade culverts at Corey Road.

Based on the results obtained from the existing conditions analysis, the existing twin 13' x 4.5 CMP arches (See Figure 6) at Corey Road are passing the desired 25-year storm. However, in order to lower the tailwater and improve the performance of the culvert at Trafalgar Drive – North, the capacity at Corey Road will be increased. This component proposes the installation of twin 48" floodplain culverts along with a new headwall at Corey Road.

Figure 5. Corey Rd CMP arches

Component 4: Floodplain benching.

In addition to the proposed floodplain culvert, it is recommended that 2,300 linear feet of floodplain benching be included downstream of Corey Road as shown on Figure 7. The floodplain benching will be located in the left and right overbanks. Although the benching is located outside of the City limits, it will help to reduce the tailwater at Corey Road and subsequently Trafalgar Drive which directly impacts City residents. To implement proposed improvements for FSUT1, the Corey Road project should be completed before the Trafalgar Drive improvements.

There are four properties (1203, 1205, 1209, and 1215 Trafalgar Drive) upstream of Corey Road located in the existing conditions 25- and 100-year floodplain. The resident located at 1209 Trafalgar Drive has reported storage building flooding. The property at 1215 Trafalgar Drive will be removed from the 25-year floodplain and 1209 Trafalgar Drive will be removed from the 100-year floodplain. While the water surface elevations will be reduced at remaining properties, they will remain in the 25- and 100-year floodplains. They will continue to experience flooding but the severity and frequency will be reduced.

A summary of the hydraulic performance for the improvements proposed along Fork Swamp are included in Table 4-3, and a summary of the improvements realized for reduction in WSEL and properties removed from floodplains is shown in Table 4-4. The water surface elevations shown assume all proposed primary system improvements for FSUT1 are constructed. The level of improvement will be reduced if all projects are not implemented.

Table 4-3: Hydraulic Performance for FSUT1

Location	Minimum Elevation at Top of Road (feet NAVD)	Desired Level of Service (Year)	Calculated Water Surface Elevations (feet NAVD)				
			2-year flood	10-year flood	25-year flood	50-year flood	100-year flood
Trafalgar Drive - South (Existing Twin 60" CMPs with Proposed 60" Floodplain Culvert)	55.81	25-year	53.14	54.57	55.62	**56.13**	**56.38**
Trafalgar Drive - North (Proposed Twin 8' x 5' RCBCs)	54.35	25-year	52.40	53.48	54.19	**54.73**	**55.16**
Corey Road (Existing Twin 13' x 4.5 CMP Arch with Proposed Twin 48" Floodplain Culverts)	54.81	25-year	50.95	51.64	52.30	53.00	53.96

*Bold text indicates the existing water surface has exceeded the crest or low point in the road thereby causing flooding.
** Green shade indicates crossing meets desired level of service. Red shade indicates crossing does not meet desired level of service.

Table 4-4: WSEL Reductions and Properties Removed from Floodplains

Location	WSEL Reduction (feet NAVD)		Properties Removed/Properties in Floodplain	
	25-Year	100-Year	25-Year	100-Year
Trafalgar Drive - South	0.67	0.25	2/3	2/3
Trafalgar Drive - North	0.95	0.62	2/3	2/5
Corey Road	1.96	1.47	1/4	1/4

Component 5: 20-acre Detention Pond.

While developing the alternatives for the Fork Swamp watershed, opportunities for potential regional detention facilities were explored. There was one area downstream of Corey Road on FSUT1 (See Figure 7), that was analyzed to determine its benefits on downstream flooding. Based on the development of a conceptual model, the proposed 20-acre detention pond would lower the flows in the 2-, 10-, 25-, 50-, and 100-year storms by 20 to 25 percent at the confluence of FSUT1 with Fork Swamp. These flow reductions continue through the downstream modeling limits of the Fork Swamp watershed. If the detention is not implemented in conjunction with the other improvements proposed for the primary system, the percent increase at the outfall will be 7 percent in the 25- year storm event.

The implementation of this facility will not impact any of the sizes of the culvert recommended as part of this Master Plan. However, it will reduce downstream flows and help to offset increases that will be created by upsizing upstream culverts. The location of this facility is outside of the City limits close to the border of Winterville. It would be an opportunity to partner with this municipality which would also benefit from the implementation of the regional detention facility. If implemented, the floodplain benching shown downstream of Corey Road (Component 4) would not be necessary.

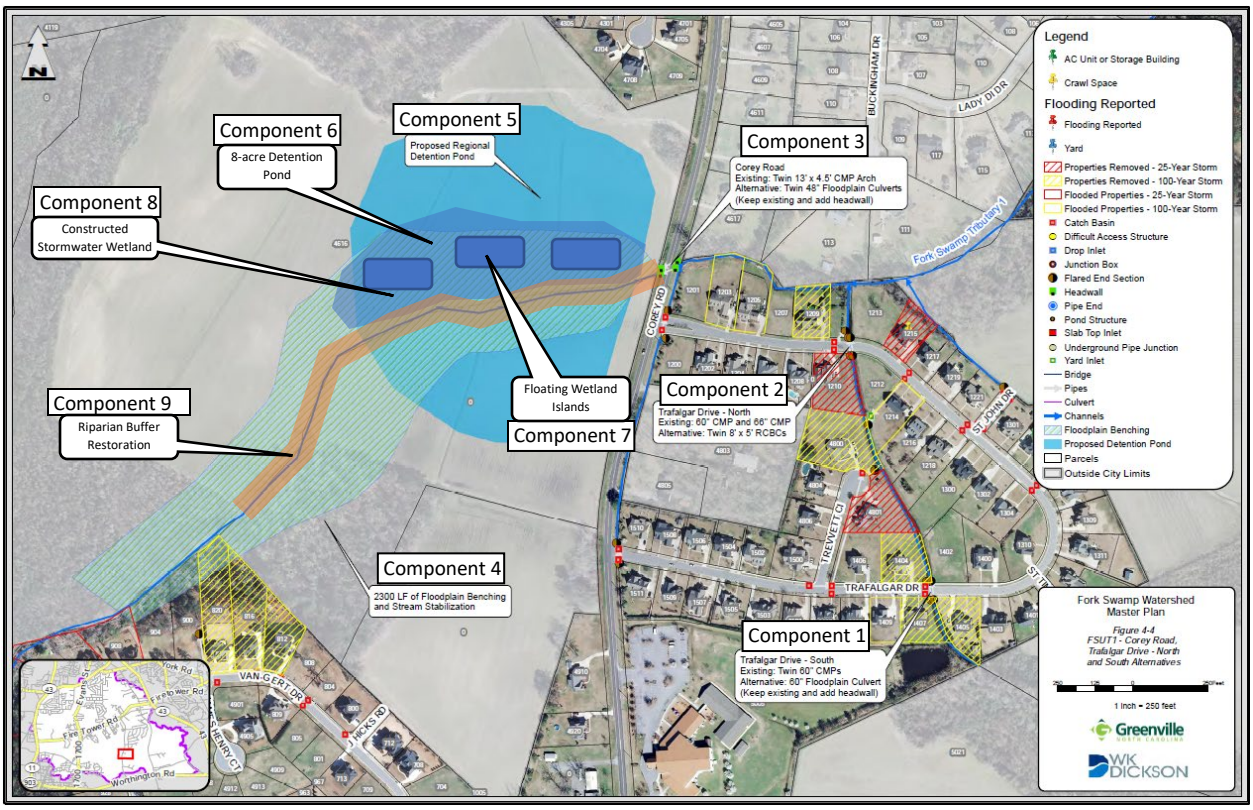


Figure 7. Corey Road Regional Detention & Stream Restoration Project Map from the Fork Swamp Watershed Master Plan (WSMP Figure 4-4)

25-YEAR Detention Analysis: In 2014, the City of Greenville enacted legislation requiring attenuation for new development and re-development for the one-year, five-year, and ten-year, 24-hour storm events. In addition, Section 9-9-10 of Ordinance No. 13-054 states the following:

> *"New development and redevelopment, as described in section 9-9-3, in areas at special risk with well documented water quantity problems as determined by the City Engineer, shall not result in a net increase in peak flow leaving the site from pre-development conditions for the 25-year, 24-hour storm event."*

As part of the Fork Swamp Master Plan, an analysis was completed to determine if there are areas within the watershed and the ETJ that should be considered "well documented water quantity problems" requiring detention for the 25-year, 24-hour storm event. Areas may be defined as well documented water quantity problems if either of the following is true:

- Structural flooding has been historically noted by property owners during storms considered smaller than the design event and this structural flooding has been corroborated by either high water marks, City staff input, or model results.
- Model results indicate structural flooding or roadway overtopping during storms smaller than the design storm and model results are corroborated by City staff input.

Portions of the watershed draining to the “well documented water quantity problems” may be considered for 25-year detention if any of the following are true:

- Future condition flows are 10% or greater than existing flows for a given subwatershed upstream of the water quantity problem.
- Proposed capital projects are not deemed to be feasible or cost effective for providing the required level of service for these water quantity problems based on future land use conditions.
- Cost differential between designing for existing conditions and future conditions is deemed to be significant and/or a significant number of structures would become floodprone during the 25-year design storm based on future conditions flows when compared to existing conditions flows.

It is assumed that for this analysis, systems with a 10-year level of service design would not be considered for the 25-year detention since the existing 10-year detention requirements would result in little to no increase in peak flows for the design event. The secondary systems evaluated in Fork Swamp watershed only required a 10-year level of service, therefore requiring upstream 25-year detention would not impact the design of a system that only needs to meet a 10-year design storm.

Large portions of the Fork Swamp watershed are already fully developed, however there are some areas of the watershed where the future conditions 25-year flows could be greater than 10% higher than the current existing flows. These areas are shown in Figure 4-14. For the purposes of evaluating if 25-year detention is appropriate, the Fork Swamp watershed is divided into four (4) distinct areas based on the drainage feature that conveys runoff from that area. Then the entire Fork Swamp watershed needs to be evaluated to limit increases in runoff from the south end of the City limits entering neighboring communities.

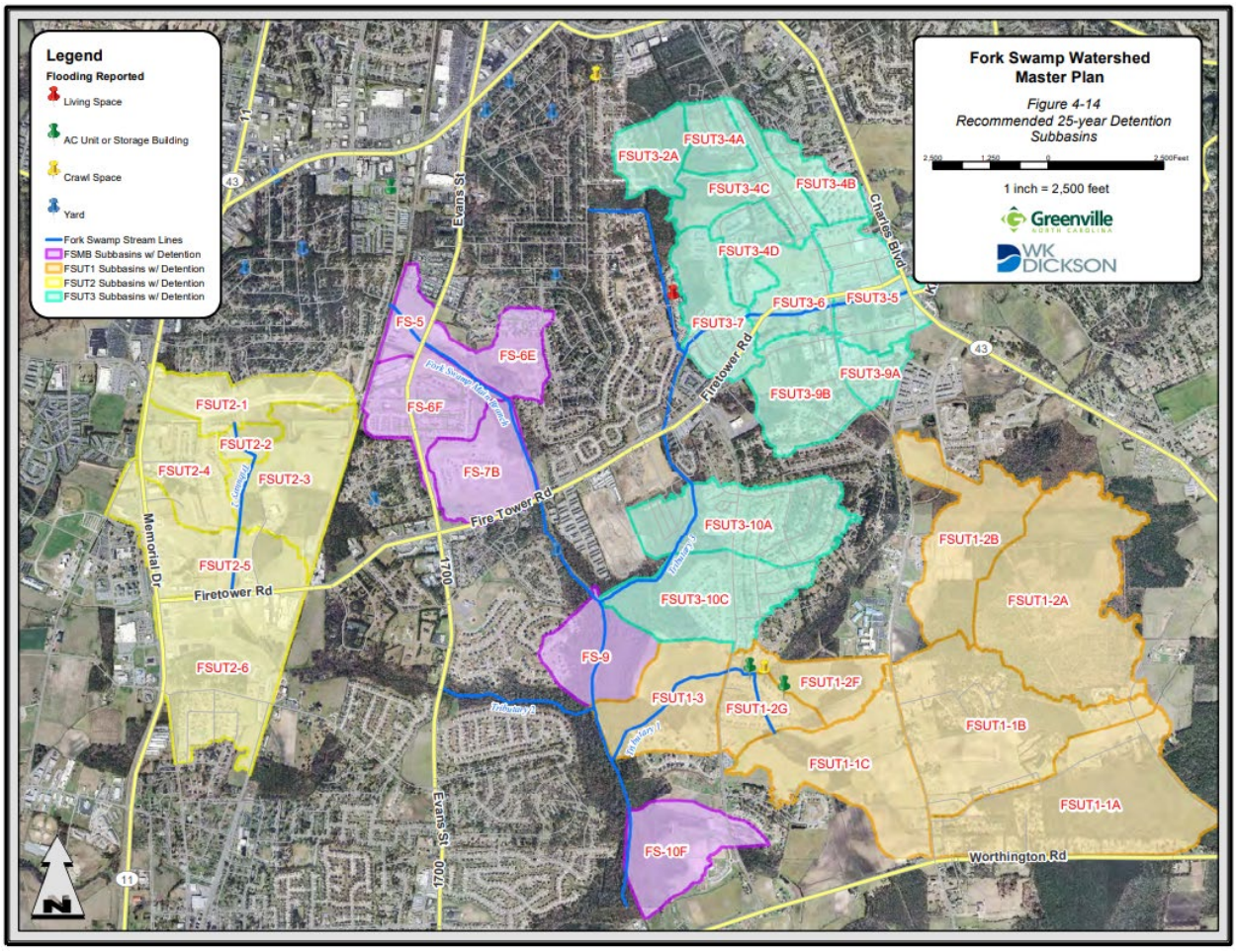


Figure 8. Recommended 25-year Detention Subbasins (WSMP Figure 4-14)

For Fork Swamp Tributary 1, repetitive flooding has been reported within the Farrington subdivision specifically on Trafalgar Drive along Fork Swamp Tributary 1. Each of the highlighted areas shown in Figure 8 have the potential for the 25-year flows to increase by greater than 10% due to the potential future development in these areas. The future condition land use was based on existing zoning. The City should carefully consider rezoning requests within the Fork Swamp Tributary 1 watershed based on the existing known flooding issues.

Component 6: 8-acre Pond with 25-year Detention Regulations.

If 25-year detention is required in the proposed areas, the recommended culvert sizes at Trafalgar Drive can be decreased, although the cost savings would not be substantial. However, the severity, frequency, and duration of flooding would be reduced, which would in return provide savings to the property owners.

For the overall Fork Swamp watershed, changes in land use (future build-out conditions) and increasing culvert capacity will increase the 25-year flow at the outlet of the study area (City limits) by approximately 8%, resulting in a 0.22-foot increase in WSEL at the outlet.

Downstream communities including Winterville and Pitt County already experience flooding along Fork Swamp in existing conditions, so any increase in flows could potentially increase the duration, severity, and frequency of flooding, although the limits of this study do not evaluate these potential impacts downstream of the City limits. If 25-year detention was required in the highlighted areas in Figure 8, the increase in the 25-year flow would be reduced to 1.1%, a reduction in WSEL of 0.17 foot. Therefore, the City could significantly reduce the size of the Corey Road Regional Detention Area to effectively ensure no net increase in the 25- year peak flow at the limits of the study. The size of the detention area could be reduced to eight (8) acres which would reduce the cost substantially. Components 4-6 while primarily analyzed for water quantity benefits for Objectives 1 & 2, also provide opportunities beyond the other components for water quality (Objective 3) and educational (Objective 4) benefits.

Component 7: Floating Wetland Islands.

To enhance the water quality treatment and maximize the retrofit opportunity, floating wetland islands were considered to be added to the proposed wet detention pond in Components 5 & 6. This allows the pond to function to maximize storage and water quantity control, while also increasing the amount of nutrient reduction provided by the measure.

Component 8: Constructed Stormwater Wetland.

While this component provides excellent water quality treatment, it is limited in storage volume by the maximum ponding depth specified by the stormwater design manual. This limits its ability to achieve Objectives 1 & 2.

Component 9: Riparian Buffer Restoration.

Previous components 5 & 6 propose a wet detention pond and therefore eliminate the need to component 4, floodplain benching. However, this site is currently a farm field that is tilled right to the bank of the stream which is heavily eroded and has no vegetated buffer. This component proposed to further enhance water quality and educational opportunities (Objectives 3 & 4) by restoring the riparian buffer along the remaining section of stream by planting trees and riparian vegetation and stabilizing the streambanks to prevent erosion.

Alternative Selection:

With all of the various components analyzed for their varying purposes and benefits, alternatives consisting of multiple varying components were developed and considered to achieve the project Objectives.

Alternative 1: No action.

This alternative proposes no improvements for water quantity or quality. With no action, the homes experiencing flooding will continue to experience flooding of increasing depth, frequency, and duration as the upstream watershed is developed and storm intensities increase. The nutrient levels and pollution will continue to increase and discharge to the Neuse River Basin contributing to the impairment.

Alternative 2 (selected alternative): Upon analysis of these various components and the interdependency among them, it was selected that the most beneficial and advantageous alternative for this project is Alternative 2 which consists of Components 3, 6, 7, & 9 collectively. The City has implemented the 25-year regulations in Component 6 allowing the proposed detention pond to reduce in size to 8 acres. The culvert upgrade at Corey Rd (Component 3) is a critical component that must be completed first before any additional benefits will be realized upstream. Component 7, the floating wetland islands, and Component 9, the riparian buffer restoration, take advantage of the opportunity to provide water quality treatment while implementing water quantity controls. This combination achieves all 4 identified Objectives.

Components 1 & 2, culvert upgrades on Trafalgar, will still be required in the future to realize the full benefits to those upstream properties, but this project allows those less expensive projects to be completed at a later time.

To achieve Objective 4, originally educational signage was considered to be installed around the wet pond, along Corey Rd, and along the restored riparian buffer. However, after considering the accessibility to this site and resulting limited visibility to the public, it was determined that a better alternative would be to provide education through social media, the City's website, local City cable access channel, and targeted mailings to the adjacent neighborhoods. This messaging will describe the natural process and functions of the stormwater control measures, the benefit to water quality, and the flood reduction and peak flow benefits. The messages will also acknowledge the partnership between the City of Greenville and Pitt County as well as the source of the project funds as ARPA LASII funds.

Section 6: Proposed Project Description:

Project Description: The Corey Road Regional Drainage Improvement project will add two-48-inch pipes to the existing culverts and two new headwalls at Corey Road. More than 50% of the construction cost of the project will be used to create a new, nature-based stormwater control measure in the form of an 8-acre wet-detention pond with floating wetland islands. This pond will be designed and constructed to adhere to the NC Stormwater Design Manual Part C: Minimum Design Criteria and Recommendations for Stormwater Control Measures and meets the NC statutory definition of nature-based solutions as it weaves natural features such as vegetated shelfs and wetland islands and processes such as denitrification, infiltration, and evapotranspiration to store, infiltrate, and treat stormwater, promoting resilience, reducing flood risks, and improving water quality.

The types of stormwater control measures included in this project are:

- Wet Detention Pond
- Floating Wetland Islands
- Restored Riparian Buffer

These stormwater control measures are the most appropriate and feasible measures for this location given the high peak flows of the stream, desire to reduce nutrients and sediment, and the existing conditions of a cleared farm field currently cultivated right to the top of bank of the stream. This combination of measures provides both needed water quantity and quality improvements.

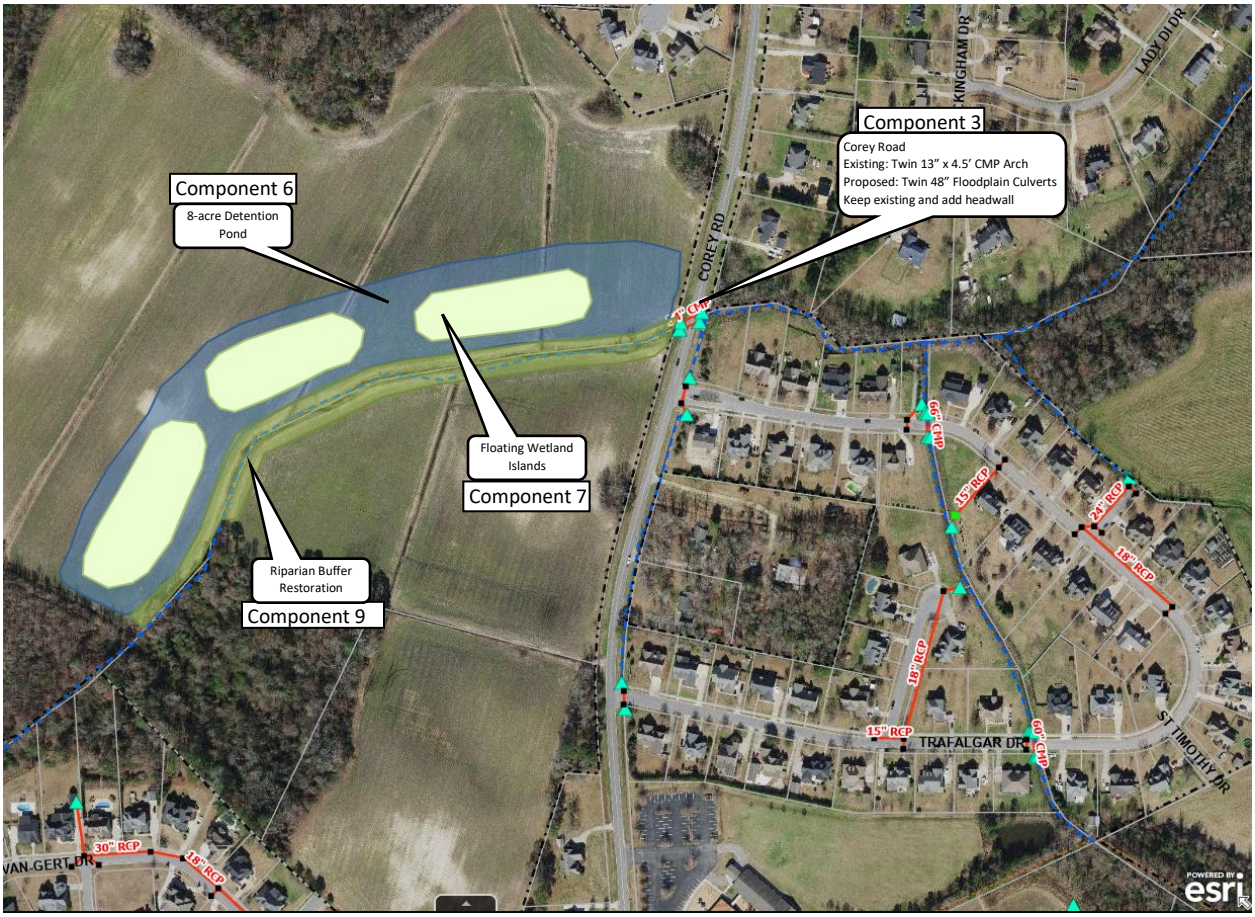


Figure 9. Proposed project components 3, 6, 7, & 9.

The future land use was accounted for during the development of the proposed improvements. The hydrologic parameters including curve numbers were adjusted for the future conditions and alternatives models. Peak flows for the primary systems were developed for the 2-, 10-, 25-, 50-, and 100-year storm events considering the future conditions and proposed alternatives. The future conditions peak flows for the project area subbasin in the 25yr storm are modeled as an increase of 8-12% over existing conditions. By sizing the proposed improvements to account for future land uses, it ensures that increased runoff will be managed so that the additional runoff will not cause new or increased flooding or exacerbate flood risks downstream or water quality issues in the watershed or river basin.

This project will increase level of service for residential stormwater infrastructure and reduce flooding risk to Corey Road (SR170), Trafalgar Drive, and residential homes. Corey Road and Trafalgar Drive serve as the only connections for approximately 55 single-family homes.

When the culverts overflow, the roads flood, emergency egress and ingress access is limited or not available, and the main sewer pump station is flooded. Additionally, the project will directly reduce the water surface elevation for 8 parcels that include single-family residential properties. The flood risk reduction will remove 2 parcels from the 25-year floodplain and 4 parcels from the 100-year floodplain with the implementation of this project. The remaining properties will see reduced depths of the lowest adjacent grade (LAG) or structural flooding.

While the water surface elevations will be reduced at remaining properties, they will remain in the 25- and 100-year floodplains. They will continue to experience flooding but the severity and frequency will be reduced. In order to lower the tailwater, it is proposed that twin 48" floodplain culverts be installed along with an 8-acre detention pond and stream stabilization and buffer restoration downstream of Corey Road. The Corey Road improvements should be constructed prior to culvert upgrades at Trafalgar Drive to provide the desired level of service noted above. The proposed improvements would result in up to 2-foot reduction in WSEL for the 25-year event. This will bring one property out of the 25-year floodplain and an additional property out of the 100-year floodplain.

With respect to Objective 2, the project will increase the carrying capacity of the three roadway culverts to carry the 25-year and 50-year design storm flood event by increasing the pipe diameter and box culvert size. The stream banks along Fork Swamp Unnamed Tributary downstream of Corey Road will also be stabilized to reduce bank erosion. This will eliminate sediment deposition into the watershed and ensure Fork Swamp can carry the designed flood. The banks will be stabilized with a nature-based solution using native non-invasive species of live stakes and bare root plants. Several log and rock vanes will be placed instream below the outlet of Corey Road to ensure stream stability. Geolifts made of natural fibers will also be installed to stabilize the bank and be planted with a riparian buffer mix of native wildflowers and pollinator mix for bees and wildlife. The detention pond and stream bank stabilization will allow the floodwaters to dissipate energy into agricultural fields prior to heading downstream to additional residential properties.

The use of nature-based solutions is central to the proposed mitigation strategy. The project will replant the riparian zone buffer with a riparian seed mix and herbaceous and native woody shrubs and trees. The project will also install bio-engineered (or nature-based) structural enhancements to stabilize the stream bank where most applicable. Stone-based structural enhancements will only be used where necessary. Natural fiber matting will also be used for reinforcement and improve surface stabilization. Compared to conventional stream stabilization solutions which typically depend on steel and concrete, Greenville's approach emphasizes the use of natural, locally available materials that will emulate the morphology of natural stream channels while simultaneously reducing erosion problems along the stream. The riparian vegetation will also offer water quality protection benefits. The replanted riparian vegetation will help to maintain and improve water quality by functioning as a buffer, filtering out sediments and debris. This will improve water quality and protect wildlife habitat. The City's Fork Swamp Watershed Master Plan defines the bankfull elevations as those associated with the channel-forming discharge, typically

between the 1 and 2-year storm events. The bankfull elevation defines the channel's shape and dimensions. As the project will mitigate existing erosion caused by the bankfull elevation, the project's level of protection provided will be the 2-year precipitation event. In addition, the proposed project will address erosion concerns for municipal utilities and residential and commercial structures vulnerable to erosion from the streambank for the full 30-year useful life expected for the project.

The proposed project achieves Objective 1 by reducing structural flooding in habitable structures and improving ability to access habitable structures during a flood event. There are four properties (1203, 1205, 1209, and 1215 Trafalgar Drive) upstream of Corey Road located in the existing conditions 25-year and 100-year floodplain. The modeled water surface elevations show 25yr flood levels at the structures at 1209 and 1215 as 2.12' and 2.59' deep respectively. During the 100yr flood, the four properties range from 1.02' to 3.38' deep respectively. Typical homes in this neighborhood include a 1-3' crawl space and attached garages. Flooding is expected in garages, crawl spaces, and possibly the finished flood of those most affected.

Figure 10. 1215 Trafalgar Drive – Google Street View

With the proposed project the property at 1215 Trafalgar Drive will be removed from the 25-year floodplain and 1209 Trafalgar Drive will be removed from the 100-year floodplain. While the water surface elevations will be reduced at remaining properties, they will remain in the 25-year and 100-year floodplains. They will continue to experience flooding but the depth, severity, and frequency will be reduced.

Water Quality Improvements: To achieve Objective 3 the project will adhere to the NC Stormwater Control Measure Credit Document requirements for regulatory credits. The exact nutrient reduction percentages will be determined during final engineering design, however, using the SNAP tool the project will be designed to reduce at least 35% total Nitrogen and 35% total Phosphorus. A standard wet-detention pond is credited for a 30%

reduction in both Nitrogen and Phosphorus. The chosen design variant with the addition of 55 coverage by Floating Wetland Islands (FWI) further reduces these nutrients. The SCM crediting document shows that the addition of FWI reduces the effluent of Nitrogen and Phosphorus by 30% and 40% respectively over a traditional Wet Pond. This ensures far greater than a 35% reduction in both nutrients.

C.3. Wet Pond

Credit Table

SCM	Role	% Annual Runoff Treated if 100% Sized	% Treated Runoff to Fates			$EMC_{effluent}$ (mg/L)	
			HSG	ET&I	Effluent	TN	TP
Wet Pond per MDC	Primary	84	A	25	75	1.22	0.15
			B	20	80		
			C	15	85		
			D	10	90		
Wet Pond per MDC with ≥ 5% covered by FWI per Fig. 1	Primary	84	A	25	75	0.85	0.09
			B	20	80		
			C	15	85		
			D	10	80		

Figure 11. Wet Pond Nutrient Crediting Table (NC SCM Crediting Document)

Figure 12. Erosion and lack of riparian buffer downstream of Corey Road

The agricultural field downstream of the culvert is devoid of any riparian vegetation and there is evidence of slumping banks in many areas. Bank conditions are currently unstable due to a loamy sand soil texture, lack of sufficient bank vegetation, and the lack of a forested buffer on either bank. This project has opportunities for bank stabilization to prevent bank erosion and sediment loading along to Fork Swamp. Live staking the stream banks along this bend and planting the area with a riparian seed mix will also help prevent future erosion and sediment loading to the channel and planting the riparian zones with native vegetation. Live staking stream banks and planting of hardwood species will help prevent undercutting and bank failures in the future and benefit downstream portions of the watershed.

Educational Messaging: In order to achieve Objective 4, this project will provide education through social media, the City's website, local City cable access channel, and targeted mailings to the adjacent neighborhoods. This messaging will describe the natural process and functions of the stormwater control measures, the benefit to water quality, and the

flood reduction and peak flow benefits. The messages will also acknowledge the partnership between the City of Greenville and Pitt County as well as the source of the project funds as ARPA LASII funds.

Section 7: Environmental Information Document (EID):

Not Applicable for LASII projects.

Section 8: Financials:

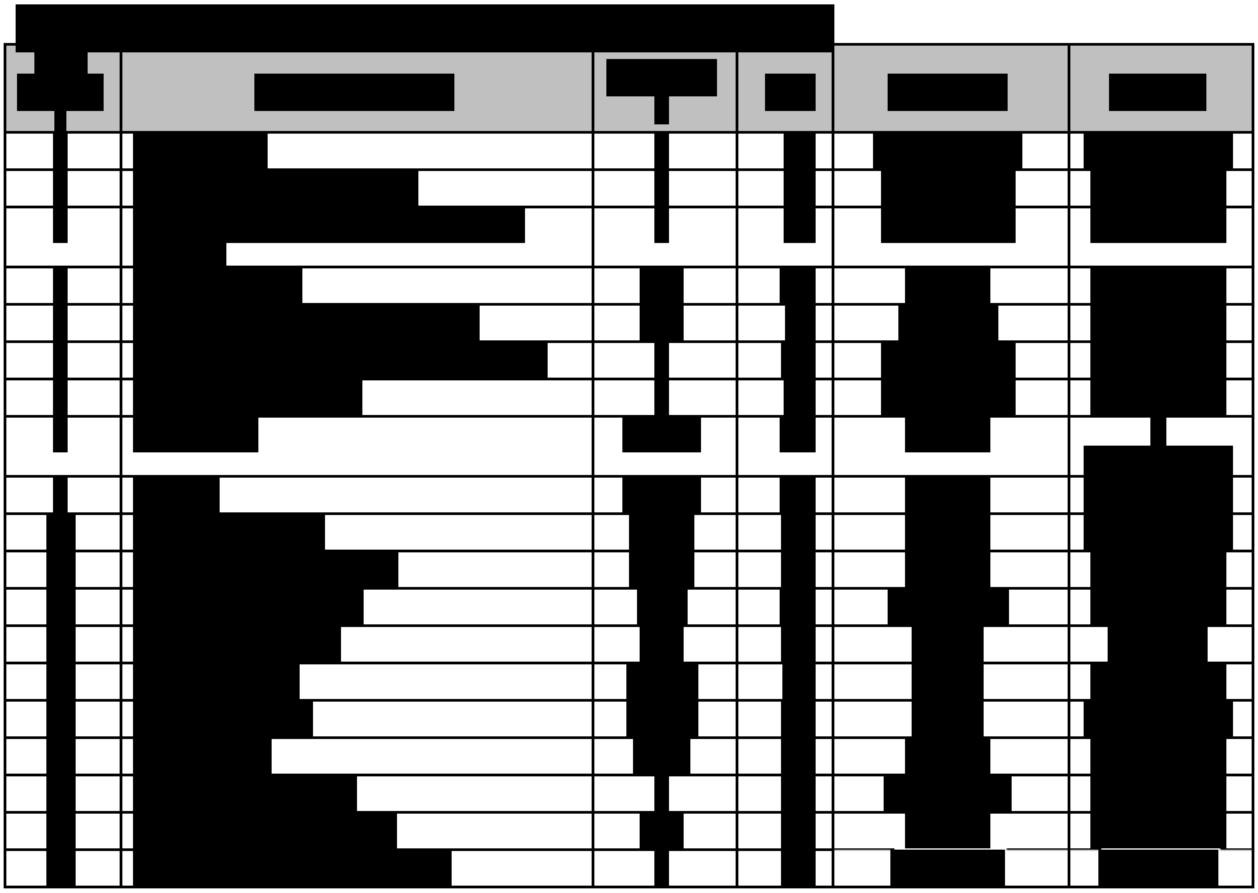
This project has a total estimated budget of just over $8,000,000. This includes planning, engineering design, permitting, land acquisition, construction, project administration, construction inspection and management, surveying, legal expenses, and funding administration.

City Council adopted the regulations in late 2002 that established the Stormwater Utility, which became effective July 1, 2003. Revenue generated by the Stormwater Utility fund is being used to support the Stormwater Management Program, which includes compliance with the Tar-Pamlico Nutrient Management State Regulations and the Federal National Pollutant Discharge Elimination System (NPDES) Regulations for water quality. It will also provide for the maintenance of the City's drainage system such as pipes and ditches, protecting properties from flooding, protecting our streams and wetlands from erosion and pollution, and major capital investments for the drainage system as it ages. Currently the stormwater utility customers consist of 16,583 single-family residential accounts, 15,869 multifamily residential accounts, and 9,663 commercial, industrial, and institutional accounts. The current rate is $7.35/ERU/Month with an ERU set at 2000 square feet of impervious area or portion thereof. This rate applies across all account types, however single family residential accounts are capped at 4 ERUs maximum. Information about the stormwater utility can be found on the City's website at https://greenvillenc.gov/government/engineering/stormwater-management.

Over the last 12 months the stormwater utility collected approximately $6 Million in revenue. 100% of the stormwater utility fee is spent on stormwater management, operations, maintenance, and capital improvements. The estimated expenditures for the last 12 months is $7.5 Million with $1.5 Million coming from the Stormwater Management

Fund balance. The budget showing official record of the actual amounts collected and expended can be found on the City's website at https://www.greenvillenc.gov/home/showdocument?id=21038. The stormwater program is entirely funded from the Stormwater utility revenues and available grant funding. No funds come from the General Fund or other City funding sources.

In 2018 City Council appointed a Stormwater Advisory Committee to evaluate the stormwater program, level of service, and rate structure and fees. After a detailed analysis with consultants and stakeholders and recommendations from this committee, City Council implemented a plan to increase stormwater utility rates by $1.00/ERU each year for a period of 4 consecutive years. July 1, 2023 marks the third of these 4 increases. With these increases in rates came additional staff and equipment and directives on expanded level of service for both maintenance and capital improvements. This increased revenue for the stormwater management fund allows projects such as this one to be completed. Projects are identified, ranked, and prioritized in the Watershed Master Plans and are completed as this funding allows. Projects such as this one that are eligible for one or more grants are moved up on the prioritization and other projects are delayed in order to provide the required grant match or cover the remaining need when grants are partially awarded. Increases in the stormwater utility fee are not based on any one particular project but the level of service for the program as a whole.



Section 9: Public Participation:

The development of the Fork Swamp Watershed Master Plan where this project was identified included a broad range of stakeholders to collect as much data, information, and tacit knowledge of the watershed as feasible. The general public was solicited through questionnaires mailed to all property owners in the watershed and through an open house public meeting where residents and business owners were encouraged to provide feedback on stormwater issues in the watershed. City staff served as a critical stakeholder by providing valuable information regarding historical flooding and erosion problems in the watershed as well as providing feedback on potential capital improvements and their prioritization.

In August of 2014, the City began distribution of questionnaires related to stormwater management property owners in the Fork Swamp watershed. Thirty-six (36) questionnaires were completed and returned to the City for consideration from Fork Swamp watershed property owners. The questionnaire results were georeferenced according to the address of the questionnaire respondent. There was one response that was located outside of the City limits. Seven (7) of the respondents indicated some level of property flooding, with one (1) property owners experiencing living space flooding, (4) four crawl space flooding, and 2 (two) AC/storage at least once per year. Twenty-four (24) respondents identified locations where street flooding occurs while another ten (10) residents reported yard flooding. A total of five (5) residents reported erosion threatening streets, yards, garages, or fences. On November 4, 2014, the City provided another avenue for obtaining citizen input by holding a public meeting. An open house format allowed property owners to attend at their convenience and speak to City staff or representatives from WK Dickson. Nine (9) residents from the watershed provided feedback at the meeting. All of these residents were located within the City limits. The results and comments from the citizen's input contributed significantly to the identification and prioritization of problem areas, and validation of model results.

Pit County, City of Winterville, NCDOT, and Greenville Utilities are partners with the City of Greenville. They are coordinating on floodplain management, education, and flood reduction. Because this project has downstream effects, floodplain mapping will be revised with lower flood elevations and flood risk will be reduced onsite and downstream outside of the City of Greenville's jurisdiction. The project will involve close coordination with NCDOT to ensure the design meets NCDOT standards for the second culvert under Corey Road. Greenville Utilities is a significant partner to ensure that the sanitary sewer main pump station along Fork Swamp Unnamed Tributary is elevated and waterproofed to limit stormwater inflow and infiltration. This will reduce and eliminate potential sanitary sewer overflows and sanitary sewer pump failures due to electrical shortages and flooding.

Public Involvement was conducted as part of the NC RCCP program, NCORR RISE Project Portfolio development, and during the Fork Swamp Watershed Master Plan project prioritization. The master planning process used a range of communications tools to engage

and solicit input from stakeholders including a questionnaire, three public meetings, social media, and direct resident contact and interviews. The Corey Road Regional Drainage Improvement and Flood Risk Resilience project was identified as a result of community input.