

# *Black Creek Watershed updates*



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[go.ncsu.edu/blackcreek](http://go.ncsu.edu/blackcreek)

# Persistence





# Black Creek Watershed Association- shows up and gets it done



## Current and former BCWA partners include:

- Town of Cary
- NC Cooperative Extension Wake County Center
- NC Division of Water Resources
- U.S. Environmental Protection Agency
- Natural Learning Initiative, NCSU College of Design
- Center for Human and Earth Restoration
- Kingswood Elementary School
- Discount Tire
- Accreditation Commission for Health Care
- Beechtree HOA
- Clemson University
- Northwoods Elementary School
- Lake Crabtree County Park
- Silverton HOA
- Windchase at Beechtree HOA
- Harvest Church
- NCSU Department of Horticulture
- Cary Rotary
- Wessex HOA
- Buckhurst West neighborhood
- Young Marines of Raleigh
- West Cary Middle School
- NCSU College of Natural Resources

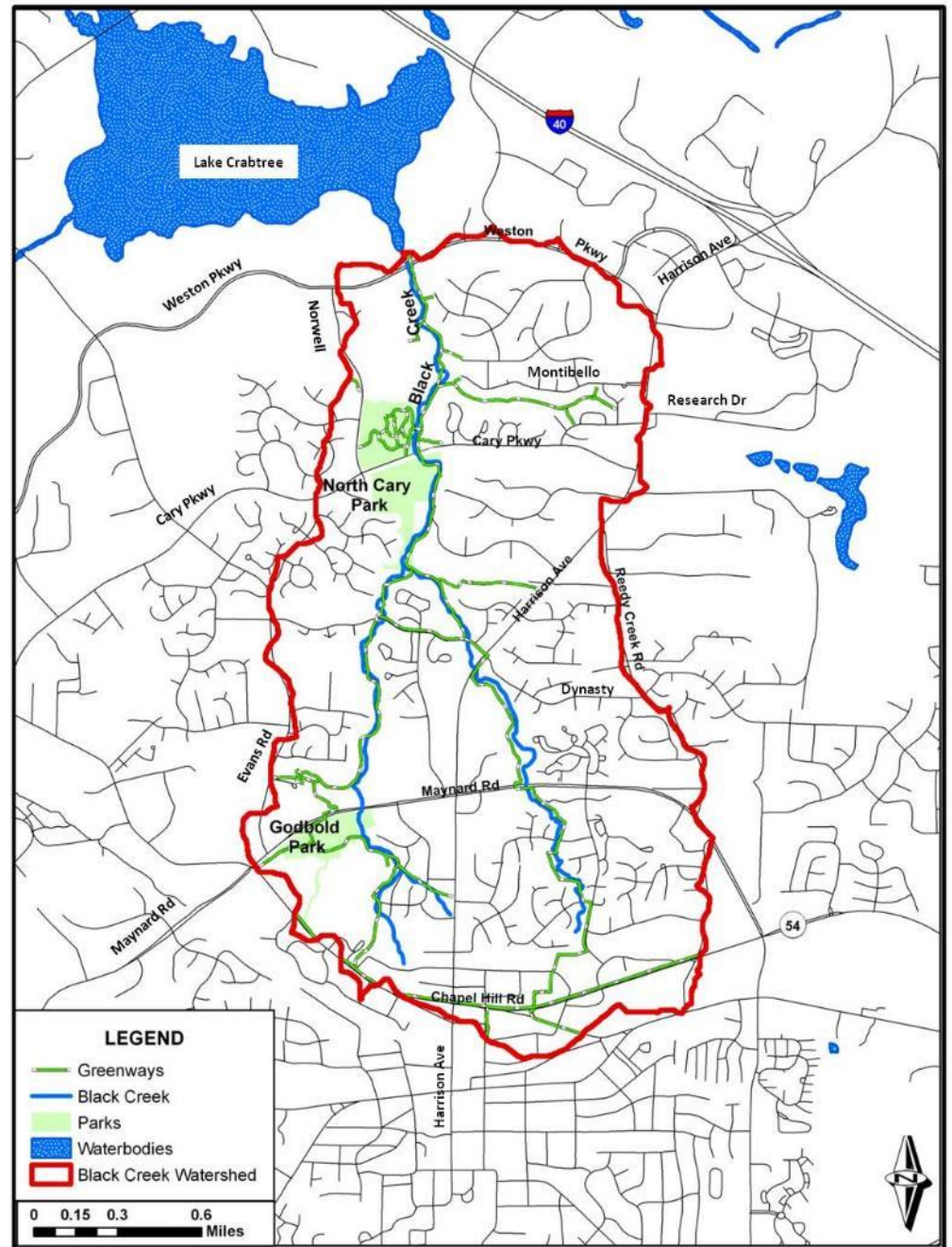




Interested, engaged population, willing private and public partners, WRRRI, NCSU BAE, Town of Cary staff support



# Our story (briefly) in Black Creek watershed



# Excessive stormwater flows & volume

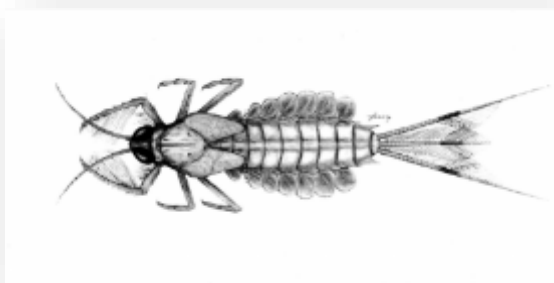
*-Black Creek Watershed Plan, 2009*



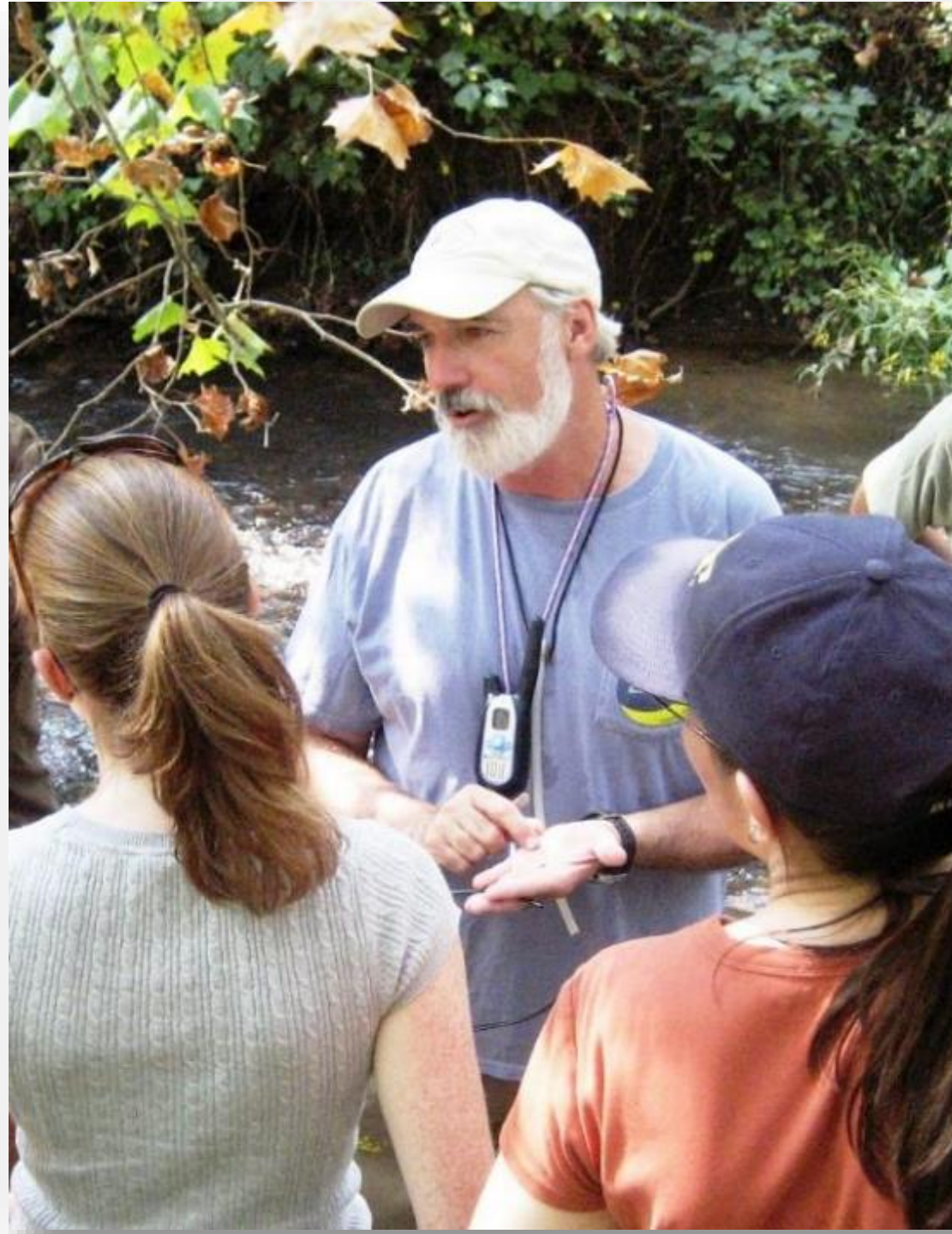


# Benthic macro-invertebrate sampling

- Spring/fall 2006-2007
- May/Nov 2016
- EPT taxa richness values consistently within 3-6 taxa range suggesting “Poor” water quality conditions using DWR criteria.



<http://penrose.consulting/>





*Engage partners to disconnect* impervious surfaces from creeks

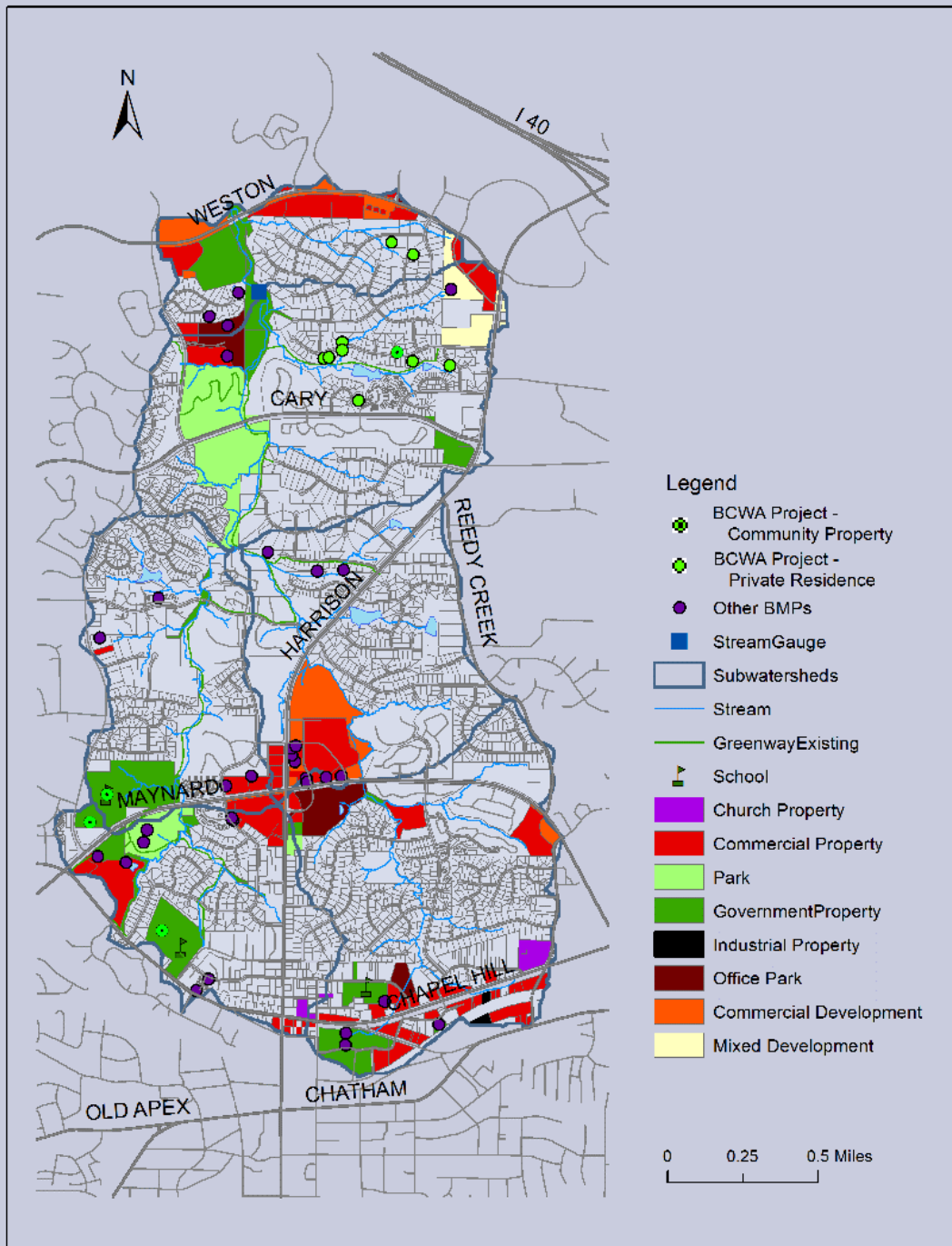




# Intercept stormwater, protect creek

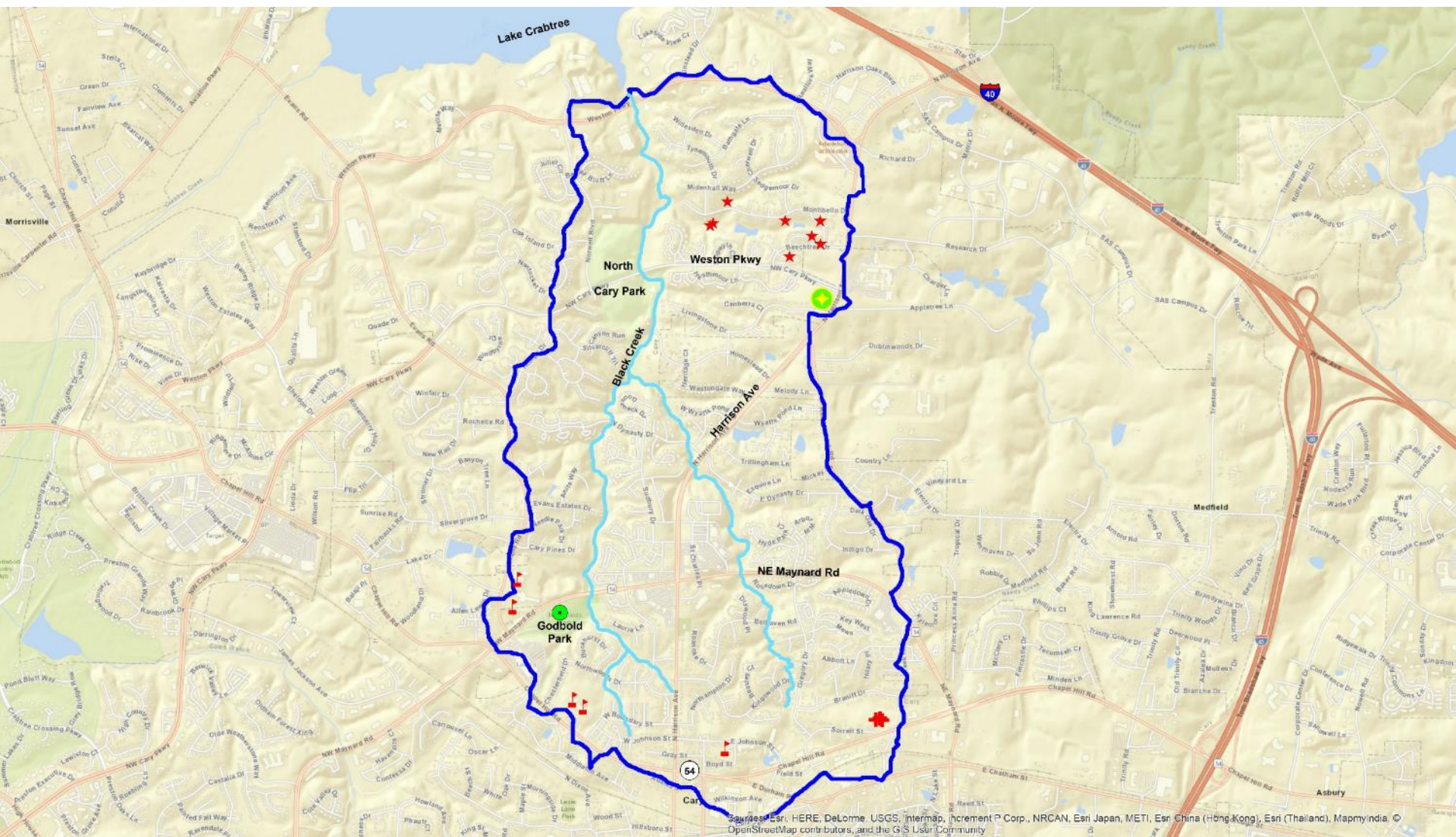
- 24 residential “rainscapes” (1 more in process)
- 3 rainwater harvesting cisterns
- 5 large bioretention areas (big rain gardens!)
  - West Cary Middle (2), Northwoods Elementary, Harvest Church, Kingswood Elementary
- 1 bioswale
- Permeable walkways
- 2 stream stabilizations





- Project sites









West Cary Middle School- BEFORE





West Cary Middle School-AFTER





West Cary Middle School- After After After





What is needed? A person(s) who can check in 1-2x yearly, plan service events, and a little \$





Some coordination, a couple clubs seeking service hours, and \$350





# More recently: Kingswood Elementary STEM Montessori

## *Team:*

*Dept. Bio & Ag  
Engineering*

*Natural Learning  
Initiative, College of  
Design*

*NCSU Extension  
Center for Human and  
Earth Restoration  
Water Resources  
Research Institute*



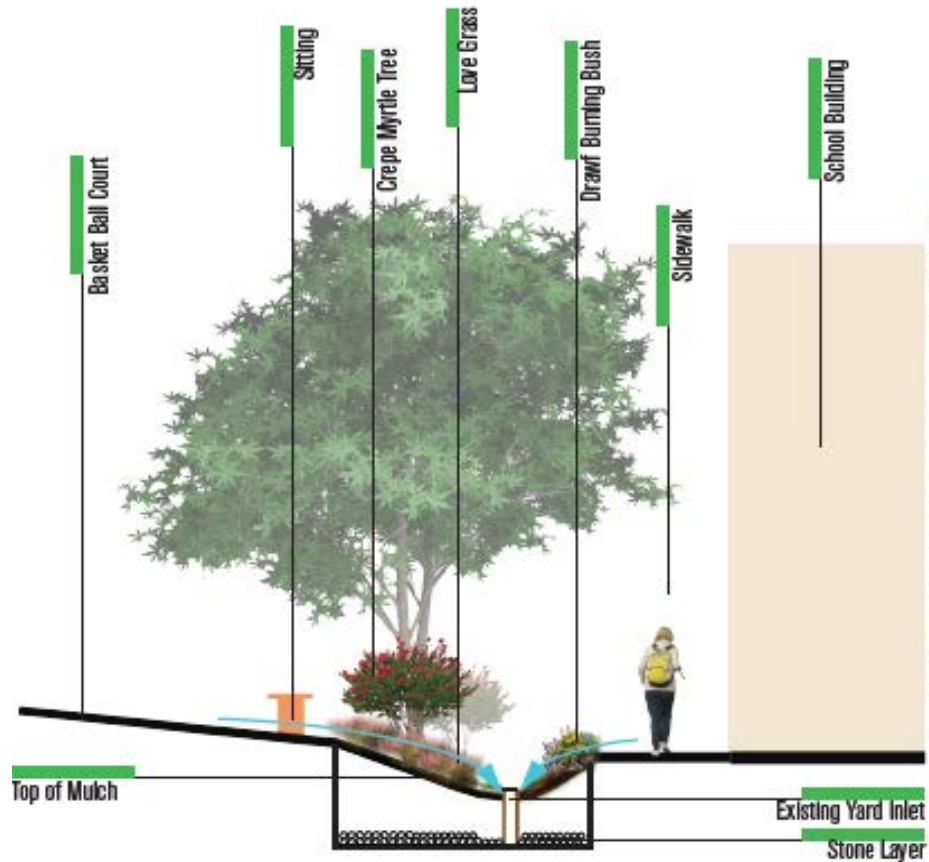


# K-5 students engaged

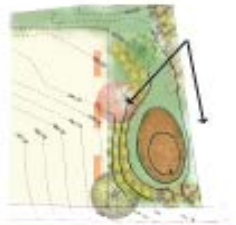
- macroinvertebrate session
- STEM Expo
- site exploration & data collection
- planting



# Design graduate students provided ideas



Section: AA'  
= Waterflow



PERSPECTIVE VIEW



# Parent & teacher feedback on green infrastructure ideas





# Before bioretention







Before bioretention



“This is so much fun! So much better than sitting in the classroom!” -*real 4<sup>th</sup> grade boy*







“It’s really great to get a break from the computer screen” - *actual PhD student*











# Before cistern & replanting

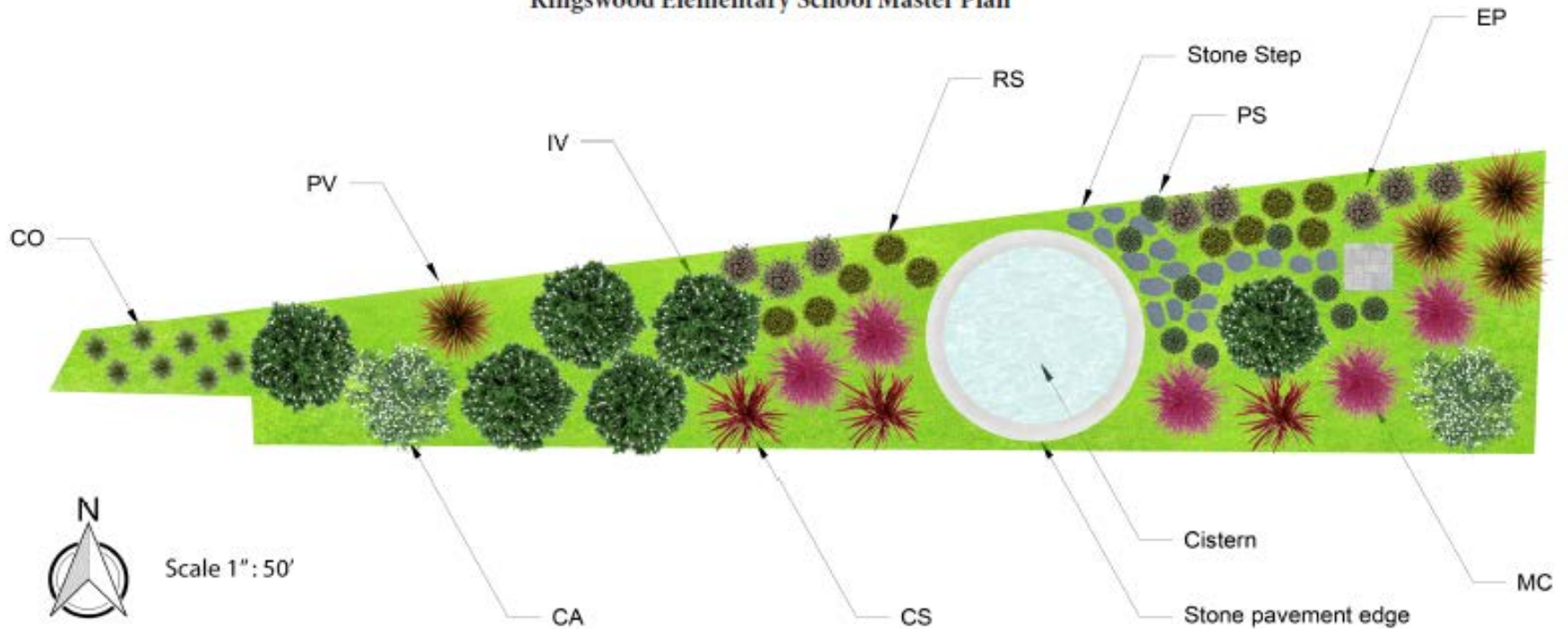








# Kingswood Elementary School Master Plan



## GRASSES

CO

MC

PV



*Carex oshimensis* 'Evergold'  
- EVERGOLD SEDGE



*Muhlenbergia capillaris*  
- PINK MUFLY GRASS



*Panicum virgatum*  
'Shenandoah'  
- SHENANDOAH SWITCHGRASS

## PERENNIALS

EP

PS

RS



*Echinacea purpurea* 'Prairie  
Splendor'  
- PURPLE CONE FLOWER



*Phlox subulata* 'Snowflake'  
- SNOWFLAKE PHLOX



*Rudbeckia f. var. sullivantii*  
Goldsturm -  
BLACK-EYED SUSAN

## SHRUB

CA

CS

IV



*Clethra alnifolia*  
- SWEET PEPPER BUSH



*Cornus sericea* 'Flaviramea'  
- RED TWIG DOGWOOD



*Itea virginica* 'Henry's  
Garnet'  
- HENRY'S GARNET SWEETSPIRE



“We love getting our hands in the dirt!”  
- *actual WRRRI/NC Sea Grant colleagues*





# Residential rain gardens (rainscapes)





# Beechtree HOA efforts- stream erosion before





# Beechtree HOA efforts- after stream stabilization





# Beechtree HOA efforts- after stream stabilization



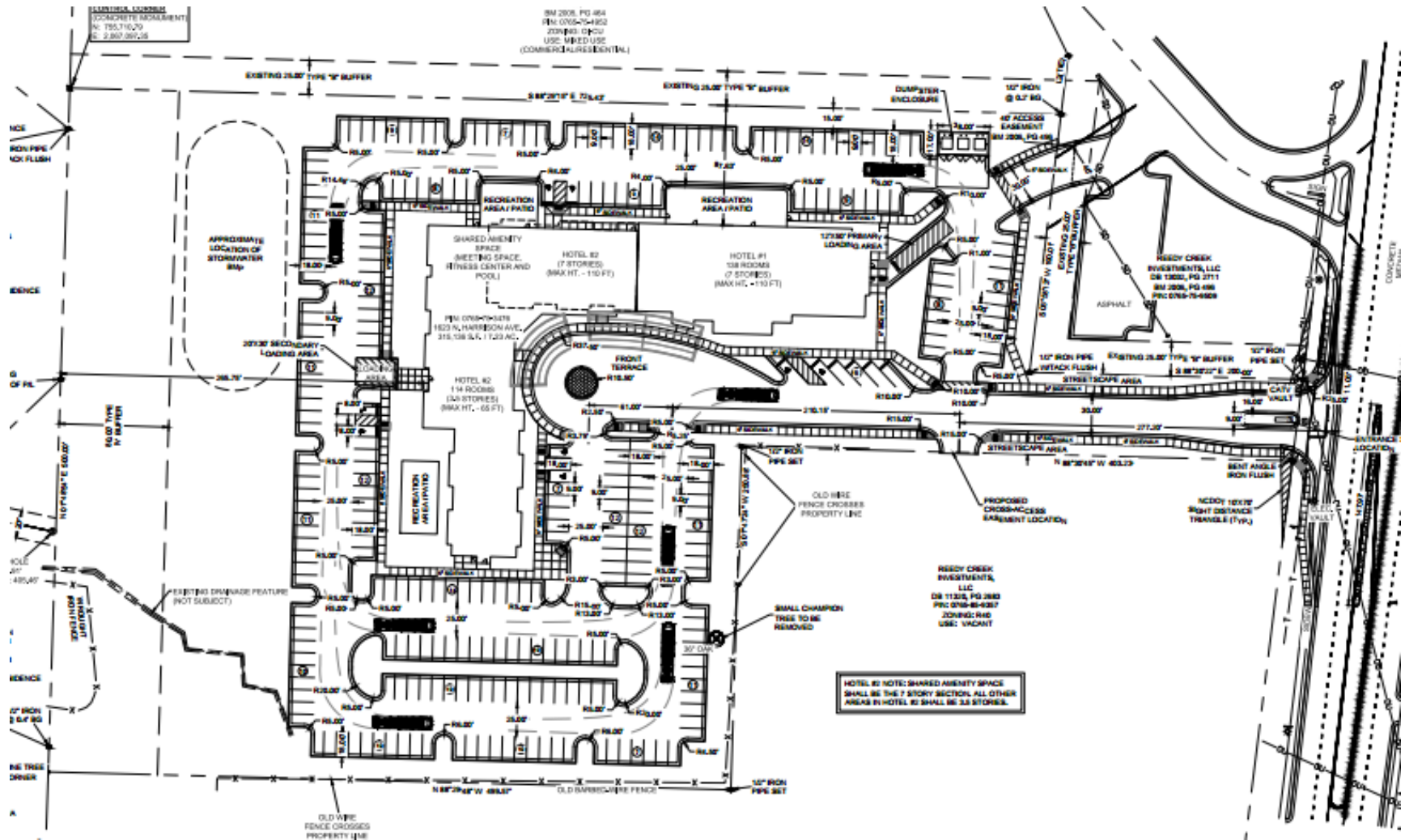


# Small scale stream stabilization workshop





# Hotels on Harrison: proposal up for rezoning









# Low impact development hotel: Goals

- Post-devpt. hydrology regime = pre-devpt hydrology
- Monitor and document effectiveness of approach
- Use as example for other developers





# Low impact development hotel: Hotel design/construction

- Compare traditional design (stormwater pond) w LID design
- Design and construct site using “hydrology protecting” stormwater devices (infiltrates/evapotranspirates)
  - 0 - 10% of pre-development runoff from site





# Stream impact monitoring

- Compare traditional design (stormwater pond) w LID design (use SNAP and/or SWMM)
- Pre-construction stream assessment
- Hydrology monitoring pre-construction, post-clearing, during/post construction
- Post-construction stream assessment





What's next? So many outdoor selfie opportunities...

