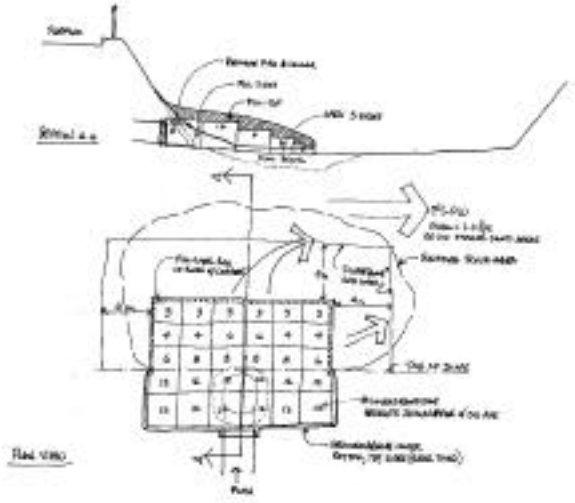
RS Culvert Scour Protection Concept



The drawing above is our concept to address the scour problems associated with culvert discharge, specifically at West Oaks Mall in Ocoee, Florida. We think we are being conservative in our dimensions of the Rainstore3 structure to dissipate the energy from water. We have based these calculations on the pipe being about 4 feet in diameter with a discharge rate of 37.5 cubic feet per second (cfs). Different size and/or shape culverts will require new design.

How RS Energy Dissipation Works

The vertical columns within the Rainstore3 cells will fill with water as the levels rise, and act to absorb and dissipate water energy from the culvert. Water will immediately rush in and around the columns in all directions. While water level will remain at the same level as the top of the pipe initially, the level will begin to drop further out from the end of the pipe. As water moves between columns, flow becomes very smooth with no tumbling or turbulance - called Laminar Flow. At the perimeter of the Rainstore3 cells, water is quite shallow and moving smoothly outward. Discharge occurs across the top of Slopetame2, filled with grass sod, again with no turbulance to disturb plant roots. Tall grass blades lay down upon each other and water flows smoothly across the surface with no erosion.

The perimeter of the outer three rows of RS3 should have the outside row of rings (columns) filled with concrete to provide long term protection (greater than 5 to 10 years expected for the plastic exposed to UV) from sunlight. Our goal is to have the velocity of the water leaving the RS3 chambers at a rate between 1 and 1.5 fps. This should be adequate to retain vegetation in the sugar sand existing.

To assist establishment of vegetation in the scour area and immediately around the discharge area from RS3, I suggest a 4 meter wide strip of Slopetame2, filled with grass sod. Other existing surfaces bare of vegetation should be sodded with grass. The remaining bare areas in the bottom of the channel do not need Slopetame2 - sod should be adequate.