



REPETITIVE LOSS AREA ANALYSIS

City of Wilson, North Carolina
Planning & Development Services

Updated November 2019

Public Version

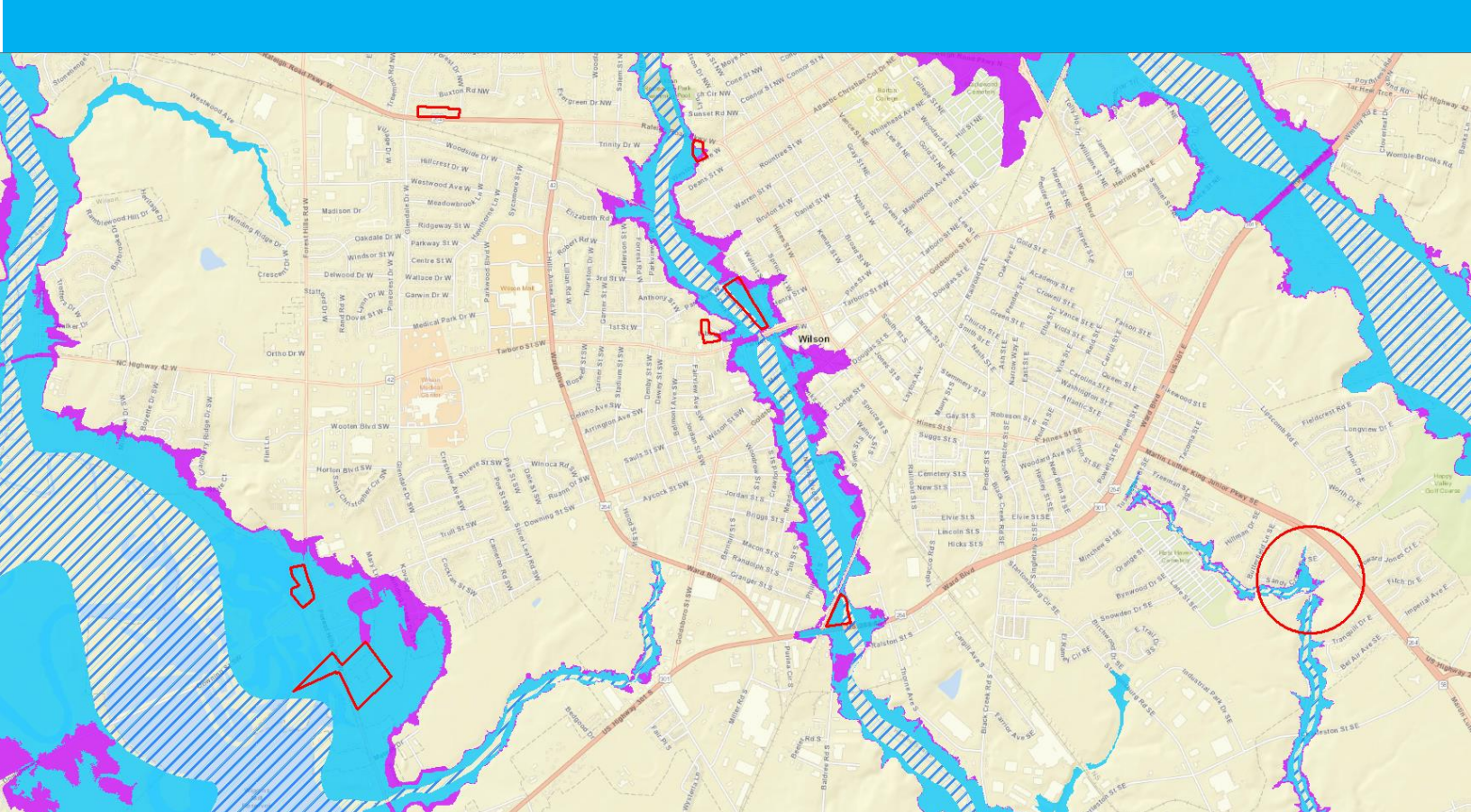


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1 Repetitive Loss Area Analysis

Background

Flooding is the most common natural hazard in the United States. More than 20,000 communities experience floods and this hazard accounts for more than 70 percent of all Presidential Disaster Declarations. In the United States, over 8 million residential and commercial structures are currently built in areas at risk to flooding. The cost of recovery is spread over local, state and federal governments and the victims themselves, who are directly affected by these disasters.



The National Flood Insurance Program (NFIP) is continually faced with the challenge of balancing the financial soundness of the program with the competing expectation of keeping premiums affordable. Repetitive loss properties are one of the two largest obstacles to achieving financial soundness of the NFIP. Since the inception of the NFIP, almost \$9 billion have been paid to repetitive loss properties, about one-fourth of all NFIP payments. While the NFIP has resulted in forty years of successful floodplain management, and many of these structures are no longer insured, repetitive loss properties are still a drain on the NFIP. Currently, repetitive loss properties represent 1.3% of all policies, but are expected to account for 15% to 20% of future losses.

Private insurance companies faced with high losses have several options to keep turning a profit. They can raise income through premium rate increases, decrease payments to insurers or reduce the exposure to the hazard. Unfortunately, the NFIP can only do what is allowed by statute. If losses increase, the Federal Emergency Management Agency (FEMA) is authorized by Congress to make incremental adjustments to increase the premium rates and reduce overall coverage. FEMA is not permitted to eliminate coverage for any policy holder including high-risk properties. Actuarial rates cannot be charged to buildings built before State and local floodplain management regulations went into effect. Since repetitive flood claims must be paid, FEMA has no choice but to spread these costs among all policyholders.

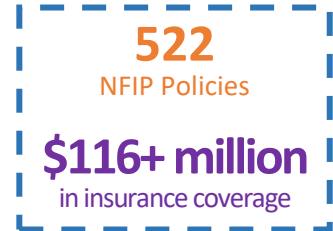
Sometimes floodplain management regulations mitigate repetitive flood losses when a building is substantially damaged. A structure where the cost to repair is equal to or exceeds 50 percent of the building's value is considered substantially damaged. A substantially damaged building must be brought up to the same flood protection level as a new building under a community's floodplain management ordinance. Many repetitive loss buildings are not in a regulated floodplain or they do not get substantially damaged and remain at risk to future damage.

Many owners of properties that experience repetitive flooding are not aware of the magnitude of damage they are exposed to because they either purchased the property after the last flood or the seller or lender did not disclose the flood hazard. Disclosure of repetitive flooding is a problem because repetitive loss areas are not shown on Flood Insurance Rate Maps (FIRMs).



The City of Wilson, North Carolina (CID-370270) has been participating in the regular phase of the NFIP since July 19, 1982. In addition to meeting the basic requirements of the NFIP, Wilson has completed additional components to participate in the Community Rating System (CRS) program. Wilson is currently a CRS Class 6 which rewards all policyholders in the SFHA with a 20 percent reduction in their flood insurance premiums. Non-SFHA policies (Standard X Zone policies) receive a 10% discount, and preferred risk policies receive no discount. Wilson has been participating in the CRS program since May 1, 2011.

As of March 31, 2015, there are currently 522 NFIP Policies in force in the City of Wilson with insurance coverage of \$116.7 million. The City has 237 paid losses against the NFIP totaling more than \$5 million with 48 of those losses being substantial damage claims since 1978. A repetitive loss property does not have to currently be carrying a flood insurance policy to be considered a repetitive loss property or a severe repetitive loss property. Many properties on the repetitive loss list are not currently insured. An insured property and claims on that property will make it a repetitive loss property. Once it is designated as a repetitive loss property, that property remains as a repetitive loss property from owner to owner; insured policy to no policy; and even after that property has been mitigated. Forty-four percent of repetitive loss buildings in the City of Wilson are currently insured (see the Repetitive Loss Requirement Section).



522
NFIP Policies

\$116+ million
in insurance coverage

TERMINOLOGY

REPETITIVE LOSS: Any insurable building for which two or more claims of more than \$1,000 were paid by the NFIP within any rolling 10-year period, since 1978. Two of the claims paid must be more than 10 days apart but, within 10 years of each other. A repetitive loss property may or may not be currently insured by the NFIP.

SEVERE REPETITIVE LOSS: As defined by the Flood Insurance Reform Act of 2004, SRLs are 1-4 family residences that have had four or more claims of more than \$5,000 or at least two claims that cumulatively exceed the building's value. The Act creates new funding mechanisms to help mitigate flood damage for these properties.

According to repetitive loss data received from FEMA in February 2015, there are a total of 16 unmitigated and two mitigated repetitive loss properties within the City of Wilson. Three properties are classified as severe repetitive loss. Of the three severe repetitive loss properties, all remain unmitigated. An updated Activity 510 Floodplain Mitigation Plan (FMP) is currently under development for the City. Since the FMP examines flooding issues as a whole within the City and does not assess individual properties, the City of Wilson has opted to complete a Repetitive Loss Area Analysis (RLAA) using the 2013 *CRS Coordinator's Manual*. The RLAA will benefit the City by examining potential mitigation measures for specific repetitive loss areas and increasing its credit in the CRS Program.

Setting

The City of Wilson, situated in eastern North Carolina, is the county seat of Wilson County. The City has a total land area of approximately 29 square miles and is located predominately in the coastal plain physiographic province of North Carolina along Interstate 95. The City of Raleigh, the State Capital, is located 40 miles to the west of the City, and the Atlantic Ocean is 100 miles to the east. The City is served by U.S. highways 264 and 301 and North Carolina highways 42 and 58. Interstate 795 connects Wilson to the City of Goldsboro and on to I-40 south, enhancing access to the seaports at Wilmington and Morehead City, North Carolina. U.S. 264 provides the City with an interstate grade highway connecting Greenville and the Research Triangle Park. According to the U.S. Census Bureau, the City had an estimated total population of 49,628 in 2013.

Figure 1.1 depicts the City of Wilson's location within the County as well as the surrounding cities and towns. Drainage within the City of Wilson flows to the Neuse River Basin.

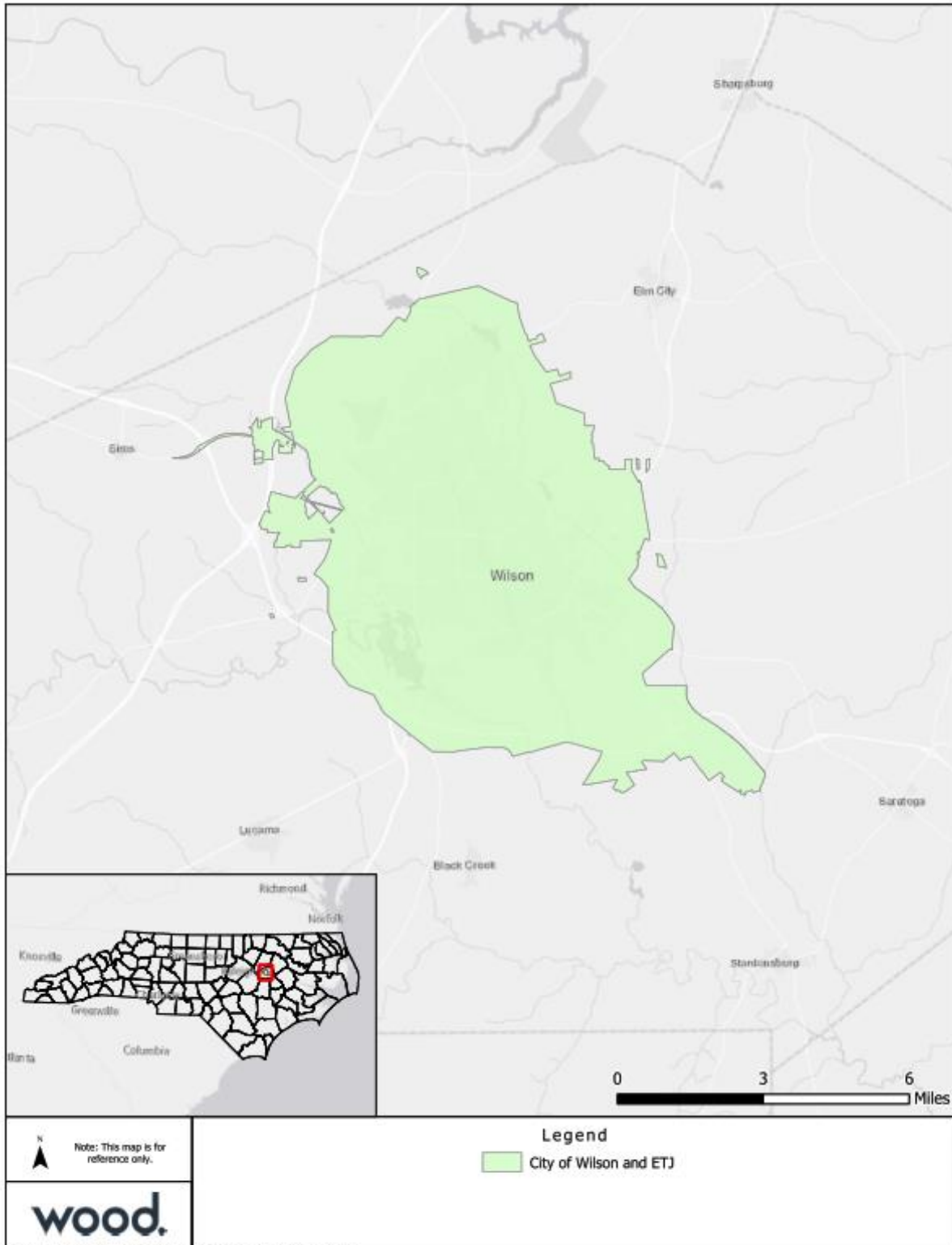


Figure 1.1 – City of Wilson Location Map

Repetitive Loss Requirement

Repetitive loss data must be maintained and updated annually in order to participate in the CRS. Since many losses under the NFIP come from repetitively flooded properties, addressing these properties is a priority for participating in the CRS Program. Depending on the severity of the repetitive loss problem, a CRS community has different responsibilities per the 2017 CRS Coordinator’s Manual.

- **Category A:** A community with no unmitigated repetitive loss properties. No special requirements from the CRS.
- **Category B:** A community with at least one, but fewer than 50, unmitigated repetitive loss properties. Category B communities are required by the CRS to research and describe their repetitive loss problem, create a map showing the showing the location of all repetitive loss properties (areas) and complete an annual outreach activity directed to repetitive loss properties.
- **Category C:** A community with 50 or more unmitigated repetitive loss properties. Category C communities are required to do everything in Category B and prepare a floodplain management plan that covers all repetitive loss properties (areas) or a RLAA for all repetitive loss areas.

Per 2019 repetitive loss data obtained from FEMA, the City of Wilson has a total of 24 unmitigated repetitive loss properties. The City is designated as a Category B repetitive loss community.

Figure 1.2 – Summary of Unmitigated Repetitive Loss Properties

Flood Zone ¹	Building Type		Building Count		Losses	Total Building Payment	Total Content Payment	Total Paid
	Residential	Non-Res.	Insured	Uninsured				
X	1		1		2	\$7,040.08	\$812.50	\$7,852.58
AE	1		1		5	\$203,545.39	\$231,460.36	\$435,005.75
X	1		1		3	\$19,304.77	\$1,453.24	\$20,758.01
AE	1		1		3	\$36,758.70	\$253.23	\$37,011.93
AE	1		1		2	\$7,829.06	\$1,055.58	\$8,884.64
C	1		1		5	\$26,369.72	\$778.75	\$27,148.47
X	1			1	2	\$3,533.56	\$1,182.65	\$4,716.21
AE	1			1	4	\$54,850.33	\$9,727.43	\$64,577.76
AE	1		1		3	\$11,610.32	\$0.00	\$11,610.32
X		1	1		2	\$12,496.29	\$59,789.00	\$72,285.29
AE	1		1		3	\$40,811.74	\$18,790.10	\$59,601.84
X	1			1	3	\$10,651.89	\$2,276.66	\$12,928.55
X	1			1	2	\$6,590.01	\$1,000.73	\$7,590.74
AE		1	1		2	\$27,991.00	\$980.62	\$28,971.62
AE		1	1		3	\$72,764.56	\$5,633.01	\$78,397.57
A06		1	1		2	\$0.00	\$64,955.99	\$64,955.99
AE		1	1		3	\$279,954.41	\$53,400.34	\$333,354.75
AE	1		1		2	\$76,658.16	\$0.00	\$76,658.16
A04		1		1	3	\$73,989.21	\$159,752.25	\$233,741.46
A04	1		1		2	\$10,419.53	\$9,288.25	\$19,707.78
C	1		1		2	\$16,179.50	\$1,012.50	\$17,192.00
C	1			1	4	\$0.00	\$203,399.15	\$203,399.15
A04	1			1	9	\$112,624.34	\$47,329.12	\$159,953.46
C	1			1	2	\$37,540.54	\$0.00	\$37,540.54
Total	18	6	16	8	73	\$1,149,513	\$874,331	\$2,023,845

Mapping Repetitive Loss Areas

There were 18 Repetitive Loss Areas identified within the City of Wilson in accordance with the principles outlined in the CRS guidance titled *Mapping Repetitive Loss Areas* dated August 15, 2008. The 18 Repetitive Loss Areas include the 24 unmitigated repetitive loss properties, 18 historic repetitive loss properties (those with one paid claim against the NFIP), plus an additional 116 properties that have the same or similar flood conditions but have not had any claims paid against the NFIP. Therefore, a total of 150 properties were included within the RLAA.

Note that this RLAA was originally developed in 2015 and included 13 repetitive loss properties per 2015 data from FEMA and a total of 134 properties. In preparing this 2019 update, 8 additional unmitigated properties were identified which necessitated the addition of 5 new repetitive loss areas encompassing 16 total properties. The additional areas are 13-18.

For reporting purposes, the 18 Repetitive Loss Areas were grouped into two subareas by flooding type, as follows:

- Subarea 1: Areas 1, 2, 3, 6, 8, 10, 11, 13, 14, 15, 17, 18
- Subarea 2: Areas 4, 5, 7, 9, 12, and 16

A detailed map of each repetitive loss area is provided in Section 2. An overview map of the City of Wilson Repetitive Loss Areas is shown in Figure 1.3 on the following page.

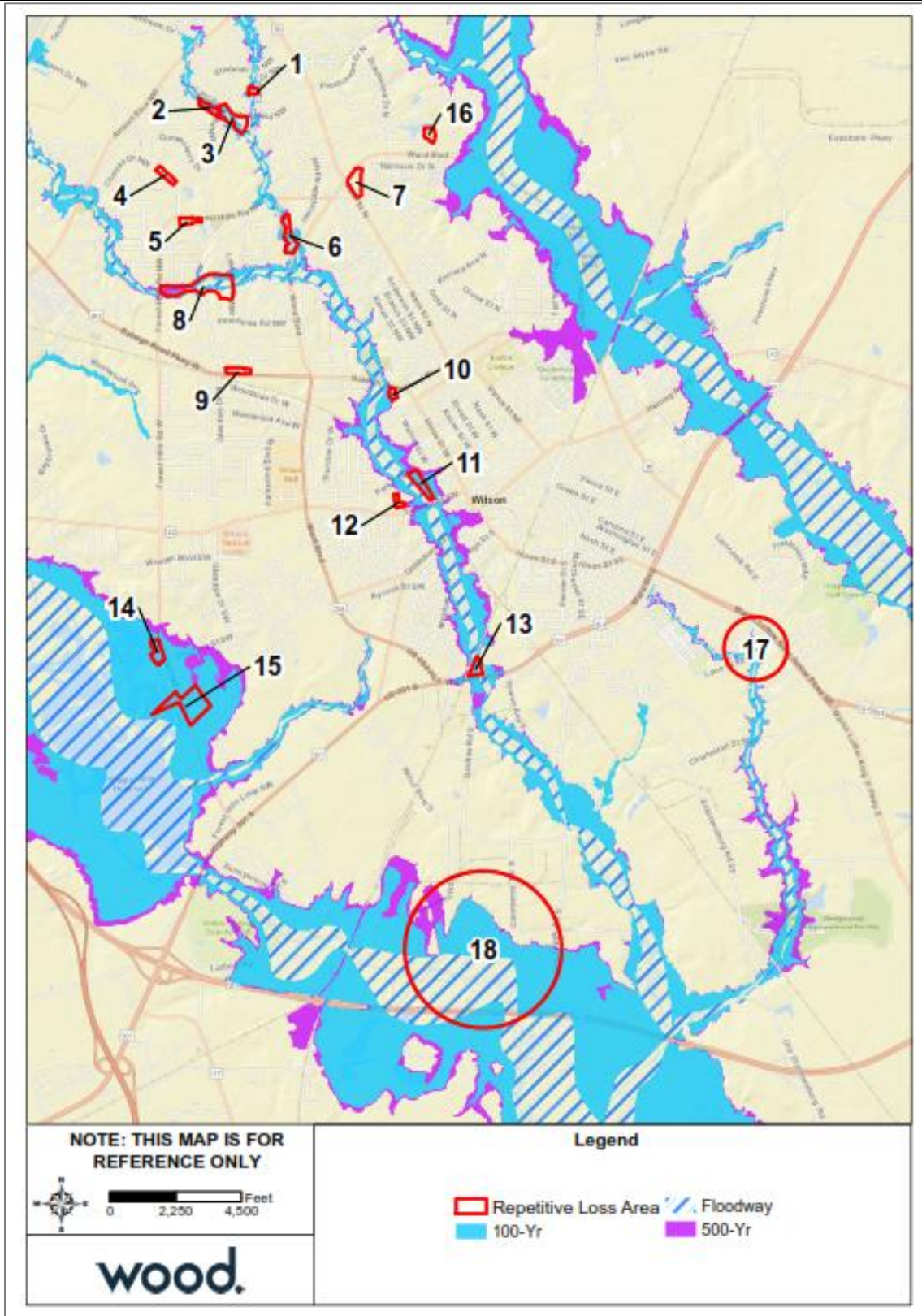


Figure 1.3 – Repetitive Loss Area Overview Map

2 The RLAA Process

The RLAA planning process incorporated requirements from Section 510 of the 2017 *CRS Coordinator's Manual*. The planning process also incorporated requirements from the following guidance documents: 1) FEMA publication *Reducing Damage from Localized Flooding: A Guide for Communities*, Part III Chapter 7; 2) CRS publication *Mapping Repetitive Loss Areas* dated August 15, 2008; and 3) Center for Hazards Assessment Response and Technology, University of New Orleans draft publication *The Guidebook to Conducting Repetitive Loss Area Analyses*. Most specifically, this RLAA included all five planning steps included in the 2017 *CRS Coordinator's Manual*:

- Step 1:** Advise all the properties in the repetitive loss areas that the analysis will be conducted and request their input on the hazard and recommended actions.
- Step 2:** Contact agencies or organizations that may have plans or studies that could affect the cause or impacts of the flooding. The agencies and organizations must be identified in the analysis report.
- Step 3:** Visit each building in the repetitive loss area and collect basic data.
- Step 4:** Review alternative approaches and determine whether any property protection measures or drainage improvements are feasible.
- Step 5** Document the findings. A separate analysis report must be prepared for each area.

Beyond the 5 planning steps, additional credit criteria must be met:

1. The community must have at least one repetitive loss area delineated in accordance with the criteria in Section 503.
2. The repetitive loss area must be mapped as described in Section 503.a. A Category "C" community must prepare analyses for all of its repetitive loss areas if it wants to use RLAA to meet its repetitive loss planning prerequisite.
3. The repetitive loss area analysis report(s) must be submitted to the community's governing body and made available to the media and the public. The complete repetitive loss area analysis report(s) must be adopted by the community's governing body or by an office that has been delegated approval authority by the community's governing body.
4. The community must prepare an annual progress report for its area analysis.
5. The community must update its repetitive loss area analyses in time for each CRS cycle verification visit.

STEP 1. Advise All Property Owners

Before field work began on the original RLAA, individual letters were mailed to property owners within the 13 identified Repetitive Loss Areas. Letters were mailed to repetitive loss properties, historical repetitive loss properties (those with one paid claim against the NFIP), and additional properties added to the repetitive loss areas which have similar flooding conditions. Of the 134 identified properties, it should be noted that 10 properties were purchased after Hurricane Floyd in 1999 and had already been mitigated. Therefore, notification letters were mailed to the remaining 124 properties. The letters were mailed to property owners on May 19, 2015.

During the 2019 update to this RLAA, letters and questionnaires were mailed to all 16 properties in the 5 additional repetitive loss areas. Additional notification letters and flood protection information was sent to all 140 properties. Letters were mailed on November 18, 2019.

Copies of all mailed letters are maintained on file with the City of Wilson Planning and Development Services Department. In accordance with the Privacy Act of 1974, the letters will not be shared with the general public. Figure 2.1 on the following page shows an example of the property owner notification letter.

Mailed Questionnaire

A property owner questionnaire was included with each letter mailed to building owners. The questionnaire asks about the type of foundation and if the building has a basement, if the building has experienced any flooding and the type of flooding, cause of flooding, flood protection measures and whether the owner has flood insurance. The updated version of the Flood Protection Questionnaire is shown in Figures 2.2 and 2.3 on the following pages.



November 12, 2019

Property Address: XXXXXX

Parcel Number: XXXXXX

Dear Property Owner:

As part of City of Wilson's participation in the National Flood Insurance Program's (NFIP) Community Rating System (CRS), the Environmental Services Department is evaluating properties that have experienced repetitive flood damage. This analysis will include the review of all previous flood data and studies conducted in these locations.

The repetitive loss analysis involves the collection of the following property level data elements:

- Building permit records (including application and associated records)
- Structure and site elevation information (elevation certificate if available)
- Tax ID and lot and parcel number
- Building property value on record (assessed value, replacement value or both)
- Land property value on record
- Building codes/floodplain development regulations exceeding minimum standards
- Historical flood information (when events occurred, amount of damage to property, etc.)

In addition, City of Wilson and its contractor will visit each property to survey the flood risk and to take photographs. Property owners are encouraged to provide any relevant flooding information. The survey crews will be looking at the type and condition of the foundation, drainage patterns on the lot and whether outside mechanical equipment is elevated.

The results of the repetitive loss area analysis will include a review of alternative approaches for property protection measures or drainage improvements where feasible. Once the analysis is complete, a copy of the report can be obtained from the City's Land Development Division or by calling (252) 399-2215.

You can help us perform this analysis by **completing and returning this questionnaire by December 6th, 2019 to me at 112 Goldsboro Street E (27893) or PO Box 10 Wilson, NC 27894-0010 or by e-mail at jholland@wilsonnc.org**. If you have any questions, please call me at (252) 399-2215.

Sincerely,

Janet Holland
Land Development Manager
City of Wilson, NC

Figure 2.1 – Example Property Owner Notification Letter



FLOOD AND PROPERTY PROTECTION QUESTIONNAIRE

Name: _____

Property Address: _____

1. How many years have you lived in/occupied the home/building at this address?

<input type="checkbox"/> Less than 1	<input type="checkbox"/> 5-10 years
<input type="checkbox"/> 1-5 years	<input type="checkbox"/> 10+ years

2. Do you rent or own this home/building?
 - Rent
 - Own

3. What type of foundation does the home/building have?

<input type="checkbox"/> Slab	<input type="checkbox"/> Basement
<input type="checkbox"/> Crawl Space	<input type="checkbox"/> Other: _____

4. Has this home/building or property ever been flooded or had a water problem?
 - Yes
 - No (If "no", please skip to question 9)

5. In what year(s) did it flood? _____

6. Where did you get water and how deep did it get?

<input type="checkbox"/> In basement: _____ deep	<input type="checkbox"/> Over 1 st floor: _____ deep
<input type="checkbox"/> In crawl space: _____ deep	<input type="checkbox"/> In yard only: _____ deep
<input type="checkbox"/> Water was kept out of building by sandbagging, sewer valve, or other protective measure	

7. What was the longest time that water stayed in the house/building? _____

8. What do you feel was the cause of your flooding? Check all that affect your home/building.

<input type="checkbox"/> Storm sewer backup	<input type="checkbox"/> Saturated ground / leaks in basement walls
<input type="checkbox"/> Sanitary sewer backup	<input type="checkbox"/> Overbank flooding from: _____
<input type="checkbox"/> Standing water next to house/building	<input type="checkbox"/> Other: _____
<input type="checkbox"/> Drainage from nearby properties	

9. What flood protection measures have you installed in the building or on the property?

<input type="checkbox"/> Sump pump	<input type="checkbox"/> Backup power system / generator
<input type="checkbox"/> Waterproofed the outside walls	<input type="checkbox"/> Sandbagged
<input type="checkbox"/> Re-graded yard to keep water away	<input type="checkbox"/> None
<input type="checkbox"/> Moved things out of basement	<input type="checkbox"/> Other: _____

Figure 2.2 – Flood Protection Questionnaire – Page 1



FLOOD AND PROPERTY PROTECTION QUESTIONNAIRE

10. Did any of the measures checked in item 9 work? If so, which ones? If not, do you know why they did not work?

11. Is your home located in a Federal Emergency Management Agency (FEMA) floodplain?

- Yes
- No
- I don't know

12. Do you have flood insurance?

- Yes
- No
- I don't know

13. Do you want information on protecting your home/building from flooding?

- Yes
- No

14. Please include any additional information and comments you may have about flooding in your area:

Please help us by completing this survey by **December 6, 2019** and returning it to:

Janet Holland
Land Development Division Manager
P.O. Box 10
Wilson, NC 27894
Phone: (252) 399-2215

Surveys can also be emailed to clsmith@columbiacountyga.gov

Figure 2.3 – Flood Protection Questionnaire – Page 2

Of the 140 mailed notification letters and questionnaires, the City of Wilson received 22 responses during the 2015 RLAA development and 1 additional response during the 2019 update, which corresponds to a response rate of approximately 16 percent. The questionnaire responses are summarized below. Note: Respondents may have skipped questions and/or provided more than one response to a question.

Q1: When did you move into this home/building at this address?

Responses Received	Percentage	Number Responding
<10 years ago	30%	6
10-19 years ago	30%	6
20-29 years ago	15%	3
30-39 years ago	20%	4
40-50 years ago	5%	1
Total	100%	20

Q2: What type of foundation does your home/building have?

Answer Choices	Percentage	Number Responding
Slab	22%	5
Crawl space	78%	18
Basement	0%	0
Other	0%	0
Total	100%	23

Q3: Has your home/building or property ever been flooded or had a water problem?

Answer Choices	Percentage	Number Responding
Yes	52%	12
No	48%	11
Total	100%	23

Q4: In what year(s) did it flood?

Responses Received	Number Responding
1999	8
2002	2
2004	2
2007	1
2009	2
2014	3
2016	1
2017	1
2018	1
Every year/ every time it rains	4

Q5: Where did you get water? How deep did the water get?

Answer Choices	Number Responding	Corresponding Depth			
		< 1 ft	1-2 ft	2-3 ft	> 3 ft
Basement	2	2			
Crawl space	3		3		
Over first floor	4				4

Answer Choices	Number Responding	Corresponding Depth			
		< 1 ft	1-2 ft	2-3 ft	> 3 ft
Yard only	8	4	2	1	1
Water kept out of house by sandbagging, sewer valve, or other protection measures	1				

Q6: What was the longest time that water stayed in the house/building?

Responses Received	Percentage	Number Responding
1-3 hours	22%	2
3-6 hours	11%	1
6-12 hours	22%	2
1 day	33%	3
3-4 days	11%	1
Total	100%	9

Q7: What do you feel was the cause of your flooding?

Answer Choices	Percentage	Number Responding
Storm sewer backup	26%	6
Sanitary sewer backup	9%	2
Standing water next to house/building	17%	4
Drainage from nearby properties	30%	7
Saturated ground/leads in basement walls	0%	0
Overbank flooding	35%	8
Other	13%	3
Total	n/a	23

Q8: Have you installed any flood protection measures on your property?

Answer Choices	Percentage	Number Responding
Sump pump	14%	2
Waterproofed the outside walls	14%	2
Re-graded yard to keep water away	14%	2
Moved things out of basement/structure	7%	1
Backup power system/generator	0%	0
Sandbagged	14%	2
Other	50%	7
Total	n/a	14

Q9: Did any of the measures checked in Question 8 work?

Answered "Yes" for the following:	Number Responding
Sump pump	2
Waterproofed the outside walls	1
Re-graded yard to keep water away	0
Moved things out of basement/building	2
Sewage backflow prevention	1
Sandbagged	1
Installed drainage and pipes	1

Answered "Yes" for the following:	Number Responding
Cut fence, removed shrubs, cleaned debris	1
Raised electrical and machinery	1
Installed flood approved vents	1

Q10: Do you have FEMA Flood Insurance?

Answer Choices	Percentage	Number Responding
Yes	60%	12
No	40%	8
Not sure	0%	0
Total	100%	20

Q11: Do you want information on protecting your home/building from flooding?

Answer Choices	Percentage	Number Responding
Yes	44%	7
No	56%	9
Total	100%	16

The following trends in survey responses should be considered when evaluating mitigation measures:

- Over half of respondents do not want information from the City for protecting their home/building from flooding. Several respondents indicated a lack of trust in the City. Some respondents indicated that they already receive this information from FEMA. However, the newly received response indicated appreciation for action on flooding and requested further information.
- 60% of the respondents do have FEMA flood insurance.
- Of those respondents who have installed flood protection measures, sump pumps and moving personal belongings out of flooded buildings/areas were the most popular methods.
- Overbank flooding, drainage from nearby properties and storm sewer backup are seen as the greatest cause of flooding issues, respectively.
- The majority of flooding has been in yards only, but several respondents have experienced flooding in crawl spaces. Hurricane Floyd caused flooding over the first floor of homes.
- Many respondents feel that new development (impervious surfaces), clear cutting trees and the lack of storm water control regulations have caused flooding in the City. Most respondents feel that the flooding has worsened over the past 15-20 years and that property values have dropped due to flooding issues.
- The years with the largest number of reported flooding incidents are 1999, 2002, 2004, 2009 and 2014. Several respondents indicated that it floods every year or every time it rains. The 1999, 2002, 2004 and 2009 flood events are detailed in NOAA's National Climatic Data Center (NCDC) database. Details for the 2014 flood event are from The Wilson Times.
 - **September 15, 1999** - Hurricane Floyd produced 15-20 inches of rain that fell across the eastern half of the state, causing every river and stream to flood. Many rivers set new flood records. Whole communities were underwater for days, even weeks in some areas. Thousands of homes were lost. Crop damage was extensive. The infrastructure of the eastern counties, mainly roads, bridges, water plants, etc., was heavily damaged. Even worse was the loss of life, mainly due to flooding. Many Carolinians did not heed the call to evacuate and many more drove into flooded streams and rivers.

In the central part of the state, 21 people lost their lives. Also, the loss of livestock was significant, mainly swine and poultry.

- **August 26, 2002** – High water blocked highways 264 and 301 in Wilson. Some people were evacuated to shelters. Stranded motorists had to be rescued by boat.
- **May 22, 2004** – About 20 homes were flooded. Between 150 and 200 people had to be evacuated; some had to be rescued.
- **June 16, 2009** – Heavy rainfall of 3 to 4 inches. Flooding was reported in low-lying areas across town near Glendale Drive and Forest Hills Road.
- **April 29, 2014** – Widespread flash flooding associated with severe thunderstorms occurred in the City of Wilson requiring water rescues around homes and businesses. Wilson Police reported stranded vehicles and significant street flooding.

STEP 2. Contact Agencies and Organizations

The City of Wilson contacted external agencies and internal departments that have plans or studies that could affect the cause or impacts of flooding within the identified repetitive loss areas. The data collected was used to analyze the problems further and to help identify potential solutions and mitigation measures for property owners. Those reports which were analyzed and reviewed included:

- City of Wilson Comprehensive Plan, Adopted 2010
- City of Wilson Unified Development Ordinance, Adopted 2013
 - Zoning Ordinance
 - Subdivision Ordinance
 - Flood Damage Prevention Ordinance
 - Stormwater Management Ordinance
 - Soil Erosion and Sedimentation Control Ordinance
- City of Wilson Capital Improvement Plan, FY2015-2019
- Wilson County Flood Insurance Study, Revised 2013
- Wilson County Comprehensive Plan, 2008
- Wilson County Multi-Jurisdictional Hazard Mitigation Plan, Updated 2009
- FEMA/ISO – Repetitive Loss and Flood Insurance Data
- Lake Wilson Emergency Action Plan

Summary of Studies and Reports

FEMA Flood Insurance Study

FEMA's FIS for Wilson County, NC is dated April 16, 2013. The FIS revises and updates information on the existence and severity of flood hazards within the County including the City of Wilson. The FIS also includes revised digital Flood Insurance Rate Maps (FIRMs) which reflect updated Special Flood Hazard Areas (SFHAs) and flood zones for the City.

Flood Insurance Claims Data

The Privacy Act of 1974 (5 U.S.C. 522a) restricts the release of flood insurance policy and claims data to the public. This information can only be released to state and local governments for the use in floodplain management related activities. Therefore all claims data in this report are only discussed in general terms.

Capital Improvement Plan

The 2015 – 2019 Capital Improvement Plan presents the five year capital plan for the City of Wilson. This planning document is a five-year outlook for anticipated capital projects designed to facilitate decision makers in the replacement of capital assets. The projects are primarily related to improvement in public service, parks and recreation, public utilities and facilities. Stormwater Management accounts for only \$2M of the total \$54M in projected funding needs.

City of Wilson Comprehensive Plan, Adopted 2010

The Wilson 2030 Comprehensive Plan is intended to ensure that in the future, Wilson develops and grows in ways that enhance the community's vitality and overall quality of life. It builds on the existing conditions and trends in the community, and serves as the road map for achieving the goals laid out in the Wilson 20/20 Community Vision. The Plan addresses numerous facets of the community, including the protection of natural resources and environmental quality.

Wilson County Multi-Jurisdictional Hazard Mitigation Plan, Updated 2009

The primary reason for developing a Hazard Mitigation Plan is to reduce a community's exposure to natural hazards by taking proactive, pre-disaster planning steps to limit development in hazard sensitive areas, particularly floodplain or flood hazard areas. The second reason is to comply with the hazard mitigation planning requirements established by the Federal Emergency Management Agency (FEMA) and the NC General Assembly and implemented through the NC Division of Emergency Management. The City of Wilson is a participant in the Wilson County Hazard Mitigation Plan. The Plan contains numerous mitigation actions for the City of Wilson, including mitigation actions for flooding hazards.

City of Wilson Floodplain Management Plan, August 2015

The purpose of the City's Floodplain Management Plan is to identify, assess and mitigate flood hazards and flood risk in the City. This plan documents the City of Wilson's flood hazard mitigation planning process and identifies relevant flood hazards and vulnerabilities and strategies the City will use to decrease vulnerability and increase resiliency and sustainability. The Plan examines flood occurrences and flood risk in the 100-/500-year floodplain; localized flooding areas identified by the City, especially those areas located in the Zone X Unshaded flood zone; stream bank erosion and erosion hazards caused by flooding; and flooding hazards associated with dam and/or levee failure.

Lake Wilson Emergency Action Plan

Lake Wilson Dam is classified as high hazard dam by the North Carolina Department of Environment and Natural Resources. This dam has the potential to affect the City of Wilson in the event of a dam failure. Lake Wilson's dam height is 19.7 feet based on the NC Dam Safety database. The Lake Wilson Emergency Action Plan, currently under development, will identify the estimated number of buildings that could potentially be impacted by a failure of Lake Wilson Dam as well as emergency procedures that should be implemented in the event of a dam failure.

STEP 3. Building Data Collection

The on-site field survey for this analysis was conducted on June 11, 2015. The National Tool Limited View was not utilized in this effort, but most of the information required by the National Tool was incorporated into the mobile application survey. The mobile application generated data collection forms are included in Appendix A. (Note: In accordance with the Privacy Act of 1974, Appendix A will not be shared with the general public).

In addition, multiple site photos were taken of each structure on the property. Photos were also taken of current drainage features and mitigation and floodproofing measures if evident from street or parking lot views. The following information was recorded for each property:

- Existing mitigation observed
- Type and condition of the structure and foundation
- Number of stories
- Height above street grade and height above site grade
- Presence and type of appurtenant structures
- Likely areas and severity of damage on property
- Presence of any HVAC units that would be vulnerable

Additional remote survey was completed using imagery and Committee data for all 16 properties in the 5 areas that were added during the 2019 update of this RLAA.

All properties were also evaluated using Geographic Information Systems (GIS), including mapping each area in relation to FEMA flood zones. Table 2.1 details the percentage of each repetitive loss area that falls within the 100-year, 500-year or Unshaded Zone X flood zone.

Table 2.1 – Repetitive Loss Area Percentage by Flood Zone

Repetitive Loss Area	Percentage of Area		
	Zone AE 100-yr	Zone X Shaded 500-yr	Zone X Unshaded
1	61%	7%	32%
2	74%	17%	9%
3	59%	5%	36%
4	0%	0%	100%
5	0%	0%	100%
6	75%	4%	21%
7	0%	0%	100%
8	57%	17%	27%
9	0%	0%	100%
10	39%	25%	35%
11	95%	5%	0%
12	0%	5%	95%
13	100%	0%	0%
14	100%	0%	0%
15	100%	0%	0%
16	0%	0%	100%
17	13%	3%	84%
18	66%	6%	28%

Source: 4/16/13 DFIRM

Note: During field survey, 12 vacant lots were discovered within the repetitive loss areas.

Subarea 1

Problem Statement

Thirteen of the identified Repetitive Loss Areas are located along Hominy Swamp (Creek) and its tributaries between Airport Boulevard and Ward Boulevard (Hwy 301). Portions of these Repetitive Loss Areas are located within the 100-/500-year floodplain and are also subject to periodic flooding from heavy rains and localized stormwater flooding. The primary source of flooding in these areas is overbank flooding from the Hominy Creek and its tributaries. Hominy Swamp (Creek) and its tributaries are known to overtop their banks due to heavy rainfall.

Some losses are due to heavy rainfall associated with hurricanes and tropical storms. The City of Wilson was severely impacted by Hurricane Floyd in 1999. The last hurricane or tropical storm to affect the City of Wilson was Hurricane Florence in September 2018. Properties in the City's Repetitive Loss Areas also experienced losses from Hurricane Matthew in October 2016.

The approach to reducing repetitive flooding in this area will require a combination of floodproofing techniques, education, and drainage improvement projects.

The majority of the repetitive loss flooding is considered flash flooding that causes damage to residential and commercial buildings as well as numerous street closures due to floodwaters overtopping the roadway. Flash flooding can occur when the capacity of the stormwater system is exceeded or if conveyance is obstructed by debris, sediment and other materials that limit the volume of drainage. Hominy Swamp (Creek) and its tributaries are known to overtop their banks due to heavy rainfall.

Repetitive Loss Area 1 is partially located within the 100-yr and 500-yr floodplain. Little Hominy Swamp (Creek) Tributary flows through this Repetitive Loss Area. The area is residential with a mix of slab on grade and crawlspace foundation types. Some homes did not have guttering, and most HVAC systems are located on the ground. One property owner indicated that the area floods two to three times per year.

Repetitive Loss Area 2 is located almost completely within the 100-yr and 500-yr floodplain. Little Hominy Swamp Tributary flows directly behind this Repetitive Loss Area. The area is residential with a mix of slab on grade and crawlspace foundation types. The majority of homes do not have guttering and all observed HVAC systems are located on the ground. Property owner surveys returned from this area indicated that flooding occurs every time it rains and has caused erosion problems as well as hazardous clean-up conditions. The homeowners feel that development on Airport Road is the cause of the repetitive flooding.

Repetitive Loss Area 3 is partially located within the 100-yr and 500-yr floodplain. Little Hominy Swamp tributary flows through this Repetitive Loss Area. The area is residential with a mix of slab on grade and crawlspace foundation types. Some homes did not have guttering, and most HVAC systems are located on the ground.

Repetitive Loss Area 6 is located almost completely within the 100-yr and 500-yr floodplain. Little Hominy Swamp (Creek) flows directly behind this Repetitive Loss Area. The area is residential with a mix of slab on grade and crawlspace foundation types. The majority of homes do not have guttering and all observed HVAC systems are located on the ground. Property owner surveys returned from this area indicate that the stream does leave its banks during periods of heavy rain.

Repetitive Loss Area 8 is located almost completely within the 100-yr and 500-yr floodplain. Hominy Swamp (Creek) flows directly through this Repetitive Loss Area. The area is residential with a mix of slab on grade and crawlspace foundation types. The majority of homes do not have guttering and all observed HVAC systems are located on the ground. One property owner indicated that flooding began due to construction on Airport Road.

Repetitive Loss Area 10 is partially located within the 100-yr and 500-yr flood zones. Hominy Swamp (Creek) runs adjacent to the area. The area is residential with a mix of slab on grade and crawlspace foundation types. The majority of homes do not have guttering and all observed HVAC systems are located on the ground. One property owner indicated that flooding is due to development on Raleigh Road.

Repetitive Loss Area 11 is located entirely within the 100-yr and 500-yr flood zones. Hominy Swamp (Creek) flows in front of the area. The area is commercial and industrial. Several lots are vacant. The entire area has been identified by the City as a known localized flooding area. Property owner surveys indicated that flooding is caused by overflow from Hominy Swamp (Creek) and blocked culverts under Tarboro Street.

Repetitive Loss Area 12 is located almost entirely within the Zone X Unshaded flood zone with a small portion of 500-year flood zone. The area is residential with a mix of slab on grade and crawlspace foundation types. The majority of homes do not have guttering and all observed HVAC systems are located on the ground.

Repetitive Loss Area 13 is entirely located within the 100-yr flood zone. Hominy Swamp (Creek) flows directly behind the properties in this area, and it is also adjacent to Ward Boulevard. The area is commercial and industrial. The area has also been identified by the City as a localized flooding area.

Repetitive Loss Area 14 is located entirely within the 100-yr flood zone. This area sits just northeast of the Wiggins Mill Reservoir and abuts marshland surrounding the reservoir. This area is commercial with low-density development. All structures have slab-on-grade foundations and are below grade. Two HVAC units that were not elevated were observed. A property owner from this area noted that recent placement of fill along Downing Street has exacerbated the problems in this area.

Repetitive Loss Area 15 is located entirely within the 100-yr flood zone. This area sits just northeast of the Wiggins Mill Reservoir and abuts marshland surrounding the reservoir. This area is commercial with low-density development. Structures have either slab-on-grade or crawlspace foundations. Most structures in the area are below grade. Two HVAC units were observed elevated above the first-floor elevation.

Repetitive Loss Area 17 is located partially within the 100-yr and 500-yr flood zones. Sandy Creek runs directly through this area, and party of the area is within the floodway. Structures in this area are residential multi-unit buildings with slab-on-grade foundations. The structures are minimally elevated on fill.

Repetitive Loss Area 18 is located partially within the 100-yr and 500-yr flood zones. This area sits directly north of U.S. Highway 264. Contentnea Creek flows through this area. A large portion of this area is within the Contentnea Creek floodway. The area is industrial but sparsely developed.

Table 2.2 – Repetitive Loss Area Overview for Subarea 1

Repetitive Loss Area	# of RL Properties	# of Historic Claim Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
1	1	0	4	5	Buckingham Road Nottingham Road
2	1	0	8	9	Brooke Lane NW Lancaster Road NW
3	2	4	22	28	Brooke Lane NW Ridge Road NW Buckingham Circle NW
6	2	2	9	13	Canal Drive NW Wildwood Court NW
8	2	7	21	30	Forest Hills Road NW Cardinal Drive NW Lakeside Drive NW Robin Hill Road NW
10	1	1	5	7	Raleigh Road NW Walnut Street W Westover Avenue W
11	2	2	6	10	Park Avenue W Beacon Street W Tarboro Street W
12	1	0	7	8	Emory Street W Libby Street W
13	1	0	0	1	Ward Boulevard
14	2	0	2	4	Forest Hills Road SW
15	2	0	2	4	Forest Hills Road SW
17	1	0	0	1	Lane Street SE
18	1	0	0	1	Commerce Drive
Total	19	16	86	121	

Note: Additional data on buildings within each repetitive loss area is located on the field survey forms in Appendix A.

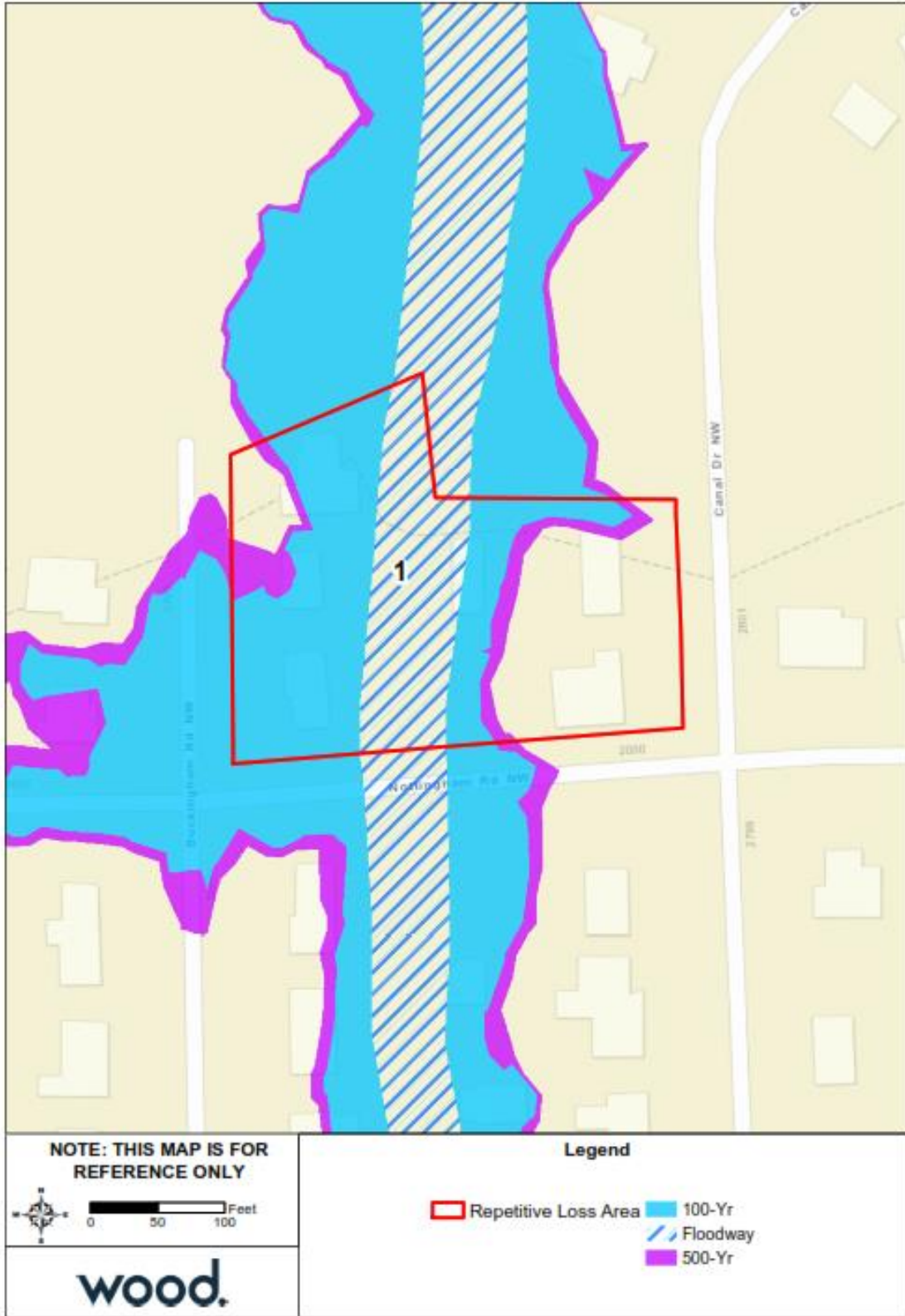


Figure 2.4 – Repetitive Loss Area 1

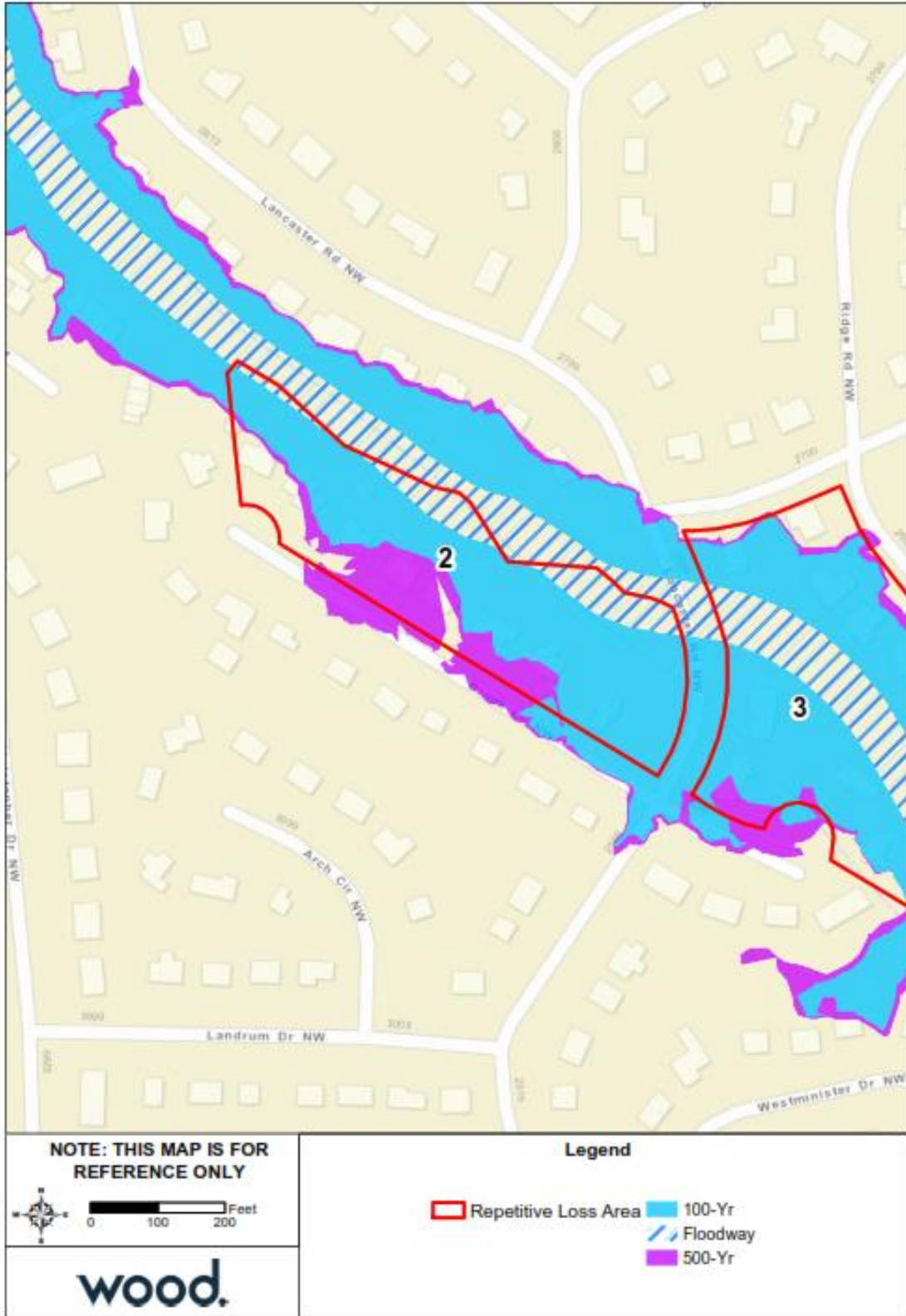


Figure 2.5 – Repetitive Loss Area 2



Figure 2.6 – Repetitive Loss Area 3



Figure 2.7 – Repetitive Loss Area 6

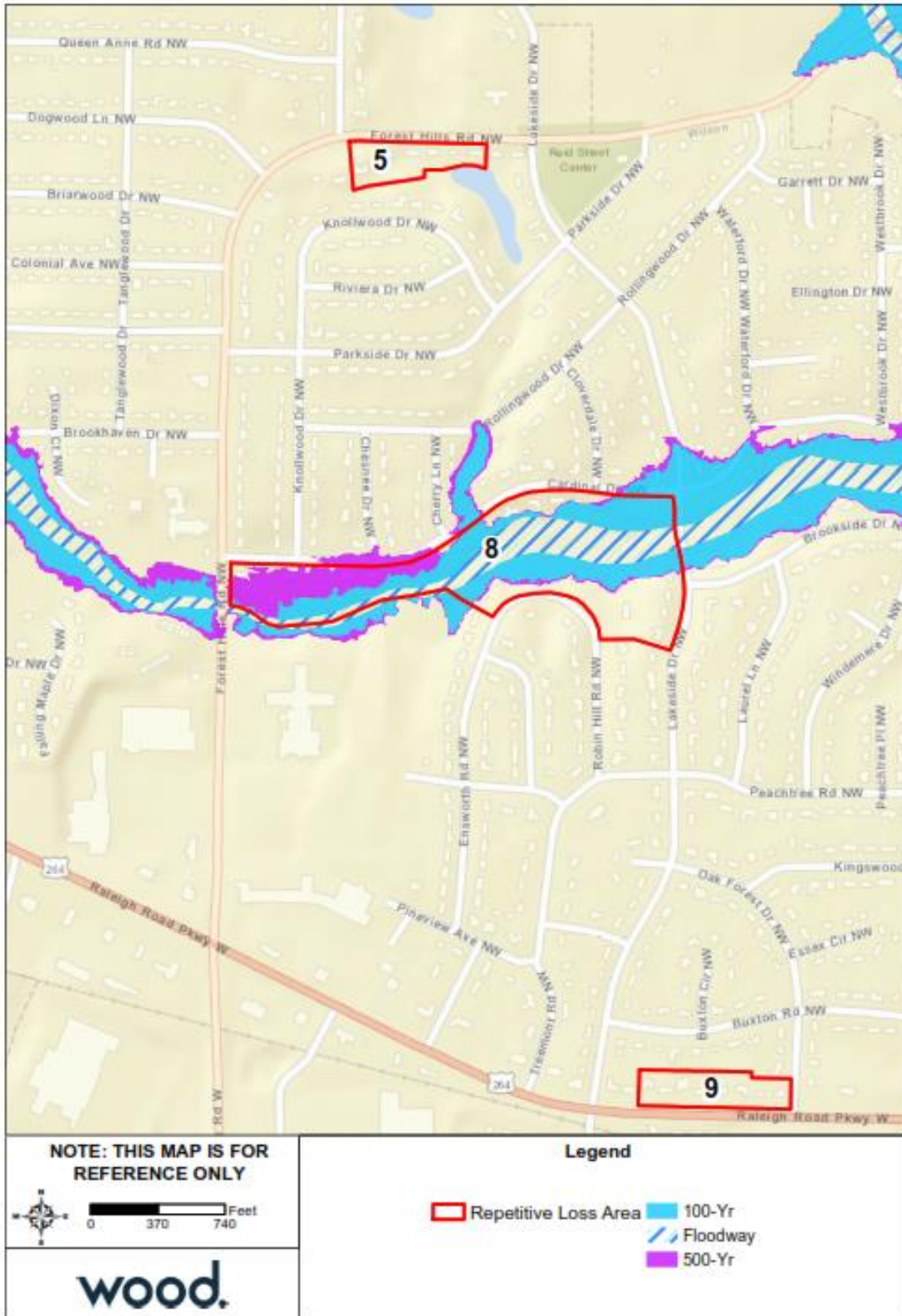


Figure 2.8 – Repetitive Loss Area 8



Figure 2.9 – Repetitive Loss Area 10

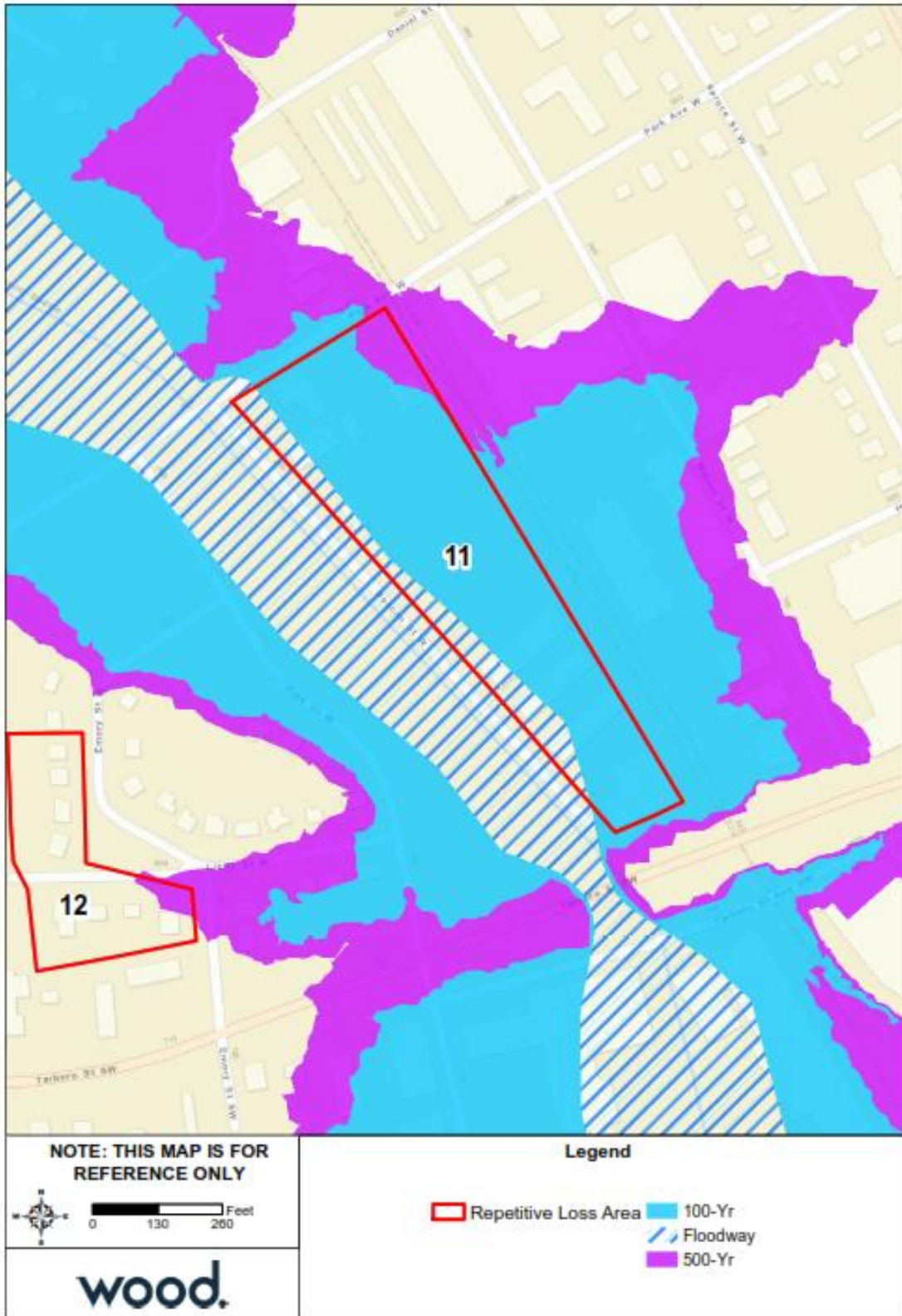


Figure 2.10 – Repetitive Loss Area 11

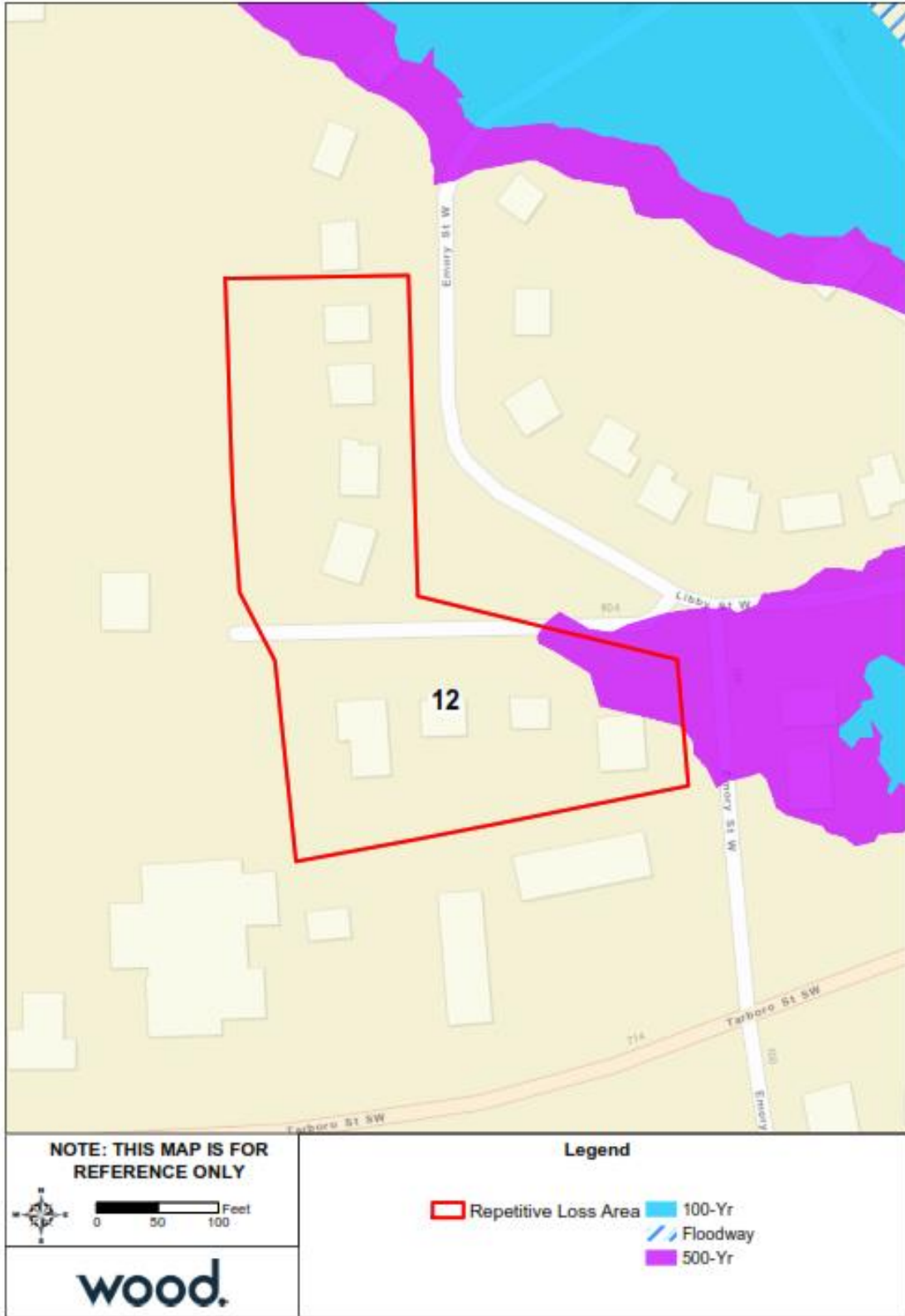


Figure 2.11 – Repetitive Loss Area 12

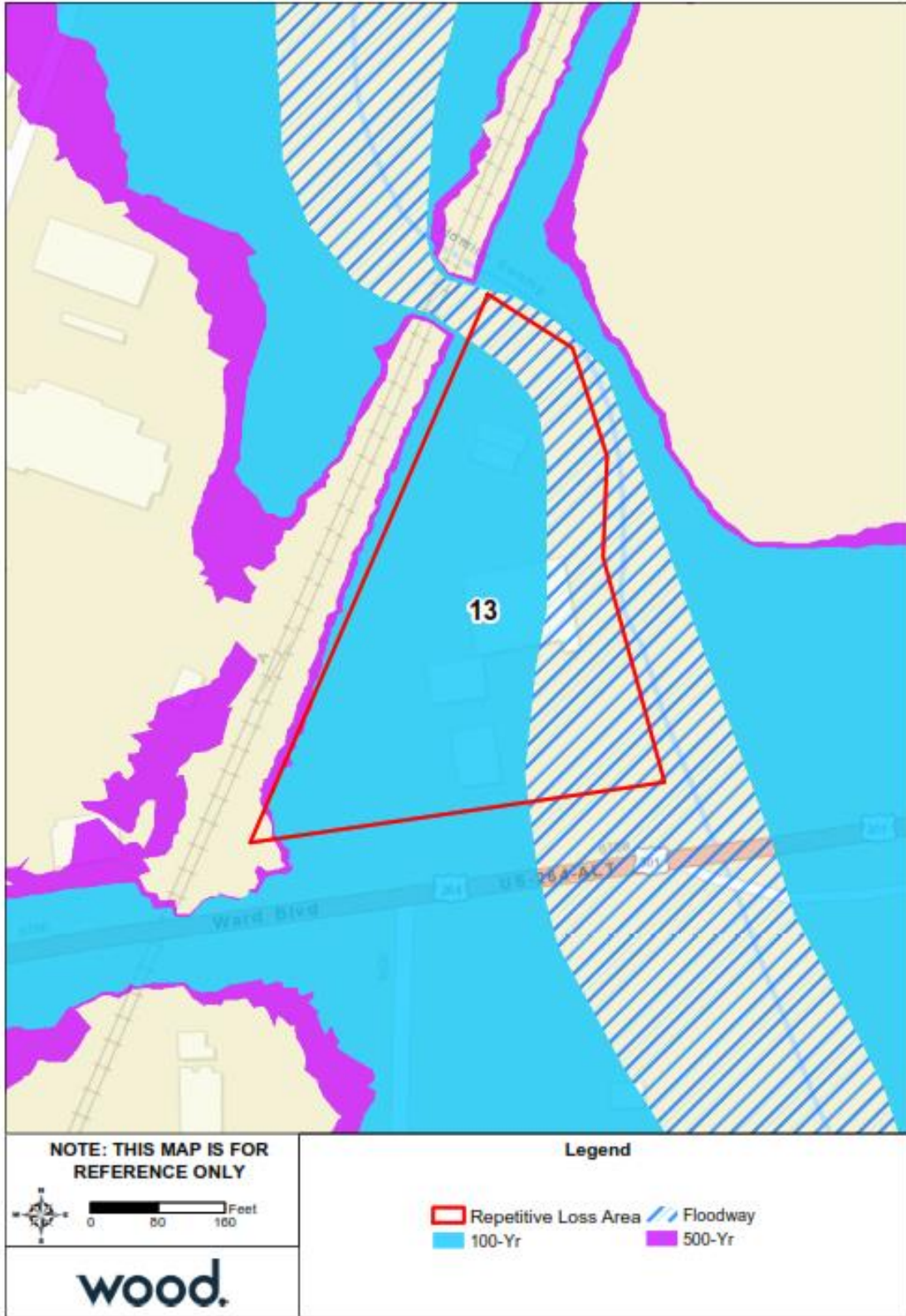


Figure 2.12 – Repetitive Loss Area 13

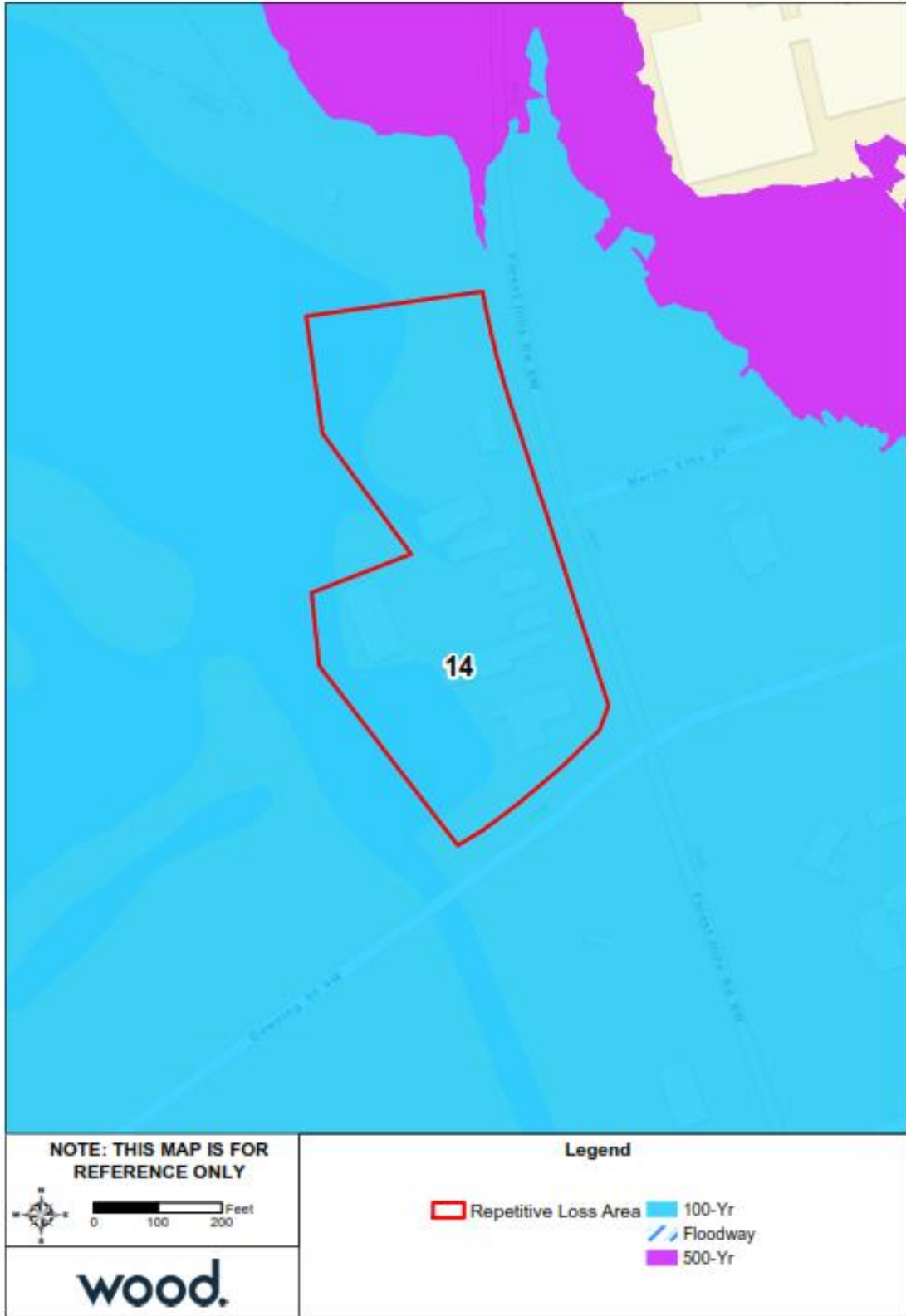


Figure 2.13 – Repetitive Loss Area 14

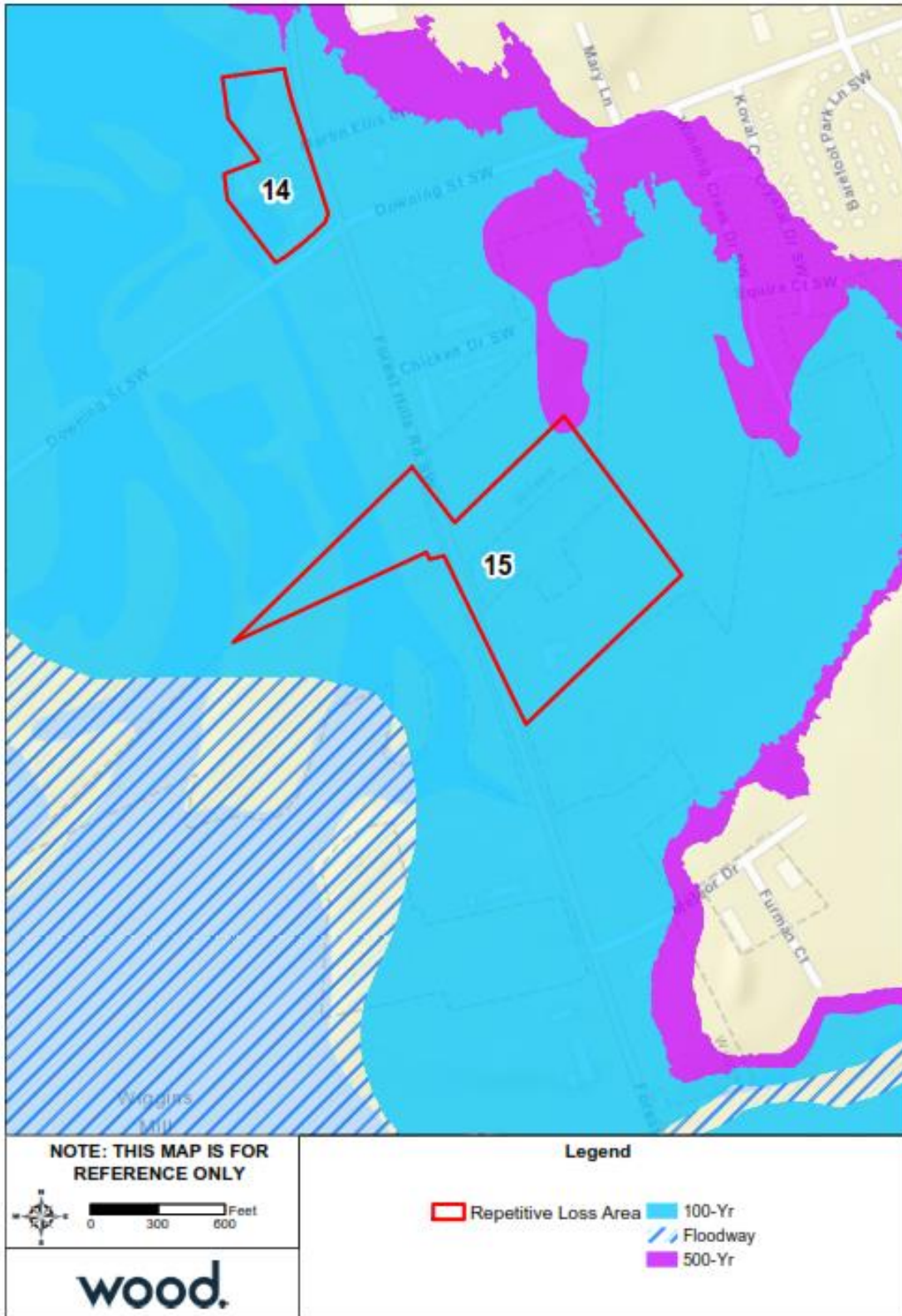


Figure 2.14 – Repetitive Loss Area 15

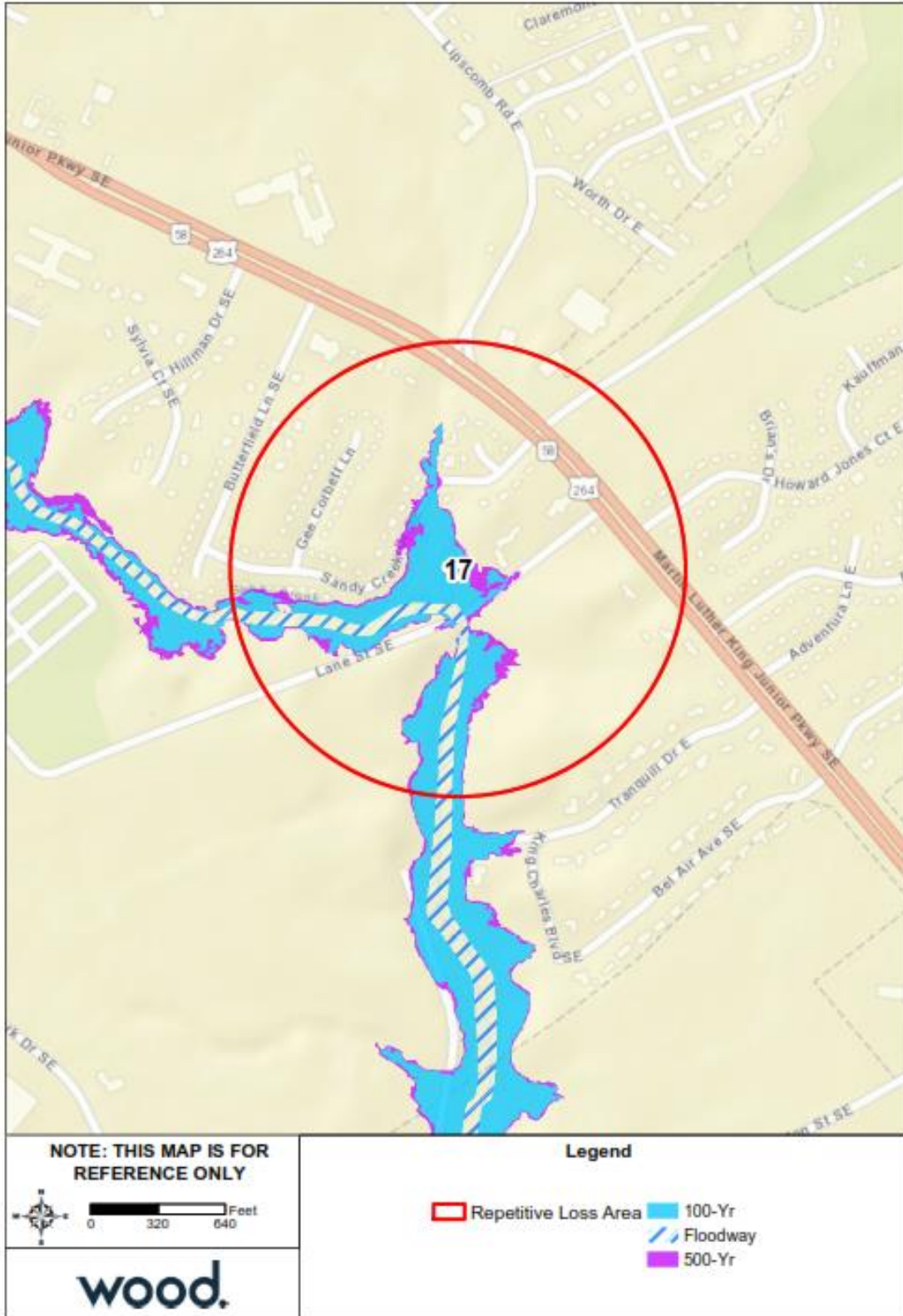


Figure 2.15 – Repetitive Loss Area 17

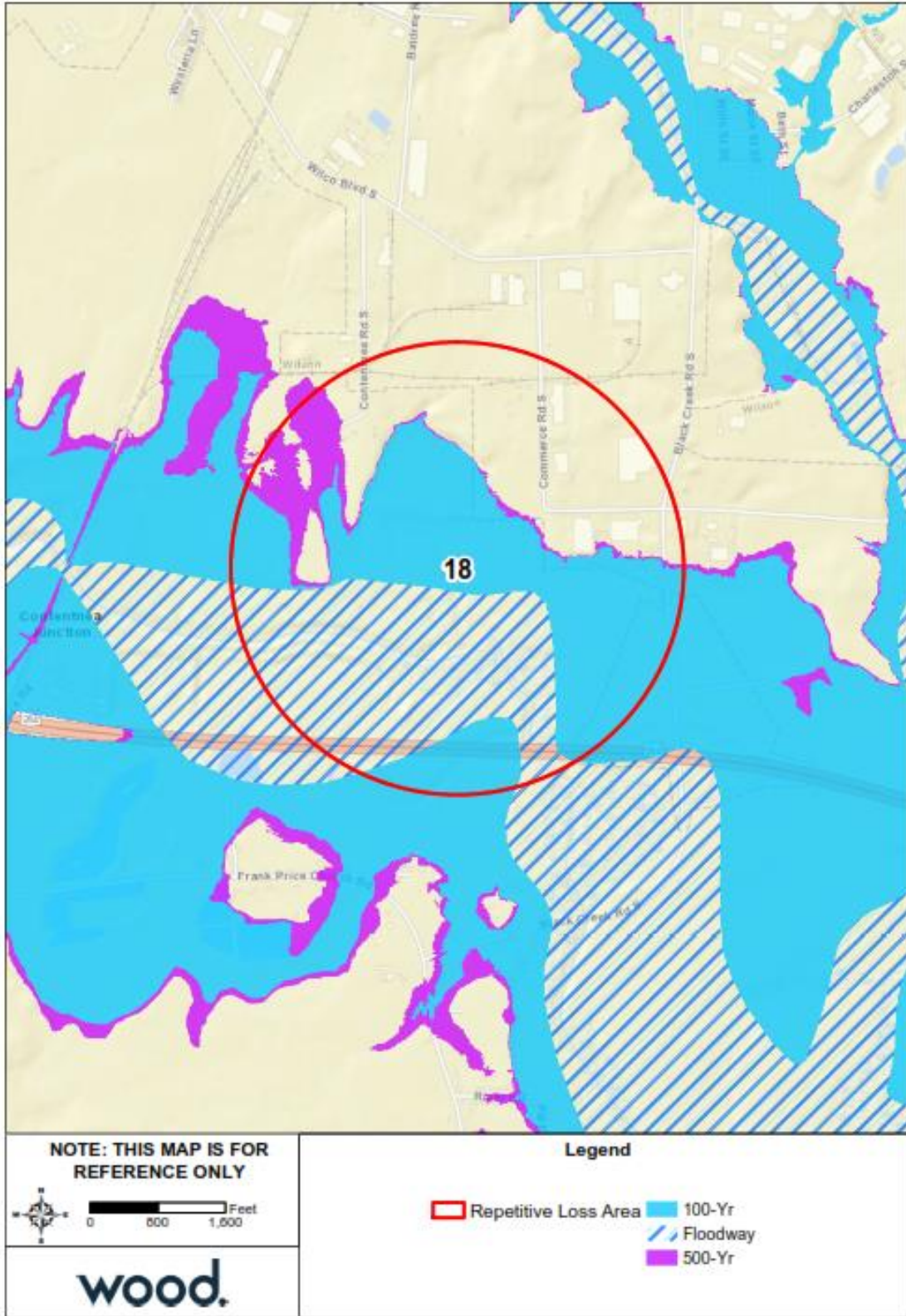


Figure 2.16 – Repetitive Loss Area 18

Example Properties in Subarea 1



Repetitive Loss Area 1 – Little Hominy Swamp Tributary



Repetitive Loss Area 2 – Elevated HVAC Unit



Repetitive Loss Area 3 – Little Hominy Swamp



Repetitive Loss Area 3 – HVAC unit on ground



Repetitive Loss Area 6 – HVAC unit on ground



Repetitive Loss Area 8 – Channel adjacent to home



Repetitive Loss Area 8 – Vacant Lot



Repetitive Loss Area 8 – Channel and street drain adjacent to home



Repetitive Loss Area 10 – HVAC unit on ground



Repetitive Loss Area 12 – Raised berm adjacent to property



Repetitive Loss Area 13 – Commercial building on property



Repetitive Loss Area 13 – Vacant area on property



Repetitive Loss Area 14 – Storm drain in front of property



Repetitive Loss Area 15 – Property below grade



Repetitive Loss Area 17 – Slab-on-grade buildings on fill

Subarea 2

Problem Statement

Five of the identified Repetitive Loss Areas are located entirely outside the high-risk flood zones. These areas are affected by periodic heavy rains and localized stormwater flooding.

The repetitive loss flooding in this subarea is considered flash flooding that causes damage to residential and commercial buildings as well as numerous street closures due to floodwaters overtopping the roadway. Flash flooding can occur when the capacity of the stormwater system is exceeded or if conveyance is obstructed by debris, sediment and other materials that limit the volume of drainage.

Losses in these areas can also be attributed to heavy rainfall associated with hurricanes and tropical storms. The City of Wilson was severely impacted by Hurricane Floyd, Hurricane Matthew, and Hurricane Florence. A severe flash flooding event in April 2017 also caused significant flooding and property damage in these Repetitive Loss Areas.

The approach to reducing repetitive flooding in this area will require a combination of floodproofing techniques, education, and drainage improvement projects.

Repetitive Loss Area 4 is located entirely within a Zone X Unshaded flood zone. An unnamed stream flows directly behind the Repetitive Loss Area. The area is residential with a mix of slab on grade and crawlspace foundation types. Some homes did not have guttering, and most HVAC systems are located on the ground.

Repetitive Loss Area 5 is located entirely within a Zone X Unshaded flood zone. An unnamed stream flows directly through the Repetitive Loss Area. The area is residential with a mix of slab on grade and crawlspace foundation types. Some homes did not have guttering, and most HVAC systems are located on the ground. One home in the area had been demolished, while heaving grading work was observed behind another home.

Repetitive Loss Area 7 is located entirely within a Zone X Unshaded flood zone. There is no visible stream near the area. However, it is a known localized flooding area identified by the City. There was no building present on the parcel at the time of the field visit, and the area appeared to be under construction.

Repetitive Loss Area 9 is located entirely within a Zone X Unshaded flood zone. There is no visible stream near the area. No localized flooding areas have been identified by the City close to the identified properties.

Repetitive Loss Area 16 is located entirely within a Zone X Unshaded flood zone. There is no visible stream running through the area; however, there is a retention pond adjacent to the area that could affect the area if overtopped during a heavy rain event.

Table 2.3 – Repetitive Loss Area Overview for Subarea 2

Repetitive Loss Area	# of RL Properties	# of Historic Claim Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
4	1	0	5	6	Chelsea Drive NW
5	1	0	5	6	Forest Hills Road NW
7	1	0	2	3	Ward Boulevard Nash Street NW
9	1	1	6	8	Raleigh Road Oak Forest Drive NW
16	1	0	5	6	Ward Boulevard
Total	5	1	23	29	

Note: Additional data on buildings within each repetitive loss area is located on the field survey forms in Appendix A.



Figure 2.17 – Repetitive Loss Area 4



Figure 2.18 – Repetitive Loss Area 5



Figure 2.19 – Repetitive Loss Area 7

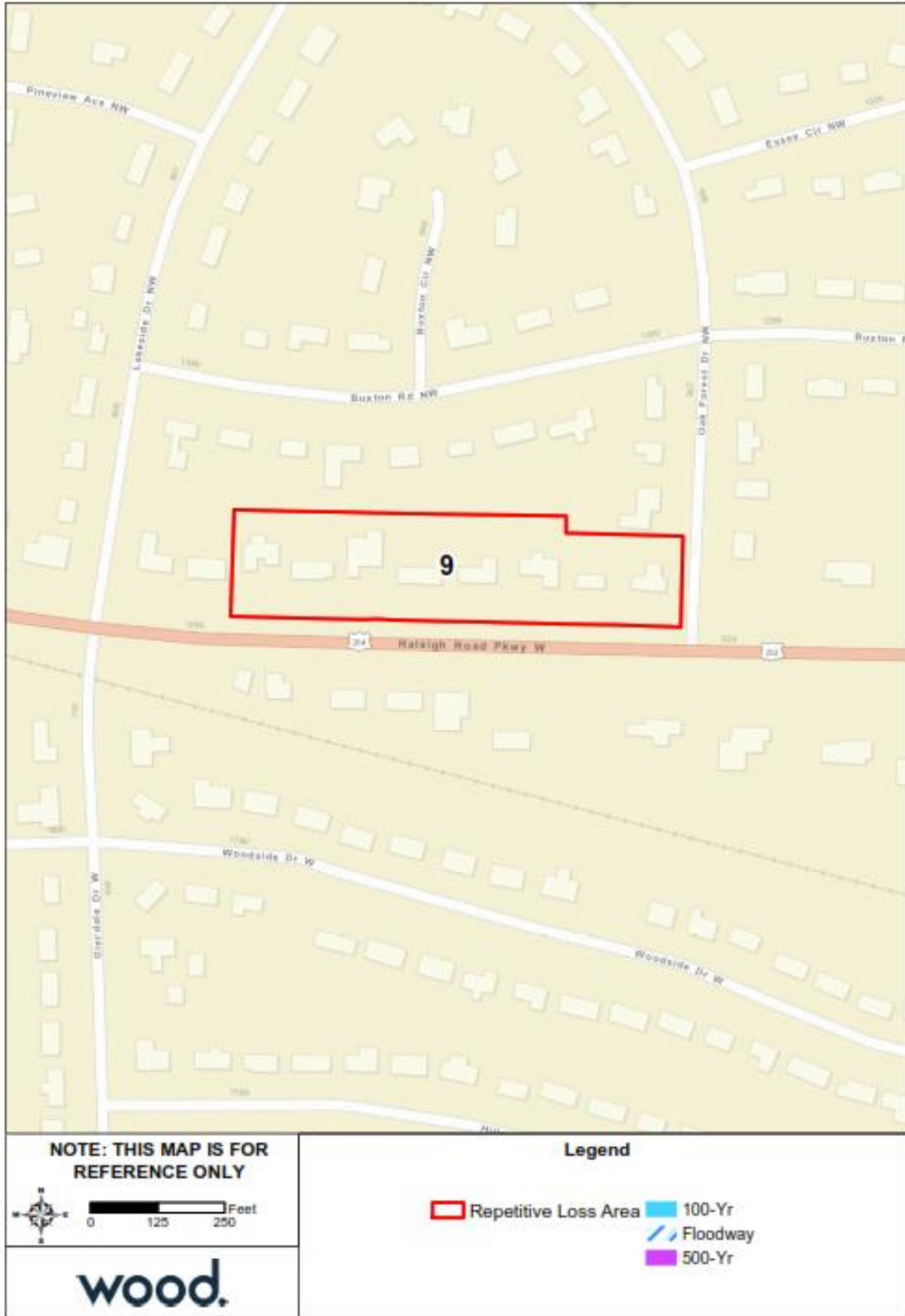


Figure 2.20 – Repetitive Loss Area 9



Figure 2.21 – Repetitive Loss Area 16

Example Properties in Subarea 2



Repetitive Loss Area 5 – Vacant Lot



Repetitive Loss Area 5 – Vacant Lot



Repetitive Loss Area 7 – Vacant lot under construction



Repetitive Loss Area 16 – Structure elevated on fill; rear yard slopes down to pond

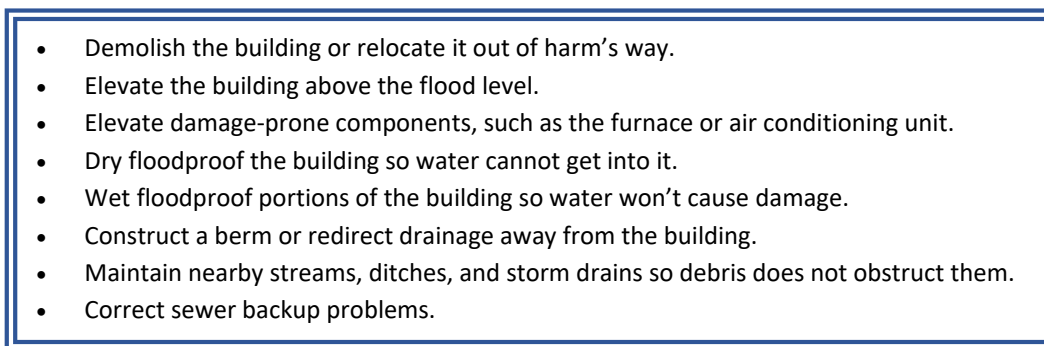
STEP 4. Review Alternative Mitigation Approaches

Mitigation Alternatives

According to the 2017 CRS Coordinator’s Manual, mitigation measures should fall into one of the following floodplain management categories:

- Prevention
- Property Protection
- Natural Resource Protection
- Emergency Services
- Structural Projects
- Public Information and Outreach

Of the above mitigation alternatives, property protection is essential to mitigating repetitive loss properties and reducing future flood losses. There are many ways to protect a property from flood damage. Property protection measures recognized in the 2017 CRS Coordinator’s Manual include relocation, acquisition, building elevation, retrofitting, sewer backup protection, and insurance. Different measures are appropriate for different flood hazards, building types and building conditions. Figure 2.22 below, found in the 2017 CRS Coordinator’s Manual, lists typical property protection measures.

- 
- Demolish the building or relocate it out of harm’s way.
 - Elevate the building above the flood level.
 - Elevate damage-prone components, such as the furnace or air conditioning unit.
 - Dry floodproof the building so water cannot get into it.
 - Wet floodproof portions of the building so water won’t cause damage.
 - Construct a berm or redirect drainage away from the building.
 - Maintain nearby streams, ditches, and storm drains so debris does not obstruct them.
 - Correct sewer backup problems.

Source: 2017 CRS Coordinators Manual.

Figure 2.22 – Typical Property Protection Measures

Improving the stormwater drainage system and storage capacity along Hominy Swamp (Creek) and its tributaries can eliminate some building damage and road closures in this area. These structural methods require large capital expenditures and cooperation from private property owners. Promoting floodproofing techniques and increasing public education and awareness of the flood hazards can be the next best alternative for property owners in this area. The City’s websites, e-mail distribution lists, press releases and variable message boards can provide benefit to business owners and residents.

Mitigation Funding

There are several types of mitigation measures, listed in the table below, which can be considered for each repetitive loss property. Each mitigation measure qualifies for one or more grant programs. Depending on the type of structure, severity of flooding and proximity to additional structures with similar flooding conditions, the most appropriate measure can be determined. In addition to these grant funded projects, several mitigations measures can be taken by the homeowner to protect their home. Please note, the Biggert-Waters 2012 National Flood Insurance Reform Act eliminated the previously available Repetitive Flood Claims grant program.

Table 2.4 – Mitigation Grant Programs

Types of Projects Funded	HMGP	FMA	PDM	SRL	IIC	SBA
Acquisition of the entire property by a gov't	X	X	X	X		
Relocation of the building to a flood free site	X	X	X	X	X	X
Demolition of the structure	X	X	X	X	X	X
Elevation of the structure above flood levels	X	X	X	X	X	X
Replacing the old building with a new elevated one	X			X	X	X
Local drainage and small flood control projects	X			X		
Dry floodproofing (non-residential buildings only)		X	X	X	X	X
Percent paid by Federal program	75%	75%	75%	75%	100%	0
Application Notes	1,2	1	1	1	3	2,4

Application notes:

1. Requires a grant application from your local government
2. Only available after a Federal disaster declaration
3. Requires the building to have a flood insurance policy and to have been flooded to such an extent that the local government declares it to be substantially damaged. Pays 100% up to \$30,000
4. This is a low interest loan that must be paid back

Potential Mitigation Measures

Structural Alternatives
Dry floodproofing. Commercial structures and even residential structures are eligible for dry floodproofing; however, in many instances this requires human intervention to complete the measure and ensure success. For example, installing watertight shields over doors or windows requires timely action by the homeowner; especially in a heavy rainfall event.
Wet floodproofing. Wet floodproofing a structure involves making the uninhabited portions of the structure resistant to flood damage and allowing water to enter during flooding. For example, in a basement or crawl space, mechanical equipment and ductwork would not be damaged.
For basements, especially with combined storm sewer and sewer systems, backflow preventer valves can prevent storm water and sewer from entering crawlspaces and basements.
Acquire and/or relocate properties/target abandoned properties.
Elevate structures and damage-prone components, such as the furnace or air conditioning unit, above the BFE.
Construct engineered structural barriers, berms, and floodwalls (Note: Assuming lot has required space for a structural addition).
Increase road elevations above the BFE of the 100-year floodplain.
Implement drainage improvements such as increasing capacity in the system (up-sizing pipes) and provide additional inlets to receive more stormwater.
Improve stormwater system maintenance program to ensure inlets and canals are free of clogging debris.

Non-Structural Alternatives
Provide public education through posting information about local flood hazards on City's websites, posting signs at various locations in neighborhoods or discussing flood protection measures at local neighborhood association meetings.
Implement volume control and runoff reduction measures in the City's Stormwater Management Ordinance.
Consider expanding riparian impervious surface setbacks.
Relocate internal supplies, products/goods above the flooding depth.
Promote the purchase of flood insurance.
Improve the City's floodplain and zoning ordinances

Current Mitigation Projects

Parkside Pond

This project includes a retrofit of an existing privately owned pond between Forest Hills Road and Parkside Drive. The City has purchased and removed two properties along Forest Hills Road adjacent to the pond that repetitively flooded. Forest Hills Road in this area also floods regularly due to the elevation of the pond and restricted outlet structure as well as undersized culverts. The first phase of the project, currently underway, consists of replacing the culvert under Parkside Drive and the riser structure to the pond to increase capacity and lower the pond by 6 inches. The pond will also be graded to increase capacity when drawn down ahead of a storm event. The lots where the two properties were removed are being excavated to increase the pond capacity and daylight some of the stream from Forest Hills Road. The second phase of the project to be handled by the NCDOT includes upsizing the culverts under Forest Hills Road. This project is intended to alleviate flooding on both Forest Hills Road and Parkside Drive and the surrounding properties, as well as provide additional water quality treatment.

Post-Matthew Acquisitions

Following devastating flooding from Hurricane Matthew in October 2016, the City was able to pursue acquisition and demolition mitigation on four properties. The City currently has ownership of these properties and is in the process of demolishing the structures.

Lake Wilson Dam Emergency Action Plan

The City prepared an Emergency Action Plan for Lake Wilson Dam. Lake Wilson Dam is classified as high hazard dam by the North Carolina Department of Environment and Natural Resources. The Lake Wilson Emergency Action Plan identifies the estimated number of buildings that could potentially be impacted by a failure of Lake Wilson Dam as well as emergency procedures that should be implemented in the event of a dam failure.

Stormwater Retention Pond

The City constructed a new stormwater retention pond in Merrimont Park. The tributary of Hominy Creek just below Merrimont Park is impacted by peak flows which leads to nuisance flooding and heavy stream bank erosion. This project intercepts and captures about 18 acres of drainage area and includes an in-stream diversion to manage excess flow. This project was intended to lessen the peak flows downstream, mitigating flooding and erosion and improving water quality.

Hominy Creek Water Quality Park and Greenway Conceptual Plan

The City completed the conceptual plan for the Hominy Creek Water Quality Park and Greenway, which includes stream and buffer restorations, side stream flood retention, floodplain reconnection, infiltration basins, wetlands, wet ponds, permeable pavement, paved greenway, and an environmental education center. The retrofits in whole will result in a linear water quality park for roughly three miles of Hominy Creek, crossing through downtown Wilson from Ward Boulevard to Ward Boulevard. The different elements will be designed to maximize flood mitigation and water quality benefit while providing recreational amenities.

Advantages and Disadvantages of Mitigation Measures

Seven primary mitigation measures are discussed here: acquisition, relocation, barriers, floodproofing, drainage, elevation, and insurance. In general, the cost of acquisition and relocation will be higher than other mitigation measures but can completely mitigate risk of any future flood damage. Building small barriers to protect single structures is a lower cost solution, but it may not be able to offer complete protection from large flood events and may impact flood risk on other properties. Where drainage issues

are the source of repetitive flooding, drainage improvements can provide flood mitigation benefits to multiple properties. Each of these solutions is discussed in greater detail below.

Acquisition:

Property acquisition and/or relocation are complex processes requiring transferring private property to property owned by the local government for open space purposes. Acquisition is a relatively expensive mitigation measure but provides the greatest benefit in the lives and property are protected from flood damage. The major cost for the acquisition method is for purchasing the structure and land. The total estimated cost for acquisition should be based on the following:

- Purchase of Structure and land
- Demolition
- Debris removal, including any landfill processing fees
- Grading and stabilizing the property site
- Permits and plan review

Table 2.5 – Advantages and Disadvantages of Acquisition

Advantages	Disadvantages
<ul style="list-style-type: none"> • Permanently removes problem since the structure no longer exists. • Allows a substantially damaged or substantially improved structure to be brought into compliance with the community's floodplain management ordinance or law. • Expands open space and enhances natural and beneficial uses. • May be fundable under FEMA mitigation grant programs. 	<ul style="list-style-type: none"> • Cost may be prohibitive. • Resistance may be encountered by local communities due to loss of tax base, maintenance of empty lots, and liability for injuries on empty, community-owned lots.

There are 3 criteria that must be met for FEMA to fund an acquisition project:

- The local community must inform the property owners interested in the acquisition program that the community will not use condemnation authority to purchase their property and that the participation in the program is strictly voluntary,
- The subsequent deed to the property to be acquired will be amended such that the landowner will be restricted from receiving any further Federal disaster assistance grants, the property shall remain in open space in perpetuity, and the property will be retained in ownership by a public entity, and
- Any replacement housing or relocated structures will be located outside the 100-year floodplain.

Relocation:

Relocation involves lifting and placing a structure on a wheeled vehicle and transporting that structure to a site outside the 100-year floodplain and placed on a new permanent foundation. Like acquisition, this is one of the most effective mitigation measures.

Table 2.6 – Advantages and Disadvantages of Relocation

Advantages	Disadvantages
<ul style="list-style-type: none"> Removes flood problem since the structure is relocated out of the flood-prone area. Allows a substantially damaged or substantially improved structure to be brought into compliance with a community’s floodplain management ordinance. May be fundable under FEMA mitigation grant programs. 	<ul style="list-style-type: none"> Cost may be prohibitive. Additional costs are likely if the structure must be brought into compliance with current code requirements for plumbing, electrical, and energy systems.

The cost for relocation will vary based on the type of structure and the condition of the structure. It is considerably less expensive to relocate a home that is built on a basement or crawl space as opposed to a structure that is a slab on grade. Additionally, wood sided structures are less expensive to relocate than structures with brick veneer. Items to consider in estimating cost for relocation include the following:

- Site selection and analysis and design of the new location
- Analysis of existing size of structure
- Analysis and preparation of the moving route
- Preparation of the structure prior to the move
- Moving the structure to the new location
- Preparation of the new site
- Construction of the new foundation
- Connection of the structure to the new foundation
- Restoration of the old site



Example of a property relocation

Barriers:

A flood protection barrier is usually an earthen levee/berm or a concrete retaining wall. While levees and retaining walls can be large spanning miles along a river, they can also be constructed on a much smaller scale to protect a single home or group of homes.

Table 2.7 – Advantages and Disadvantages of Barriers

Advantages	Disadvantage
<ul style="list-style-type: none"> Relative cost of mitigation is less expensive than other alternatives. No alterations to the actual structure or foundation are required. Home owners can typically construct their own barriers that will complement the style and functionality of their house and yard. 	<ul style="list-style-type: none"> Property is still located within the floodplain and has potential to be damaged by flood if barrier fails or waters overtop it. Solution is only practical for flooding depths less than 3 feet. Barriers cannot be used in areas with soils that have high infiltration rates.

The cost of constructing a barrier will depend on the type of barrier and the size required to provide adequate protection. An earthen berm will generally be less expensive compared to an equivalent concrete barrier primarily due to the cost of the materials. Another consideration is space; an earthen barrier requires a lot of additional width per height of structure compared to a concrete barrier to ensure proper stability. Key items to consider for barriers:

- There needs to be adequate room on the lot
- A pump is required to remove water that either falls or seeps onto the protected side of the barrier

- Human intervention will be required to sand bag or otherwise close any openings in the barrier during the entire flood event

Floodproofing

Wet floodproofing a structure consists of modifying the uninhabited portions (such as a crawlspace or an unfinished basement) to allow floodwaters to enter and exit. This ensures equal hydrostatic pressure on the interior and exterior of the structure which reduces the likelihood of wall failures and structural damage. Wet floodproofing is practical in only a limited number of situations.

Table 2.8 – Advantages and Disadvantages of Wet Floodproofing

Advantages	Disadvantages
<ul style="list-style-type: none"> • Often less costly than other mitigation measures. • Allows internal and external hydrostatic pressures to equalize, lessening the loads on walls and floors. 	<ul style="list-style-type: none"> • Extensive cleanup may be necessary if the structure becomes wet inside and possibly contaminated by sewage, chemicals and other materials borne by floodwaters. • Pumping floodwaters out of a basement too soon after a flood may lead to structural damage. • Does not minimize the potential damage from a high-velocity flood flow and wave action.

A dry floodproofed structure is made watertight below the level that needs flood protection to prevent floodwaters from entering. Making the structure watertight involves sealing the walls with waterproof coatings, impermeable membranes, or a supplemental layer of masonry or concrete; installing watertight shields over windows and doors; and installing measures to prevent sewer backup.

Table 2.9 – Advantages and Disadvantages of Dry Floodproofing

Advantages	Disadvantages
<ul style="list-style-type: none"> • Often less costly than other retrofitting methods • Does not require additional land. • May be funded by a FEMA mitigation grant program. 	<ul style="list-style-type: none"> • Requires human intervention and adequate warning to install protective measures. • Does not minimize the potential damage from high-velocity flood flow and wave action. • May not be aesthetically pleasing.

Drainage Improvements

Methods of drainage improvements include overflow channels, channel straightening, restrictive crossing replacements, and runoff storage. Modifying the channel attempts to provide a greater carrying capacity for moving floodwaters away from areas where damage occurs. Whenever drainage improvements are considered as a flood mitigation measure, the effects upstream and downstream from the proposed improvements need to be considered.

Table 2.10 – Advantages and Disadvantages of Drainage Improvements

Advantages	Disadvantage
<ul style="list-style-type: none"> • Could increase channel carrying capacity through overflow channels, channel straightening, crossing replacements, or runoff volume storage. • Minor projects may be fundable under FEMA mitigation grant programs. 	<ul style="list-style-type: none"> • May help one area but create new problems upstream or downstream. • Channel straightening increases the capacity to accumulate and carry sediment. • May require property owner cooperation and right-of-way acquisition.

Elevation

Elevating a structure to prevent floodwaters from reaching living areas is an effective and one of the most common mitigation methods. Elevation may also apply to roadways and walkways. The goal of the elevation process is to raise the lowest floor of a structure or roadway/walkway bed to or above the required level of protection.

NOTE: Elevating a structure with a slab-on-grade foundation can cost over 30% more than a crawlspace foundation. Many properties in Wilson’s Repetitive Loss Areas have slab-on-grade foundations, so this mitigation alternative may be cost-prohibitive.

Table 2.11 – Advantages and Disadvantages of Elevation

Advantages	Disadvantages
<ul style="list-style-type: none"> Elevating to or above the BFE allows a substantially damaged or substantially improved house to be brought into compliance. Often reduces flood insurance premiums. Reduces or eliminates road closures due to overtopping. May be fundable under FEMA mitigation grant programs. 	<ul style="list-style-type: none"> Cost may be prohibitive. The appearance of the structure and access to it may be adversely affected. May require property owner cooperation and right-of-way acquisition. May require road or walkway closures during construction.

Flood Insurance:

Insurance differs from other property protection activities in that it does not mitigate or prevent damage caused by a flood. However, flood insurance does help the owner repair and rebuild their property after a flood, and it can enable the owner to afford incorporating other property protection measures in that process. Insurance offers the advantage of protecting the property, as long as the policy is in force, without requiring human intervention for the measure to work.

Table 2.12 – Advantages and Disadvantages of Flood Insurance

Advantages	Disadvantages
<ul style="list-style-type: none"> Provides protection outside of what is covered by a homeowners’ insurance policy. Can help to fund other property protection measures after a flood through increased cost of compliance (ICC) coverage. Provides protection for both structure and contents. Can be purchased anywhere in a community, including outside of a flood zone. 	<ul style="list-style-type: none"> Cost may be prohibitive. Policyholders may have trouble understanding policy and filing claims. Does not prevent or mitigate damage.

STEP 5. Conclusion and Recommendations

Conclusion

Based on the field survey and collection of data, the analysis of existing studies and reports, and the evaluation of various structural and non-structural mitigation measures, the City of Wilson proposes that mitigation measures should be implemented for the Repetitive Loss Areas. Table 2.16 examines past and current mitigation actions in this area.

Table 2.13 – Past and Current Mitigation Actions

Past and Current Mitigation Actions	
1	Property owners have documented flooding and identified flooding concerns in returned questionnaires from this analysis.
2	The City has previously eliminated 12 properties from the repetitive loss list through acquisition and demolition.
3	Property owners are aware of flooding causes. Some property owners have undertaken specific floodproofing measures at their own expense.
4	City has undertaken capital improvement projects to improve drainage within the repetitive loss areas.

Prioritization

In order to facilitate the implementation of the following recommended mitigation actions, a prioritization schedule is included based on the following:

- Cost
- Funding Availability
- Staff Resources
- Willingness of Property Owner to Participate
- Additional Planning Requirements

The priority rating for the following mitigation actions is summarized in Table 2.14. Each of the above prioritization variables was rated on a scale of 1 to 5, with 5 indicating the greatest difficulty for implement. The weight of each variable is indicated in the prioritization table. Those mitigation actions with the lowest overall priority scores should be implemented first. An overall priority rating of high, medium, or low is assigned to each recommended action, using the following scale:

- High Priority (should be completed within 2 years): Score of 0.00 – 1.99
- Medium Priority (should be completed within 2 to 4 years): Score of 2.00 – 3.99
- Low Priority (should completed within 4 to 5 years): Score of 4.00 – 5.00

Recommendations

The City will encourage property owners to use floodproofing measures to help protect lower levels of their property. The City will also increase its public education efforts to increase awareness of flood preparedness and flood protection measures including moving valuable items to above the flood elevation and permanently elevating vulnerable HVAC units. At the same time, the City will work with property owners, citizens, neighboring communities, the state and other regional and federal agencies to implement capital improvement projects which will help to eliminate flooding in the repetitive loss areas.

Mitigation Action 1:

Property owners should to obtain and keep a flood insurance policy on their structures (building and contents coverage). The City will continue on an **annual basis** to target all properties in the repetitive loss areas reminding property owners and occupants of the advantages of maintaining flood insurance.

Responsibility

The City's Planning & Development Services Department will provide the most relevant up-to-date flood insurance information to all property owners within the repetitive loss areas through annual outreach and other efforts.

Funding

The cost will be paid for from the City of Wilson's operating budget.

Priority: High

Mitigation Action 2:

Property owners should not store personal property in basements and crawl spaces since personal property is not covered by a flood insurance policy. The City will increase its outreach efforts on an **annual basis** for the identified repetitive loss areas to include this specific information in the outreach materials.

Responsibility

The City's Planning & Development Services Department will provide the most relevant up-to-date information to all property owners within the repetitive loss areas.

Funding

The cost will be paid for from the City of Wilson's operating budget.

Priority: High

Mitigation Action 3:

When appropriate for commercial buildings, property owners should consider floodproofing measures such as flood gates or shields, flood walls, and hydraulic pumps.

Responsibility

The City's Planning & Development Services Department will promote effective flood protection measures and provide advice and assistance to property owners who may wish to implement such measures in an **on-going** program.

Funding

The cost will be paid for by individual property owners. Advice and assistance will require staff time. Promotion of existing floodproofing measures may require some additional funds from the City's operating budget.

Priority: Medium

Mitigation Action 4:

Continue acquisition/demolition mitigation of high-risk flood-prone properties. The highest priorities are properties at the greatest flood risk and where drainage improvements will not provide an adequate level of protection.

Responsibility

The City's Planning & Development Services Department will continue to target properties for acquisition/demolition.

Funding

The acquisition and demolition will be paid for using FEMA mitigation grant funds. Staff time to develop the list of target properties will require funds from the City's operating budget.

Priority: Low

Mitigation Action 5:

Prioritize CIP projects to focus on drainage improvement projects in those basins containing repetitive loss areas.

Responsibility

The City's Engineering Department.

Funding

The cost will be paid for by the City's operating budget.

Priority: Medium

Mitigation Action 6:

Encourage property owners to elevate inside and outside mechanical equipment above the BFE and install flood resistant materials in crawl spaces.

Responsibility

The City's Planning & Development Services Department will promote effective flood protection measures and provide advice and assistance to property owners who may wish to implement such measures in an **on-going** program.

Funding

The cost will be paid for by individual property owners. Advice and assistance will require staff time. Promotion of existing floodproofing measures may require some additional funds from the City's operating budget.

Priority: Medium

Mitigation Action 7:

Based on the high number of rental properties identified within the repetitive loss areas, the City's Planning & Development Services Department will encourage renters to purchase rental insurance for their contents.

Responsibility

The City's Planning & Development Services Department along with local insurance agents will promote the benefits of renter's insurance.

Funding

The cost will be paid for by the City's operating budget.

Priority: Medium

Prioritization Table

Table 2.14 – Prioritization of Recommended Mitigation Actions

Mitigation Action #	Prioritization Variables (Weight)					Total
	Cost (30%)	Funding Availability (25%)	Property Owner Willingness (20%)	Staff Resources (15%)	Planning Needs (10%)	
1: Ongoing outreach to promote flood insurance	2	2	1	1	1	1.55
2: Ongoing outreach about personal property protection	2	2	1	1	1	1.55
3: Promote and advise on floodproofing	2	3	4	2	2	2.65
4: Continue acquisition and demolition	5	4	5	4	4	4.50
5: Prioritize drainage-related CIP projects	4	2	2	3	4	2.95
6: Encourage property owners to elevate mechanical equipment	2	2	3	2	1	2.10
7: Encourage renters to purchase flood insurance	2	2	3	2	2	2.20

3 References

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- Federal Emergency Management Agency, National Flood Insurance Program, Community Rating System, Mapping Repetitive Loss Areas, August 2008.
- City of Alexandria, Potomac River Waterfront Flood Mitigation Study, Evaluation and Recommendations of Mitigation Measures, July 2012.
- University of New Orleans, Center for Hazards Assessment, Response and Technology, Draft Guidebook to Conducting Repetitive Loss Area Analyses, 2012.

Appendix A – Building Survey Data

Note: In accordance with the Privacy Act of 1974, Appendix A will not be shared with the general public.