

# Soil Strategies for the Urban Environment

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Compost 2018 Game On! *Building Sustainable  
Communities*

# Presentation Highlights

- The Need for Urban Soil Strategy
- The Soil and Water Connection
- NRCS Tech Note --Managing Soil Organic Matter
- Engineered Soils and Landscape Systems
- Sustainable Soil Projects -- Examples

ERTH Products LLC

*Environmental Resource & Technology For Humanity*

ERTH Products is a compost manufacturing company specializing in the engineering of specialty soils for landscapes and green building projects

# ERTH PRODUCTS, LLC

*Changing the Way the World Grows*



# •Compost Manufacturing



# SALES



# OPERATIONS



# •Shipping





•I gave my word  
•the load would  
•go out today!



# 29 year History

- 1989-1997 Formative Years
- 1997 BioCycle West Coast Conference  
Soils for Salmon Program  
The Soil & Water Connection
- 2001 BioCycle Atlanta Conference  
The Soil & Water Connection
- 2001 White paper  
“ The Need For A Soil Strategy-- *Soils The Essential link to Water Quality and Quantity*”

## *October 2001 White Paper*

*“Increasing water demands fueled by the rapidly expanding population and water shortages caused by the extended drought have created the need to place greater emphasis on effectively managing our natural resources.*

*These concerns coupled with new rules, guided by the Federal Clean Water Act will require a holistic approach by the state to ensure soil and water resources are protected.*

*Preserving or restoring soil quality is the first step toward protecting water resources”*

# Need for a Urban Soil Strategy

- Increasing Water Demands fueled by rapidly expanding population
- Water Shortages – caused by extended Droughts 1998-2003
- Floods fueled by urban development & impervious surfaces
- Clean Water Act
- NPDES Phase 2 ..... 2002
- Tri-State Water Wars



# The Soil Water Connection

Photo courtesy of  
Environmental  
Science & Technology

# Healthy Soils are the Very Basis for Clean Water.....

- Water Loss, contamination, and purification are all directly affected by the soil
- When soil no longer stores nutrients, regulates water flow or filters chemical and biological contaminants water quality is directly compromised
- The decline and degradation of soil starts a chain reaction with profound consequences for water

– Composting Council Research and Education Foundation,  
A watershed Manager's Guide to Organics: The Soil and  
Water Connection, March 1997

# Landscapes Have Long Been Ignored as Essential Reservoirs Responsible for:

- Stormwater Retention & Storage
- Ground Water Recharge,
- Control of Ground Water Base Flows
- Overall Water Quality and Quantity



# Urban Development & Impervious Surfaces

- Changed hydrology and ecology contributing to:
  - Increase Stormwater Peak Flow Rates and Volumes
  - Increase Frequency of Floods
  - Decreased Water Quality in Receiving Bodies of Water
  - Contributed to Water Shortages & Water Pollutants
  - Try State Water Wars

# Rain Events now Flood Events





# Regulatory Environment

1948 Federal Water Pollution Control Act

1972 Clean Water Act

1973 Clean Air Act

1990 NPDES Phase 1

2002 NPDES Phase 2

# Managing Soil Organic Matter The Key to Air & Water Quality

*2003 Soil Quality Technical Note 5*

- Soil conservation policy in the US stems from the devastating erosion events of the 1920s and 30s.
- Focus on preserving agriculture productivity... reducing soil loss....The “T” factor, tolerable soil loss ...erosion control
- By the end of the century environmental concerns became as important as agricultural productivity
- Focus now is to go beyond erosion control “T” and manage for Soil Quality. Soil Carbon “C”



Soil Quality Technical Note No. 5

## Managing Soil Organic Matter The Key to Air and Water Quality

### Management



Reduced tillage, Cover crops, Rotational grazing, High biomass rotations



### Soil quality



Soil organic matter, Soil structure, Soil Organisms, Water holding capacity, Infiltration



### Air quality, Water quality, Productivity



Fewer pollutants, Less dust, Less sediment, Drought and disease resistance

### Erosion control is not enough

Soil conservation policy in the United States stems from the devastating erosion events of the 1920s and '30s. Out of concern for preserving agricultural productivity came the concept of tolerable soil loss and the creation of the T factor – the maximum annual soil loss that can occur on a particular soil while sustaining long-term agricultural productivity. Conservationists focused on reducing soil loss to T by applying practices, such as terraces, contour strips, grassed waterways, and residue management.

By the end of the century, concerns about air and water quality became as important as concerns about agricultural productivity. To address these environmental goals and maintain the land's productive potential, we must now go beyond erosion control and manage for soil quality. How soil functions on every inch of a farm – not just in buffers or waterways – affects erosion rates, agricultural productivity, air quality, and water. Soil organic matter, Soil quality. The most practical way to enhance soil quality today is to promote better management of soil organic matter or carbon. In short, we should go beyond T and manage for C (carbon).

### Why focus on soil organic matter?

Many soil properties impact soil quality, but organic matter deserves special attention. It affects several critical soil functions, can be manipulated by land management practices, and is important in most agricultural settings across the country. Because organic matter enhances water and nutrient holding capacity and improves soil structure, managing for soil carbon can enhance productivity and environmental quality, and can reduce the severity and costs of natural phenomena, such as drought, flood, and disease. In addition, increasing soil organic matter levels can reduce atmospheric CO<sub>2</sub> levels that contribute to climate change.

Technical Note No. 5

October 2003

Series written by:  
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[soils.usda.gov/sqi](http://soils.usda.gov/sqi)



# Why Focus on Soil Organic Matter

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# Going Beyond T Managing for C (carbon)

Most practical way to enhance soil quality today is to manage soil organic matter or carbon

“Because organic matter enhances water and nutrient holding capacity and improves soil structure, managing for soil carbon can enhance productivity and environmental quality”

# Compost and Organic Matter!!

“Managing for soil carbon can reduce the severity and costs of natural phenomena, such as drought, flood, and disease.

In addition, increasing soil organic matter levels can reduce atmospheric CO<sub>2</sub> levels that contribute to climate change.”

*NRCS Soil Quality Institute Soil Technical Note No.5*

# Soil Quality -- The Capacity of a Soil to Function

- Sustain plant and animal diversity and productivity
- Regulate and partition water and solute flow
- Filter and buffer potential pollutants
- Store and cycle nutrients
- Support buildings, Roads and other Structures

# Engineered Soils

- Soils designed with compost and mineral aggregates in a measurable way so as to meet specific soil quality and depth requirements
- Improves the Physical Chemical and Biological Characteristics
- Soils designed to perform to a standard of permeability, stability and fertility

# Engineered Soil and Landscape Systems

Self-supporting Soil and Plant Systems that Mimic Pre-development Hydrology

Simultaneously support :

Plant Growth

Soil Microbes

Water Infiltration

Water Conservation

Nutrient Absorption

Pollution Absorption

# Vegetation and Soils

It is important that both quality soil and vegetation be viewed together as an essential part of a dynamic system in managing air and water resources

A valuable tool for use in land disturbing activities to re-establish the pre-development volume of runoff, recharge, storage, and evaporation.

# Going Green

## GreenScapes and Green Building

- Sustainable landscape construction practices are taking root in commercial and residential green building programs
- Functional soil and landscapes are highly effective, cost-efficient and aesthetically pleasing

# GreenScapes and GreenBuilding Programs

- Reduce Life Cycle Cost for Stormwater Infrastructure
- Shifts maintenance burdens away from local governments
- Provide superior control of non-point source pollution and hydrologic control of small, frequently-occurring storms
- Help with NPDES Phase II final Rule Compliance
- Help Mitigate Combined Sewer Overflows
- Help with Watershed Pollutant load management

# Green Building Program Examples

# Ponce City Market-Atlanta, GA

Landscape Contractor: Davis Landscape

Architect: Eberly & Associates

Installation Date: May 2015

Lightweight Soil: Intensive Lightweight Soil 4500 cubic yards

Extensive Lightweight Soil 300 cubic yards / Bio-Retention Soil 2200 cubic yards

Composted Amended Soils- 1800 cubic yards



# Mayfair Renaissance

13th Street  
Atlanta, GA

Architect: **Smallwood, Reynolds, Stewart & Stewart of Atlanta, GA**

Landscape Contractor: **Valley Crest**

Installation Date: **November 2001**

Structural Soil: **2100 cu/yds**

Lightweight Soil: **1100 cu/yds**



# Eclipse

Buckhead

Architect: Preston Partnership

Landscape Contractor: ProLandscapes

Installation Date: December 2004

Intensive Lightweight Soil: 480 cu/yds



# Eclipse

Buckhead

Architect: Preston Partnership

Landscape Contractor: ProLandscapes

Installation Date: December 2004

Intensive Lightweight Soil



# Paramount At Buckhead

Stratford Road  
Atlanta, GA

Landscape Contractor: Builders Landscape

Installation Date: December 2003

Intensive Lightweight Soil: Rooftop Gardens/Planting



# Midtown Metropolis

933 Peachtree Street  
Atlanta, GA

Architect: HighGrove Partners

Landscape Contractor: HighGrove Partners

Installation Date: October 2002

Lightweight Soil: Rooftop Gardens/Planting



# Midtown Metropolis

933 Peachtree Street  
Atlanta, GA

Architect: HighGrove Partners

Landscape Contractor: HighGrove Partners

Installation Date: October 2002

Lightweight Soil: Rooftop Gardens/Planting



# Spire

Atlanta, GA

Architect: Preston Partners

Landscape Contractor: Prolandscapes

Installation Date: May 2005

Lightweight Soil: Rooftop Gardens/Planting



# Realm

Atlanta, GA

Architect: Preston Partners

Landscape Contractor: Prolandscapes

Installation Date: March 2006

Lightweight Soil: Rooftop Gardens/Planting



# World Congress Center Viaduct

Atlanta, GA

Landscape Contractor: Ray Landers Company

Installation Date: June 2004

Intensive Lightweight Soil



# Manhattan Condos

Atlanta, GA

Landscape Contractor: Pro-Care Environmental

Installation Date: July 2006

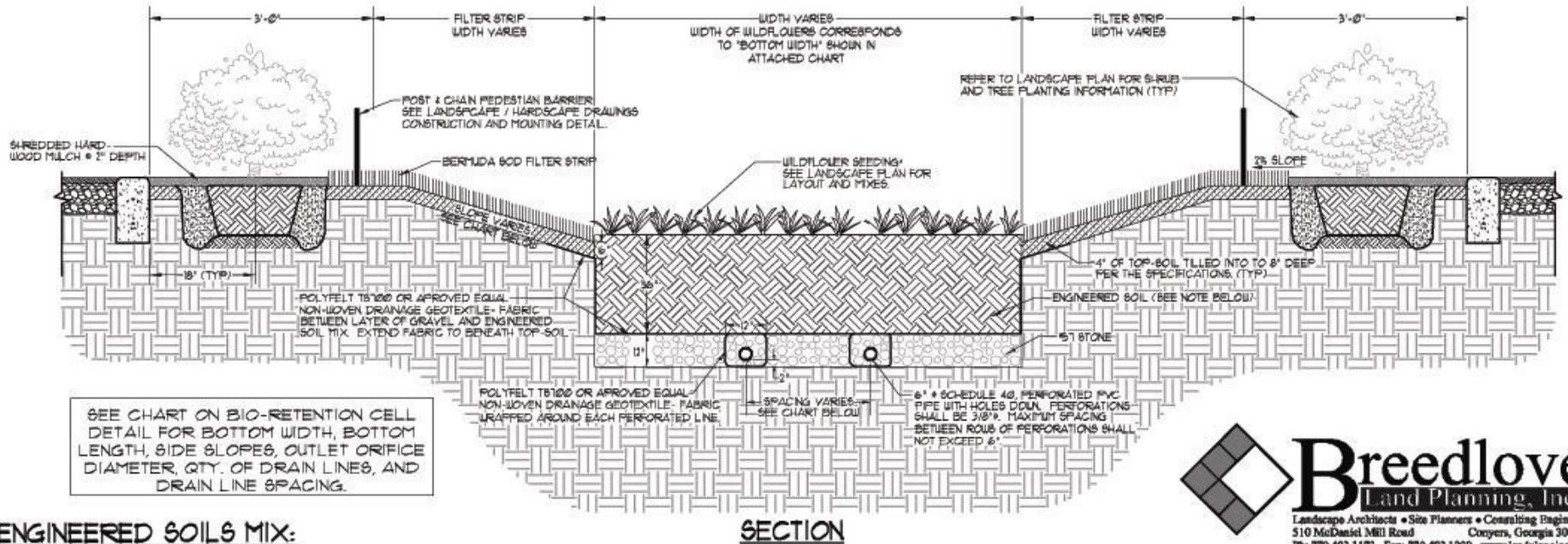
Intensive Lightweight Soil



# Bio-Retention / Rain Gardens



# TYPICAL BIO-RETENTION CELL CROSS SECTION DETAIL FOR THE FREEMANVILLE ROAD HIGH SCHOOL SITE



## ENGINEERED SOILS MIX:

THE ENGINEERED SOIL MIX SHALL CONSIST OF THE FOLLOWING COMPONENTS:

- 40% ONSITE TOP SOIL - SCREENED TO REMOVE STONES, STICKS, AND RUBBISH PER THE GRASSING SPECIFICATIONS.
- 25% "ERTH FOOD" - AS MANUFACTURED BY EARTH PRODUCTS, LLC, 402 LINE CREEK DR, PEACHTREE CITY, GA 30269, 770-486-8150. OR APPROVED EQUAL
- 15% "HYDROCKS" EXPANDED CLAY -AS MANUFACTURED BY EARTH PRODUCTS, LLC, 402 LINE CREEK DR, PEACHTREE CITY, GA 30269, 770-486-8150. OR APPROVED EQUAL.
- 20% COURSE RIVER SAND

COMPONENTS SHALL BE BLENDED THOROUGHLY AND INSTALLED WITH A BLOWER TYPE APPLICATION TO PREVENT COMPACTION AND ENSURE EVEN DISTRIBUTION.



# Milton High School – Bio-Retention Ponds

## Design Characteristics



Filter Fabric & Under-Drain Installation



Conveyor or Blow Soil Into Place to Alleviate Over-Compaction



# Milton High School – Bio-Retention Ponds



September 14, 2006

Georgia Department of Natural Resources  
Wildlife Resources Headquarters  
Social Circle, GA  
LEED Certified Gold Project



# Compost Amended Soils Landscape System Federal Reserve Bank- Atlanta, GA



# Compost Amended Soils Landscape System Alys Beach, FL



# Cornell University Structural Soil™

Columbus Streetscape

1 Year after planting



# Cornell University Structural Soil™



Georgia Tech-Technology Square

# Cornell University Structural Soil™



Georgia Tech-Technology Square

# Progress

- Green Building Programs
- USGBC
- Green Sports Alliance
- Low Impact Development
- Model Ordinances
- Metropolitan North Georgia Integrated Water Resource Management Plan Promoting Green Infrastructure
  - Cory Rayburn

- Choices made during construction and landscaping projects can impact soil and water functions for decades
- The continued practice of installing poorly-performing landscapes and hard scapes which contribute to impervious surfaces when properly functioning soil and vegetated systems are practical and cost-effective should be viewed as a lost opportunity

A photograph of a toddler with blonde hair, seen from behind, standing on a wooden deck. The child is holding a long, green, inflated balloon. The deck is made of wooden planks and is surrounded by a white fence. The ground outside the deck is covered with many seashells. A yellow banner with a blue border is overlaid on the bottom center of the image, containing text.

•The End!

- Or should it be
- the beginning?