



# **Water Conservation, Efficiency and Beyond**

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## **A Total Water Management Approach**

Potable Water

Reuse Water

Wastewater

Groundwater

Stormwater

Total Water Management is the  
**WATER?**  
Sustainable Solution

Non-potable Water

Roof Water

Gray Water

Reclaimed Water

Rainwater

Surface Water

# Water Vocabulary

- **Potable Water – Drinking Water**
- **Non-Potable Water**
  - **Gray Water**

Generated from domestic processes such as dish washing, laundry and bathing; comprises 50-80% of residential wastewater
  - **Stormwater**

Water that originates from rain events that runs off from surfaces such as parking lots, roadways, land and drainage features
  - **Rainwater Harvesting**

Water that originates from rain events and is collected from rooftop collection systems
  - **Reclaimed Water / Water Reuse**

Highly treated wastewater originating from domestic, municipal or industrial systems that is suitable for a beneficial use

# Presentation Outline

- **Tier I - Water Conservation & Efficiency**
  - **Tier II - Water Reuse**
    - Stormwater
    - Rainwater Harvesting
  - **Tier III - Water Reuse**
    - Reclaimed Water
  - **Questions & Answers / Discussions**
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- The background of the slide features a central image of a globe surrounded by several hands of different skin tones, all reaching towards the center. The globe is partially obscured by green leaves. The entire scene is set against a light green background with a subtle pattern of leaves and hands, creating a sense of global unity and environmental care.



**Tier II**  
**Beyond Conservation**  
-  
**Integration of Stormwater  
Management and Rainwater  
Harvesting**

Chris Stanley, P.E.  
McKim & Creed, P.A.

# Why Stormwater Reuse?



# Northern Guilford Middle School

- Greensboro, Guilford County, NC
- Holistic Water Cycle Approach
  - Rainwater to Toilet Flushing to a “Living Machine” to Underground Irrigation to Groundwater Recharge
- 360,000 Underground Rainwater Cistern

# Northern Guilford Middle School



# Northern Guilford Middle School

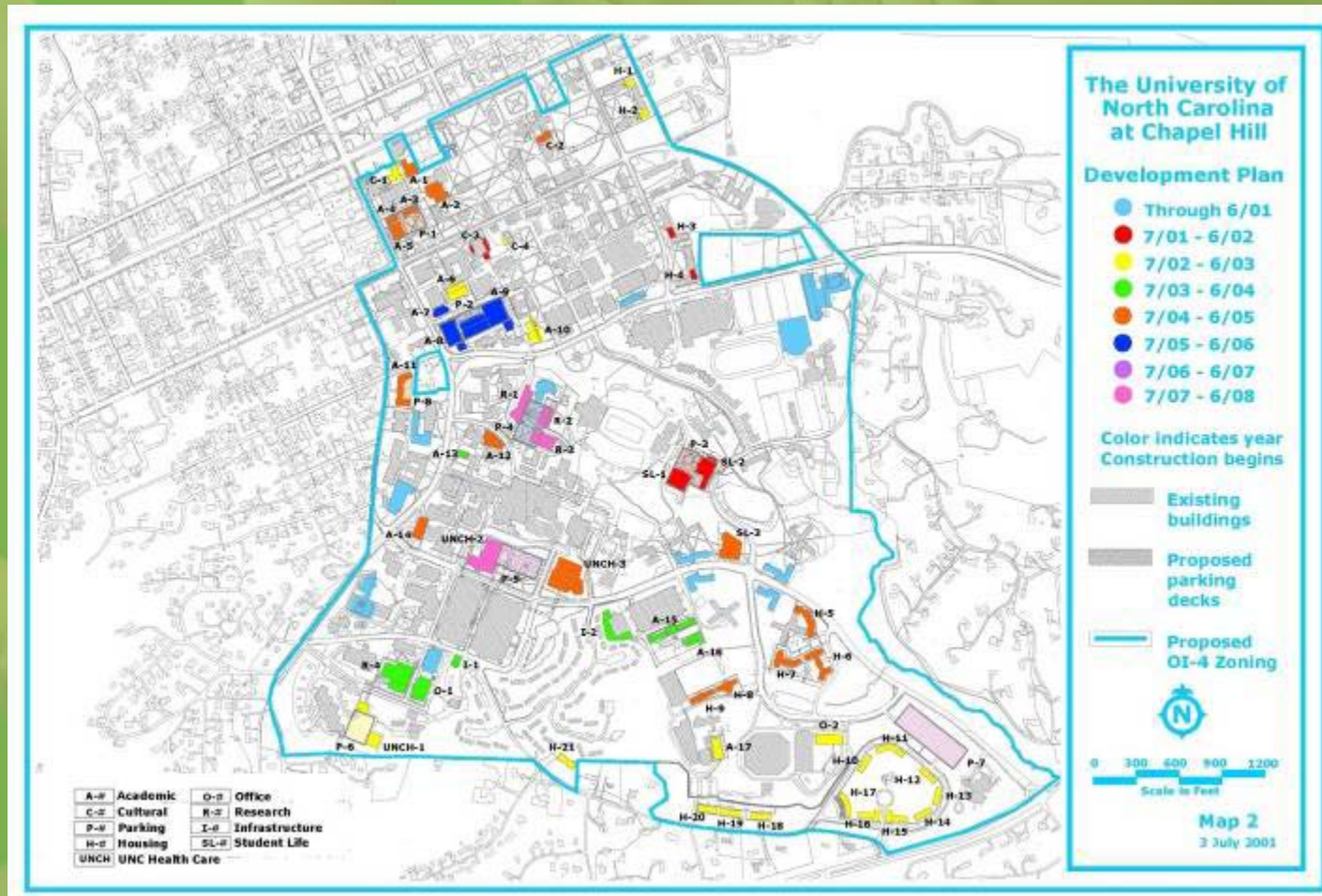


# Other School Cisterns

- RD & E Smith Middle School – Chapel Hill, NC – 6-13,000 gal precast concrete tanks for toilets & irrigation
- Catawba College Center for the Environment – 2-5,000 gal Underground Cisterns
- EcoDorm at Warren Wilson College – 10,000 gal recycled train tanker for roof rainwater collection (toilets & irrigation)

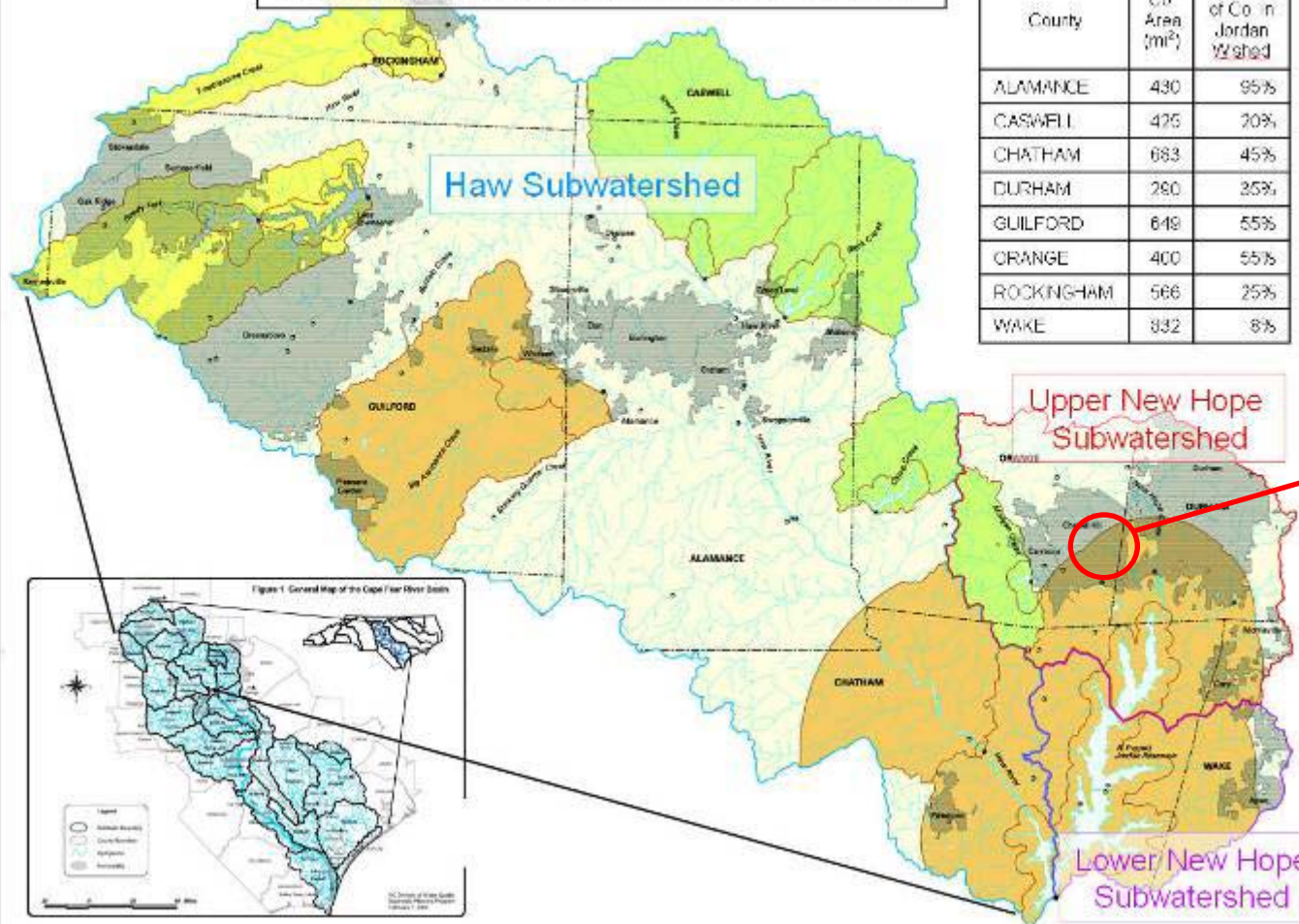
# UNC-Chapel Hill Campus Development Plan

*“Master Plan Implementation”*



# Jordan Lake Water Supply Nutrient Strategy

Jordan Lake and Its Watershed



# LEED Certification

## Leadership in Energy and Environmental Design



### LEED for New Construction and Major Renovation 2009 Project Scorecard

Yes	?	No			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>Water Efficiency</b>		<b>10 Points</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prereq 1	<b>Water Use Reduction, 20% Reduction</b>	Required
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.1	<b>Water Efficient Landscaping, Reduce by 50%</b>	2
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 1.2	<b>Water Efficient Landscaping, No Potable Use or No Irrigation</b>	2
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 2	<b>Innovative Wastewater Technologies</b>	2
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 3.1	<b>Water Use Reduction, 30% Reduction</b>	2
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Credit 3.2	<b>Water Use Reduction, 40% Reduction</b>	2
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>Project Totals (Certification Estimates)</b>		<b>110 Points</b>
Not Certified			<b>Certified:</b> 40-49 points <b>Silver:</b> 50-59 points <b>Gold:</b> 60-79 points <b>Platinum:</b> 80+ points		

### Sustainable Sites Credits






Credit 6.1 – Stormwater Quantity Control

Credit 6.2 – Stormwater Quality Control

# 2002, 2007-2008 Drought

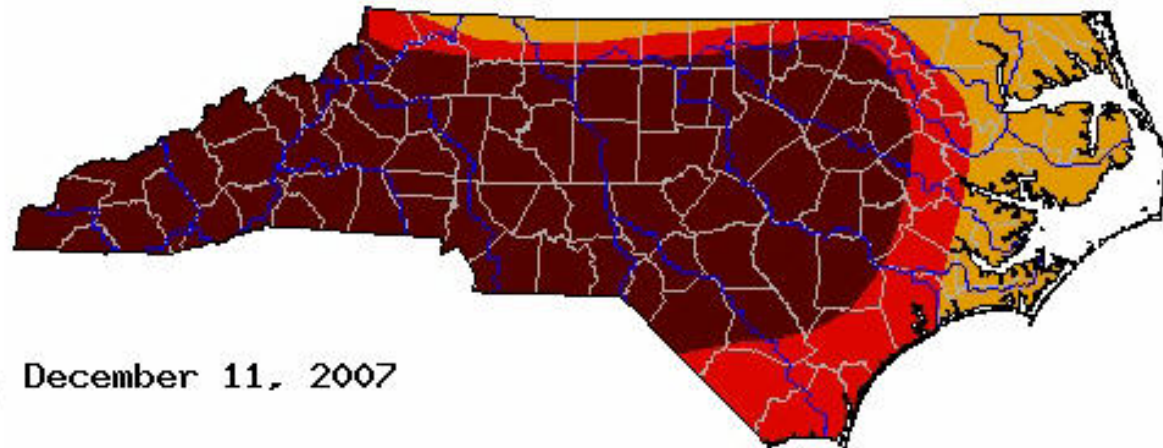
## North Carolina Drought Conditions

### Drought Classifications

-  D0 - Abnormally Dry
-  D1 - Moderate Drought
-  D2 - Severe Drought
-  D3 - Extreme Drought
-  D4 - Exceptional Drought

-  Major River Basins  
([View Map](#))

- A = Agricultural  
(crops, pastures, grasslands)
- H = Hydrological (water)



\* Courtesy of the NC Drought Management Advisory Council

# Other Stormwater Regulations

- **Peak Rate**
    - post-development peak discharge rate not to exceed pre-development peak
  - **Water Quality**
    - 85% TSS removal
- And...
- **VOLUME CONTROL**
    - post-development volume (2-yr storm) not to exceed pre-development volume

# Stormwater Volume Control

## Methods:

- Match existing impervious cover
- Infiltration
- Evapotranspiration
- Rainwater harvesting



# Ramshead Cistern – 56,000 gal

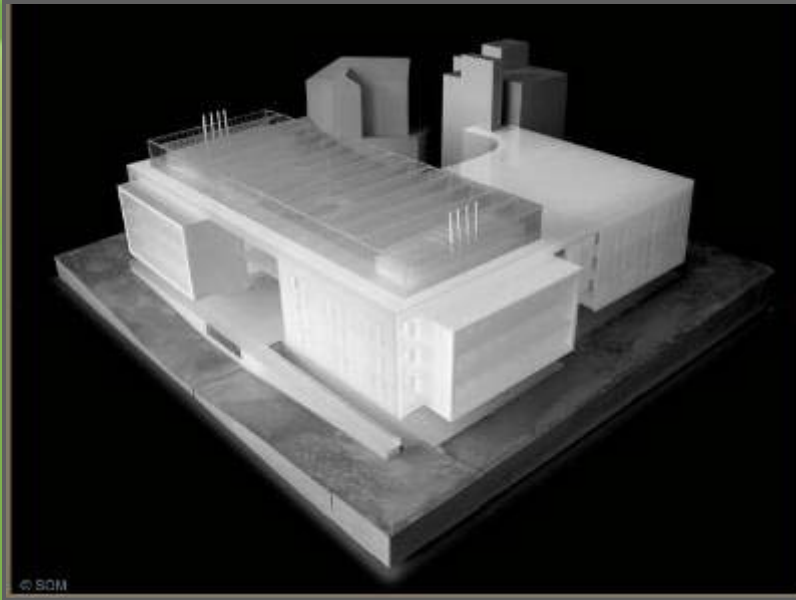


# Rain Gardens / Bioretention



# UNC-CH Bell Tower Development

## 300,000 gal



### Project Facts:

Completion Year – 2011

Site Area – 430,000 ft<sup>2</sup>

Project Area – 210,000 ft<sup>2</sup>

Building Height – 100 ft

Number of Stories - 5



# Contact Information

**Thomas M. Hunter, Jr. P.E., R.A.**  
**System Facilities Engineer**  
**Admin and Facility Services**  
**NC Community College System**  
**200 W. Jones Street**  
**5013 Mail Service Center**  
**Raleigh NC 27699-5013**  
**919.807.7218 (O)**  
**[huntert@nccommunitycolleges.edu](mailto:huntert@nccommunitycolleges.edu)**

**Claudia Powell, Environmental Specialist**  
**Division of Pollution Prevention and**  
**Environmental Assistance**  
**North Carolina Department of Environment**  
**and Natural Resources**  
**2728 Capital Boulevard**  
**1639 Mail Service Center**  
**Raleigh, NC 27699-1639**  
**919-715-6532 (O)**  
**[claudia.powell@ncdenr.gov](mailto:claudia.powell@ncdenr.gov)**

**Chris Stanley, P.E.**  
**McKim & Creed, P.A.**  
**1730 Varsity Drive, Suite 500**  
**NCSU Centennial Campus**  
**Raleigh, NC 27606**  
**919.233.8091 (O)**  
**[cstanley@mckimcreed.com](mailto:cstanley@mckimcreed.com)**

**Donald L. Safrit, P.E.**  
**McKim & Creed, P.A.**  
**1730 Varsity Drive, Suite 500**  
**NCSU Centennial Campus**  
**Raleigh, NC 27606**  
**919.210.9814 (M)**  
**919.233.8091 (O)**  
**[dsafrit@mckimcreed.com](mailto:dsafrit@mckimcreed.com)**