



**Date:** March 24, 2011

**To:** Thomas J. Bonfield, City Manager  
**Through:** Theodore L. Voorhees, Deputy City Manager  
Ed Venable, Engineering and Stormwater Manager  
Paul Wiebke, Assistant Stormwater Manager  
John Cox, Water Quality Manager  
**From:** Michelle Woolfolk, Civil Engineer  
**Subject:** Authorization of Intergovernmental Agreement with the U.S. Geological Survey for Operation & Maintenance of the City of Durham Rainfall and Streamflow Network (Agenda Item #7641)

### **Executive Summary**

In 2008 the City entered into an intergovernmental agreement with the U.S. Geological Survey to purchase, install, operate and maintain a network of automated devices measuring rainfall and streamflow. These devices are needed to provide information necessary for the City's annual report to the N.C. Division of Water Quality regarding stormwater quality, including the response of local streams to rainfall. The intergovernmental agreement is negotiated and renewed regularly between the City of Durham and the U.S. Geological Survey.

### **Recommendation**

The Administration recommends that the City Council authorize the City Manager to execute an intergovernmental agreement for the continued operation of the rainfall and streamflow automated monitoring network for an amount not to exceed \$83,700.00 in each of fiscal years 2012 and 2013, for a total of \$167,400.00.

### **Background**

The City's NPDES Municipal Stormwater Permit (NCS000249) requires multiple items that rely on manual and automated monitoring of the stream network. These include the following:

- a Water Quality Monitoring and Assessment Program, and
- Water Quality Recovery Program Plans.

The Water Quality Monitoring and Assessment Program includes regular monitoring of stream flow, numerous water quality parameters and biology (i.e., benthic macroinvertebrates). The Water Quality Recovery Program Plans also require monitoring programs, although these are specifically designed to address needs and accomplishments of specific watersheds. Water Quality Recovery Program Plans are currently required in the Third Fork Creek and Northeast Creek watersheds where EPA approved Total Maximum Daily Loads (TMDLs) have been completed. Other watersheds (e.g., Ellerbe, Little Lick and New Hope Creeks) have been identified as needing TMDLs.

The U.S. Geological Survey conducts water resources monitoring throughout the nation through its Cooperative Water Program. Many municipalities participate in the program in order to monitoring stream flow to and from reservoirs, to assess flooding, and to evaluate

water quality impacts. The Engineering and Stormwater Services Division uses stream flow measurements to estimate pollutant loading, particularly nitrogen and phosphorous, from large city watersheds. The Engineering and Stormwater Services Division also uses simultaneous measurement of rainfall and stream flow or stream stage to evaluate potential illicit discharges to streams or to the storm water drainage system. The Water Management Department is using the measurements of rainfall in their infiltration and inflow studies of the collection system.

Per the agreement, the U.S. Geological Survey installed a total of six rainfall and six stage or stream flow gauges around the city. These are listed below in Table 1.

Table 1. U.S. Geological Survey Automated Monitoring Locations and Types

Stream	General location	Type of monitoring
Ellerbe Creek	Club Boulevard	Stage, streamflow, rainfall
Eno River	Cole Mill Road	Stage, rainfall
Eno River (a)	Roxboro Road	Rainfall
Little Lick Creek	Wake Forest Hwy	Stage, rainfall
North Prong	Carpenter Fletcher Road	Stage
Sandy Creek	Cornwallis Road	Stage, streamflow, rainfall
Third Fork Creek	Highway 54	Stage, streamflow, rainfall

(a) Stream stage and flow monitoring near Roxboro Road is performed in cooperation with Triangle Area Water Supply Steering Committee and the U.S. Army Corps of Engineers.

Further, this agreement would allow the cities of Durham and Raleigh to cost-share funding of a stream flow gauge in Ellerbe Creek.

Stream stage and flow information is available to any interested party and can be accessed on the internet at the U.S. Geological Survey web site: <http://waterdata.usgs.gov/nc/nwis/current/?type=flow>. Rainfall information is available on the internet at [http://waterdata.usgs.gov/nc/nwis/current/?type=precip&group\\_key=huc\\_cd](http://waterdata.usgs.gov/nc/nwis/current/?type=precip&group_key=huc_cd). An example of the stage and streamflow web page is provided below for the station on Ellerbe Creek at Club Boulevard.

**National Water Information System: Web Interface**

USGS Water Resources Data Category: Real-time Geographic Area: North Carolina

[News](#) - updated November 2010

**USGS 0208675010 ELLERBE CREEK AT CLUB BOULEVARD AT DURHAM, NC**  
**PROVISIONAL DATA SUBJECT TO REVISION**

Available data for this site Time-series: Real-time data

This station is operated in cooperation with the City of Durham.

Precipitation data for this general location is available at [this location](#).  
[Boating safety tips](#)

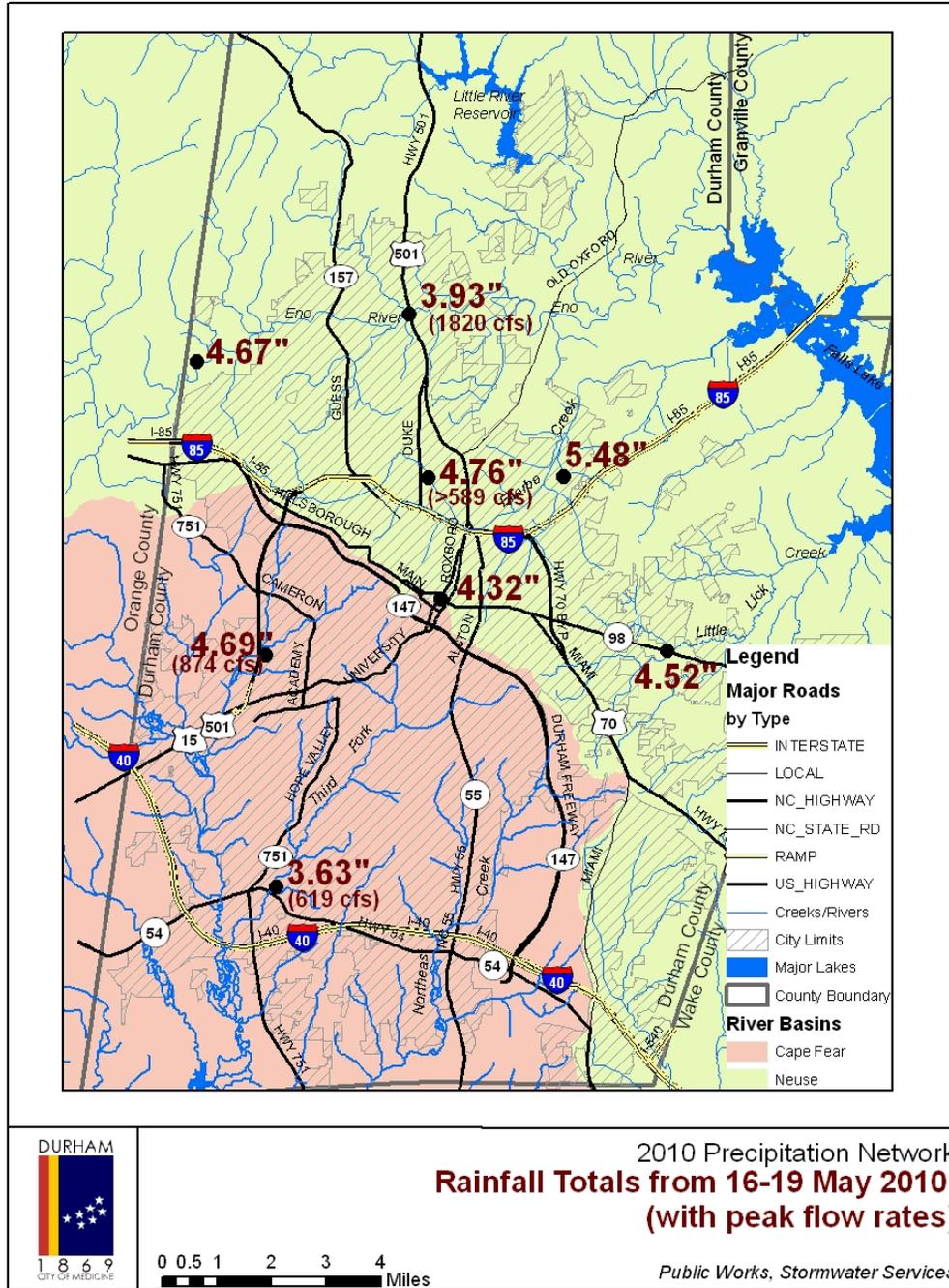
This station managed by the Raleigh Field Office.

Available Parameters	Output format	Days	
<input type="checkbox"/> All 2 Available Parameters for this site	<input checked="" type="radio"/> Graph	7	<input type="button" value="GO"/>
<input checked="" type="checkbox"/> 00065 Gage height	<input type="radio"/> Graph w/ stats	(1-120)	
<input checked="" type="checkbox"/> 00060 Discharge	<input type="radio"/> Graph w/o stats		
	<input type="radio"/> Table		
	<input type="radio"/> Tab-separated		

[Summary of all available data for this site](#)

**Gage height, feet**

Most recent instrument reading: 0.21 - 03-20-2011 11:15 EST



### Issues/Analysis

Long-term operation of the precipitation and streamflow network will ensure that permitting, water quality, flood forecasting, and urban stream restoration needs can be served. Long-term measurements are needed to evaluate how streams respond to intense periods of rainfall, including delivery of pollutants, stream bank collapse, and flooding potential.

**Alternatives**

The alternative is to deny authorization to negotiate and execute intergovernmental agreements for continued operation and maintenance of the network. Capital funds already spent to purchase and install equipment would be unrecoverable.

**Financial Impact**

Operation and maintenance annual costs for FY2012 and FY2013 provided by the U.S. Geological Survey are \$83,700.00 and will be paid from the Public Works Stormwater operating budget (Organization code 5500L041, Object code 728600). The U.S. Geological Survey is providing \$16,500.00 of matching funds for each of fiscal years 2012 and 2013, for a total of \$33,000.00.

**SDBE Summary**

Not applicable