

Tom's Creek Watershed Update

Wednesday, June 26, 2019

Tonight's Meeting

- Flooding in Toms Creek Watershed
 - Stormwater/flooding/watershed orientation
 - History/chronology
 - 2016 engineering study
 - FEMA grants
- Other active efforts and next steps

Water Quality
Management

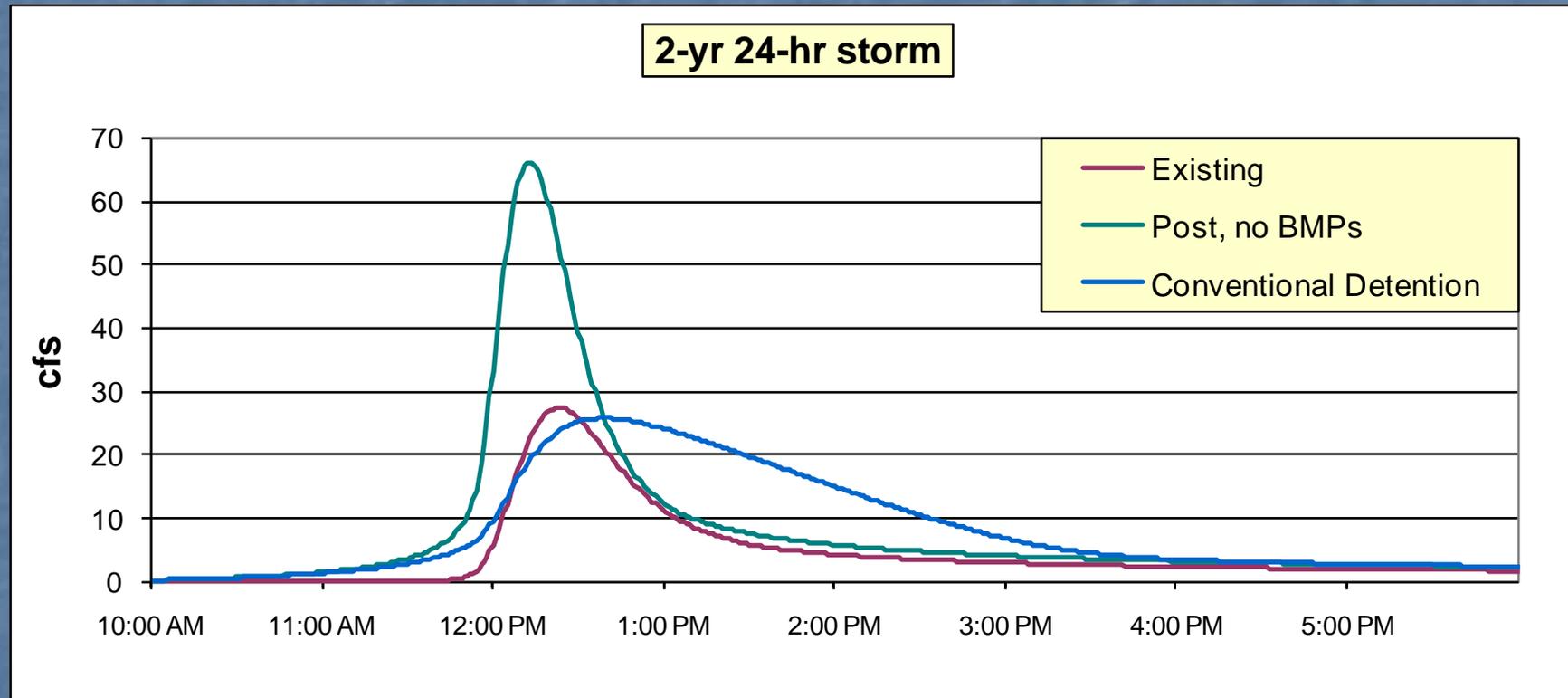
Erosion Control

**Stormwater
Management**

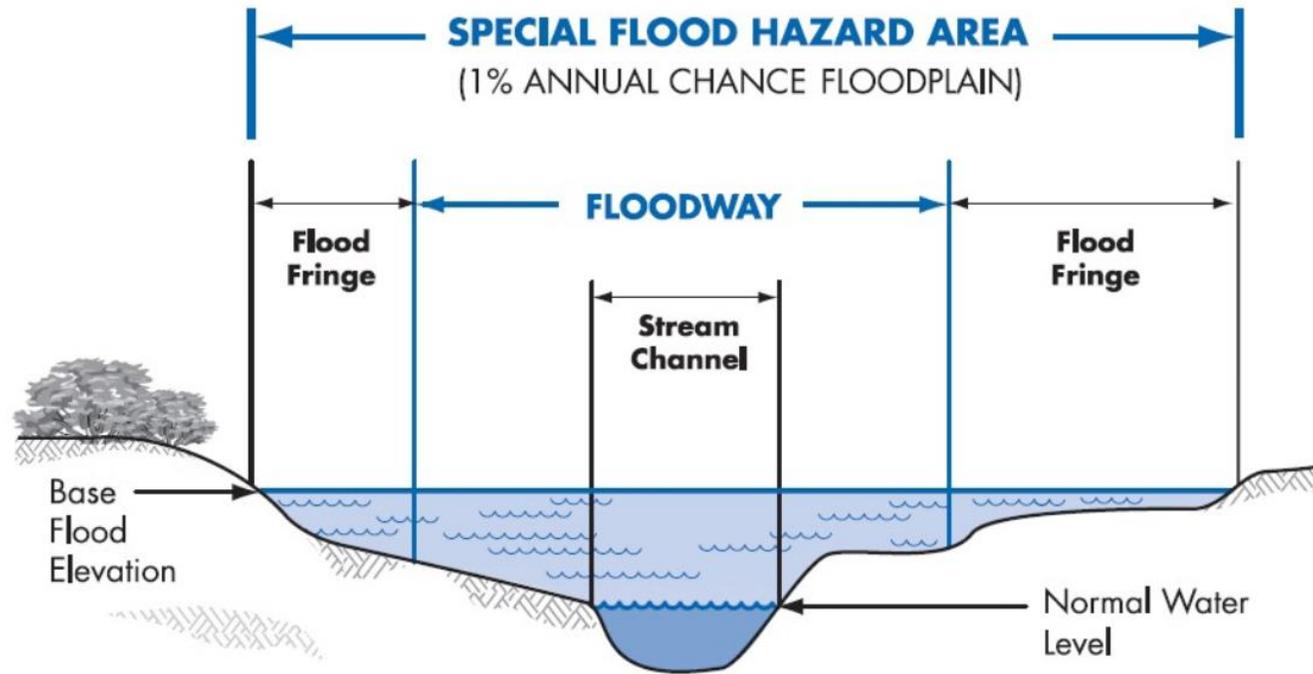
Stream Channel
Integrity

Flooding and
Drainage

Changes in Flow



For floodplains with Base Flood Elevation information, check the Flood Insurance Study to find the Flood Profile which shows water surface elevations for different frequency floods.



Terms and Definitions

Special Flood Hazard Area (SFHA) is that portion of the floodplain subject to inundation by the base flood and/or flood-related erosion hazards. SFHAs are shown on Flood Insurance Rate Maps (FIRMs) as Zones A, AE, A1-A30, AH, AO, and AR for riverine floodplain areas. Coastal flood zones are V, VE, and V1-V30.

The **floodway** is the area of the floodplain where floodwaters usually flow faster and deeper.

The **base flood** means the flood having a 1% chance of being equaled or exceeded in any given year (also called the "100-year floodplain").

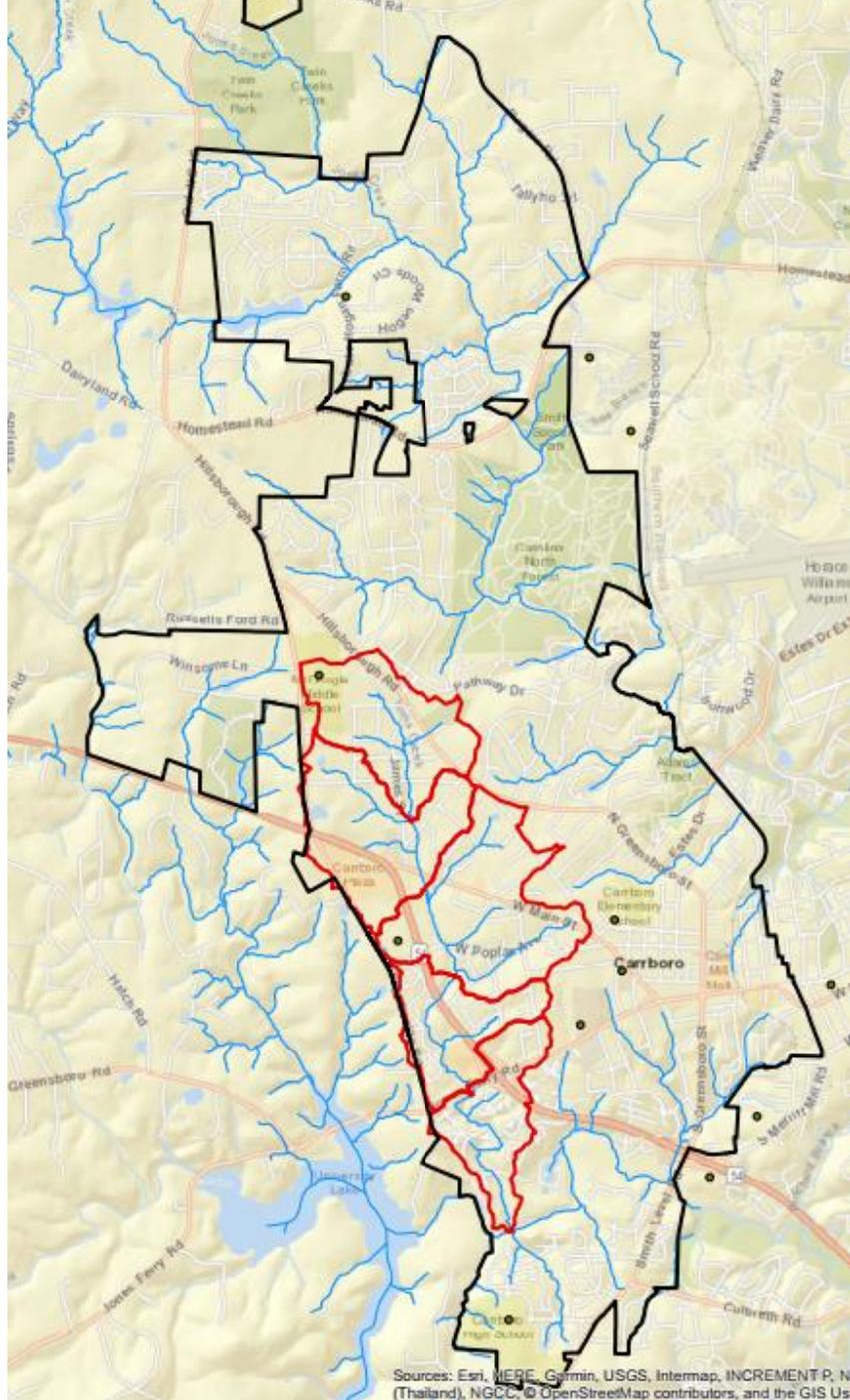
Storm Intensity and Recurrence....

Table 3: Rainfall Depth Duration Values for Carrboro^{4,5}

	Rainfall Depth (Inches) For Design Storm Recurrence Interval (Years)									
<u>Duration</u>	<u>1 yr</u>	<u>2 yr</u>	<u>5 yr</u>	<u>10 yr</u>	<u>25 yr</u>	<u>50 yr</u>	<u>100 yr</u>	<u>200 yr</u>	<u>500 yr</u>	<u>1000 yr</u>
60-min	1.4	1.69	2.06	2.35	2.69	2.95	3.19	3.43	3.72	3.95
6-hr	2.15	2.59	3.2	3.71	4.37	4.91	5.46	6.02	6.78	7.42
12-hr	2.54	3.06	3.81	4.44	5.28	5.98	6.71	7.47	8.52	9.42
24-hr	2.96	3.58	4.47	5.17	6.11	6.86	7.62	8.4	9.48	10.3

Cross Reference Between Recurrence Interval, Probabilities, and % Chance

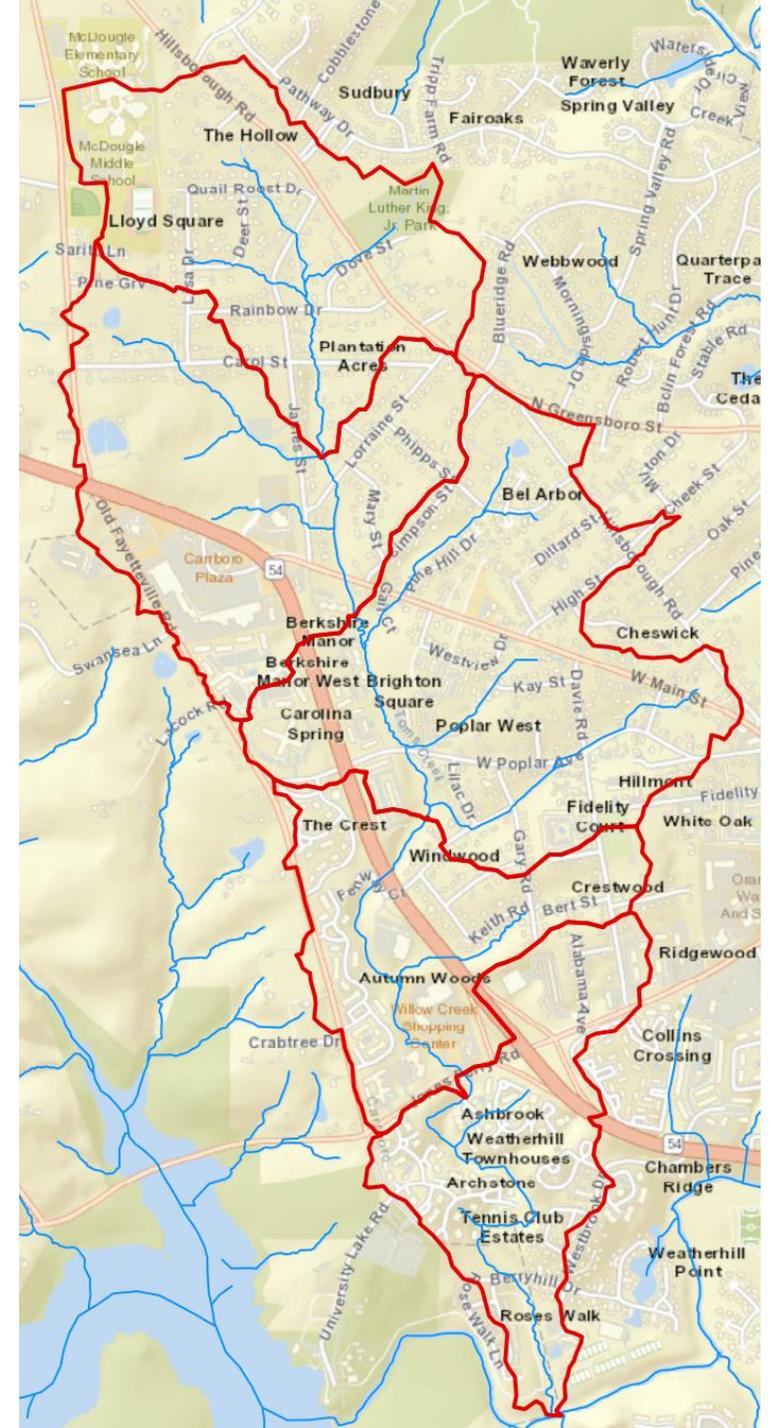
Recurrence Interval (Years)	Probability of Occurrence in any Given Year	% Chance of Occurrence in any Given Year
100	1 in 100	1%
50	1 in 50	2%
25	1 in 25	4%
10	1 in 10	10%
5	1 in 5	20%
2	1 in 2	50%



Toms Creek watershed and subwatersheds

←Townwide

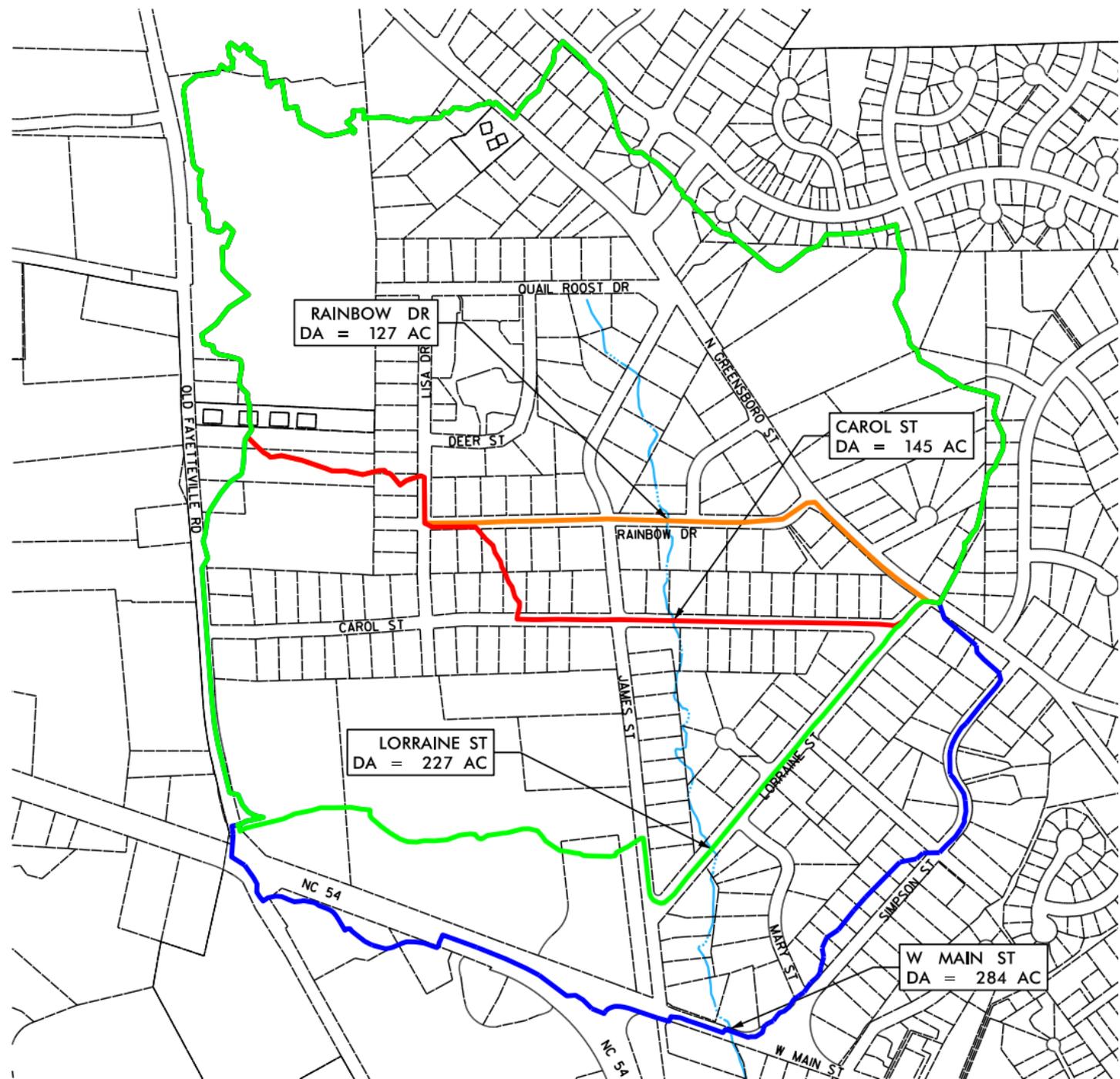
Zoomed in→

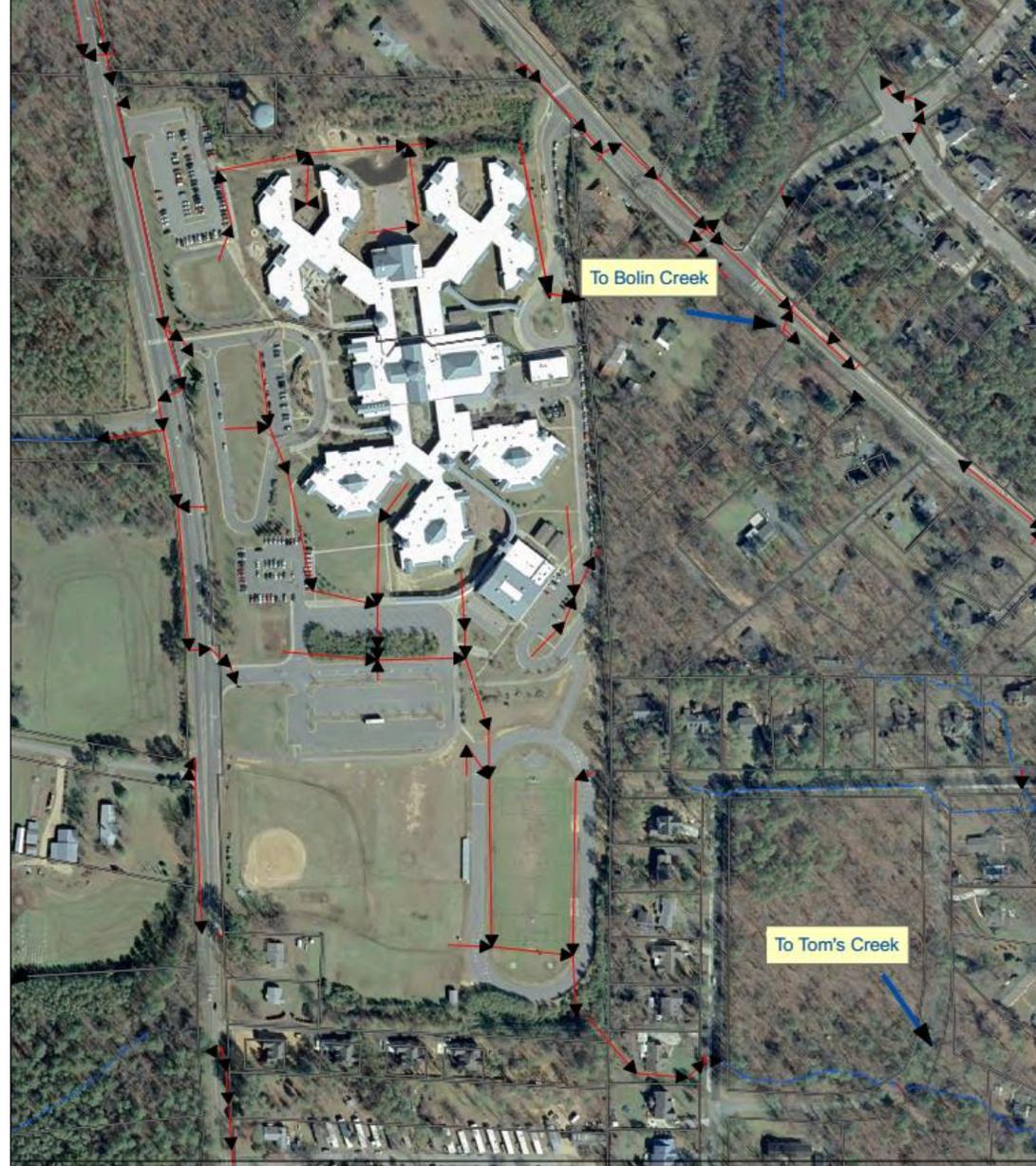


Focus on upper watershed
(upstream of Main Street)



TOMS CREEK DRAINAGE AREA

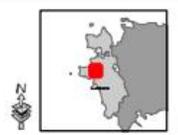




McDougle Site Runoff



-  Stormwater Pipe
- Streams**
- TYPE**
-  Intermittent
-  Permanent



NC State Plane Coordinate System (NAD 83)
 THIS MAP IS NOT A GUARANTEED SURVEY, AND
 NEGLIGENCE IS NOT BE PLACED ON THE ARCHITECT.
 The General Contract documents shall be the governing documents
 in the event of any dispute or litigation. All work shall be completed
 in accordance with the specifications and drawings.

McDougle Rain Garden



About the Watershed

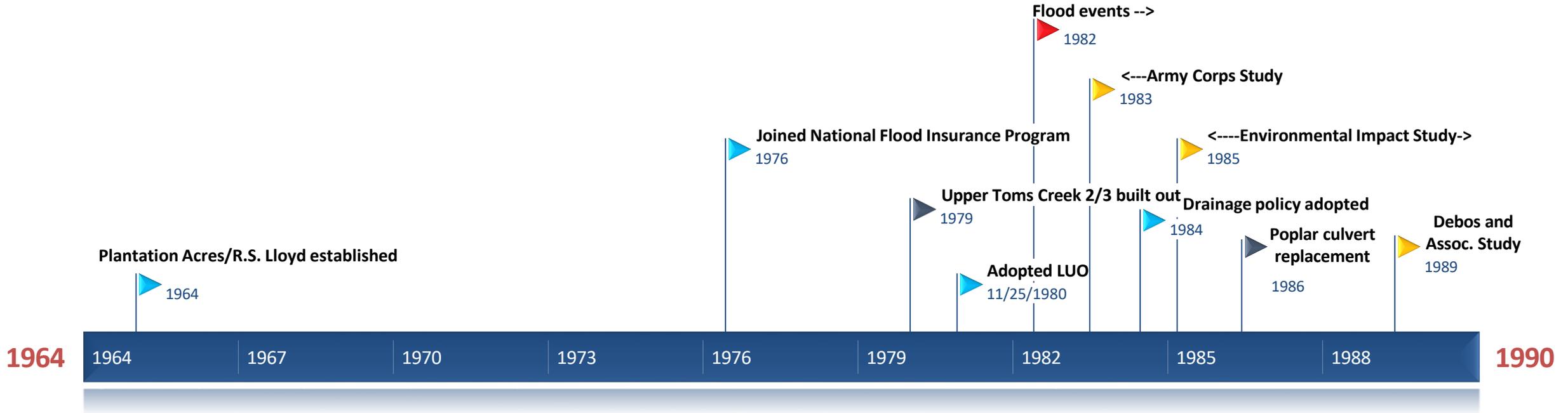
Watershed/Land Use Related Information for Upper Toms Creek Watershed

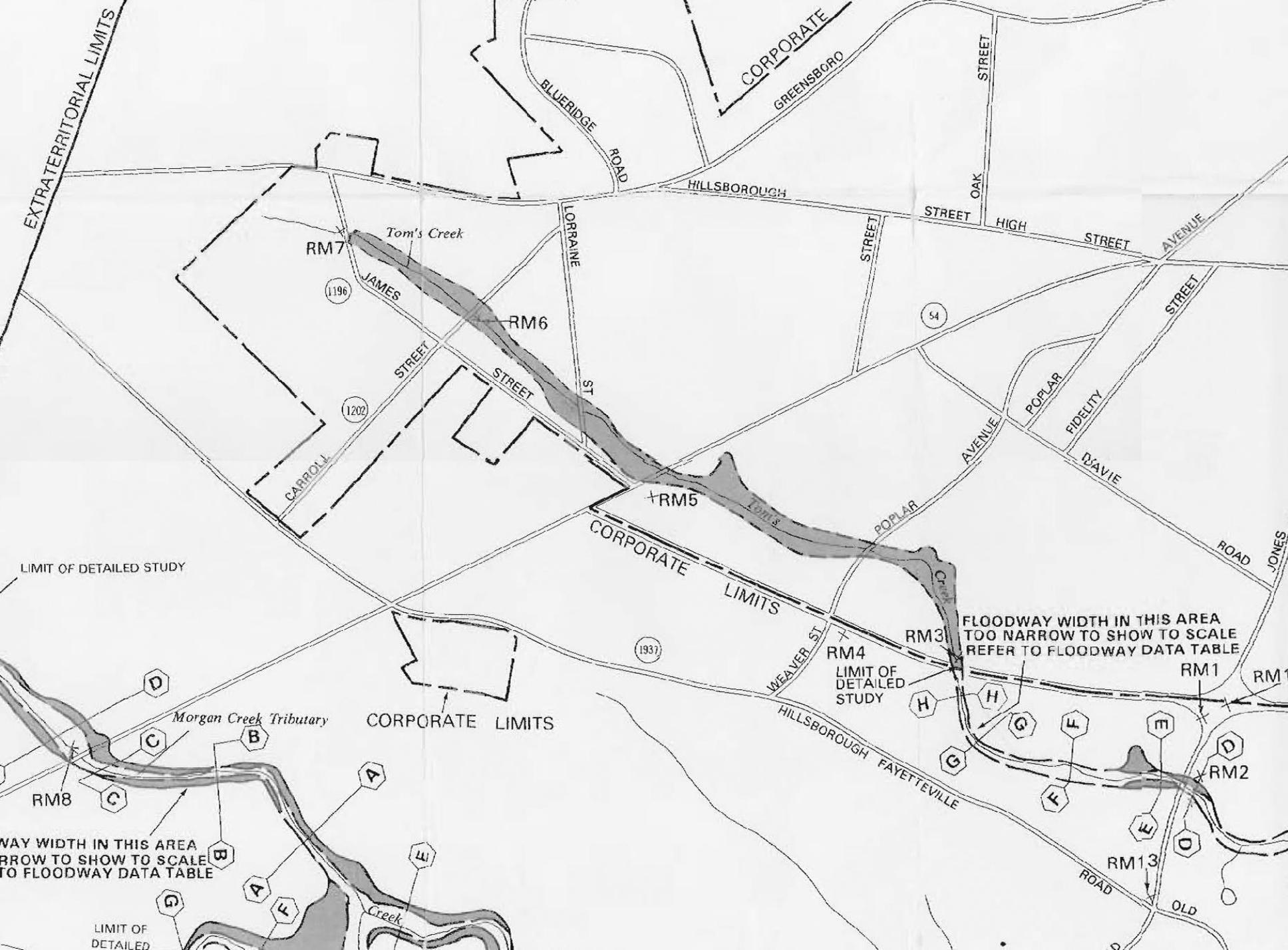
(Headwaters to Main Street)

<u>Watershed Characteristics</u>		
Watershed size: 284 acres	% Impervious: ~20%	% Impervious at build out: ~26%
# of parcels: 274	Current sites with SCMs: 2*	Current area treated by SCMs: 22 acres
% watershed built out prior to LUO (1980): ~67 %	% watershed built out since 1980: ~ 16%	% watershed not built out: ~17%**

* McDougle School and Lloyd Square currently; MLK Park design includes wetland, cisterns

** The Lloyd Property comprises 80% of this





FLOODWAY

FLOOD BOUNDARY AND FLOODWAY MAP

TOWN OF
CARRBORO,
 NORTH CAROLINA
 ORANGE COUNTY

ONLY PANEL PRINTED

COMMUNITY-PANEL NUMBER
 370275 0005C

REVISION DATE:
 FEBRUARY 9, 1980

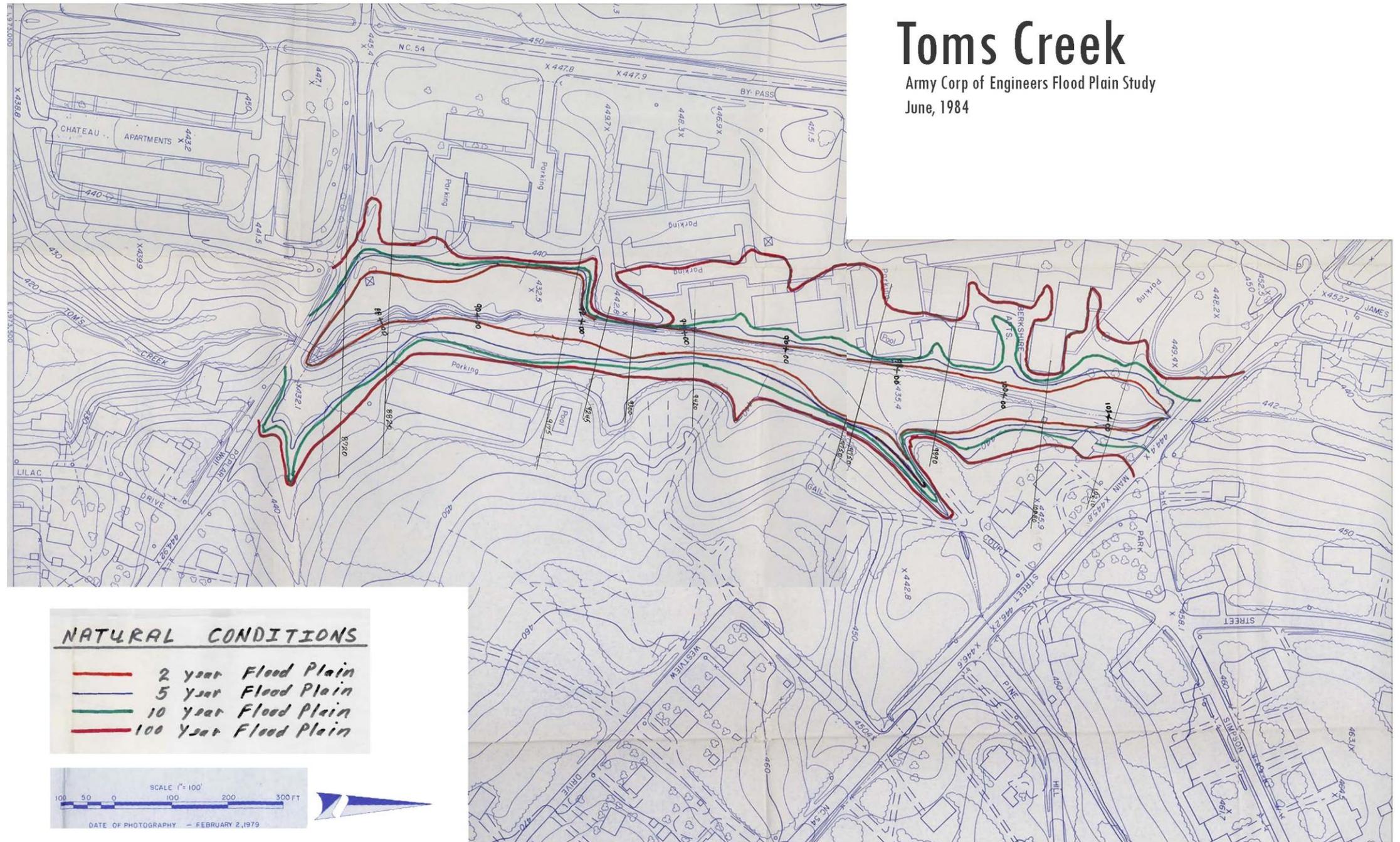


U.S. DEPARTMENT OF HOUSING
 AND URBAN DEVELOPMENT
 FEDERAL INSURANCE ADMINISTRATION

Tom's Creek

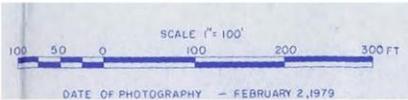
Toms Creek

Army Corp of Engineers Flood Plain Study
June, 1984



NATURAL CONDITIONS

- 2 year Flood Plain
- 5 year Flood Plain
- 10 year Flood Plain
- 100 Year Flood Plain



1990

1990

1992

1994

1996

1998

2000

2002

2004

2006

2008

2009



Request to FEMA for flood mapping assistance
11/27/1990



<-Post Office, McDougle Elem. And Middle Schools built ->



Tropical Storm Jerry
8/1995



Hurricane Fran
9/1996



Hurricane Floyd
9/1999



LUO stormwater provisions revised
1999



LUO flood provisions revised; Special Flood Hazard Area designated
2007



<-LUO stormwater/buffer provisions revised
2009

2010

2010

2011

2012

2013

2014

2015

2016

2017

2018

2019

2019

2012 storm event
6/2012

HMGP applications
2013

2013 flood event
6/30/2013

2013 storm event
5/2013

LUO stormwater and buffer provisions revised

2014

←--Plantation Acres site visits-----→

←Board of Aldermen agendas and retreat-----→

2015 storm event
3/2015

HMGP applications accepted
9/2015

Lloyd Square construction >

2016 storm event
8/2/2016

Engineering/flood study
2016

LUO flood provisions, flood map revised
6/2017

Stormwater Utility, Advisory Commission,
and Enterprise Fund established
9/2017

Stormwater Utility rate structure
established
6/2018

Lloyd Property rezoned
6/2018

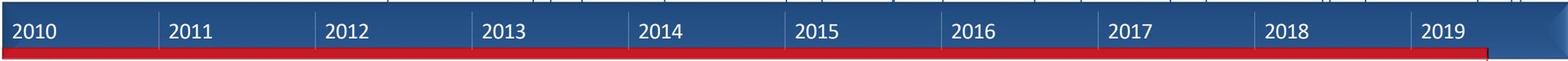
Hurricane Florence
9/13/2018

LUO stormwater
provisions being
reviewed

Watershed/
engineering
assessment

HMGP
applications
under review

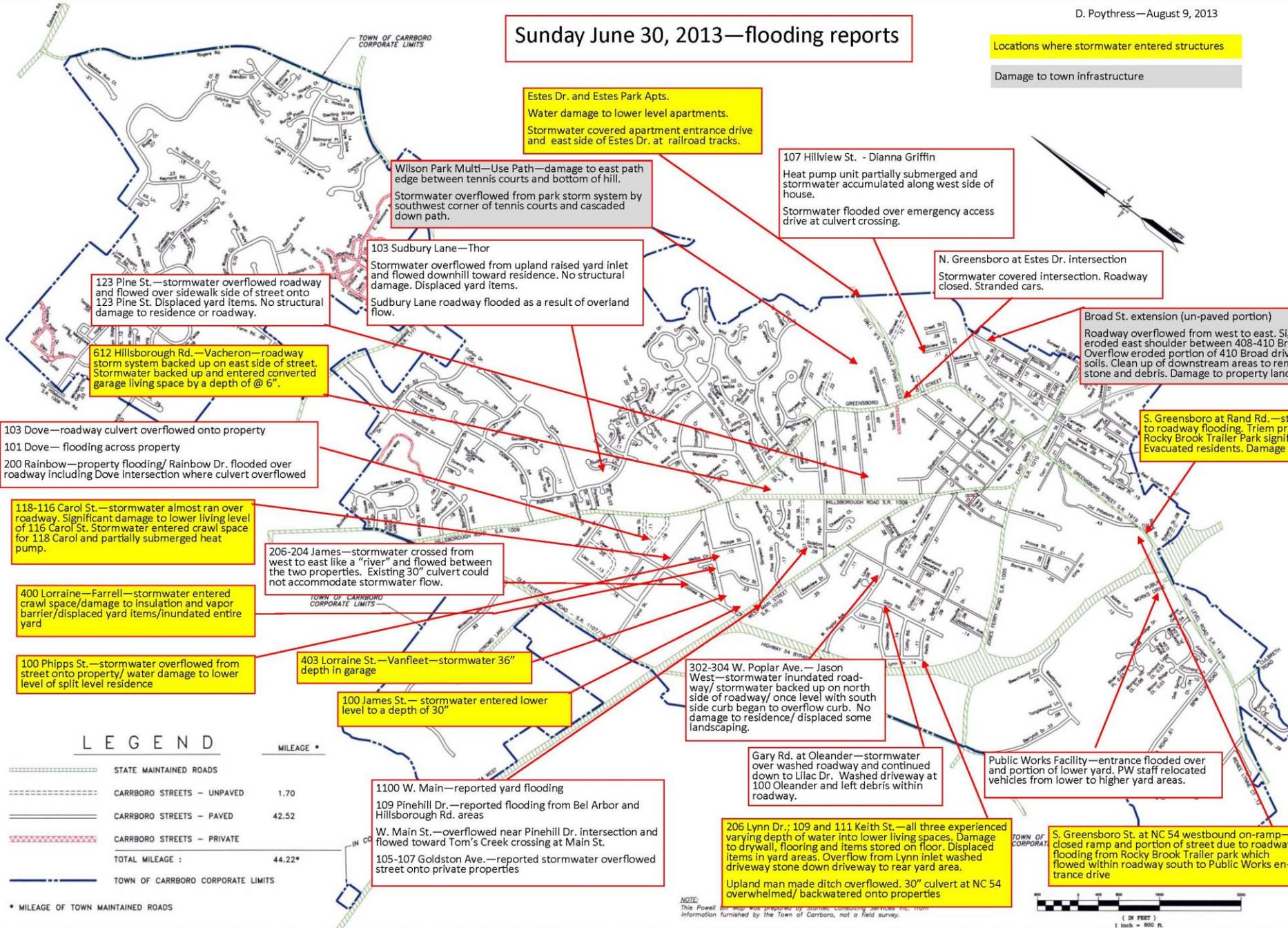
Today



Sunday June 30, 2013—flooding reports

Locations where stormwater entered structures

Damage to town infrastructure



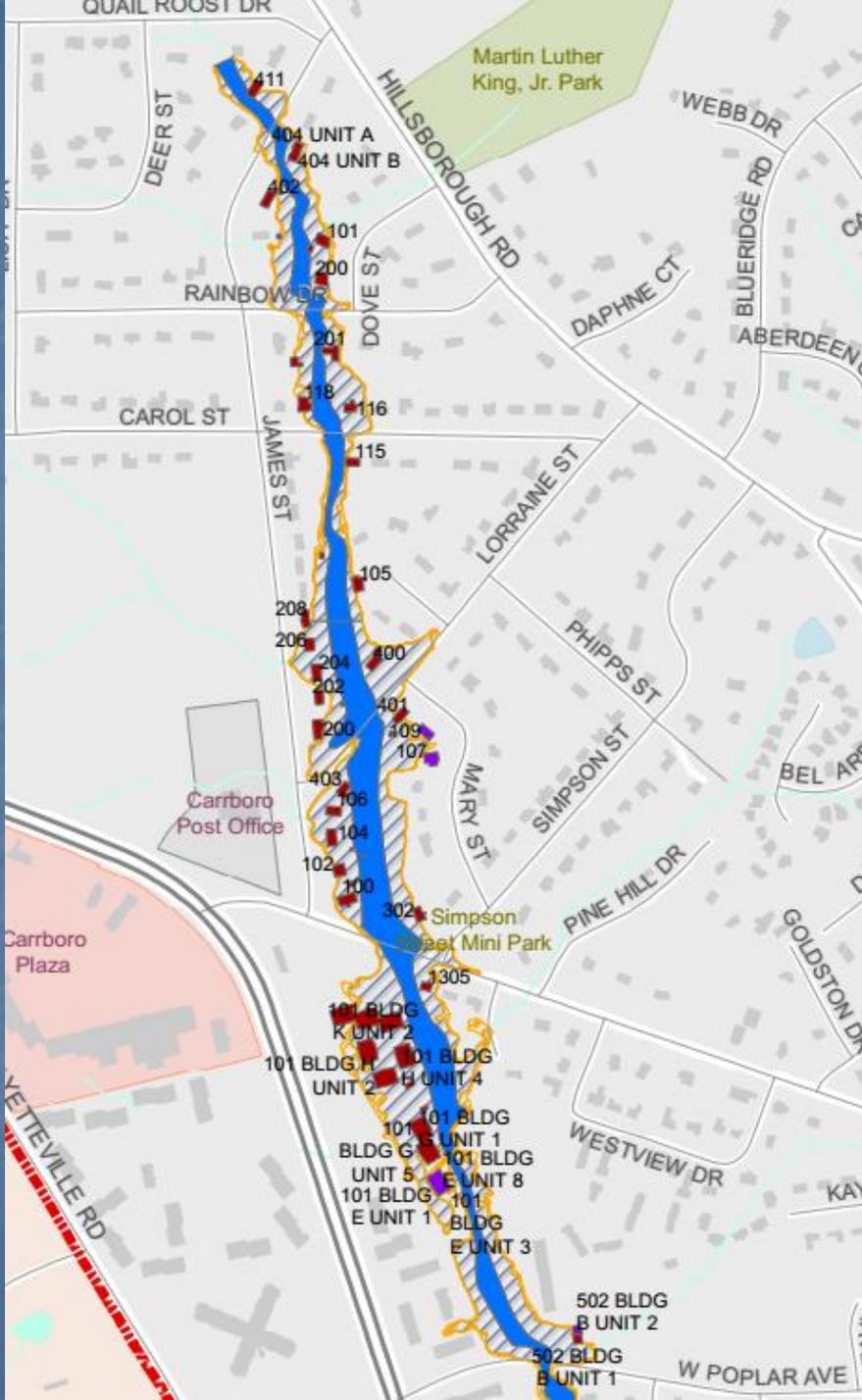
PREPARED FOR THE
TOWN OF CARRBORO
NORTH CAROLINA

Stan
LANDSCAPE ARCHITECTURE
1000 N. GREENSBORO ST. SUITE 100
CARRBORO, NC 27510
(919) 851-9116 FAX (919) 851-9177
LICENSE # 1077

TOWN OF CARRBORO
ORANGE CO. NORTH CAROLINA
POWELL BILL MAP - 2013

20130809104
JOB No. SCALE
CPR DESIGN
CPR DRAWN
RLD CHECKED
16AUG2013 SHEET
DATE FILE No.

NOTE: This Powell Bill Map was prepared by a licensed consulting services firm from information furnished by the Town of Carrboro, not a field survey.



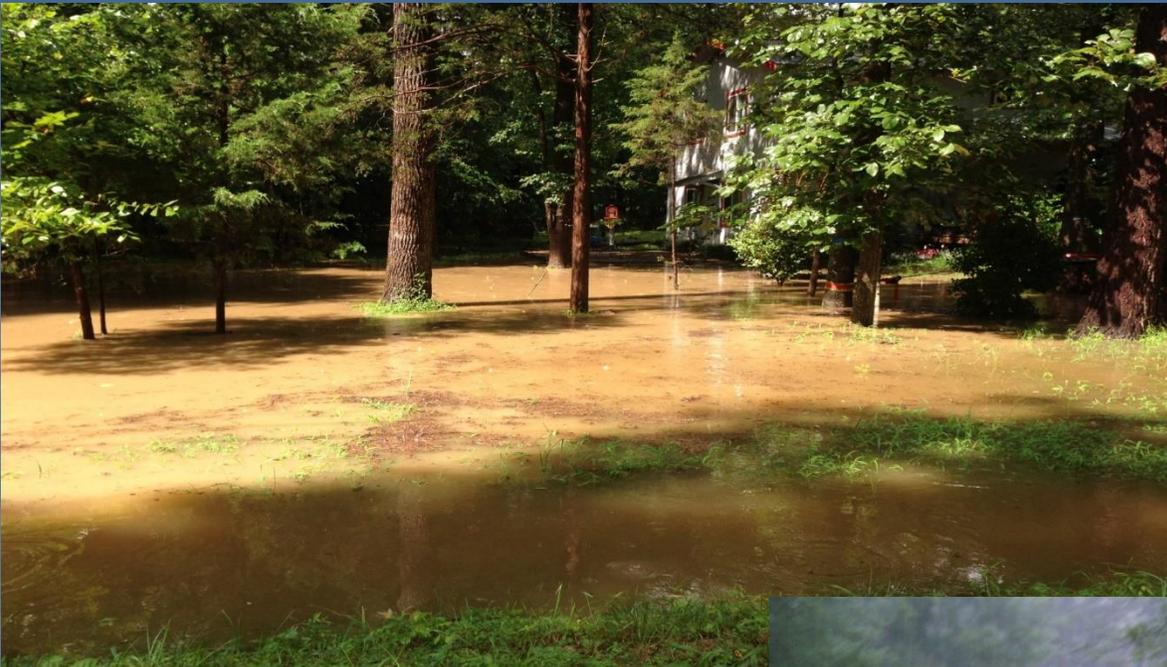
Properties in Mapped Floodplain upstream of W. Main Street

(base flood (BFE) and finished floor (FFE) elevations for highest risk properties. Note BFE>FFE for 4 properties)

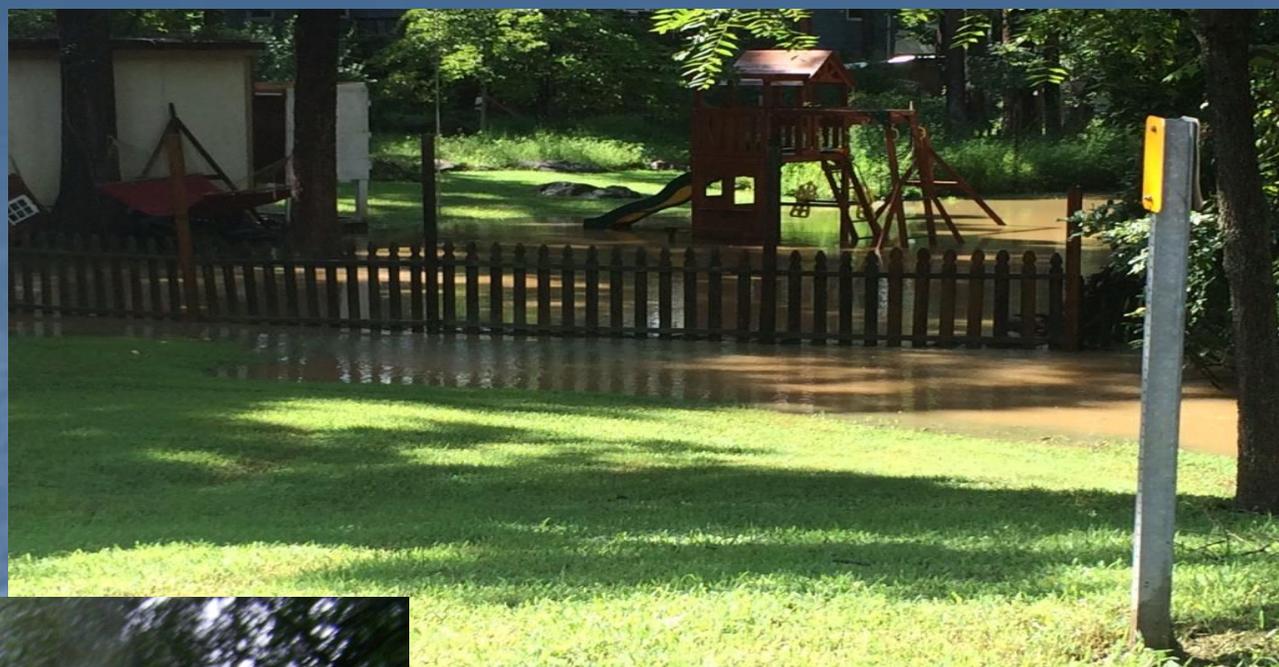
Address	Year Built	BFE	FFE
115 Carol	1971		
116 Carol	1972	461.7	458.6
118 Carol	1973		
101 Dove	1977	466.1	467.6
100 James	1979	445.9	448.3
102 James	1969	445.9	443.5
104 James	1971		
106 James	1974		
200 James	1973	450.8	455.3
202 James	1974		
204 James	1971	450.8	457
206 James	1972	450.8	456.6
208 James	1971		
402 James	1974		
404 James	1979		
411 James	1985		
400 Lorraine	1975	450.8	450.5
401 Lorraine	1975		
403 Lorraine	1975	446.1	445.8
107 Mary	1971		
109 Mary	1971		
105 Melba	1971		
200 Rainbow	1986	465.3	468.1
201 Rainbow	2002	461.7	471
302 Simpson	1974		



Rainbow Drive on June 30, 2013



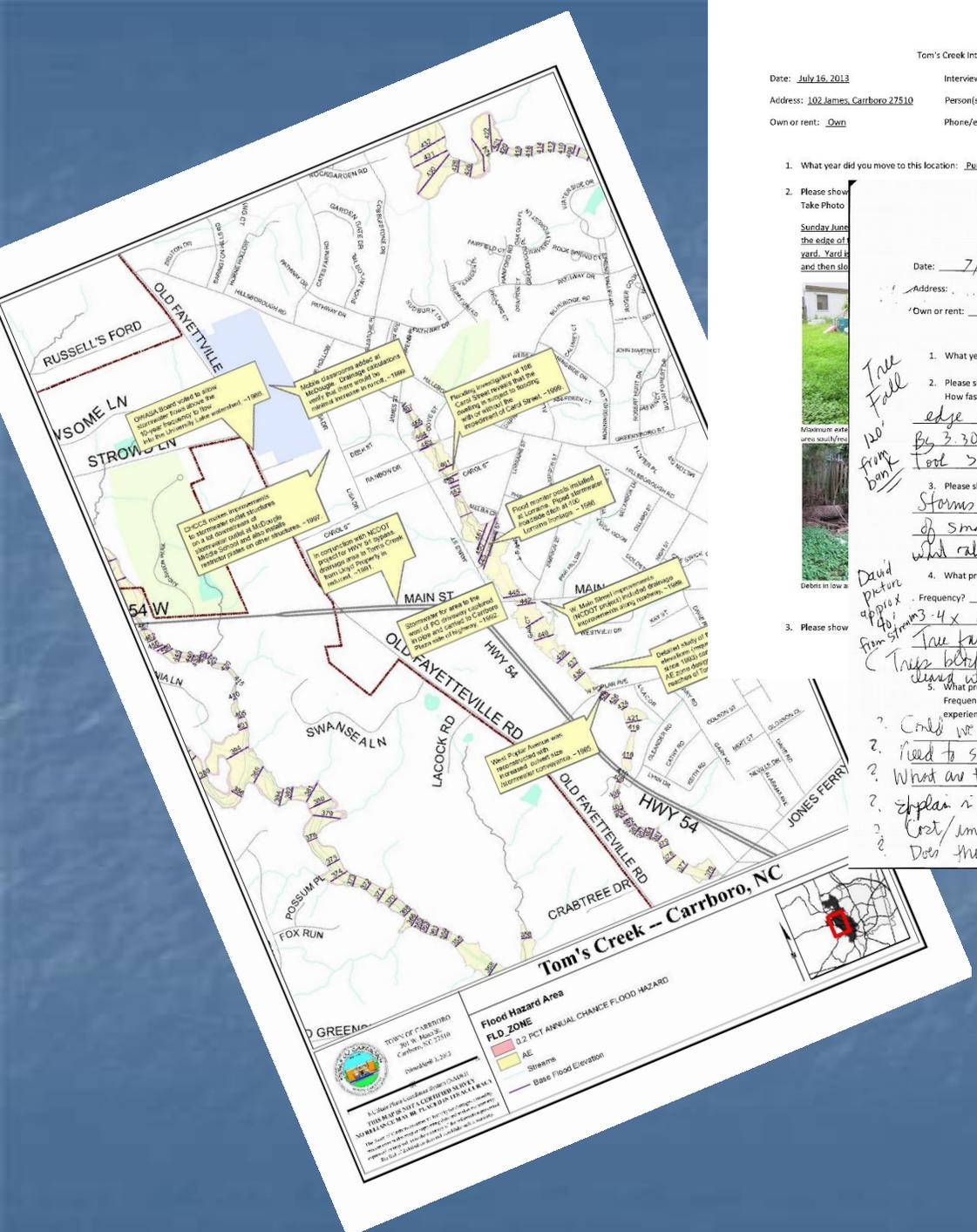
[116 Carol Street](#)



[200 James Street](#)



[303 Lorraine Street](#)



Tom's Creek Interview Form
 Date: July 16, 2013 Interviewer: Patricia McGuire
 Address: 102 James Carrboro 27510 Person(s) interviewed: Kinte
 Own or rent: Own Phone/e-mail: 919/619-0621

1. What year did you move to this location: Purchased home in 1982. Moved to home in 1992.

2. Please show Take Photo

Sunday June the edge of yard. Yard and then side



Minimum water level (shady)
Tree Fall
No from bang
David Picton approx 4x 2 from storm 3-4 x 2 tree fall
Tree blown down with debris

3. Please show

Tom's Creek Interview Form
 Date: 7/30/2013 Interviewer: Patricia McGuire
 Address: 116 Carle St. Person(s) interviewed: Jim Carline
 Own or rent: own Phone/e-mail: (George?)

1. What year did you move to this location: 12/2012

2. Please show us the water's edge where the worst flooding has occurred? When did this occur? How fast did the water come up from when the storm started? Take Photo
edge of the walking to front door -
By 2:30 up to edge of the patio June 30th
took photo (6' inside on May 20; 11' on June 6)

3. Please show us the water's edge for typical flooding in your yard? Take photo
Storms in early May - water level to edge level
of small wooded area - not in kniv/long dropped
with rat

4. What prop Frequency? —
experience?

Tom's Creek Interview Form
 Date: 7/23/13 Interviewer: David P.
 Address: _____ Person(s) interviewed: Chubino Christian
 Own or rent: _____ Phone/e-mail: _____

1. What year did you move to this location: 1993

2. Please show us the water's edge where the worst flooding has occurred? When did this occur? How fast did the water come up from when the storm started? Take Photo
June 30
pond from elevated property overflowed and
overtopped the road w/ a 16' of the shed
like a waterfall
David getting photo

3. Please show us the water's edge for typical flooding in your yard? Take photo
don't remember how high it rose to me but it stayed high the night normally done

4. What property damage occurs during typical flooding. Yard? Structure? Take photo
 Frequency? _____ (once/year? 2 times/year? Once in 5 years? Other?)
only water at one time - heavy rains
at least 6x/year -

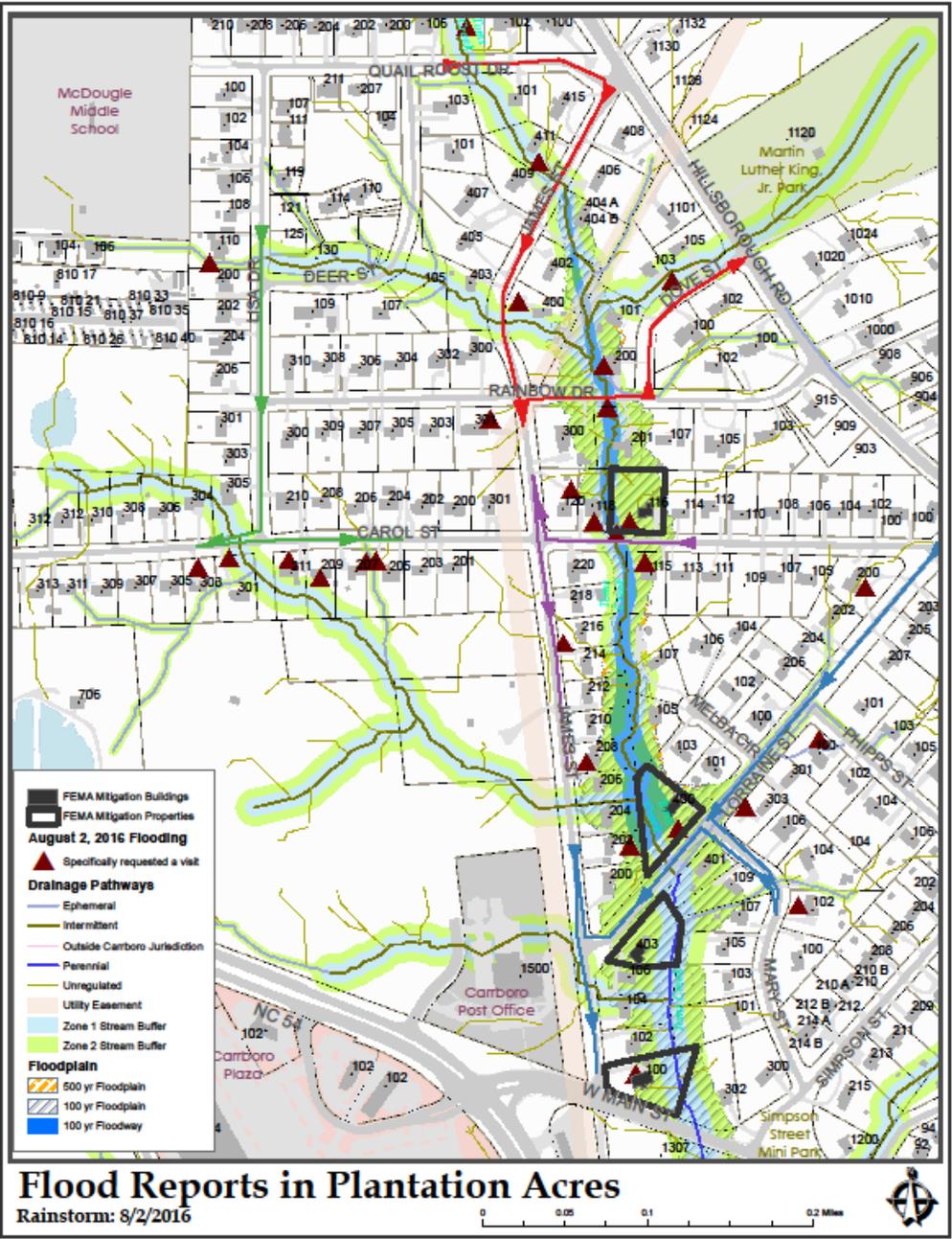
5. What property damage occurred during the Worst Flooding experience. Yard? Structure? Frequency? _____ (Date when happened: 6/30/13) What years did you experience flooding with structure damage?
none ->

Field Visits

- Plantation Acres/Tom's Creek
- July 16, 23, and 30, 2013
- Visits scheduled in three locations
- Residents of 16 properties met with staff and participated in interviews

Walk-About Details

- Plantation Acres/Tom's Creek
- August 28, 2016
- 28 properties
- 4 teams visited 7 properties each



1

Flood Incident Interview Form

Date: 8/26/16
Address: 115 Carl St
Own or rent: OWN
Interviewer: NRT
Person(s) interviewed: 82/83 / new home bar
dry houses / run for one decade

1. What year did you move to this location? 181 When did this occur?
2. Please show us the water's edge where the worst flooding has occurred? Take photo.
upto Tim's water box / McDonough - missed
Carroll St. down

3. Please show us the water's edge for typical flooding in your yard? Take photo.
3-4 x a year / increased by 1/2
Photo 1 / Photo 2

4. What property damage occurs during typical flooding? Yard? Structure? Take photo.
Frequency? 3-4 x (once/year? 2 times/year? Once in 5 years? Other?)
No carpet / stream runs through home 1x every two years
5. What property damage occurred during the Worst Flooding experience? Yard? Structure? Take photo.
Frequency? 2013 (Date when happened; Hur.?)
Note No flooding w/ Fran - non

Property damaged
slightly
down
1 m per
with down
ump pump out

Doubled gutters / gutters will put in 1.
most of gate storm flow
lot of water short
period of time.

Photo 3
Photo 4
Photo 5
Photo 6
Photo 7
Photo 8

Flood Incident Interview Form

Date: August 27, 2016
Address: 300 Rainbow Drive
Own or rent: OWN
Interviewer: _____
Person(s) interviewed: John & Gail Moriarty

1. What year did you move to this location? April / May, 1987 - Not in Flood
2. Please show us the water's edge where the worst flooding has occurred? When did this occur?
Plain - adjacent to Flood Plain

Photo Included - 2013 - To edge of garage and up to
second step on rear deck - water washed over
Rainbow Drive

3. Please show us the water's edge for typical flooding in your yard? Take photo.
Typical flooding from light to moderate rain - washes
upto and over landscaping stones around back yard.

4. What property damage occurs during typical flooding? Yard? Structure? Take photo.
Frequency? _____ (once/year? 2 times/year? Once in 5 years? Other?)
yard wash, driveway wash with each rain of 1/4 to 1/2"
recycling containers, flooded lawn mowers & tillers
under deck, displaced HVAC units

5. What property damage occurred during the Worst Flooding experience? Yard? Structure? Take photo.
Frequency? _____ (Date when happened; 2013)
Moved HVAC on pad, flooded lawn mowers & tillers
away, lawn ornaments, flower pots, washed
away mulch, left large rivulets in yard
and woods, washing away soil around
large trees around creek making them a
potential hazard for falling on house.

2016 Engineering Study

- Hydrologic/hydraulic modeling (field calibration); interviews with affected property owners; potential mitigation efforts
- June 30, 2013 was found to be equivalent to a storm with an intensity of 4.4 inches per hour
- Modeling looked at:
 - impacts to: finished floors; foundations; garages; basements.
 - culvert replacements: Rainbow, Carol, Lorraine Streets

Flood Study Details

June, 2013 storm

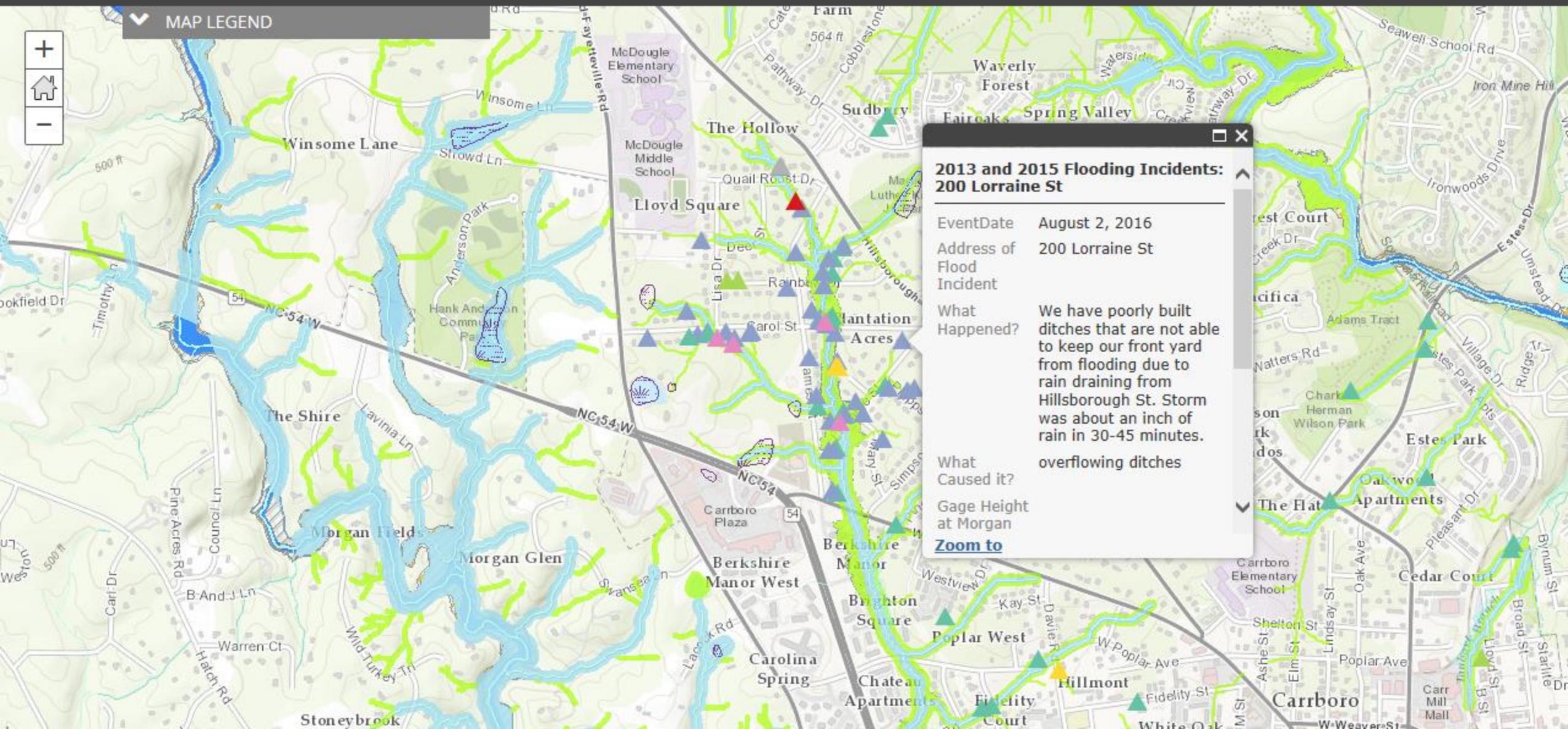
Properties reporting damage: 6	Modeled finished floor elevations impacted: 1	Modeled finished basements impacted: 2
Modeled garages impacted: 2	Modeled foundations impacted: 5	

Culvert Replacement Analyses

- "...it does not appear that a single solution exists that will decrease flooding impacts for all affected property owners."
- "The modeling dictates that reduction in flood elevations upstream will likely cause an increase in flood elevations downstream."
- "Potentially significant reductions in flood impacts can be achieved, but the improvements will not be without increased impacts elsewhere."

Flooding Events in Carrboro, NC

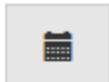
Reports of flooding in Carrboro from September 2012 to the present



Please tell us about flood events in Carrboro

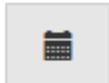
1. Enter Information

Date of Flood Incident



When did the flood happen (not when you are reporting it)?

Date of Report



September 27, 2016 5:47 PM

Date reporting if no date for flooding available

Address of Flood

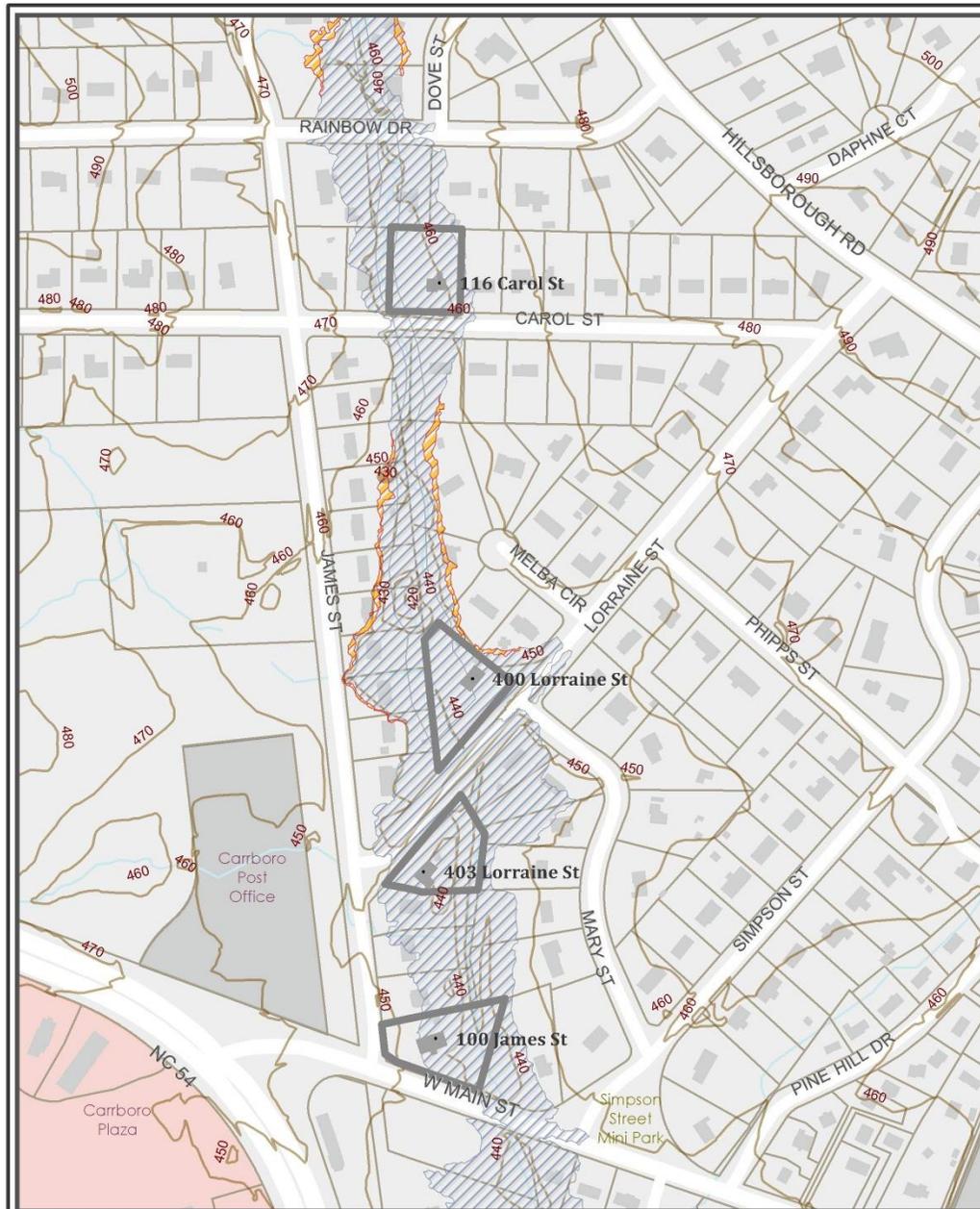
120 Hideaway Lane

Address where the flood occurred--optional. You can specify the location below.

Describe the Flooding

Describe what happened. For example, water overtopped the curb and flooded my yard.

What happened? What flooded? 255 characters remaining



Location of Four Properties--HMGP Applications

HMGP-4167 Floodplain 500 yr floodplain 100 yr floodplain



1 inch = 300 feet

Individual homeowners, businesses, and private nonprofits may apply for funding through eligible subapplicants



Subapplicants

Federally-Recognized Tribes

State Agencies

Private Nonprofits (HMGP only)

Tribal Agencies

Local Governments/Communities



Applicants

Territories

Federally-Recognized Tribes

States



FEMA

What is the process of applying for HMGP?

HMGP funding may be available after a Presidential major disaster declaration. The funding amount is calculated from a percentage of the overall disaster damage (refer to the Hazard Mitigation Assistance Guidance for more information).

States, territories, or federally recognized tribal governments administer the program and prioritize projects. Because HMGP funding is limited, they must make difficult decisions as to the most effective use of grant funds. After reviewing project applications to determine if they meet the program requirements, the states, territories, or federally recognized tribal governments forward the applications to FEMA for review and approval.

FEMA awards the HMGP funds to the Applicant, which disburses those funds to its subapplicants, generally the local governments are responsible for implementing the project and are required to meet all federal, state and local procurement procedures as well as meet codes and standards.

Homeowners may start their projects once notified by their local/tribal/state government official. Work started prior to FEMA review and approval is ineligible for funding.

Please contact your State Hazard Mitigation Officer, or federally recognized tribal/local government official to obtain information on the HMGP application process. FEMA maintains a list of State Hazard Mitigation Officers at www.fema.gov/state-hazard-mitigation-officers.



Project example
House Elevation – Freeport, New York

HMGP Funding Process for Homeowners



1. Disaster Strikes

The President of the United States declares a disaster for the State or Tribal Government and federal disaster aid becomes available. For a list of major disaster declarations, please visit www.fema.gov/disasters

2. Research Point of Contact

Generally, homeowners can contact their State/local emergency management department to find their mitigation point of contact. In some cases, the state/tribal/local emergency management department advertises information on mitigation opportunities through:

- Town hall meetings
- Local papers
- Media outlets (radio, televisions, billboards, etc.)
- State/local websites

3. Research the HMGP

Homeowners can refer to www.fema.gov/hazard-mitigation-grant-program for information on project types and general program requirements. Be sure your community wants to participate in the HMA program in order to submit a grant application to FEMA.

4. Decision to Apply to the HMGP

Applying for HMGP funding is voluntary. Homeowners must decide whether to apply for HMGP assistance, mitigate their homes using other funding sources, or not mitigate. Homeowners should consider all of their options and seek assistance in developing a plan that may include applying for HMGP funding.

5. Application Development

Generally, local governments develop applications. The applications are submitted to the state, territory, or federally recognized tribal government and then to FEMA.

**States, territories, federally recognized tribes or local governments may decide not to apply for HMGP funding. In that case, homeowners must seek funding from other sources in order to implement mitigation measures to their homes.*

6. FEMA Review

FEMA reviews the submitted applications for: eligibility, cost effectiveness, feasibility, and environmental laws and regulations that may impact the project. The applications that meet these program requirements may be approved based on funding availability.

7. Project Implementation

FEMA awards funds to the Applicant, which disburses the funds to its local governments. Homeowners may start their projects once notified by their state/tribal/local government official.

8. Project Completion

Once the project is completed, closeout begins. Closeout is a process by which FEMA reviews and verifies that the project meets all of the program's and federal grant management requirements.

What are common Do's and Don'ts?

- **Do contact your mitigation point of contact.** Contact your State Hazard Mitigation Officer, federally recognized tribe, or local government official to obtain information on the HMGP application process.
- **Do consider other funding sources.** The HMGP application process may take several months.
- **Do NOT start work until receiving notification from your state/tribal/local government official.** FEMA does not reimburse costs for work already started or completed prior to FEMA review and approval. This does not include basic repair work to make your residence habitable; rather, it includes risk reduction costs that would be funded by the mitigation grant.

Current Hazard Mitigation Grant Program Project



Acquisition applications for 100 James Street and 116 Carol Street did not move forward beyond appraisal (step 7 from previous slide).

400 and 403 Lorraine Street Elevation grant in process
Design complete; construction bid received
Currently awaiting State/FEMA approval of grant extension request

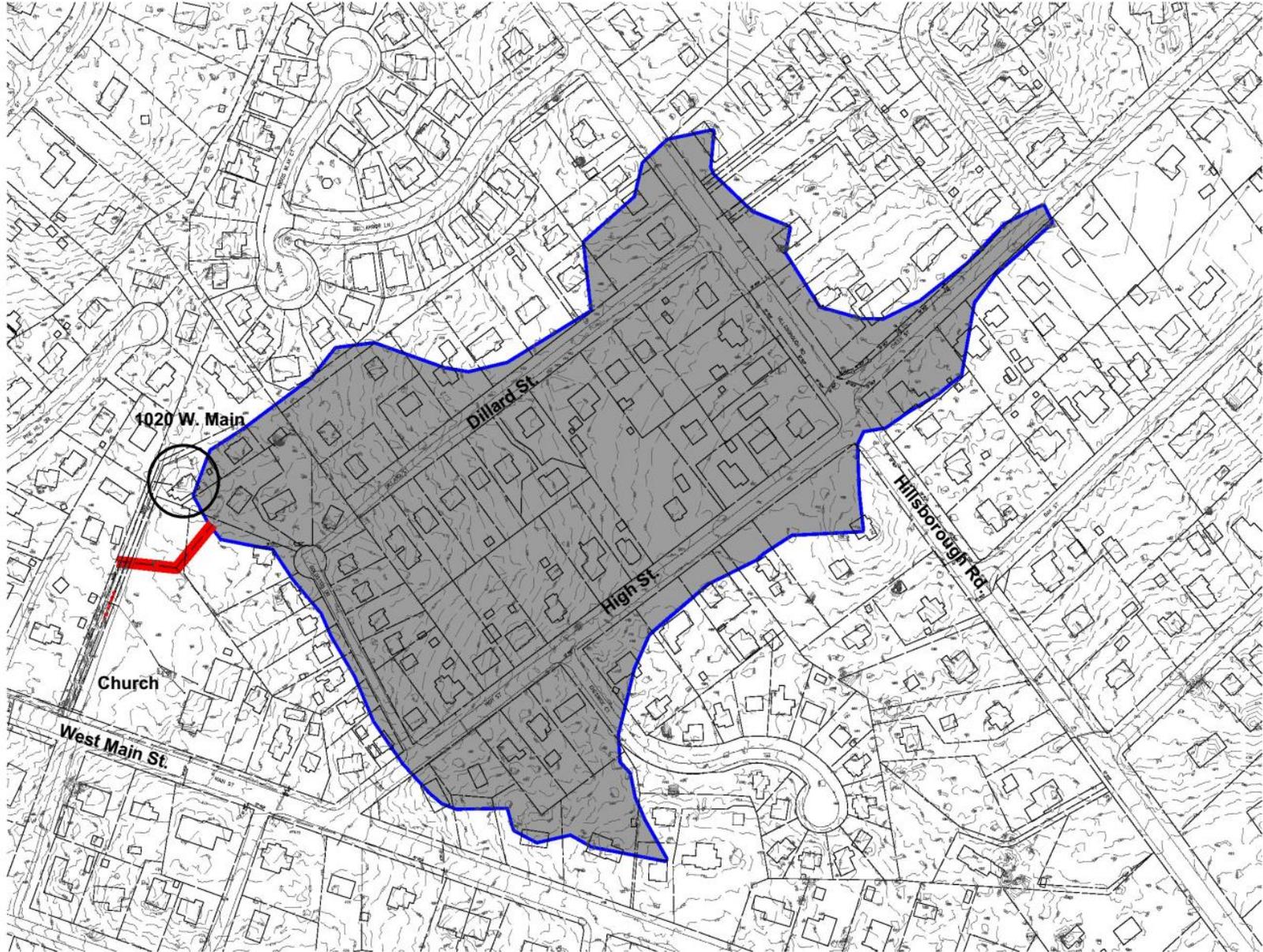


Hazard Mitigation New Funding (2019)

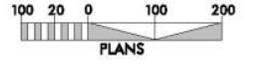
- Acquisition Letter of Interest, 116 Carol Street.
- Elevation Letter of Interest, 400 and 403 Lorraine and 100 James
 - Lorraine St. properties included as backup plan for if current grant extension/funding request is not approved
- Letters of interest submitted; if accepted, full application will be prepared

Catchment of Concern

W MAIN STREET DRAINAGE AREA



PROJECT REFERENCE NO.	SHEET NO.
1020 W MAIN	DRG AREA
HW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



DRAINAGE AREA:
20.1 AC

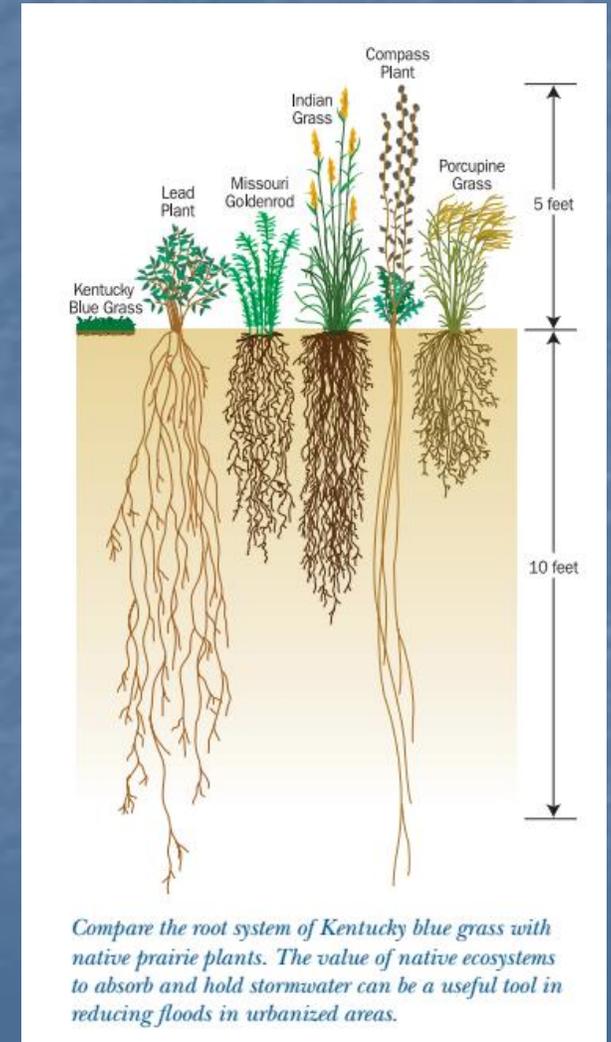
PROPERTIES WITHIN DRAINAGE AREA:
83

Current/Planned Activities

- Stormwater/watershed scale assessment (upper Toms Creek planned as pilot area)
 - Currently being scoped; could include field and engineering studies
- Enhanced outreach efforts
- Stormwater Control Measure maintenance and inspection

Community Opportunities

- Residential “low impact development” such as:
 - Residential landscaping (e.g., lawns to native plants; increased tree canopy)
 - Rainwater harvesting
 - Rain gardens
 - Permeable pavement





Reducing Damage from Localized Flooding

A Guide for Communities

FEMA 511 / June 2005



[ADVANCE TO TABLE OF CONTENTS](#)

Resources.....

■ My RainReady

Taking Action: A Guide for Homeowners



In RainReady® communities, better water management means that homes, schools, and businesses are prepared for rain—whether too much or too little. RainReady programs keep residences secure and dry, services running, and rivers and lakes clean.

Wet basement, parched lawn, or cracking foundation? There are many well-tested options available to homeowners in need of water management solutions. Here are ten actions homeowners can take to protect their properties. For more details, visit www.rainready.org/for-homeowners.

- ASSESS YOUR PROPERTY**
 The first step to making improvements is understanding how water falls on your property and flows through your pipes. If you have significant problems, you may need the help of an engineer, plumber, electrician, or landscape designer. Try to find an assessor that is independent of any contractor so they will be focused on the most affordable solutions. Always document problems with words, photographs, and videos, as this information will be helpful for assessments, insurance claims, and acquiring help from your municipality.



- MAKE YARD IMPROVEMENTS**
 In order to prevent flooding and minimize the impact of water scarcity in your home and neighborhood, try to capture stormwater runoff using rain gardens, swales, dry wells, permeable paving, rain barrels, or cisterns. Since conventional lawns exacerbate water management problems, consider replacing yours with a variety of native plants and grasses, which absorb more water and require less fertilizing, mowing, and water. Other yard improvements include re-grading land so that stormwater drains away from your building, disconnecting gutter downspouts from municipal sewer lines, and constructing walls and barriers to prevent water from reaching low-entry points.



- MANAGE WATER WITHIN YOUR HOME**
 There are a range of appliances, fixtures, water systems, and accessories on the market that can help you manage water in your home. For example, you can save energy, water, and money by using high-performance, water-efficient appliances. Alarm systems for sump-pumps, home rain gauges, and smartphone flood-alert applications all help minimize the damage of flooding. If water regularly enters your home, place appliances, furnaces, hot water heaters and electrical panels above the typical flood level on wood or concrete blocks. There are also a range of floodproofing devices on the market, such as floor-drain guards, standpipes, sump pumps, backwater valves, overhead sewer pumps, and interior and exterior drain tiles.



- HAVE YOUR BUILDING SEWERS CHECKED**
 Faulty pipes connecting your home to the municipal sewer system can exacerbate foundation damage and flooding in your home. Ensure that roots, grease, waste, or tree roots are not obstructing the

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Am I at risk of flooding?

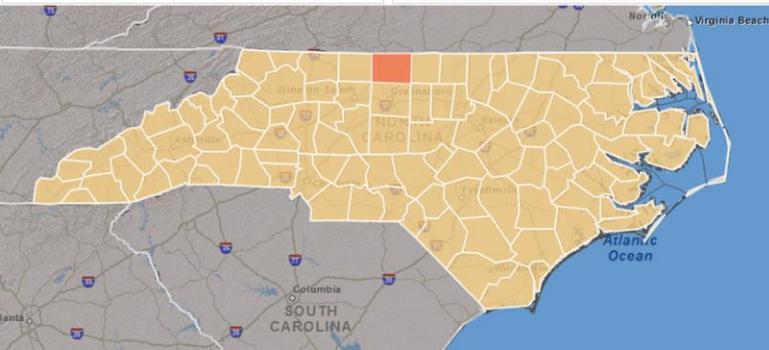
General Public

Enter all or part of your address and click GO.
Address, City, or ZIP

OR select a county
County

Benefits of Floodplain Mapping

Floods are among the most frequent and costly natural disasters in terms of human hardship and economic loss. North Carolina's Digital Flood Insurance Rate Maps (DFIRM) enable business leaders and residents to more accurately predict flood hazards and prepare for flood risks. Go to [NC Floodmaps](#) for more information.



Stay involved/follow up

<http://townofcarrboro.org/1227/Toms-Creek>

- Video link for this meeting
- Form for requests
- Resource materials
- For floodprone property owners, keep apprised of future federal declarations and opportunities
- Stormwater Utility is providing Board of Aldermen with monthly reports
- Stormwater Advisory Commission meeting agendas and minutes (seats open)

Questions



