

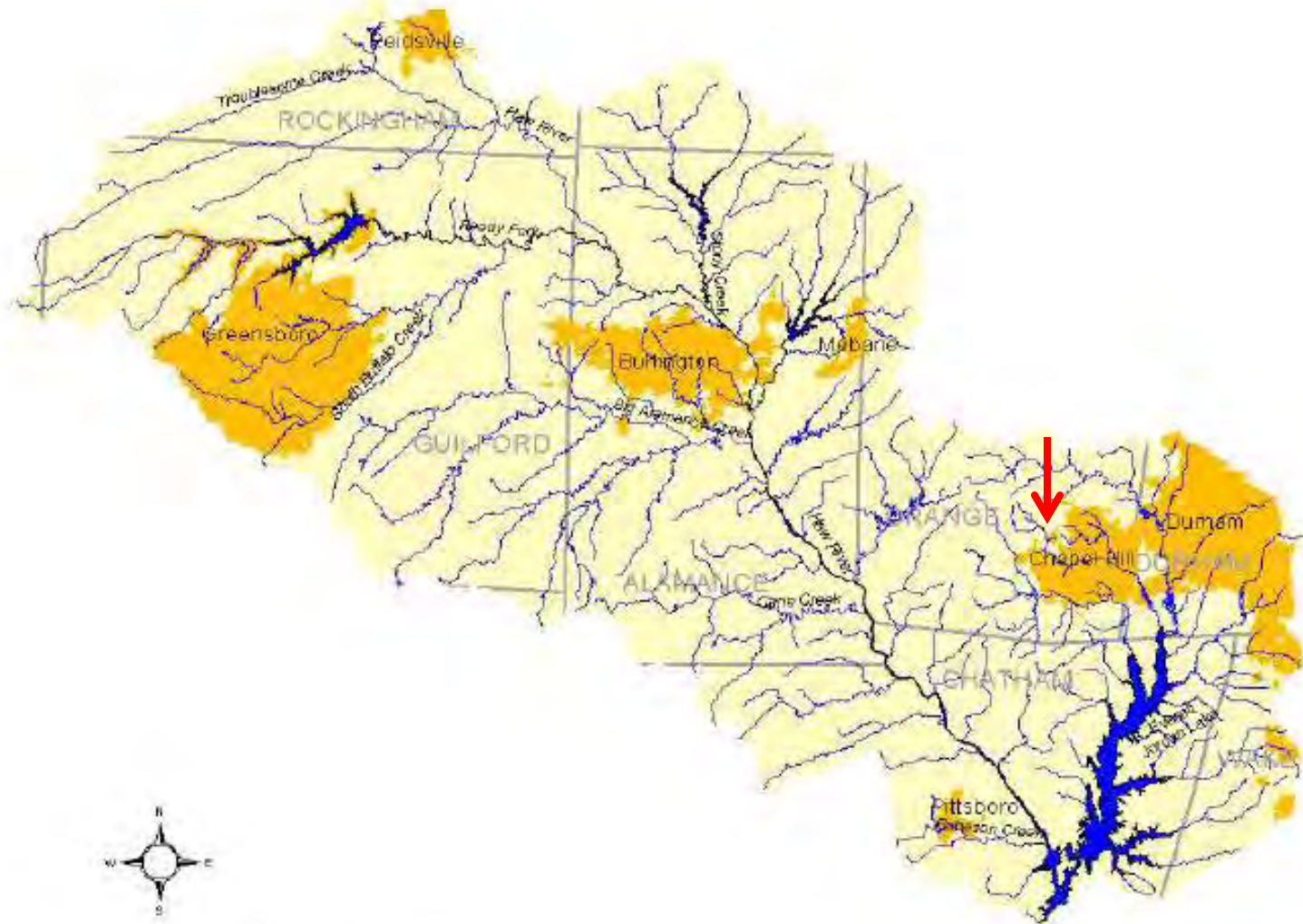
APPENDIX 11: "CAN WE HEAL OUR WATERWAYS?" SYMPOSIUM PRESENTATION

Restoring Bolin Creek

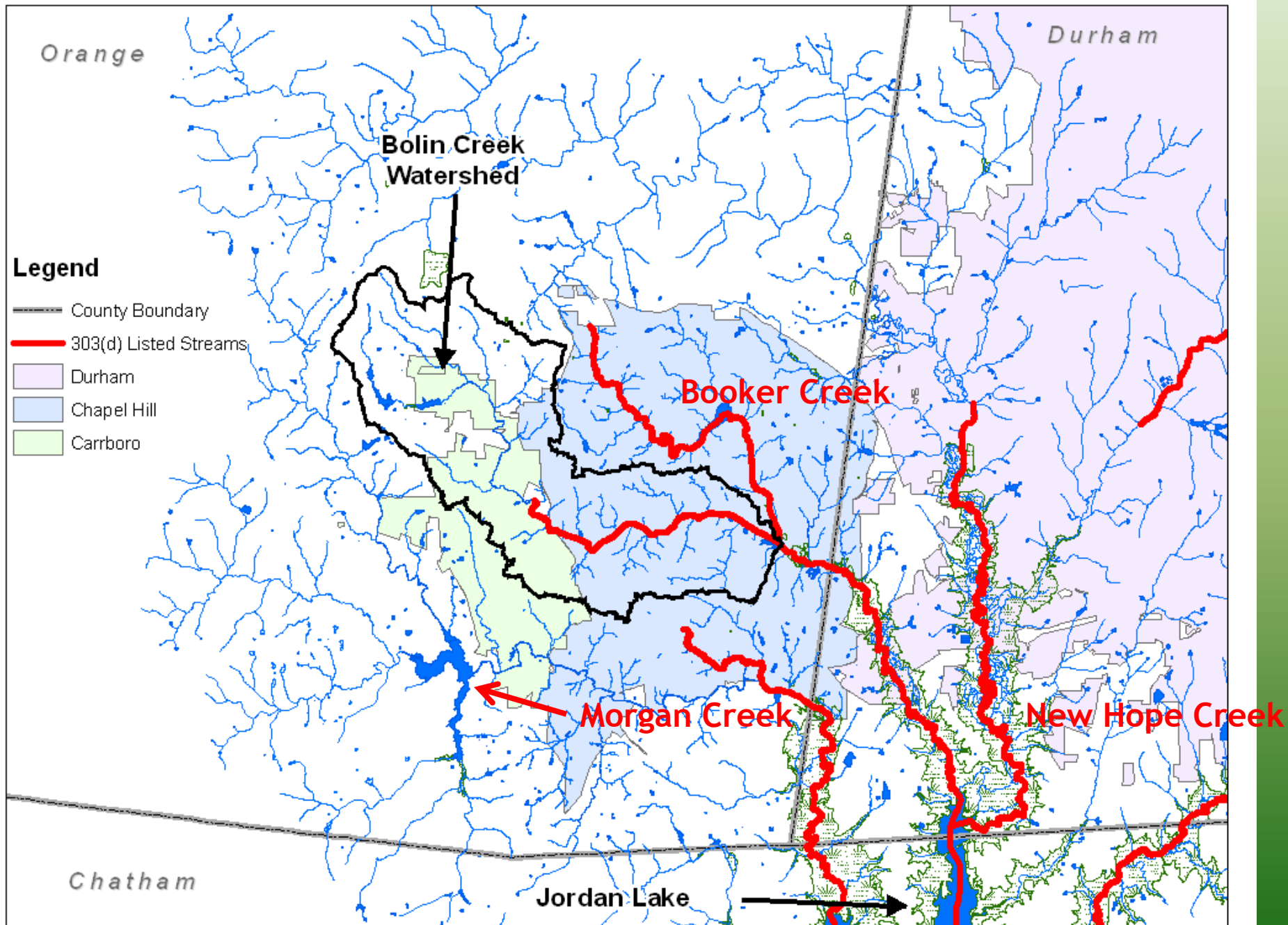
Randy Dodd, Town of Carrboro
Trish D'Arconte, Town of Chapel Hill



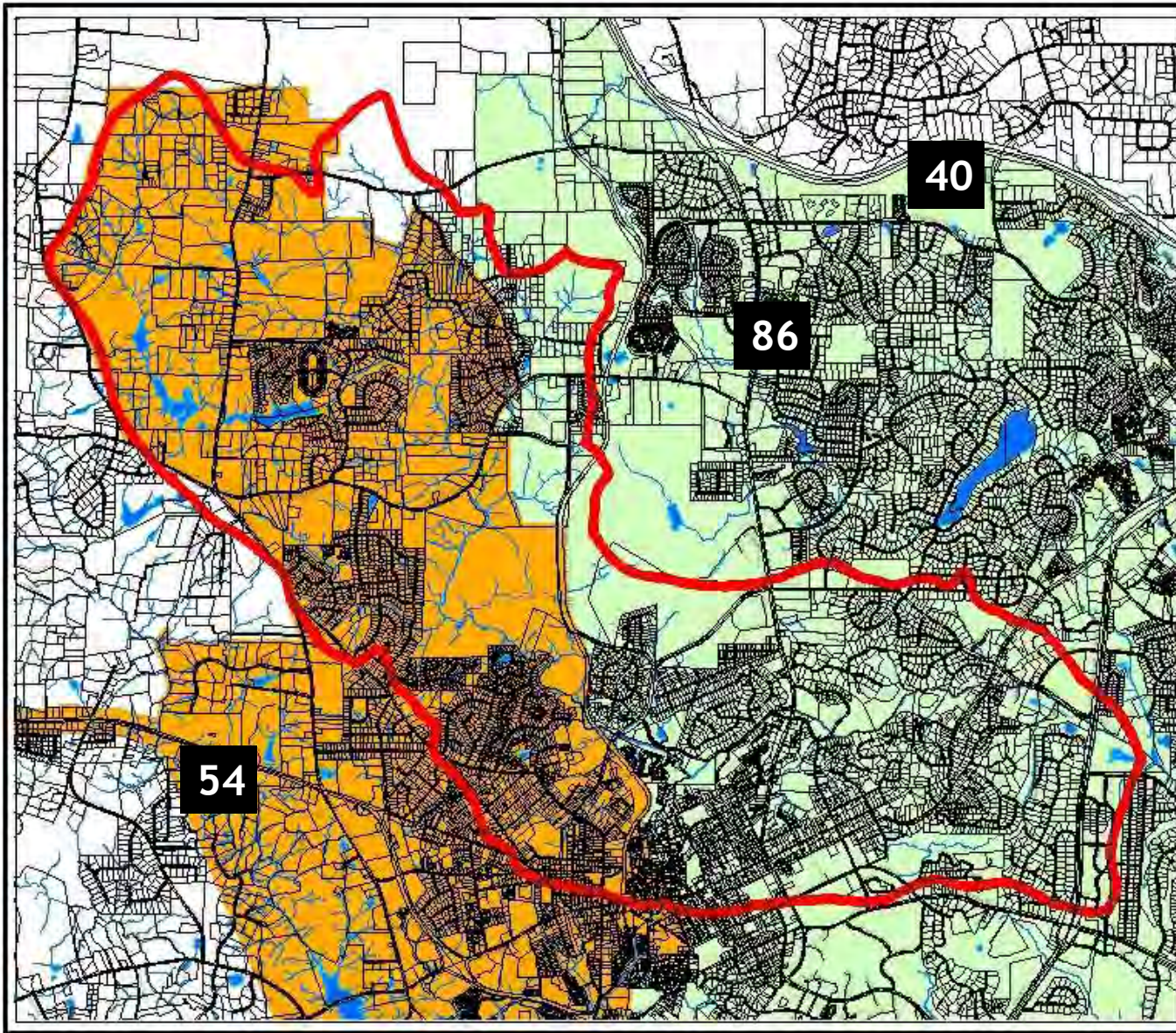
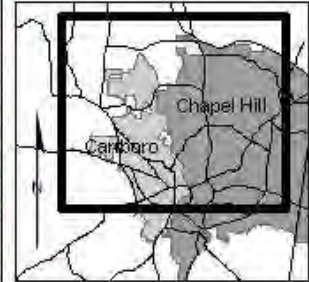
Where is Bolin Creek?



B. Everett Jordan Lake Watershed
(Cape Fear River Basin)



Bolin Creek Watershed



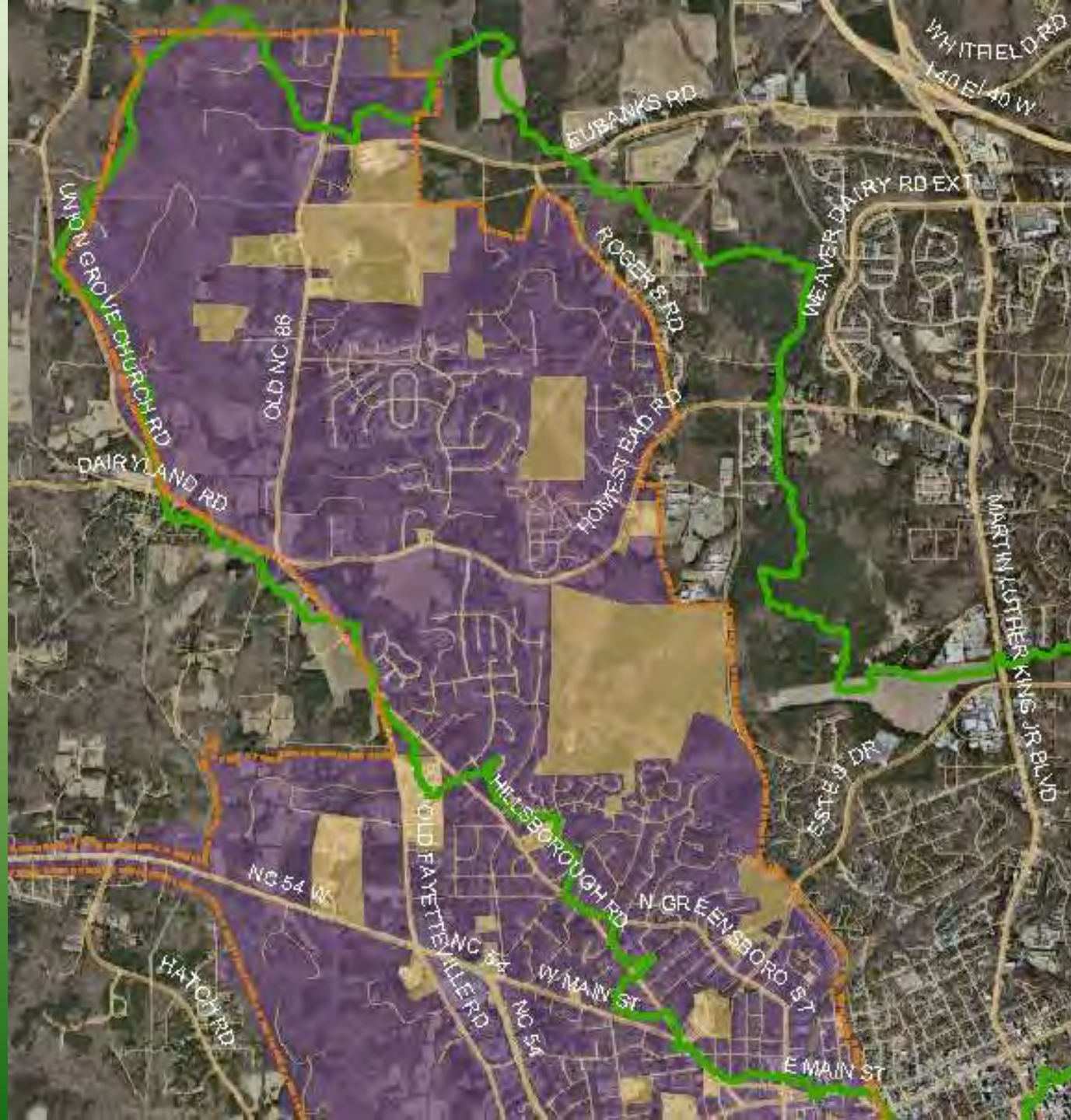
Legend

- Bolin Creek Watershed
- Streams
- Carrboro Planning
- Chapel Hill Planning

THIS MAP IS NOT A CERTIFIED SURVEY
NO WARRANTY MAY BE PLACED IN ITS
ACCURACY
The Town of Carrboro assumes no liability
for damage caused by inaccuracies in
this map or supporting data and makes no
warranty, expressed or implied, as to the
accuracy of the information presented.
The fact of the inclusion does not constitute
an warranty.



TOWN OF CARRBORO
301 W. Main St.
Carrboro, NC 27510
Printed Oct 18, 2006



Private Land

Public Land



Private Land

Public Land

Town Land

Local Streets

How is Bolin Creek Doing?

One of more studied streams in central NC

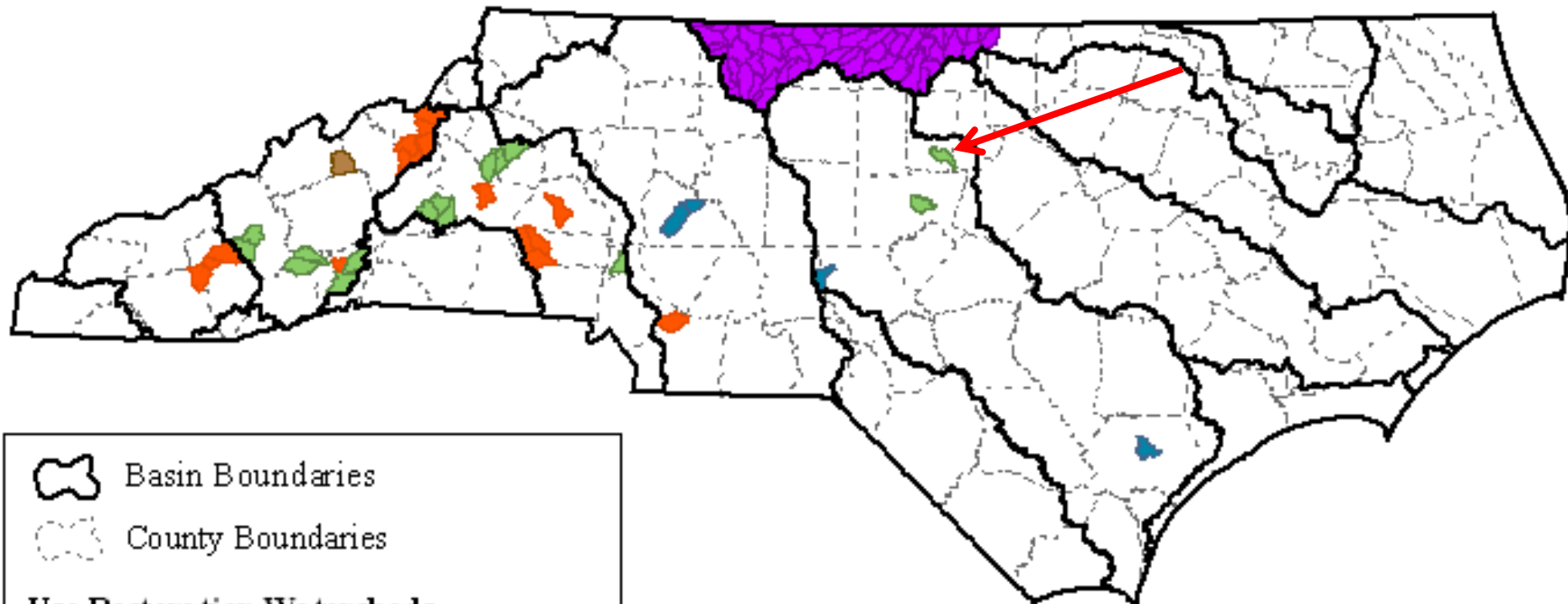
- NC DWQ - every 5 years
- Intensive WARP study - 2003
- Chapel Hill monthly physical and chemical data: 1994-2008
- Aquatic Insects:
 - Carrboro - 2000-2011
 - Chapel Hill - 2011
- Miscellaneous studies
- Volunteer monitoring


Bolin Creek Watershed Restoration


- Bolin Creek Watershed Restoration Team formed: 2005
 - Local, State, Federal collaboration
- **Goal: Improve the aquatic health of Bolin Creek and its tributaries**
- Objectives:
 - Restore stream hydrology
 - Storm flow
 - Base flow
 - Restore habitat
 - Address pollutant (sediment, toxic, nutrient) inputs
 - Stabilize streambanks
 - Improve riparian conditions

Restoration Watersheds in North Carolina


October 2010





 Basin Boundaries


 County Boundaries


Use Restoration Watersheds

 Build / Prepare

 Implementation

 Transition to Maintenance

 On Hold

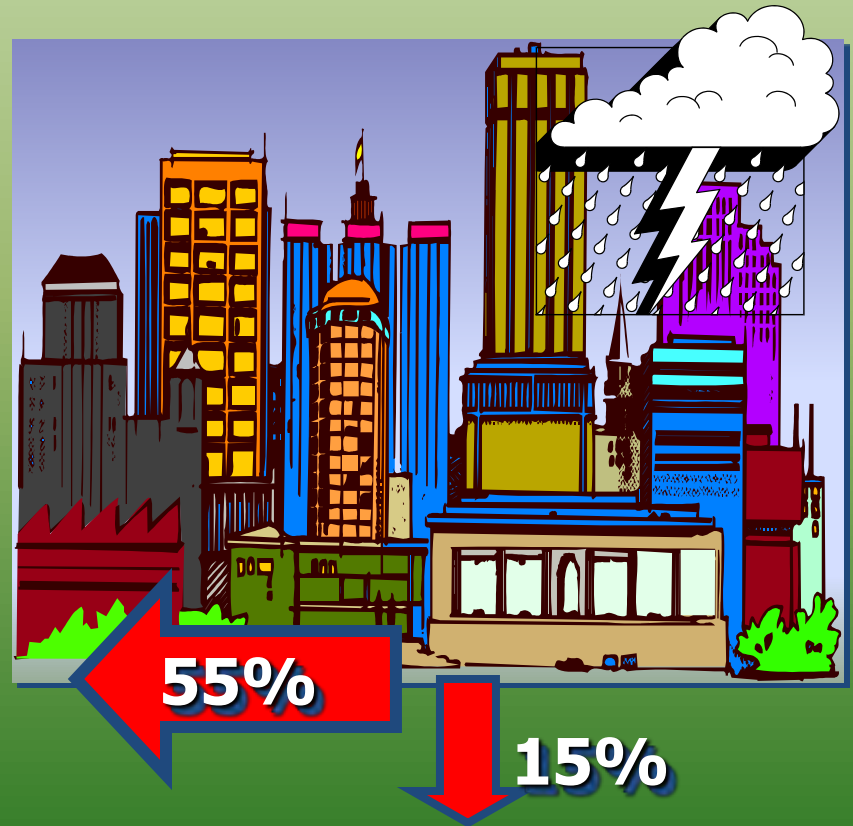
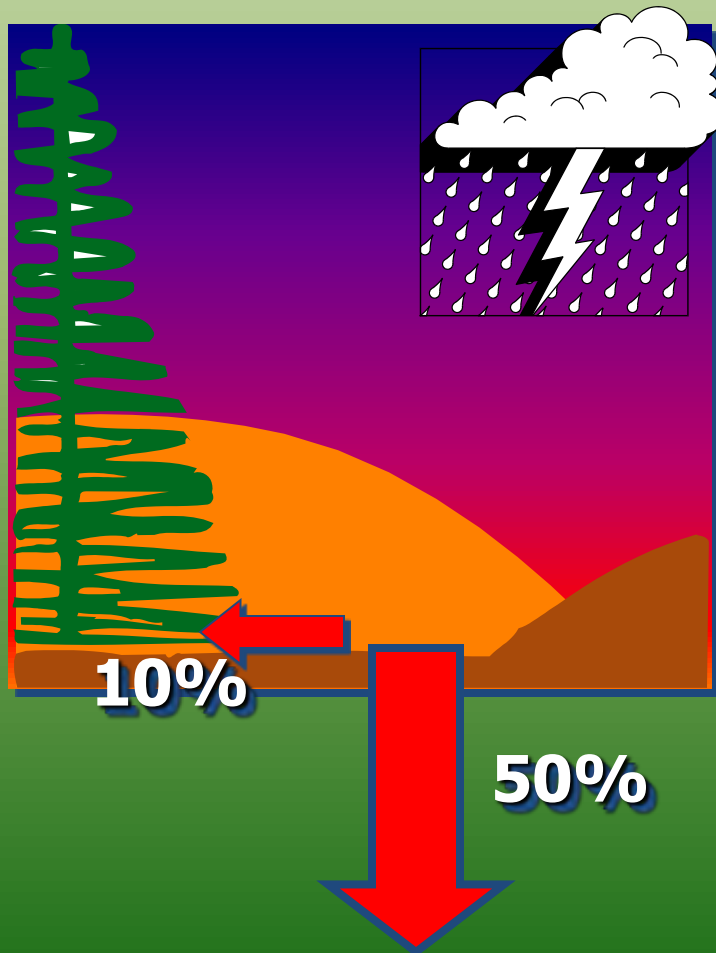
 Explore

0 60 120 240 Miles

Use Restoration Waters Program

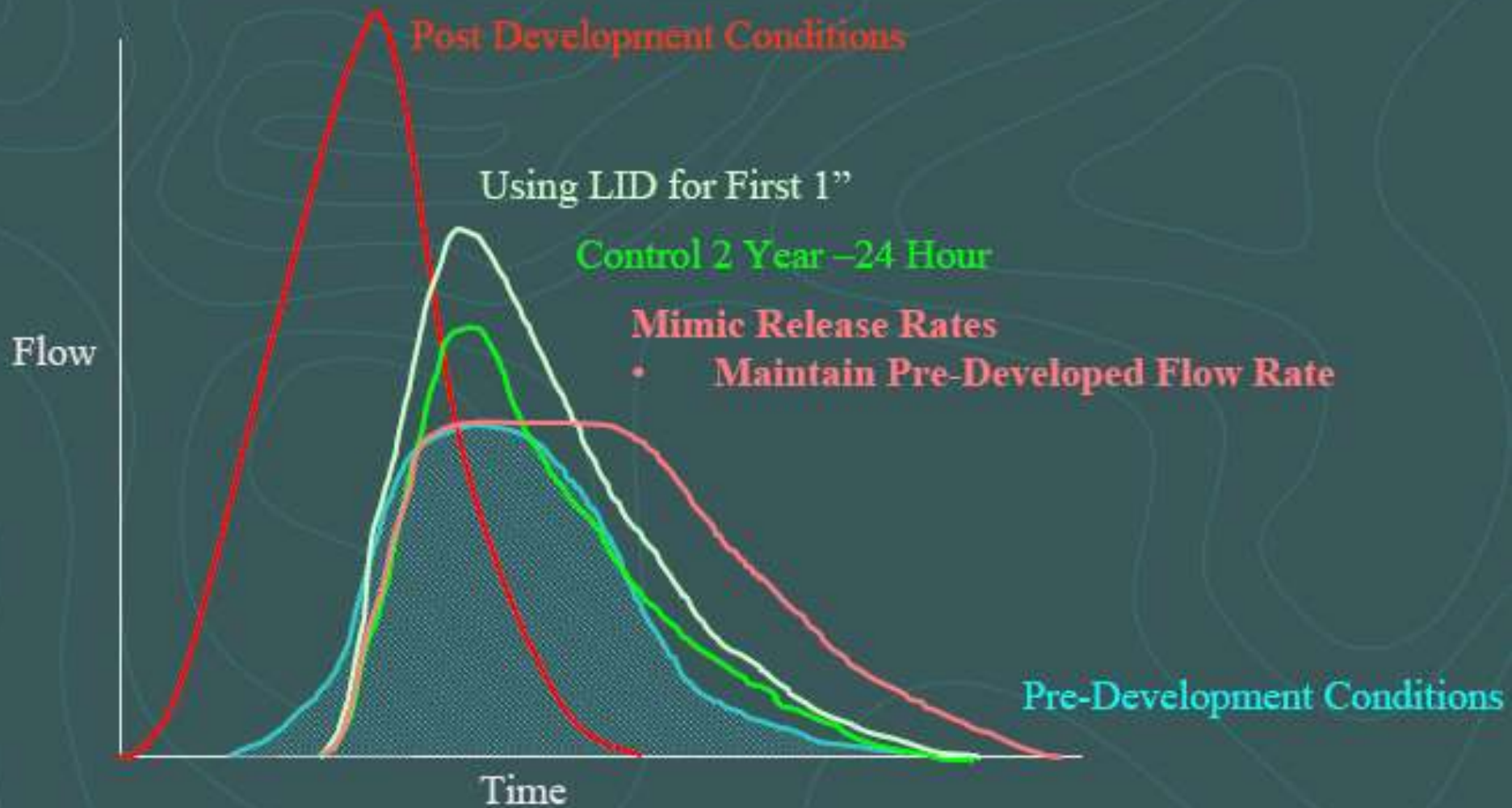
- Bolin Creek selected because of confidence in local community
- Alternative to more stringent federal/state regulation
- Partnership to restore impaired waters
- Emphasis on “measurable results”
- Federal/State financial and technical assistance
- Required Watershed Restoration Plan
- Two EPA/DENR grants received to date.
 - 2008-2012
 - Total value: \$986k

Development Impacts on the Water Cycle



Credit: NCSU

Hydrograph



Bolin Creek WRT Initial Project

- Mini-grant from Clean Water Management Trust Fund (2007)
 - Contracted with Earth Tech:
 - Identify/prioritize areas of instability
 - Identify/prioritize restoration opportunities

BOLIN CREEK WATERSHED Geomorphic Analysis and Potential Site Identification for Stormwater Structures and Retrofits



TOWN OF CARRBORO
NORTH CAROLINA

Prepared By:



A **tyco** International LLC Company

Earth Tech of North Carolina, Inc.
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607

Earth Tech Study

Pay Item Description	Estimated Quantity	Unit	Unit Bid Price	Bid Amount	Criteria and Point Allocation	
					Criteria (20 Total Points Possible)	Possible Points
					Reduced	5
Excavation	60.0	CY	15.00	\$900	00	[5]
Site Preparation and Planting	0.0	AC	7500.00	\$150	300	[4]
Rip Rap Class B	5.0	Tons	45.00	\$225	500	[3]
Filter Fabric	15.0	SY	5.00	\$75	Removed	[2]
Grade Control Vanes	6.0	EA	3000.00	\$18,000	\$23,000	[1]
Silt Fence	500.0	FT	3.75	\$1,875	and \$50,000	5
Construction Safety Fence	665.0	LF	2.50	\$1,663	and \$80,000	[1]
Construction Entrance	1.0	Ea	2500.00	\$2,500	seen from street)	[1]
			Total	\$25,388	(to a street)	[3]
					ent to a highly traveled	[5]



4	Construction Access	5
	Poor	[1]
	Good	[3]
	Excellent	[5]
5	Critical Nature of Project	5
	Critical (exponential increase of problem is expected if project is delayed; i.e. headcut causes channel incision which causes decades of channel instability and is order of magnitudes higher if you wait to repair)	[5]
	Very High (problem will increase in future at a steady rate)	[4]
	High (problem will increase, but range of future impact is limited)	[3]
	Medium (problem is severe but not expected to increase significantly)	[2]
	Low (problem is present, but stable, no expected increase)	[1]

Earth Tech Project Recommendations

- **Streambank stabilization; 8 projects**
- Stormwater projects (retrofits and new);
22 projects
- Stream restoration; 1 project
- Dam retrofit; 1 project
- Conceptual designs

BCWRT Follow Up/ Current Work

- Follow up on EEP, ET, other studies
- 2 319 grants received
- Restoration projects (pilot/demonstration)
 - 4 on the ground projects
- Low Impact Development site monitoring study
- Intensive subwatershed analysis
- Watershed restoration plan

319 Restoration Grants

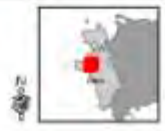
- 2008 Chapel Hill lead
- 2009 Carrboro lead
- 60/40 federal/local funding
- Partnering with NCSU, Chapel Hill Carrboro City Schools, Friends of Bolin Creek



McDougle Site Runoff



- Stormwater Pipe
- Streams**
- TYPE**
- Intermittent
- Permanent



City of Columbus, Georgia
 Planning Department
 100 North Broad Street, Suite 1000
 Columbus, Georgia 31902
 Phone: 678.265.5000
 Fax: 678.265.5001
 Website: www.cityofcolumbus.org

McDougle Project

Rain garden





















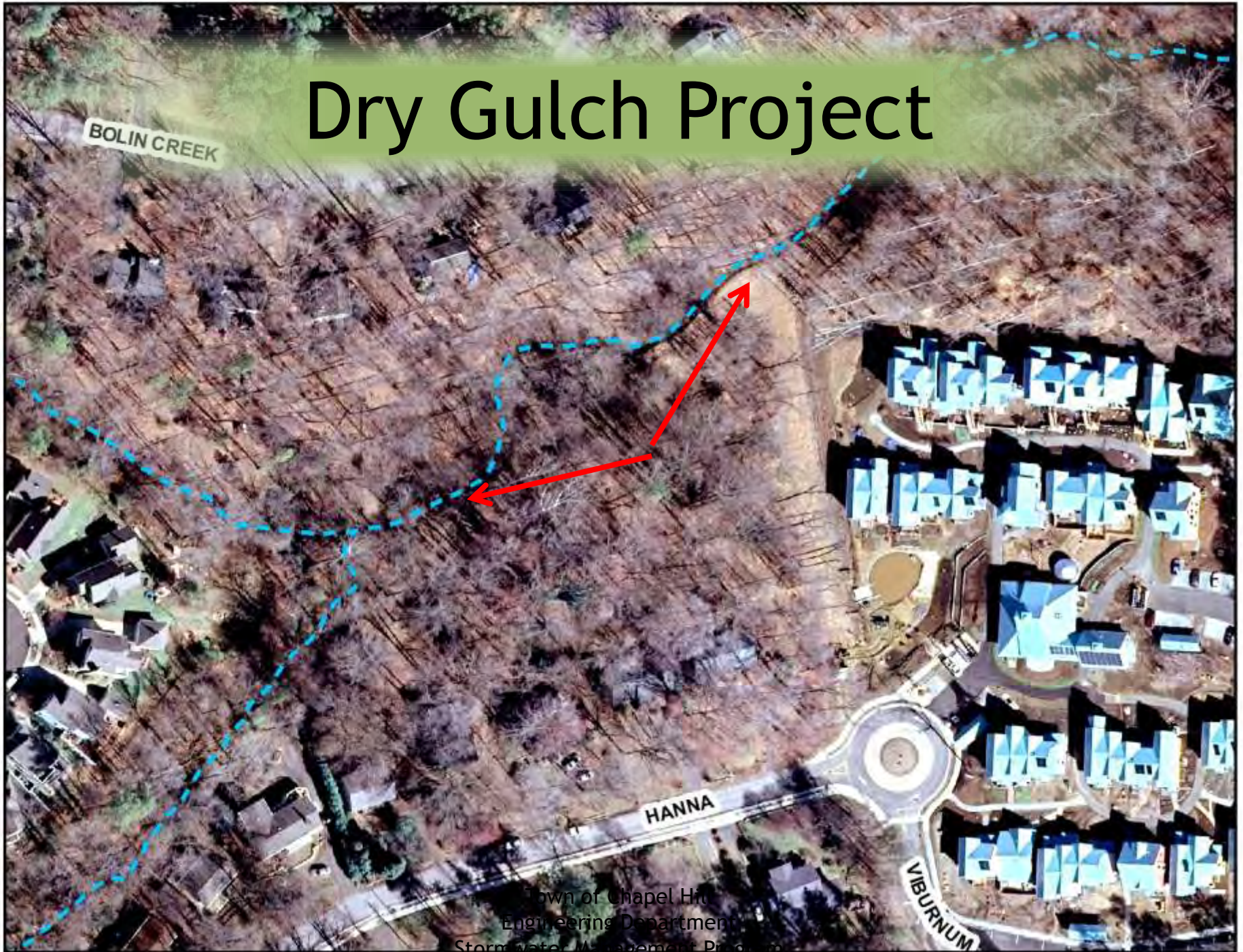




Credit: Dave Otto

Dry Gulch Project

BOLIN CREEK





- *Scope: channel stabilization*
- *Project construction planned: March, 2012*

Pacifica Runoff Monitoring

- Evaluate effectiveness of Low Impact Development, stormwater management
- 2 year continuation
 - Predevelopment and construction runoff monitoring complete





Baldwin Park Stream Restoration

SITE 19



Legend

- Stormwater Lines
- Perennial Stream
- Intermittent Stream
- Ephemeral Stream
- Stream, unknown flow

Earth Tech
A tyco International, Inc. Company

AERIAL PHOTO VIEW
BOLIN CREEK WATERSHED
Geomorphic Analysis and Potential Site Identification For
Stormwater Structures and Retrofits

0 25 50 100 Feet
1 inch equals 50 feet

Problems Observed



Construction



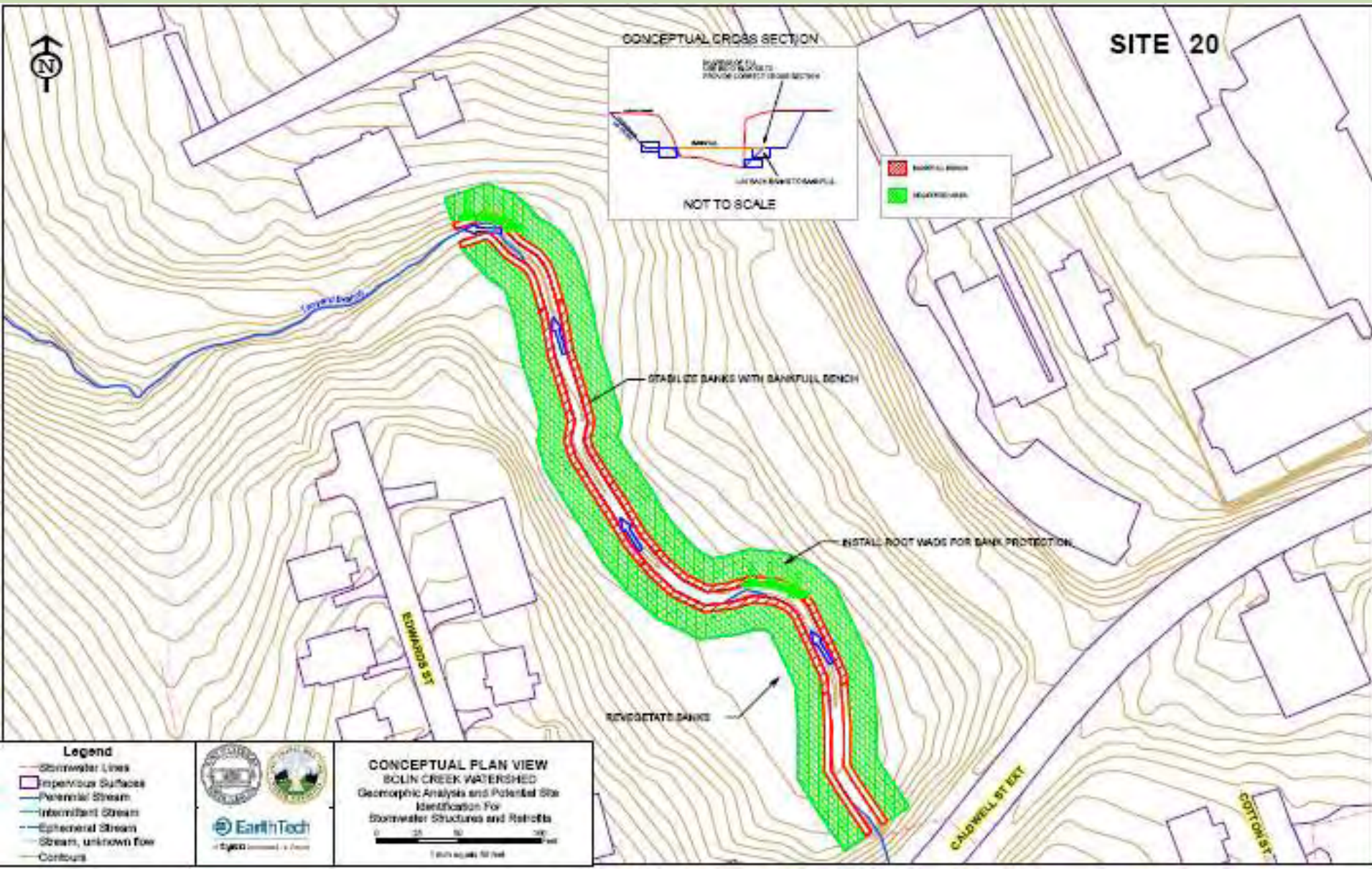
After Construction



After construction



Proposed Tanyard Branch Stream Restoration



Tanyard Branch erosion



Tanyard Branch Alternatives Analysis

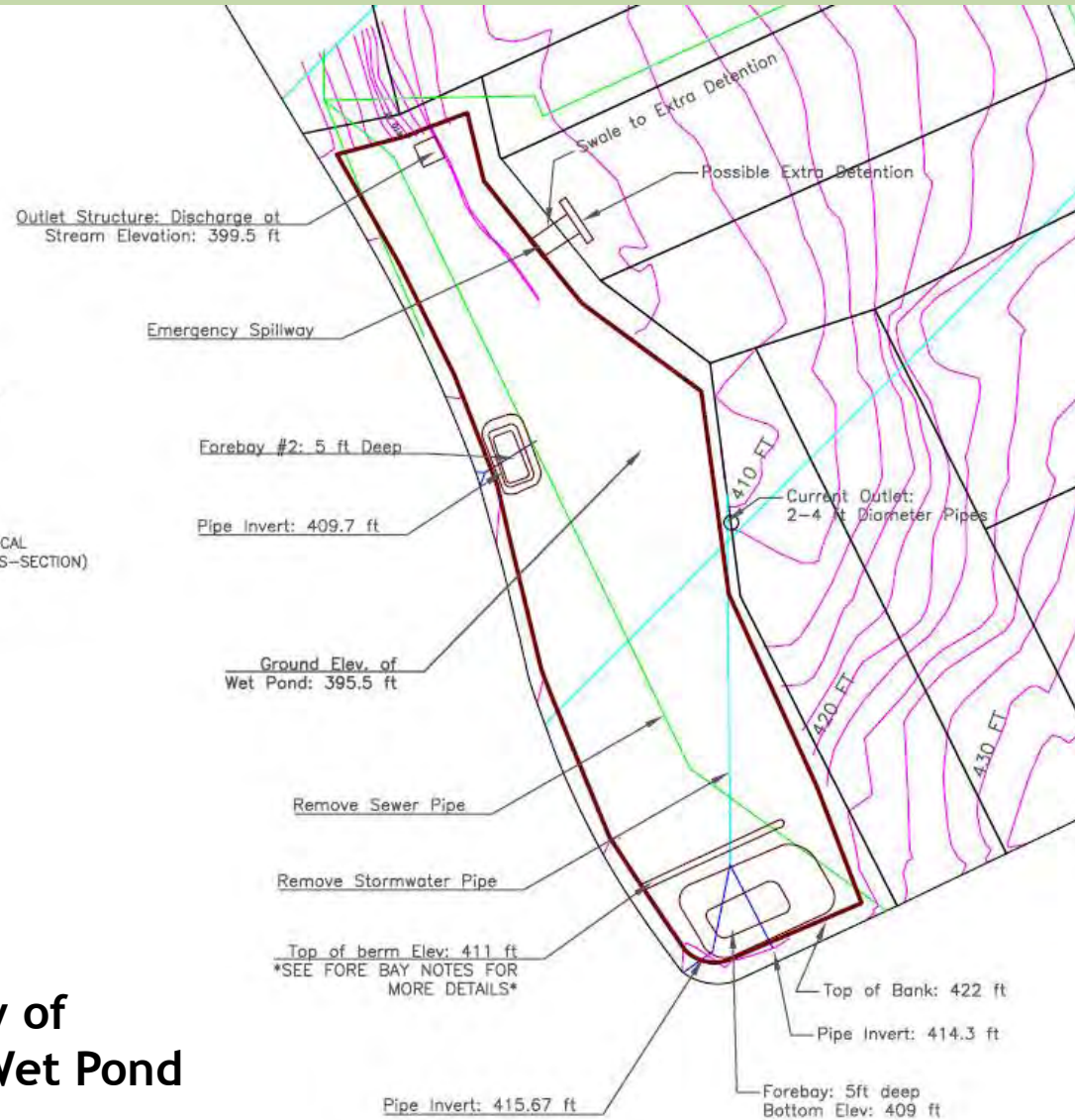
NOTES:

WET POND:

1. BOTTOM ELEVATION OF WET POND: 395.5 FT
2. PERM POOL ELEVATION: 399.5 FT
3. 1 FT FOR SEDIMENT STORAGE BELOW PERM. POOL ELEVATION
4. MUST HAVE FENCING AROUND ENTIRE WET POND.
5. RETAINING WALLS AROUND ENTIRE POND.

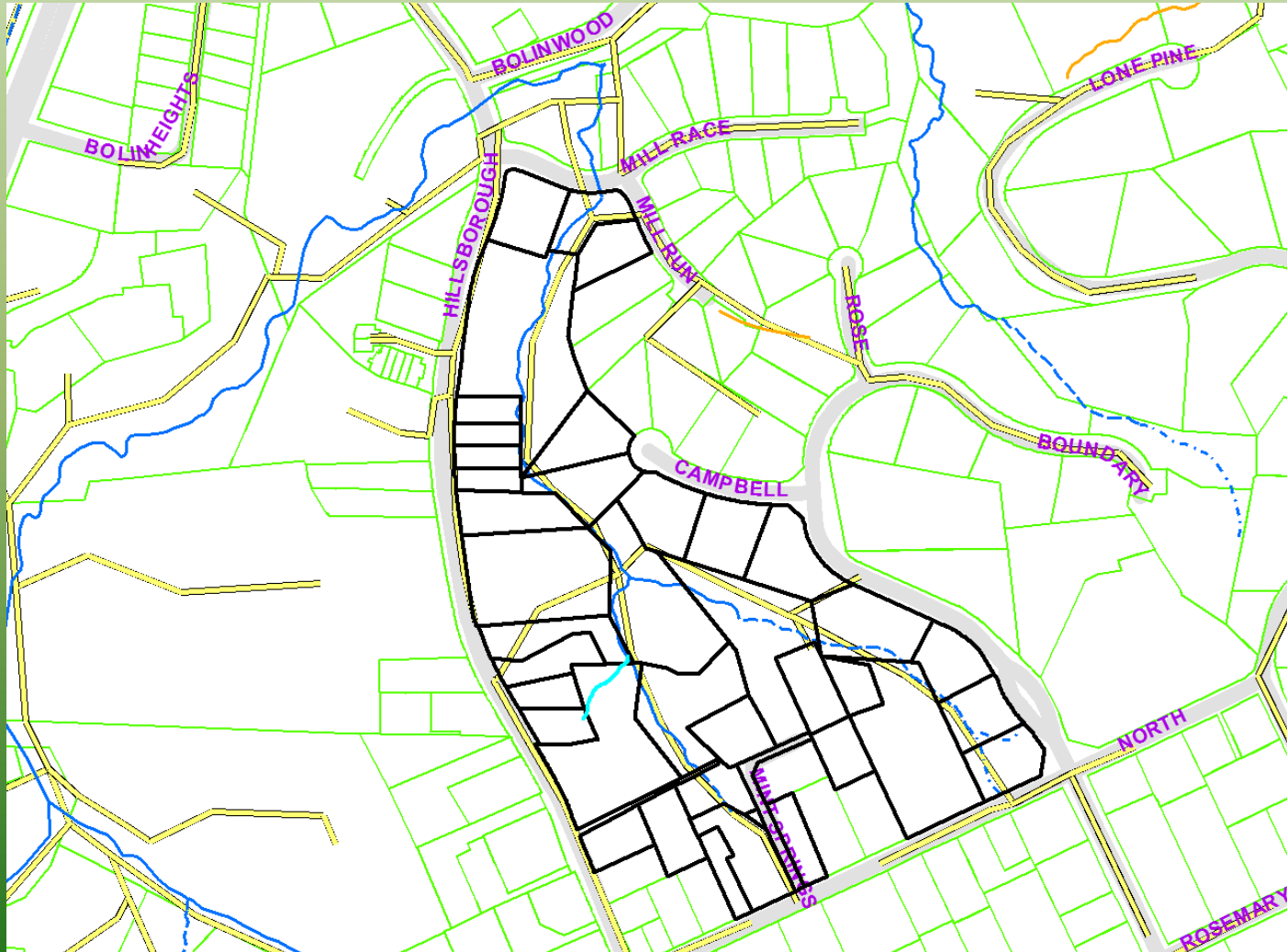
FOREBAY:

1. MAX DEPTH OF FOREBAY: 5 FT
2. MIN. DEPTH OF FOREBAY: 3 FT
3. TOP OF BERM ELEVATION: 411 FT
4. SLOPES OF BERM ON WET POND SIDE ARE VERTICAL AND WILL REQUIRE A RETAINING WALL (SEE CROSS-SECTION)
- 5.

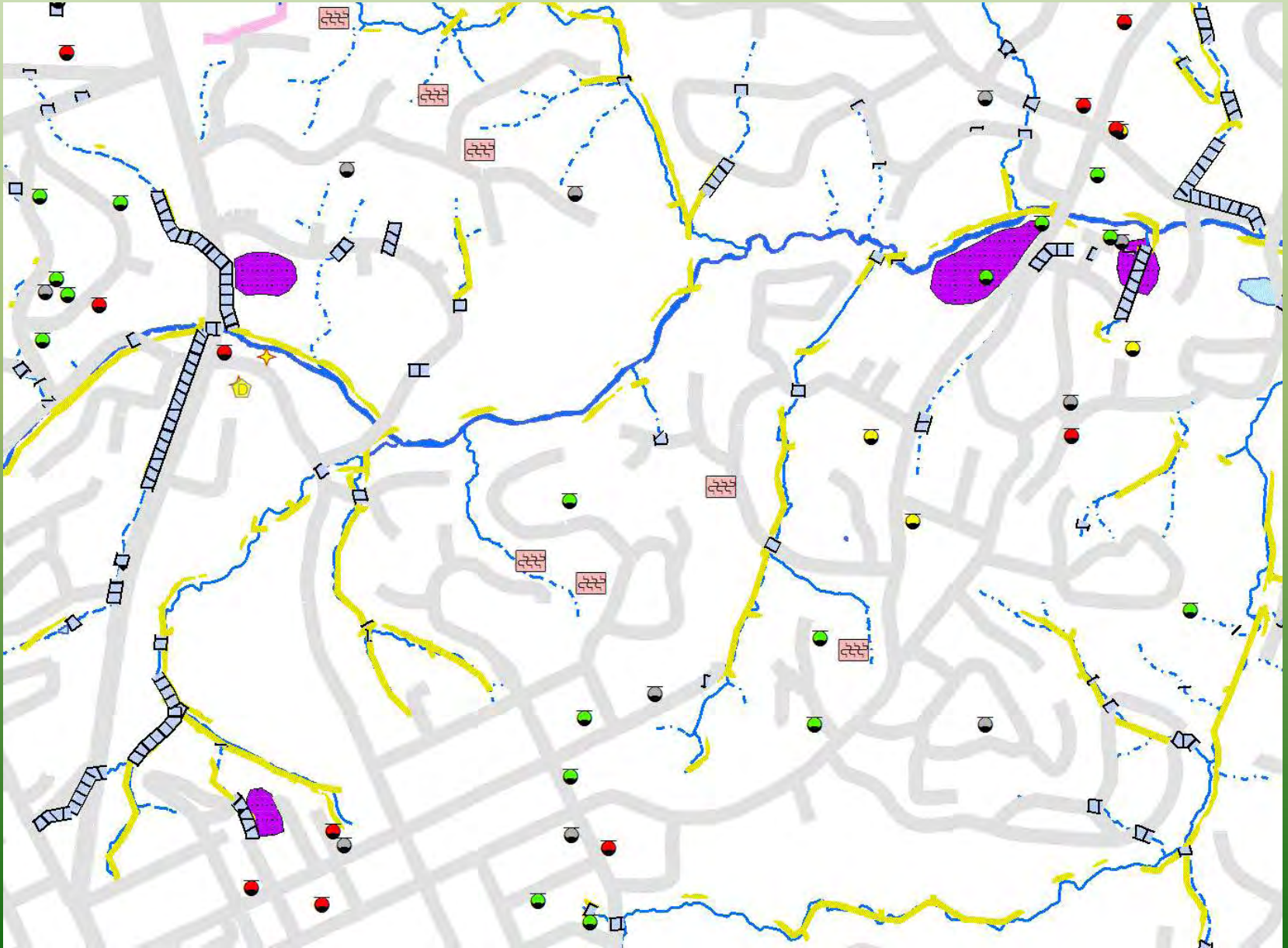


D. 8 Plan View of Under-Sized Wet Pond

Watershed Restoration Challenges



Watershed Restoration Challenges



Watershed Restoration Challenges



Watershed Situation Assessment

- Conducted by Watershed Education for Communities and Officials (WECO) - affiliated with NCSU
- Study goal: understand full spread of interests related to Bolin Creek and watershed restoration
- Help Towns determine how to better engage stakeholders

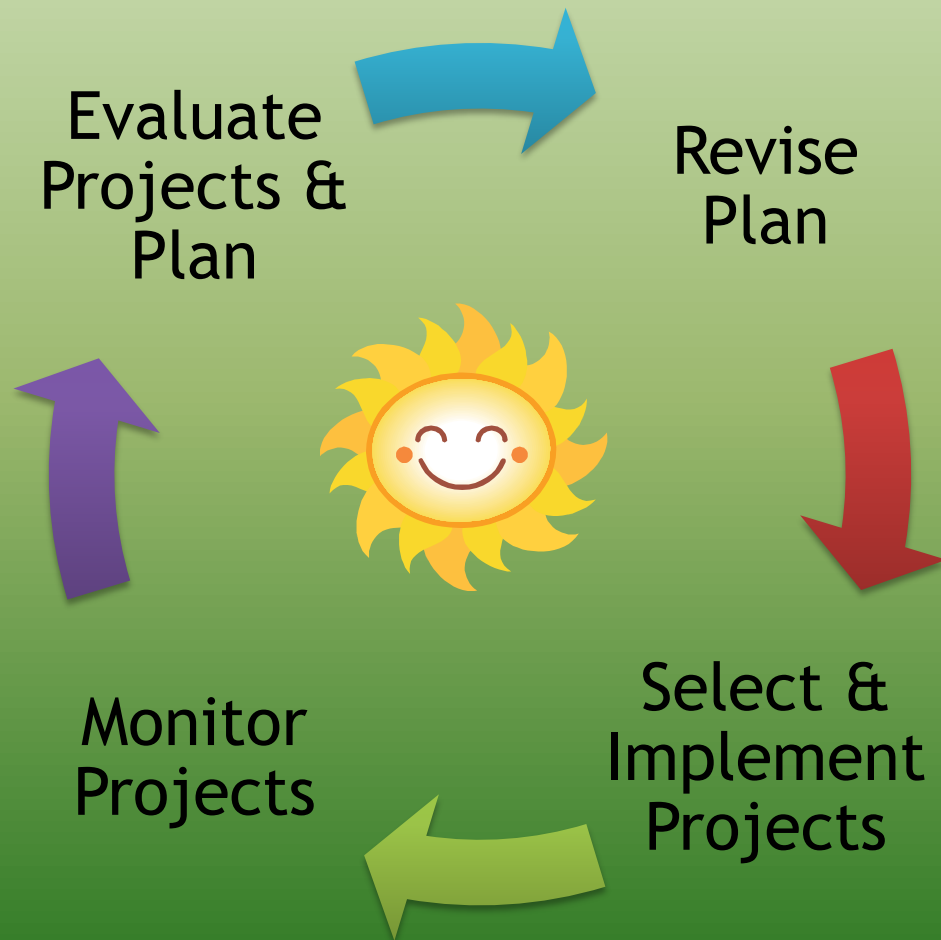
WECO Situation Assessment Recommendations

- Create new collaborative watershed group
- Neutral party for watershed facilitation
- Online commons
- Local government internal review
- More Carolina N Forest outreach
- Carrboro revenue ideas
- Utility infrastructure planning and maintenance
- Facilitated, holistic discussion of environmental management and transportation

Watershed Restoration Planning

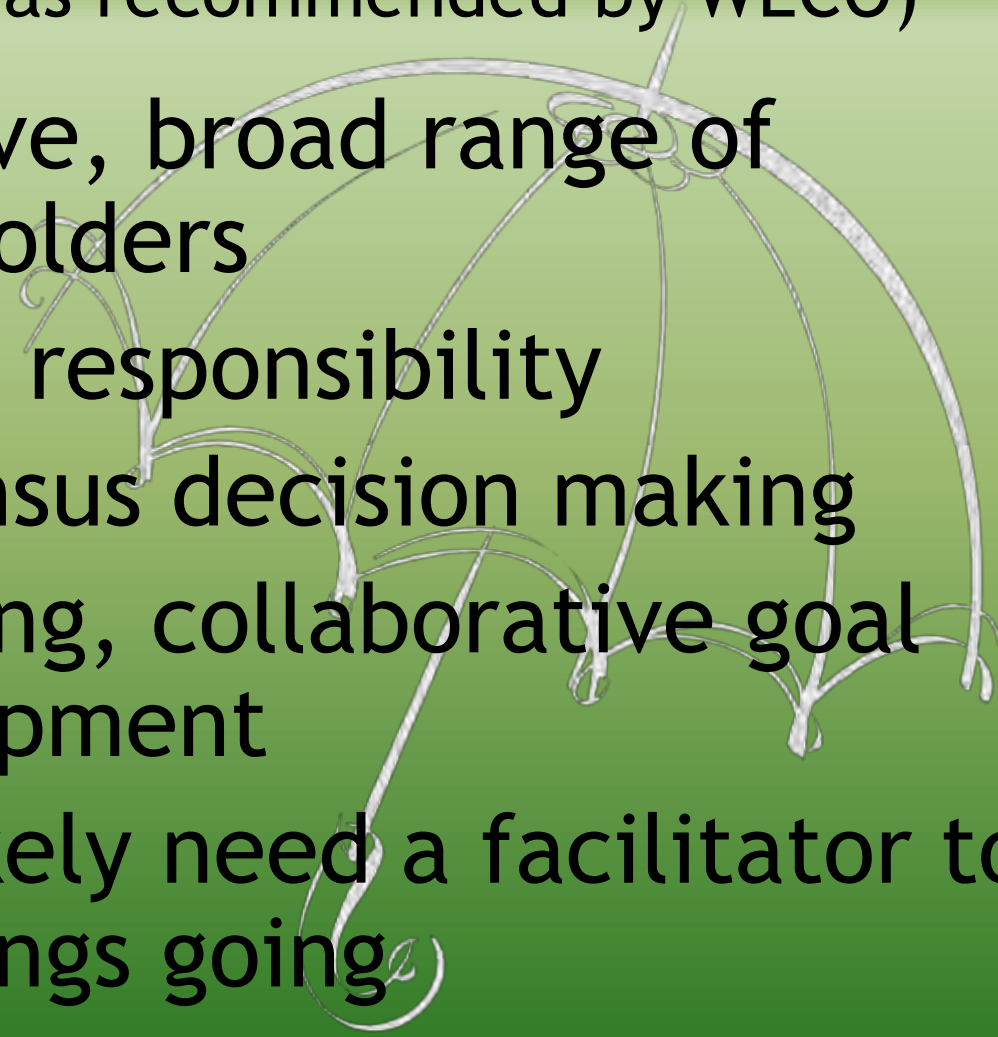
- Meet requirement for 9-element EPA plan
- This version: focus on technical aspects
 - Stressors and sources - rate by severity
 - Projects - rate by technical feasibility
- Identify challenges and barriers
- Estimate costs, identify funding sources
- Monitoring plan
- Process for regular evaluation and revision
- Incorporate stakeholder concerns from Situation Assessment

Watershed Plan Life Cycle



Umbrella Organization

(as recommended by WECO)

- Inclusive, broad range of stakeholders
 - Shared responsibility
 - Consensus decision making
 - Visioning, collaborative goal development
 - Will likely need a facilitator to help get things going
- 

WANTED: CAT HERDER

(AKA Watershed Facilitator)



Next Steps for the Towns

- Complete draft Watershed Plan for technical review by State/EPA
- Evaluate funding and staffing needs
- NPDES and Jordan Lake Rules activities:
 - Education and outreach
 - Eliminate discharges and dumping
 - New Development stormwater requirements
 - ID stormwater retrofit projects

Next Steps For Everyone

- Follow up on WECO recommendations
 - Set up “umbrella organization” or expand existing restoration team
 - Watershed Facilitator
 - Create online commons
- Seek commitment for resources from stakeholders
- Share with your neighbors
- Communicate priorities to elected officials
- Every little bit counts



For More Information



- Chapel Hill Stormwater Management Division
www.townofchapelhill.org/stormwater
- Town of Carrboro Surface Water
www.townofcarrboro.org/pzi/Env/water.htm
- NCSU Watershed Education for Communities and Officials
www.ncsu.edu/weco
- EPA 9-element watershed plans
water.epa.gov/polwaste/nps/handbook_index.cfm
- DWQ Use Restoration Watershed Program
portal.ncdenr.org/web/wq/ps/bpu/urw
- EPA - Impaired Waters and Total Maximum Daily Load
water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/intro.cfm