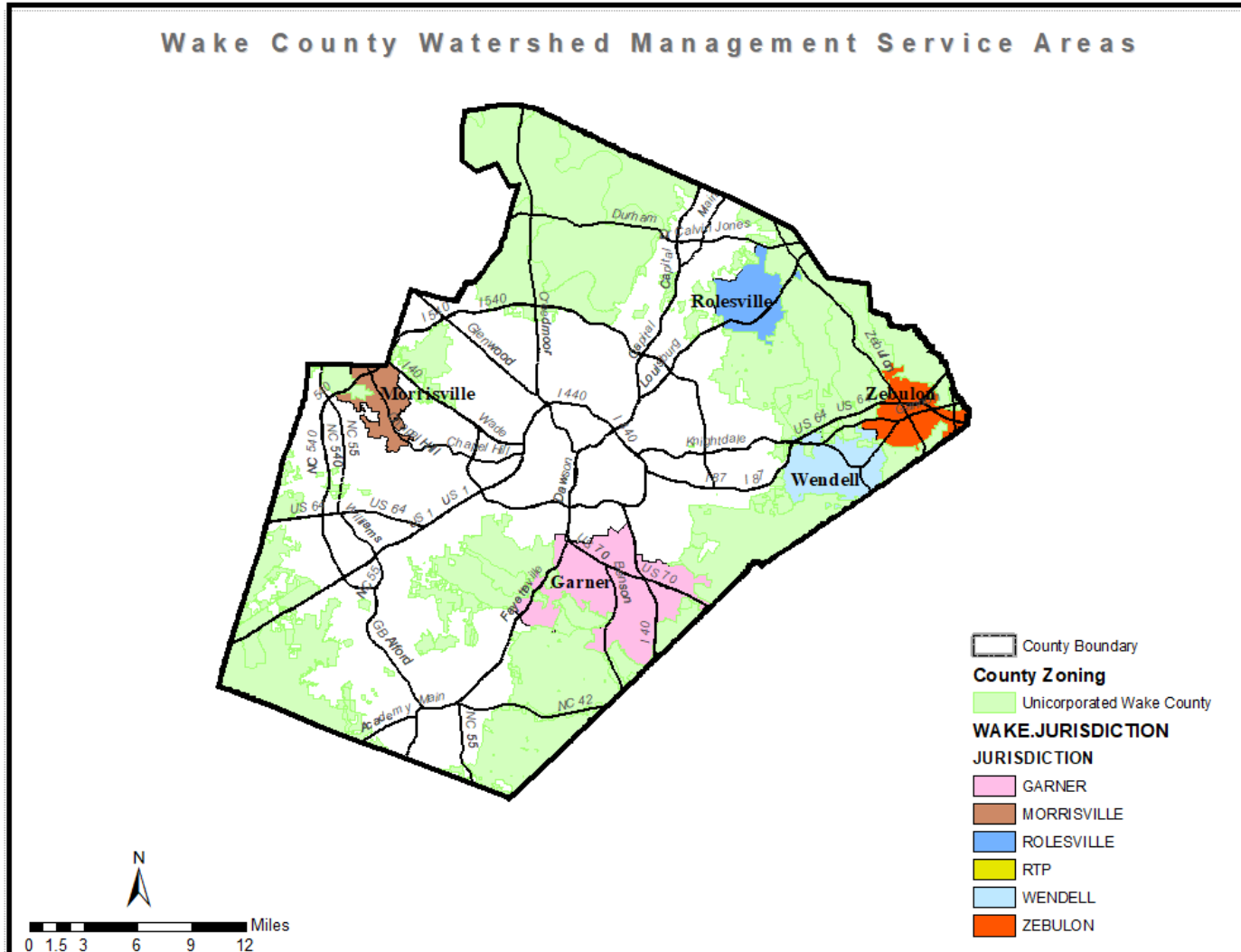


# **How to Streamline Your Construction Plan Submittal: Erosion and Sediment Control, Stormwater Management and Floodplain Guidance**

**Barney Blackburn, PE, CPESC, CPSWQ**  
**Environmental Services – Watershed Management**  
**Environmental Engineer Supervisor**

# Plan Review Service Areas



## Wake County Jurisdiction:

- Erosion control
- Stormwater
- Floodplain

## Municipal Jurisdictions:

### Erosion Control Only:

- Garner
- Morrisville

### Erosion Control and Stormwater:

- Rolesville
- Wendell
- Zebulon

# Barney Blackburn, PE, CPESC, CPSWQ

- Plan Review Team Lead
- Wake County Construction Plan Reviews:
  - Subdivisions
  - Commercial Sites
- Town of Wendell Contact/Sites
- Swift Creek Contact

# Shawn Springer, PE, CFM

- Falls Lake Contact/Sites
- Jordan Lake & RTP Contact/Sites
- Wake County Construction Plan Reviews:
  - Subdivisions
  - Commercial Sites
- Town of Morrisville Contact/Sites

# Janet Boyer, PE, CFM

- Little River Rules
- Wake County Construction Plan Reviews:
  - Subdivisions
  - Commercial Sites
- Town of Rolesville Contact/Sites

# Carrie Mitchell, PE, CFM

- Floodplain Manager (In-Training)
- Wake County Construction Plan Reviews:
  - Subdivisions
  - Commercial Sites
- Town of Zebulon Contact/Sites

# Kevin Zelaya, PE

- Swift Creek Contact
- Wake County Construction Plan Reviews:
  - Subdivisions
  - Commercial Sites
- Town of Garner Sites

# Wake County Submittals


- Electronic Submittals of **All** Documents in EnerGov System
- Plan Review & Permit Fees Invoiced through EnerGov
- Fees can be Paid by Credit Card or Check (Write to: Wake County)
  - If Check, Hand Deliver to Building 6<sup>th</sup> Floor or Verify Mailing Address
- Once Plan Review Fees **Paid in Full**, Review Cycle Begins!



# Wake County & Municipal Submittals

- Erosion Control, Stormwater and/or Flood Studies
  - Wake County Jurisdiction
  - Research Triangle Park (RTP)
- Erosion Control Only
  - Town of Garner
  - Town of Morrisville
  - Residential Single Lot and Lot by Lot (Wake County & Municipalities)
- Erosion Control & Stormwater Submittal (Subdivisions & Commercial)
  - Town of Rolesville
  - Town of Wendell
  - Town of Zebulon

# Required Forms for Submittals

- [Joint Construction Application](#), [Individual Lot Application](#)
- [Financial Responsibility/Ownership Form](#) (ESC Submittal)
  - [Signature Authority Form](#) (NEW!)
- [Notarized Consent Letter from Land Owner](#) (ESC Submittal) 
- Applicable Submittal Checklist
- Property Deed

# Landowner Notarized Consent Letter

**If the developer (FRP) is not the current landowner of the parcels, provide notarized letters from the landowners to grant the FRP permission to “permit and construct” the project on their land.**

**See § 113A-54.1. Approval of erosion control plans. Letter (a) of the Sedimentation Pollution Control Act (SPCA) of 1973 and Wake County UDO Subarticle 10-30-2(B)(2)(c).**

# General Statute 113A-54.1(a.) of SPCA

## § 113A-54.1. Approval of erosion control plans.

- (a) A draft erosion and sedimentation control plan must contain the applicant's address and, if the applicant is not a resident of North Carolina, designate a North Carolina agent for the purpose of receiving notice from the Commission or the Secretary of compliance or noncompliance with the plan, this Article, or any rules adopted pursuant to this Article. **Except as provided in subsection (a1) of this section, if the applicant is not the owner of the land to be disturbed, the draft erosion and sedimentation control plan must include the owner's written consent for the applicant to submit a draft erosion and sedimentation control plan and to conduct the anticipated land-disturbing activity.** The Commission shall approve, approve with modifications, or disapprove a draft erosion and sedimentation control plan for those land-disturbing activities for which prior plan approval is required within 30 days of receipt. The Commission shall condition approval of a draft erosion and sedimentation control plan upon the applicant's compliance with federal and State water quality laws, regulations, and rules. Failure to approve, approve with modifications, or disapprove a completed draft erosion and sedimentation control plan within 30 days of receipt shall be deemed approval of the plan. If the Commission disapproves a draft erosion and sedimentation control plan or a revised erosion and sedimentation control plan, it must state in writing the specific reasons that the plan was disapproved. Failure to approve, approve with modifications, or disapprove a revised erosion and sedimentation control plan within 15 days of receipt shall be deemed approval of the plan. The Commission may establish an expiration date for erosion and sedimentation control plans approved under this Article.

# Wake Co. UDO Subarticle 10-30-2(B)(2)(c)

**(2) Financial Responsibility and Ownership.** The erosion and sedimentation control plan must include an authorized statement of financial responsibility and ownership that complies with the following:

(a) Is signed by the financially responsible party for the land-disturbing activity or their Attorney in Fact, including the mailing and street addresses of the principal place of business of the financially responsible party the owner of the land; and any registered agents. A post office box is not an acceptable mailing address;

(b) If the financially responsible party is not a resident of Wake County, a resident Wake County agent must be designated for the purpose of receiving notices of compliance or non-compliance with the erosion and sedimentation control plan, this Article, the North Carolina Sedimentation Pollution Control Act or any other applicable erosion and sedimentation control regulations;

(c) If the applicant is not the owner of the land to be disturbed, the erosion and sedimentation control plan must include the owner's written consent for the applicant to submit an erosion and sedimentation control plan and to conduct the anticipated land-disturbing activity.

# Required Maps

- USGS Topographical Map with Project Limits (In Color)
- Wake County Soil Survey Map from 1970 Manuscript (In Color)
- <https://experience.arcgis.com/experience/a16078049de54d42a2bc384b9ceda91f> (USGS and Soil Survey Map Website)
- NRCS Web Soil Survey (WSS) for Hydric Soil Delineation **Only!**

# Erosion & Sediment Control Plans

- Seal, Sign & Date All Construction Drawing Submittals
- Include Existing Condition Plan Sheet
- Provide a Minimum of 3 Phases:
  - Phase 1: Limits of Disturbance (LOD) to Only Install Perimeter ESC Measures
  - Phase 2: Expand LOD for Grading Remainder of Site
  - Phase 3: Final Grade Buildout Conditions
- Scale ESC Construction Details to be Legible
- Include Current NCG-01 Details from NCDEQ [Website](#)



# NCDEQ Vs. Wake County Basin Design

Basin Design Criteria	NCDEQ	Wake County
Surface Area	325 ft <sup>2</sup> /cfs	435 ft <sup>2</sup> /cfs
Basin Volume	1,800 ft <sup>3</sup> per disturbed area	1,800 ft <sup>3</sup> per <u>drainage</u> area
Dewatering Time	2 to 5 days	3 to 5 days
Skimmer and Orifice Sizing	1,800 ft <sup>3</sup> per disturbed area	1,800 ft <sup>3</sup> per <u>drainage</u> area
Weir Length	4 ft. Minimum	10 ft. Minimum



# Sediment Basin Drainage Area Limits

Sediment Basin Type	Drainage Area Limit (Acres)
Wake County Custom Basin or Excavated Sediment Storage	1
Skimmer Sediment Basin	10
Riser Basin with Skimmer	100

# Sediment Basin Design Criteria

## Sizing the Storage Area

Surface area requirements must be met for all sediment basins.

$435 \times Q^{10*}$  = surface area required for ALL types of sediment basins.

\*Use minimum  $C=0.5$  for areas draining to basin. **Disturbed Area**

Sediment Basin volume is determined by 1,800 cu/ft per Drainage Acre.

Wake County Custom Basin volume is determined by 3,600 cu/ft per Drainage Acre.

The maximum depth allowed is 4 feet. (from bottom of basin to weir)

The minimum depth required is 2 feet. (from bottom of basin to weir)

The floor of all basins should be roughly level.

Basin should dewater in 3 to 5 days.

Use required Sediment Basin volume (1,800 ft<sup>3</sup> per Drainage Acre) to size skimmer and orifice diameter.

**\*NEW\*** View the [Wake County Hybrid Sediment Basin Design Spreadsheet](#) [here](#).

## Sizing the Weir

Weir Equation: (Minimum weir length of 10')

$Q = CLH^{3/2}$ .  $C=3.0$  (max).  $H$  for  $Q$  is not to exceed 0.5'.

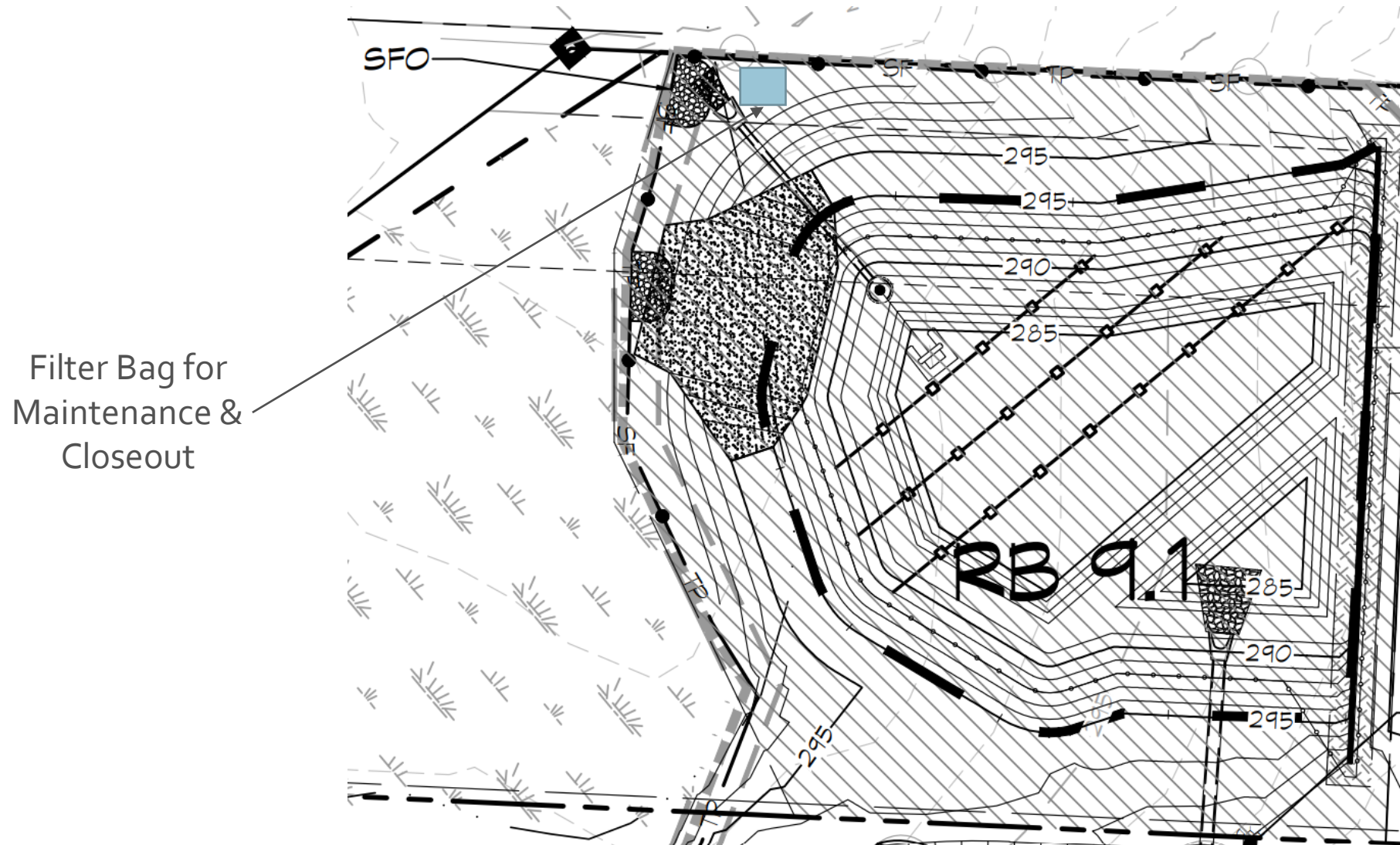
An additional 1.0' of weir capacity is required for the conveyance of larger storm events; therefore, the total weir depth will be 1.5'.

A minimum weir length of 10' is required.

# Sediment Basin Guidance

- [Wake County Hybrid Sediment Basin Design Spreadsheet](#)
- Show Skimmer Attached to Permanent Riser (**ALL PHASES**)
- Include Pad & Label for Filter Bag for Maintenance & Closeout
- Show Porous Baffles in Permanent SCM Basins for **ALL** Phases

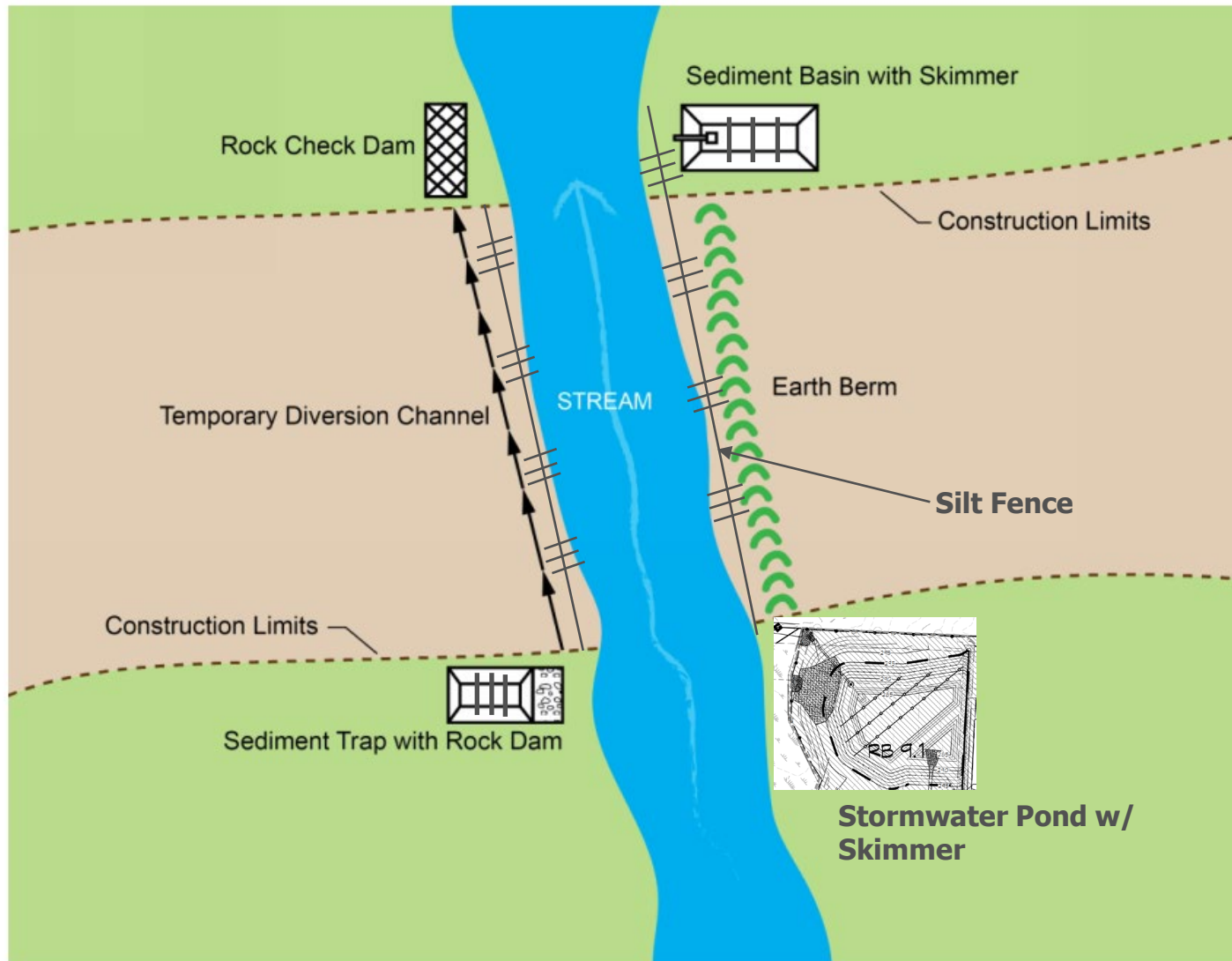
# Sediment Basin Example



# Stream Crossings

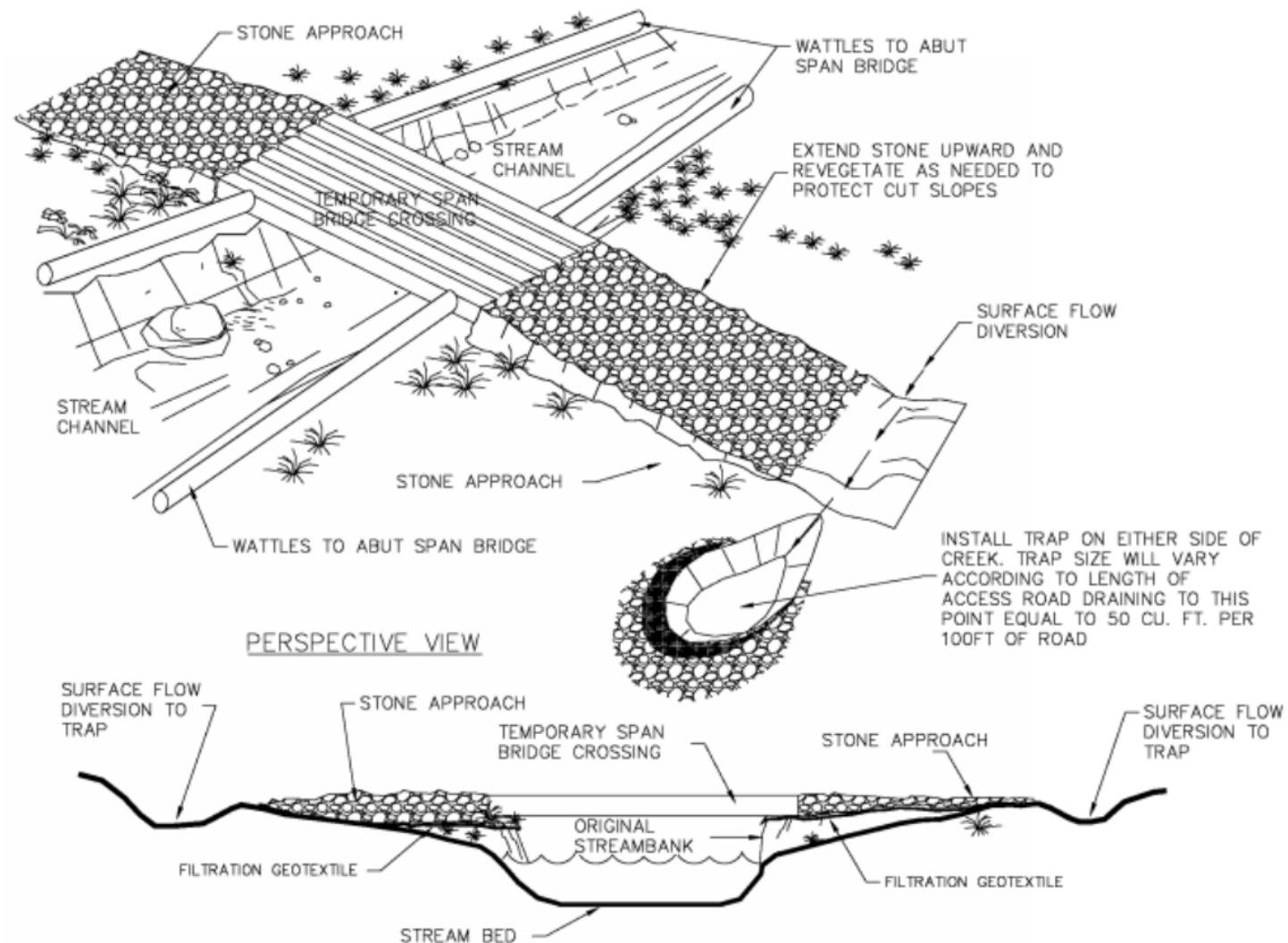
- Design “4-Corner” Sediment Storage Approach
- Include a Detailed Construction Sequence to Manage Stream Flow
- Provide All Applicable Stream Management Details
  - Impervious Dikes
  - Filter Bag
  - Pumparound (Size Pump to Convey 2-year Storm Peak Flow)
- Show Stream Crossing Location (Stone w/ Culvert(s), Single Span Mat)

# “Four-Corners” Stream Protection





# Single Span Stream Crossing Detail



# Stormwater Management Guidance

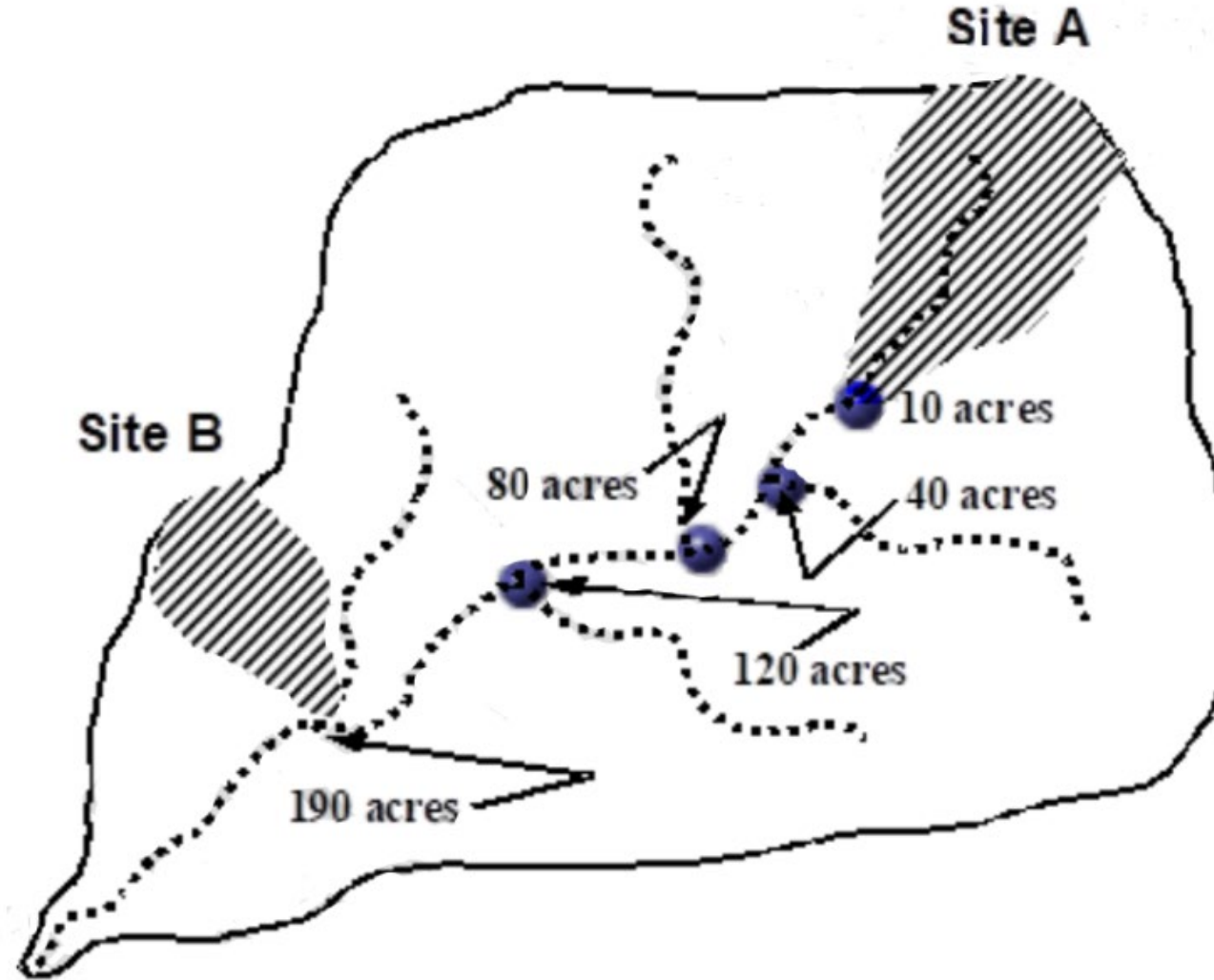
- [Wake County Hybrid Stormwater Tool for Wake County Jurisdiction](#)
- [Wake County \*\*Municipal\*\* Stormwater Tool for Municipalities](#)
- Provide Target Curve Number (TCN) Volume (Subdivisions Only)
- Treat Impervious Surfaces w/ SCMs to Maximum Extent Practicable
  - Utilize Disconnected Impervious Surface (DIS) Credit
  - DIS for Residential Development with Drainage Area < 30% Impervious



# Downstream Impact Analysis (DIA)

- [Wake County UDO Subarticle 9-22](#)
  - Applies to Subdivisions & Commercial Sites
  - Towns of Rolesville, Wendell & Zebulon
- Analysis of 10-year, 24-hour Design Storm Pre/Post Conditions
- Drainage Area Evaluation of “10% Rule”
- Provide Drainage Area Map(s) & Pre/Post “Q” Summary Table

# Downstream Impact Analysis Drainage Areas



# SCM Placement & Easements

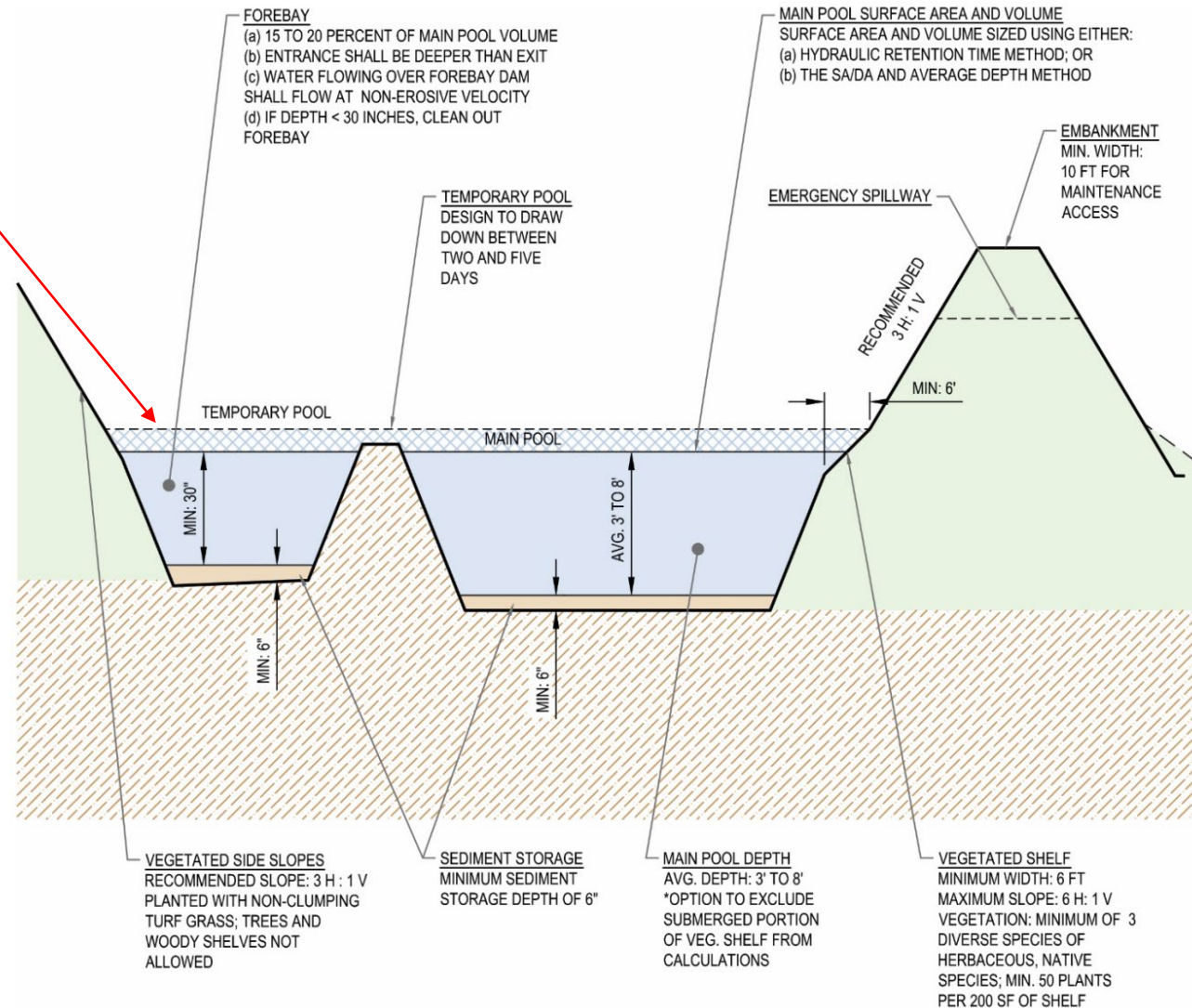
- Place SCMs in Open Space
  - Not Allowed on Residential Lots for New Regular Subdivisions
- Provide Minimum of 20 ft. Access Easement to SCM
  - Can be Centered on Residential Lot Lines (10 ft. on Each Lot)
- Provide Min. of 10 ft. Maintenance Easement from Toe of Embankment
- Avoid Placement in Hydric Soils if Feasible (Armor Toe with Rip Rap)

# SCM Design Reminders

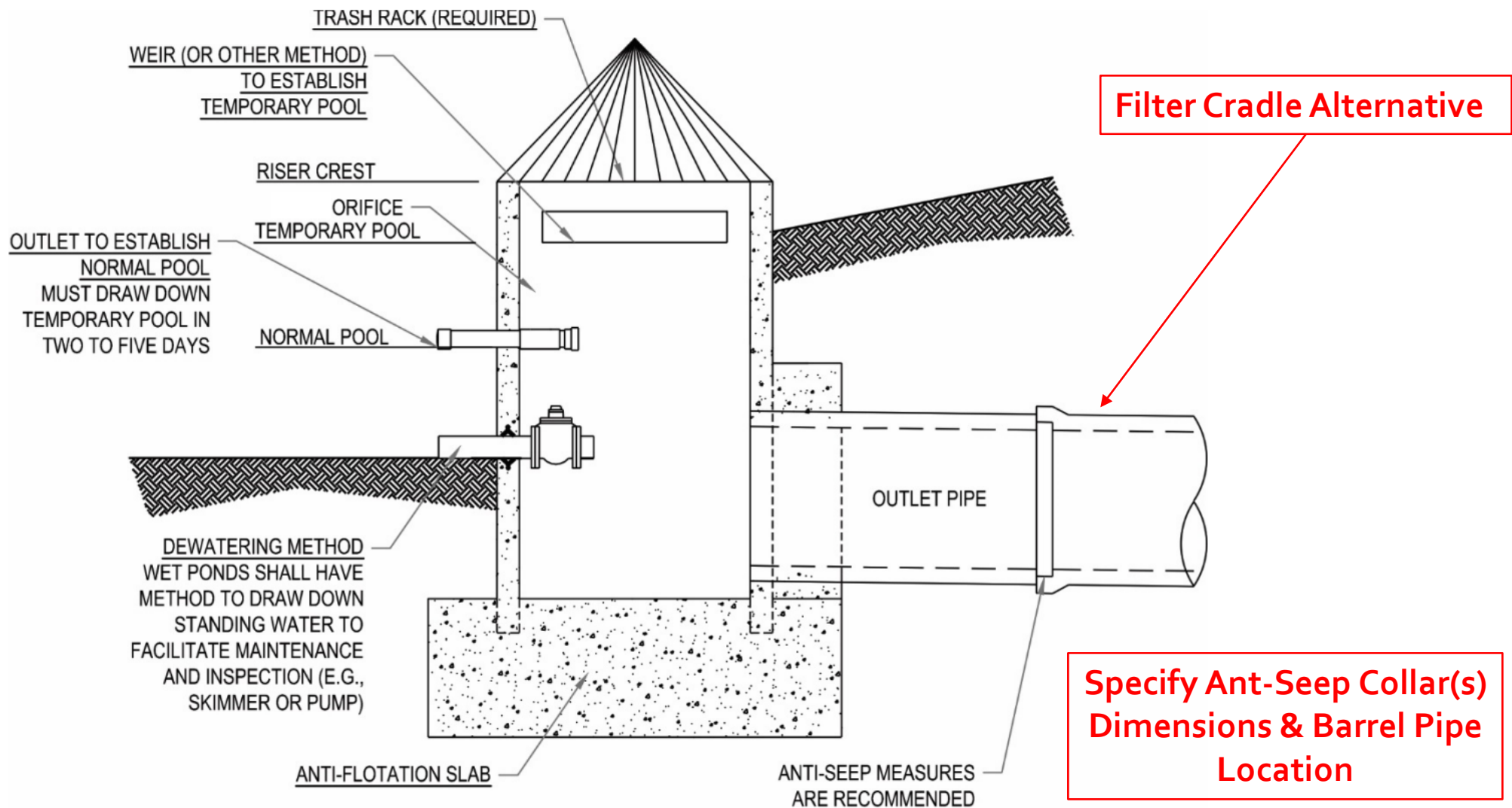
- SCM Design Must Follow [NCDEQ Stormwater MDC Guidelines](#)
- Model and Show 1-year, 10-year & 100-year Storms in Profile Section
- Provide & Label Vegetative Shelf Width on Plan View & Profile Section
  - Specify Appropriate Plants or Provide Plant List
- Include Anti-Buoyancy Calculations for Riser Pipe Footer Slab
- Design Anti-Seep Collar(s) or Filter Cradle around Barrel Pipe
  - For Anti-Seep Collar(s), Specify Material Type, Widths, and Thickness & Show Location

# SCM Cross Section View

Don't Forget the Forebay!



# SCM Outlet Structure



# Wake County Stormwater Manual Update

- Updated Stormwater Management Information for:
  - Subdivisions
  - Single Lot Stormwater Deviations
  - Non-Residential Sites
- Downstream Impact Analysis (DIA) Step-by-Step Procedure & Example
- Erosion & Sediment Control Section (New!)
- Floodplain Management Section (New!)

# Neuse River Stormwater Rules Update

- SNAP Tool Required for Nutrient Loading
- Requirement Removed for Pre/Post Peak Flow for 1-year Storm
  - Wake County to Remove Requirement (Outside of Falls Lake)
  - Except for Falls Lake Watershed
- Wake County to Keep Target Curve Number Volume (Subdivisions)
  - Separate Wake County Spreadsheet Tool



# Wake County Implementation Schedule

- EMC to Approve Wake Co. Draft Stormwater Program (May 2023)
- Wake County Will Have 6 Months to Revise/Adopt SW Ordinance
  - Article 9 of Unified Development Ordinance (UDO)
- Municipalities Will Have to Follow Similar Process
  - Rolesville
  - Wendell

# Flood Study Cases

- Structural Fill & Culverts in Stream Channels (FEMA Floodplain)
- Structural Fill & Culverts in Hydric Soils (Drainage Area  $\geq 5$  acres)
- Applies to Roads and Residential Driveways
- SCM Dams Located in Hydric Soils (Drainage Area  $\geq 5$  acres)

Photos courtesy of City of Raleigh

# Flood Study Submittal Requirements

- [Flood Study Submittal Checklist](#)
- Narrative
- Drainage Area Maps
- Hydrologic Model

# Flood Study Calculations

- Determine Culvert Size to Convey:
  - 10-year Storm
  - 25-year Storm for High Quality Waters & County Water Supply Watersheds
- Calculate 100-year Storm Backwater and Easement (BFE + 1 ft.)
- Balance of Cut and Fill
  - SCM Dams/Embankments

# Hydric Soil Structural Fill Requirements

- Wake County UDO [Subarticle 14-21-1](#) references:
  - Subarticle 14-19
  - Subarticle 14-20
- Balance of Cut and Fill (UDO Subarticle 14-20-2 (B))
- SCM Embankments in Hydric Soils Require Flood Study Submittal!

# Minor Flood Study

- \$500 Review Fee, 30-Calendar Day Review, 15 Days - Resubmittals
- Drainage Area < 100 Acres
- Most Hydrologic Models Accepted
- HEC-RAS Analysis Not Required

# Major Flood Study

- \$1,000 Review Fee, 30-Calendar Day Review, 15 - Days Resubmittals
- Drainage Area > 100 Acres
- HEC-RAS Analysis **Required**
- HEC-RAS Submittal Checklist & Report Format Guide
  - [HEC-RAS Submittal Checklist](#)
  - [HEC-RAS Report Format Guide](#)

# Questions?

**Barney Blackburn, PE, CPESC, CPSWQ**

Environmental Engineer Supervisor

Office: 919-856-7425

Mobile: 919-418-3791

[barney.blackburn@wake.gov](mailto:barney.blackburn@wake.gov)