GREEN GROWTH GUIDELINES

A Framework for Sustainable Development for Coastal Georgia

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What is Green Infrastructure?

An interconnected network of undisturbed natural areas and open space that helps preserve the values and functions of our watersheds and provides a wide array of benefits to both people and wildlife.

An ecological framework for environmental, social, and economic health... our natural life support system.

(Benedict and McMahon 2006)

Green Infrastructure Tools: practices and strategies that incorporate fundamental GI principles to improve water quality, air quality and habitats, protect human health and restore naturally functioning ecosystems.
## Green Infrastructure Stormwater

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<td>Dry Swales</td>
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</tbody>
</table>
The recommended approach looks like this......

Better Site Planning

Better Site Design

Low Impact Development Practices

Stormwater Management Practices

Receiving Waters

Environmental Protection Division
rather than this.....
GI Goals

Protect the Environment & Human Health

- Reduce runoff rates, volumes and pollutant loads
- Protect of the integrity of streams, wetlands, riparian areas
- Preserve connectivity of areas that provide valuable habitat for aquatic and terrestrial organisms

Save Money and Time

- Reduce or eliminate need for larger, more expensive practices
- Reduce maintenance
- Reduce overall cost of development while maintaining or increasing overall value of project
- Streamline or eliminate expensive, time consuming federal permitting
Healthy systems require a network of vital connections
Using our “Natural Capital” (intact natural environment) and designing with the land to provide important ecosystem services:

- Flood Control
- Pollutant Removal
- Recreation
- Water and Air Quality Protection
- Energy Efficiency
- Carbon Sequestration
- Groundwater Recharge
Green Infrastructure Toolbox

- Green Growth Guidelines (G3)
- GA SW Mgmt Manual Coastal Stormwater Supplement (CSS)
- Coastscapes Communities Program
- Coastal Model Ordinances
- GA Statewide Water Plan
- Governor’s Coastal Comprehensive Plan
- Georgia State Wildlife Action Plan and Coastal Biological Assessment
Green Growth Guidelines - G3

- Development tool geared for the coast
- Site-scale approach
- Intended for broad audience
- Environmental, economic, social benefits
Contents of G3

- Comprehensive Planning Methods
- Conservation Design Principles
- Low Impact Construction Practices
G3 Overview

- Site Fingerprinting Using GIS & GPS
- Designing with the Landform
- Low Impact Stormwater Management
- Streambank Stabilization
- Recreational Facilities (Marinas, Golf Courses)
CH. I Site Fingerprinting

- Utilize GIS/GPS Technology
- Identify Existing Conditions
- Consider Constraints & Opportunities
- Analyze Alternatives
- Predict Results
## Mapping the Site

- Topography
- Hydrology
- Infrastructure
- Land use
- Zoning
- Significant landmarks
- Wetlands & waterways
- Groundwater recharge areas
- Floodplain
- Tree Cover
- Soils
- Wildlife Habitat
- Historic & Archeo Resources
- Setbacks & Buffers
- Essential Fish Habitat
- Shellfish Harvesting Areas
Topography

Exhibit 1: Topographic & Hydrologic Features
This exhibit displays a topographic map compiled in 1973 by the U.S. Geological Survey (USGS). This map shows the general topography and hydrology of the site and the surrounding area. Topographic maps illustrate a three-dimensional configuration of the Earth's surface (the actual ground elevation) using contour lines. Broadly spaced contours represent gentle slopes while close contour intervals indicate steep slopes. These maps show major geographic features including mountains, hills, rivers, valleys, and depressional wetlands. Also represented on the topographic map are man-made features such as roads, churches, railroads, land boundaries, and buildings. Topographic maps are bounded by rectangular-shaped areas defined by latitudes and longitudes separated at 30', 15', or 7.5' intervals. These "quadrangles" are named by the most prominent geologic feature or the largest town. The 124-acre project site known as the Tupelo Tract is located on the Waterston Quadrangle.

On this map, the low-lying Bald Cypress Swamp is graphically illustrated by its defining boundary identified by the twenty-foot contour line. Also depicted is the presence of an intermittent stream flowing through the tract. This stream flows beneath the Tupelo Parkway and eventually discharges into Bald Cypress Swamp. Several borrow pits and cleared areas located around the site are instantly recognizable, as well as a slanted railroad to the south of the subject parcel. Distances and the location of significant landmarks are also ascertainable from the topographic map. Approximately 4,800 linear feet of the Tupelo Tract extends east-west along the Tupelo Parkway. Breeching the seasonal ridge defining Bald Cypress Swamp is Listing Oak Road, where Old Juniper Church and Honey Ridge Farms are located. Further east on Listing Oak Road, approximately 300 feet from Benchmark 23, is County Road 13 which runs south from Tupelo Parkway, south to Listing Oak Road through the heart of the uplands portion of the tract. This access road location, the site's proximity to main thoroughfares (Tupelo Parkway and Listing Oak Road) and the concentration of uplands as a contiguous body on the northern portion of the property make the tract ideal for residential development.

Tupelo Tract: 124 Acres
1 inch equals 1,000 feet
Infrastructure

Exhibit 2: Available Infrastructure

This exhibit is derived from the layering of 2002 transportation and 2003 utility information maintained and updated by Calhoun County and the Georgia Department of Transportation (GDOT) with black and white aerial photography distributed by Earthdata International, Inc. This map shows the location of roads and existing utility easements in the immediate area. This exhibit was designed to reveal the available connections of the Tupelo Tract to existing gas and power easements.

Note the existing utility easement maintained by Calhoun County running alongside the Tupelo Parkway and the property access road, County Road 13 which offers connection to municipal utilities such as electricity, gas, water, sewer, and transmission lines. With this infrastructure already in place, the monetary costs associated with the project decrease dramatically, as does the disturbance required to install them. Furthermore, the existing road crossing and utility easement also reduces the need for further environmental impacts to the wetland system, benefiting both the natural area and the developer by eliminating engineering, construction, and permitting costs associated with such impacts. In addition, County Road 13 provides connection to a main thoroughfare that runs up and down the entire Georgia coast. An interchange for the Tupelo Parkway is located within a ¾ mile of the property; an indication the site is accessible yet somewhat secluded by adjacent natural areas.
Figure 3 is a map of land uses compiled by the Calhoun County Planning Commission and Waterford Building and Zoning Commission. Examining surrounding land uses is an important factor in determining the placement of future development. Land use maps offer insight to amenities available to serve residential communities such as grocery stores, shopping centers, and recreational areas. Benefits to a commercial development could be an analysis of current commercial districts, proximity to competitors, and accessibility to major thoroughfares. A commercial development could benefit from an analysis of existing commercial districts, proximity to competitors, and accessibility to major thoroughfares. Understanding the surrounding land uses helps define the market conditions.

The current land use of the subject tract is predominantly single-family (low to medium density) residential with clearly designated areas of wetlands, marsh, and recreational uses. The property to the north of the tract across the Tupelo Parkway is largely undeveloped. The properties along the Tupelo Parkway interchange are predominately retail, office, and commercial businesses which are conveniently located near the proposed development. In addition, adjacent public and institutional uses provide recreational opportunities. The context of the subject tract indicates an ideal location for a residential development.

**Landuse Classifications**

- Retail, Office & Commercial
- Single Family Residential
- Agriculture & Forestry
- Recreation
- Wetlands & Marsh
- Public & Institutional
- Recreation
- Industrial
- Mobile Homes
- Undeveloped

Tupelo Tract  
Roads  
Lakes

1 inch equals 2,000 feet
Sites of Interest

Exhibit 4: Significant Landmarks & Other Sites of Interest

 Parcel information compiled by Cobb County and data from the U.S. National Park Service was utilized to build this map. This exhibit reveals some sites of interest located in close proximity to the Tupelo Tract including nearby churches, cemeteries, historic sites, recreational areas, wildlife preserves and adjacent residential developments. Most features recorded on a plat are listed within the parcel layer and are available to the viewer instantly as a particular parcel is selected. Information within the parcel database was queried to determine the value of the subject properties and adjacent tracts, the owner information, zoning designation, deeded acreage, and significant landmarks in the immediate project vicinity. Historic sites and structures were located by querying the National Register of Historic Places (NRHP) database. In addition, archaeological sites were identified using report data from the Georgia Archeological Site File (GASF) database.

This map shows the Tupelo Tract is bordered on the west by the Ashley Creek Wildlife Preserve and to the southwest by McDonough Plantation, a national historic site where a historic 18th century tabby house and rice mill are located. Juniper Crossing, a residential community is located southeast of the tract and Waterston Park, a county recreational area located east of the Tupelo Tract. This map also assisted in planning for future green space areas and trail connections.

Sites of Interest

- McDonough Plantation National Historic Site
- Juniper Crossing Residential Community
- Waterston Park Recreational Area
- Ashley Creek Wildlife Preserve
- Additional Green Space Sites
- Juniper Creek Cemetery
- Tupelo Tract

1 inch equals 1,000 feet
Wetlands

Exhibit 5: Wetlands, Streams, & Groundwater Recharge Areas

Figure 5 depicts the wetlands, marshes, ponds, lakes, streams, riparian forests, and significant groundwater recharge areas located within the met and the immediate area. This map was used to locate the approximate wetland and stream boundaries so to avoid and minimize impacts to these areas to the greatest extent possible. These data layers were supplied by the U.S. Geological Survey (USGS) and the U.S. Fish & Wildlife Service (USFWS). In the mid 1970's, using aerial photography combined with information from NRCS soil surveys, the USFWS initiated the National Wetlands Inventory (NWI) program. The program was implemented to map the Nation's wetlands and report on their status. Each wetland is defined by type of vegetation and the area's proximity toward inundation (i.e. broad-leaved deciduous, seasonally flooded or needle-leaved, semi-permanently flooded). The presence and extent of the Ashley Creek and its large contiguous swath of riparian wetlands known as the Bald Cypress Swamp is apparent within the Topolo Tract. A large portion of the Topolo Tract is highland, while its southern, eastern and western borders are composed of deciduous semi-permanently flooded and semi-flooded wetlands.

Wetland systems are essential to flood control and provide habitat for a diverse palette of plants and animals, some of which are endangered or threatened. The NWI enables the planner to design a layout which avoids and minimizes impacts to the system. In addition, this map can be used to locate future development, specifically stormwater drainage systems and septic systems, away from major groundwater recharge areas and wetlands. Existing aquifer resources can also identify necessary buffers and conservation areas.

NWI Codes

- Broad-Leaved Deciduous Seasonally Flooded
- Needle-Leaved Deciduous Seasonally Flooded
- Deciduous Semi-Flooded
- Deciduous Semi-permanently Flooded
- Needle-Leaved Evergreen Seasonally Flooded

Groundwater Recharge Area

Topolo Tract

Rural Roads

Streams

Lakes

1 inch equals 1,000 feet
Floodplain and Elevations

Figure 6: Floodplain and Elevations

Exhibit 6: Floodplain and Elevations

This exhibit shows the floodplain and elevation contours produced by the Federal Emergency Management Agency (FEMA). The floodplain is depicted with different zones, each indicating a specific elevation range. The map shows the project site located outside the floodplain, while most of the surrounding area northeast of the site is located within an area of flood concern. The map clearly indicates the area within the Tepco Tract north of County Road 13 is 18 to 24 feet above mean sea level, while the area south, northeast, and southwest of County Road 13 has a peak elevation of 20 feet and averages somewhere around 18 feet above mean sea level. These dimensions reflect natural drainage toward the lower, southern portions of the property, specifically toward the Ashley Creek. This information was utilized to determine the location of roads, stormwater treatment practices, and the general layout of the residential home sites.

Elevations

- 0.0 - 18.01 - 19.0
- 0.01 - 15.0
- 15.01 - 17.0
- 17.01 - 18.0
- 19.01 - 20.0
- 20.01 - 22.0
- 22.01 - 24.0

Flood Zones

- A
- X

Legend:

- Tepco Tract
- Lakes
- Roads
- Streams

1 inch equals 800 feet

0 415 830 1,660 Feet
Vegetation Type/Extent

Exhibit 7: Vegetation Types & Extent of Coverage

The U.S. Geological Survey supplies Color Infrared Aerial Photographs (CIR) of most of the United States. Each CIR is bound by the same coordinates as used to define the quadrangles of USGS topographic maps. This is the CIR of the Watertown Quadrangle taken in 1999. The aerial photograph was used to determine potentially wet areas within and adjacent to the site. This photograph displays bare signatures emitted from the terrain in a range of colors from red to black. Wetlands, streams, marshes, lakes, and ponds display generally as black, indicating deep water; lighter shades of blue represent seasonally flooded forest wetlands; greens blue indicate emergent wetlands and marshlands. Uplands typically show as a range of deep blue/green to pink depending on the density of vegetation cover. The denser the vegetation the more intense the red or brownness. Average tree cover can be quickly calculated when assessing site suitability. The type of indigenous trees and vegetation types within and around the subject tract can be identified and quantified on this coverage by recognizing its characteristic signature. The physical condition, growth stages, and approximate age of the vegetation can also be inferred. Stressed vegetation, old growth forests, and past forestry and agricultural practices can be determined by viewing this type of imagery.

The uplands within the Tupelo Tract appear to be covered by mostly pine forest mixed with some poplar and sycamore. The viewer can infer from the light blue signature of this area and its proximity to the creek that it is most likely bottomland hardwood forest comprised of pines, maple, and cypress. The wetlands appear to have been tampered in the past and re-planted with pines evident by linear features (crevices) and their associated bright red trees (upland species) intermingled among the dark blue tones indicative of wetlands. Also note a faint blue signature north of County Road 13 and generally located within the uplands of the Tupelo Tract. This is a low-lying area potentially subject to flooding (floodplain and Elevations) and is most likely an isolated wetland due to its proximity to the Black Cypress Swamp and Ashley Creek. CIR photography makes these systems immediately apparent to the viewer and can be used by site designers to avoid and minimize impact to these areas during the planning phase of development. In addition, this imagery greatly aids in the planning of tree savanna areas timber harvest areas, buffer and fencing trails.
Exhibit 8: Soils Analysis

This soil map was taken from the Soil Survey of Calhoun County generated in 1977 by the Natural Resources Conservation Service (NRCS). Soils are important for many reasons; they contain plant and animal life; they regulate the flow and filtration of contaminants in runoff; and they are critical for locating septic systems and where engineering foundations for roads and buildings. A soil survey depicts soil boundaries by series with supporting tables of information on soil properties. The plasticity, drainage capacity, stability, permeability, and shrink-swell potential of each soil series are described in detail within the database. Building lots and supporting infrastructures can be located based on the suitability of certain soils and their intended use.

Most of the upland soils contained within the Tupelo Tract belong to the Lakeland, Wahsee, and Ocella Series. These series are generally sandy, well-drained soils adequate for most road and building foundations, as well as for stormwater detention facilities. The Ashley Creek and surrounding areas contain Ellabelle soils. Ellabelle is a poorly-drained wetland soil that should be avoided with structural foundations, especially sites supported by septic tanks.

Soil Types
- Albany
- Craven
- Ellabelle
- Ocella
- Mascotte
- Olustee
- Ogeechee

Hydric Soils Shown Stippled in Blue May Indicate the Presence of Wetlands
- Tupelo Tract
- Streams
- Lakes
- Roads

1 inch equals 1,000 feet
Setbacks and Buffers

Exhibit 9: Areas of Special Concern

with Setbacks and Buffers

Exhibit 9 layers U.S. Fish & Wildlife Service (USFWS) maps of critical habitat and species of concern with federal, state, and county threatened and endangered-listed species lists as well as actual field survey information conducted by the Ashley Creek Wildlife Preserve. This map was used to determine if species of concern and their critical habitats exist on the subject tract. Since the subject site is located near a freshwater stream and a large system of bottomlands, essential habitat is available for potential threatened and endangered species. A threatened and endangered species survey was conducted for Ashley Creek Preserve and the immediate areas. GIS was used to locate and map the species and their habitat in the field. This information was then imported to GIS where it was viewed and manipulated to determine the amount of space required to sustain these species once the Tupelo Tract is developed.

Buffers are applied in varying widths to essential habitat including stream and wetlands depending on the habitat requirements of certain species. The state mandates a 50' buffer for streams that support or could support trout and 25' for other streams, lakes, and marshlands. In addition to these buffers, there are species of concern that require buffers of various widths for adequate protection. The Ashley Creek was subject to a 50' buffer due to the presence of protected fish downstream; the Bald Cypress Swamp requires a 25' buffer along its boundaries. In addition, there were several species of concern in the area that require buffers, including a Bald Eagle (1/4 mile), Gopher Tortoises (100'), and Hooded Pitcher Plants (25'). These buffered areas and the resources within them are considered primary and secondary conservation areas. These areas can be beneficial to a development as they form a large contiguous green space available for recreational use such as hiking and nature watching.

- Hooded Pitcher Plants 25' Buffer
- Gopher Tortoise Burrow 100' Buffer
- Essential Fish Habitat
- Bald Eagle's Nest 1/4 Mile Buffer
- Protected Species Buffers
- Buffered Area 64 Acres
- Wetland Buffer 25'
- Bald Cypress Swamp
- Stream Buffer 50'
- Tupelo Tract

1 inch equals 1,000 feet
Coastal Resources

Exhibit 10: Downstream Coastal Resources of Concern

This map was assembled from USGS color infrared photography and coastal data sets compiled by the Georgia Department of Natural Resources (GADNR). Figure 10 reveals the coastal resources located within a ½ mile downstream of the Topeekegee. The Ogeechee Creek eventually discharges into the Ogeechee River which outfalls into a system of marshlands, hammocks, and beaches all of which are areas vital to the existence of fish, crab, shellfish, and migratory birds that inhabit these areas. This information can be used to avoid impacts to the nearby marsh ecosystem by implementing measures that improve downstream water quality and protect resident and transient animal populations simultaneously. For example, upstream development with detention ponds, bio-swales, and forested stream buffers capture and store stormwater runoff before it enters creeks and marshes lessening the impact to those downstream species and their habitats. In addition to upstream improvements, waterfront development must give special consideration to storm surge, parking lots, and turf blends since pollutants from these areas can cause serious degradation to coastal ecosystems. Shellfish and harvest areas have strict water quality standards imposed by the U.S. Department of Agriculture (USDA) regarding nutrient loadings, turbidity, dissolved oxygen and especially local clostridial bacteria (most often related to septic tanks). Waterfront development setbacks must be greater near these areas to assure that septic systems’ effluent does not reach these harvest areas via shallow groundwater. Community waste treatment systems, whether sewer or on-site systems with a common drainfield set back as far as possible from the water would be an ideal design for these areas.

This photography can also be used for river and beach erosion studies. Accreted sand beaches and dunes as well as areas of tidal creek and channel shoaling are evident from an aerial view. Coastal estuaries, marshlands, rivers, and creeks play a vital role in the proliferation of fish, crab, and shellfish populations. For this reason, these areas deserve special planning and design measures that serve to protect these resources in perpetuity. The sustained health of these resources can provide endless commercial and recreational opportunities to residents and visitors including fishing, boating, kayaking and swimming.
Exhibit 11: Overall Composite: Buildable, Primary, & Secondary Conservation Areas

Figure 11 is a compilation of previously analyzed individual site characteristics. These features are classified into three main areas: Primary Conservation, Secondary Conservation, and Actual Buildable Areas. Primary conservation areas include the Ashley Creek and the Bald Cypress Swamp. These areas are considered essential fish and plant habitat and should be preserved to the greatest extent possible. Secondary conservation areas denote areas to be considered during site design for additional protection such as wetlands, groundwater recharge areas, and downstream resources. By viewing an overlay of these conservation areas, a viable buildable area for the Tupelo Tract was determined and quantified. The "development envelope" consists of 124 acres, including standard setbacks and buffers, mostly located on the upland, north of the Bald Cypress Swamp. The remaining portion of the property comprises a preserved area of approximately 64 acres, almost all within Bald Cypress Swamp and Ashley Creek.

Primary Conservation Areas
- Bald Cypress Swamp
- Ashley Creek

Secondary Conservation Areas
- Buffered Area 61 Acres
- Wetland Buffer
- Stream Buffer
- Actual Buildable Area: 124 Acres
- Tupelo Tract
- Lakes
- Roads

1 inch equals 1,000 feet
CH. II
Designing with the Landform

- Simple, intelligent design
- Design with nature
- Increased value, cost-savings
Conventional Site Plan
Conventional Lot

Small wooded area preserved around property line

Most of lot grassed

Driveway 100' + long

Typical Lot Development - Conventional

Figure 2.6.2.1.a - nts

Matthew R. Baker, ASLA
Community Preserve Lot

Typical Lot Development - Community Preserve

Matthew R. Baker, ASLA
Village Site Plan
Village Lot

Two story house behind street trees with front porch

Alley (permeable paving) with bioretention along edges

Short driveway

Two story garage with affordable apartment above

Short driveway

Neighborhood street with parking and sidewalk one side

Typical Lot Development - Village
Figure 2.6.2.3.a - nts
Matthew R. Baker, ASLA
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<th>Conventional</th>
<th>Community Preserve</th>
<th>Village</th>
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<td>Total Site Area</td>
<td>188.6</td>
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<td>188.6</td>
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<tr>
<td>Total Uplands</td>
<td>123.9</td>
<td>123.9</td>
<td>123.9</td>
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<tr>
<td>Disturbed Footprint</td>
<td>54%</td>
<td>26%</td>
<td>34%</td>
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<tr>
<td>Total Gray Space</td>
<td>12%</td>
<td>11%</td>
<td>17%</td>
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<tr>
<td>Upland Greenspace</td>
<td>18%</td>
<td>61%</td>
<td>48%</td>
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<tr>
<td>Greenspace (w/wetlands)</td>
<td>46%</td>
<td>74%</td>
<td>66%</td>
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<tr>
<td>Greenspace (w/on lot)</td>
<td>61%</td>
<td>79%</td>
<td>71%</td>
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<tr>
<td>Lot Yield (Net of Upland)</td>
<td>1.1 dua</td>
<td>1.1 dua</td>
<td>2.0 dua</td>
</tr>
<tr>
<td>Total Impervious (per lot)</td>
<td>4869 sf</td>
<td>4125 sf</td>
<td>3118 sf</td>
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<tr>
<td>Stormwater Runoff (per lot)</td>
<td>2.1 cfs</td>
<td>1.4 cfs</td>
<td>1.0 cfs</td>
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<tr>
<td>Total Cost (w/ impact fees)</td>
<td>$1.4 M</td>
<td>$1 M</td>
<td>$2.6 M</td>
</tr>
<tr>
<td>Total Cost (w/o fees)</td>
<td>$1 M</td>
<td>$680k</td>
<td>$1.8 M</td>
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<tr>
<td>Gross Profit Margin (w/fees)</td>
<td>36%</td>
<td>47%</td>
<td>51%</td>
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<tr>
<td>Gross Profit (w/o fees)</td>
<td>41%</td>
<td>52%</td>
<td>56%</td>
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Water Quality

- Interaction
  Vegetation-Soils
- Infiltration-Filtration
- Microbial Activities
- Immobilizes-Removes
  Pollutants
- Erosion-Sedimentation
CH. III
Stormwater Management

- Multi-purpose
- Flood Relief
- Control NPS
- Wildlife Habitat
- Enhanced Appearance
Stormwater Pond/Forebay

- inlet
- pedestrian path / maintenance access
- forebay
- forebay dam in existing undisturbed soil, 6" below normal water surface
- high wetland shelf
- safety bench
- low wetland shelf
- limits of grading
- stabilize slopes with native vegetation
- 6' deep pool
- outlet structure
- stable outlet
Bio-Retention Areas

- storm inlet (beyond)
- amended soil
- 6" water ponding depth
- curb openings with energy dissipators
- shoulder behind curb

Additional flood storage during high flow events
Emergent plantings
Limits of excavation

Filter fabric
8" perforated drainage pipe w/ filter sock
Drainage layer (clean sharp sand or #57 gravel)
Rain Gardens

No liner or geotextile fabric allows the in-situ soils to infiltrate to their maximum capacity.

In-situ soils must have a high porosity to allow runoff to infiltrate at a rate of greater than 1"/hr.

Soil medium consisting of 50-60% sand, 20-30 top soil, and 20-30% leaf compost allows a high infiltration capacity.
Residential Application
Commercial
Industrial
Transportation
Green Roofs

- Versatile Application
Permeable Paving
CH. IV
Streambank Stabilization

- Natural & Effective Solutions
- Native Trees & Plants
- Habitat
Mimic Natural System

- Wildlife habitat
- Overhead cover for fish
- Shading to maintain cooler water temperatures
- Improved water quality
- Organic food supply for aquatic invertebrates
- Filter pollutants and sediment from runoff
- Roots stabilizing streambank
Bio-Engineering

- Slope & Grade Banks

- Plant Native Vegetation
Temporary Solutions
Fiber Rolls, Geo-grids
Permanent Reinforcement
Gabions, Cribwalls, Revetments
G3 is available on the web

www.gadnr.org

Coastal Resources-Coastal Management Program