

FLOODPLAIN MITIGATION

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Greenville County Facts

- Located in the North West corner of the state at the North Carolina and Georgia borders
- Population +/- 500,000
- Riverine Flooding from severe thunderstorms
- Susceptible to tropical storm events
- Mostly non- catastrophic damages
- First Flood Damage regulations 1988, first effective regulations 1999
- FEMA Map Modernization 2004, 2011 and 2019

Older women
pack a punch.
Lifestyle 15



Weather
Rain and snowing
continuing.
High: 78
Low: 64

MONDAY, AUGUST 28, 1900



State Edition

FLOODING IN THE UPSTATE

Rain leaves death, chaos in its wake

■ **A lasting impression:** Remnants of Tropical Storm Jerry close schools and roads and drive hundreds from their homes.

100-year-storm batters Upstate

1997

- **Village water** turns into fountain in Tayfield
- **Flowerbed** just people from raying around in Oxenford's Church
- **Green man** weathers post from Saffron Walden
- **Shades on** Page 5A
- **Upstate** more about roads, money and more. Page 2

Supporters of the march left at least three people stranded in the Highway, with many of the vehicles left from their homes and families were stranded by the 11th minute. The march had to be postponed.

Many of the vehicles were damaged and were washed out by the remnants of Tropical Storm Jerry, and the Highway was closed for several days. The Highway was closed for several days. The Highway was closed for several days.

Part of the march was cancelled. The Highway was closed for several days. The Highway was closed for several days. The Highway was closed for several days.

The rain was "approximately a centimeter

File #130005 and Page 4A



Dangerous road: Cholobore walk away from a washed out Noddy River bridge on Log Shoals Road Sunday during washed out two bridges in the Upstate.

Teen dies trying to rescue friend

By Bryan Garner
Staff Writer



As the raging current in a swollen stream hurled an athletic young man for 50 yards down a drainage pipe about 100 ft. long, the crowd of spectators on the shore



Fronts of
drowning
station
Crews
Michael Dwyer
swims in his
body in yellow
swims Dwyer
Dwyer was
caught in boat
swims off
Hawthorn
in Hawthorn

Warmer ties
spark talk
of summit
with China

By Charles Wetzlar
Associate Editor, *Financial Times*

BEIJING - American and Chinese officials agreed tonight to begin planning a half-century anniversary signalling that China's reborn of its once-fallen emperor, Mao, who has been longed to issue a declaration of the

Uniformity of basic principles, said the two sides, is agreed to between an explicit negotiating between French and Chinese President Deng Xiaoping. (China's official newspaper, the People's Daily, said the two sides agreed to a "basic principle" of "mutual respect for sovereignty and territorial integrity.")

But I must tell the English how difficult it is to get a Chinese man to tell anything he does not like. I am sure that if I were to ask him to tell me anything, he would not tell me anything.

Tarnoff had negotiators discuss "a wide array" of proposals for the meeting ahead in February.

1. *Amara* *agrippina* *Lin.* To
provide that a *Chrysomelid*
which is *Agrippina* *Lin.* is
found in the *Amara* *agrippina* *Lin.*

the following information
regarding the subject's name
should be included in the report.

Clinton, daughter of Wm. H. American, an Ohioian, making his nerve a 25-year-old alleged emigrant. Fred. Hoffman Clinton said she lived in U. S. women's club, the house of her brother, Wm. H.

Not everything has been lost, but some of the most serious of our relationships (Chinese have been Maoistism, although the U.S. is in the United Nations, and the U.S. is in the United Nations, and the U.S. is in the United Nations.)

As part of the programme, many of South Western's Railways Prehistoric Group Quichee on Heritage railways, will a United Nations in September.

China's president, in getting the Communist Party in New York to October General Assembly. That moment would take place a formal state visit to Washington.

U.S. Embassy spokes-
person said no final decision
was made on whether to hold
and China's official X
Agency made no mention
part on Taiwan's news

The images addressed last, as listed by Tarnoff, deliver on that issue: human rights, trade, racism and culture.

INSIDE

- Abby
- Algar's store
- Bridge
- Buena Vista
- Candlestick
- Cassadaga
- Crytchfield
- Deane's
- Edgewater





Storm Water Task Force

- Through the action of County Council --
- Storm water task force created – June 1999
- Objective – Prepare comprehensive action plan
- Recommendations:
 - Enact ordinance changes to restrict floodplain development
 - 4 ft freeboard
 - No BFE increase in the 1% SFHA
 - Require compensatory storage
 - Higher development standards for unstudied areas
 - Address future development in floodprone areas
 - NAI Concept (No Adverse Impact)
 - Develop watershed master plan to address structures already in the floodplain.

WATERSHED FLOODING PRIORITIZATION AND ACTION PLAN

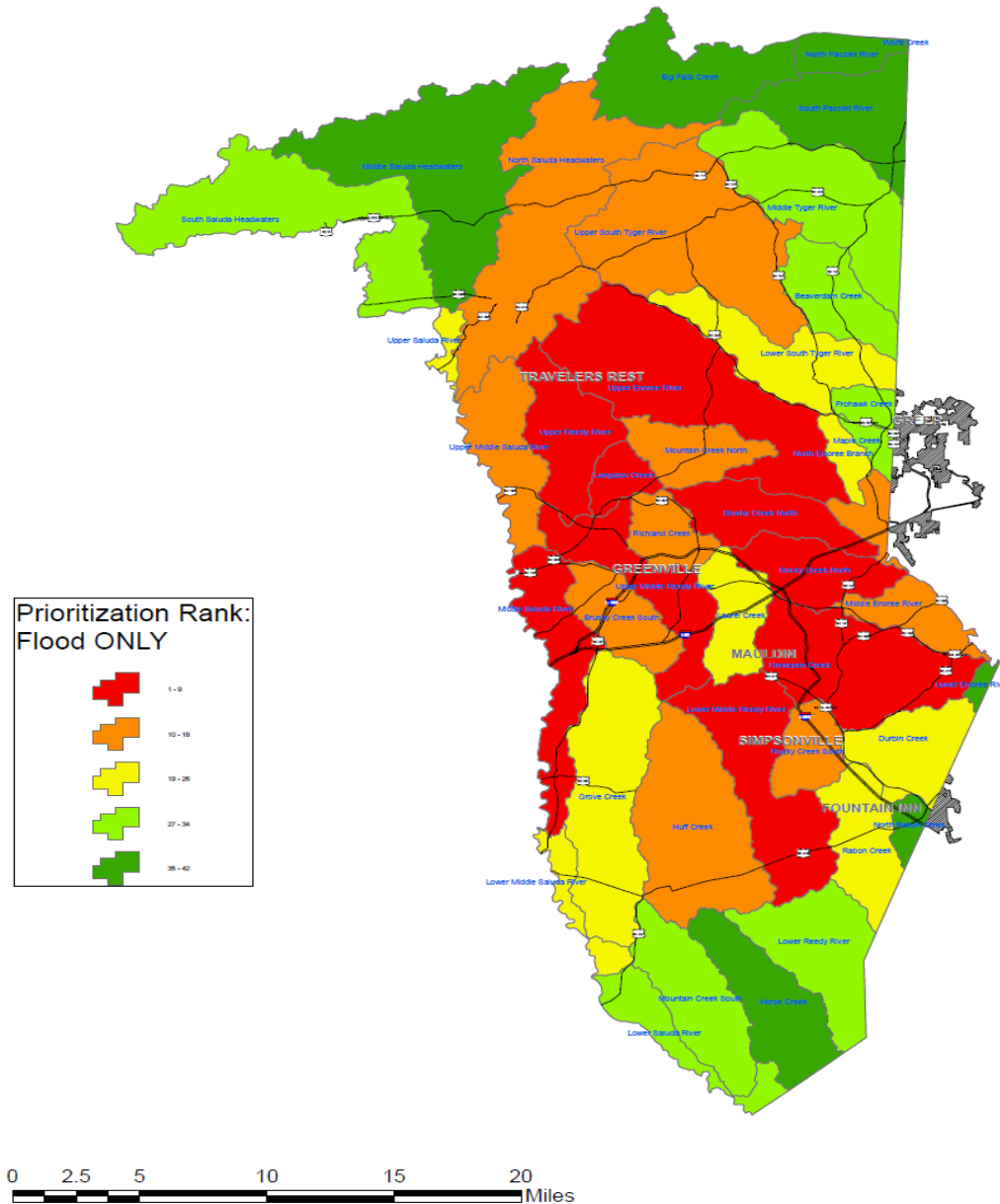
- Final Plan developed – August 2007
- Key components:
 - Status update of existing watershed studies
 - Prioritize watersheds for future study
 - Identify watersheds
 - Identify hazards
 - Flood hazard ranking (Risk Map Concept)
 - Repetitive loss structures
 - Funding Analysis for mitigation actions

Watershed Study Objectives

- Map modernization
- Development of methodology for determining “at risk” structures, including infrastructure
- Identification of “at-risk” structures
- Bridge level of service survey
- Mitigation alternatives analysis
- Recommended alternatives

Major Watershed Studies

- Rocky Creek Watershed (2001) Updated 2015
- Brushy Creek Watershed (2007)
- Upper Reedy River Watershed (2009)
- Gilder Creek Watershed (2010)
- Grove Creek (2014)
- FEMA/SCDNR Map Modernization 2004 - 2019



Mitigation Programs

- Relocation
- Elevation
- Structural Projects
 - Detention/ Storage Facilities
 - Channel Improvements
 - Floodwalls/ Levees
- Acquisition

Relocation

- In some cases entire subdivisions or small towns have been relocated
- Disruptive to the residents of the community
- Expensive





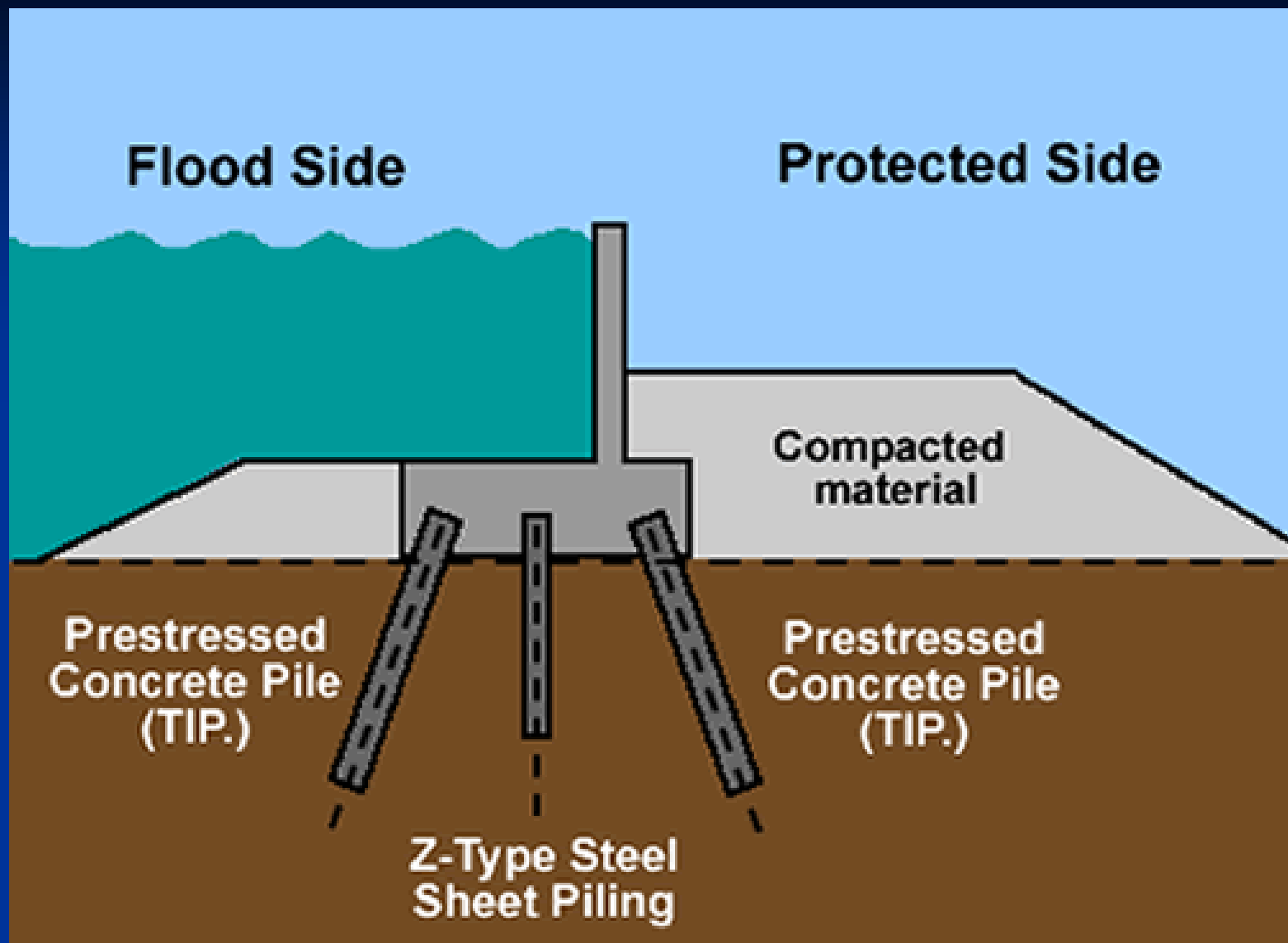
Elevation

- Greenville County has established a \$7,500 grant for assistance in elevating a structure located in a defined Area of Special Flood Hazard or a structure that has been flooded.
- ICC - Increased Cost of Compliance under NFIP
- Local Civic and Religious Organizations willing to assist



Structural Projects

- May alleviate threats of certain events
- May work in some cases
- Very costly



T-Wall supported on a pile foundation





Choosing the Mitigation System

A Cost/Benefit analysis of each alternative resulted in selection of the following mitigation alternatives

- Acquisition of residential structures
- “In- house” replacement of bridges and culverts
- Contracting larger infrastructure projects

Acquisition Benefits

- *Alleviates the risk in all cases of flooding*
- Allows residents the opportunity to utilize equity in their home
- Offers residents chance to be part of the solution
- Returns land to the natural benefit of floodplains and provides open space in communities for other beneficial programs
- Benefits the NPDES Program

Major Acquisition Components

- Mitigation Funding
- Elected Body Approval
- Choosing Affected Structures
- Community Involvement
- Acquisition Process
- Representation

Mitigation Funding

- Stormwater Utility Fee
- FMA, PDM , HMPG Grants
- SCDOT, SCDNR, SCEMD Grants
- Local Government Funding
 - Bonding
 - “Pay as you go”
 - Partnerships with local communities

Elected Body Approval

- Research thoroughly
- Explain the facts clearly
- Meet with key individuals and explain the benefits to the citizens of the jurisdiction and the community in general
- Prepare multiple solutions and the cost and benefits of each
- Provide yearly updates of program

Choosing Affected Structures

- Lowest floor elevation in the floodplain as it relates to various storm events
- Access of normal vehicles and emergency vehicles during times of inundation
- DHS/ FEMA Cost Benefit Ratio for grant qualification
- Neighborhood continuity

Community Involvement

- Meeting with the community residents Prior To Field Activity
- Regular updates during the field work
- Community Meeting when the study is complete and the results and mitigation methods are known
- Meeting with individual homeowners when affected areas are selected

Acquisition Process

- Select Homes
- Meet With Owners
- Appraisal
- Offer And Contract
- Closing
- Asbestos Survey
- Removal Specifications
- Demolish Or Move Structure
- Site Maintenance

Acquisition Representation

- Hire a dedicated contractor to work through the Acquisition process
 - Meet with the owner
 - Explain the process
 - Arrange for the valuation
 - Contract offer
 - Title Search/ Insurance
 - Preparation of Deed and Settlement Forms
 - Closing









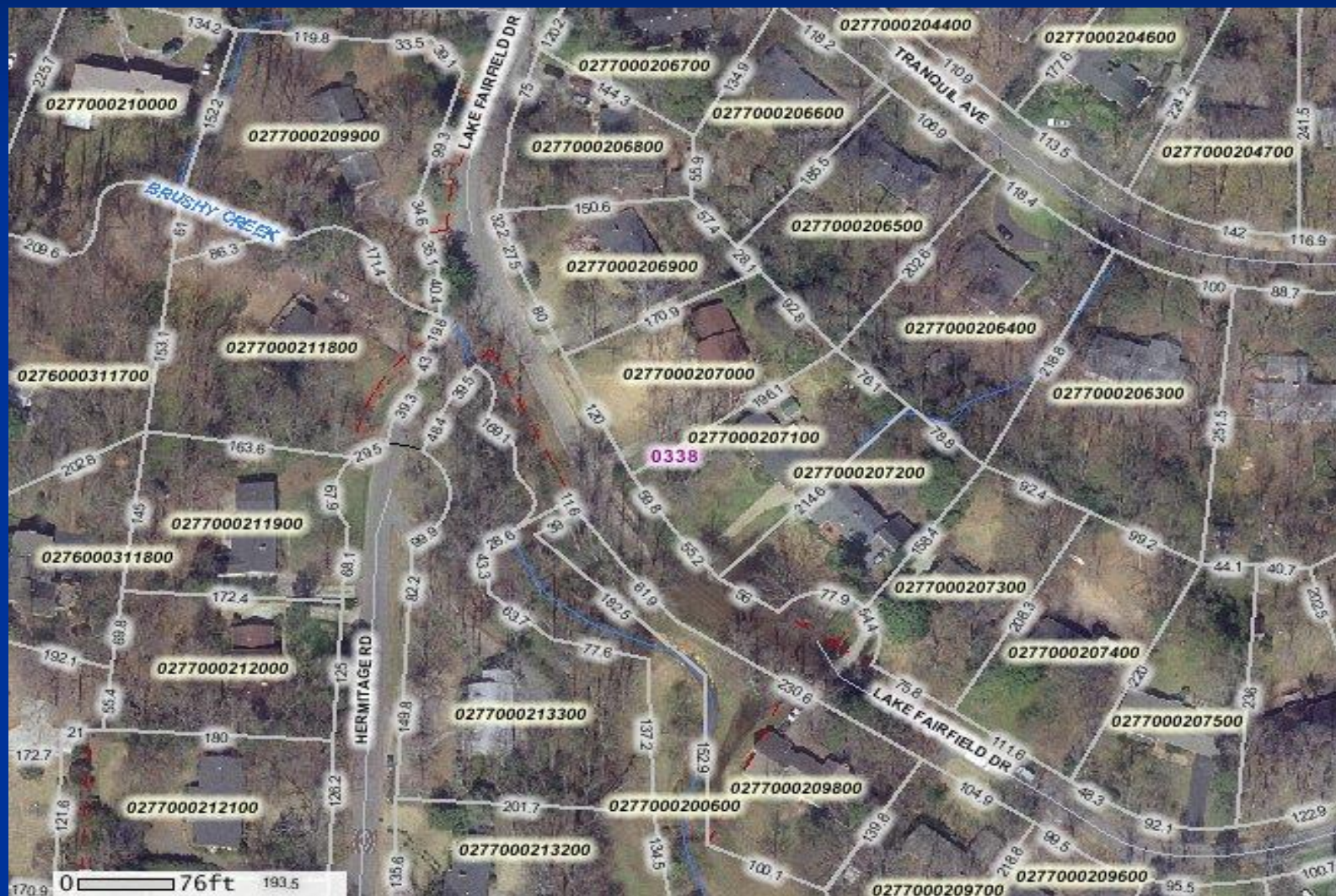




Lake Fairfield Area And Kenilworth Drive

- Lake Fairfield Area
 - Structure and road flooding
 - Bridge overtopping
- Kenilworth Drive
 - Structure and road flooding
 - Repetitive loss structures

LAKE FAIRFIELD











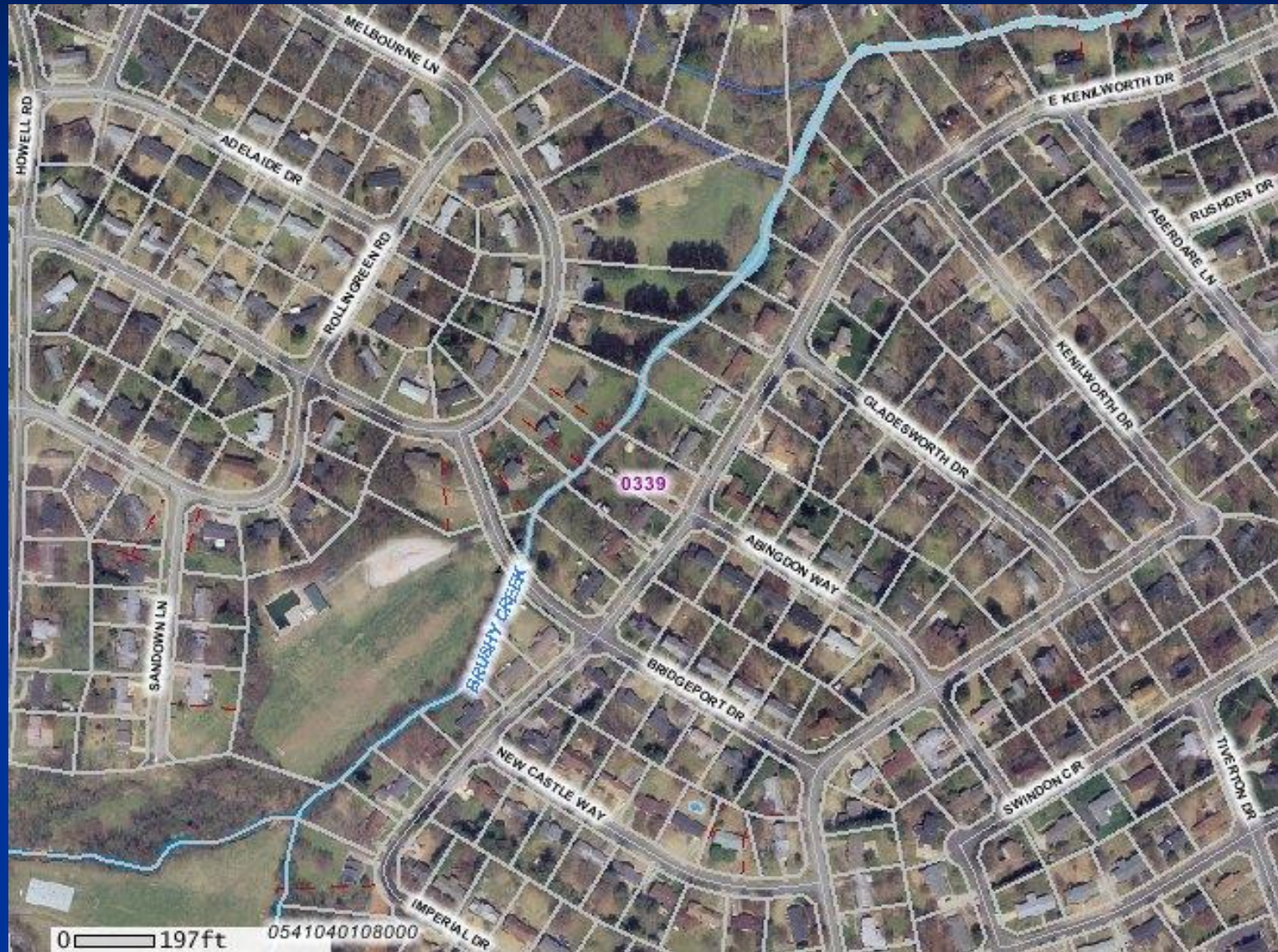








KENILWORTH DRIVE







GreenGate Community Initiative, Developmental Vision



Infrastructure Projects

- One of the major benefits of the Watershed studies reveled the need to address infrastructure issues.
 - Bridge replacements
 - Undersized structures
 - Neighborhood drainage issues
 - Streambank stabilization
 - Dedicated work force and equipment to carry out the defined tasks

Summary of Mitigation Program

- **5** Major Watershed Studies Accomplished
- Map Modernization and Development of Flood Risk Mapping
- Structures Removed from SFHA **208**
- Land Return to Floodplain **105.6** acres
- Continued Community Involvement
 - Parcels leased to individuals **15**
 - Community Organizations **18**
 - Parcels of Land Maintained by County Floodplain Division **150**
- Bridges and Crossings Upgraded
- 32 repetitive loss properties removed
- Community recreation space expanded
- NPDES Water Quality Improvement

NPDES Benefits

- Eliminate runoff of vehicle spillage
- Eliminate groundwater and stream contamination from private sewage disposal systems
- Eliminate pet waste runoff
- Eliminate lawn fertilizer and chemical runoff
- Provide vegetative pervious cover vs roof and concrete and asphalt surfaces

Warning
Authorized Personnel Only
Property of Greenville County
No Trespassing

NO TRESPASSING
COUNTY OF GREENVILLE
GOVERNMENT PROPERTY

STREAM GAUGE
STATION

FOR MORE INFORMATION OR TO REPORT
POTENTIAL VANDALISM CALL THE
LAND DEVELOPMENT DEPARTMENT AT
864-467-4610



Marty
the
Mitigation Moose

Questions or Comments