

Design and Implementation Strategies for a Sustainable Built Environment

American Planning Association, Florida Chapter
2012 Conference

Ted Kozak, ISA Certified Arborist, *City of Greenacres Planning & Engineering*
Bonnie Landry, AICP, CNU-A, *Martin County Community Redevelopment Agency*

Mike Orfanedes, ISA Certified Arborist, *UF / IFAS Extension - Broward County*

Laura Sanagorski, ISA Certified Arborist, *UF / IFAS Extension - Palm Beach County*



Introduction

Sustainable built environment:

“Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

- from the World Commission on Environment and Development’s (the Brundtland Commission) report *Our Common Future* (Oxford: Oxford University Press, 1987).

Introduction

Expanded roles of the local Planner:

- Private and public project site landscape design and planning
- Landscape inspection after installation
- Drainage plan review and coordination
- Regulatory responsibilities of the Clean Air Act, Clean Water Act, and the Safe Drinking Water Act shared with Federal, State, and Regional agencies

Introduction

Trees and vegetation provide many important environmental, social, and economic benefits for sustainability:

- Shade for reduced utility bills
- Cleaner, oxygenated air
- Aesthetically pleasing and safer neighborhoods
- Carbon sequestration to minimize climate change
- Increased home values
- Habitat for wildlife

Introduction - Aesthetics / Shading

- *Study: A 10% increase in tree canopy correlates to a 12% reduction in crime in urban areas
- Reason: People enjoy spending time in pleasant outdoor spaces; creates “eyes on the street”, signaling would-be robbers that the area is well kept



* Source: University of Vermont and USDA Forest Service published in the June 2012 issue of the Journal of Landscape and Urban Planning

Introduction - Benefits of Landscaping



Introduction

- Purpose
 - Plain language to inspire stormwater management best practices
- Written by Martin County CRA
- Endorsed and funded in part by SFWMD



Introduction

- Provides detailed information about various strategies toward treating and managing stormwater
- Tear Sheet format
 - One page detail sheet about each tool
- Purpose:
 - Improve built environment
 - Encourage redevelopment
 - Inspire environmental stewardship
 - Sustainability and maximize use of tax dollars

Pervious Concrete



Pervious Concrete			
Cost Factor			
	L	M	H
Construction Cost			\$
Maintenance Cost		\$	
Stormwater Value			
	L	M	H
Water Quality			X
Storm Control		X	
Water Table and Soil Types			
	L	M	H
Water Table	X	X	X
Soil Permeability		X	X
L - Low			
M - Medium			
H - High			

Introduction

- Profiles each tool
 - Cost Factors
 - Stormwater Value
 - Water Table and Soil Types
 - Low, Medium, High
- Applicability:
 - General public
 - County Departments
 - Developers
 - Local Engineering and Design firms
- Available via website: www.martincountycra.com

Pervious Concrete			
Cost Factor			
	L	M	H
Construction Cost			\$
Maintenance Cost		\$	
Stormwater Value			
	L	M	H
Water Quality			X
Storm Control		X	
Water Table and Soil Types			
	L	M	H
Water Table	X	X	X
Soil Permeability		X	X
L - Low			
M - Medium			
H - High			

UF / IFAS Florida-Friendly Landscaping™

Florida Yards & Neighborhoods (FYN)

Green Industry Best Management Practices (GI-BMP)

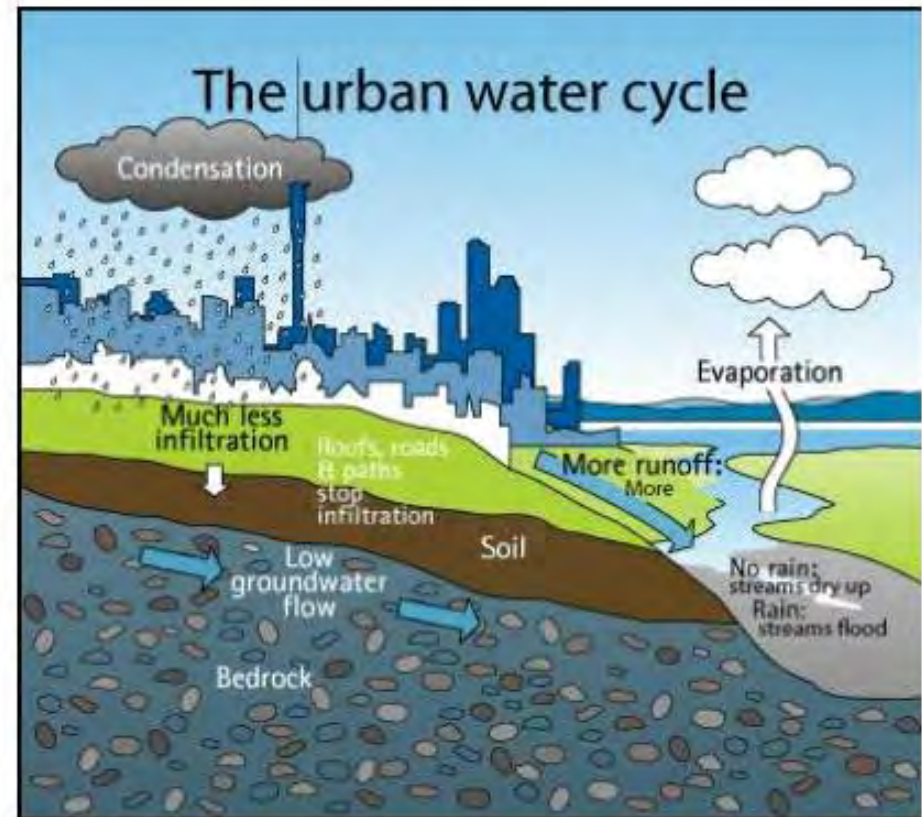
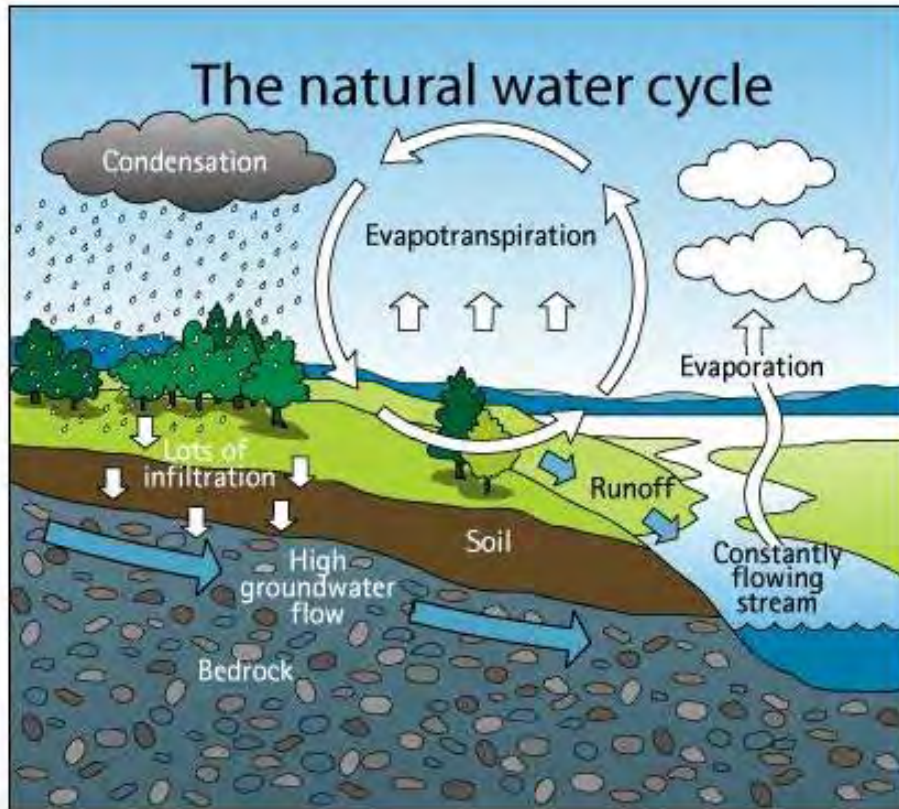
Builder & Developer

Homeowner

Professionals

Florida-Friendly Landscaping™ is the research-based model which emphasizes nine major principles that can help you create beautiful landscapes and gardens and ultimately preserve natural resources, reduce water pollution, and decrease inputs

Introduction



Florida-Friendly Landscaping™ PROGRAM



The Nine Florida-Friendly™ Principles

1. Right Plant, Right Place
2. Water Efficiently
3. Fertilize Appropriately
4. Mulch
5. Attract Wildlife
6. Manage Yard Pests Responsibly
7. Recycle Yard Waste
8. Reduce Stormwater Runoff
9. Protect the Waterfront

1. Right Plant, Right Place

*Choose plants to suit
existing site
conditions to
minimize fertilizer,
pesticide, and water
use*

Planners can use their
knowledge about the
site to make sure
that appropriate
plants are being
planted



Right Plant, Right Place - Plants Serving Function in Urban Landscape



Rain Garden



Water Filtration



Littoral Zone



Right Plant, Right Place

Tree Planting: Plan for **MATURE** canopy rooting space or.....



Broken and lifted sidewalks



Overhead utility wire conflicts

Right Plant, Right Place



Right Plant, Right Place

Plant Adapted, not Non-Adapted Species!!!



Foxtail with early-stage chlorosis



Foxtail with severe stunting



Queen palm showing signs of frizzle top

Palm Species Prone to Nutrient Deficiencies on High pH Soils

Right Plant, Right Place

Planting Depth
Does Matter!



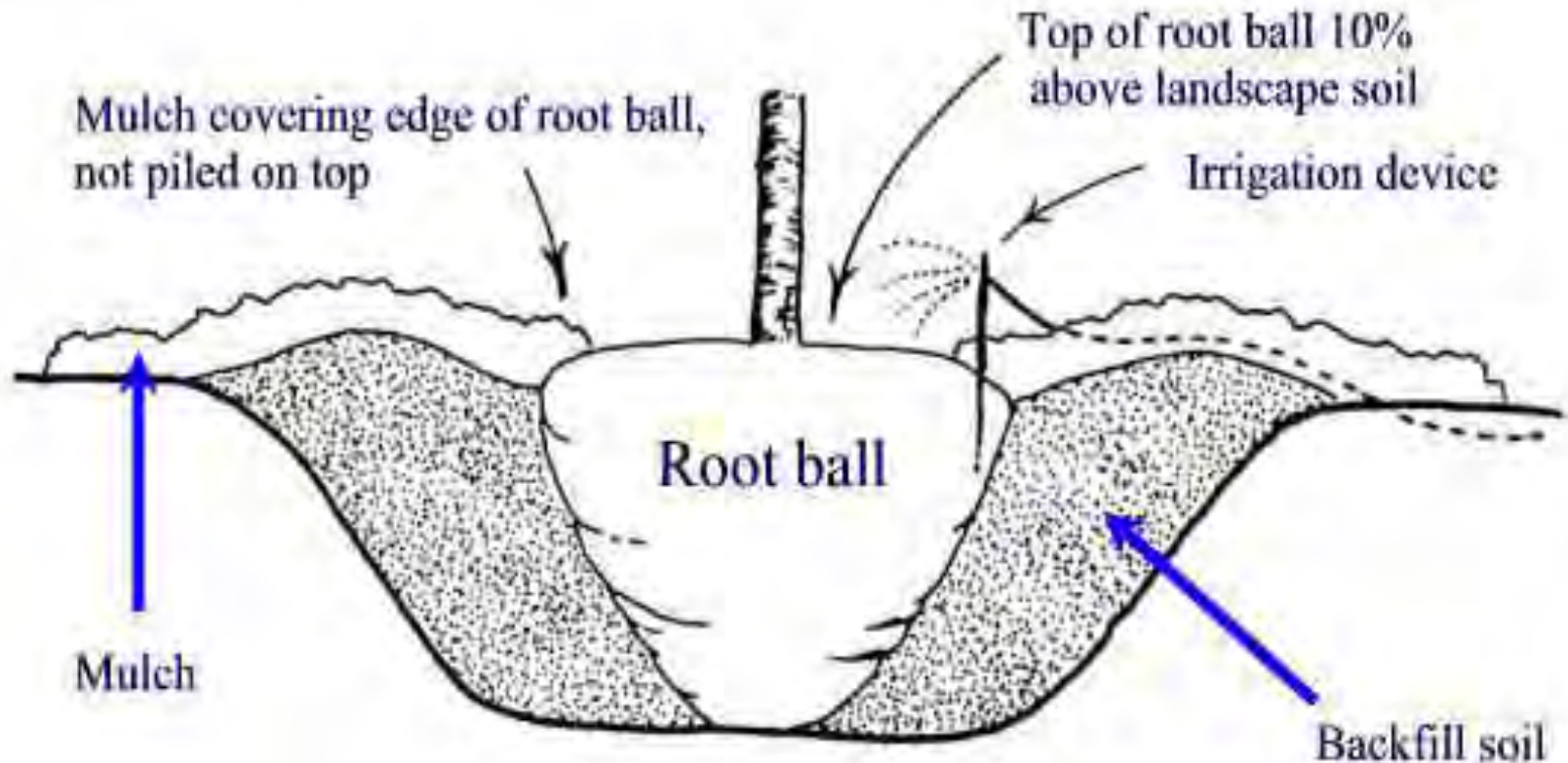
Correct – Trunk flare & top of 1st order roots at grade

MO



Incorrect - Trunk flare & 1st order roots buried

Right Plant, Right Place - Tool



Dr. Ed Gilman

Installation BMP's – Correct UF-IFAS Planting Detail

Right Plant, Right Place

Buyer beware. A quality landscape begins with quality plant material



Insist on Florida Grade No. 1 or better. Hire a certified landscape inspector trained in the Florida Grades and Standards!

MO

Right Plant, Right Place



Florida Department of Agriculture and Consumer Services
Charles H. Bronson, Commissioner

Division of Plant Industry
Richard Guskalla, Director

EXAMPLES	TYPE ONE MATRIX — SPREADING & ROUNDED SHAPES										EXAMPLES
	CALIPER	MINIMUM TREE HEIGHT	MAXIMUM TREE HEIGHT	MINIMUM CROWN SPREAD DIAMETER			MINIMUM B&B ROOT-BALL DIAMETER	MINIMUM GROW BAG ROOT-BALL DIAMETER	MINIMUM CONTAINER VOLUME		
				FL. FAN.	#1	#2					
apple, pitch-bauhinia bay, red-camphor tree carambola citrus dogwood, flowering fig, fiddle-leaf fig, rusty fig, weeping floss silk tree goldenrain tree gumbo limbo holly, round kapok laurel, Cuban-lychee loquat	1/4"	18"	30"	10"	8"	6"	6"	—	4" Sleeve	mahoe mango mangrove, black oak, laurel oak, live oak, sand live oak, water oak, white olive, black-olive, spiny black-pagoda tree, Japanese rubber tree, Indian-sausage tree shaving brush tree silk-cotton tree, red sycamore tamarind weeping willow	
	1/2"	24"	6'	14"	12"	8"	8"	—	1 Gal.		
	3/4"	4'	8'	30"	24"	18"	14"	—	3 Gal.		
	1"	5'	10'	36"	30"	24"	16"	12"	5 Gal.		
	1 1/4"	6'	11'	42"	36"	30"	18"	14"	7 Gal.		
	1 1/2"	7'	12'	48"	42"	34"	20"	16"	15 Gal.		
	2"	8'	15'	54"	48"	42"	24"	18"	15 Gal.		
	2 1/2"	9'	16'	60"	54"	48"	28"	18"	25 Gal.		
	3"	10'	18'	66"	60"	54"	32"	20"	45 Gal.		
	3 1/2"	11'	18'	6'	5 1/2"	5'	36"	24"	65 Gal.		
	4"	12'	22'	7'	6 1/2"	6'	40"	30"	95 Gal.		
	4 1/2"	14'	24'	8"	7 1/2"	7'	44"	36"	95 Gal.		
	5"	16'	26'	10"	9"	8"	48"	36"	95 Gal.		
	5 1/2"	17'	28'	11'	10"	9"	50"	—	200 Gal.		

Notes:

- Trees to be graded under this matrix are listed in the index of trees on pages 37-44.
- Any liner less than 1/4" caliper shall be a minimum of 12" in height, well-rooted in its container which shall not be less than 7" in diameter. Bare-root trees shall be so noted.
- Ball depth on B&B stock shall be at least 2/3 of the root-ball diameter shown. For trees larger than 5 1/2" caliper, root-ball diameter shall be 8-5" for each inch of tree caliper. Trees grown in soils with a high water table can have shallower root balls provided the root-ball diameter is increased to the next larger tree size in the table.
- Red or black mangrove may be a minimum of 18" overall height in a 1-gallon container, 24" overall height in a 3-gallon container.
- For the purpose of determining minimum root-ball size, cured trees can have a caliper up to 1" larger than indicated in the table.

Notes:

1. Trees to be graded under this matrix are listed in the index of trees on pages 37-44.
2. Any liner less than 1/4" caliper shall be a minimum of 12" in height, well-rooted in its container which shall not be less than 2" in diameter. Bare-root trees shall be so noted.
3. Ball depth on B&B stock shall be at least 2/3 of the root-ball diameter shown. For trees larger than 5 1/2" caliper, root-ball diameter shall be 8/5" for each inch of tree caliper. Trees grown in soil with a high water table can have shallower root balls provided the root-ball diameter is increased to the next larger tree size in the table.
4. Red or black mangrove may be a minimum of 18" overall height in a 1-gallon container, 24" overall height in a 3-gallon container.
5. For the purpose of determining minimum root-ball size, cured trees can have a caliper up to 1" larger than indicated in the table.

The Florida Grades and Standards is a regulatory document and is a wealth of practical, research-based information designed to render an un-biased evaluation of quality in Florida trees, shrubs and other landscape plants.

Right Plant, Right Place



Straps and Supports and
Strangle and Damage Trees...



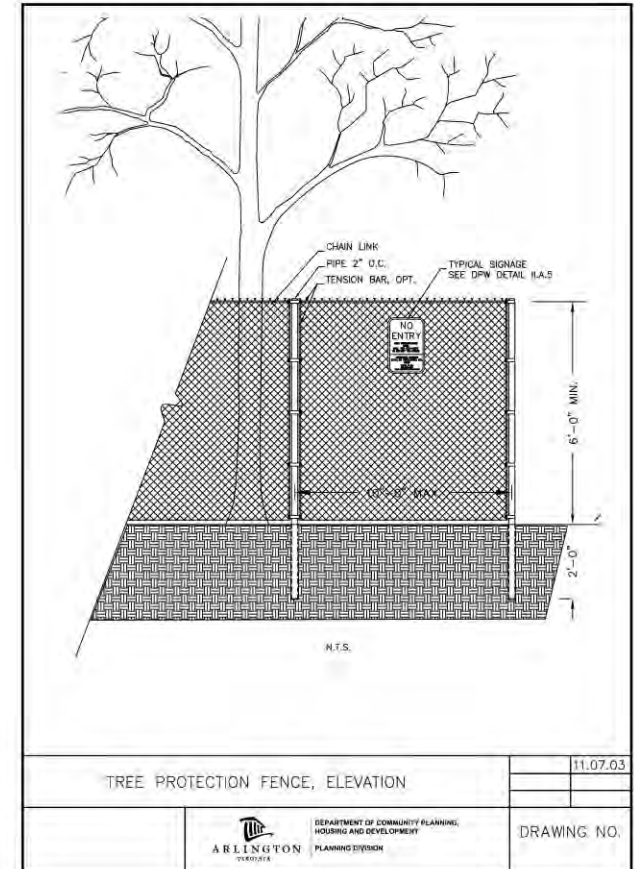
Remove them in a timely
manner: 6-9 months after
installation.

Right Plant, Right Place

On-Site Tree Preservation



Prior to, and during all phases of construction, protect trees from mechanical damage and soil compaction at least to the drip line.



Tree preservation survey
and tree protection detail

2. Water Efficiently

*Water only when needed.
Efficient watering conserves
water and reduces runoff.*

Planning decisions can ensure
that a minimum amount of
water is used and that waste is
reduced.



Water Efficiently- Micro irrigation



**Standard Spray Heads-
Higher Water Usage**



**Lower Water Usage with Micro
irrigation
FFL Demo Plot- Manatee County**

*Planting for different irrigation zones
High, medium and low water usage*

Water Efficiently-Plant Selection Tool

			
Scientific Common <i>Quercus shumardii</i> Shumard Oak	Scientific Common <i>Quercus virginiana</i> Live Oak	Scientific Common <i>Simarouba glauca</i> Paradise Tree	Scientific Common <i>Swietenia mahagoni</i> West Indian Mahogany
Reg/Native N 8-9a Yes	Reg/Native N C S 8b-10b Yes	Reg/Native S 10b-11 Yes	Reg/Native S 10b-11 Yes
G, H, S 55-80↑ 40-50⇒	G, H, S 40-80↑ 60-120⇒	G, H, S 30-50↑ 25-30⇒	G, H, S Fast 40-75↑ 40-60⇒
Soil pH, Txt ●●●○ Any	Soil pH, Txt ●●●○ Any	Soil pH, Txt ●●●● Any	Soil pH, Txt ●●●● Any
Soil Mst, Drgt ☹☹☹ High	Soil Mst, Drgt ☹☹☹ High	Soil Mst, Drgt ☹☹☹ Medium	Soil Mst, Drgt ☹☹☹ High
Light/Best Salt  M	Light/Best Salt   H	Light/Best Salt   H	Light/Best Salt   H
Wildlife  	Wildlife  	Wildlife 	Wildlife 
provides food for wildlife; tolerates occasionally wet soil; medium to high wind resistance	provides food for wildlife; not for small lots; susceptible to caterpillars, root rot and insect galls; tolerates occasionally wet soil; high wind resistance	yellow, summer flowers; medium to high wind resistance; don't plant near sidewalks and driveways (surface roots)	medium to high wind resist- ance; tolerates occasionally wet soil; susceptible to webworms

36

The Florida-Friendly Landscaping™ Guide to Plant Selection & Landscape Design



Florida-Friendly Landscaping™

[Home](#) [About FFL](#) [Contact Us](#) [Local Offices](#) [Partners](#) [FloridaYards.org](#)

Search

GO

FYN Homeowner Program

9 FFL Principles
Your County
Official Yard Recognitions
Florida-Friendly Living
Publications & Training
Remove Invasives

FYN Builder & Developer Program

Landscape Architect CEU Classes
Educational Services
Designations & Awards
Success Stories
Low-Impact Development
UF/IFAS Partnership at Hastings
Community Association Kit

Resources

[FYN Educators: Log In](#)

Florida-Friendly Landscaping™ PROGRAM

Florida-Friendly Landscaping™ (FFL) means using low-maintenance plants and environmentally sustainable practices. Learn how you can have a beautiful landscape that could save you time, energy and money while protecting our future. Find out more from your county's FYN program or from this web site and the FloridaYards.org companion web site of the FDEP Springs Initiative. Read more about the program...



For Homeowners

Solutions for your yard: all you need to know about tending a Florida landscape.

[More...](#)



Community Associations and Property Managers



The Nine FFL Principles

See the new E-learning Articulate **presentation**.

1. Right Plant, Right Place
(933KB pdf)
2. Water Efficiently
(688KB pdf)
3. Fertilize Appropriately
(965KB pdf)
4. Mulch
(515KB pdf)
5. Attract Wildlife
(401KB pdf)
6. Manage Yard Pests Responsibly



FYN Homeowner Program

9 FFL Principles

Your County

Official Yard Recognitions

Florida-Friendly Living

Publications & Training

Remove Invasives

FYN Builder & Developer Program

Landscape Architect CEU Classes

Educational Services

Designations & Awards

Success Stories

Low-Impact Development

UF/IFAS Partnership at Hastings

Community Association Kit

Resources

FYN Educators: Log In

GI-BMP Program

Program Overview

Training Schedule

Instructor Program

GI-BMP Manual

Certification List

Fertilizer Ordinances

Contacts

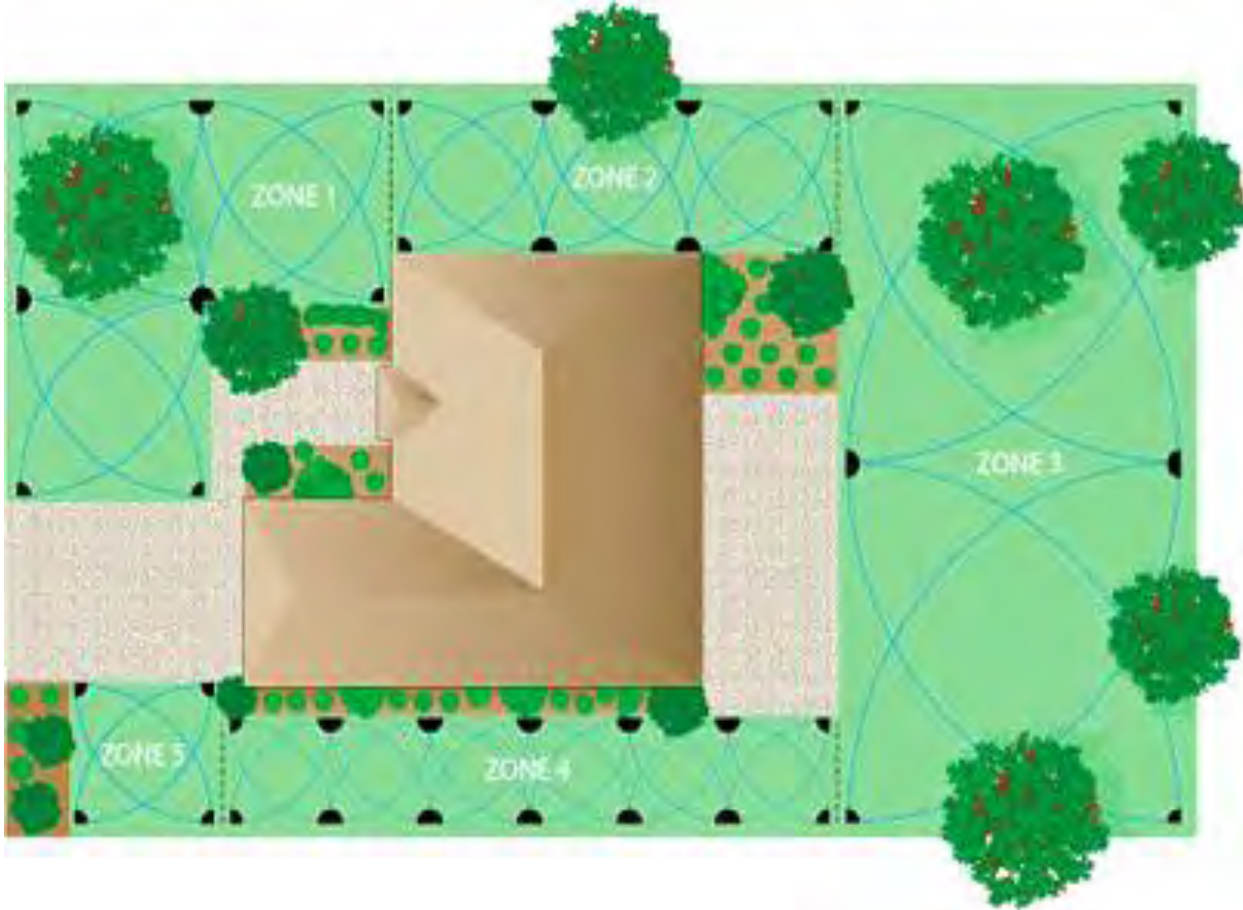
Florida Yards & Neighborhoods Publications

- Brochure
- Handbook
- The Florida-Friendly Landscaping™ Guide to Plant Selection & Landscape Design, 1st ed. (2010)
- How to convert a yard to Florida-Friendly Landscaping™
- Sample plant lists and designs for four Florida Regions —North, North Central, South Central, and South:
 - FFL Book Zone 8A-8B
 - FFL Book Zone 9A
 - FFL Book Zone 9B
 - FFL Book Zone 10
- Yard Recognition Checklist
- Videos
 - Developing a Better Way - Using Low Impact Development Practices
 - Florida Yards and Neighborhoods: Nine Landscape Principles
 - Creating A Florida-Friendly Yard
 - Landscaping for a Rainy Day
 - Secrets to a Florida Yard
- Articulate Flash eLearning Modules
 - The Nine Florida-Friendly Landscaping™ (FFL) Principles
 - How to use the Florida-Friendly Landscaping™ Plant List

University of Florida Publications

- Extension Publications

Water Efficiently



Residential property showing different irrigation zones based upon plant type and need. *Courtesy of St. Johns Water Management District*

Water Efficiently - Tool

Rain shut-off valves



3. Fertilize Appropriately

Fertilize Appropriately

More isn't always better.

Fertilizer overuse can be harmful to a property and the environment

Planners can ensure that the right fertilizer products are selected and applied appropriately to reduce their impact on the environment and discourage pests and diseases



Fertilize Appropriately - Example

- *Think before you plant....*
 - *(i.e. planting palms that we cannot properly fertilize and maintain.)*
 - *Why create “temporary” landscapes?*
 - *What would a landscape look like without maintenance and fertilizer?*
 - *Design with minimal maintenance in mind*
 - *Know the 2% phosphorus “rule” – don’t exceed 2% P!*

Fertilize Appropriately



MOQueen palms in decline due to nutritional deficiencies resulting in “frizzle top”

4. Mulch

Mulching reduces weeds, helps soil retain moisture and builds soil organic matter

Planners should ensure that mulch is used and applied appropriately and that sustainable mulch products like melaleuca mulch are selected



Mulch - Protecting Trees



No Volcanoes

Mulch - Self Mulching



Mulch - Protecting Trees

Maintain Tree Circles: Avoid mechanical damage from mowers and weed eaters



Mulch - Protecting Trees



Repeatedly hitting a tree with a lawn mower or weed whacker may cause irreversible damage

Weed whackers and lawnmowers that hit tree trunks week after week cause irreversible damage

Prevent Weed Whacking

5. Attract Wildlife

Attract Wildlife

Plants that provide food, water, and shelter can attract and conserve Florida's diverse wildlife

Planners can encourage the use of vegetation to attract wildlife to enhance the enjoyment of residents and increase the community's connection with nature



Attract Wildlife



TK

Hummingbird

6. Manage Yard Pests Responsibly

Manage Yard Pests Responsibly

*Implement an Integrated Pest
Management (IPM) Program
to safely manage pests in the
landscape*

Effective IPM will allow property
owners and managers to
reduce pest control costs and
maintain healthier landscapes



Manage Yard Pests Responsibly



Manage Yard Pests Responsibly

monitor for pests on a regular basis



More pest scouting - *photos courtesy of Karolynne M. Griffiths, USDA/APHIS/PPQ-CAPS*

7. Reduce Yard Waste

Recycle Yard Waste

Leaving grass clippings, leaves, and compost on-site returns nutrients to plants and reduces waste

“Leaf litter is free fertilizer”

Planners can encourage the use of landscape waste to save money and increase the health of plants

Reduce Yard Waste

- Planting plants that are slow growing and can reach their right size when planted in right place
 - Less pruning means less yard waste
 - Chose species that do not have heavy leaf litter
 - Wild Tamarind, Stoppers, Bridalveil vs. Calophyllum, Seagrape, Magnolia, Black Olive
- Placement site to hold or store landscape waste to be converted to composting

Reduce Yard Waste - Tool

Invoice

Date

5/31/2012

Invoice #

11714

Terms

Due upon receipt.

Bill To

Ship To

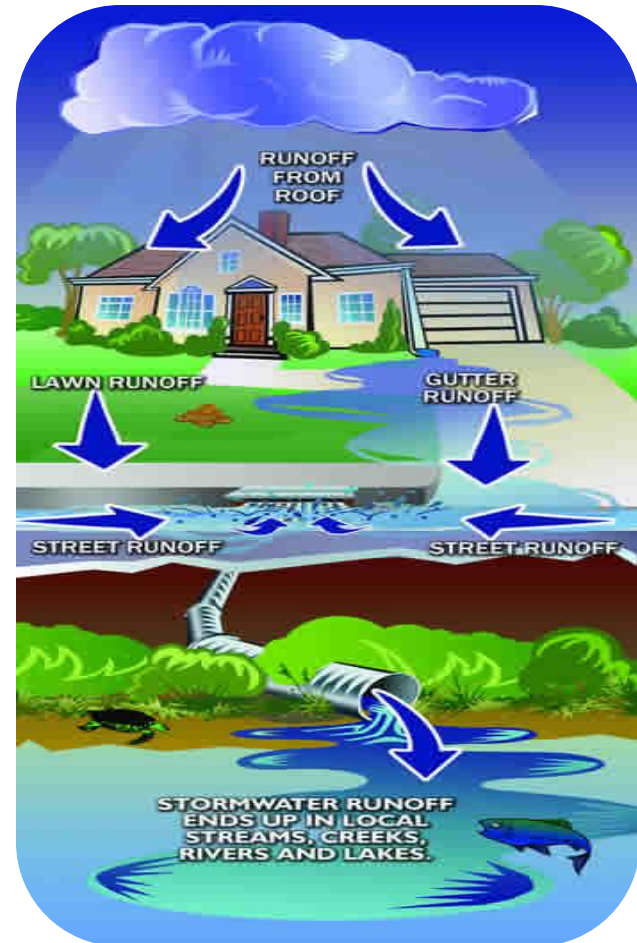
Q	Description	Rate	Amount
11	5/10/12 Disposal, pick up and haulage to dump facility, 11 yards	16.00	176.00

8. Reduce Stormwater Runoff

Reduce Stormwater Runoff

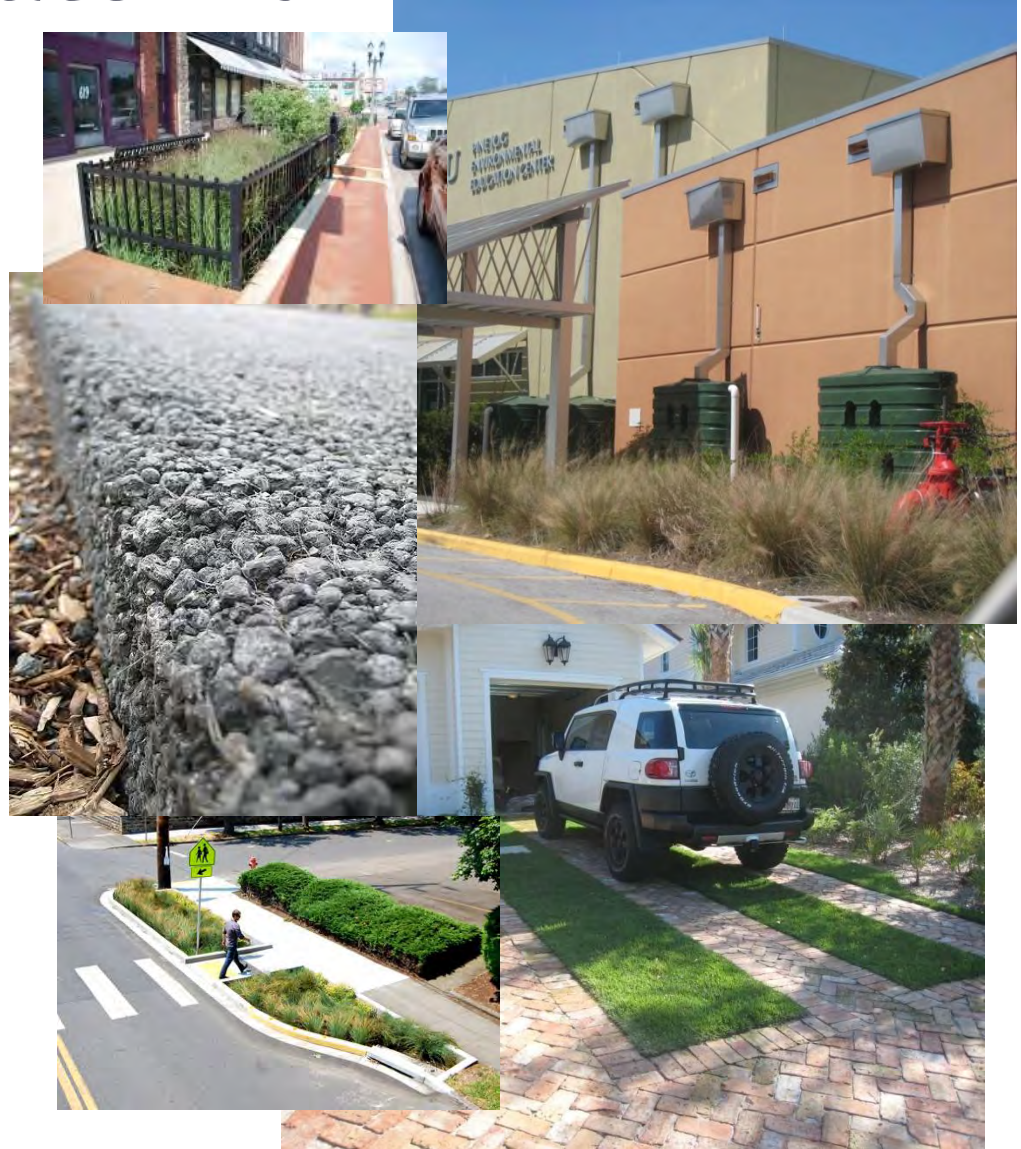
Water that runs off lawn and pavement carries pesticides, fertilizers, and harmful substances that contribute to nonpoint source pollution

Planners can use pervious surfaces, rain barrels, swales, and berms to reduce erosion, reduce pollution and keep water onsite



Reduce stormwater runoff

- Pervious surfaces
 - Filter pollutants, slows runoff
- Swales & Berms
 - Divert water & slow runoff
- Raingardens
 - Plants filter water and slow entrance into ground
 - Locate near paved surfaces or below drain spouts
- Stormwater Harvesting – Rain Barrels



Reduce Stormwater Runoff

- Stormwater Harvesting



Applications

TYPICAL MANAGEMENT PRACTICE



OFF-SITE REQUIREMENTS



50 foot ROW

Applications

Innovative Management

83

APPLIED STRATEGIES



Applications Perspective



BL

50 foot ROW

Reduce stormwater runoff

Typical management



Requires land purchase
Permanent annual loss of tax revenue
Long-term high maintenance costs
• Annual cost \$19,000

Reduce stormwater runoff

Sustainability saves long-term

Efficient Land Use



Case Study

Palm City Pervious

- Innovation and Sustainability does not mean more cost
- Pervious Asphalt
 - No Design
 - No Permit
 - No Infrastructure (pipes, gutters, curbing and sub grade)
- 80% Overall cost savings compared with Standard Asphalt



Reduce stormwater runoff

Innovative management



Utilize Right of Way
No loss of tax
revenue
Lower annual
maintenance cost

Reduce stormwater runoff

Life-cycle cost analysis

- Approved by Congress June 2012
- provision that calls for the use of total life-cycle cost analysis as part of the contract-awarding process for new federal projects



Life-cycle cost analysis (LCCA) is a method for assessing the total cost of facility ownership. It takes into account all costs of acquiring, owning, and disposing of a building or building system.

9. Protect the Waterfront

Protect the Waterfront

*Waterfront property is fragile
and should be protected from
pollution*

Planners can help to ensure that
waterfronts are protected for
the enjoyment of all



Protect the Waterfront



Protect the waterfront

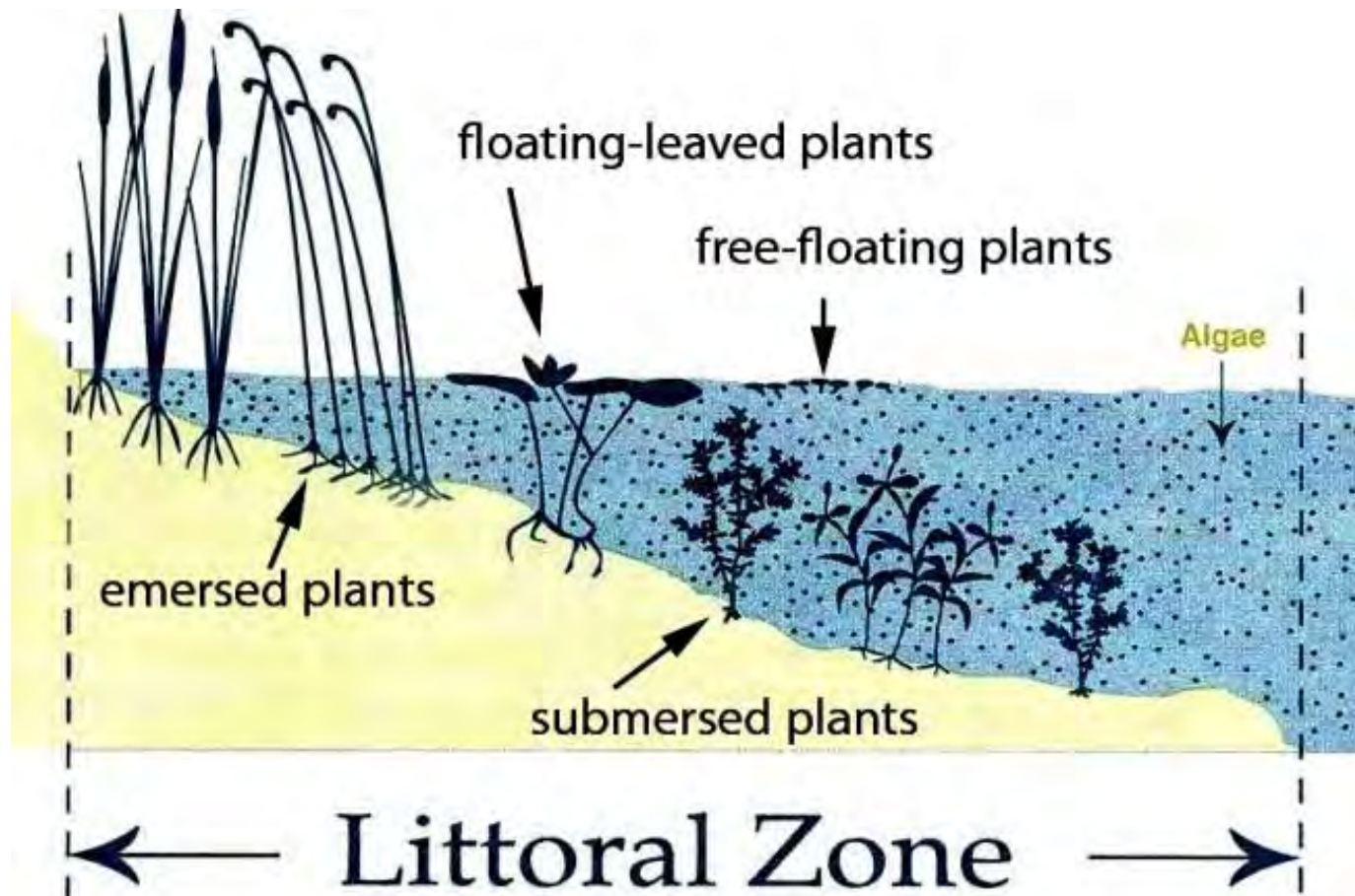
- The land we live on is directly connected to water
- Surface water eventually ends up here



Protect the Waterfront



Protect the Waterfront-Littoral



Florida-Friendly Landscaping™ PROGRAM



The Nine Florida-Friendly™ Principles

1. Right Plant, Right Place
2. Water Efficiently
3. Fertilize Appropriately
4. Mulch
5. Attract Wildlife
6. Manage Yard Pests Responsibly
7. Recycle Yard Waste
8. Reduce Stormwater Runoff
9. Protect the Waterfront

TK

TK

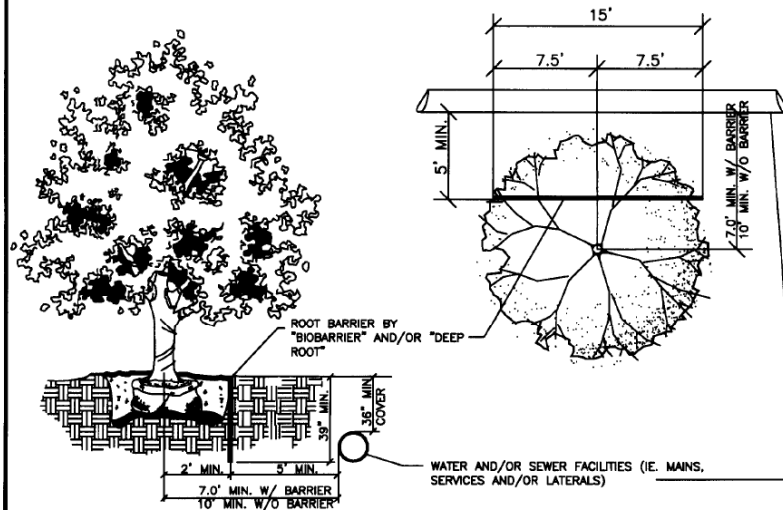
1

Landscape Notes

LANDSCAPE AND ROOT BARRIER NOTE:

Trees shown on this plan are for graphic representation only. Tree spacing is based on design requirements and the trees shown on this plans attempt to accomplish that spacing while maintaining the required setbacks from utilities. Trees may be field adjusted to avoid conflicts with driveways and underground utilities. In any case the trees shall be located in the filed in accordance with the planting details shown hereon.

Additionally, trees are to be installed with a ten foot (10') separation from any water or sewer main and/or service, hydrants, and lift stations. If a ten foot (10') separation cannot be achieved, the tree can be installed with a root barrier system. Refer to the "Root Barrier" detail for installation requirements.

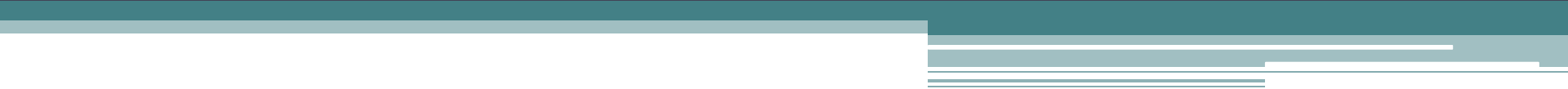


Typical Root Barrier Detail

Resources

- Sea grant Program website: flseagrant.ifas.ufl.edu
- Florida Friendly Website: FYN.IFAS.UFL.EDU
- Florida-Friendly Landscaping™ Guide to Plant Selection & Landscape Design:
fyn.ifas.ufl.edu/pdf/FYN_Plant_Selection_Guide_v090110.pdf
- EDIS: edis.ifas.ufl.edu
- www.martin.fl.us (*Departments: go to Community Development Department*)
- Feature Creature website:
entnemdept.ufl.edu/creatures

Thank you!

A series of horizontal lines in teal and light blue colors, located at the bottom of the slide. The lines vary in length and are stacked, creating a modern, layered effect.