



Project Number

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Removal Effectiveness of Co-mingling Off-site Flows with FDOT Right-of-way Stormwater

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Current Situation

Roadways are designed to allow rain water to run off and not cause driving hazards, especially important in Florida where heavy downpours are a regular occurrence. Once the water is shed off the roadway, it is collected in culverts and ditches which channel the water away from the road and into stormwater ponds and other features where sunlight, air, and biological activity can reduce pollutants and excess nutrients to acceptable limits before entering the groundwater. The stormwater system is designed to manage the runoff expected from the roadway. However, the roadway isn't the only surface receiving rain, and runoff from adjacent properties may enter the FDOT-designed stormwater system. This presents designers with decisions about whether to allow this off-site water to enter the FDOT system, and if they do, how to design the stormwater system to accommodate the additional water.

Research Objectives

University of Central Florida researchers developed methods to estimate the effect of allowing off-site runoff into FDOT stormwater system designs while still meeting regulatory requirements. These methods were added to computer models frequently used to design runoff systems.

Project Activities

Because designers have many options in designing runoff systems, the researchers studied and simulated many scenarios. They considered five Florida regions, each with a characteristic rainfall pattern. For each location, assuming rainfall of one inch per hour, 75 simulations were run in order to consider the full range of runoff volumes, delay times before off-site runoff was allowed to enter the FDOT system, and the sizes of the chosen treatment facility. The primary forms of stormwater treatment considered were retention and detention ponds.

Results from the simulations were incorporated in the BMPTRAINS software, which designers use to assist in the analysis and design of stormwater management systems. BMPTRAINS is used by all Florida water management districts and the Florida Department of Environmental Regulation.

In the report, the researchers presented seventeen example design scenarios to demonstrate the use of BMPTRAINS in considering onsite and offsite runoff. One of these problems highlights a newly added BMPTRAINS feature: a cost analysis to aid in the decision to allow offsite flows to bypass or not to bypass an FDOT stormwater system. BMPTRAINS was also enhanced with expansions to the range of site conditions which can be considered.

Project Benefits

Improved design tools can help designers to better accommodate the treatment of stormwater runoff and help ensure the quality of Florida's surface and groundwater environments.

For more information, please see www.fdot.gov/research/.



This attractive roadside pond is actually part of stormwater management plan.