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Constructed Storm Water Wetland and Stream Stabilization in Newland, North Carolina

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Abstract Text:

The Town of Newland is a small town located in the mountains of western North Carolina. The North Toe River, a designated trout stream, flows along the western portion of downtown Newland. The Town owns a vacant 10.4-acre parcel in the floodplain along the North Toe River adjacent to the downtown area. In conjunction with the Town, the North Carolina Wildlife Commission and funding from the North Carolina Division of Water Resources, Extension Associates with the Department of Biological and Agricultural Engineering at North Carolina State University (NCSU) developed a two phase project to address water quality.

The first phase of the project consisted of constructing a 1.4-acre stormwater wetland in the floodplain to treat stormwater from a 17-acre catchment that includes portions of downtown Newland. Stormwater wetlands are effective best management practices for removing sediments, nutrients, metals, chemicals, and bacteria from stormwater. The Newland wetland was designed to capture and treat the runoff produced by the first flush (precipitation = 1.2 inches) and a flashboard riser outlet structure was sized to drawdown this volume of water over a 72-hour period to optimize the stormwater treatment. The constructed wetland consists of deep pools, shallow water, and temporary inundation areas that create a diverse ecosystem for wetland plants and animals.

The second phase of the project consisted of streambank stabilization in eroding areas on the North Toe River. Streambank stabilization measures such as rock cross vanes, j hooks, double wing deflectors, and brush mattresses were located to protect infrastructure, provide public access, discourage erosion, and improve instream habitat.

The Town of Newland intends to develop the property for use as a public green space with a walking and biking trail along the border of the wetland. NCSU will develop educational signage for the greenway trail to inform local residents about stream and wetland ecology, watersheds, clean water and natural resources protection. NCSU also intends to monitor the stormwater wetland for pollutant removal efficiencies.

Impact Statement:

The project has improved water quality by routing stormwater from a downtown area through a constructed wetland before discharging it to the river. Stormwater wetlands are effective best management practices for removing sediments, nutrients, metals, chemicals, and bacteria from stormwater. Furthermore, this project has decreased sedimentation in the river by stabilizing eroding streambanks.