

Eco-Stone® ...an Integral Part of Efforts to Maintain Environmental Sustainability Within a Low-Impact Development.



The Madera Community
Gainesville, Florida



Developed to reduce stormwater run-off while maintaining a high level of natural filtration, Eco-Stone was the ideal choice.



Manufactured by
Oldcastle Coastal, Gainesville, Florida

Site Design

Basic LID strategy for handling runoff is to: 1) reduce the volume of runoff and 2) decentralize flows. Madera's site design addressed both of these issues with the following guidelines:

□ **Planning site** layout and grading to natural land contours can minimize grading costs and retain a greater percentage of the land's natural hydrology. Contours that function as filtration basins can be retained or enhanced, and incorporated into the landscaping design. The survey established that there were two existing low-lying areas that would control 70% of stormwater for the entire site. These smaller retention/detention areas allow localized filtration rather than carry runoff to a remote collection area.

□ **The topography survey** and existing trees drove the site design. The roads and lot locations worked around existing tree groves creating winding roads and sidewalks weaving in and out of tree groves. The lots were strategically placed so that the existing tree canopy could be used as shading. This helped to limit clearing that minimized compaction. Compaction of the earth by the construction vehicles can decrease infiltration by 60–80%.



□ **Decreasing impervious surfaces** can be a simple strategy to avoid problems from stormwater runoff and water table depletion, by reducing surfaces that prevent natural filtration. Reducing roadway surfaces can retain more permeable land area. The street design at Madera helps to limit clearing and compaction with streets that are 20 feet wide compared to an average residential street of 35 feet. All roads were designed to existing grade to eliminate the need for both traditional curb and gutter or grass swales, reducing the concentration of stormwater runoff. This greatly reduces the pavement area needed for circulation. Shared driveways at Madera helped reduce pavement needs and pervious paving stones have increased infiltration.

□ **Infiltration storage tank systems** can be designed to store rainwater for dry-period irrigation, rather than channeling it to streams. Madera's infiltration tanks hold up to a third of roof run-off.

□ **Native landscaping**, works with preexisting conditions, particularly climatic. The health of Florida's estuaries, rivers, lakes and aquifers depends partly on how the yard is landscaped and maintained. Florida-friendly landscaping emphasizes these major principles that can create and maintain beautiful lawns and gardens:

- Right Plan, Right Place
- Water Efficiently
- Fertilize Appropriately
- Mulch / Recycle
- Control Yard Pests Responsibly
- Reduce Stormwater Runoff
- Protect the Waterfront
- Attract Wildlife

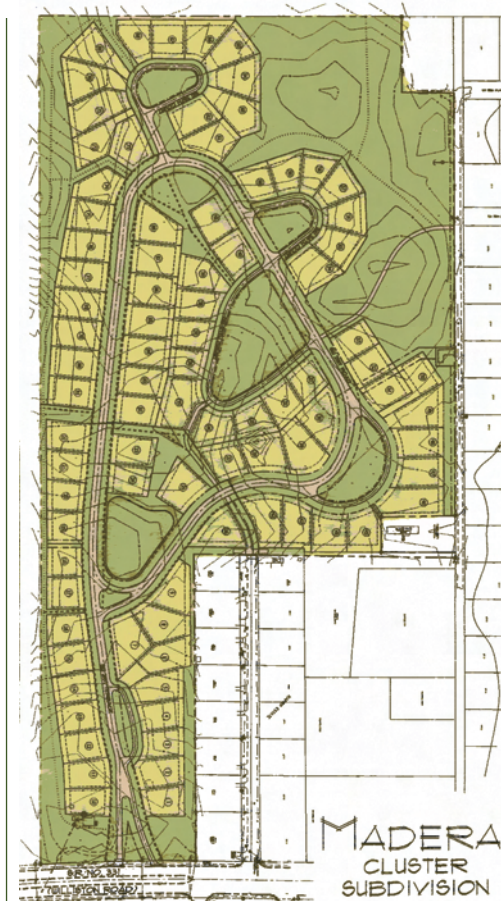


Low Impact Development (LID) strategies strive to allow natural infiltration to occur as close as possible to the original area of rainfall. By engineering terrain, vegetation, and soil features to perform this function, costly conveyance systems can be avoided, and the landscape can retain more of its natural hydrological function.

Within the Madera Community, Low Impact Development practices dovetail with “green” building practices that incorporate environmental considerations into all phases of the development process.



The Madera community has been designed for resource and energy efficiency, indoor environmental quality, environmental sustainability, durability and cost effectiveness. It was the intent of the developers to design and build housing that is exemplary in energy performance and sustainability features.



Gainesville, Florida

Other Technologies

Located on a fully wooded 44-acre site in Gainesville, directly adjacent to the University of Florida campus, Madera consists of 80 lots being developed by Green Trust, LLC, and built by three builders. In the spring of 2002, selected builders were invited to participate in a presentation and meeting with the Florida Energy Extension Service (FEES) which spearheaded the project for the University and the development partnership. Following that meeting, the participating builders were selected. The homes were designed to be both green and profitable. The first eight homes were to be used as educational and sales tools for prospective buyers and as a vehicle for education and outreach, and to entice other developers and builders to apply these lessons to other projects.

Advanced Technologies

It is the goal of the US Department of Housing and Urban Development's Partnership for Advanced Technology in Housing (PATH) to accelerate the development and use of technologies that radically

improve the quality, durability, energy efficiency, environmental performance, and affordability of America's housing market. These homes feature several of PATH's proven technologies combined in such a way that implementation is affordable to the developer and beneficial to the homeowner. Highlighted below are some of the PATH technologies utilized in this project.

Low-Impact Development (LID) Practices for Storm Water Management

With more stringent design requirements, costs for traditional storm water collection and conveyance systems have risen sharply. Organizations from community groups, to regional water-shed authorities, to state and federal agencies have become involved in this issue. Subsequent changes in storm water regulations could strongly impact builders and communities as new regulations and practices are implemented. Low-Impact Development (LID) techniques can offer developers a more cost-effective way to address storm water management through site design modifications and “Best

Management Practices” (BMPs). Madera incorporated these strategies to develop in an environmentally responsible manner.

Research

To research how the site was currently functioning, the developer, Wendy Bratzil, hired a biologist and hydrologist to study the ecological aspects. It was discovered that Sand Hill Cranes, which are on the endangered species list, nest on the site and migrating song birds use the site as a stop-over point. Preserving the natural habitat for these birds became an important issue that helped guide the design process.

The other key research was with residents from the surrounding community who had shunned prior attempts to develop this site. Before any design began the developers met with the residents to address their concerns and to also learn about the area such as traffic flow and congestion. The developer's friendly approach proved to be successful when the neighbors gave a standing ovation to the site design presentation.

Landscape Materials

In creating a water and energy efficient landscape, Madera chose the following features and products:

Concrete Pavers

The Uni Eco-Stone[®] Paving System is designed to reduce stormwater runoff through infiltration, while providing a highly durable, yet permeable pavement capable of supporting vehicles.



Compaction Reduction

The open mesh design of the Grass Trac[®] Turf system, which is a heavy-duty wire mesh with torsioned flat wire reinforcement that can be installed before sodding or over existing turf, allows rainwater to percolate freely into the soil, while creating a drivable turf, recharging ground water and reducing runoff.

Infiltration Tanks

The Atlantis Matrix[®] Module, used with Atlantis Geotextile[®], were installed underground to provide on-site percolation of excess runoff.

Irrigation System

A well-designed irrigation system was installed that includes drip irrigation around the landscape plantings to reduce water loss through evaporation.

Installation

Low-Impact Development requires more precise engineering for soil characteristics, filtration rates, water tables, native vegetation, natural habitat and other site features. For residential development, participation of environmental consultants and planners is critical from the early on.



Benefits / Costs

Cost benefits to builders and developers utilizing LID strategies can be significant. According to the Center for Watershed Protection, traditional curbs, gutters, storm drain inlets, piping, and detention basins can cost two to three times more than engineered grass swales and other techniques to handle roadway runoff. Other LID strategies can have similar impact. Choosing permeable pavement for a parking area may remove the need for catch-basin and conveyance piping. Small distributed filtration areas on individual lots can reduce site requirements for larger detention ponds that take up valuable land area.

Madera saved \$40,000 in stormwater costs by using existing forested basins as catchment areas rather than grading new ponds. Green Trust did this by performing a topographic survey early in the planning process.

Note: This case study is composed of excerpts from the original PATH (Partnership for Advancing Technology in Housing) study published in 2005. It has been reproduced with the permission of the U.S. Department of Housing and Urban Development.



Oldcastle Architectural Products Group
375 Northridge Road, Suite 250
Atlanta, Georgia 30350
Phone: 1-877-BELGARD
www.Belgard.Biz