Feature #4 - THE POCKET WETLAND (Constructed Wetland) - The Pocket Wetland is the central stormwater control device for the site and captures runoff from 7 of the 12 acres. Stormwater Wetlands can be one of the most effective tools for removal of pollutants by using marsh vegetation to trap and remove 80% of total suspended solids, 40% of Phosphorous, 30% of Total Nitrogen, 70% of Fecal Coliform Bacteria, and 50% of Metals. It also offers aesthetic and wildlife values. The wetland was designed to release flows at "pre-development" rates for all storm events up to a 100-year storm. Since the wetland was excavated below its prior elevation of 1,402 ft to it's lowest point of 1,394 ft, in the deep pools it will have the appearance of shelves with a high marsh area (0-6"), a low marsh area (6-18") and deep water pools (2-3' ft). The wetland was designed to stay wet all the time, and marsh vegetation will be planted to filter and uptake polluntants. All runoff from the building itself and the parking lots is directed to this wetland.

LESSONS LEARNED - These **four** innovative stormwater features represent a new way of thinking about and managing storwmater in Habersham County. The principles shown of increasing infiltration and treatment of stormwater using swales, improved soils and vegetation can be applied in many other development settings, including residential and small commercial. Of the **four** features only the Pocket Wetland is functioning below it's intended design. Stockpiled topsoil from pre-construction should have been placed in the structure to facilitate vegetation success and the structure is not holding water as it was designed, and as a result planted vegetation cannot filter runoff. Additionally erosion problems during construction have filled the strucutre with sediment which is re-suspended during rainfall and enters adjacent streams. Overall, the described practices demonstrate the potential to improve stormwater management for cleaner healthier streams.

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Judicial Center

Innovative Stormwater Features

All impervious surfaces create stormwater during rainfall. Four features at the new Habersham County Judicial Center provide models of how to reduce the volume and the impacts of stormwater through better design, such as this "curbless bioswale."

"Stormwater" is defined as rainwater that is unable to soak into the ground and becomes surface runoff. Stormwater is created when impervious surfaces such as the roof of a building, roads and parking lots discharge runoff directly into streams and rivers.

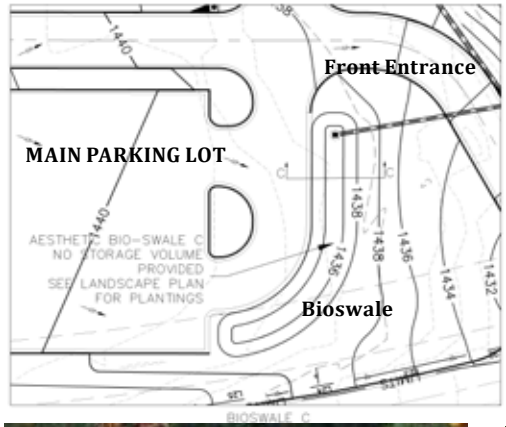
Stormwater is considered the 3rd leading cause of water quality impairment in the Soque River Watershed after bacteria and sediment. But why and how does **"Stormwater"** create problems?

- **Stormwater carries pollutants** - When rainwater flows across roads, driveways, and compacted soils it carries pollutants such as oils, antifreeze, and sediment. The best way to remove these pollutants is to allow soils and vegetation to filter and treat stormwater runoff before it enters streams.
- **Stormwater erodes stream channels** - Streams have evolved over decades to carry a certain volume of water based on annual rainfall and associated runoff. By dramatically increasing runoff volumes, stream channels often erode their banks laterally or scour downward (incision) to handle this new volume of water. Stormwater impacted streams then become a source of sediment pollution as bank stability, stream depth, width, and bottom substrate are all disturbed by too much water running off during heavy rains.

Fortunately new techniques in Stormwater Management can reduce these negative impacts by **REDUCING THE VOLUME OF STORMWATER** by increasing the amount of rainfall that infiltrates back into the ground, and by **INCREASING THE FILTRATION AND TREATMENT OF STORMWATER** before it is released back into a stream.

By focusing on how to transform RAINWATER into GROUNDWATER and prevent it from ever becoming STORMWATER, these new practices have important implications to our long-term water supply in addition to reducing negative effects to stream stability and water quality.

The **Habersham County Judicial Center** is an ideal location to demonstrate models on how to better manage stormwater due to its high visibility to residents and visitors to the county. The 12 acre site was the former location of the Habersham High School, and since the footprint of the actual building is small, there was ample space around the building to build structures and conveyances that could provide additional treatment for stormwater.



Feature #1 - THE CURBLESS BIOSWALE
This highly visible feature at the front entrance to the courthouse is designed to capture and treat silt and pollution from all rain events up to 1.2 inches. Larger events will overflow this structure into the pocket wetland. It serves as a first stage filtration and infiltration of runoff from the southern end of the main parking lot.

An interesting feature is that the parking lot was designed so that runoff would flow directly into the swale due to the **absence of curb and gutter** along the bend. To increase infiltration a perforated underdrain, gravel and engineered soils underlay the swale.

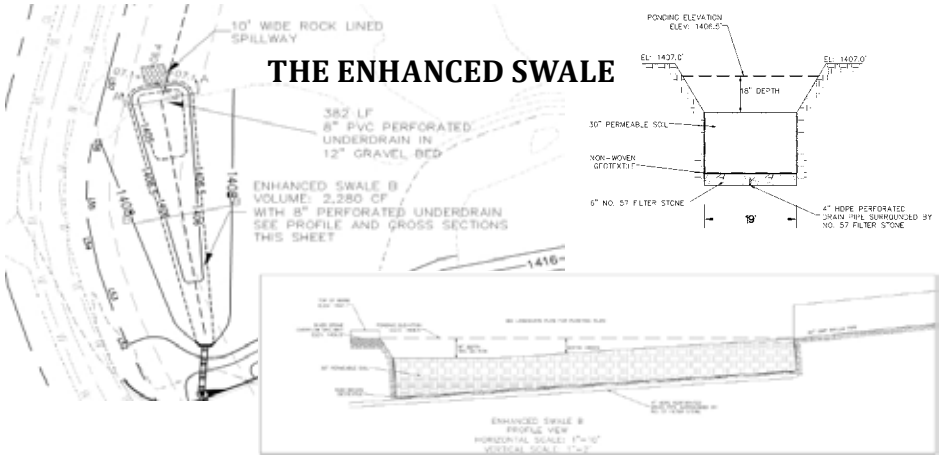
A perforated underdrain and gravel bed allows water to infiltrate back into the groundwater table.

Soils high in organic matter and sand overlay the gravel which also increases infiltration.

Completed construction of bioswale prior to vegetation.

Rock, native shrubs and wetland plants help reduce landscape maintenance, and creates an attractive aesthetic. Plants also help to filter pollutants.

Feature #2 - OPEN CHANNEL SWALE
Along Stanford Mill Road is a great example of optimizing natural space for the conveyance, treatment and infiltration of stormwater. Stormwater generated on the road in front of the Judicial Center (Llewellyn Street) is captured in a stormwater grate. Typically this water would be piped to the nearest stream, or allowed to flow down a curb and gutter to the nearest pipe. In this case an open channel rather than pipe allows the water to spread across a swale creating an attractive grassed area easy to manage and reducing piping costs and stormwater volumes.



Feature #3 - THE ENHANCED SWALE - Similar to the curbless bioswale, but larger, the "enhanced swale" is also a vegetated channel with engineered soils and an underdrain. As water is conveyed into the vegetated channel it will be slowed and treated by vegetation, and filtered by engineered soils before slowly infiltrating into a peforated drain.

The engineered soils (or filter bed) that overlays the underdrain system is less than 25% clay, 1.5-3% organic content with a pH of 5.5-6.5 and infiltration rate of 0.5 inches of water per hour. Once water enters the underdrain it will continue to infiltrate into surrounding soils via perforations in the pipe reconnecting the filtered stormwater into the groundwater table. This structure will capture water draining from Lewallyn Street, and runoff from the Stanford Mill entrance all the way up to the staff parking lot. This feature is sized to capture the first 1.2 inches of rainfall.

This structure captures all the water that flows through the open channel swale as well as runoff from the rear entrance. It's primary features are an underdrain system that allows greater infiltration of stormwater and vegetation to treat and purify runoff before discharge to a stream.