



REPETITIVE LOSS AREA ANALYSIS

Chatham County, Georgia

May 2018

Public Version

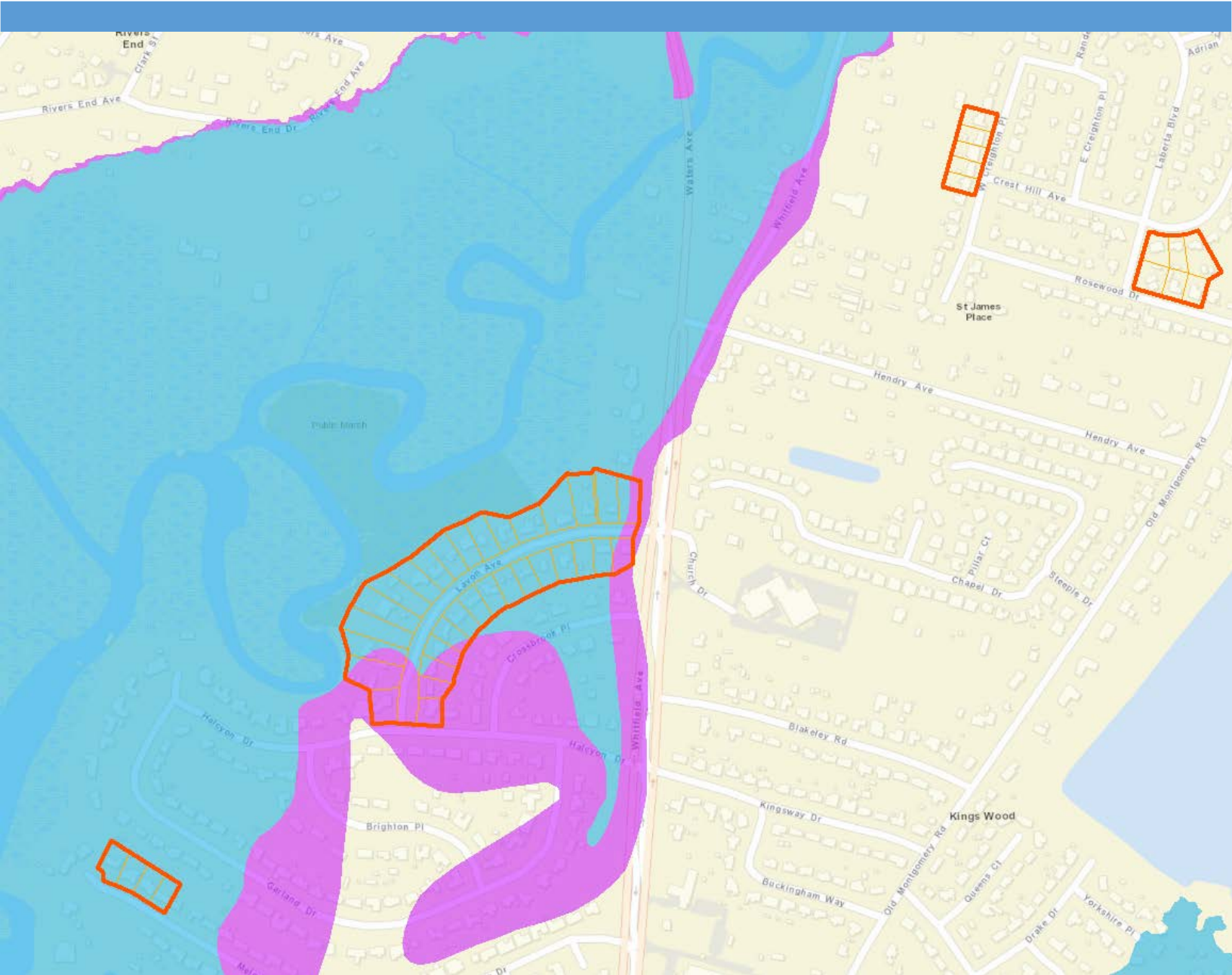


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1 Repetitive Loss Area Analysis

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 due to the fact that repetitive loss areas are not shown on Flood Insurance Rate Maps (FIRMs) but instead must be identified and mapped by local communities.

Chatham County (CID-130030) has been a regular participant in the NFIP since August 1, 1980. In addition to meeting the basic requirements of the NFIP, the County has completed additional components to participate in the Community Rating System (CRS) program. Chatham County 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. Chatham County has been participating in the CRS program since October 1, 2009.

As of June 30, 2017, there are currently 17,087 NFIP Policies in force in Chatham County with insurance coverage of over \$4.9 billion. The County has 827 paid losses against the NFIP totaling more than \$11.2 million with 28 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. In some cases, a community will find that properties on its repetitive loss list are not currently insured. An insured property with 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. There are 40 repetitive loss properties in Chatham County and 29 of those properties are currently insured (see the Repetitive Loss Requirement Section for greater detail).

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 as of January 31, 2017, there are a total of 40 unmitigated and 4 mitigated repetitive loss properties within Chatham County. One of these properties is classified as severe repetitive loss, and it remains unmitigated. An updated Activity 510 Floodplain Mitigation Plan (FMP) is currently under development for the County. Since the FMP examines flooding issues as a whole within Chatham County and does not assess individual properties, the County has opted to complete this Repetitive Loss Area Analysis (RLAA) using the 2017 *CRS Coordinator's Manual*. This RLAA will benefit the County by examining potential mitigation measures for specific repetitive loss areas and increasing its credit in the CRS Program.

Setting

Chatham County is the northernmost coastal county in Georgia. It is bounded by the Savannah River and Jasper County, South Carolina to the northeast, Effingham County to the northwest, and Bryan County and the Ogeechee River to the south and southwest. According to the U.S. Census Bureau, Chatham County has a total area of 632 square miles, of which approximately 426 square miles is land area and 206 square miles is water area. This analysis covers only the unincorporated areas of Chatham County.

Chatham County has a moderate climate, with an average annual high temperature of 77.3 degrees Fahrenheit and an average annual low temperature of 56.3 degrees Fahrenheit. Average annual rainfall is approximately 48 inches. The County experiences a rainy season from June through August, with average precipitation around 6 inches per month. The County has a generally flat topography and low elevation, ranging from sea level at the coast to a high point of approximately 49 feet above sea level in Savannah. Much of the County is covered by wetlands and tidal marshes.

Figure 1.1 depicts Chatham County's location as well as the incorporated municipalities and major roads. Figure 1.2 depicts the major drainage basins that cover the County.

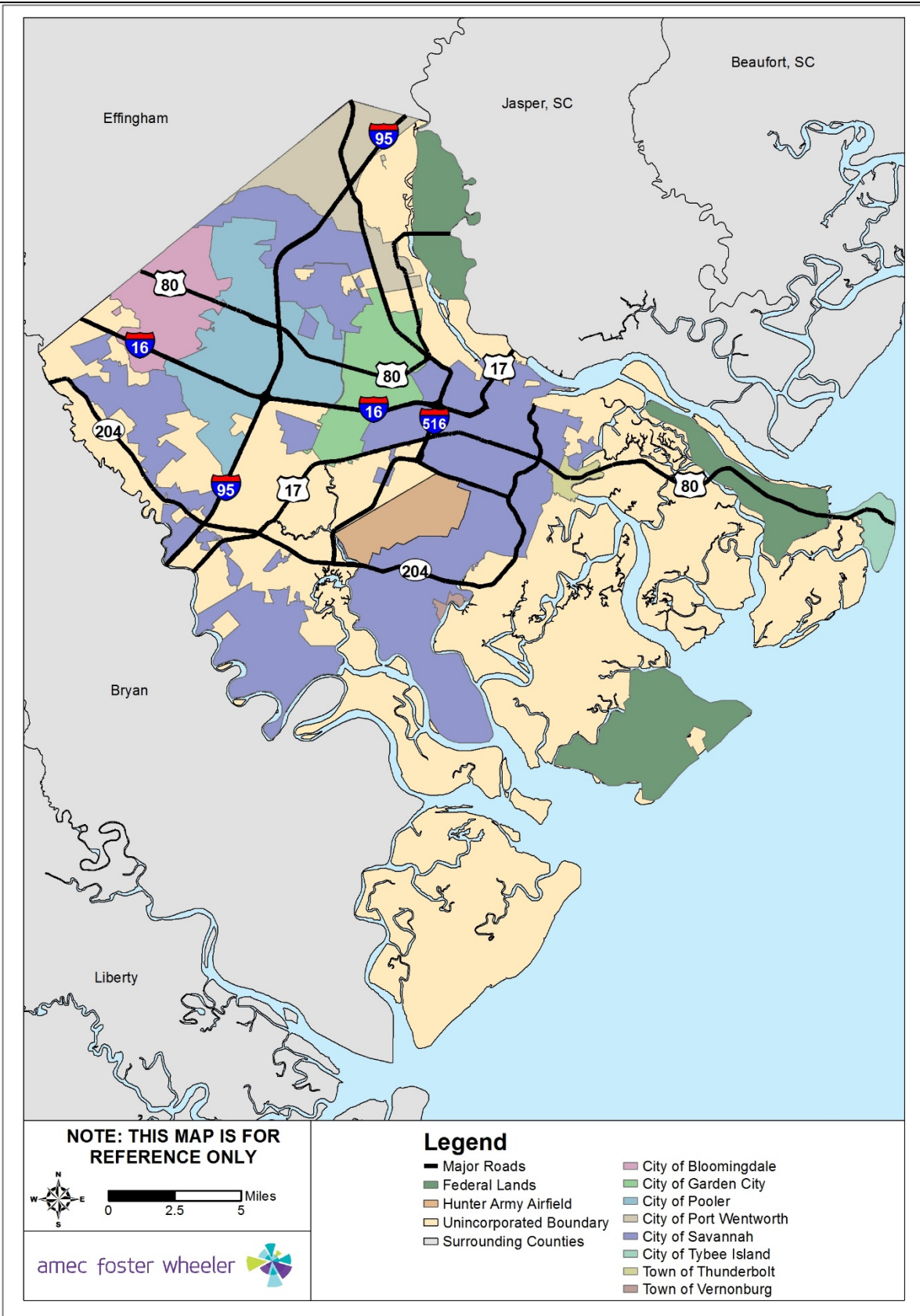


Figure 1.1 – Chatham County Location Map

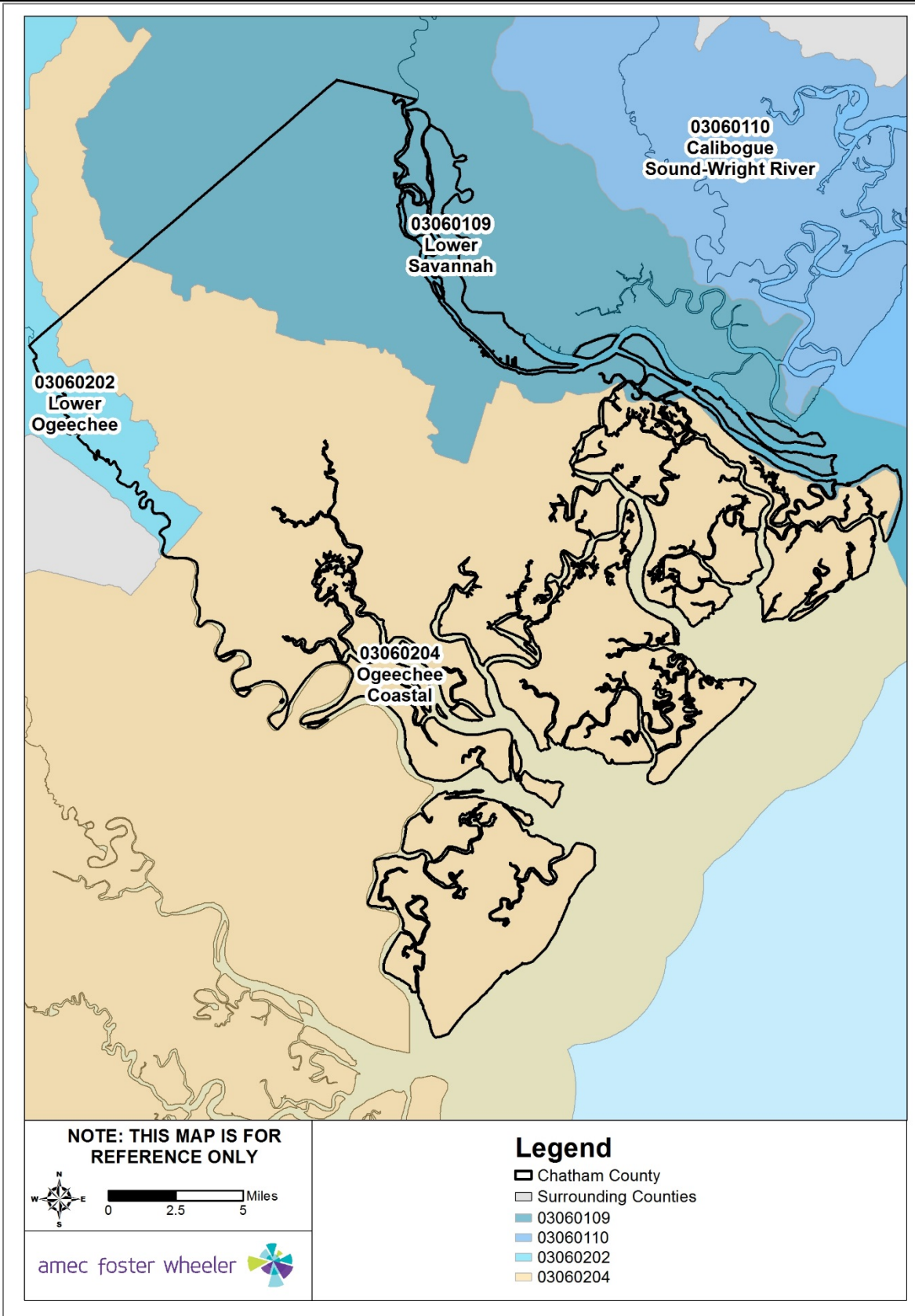


Figure 1.2 – Chatham County Drainage Map

Repetitive Loss Requirement

Repetitive loss data must be maintained and updated annually in order to participate in the CRS. Since many of the 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.

- **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 either a floodplain management plan that covers all repetitive loss properties (areas) or prepare a RLAA for all repetitive loss areas.

Since the latest repetitive loss data obtained from FEMA for Chatham County contained a total of 40 unmitigated repetitive loss properties, the County is designated as a Category B repetitive loss community.

Mapping Repetitive Loss Areas

Twenty-Nine Repetitive Loss Areas were identified within Chatham County in accordance with the principles outlined in the CRS guidance titled *Mapping Repetitive Loss Areas* dated August 15, 2008. The 29 Repetitive Loss Areas included the 40 unmitigated repetitive loss properties plus an additional 154 properties including historic claims properties (those with one claim paid against the NFIP) and properties that have the same or similar flood conditions but have not had any claims paid against the NFIP. Therefore, a total of 194 properties were included within the RLAA.

A detailed map of each Repetitive Loss Area is provided in Section 2. An overview map of the Chatham County Repetitive Loss Areas is shown in Figure 1.3 on the following page.

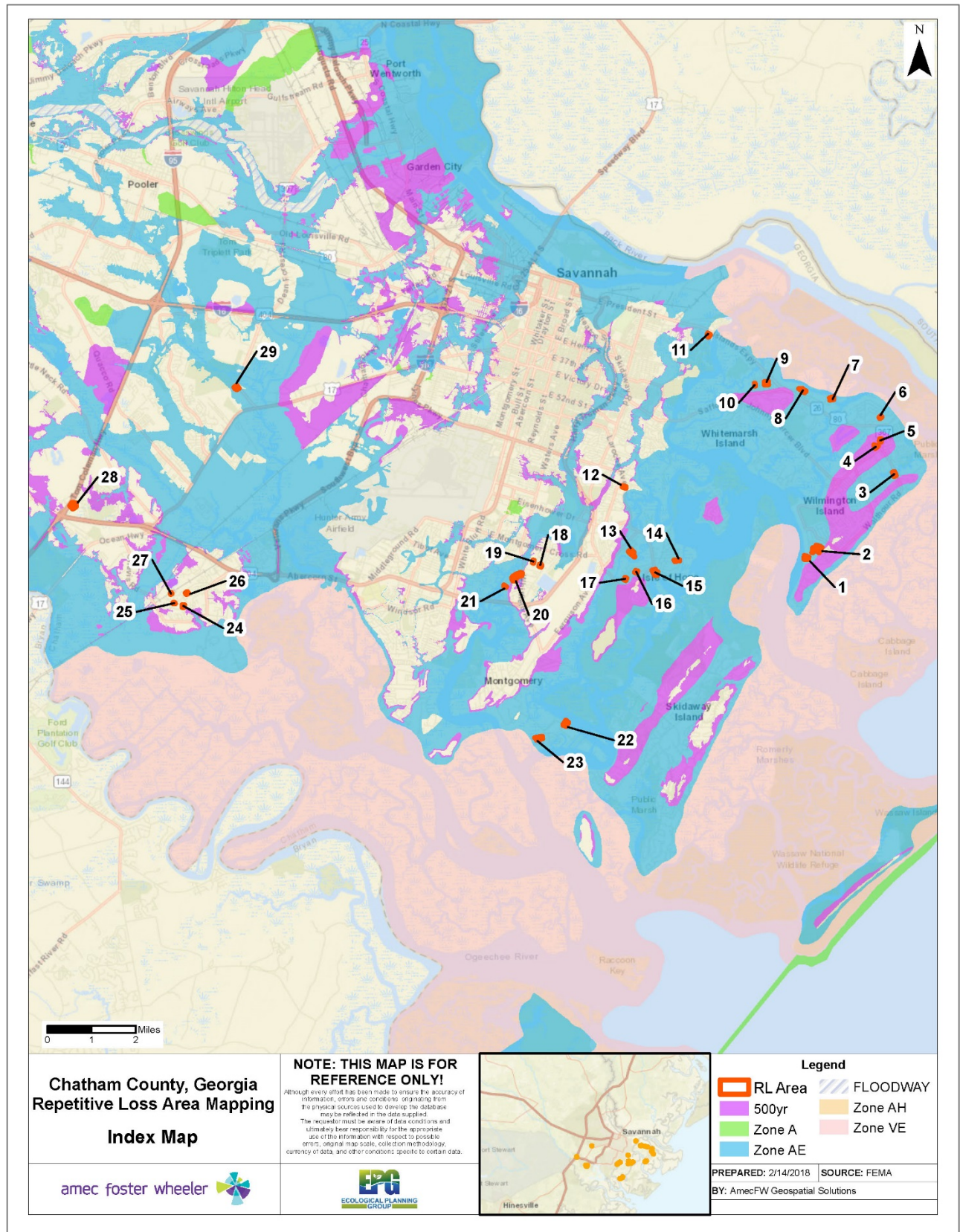


Figure 1.3 – Chatham County Repetitive Loss Areas

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 RLAA, individual letters were mailed to property owners within the 29 identified Repetitive Loss Areas on November 9, 2017. Figure 2.1 on the following page shows an example of the property owner notification letter. Letters were mailed to repetitive loss properties, historical claims properties (those with one paid claim against the NFIP), and additional properties with similar flooding conditions but which have no claims paid against the NFIP. Copies of all 194 mailed letters are maintained on file with the Chatham County Engineering Department. In accordance with the Privacy Act of 1974, the letters will not be shared with the general public.

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 Flood Protection Questionnaire is shown in Figure 2.2 and Figure 2.3 on the following pages.



[DATE]

[NAME]

[ADDRESS]

[CITY], GA [ZIP]

Property Address: XXXXXX

Parcel Number: XXXXXXXXXXXX

Dear Property Owner:

As part of Chatham County's participation in the National Flood Insurance Program's (NFIP) Community Rating System (CRS), the Department of Engineering 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 event information (when events occurred, amount of damage to property, etc.)

In addition, Chatham County 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 Engineering Department or by calling (912) 652-7814.

You can help us perform this analysis by **completing this questionnaire and returning to me at Chatham County Department of Engineering, 124 Bull Street, Room 430, Savannah, Georgia, 31401**. If you have any questions, please call me at **(912) 652-7814**.

Sincerely,

Michael Blakely, CFM
Floodplain Administrator, CRS Program Manager
Chatham County Department of Engineering

Figure 2.1 – Example RLAA Property Notification Letter



FLOODPLAIN PROTECTION QUESTIONNAIRE

Name: _____

Repetitive Loss Property Address: _____

1. How many years have you occupied the 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 building?
 - Rent
 - Own

3. What type of foundation does the building have?

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

4. Has this 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 building? _____

8. What do you feel was the cause of your flooding? Check all that affect your 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 building	<input type="checkbox"/> Other: _____
<input type="checkbox"/> Drainage from nearby properties	

9. What flood protection measures have you installed 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 – RLAA Survey, Page 1



FLOODPLAIN PROTECTION QUESTIONNAIRE, *CONTINUED*

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 the building located in a Federal Emergency Management Agency (FEMA) floodplain?

- Yes
- No
- I don't know

12. Do you have FEMA Flood Insurance?

- Yes
- No
- I don't know

13. Do you want information on protecting your building/property 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 **Thursday, December 14, 2017** and returning it to:

Michael Blakely, Floodplain Administrator
 Chatham County
 Department of Engineering
 124 Bull Street, Room 430
 Savannah, Georgia 31404
 Phone (912) 652-7814

Surveys can also be emailed to mblakely@chathamcounty.org

Figure 2.3 – RLAA Survey, Page 2

Of the 194 mailed notification letters and questionnaires, Chatham County received 23 responses which corresponds to a response rate of approximately 12 percent. The questionnaire responses are summarized below. Note: Respondents may have skipped questions and/or provided more than one response to a question.

Q1: How many years have you occupied the building at this address?

Answer Choices	Percentage	Number Responding
Less than 1	0.0	0
1-5	21.7	5
5-10	8.7	2
10+	69.6	16
Total	100.0	23

Q2: Do you rent or own this building?

Answer Choices	Percentage	Number Responding
Rent	0.0	0
Own	100.0	23
Total	100.0	23

Q3: What type of foundation does the building have?

Answer Choices	Percentage	Number Responding
Slab	87.5	21
Crawl Space	12.5	3
Basement	0.0	0
Other	0.0	0
Total	100.0	24

If other:

Q4: Has this building or property ever been flooded or had a water problem?

Answer Choices	Percentage	Number Responding
Yes	39.1	9
No	60.9	14
Total	100.0	23

Q5: In what year(s) did it flood?

- 1999
- 1996, 1999
- 2016 – 2005
- Every rain
- 7/5/1996, 6/29/1999, 9/11/2017
- 1999, 2016, 2017
- 2015, 2016, 2017
- 1970s (Hurricane David)
- September 2017

Q6: Where did you get water and how deep did it get?

Answer Choices	Percentage	Number Responding
In basement	0.0	0
In crawl space	22.2	2
Over 1 st floor	55.6	5
In yard only	22.2	2
Water was kept out of house by sandbagging, sewer valve, or other protective measure	0.0	0
Total	100.0	9

In crawl space: 6", 2-3'

Over 1st floor: 2", 18", 4", 7", 6-12"

In yard only: few inches

Q7: What was the longest time that water stayed in the building?

- Half hour
- 6 hours
- 2 weeks
- Do not know – we evacuated
- 2 weeks
- 4-5 days

Q8: What do you feel was the cause of your flooding? Check all that affect your building.

	Percentage	Number Responding
Storm sewer backup	12.5	2
Sanitary sewer backup	6.3	1
Standing water next to house/building	12.5	2
Drainage from nearby properties	12.5	2
Saturated ground / leaks in basement walls	0.0	0
Overbank flooding from: _____	31.3	5
Other	25.0	4
Total	100.1	16

Overbank flooding from: street, river, Herb Creek, Vernon River, Hurricane David

Other: Hurricane Matthew, Hurricane Irma, October 2015 tide, could have been combination of factors, drainage ditch does not allow for effective storm water drainage, drainage from St. James Church

Q9: Have you installed any flood protection measures on the property?

Answer Choices	Percentage	Number Responding
Sump pump	12.5	2
Waterproofed the outside walls	6.3	1
Re-graded yard to keep water away	25.0	4
Moved things out of basement	0.0	0
Backup power system / generator	25.0	4
Sandbagged	6.3	1
Other	25.0	4
Total	100.1	16

Other: County drainage improvements and frequent monitoring have greatly improved situation; cut trees blocking flow; elevation; industrial drain from driveway to river.

Q10: Did any of the measures checked in item 9 work? If so, which ones? If not, do you know why they did not work?

Yes:

- County drainage improvements - specifically replacing small culvert under Wilmington Island Rd. with 2 large box culverts. Additionally, clearing of canal behind house and storm sewer maintenance on a regular basis
- Both regrade and tree removal
- On hill
- All seem to work. Flood problem from wind driven Irma tidal surge affected dock, dockhouse, boathouse, walkway and railings, not my house.

No:

- Too much water too quickly
- We were out of town when it happened. Neighbors that stayed stated that water came rushing across road and in less than 30 minutes 6 homes in cul-de-sac incurred severe flood damage

Q11: Is the building located in a Federal Emergency Management Agency (FEMA) floodplain?

Answer Choices	Percentage	Number Responding
Yes	56.5	13
No	8.7	2
I don't know	34.8	8
Total	100.0	23

Q12: Do you have FEMA Flood Insurance?

Answer Choices	Percentage	Number Responding
Yes	78.3	18
No	13.0	3
I don't know	8.7	2
Total	100.0	23

Q12: Do you want information on protecting your home/building from flooding?

Answer Choices	Percentage	Number Responding
Yes	56.5	13
No	43.5	10
Total	100.0	23

Q13: Please include any additional information and comments you may have about flooding in your area:

- "Road side drain pipes need surveillance and periodic cleaning"
- "We did not have insurance the first time we flooded. The second time we did. During Hurricane Matthew, we did not flood although the water came extremely close. I also constantly clean and clear the sewer grates of debris. I also believe the building of St. James Church and paving the parking lot makes all their water run into the neighborhood water system. Also, the County could maintain the ditch behind my house. Every year I have to write and request that they clean it like they are supposed to. They never do it until I ask."

-
- “1. Flood history unknown prior to 2007. 2. Neighboring housing/properties have flooded. 3. Stormwater drain ditch in front of driveway has standing water after each rain. GA DOT has been contacted to correct, but no further contact made to homeowner.”
 - “Think the building of the Truman Pkwy has changed some of the water [dispersion]”
 - “Flood insurance has been paid by mortgage loan every month”
 - “Water table is a foot below topsoil, neighborhood has septic tanks and troubles with drainage given how small lots are, remediation is very costly”
 - “Our property has flooded three times since October 2015. As a result our HVAC compressors were damaged in 2 of the floods and were replaced and our duct work was damaged in all 3 floods and it has not been replaced three times. Insulation damaged and replaced all 3 times.”
 - “Many years ago, there was some street flooding. The right of ways and sewers were not being maintained. I believe this has gotten better. So there has been no street flooding.”
 - “The street that I live on has different levels of elevation. We are on the highest point of the street and have never had flood water on our property.”
 - “I have never had a flood incident! Irma has no impact! Why do you think I've had a flood? After my house is paid off I will cancel flood insurance, it is a rip off! Irma caused no flooding of houses on my street, only street wash and yards close to the marsh. There would have been less damage in Paxton if idiots hadn't driven their cars and trucks through the rising water. The wash flooded garages.”
 - “To help greatly is to keep Engineering and Project out of neighborhood!”
 - “My next-door neighbor has had water in the house 3x since I've been here, but not mine.”
 - “Twice our street has flooded but the water never came close to our house.”
 - “Neighbors have indicated that since a canal improvement there has been no flooding for 20 years. Maybe it would be a good idea for Chatham County to better maintain the drainage canals.”
 - “Had an elevation survey performed on the property this year (2017). The property has never flooded or has had a water problem as per the seller's disclosure form from the original owner of the home (1970-2014). 2014-2017 hasn't witnessed any issues.”
 - “We are interested in holding a neighborhood meeting (Halcyon Bluff) to discuss what may have contributed to the severity of this flooding and future measures to take.”

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

- The majority of respondents have owned their residences for 10 or more years, so they have a good understanding of flood problems and any changes in runoff. The majority of homes are slab on grade.
- Almost 60 percent of respondents do not want information from the County for protecting their home/building from flooding.
- Almost 80 percent of the respondents do currently have FEMA flood insurance; however, almost 35 percent of respondents did not know if their home is located in a floodplain.
- Of those respondents who have installed flood protection measures, re-grading the yard, county drainage improvements and canal/storm system maintenance were seen as the most effective methods.

-
- There is a perception that the County could improve drainage ditch and storm sewer inlet maintenance and that maintenance is not performed on a regular basis unless requested.
 - 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 over the first floor of homes.
 - The years with the largest number of reported flooding incidents are 1996, 1999, 2015, 2016 and 2017. The following flood events are detailed in NOAA's National Center for Environmental Information (NCEI) database:
 - **July 5, 1996** - Eight to ten (8-10) inches of rain fell in 3-4 hours in and around Savannah. As a result, 50 streets and 100 homes were flooded to various degrees. Numerous businesses had water several inches deep. There were 31,000 residents without power for several hours. This event also occurred close to high tide. Some streets had water up to headlights on cars while some homes had water almost knee deep. Several car dealerships had significant damage to some cars. Two elderly men barely escaped with their lives when their car stalled. By the time they were rescued, water was within six (6) inches of filling the inside of the car.
 - **June 29, 1999** - Slow moving showers and thunderstorms developed repeatedly across Chatham County and Effingham County during the day. Twenty-four hour rainfall amounts ranged from about 7 inches to over 13 inches. As a result of the flooding, over 500 homes and businesses were damaged to varying degrees and almost 600 automobiles were damaged. Water was as much as 6 ft deep in some places. Numerous roads were washed out and/or closed during the flooding. Estimated dollar damage for public property was 4.5 million dollars and at least another 2.5 million dollars for private property.
 - **October 27, 2015** – A combination of persistent and strong east/northeast winds, the Perigean spring tide and a full moon produced 2 days of elevated high tide cycles along the southeast Georgia coast. Major coastal flood stage levels were recorded at the Fort Pulaski, GA (FPKG1) tide gauge on Oct 27, 2015, which claimed 3rd place on the all-time historic crest list with a high tide of 10.43 feet mean lower low water. Moderate coastal flood stage levels were also recorded at the Fort Pulaski, GA (FPKG1) tide gauge on Oct 28, 2015, which claimed 9th place on the all-time historic crest list. Roads reported closed included Highway 80 between Savannah and Tybee Island; Shipyard Road to Burnside Island; La Roche Avenue near Norwood Avenue and Raleigh Drive; Barley Drive near the Islands Expressway; the road to Elba Island; Jones Avenue, 6th Avenue, 10th Street, Chatham Avenue and Lewis Avenue in Tybee Island; Mercer Road; Whippoorwill Road and Bobwhite Road on Wilmington Island; and Catalina Boulevard leading to Spanish Hammock Island.
 - **November 13, 2016** – A combination of astronomical and meteorological influences resulted in a very high high tide cycle along the southeast Georgia coast. A full moon and the annual proxigee produced an elevated astronomical influence and elevated northeast winds further locally enhanced the tide. The result was a high tide measured at Fort Pulaski, GA that ranked in the top 10 highest on record, at 10.05 feet above Mean Lower Low Water.

-
- **September 11, 2017** - Irma became a major hurricane over the eastern Atlantic on September 1, 2017. Irma officially made landfall at Marco Island, FL on September 10 as a Category 3 hurricane. Following landfall, Irma tracked to the north-northwest and eventually the northwest as it progressed up the western side of the Florida peninsula. Irma steadily weakened during this time and was downgraded to a tropical storm on September 11th. Through the rest of September 11th, Irma tracked to the northwest into southern Georgia and widespread impacts occurred across the Southeast. Despite the fact that the center of Irma tracked well to the west of the southeast Georgia and southeast South Carolina region, it still caused significant impacts due to heavy rainfall, strong winds, tornadoes, and storm surge. Feeder bands around Irma continuously moved onshore on September 11th and produced very heavy rainfall rates with rainfall totals generally ranging from 3 to 9 inches. The daily record rainfall total for September 11th was 4.74 inches at the Savannah-Hilton Head International Airport (KSAV). This widespread heavy rain resulted in several reports of flash flooding with water entering homes and businesses.

STEP 2. Contact Agencies and Organizations

Chatham County 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 agencies, reports and associated data which were analyzed and reviewed included:

- Chatham County Code of Ordinances
 - Zoning Ordinance
 - Subdivision Regulations
 - Floodplain Management Ordinance
 - Stormwater Management Ordinance
 - Erosion and Sedimentation Control Ordinance
- Chatham County-Savannah Comprehensive Plan, 2016
- Chatham County Pre-Disaster Hazard Mitigation Plan, 2015
- Chatham County, Georgia and Incorporated Areas Flood Insurance Study, 2014
- Federal Emergency Management Agency (Repetitive Loss Data: 1-21-2017 & Flood Insurance Data: 6-30-2017)
- Chatham County Engineering and Public Works Departments

Summary of Studies and Reports

FEMA Flood Insurance Study

FEMA most recent FIS for Chatham County, GA is dated July 7, 2014. The FIS revises and updates information on the existence and severity of flood hazards within the County. The FIS also includes revised digital Flood Insurance Rate Maps (FIRMs) which reflect updated Special Flood Hazard Areas (SFHAs) and flood zones for the County.

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

Preparation of the Chatham County annual budget includes the preparation of a long-range Capital Improvement Program. 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 roads and drainage, parks and recreation, public utilities and facilities. Of the major capital expenditures planned for the 2016/2017 fiscal year, drainage accounted for \$33,892,090, or 14.88% of total expenditures.

Chatham County – Savannah Comprehensive Plan, Updated 2016

The Chatham County - Savannah Comprehensive Plan is intended to guide growth and development decisions over the next 20 years. The Comprehensive Plan includes a set of goals and policies as well as

an official Future Land Use Map, both of which are intended to inform decisions related to capital investment and rezoning. Specifically, the plan encourages pedestrian-oriented, mixed-use development. The plan also recommends taking actions to understand and adapt to sea level rise.

Chatham County Pre-Disaster Hazard Mitigation Plan, 2015

The primary reason for developing a Hazard Mitigation Plan (HMP) 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 implemented through the Georgia Emergency Management Agency (GEMA). The Chatham County Pre-Disaster HMP includes a number of recommendations for flood mitigation including prevention of flooding, protection of existing development, acquisition of flood areas for green space, and public education on flood risk and response.

Chatham County Floodplain Management Plan, 2017

The County is currently in the process of preparing a Floodplain Management Plan (FMP). The purpose of the FMP is to identify, assess and mitigate flood hazards and flood risk in the County. This plan documents the County's flood hazard mitigation planning process and identifies relevant flood hazards and vulnerabilities as well as strategies the County 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 County, including those areas located in the Zone X Unshaded flood zone; stream bank erosion, coastal erosion, and erosion hazards caused by flooding; flooding associated with sea level rise and climate change; dam failure inundation; and flooding associated with hurricane and tropical storm rain and storm surge.

STEP 3. Building Data Collection

The on-site field survey for this analysis was conducted between November 10, 2017 and December 6, 2017. The National Tool Limited View was not utilized in this effort, but most of the information required by the National Tool was incorporated into a mobile application survey. The data collection forms generated by the mobile application 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

Data was also gathered, when possible, through conversations with property owners and/or residents. These conversations provided detail on the extent of flooding, potential causes of flooding, and recollections from past flood events, which help to better understand flooding issues for these areas.

Data was also incorporated from off-site research, including a review of FEMA Flood Insurance Rate Maps and the location of the Repetitive Loss Areas in relation to FEMA flood zones.

Table 2.1 on the following page 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	100.0	0.0	0.0
2	90.3	9.7	0.0
3	100.0	0.0	0.0
4	0.0	100.0	0.0
5	0.0	100.0	0.0
6	100.0	0.0	0.0
7	100.0	0.0	0.0
8	100.0	0.0	0.0
9	100.0	0.0	0.0
10	100.0	0.0	0.0
11	94.1	0.0	5.9
12	0.0	0.0	100.0
13	100.0	0.0	0.0
14	100.0	0.0	0.0
15	100.0	0.0	0.0
16	100.0	0.0	0.0
17	100.0	0.0	0.0
18	0.0	0.0	100.0
19	0.0	0.0	100.0
20	78.7	21.3	0.0
21	100.0	0.0	0.0
22	100.0	0.0	0.0
23	100.0	0.0	0.0
24	0.0	0.0	100.0
25	0.0	0.0	100.0
26	0.0	0.0	100.0
27	0.0	0.0	100.0
28	0.0	0.0	100.0
29	100.0	0.0	0.0

Source: 7/7/2014 FIRM

Problem Statement:**Areas of Coastal/Tidal Flooding**

Of the 29 identified Repetitive Loss Areas in Chatham County, 22 are located in areas vulnerable primarily to coastal and tidal flooding. The areas include locations on or near the Savannah River, Ogeechee River, Wilmington River, Ossabaw Sound and Wassaw Sound. While the primary flood source in these areas is coastal or tidal flooding, some flooding in these repetitive loss areas is also considered flash flooding. 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. Tidal influences can also exacerbate flash flooding in Chatham County when heavy rains fall during a high tide, which prevents the stormwater infrastructure from draining floodwaters.

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

Repetitive Loss Area 1

Repetitive Loss Area 1 is completely located within the 100-yr floodplain. The Wilmington River is located just west of this Repetitive Loss Area. The area is residential with slab on grade foundation types. In general, HVAC systems were not visible from the street; therefore, it was not possible to determine if elevation should be considered as a mitigation measure in this particular area.

Table 2.2 – Repetitive Loss Overview for Area 1

Repetitive Loss Area	# of RL Properties	# of Historic Claims Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
1	2	1	3	6	Wilmington Island Rd

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

Area 1 contains a total of six properties. There were no vacant lots discovered during the field survey.

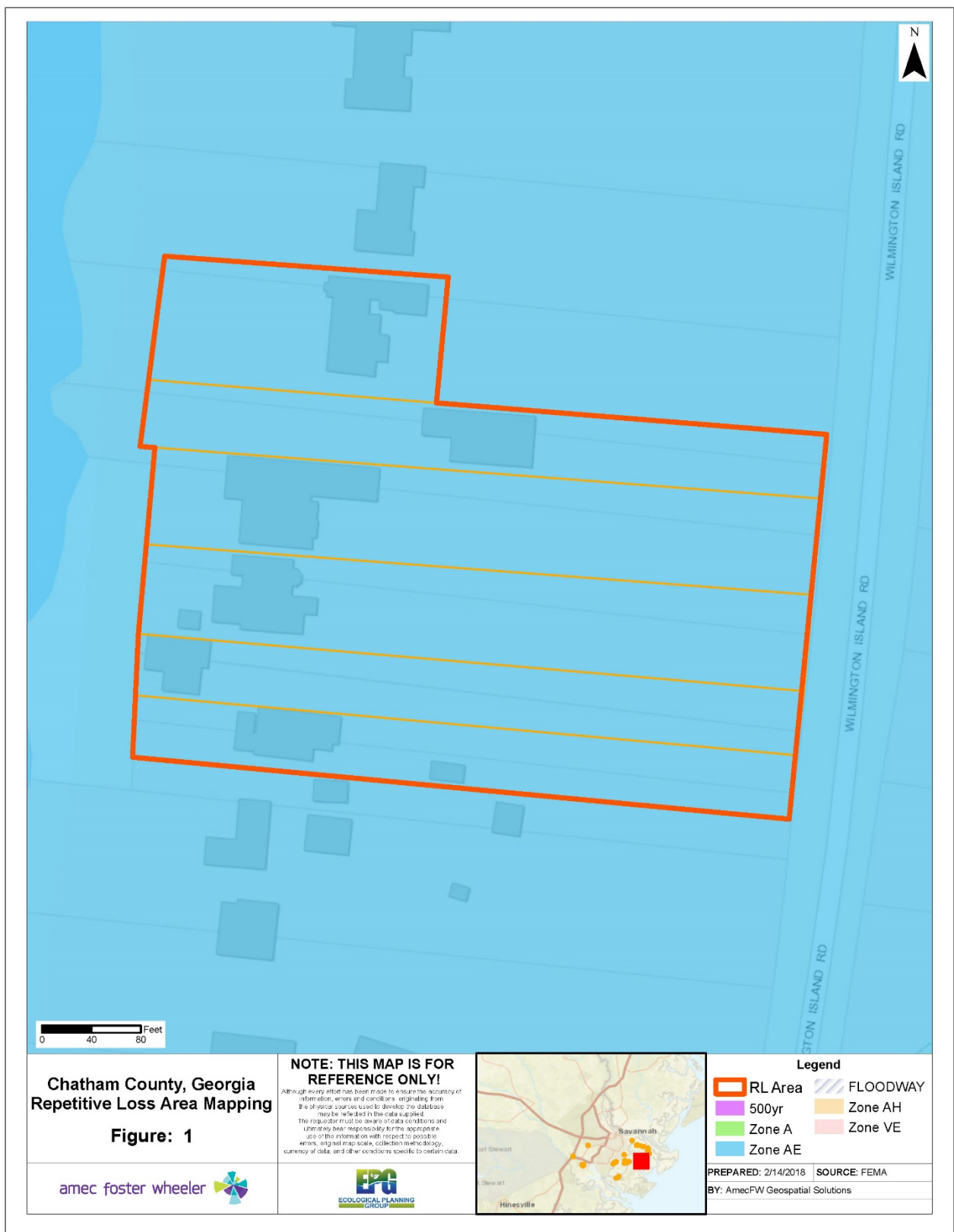


Figure 2.4 – Repetitive Loss Area 1

Example Properties in Repetitive Loss Area 1



Repetitive Loss Area 2

Repetitive Loss Area 2 is located almost entirely within the 100-yr floodplain. The area sits just west of the Wilmington River. The area is residential and contains slab on grade foundation types. HVAC systems that were visible from the street did not appear to be elevated. The neighborhood streets did have curbing and lots appear to be above the elevation of the road. One property owner said their home has flooded twice due to inadequate neighborhood drainage. The last time the home flooded was about 15 years ago. To his knowledge, no flooding has occurred at his home or any of the nearby homes since the culverts were enlarged in the canal beneath Wilmington Island Road approximately 10 to 12 years ago. One repetitive loss property did have a drainage ditch adjacent to the house, though the owner was not available to discuss whether or not the ditch was created as a mitigation measure to improve drainage.

Table 2.3 – Repetitive Loss Overview for Area 2

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
2	7	5	17	29	Ashley Rd, Montague Rd, Montford Rd, Montford Ct, S Millward Rd

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

Area 2 contains a total of 29 properties. There were no vacant lots discovered during the field survey.

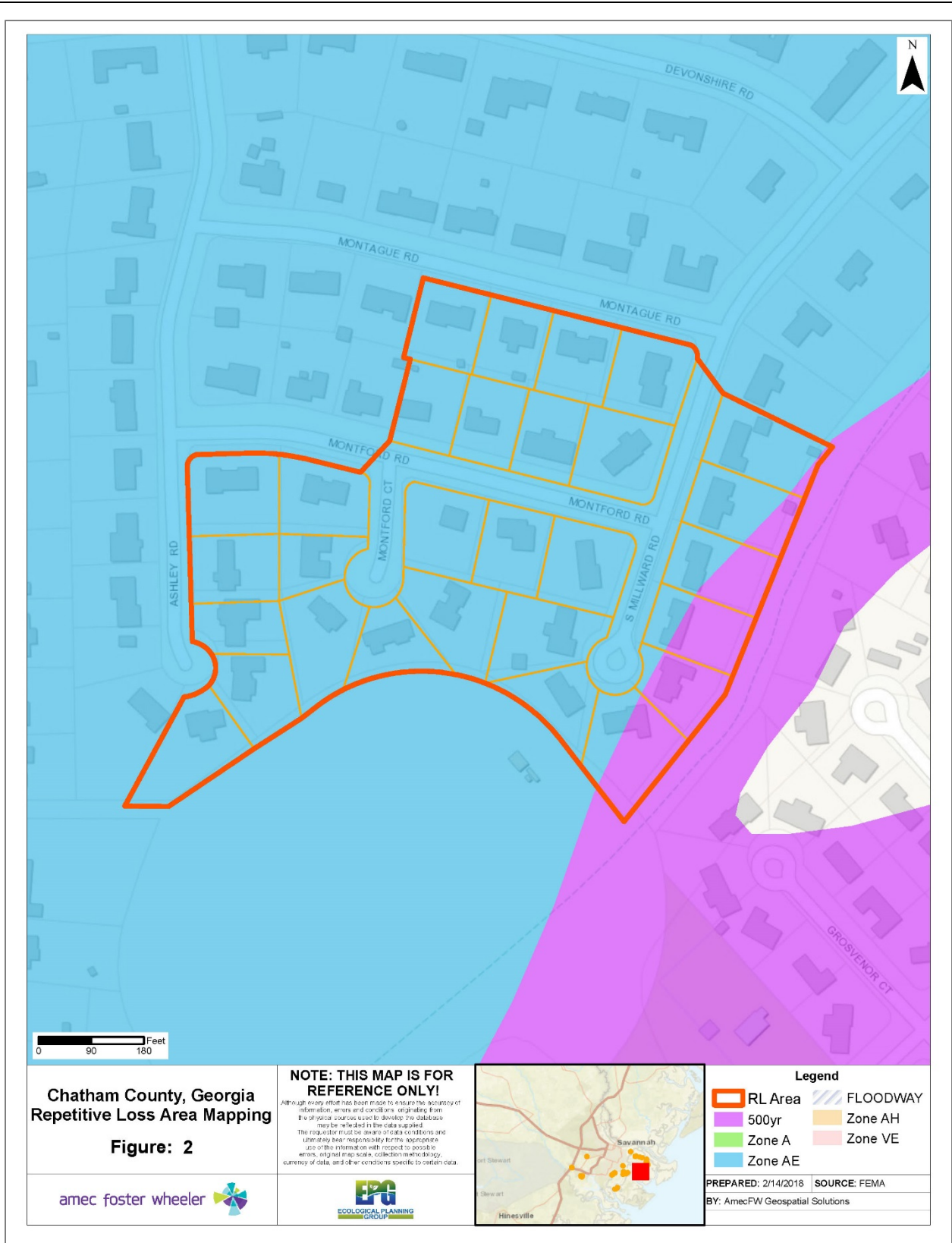


Figure 2.5 – Repetitive Loss Area 2

Example Properties in Repetitive Loss Area 2



Drainage ditch adjacent to home



HVAC at grade



HVAC at grade

Repetitive Loss Area 3

Repetitive Loss Area 3 is completely located within the 100-yr floodplain. This Repetitive Loss Area sits on along Betz Creek and marshland. The area is residential with elevated and pier foundation types. In general, HVAC systems were not visible from the street; therefore, it was not possible to determine if elevation should be considered as a mitigation measure in this particular area.

Table 2.4 – Repetitive Loss Area Overview for Area 3

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
3	1	0	2	3	Betz Creek Rd

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

Area 3 contains a total of three properties. There were no vacant lots discovered during the field survey.

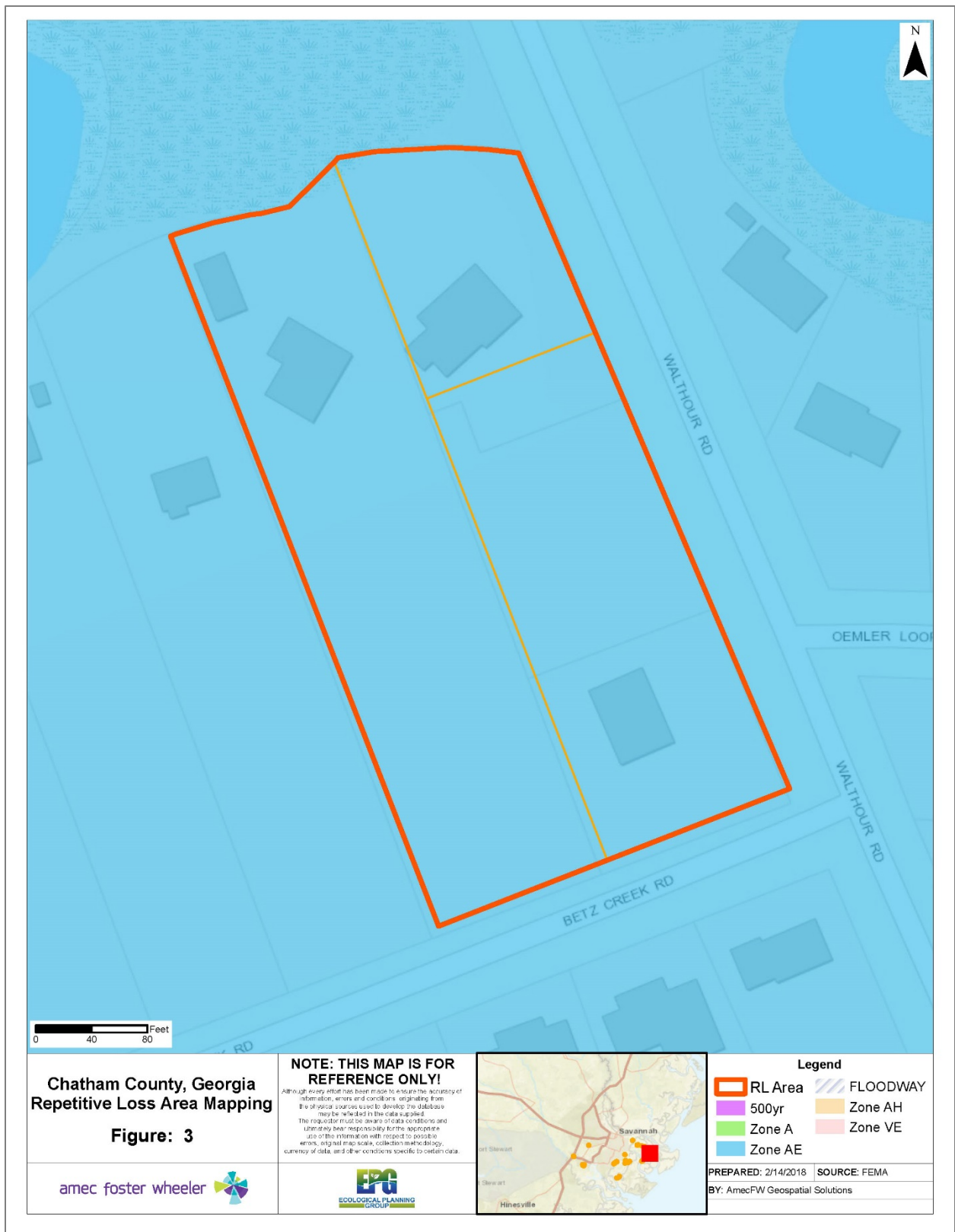


Figure 2.6 – Repetitive Loss Area 3

Example Properties in Repetitive Loss Area 3



Home elevated on piers

Repetitive Loss Area 4

Repetitive Loss Area 4 is located within the 500-yr floodplain. A tributary to Turner Creek and marsh land are nearby to the northwest. The area is residential with slab on grade foundation types. No HVAC systems were observable.

Table 2.5 – Repetitive Loss Overview for Area 4

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
4	1	0	7	8	Golden Isles Way, Treasure Loop, Tropical Way

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

Area 4 contains a total of eight properties including one vacant lot discovered during the field survey.

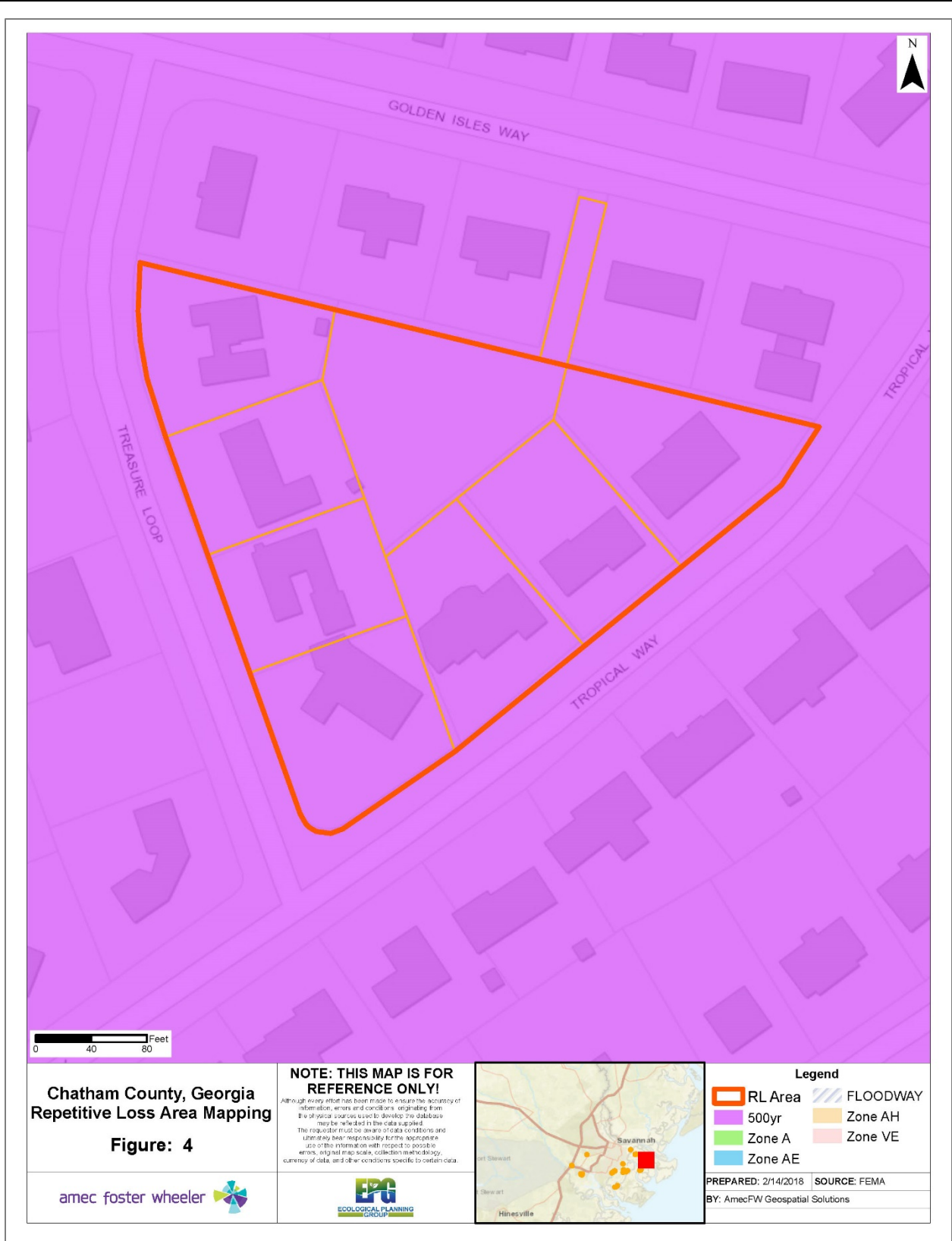


Figure 2.7 – Repetitive Loss Area 4

Example Properties in Repetitive Loss Area 4



Drainage ditch visible in yard



Drainage ditch visible in yard



Drainage ditch visible in yard

Repetitive Loss Area 5

Repetitive Loss Area 5 is located completely within the 500-yr floodplain. A tributary to Turner Creek and marsh land are nearby to the northwest and additional marshland along Bull River is nearby to the east. The area is residential with slab on grade foundation types. There is no curb and gutter along the street. Two homes had drainage inlets installed as structural mitigation measures in the front yard.

Table 2.6 – Repetitive Loss Overview for Area 5

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
5	1	0	4	5	E Sugar Tree Ct

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

Area 5 contains a total of five properties. There were no vacant lots discovered during the field survey.

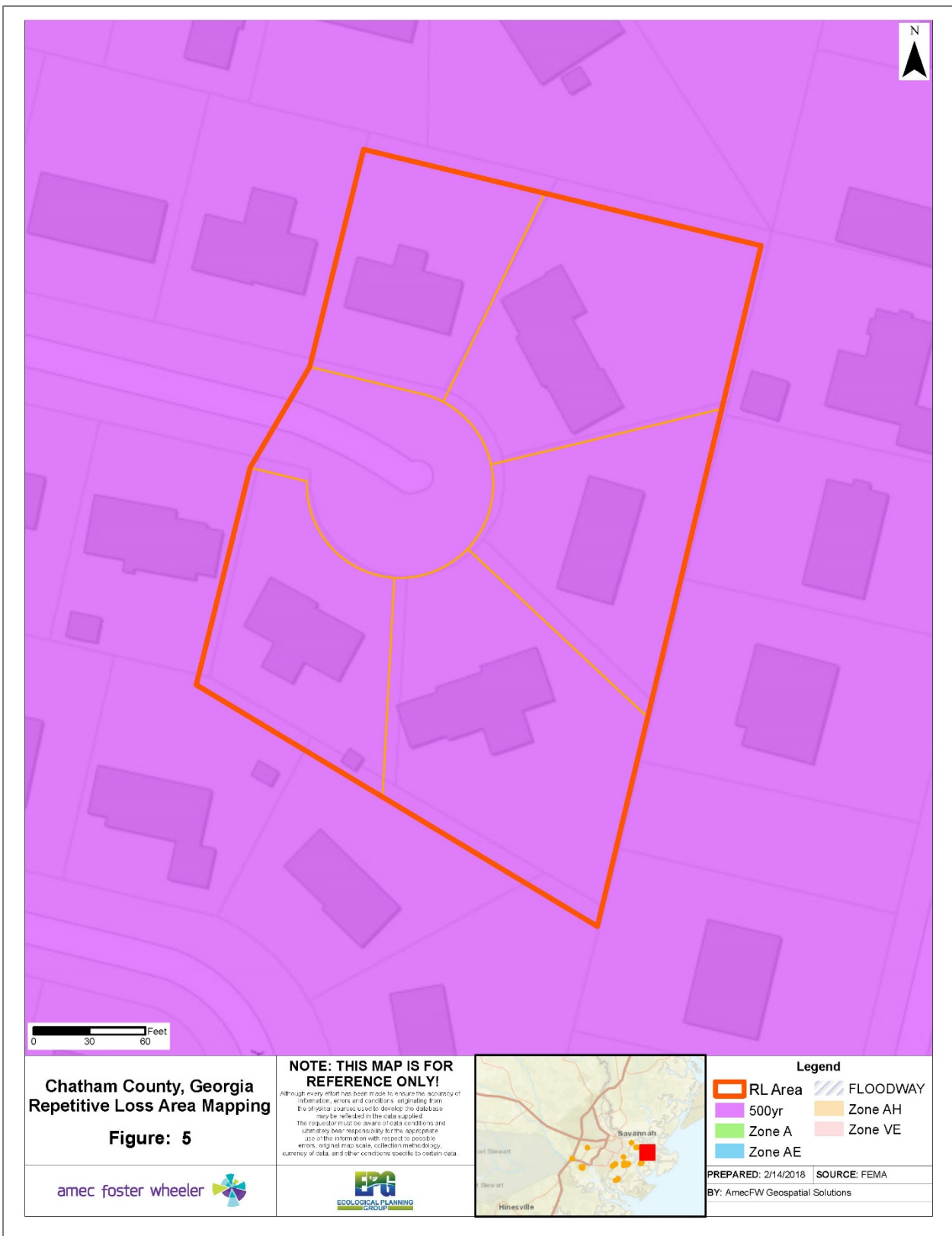


Figure 2.8 – Repetitive Loss Area 5

Example Properties in Repetitive Loss Area 5



Stormwater inlet visible in yard



Stormwater inlet visible in yard

Repetitive Loss Area 6

Repetitive Loss Area 6 is located completely within the 100-yr floodplain. The Bull River flows nearby to the east of this Repetitive Loss Area with marsh area in between. The area is residential with slab on grade foundation types. The homes did not appear to have guttering. HVAC systems were not visible from the road. One property owner indicated that she has not had any flooding issues within the past 3.5 years.

Table 2.7 – Repetitive Loss Overview for Area 6

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
6	1	0	2	3	E Point Dr

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

Area 6 contains a total of three properties. There were no vacant lots discovered during the field survey.

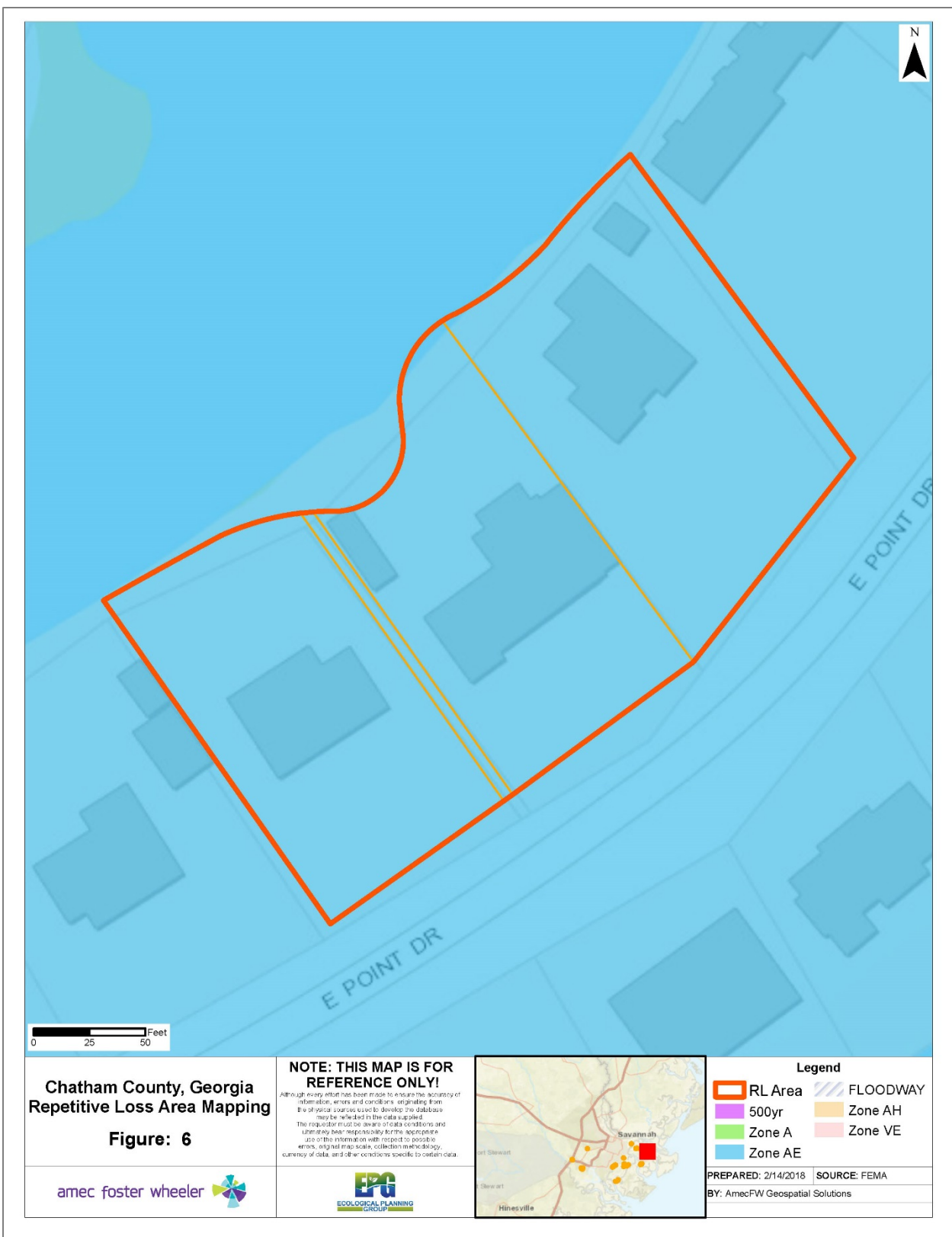


Figure 2.9 – Repetitive Loss Area 6

Example Properties in Repetitive Loss Area 6



Repetitive Loss Area 7

Repetitive Loss Area 7 is located completely within the 100-yr floodplain. Richardson Creek flows directly behind this Repetitive Loss Area with marshland in between. The area is residential with elevated foundation types and what appears to be fully enclosed, livable space underneath. HVAC systems were not elevated. One owner reported that minor flood damage during Hurricane Irma resulted in approximately 4 inches of water in the sun porch and one foot of water in the garage. This is reportedly the only flood damage at their home within 36 years. Another home had a wooden dock that appeared to have flood damage. There was also a grated yard inlet in the back yard. The home was currently unoccupied and interior repairs or renovations were under way. A neighbor said that the home has had numerous flood damage incidents.

Table 2.8 – Repetitive Loss Overview for Area 7

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
7	1	0	2	3	

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

Area 7 contains a total of three properties. There were no vacant lots discovered during the field survey.

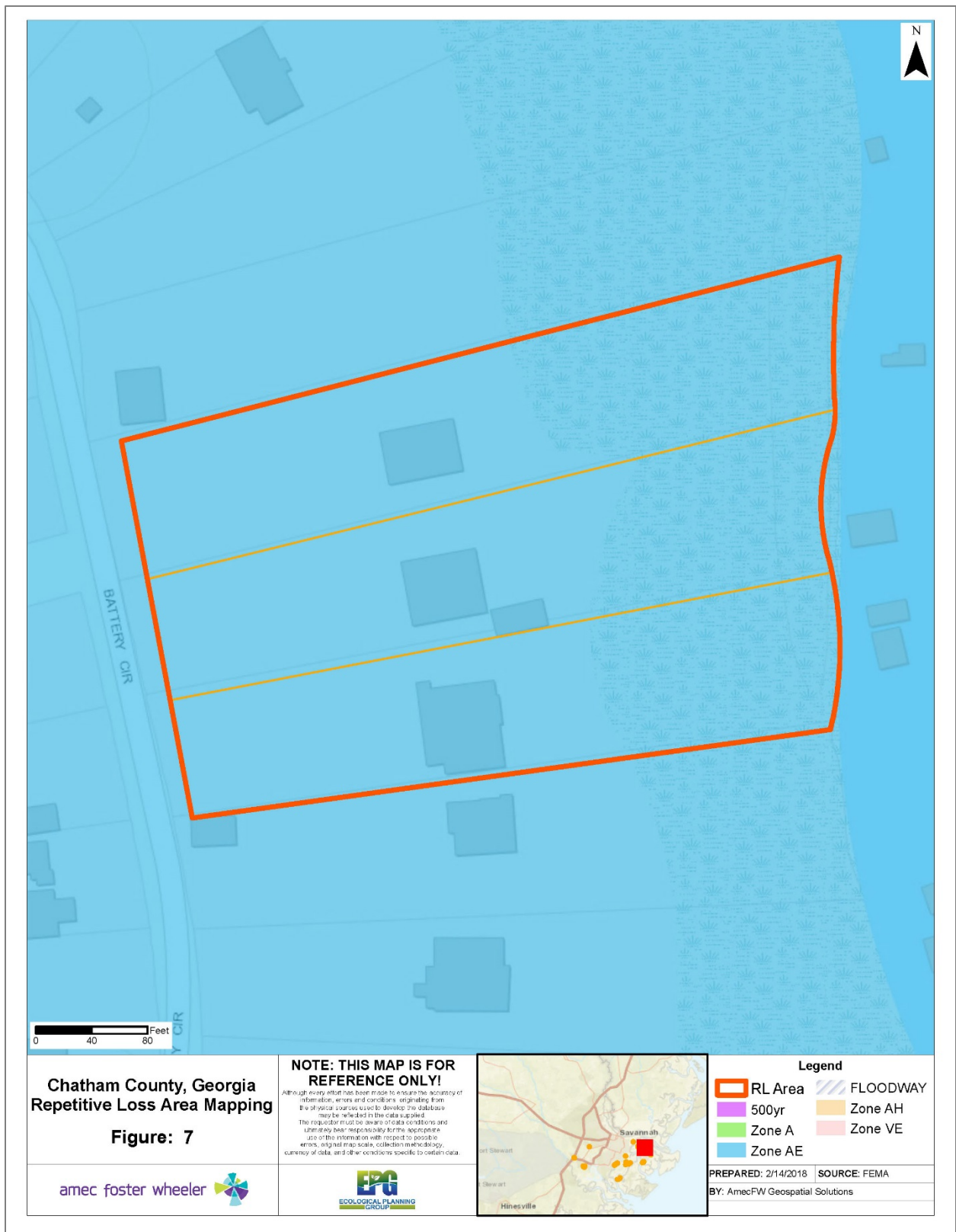
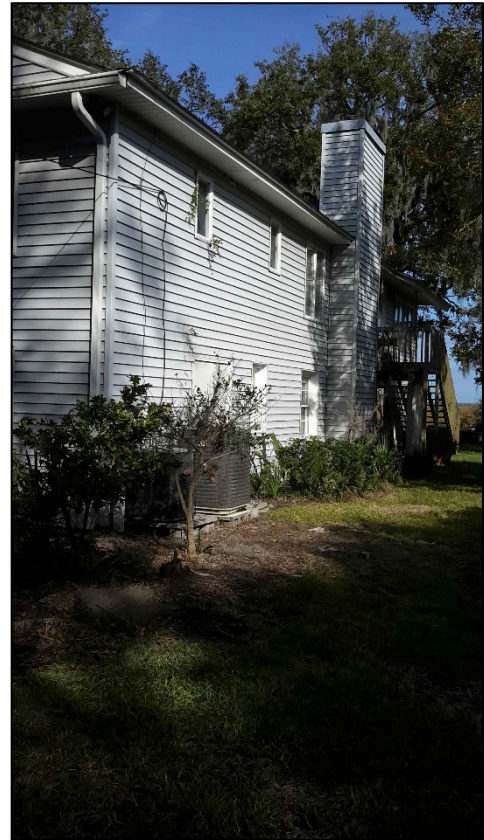


Figure 2.10 – Repetitive Loss Area 7

Example Properties in Repetitive Loss Area 7



Flood damaged deck and dock



Home with multiple reported incidents of flood damage does not have elevated HVAC



Repetitive Loss Area 8

Repetitive Loss Area 8 is located completely within the 100-yr floodplain. Richardson Creek flows directly north and east of this Repetitive Loss Area with marshland in between. The area is residential with a mix of crawlspace and slab on grade foundation types. Several homes did not have guttering. Three homes had visible drainage features in the yard.

Table 2.9 – Repetitive Loss Overview for Area 8

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
8	1	0	8	9	Riverside Dr, Penrose Dr

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

Area 8 contains a total of 9 properties. There were no vacant lots discovered during the field survey.

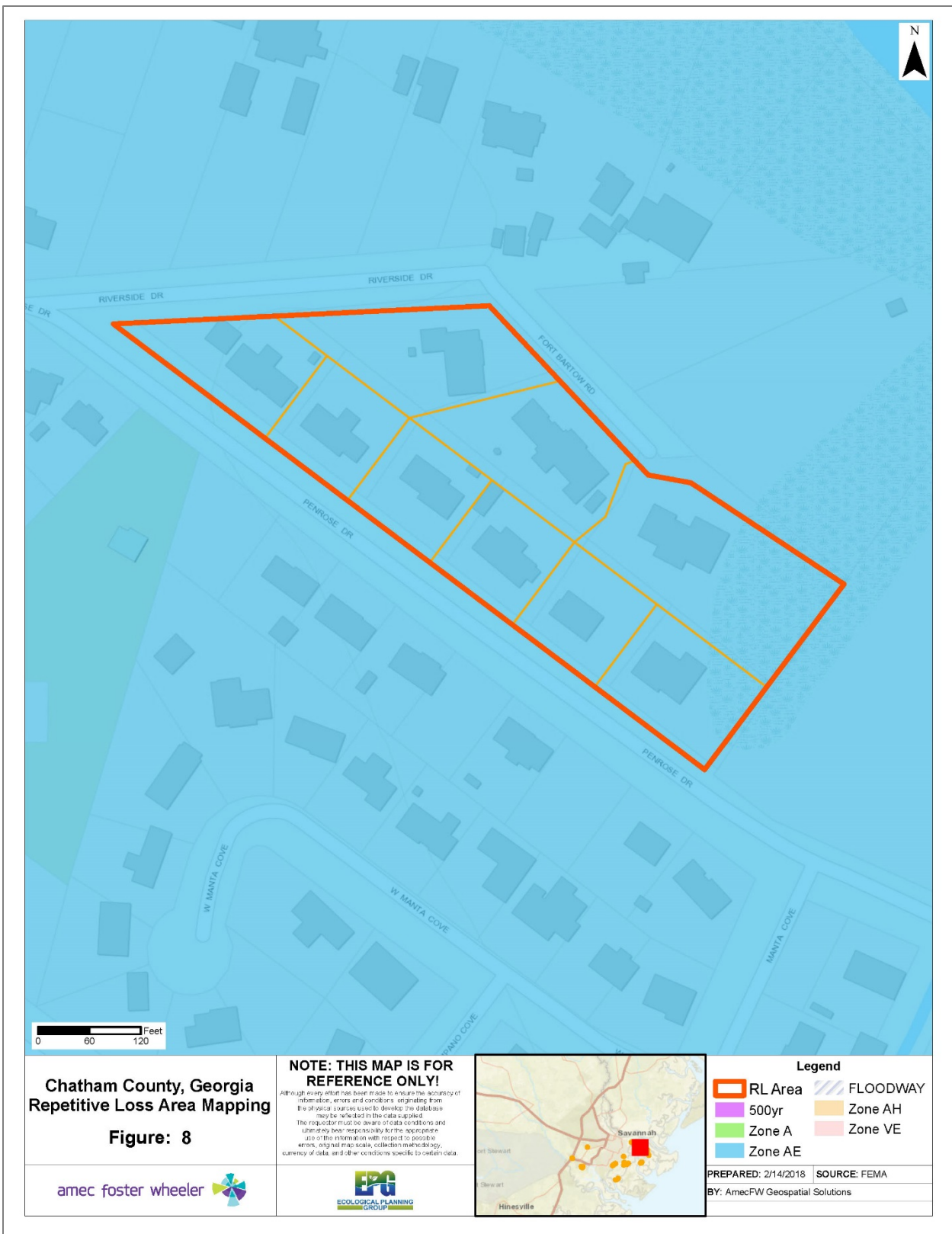


Figure 2.11 – Repetitive Loss Area 8

Example Properties in Repetitive Loss Area 8



*Drainage ditch behind home with flume
from curb and gutter*



Drainage feature in yard



Drainage feature in yard

Repetitive Loss Area 9

Repetitive Loss Area 9 is located completely within the 100-yr floodplain. Richardson Creek flows north and east of this Repetitive Loss Area. The area is residential with a mix of crawlspace and slab on grade foundation types. Several homes did not have guttering and HVAC systems were not elevated. Many homes had a drainage ditch running through the property.

Table 2.10 – Repetitive Loss Overview for Area 9

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
9	2	0	14	16	Cheryl St, Debbie St, Lora St, Jean Vermillion Blvd

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

Area 9 contains a total of 16 properties. There was one vacant lot identified during the field survey.

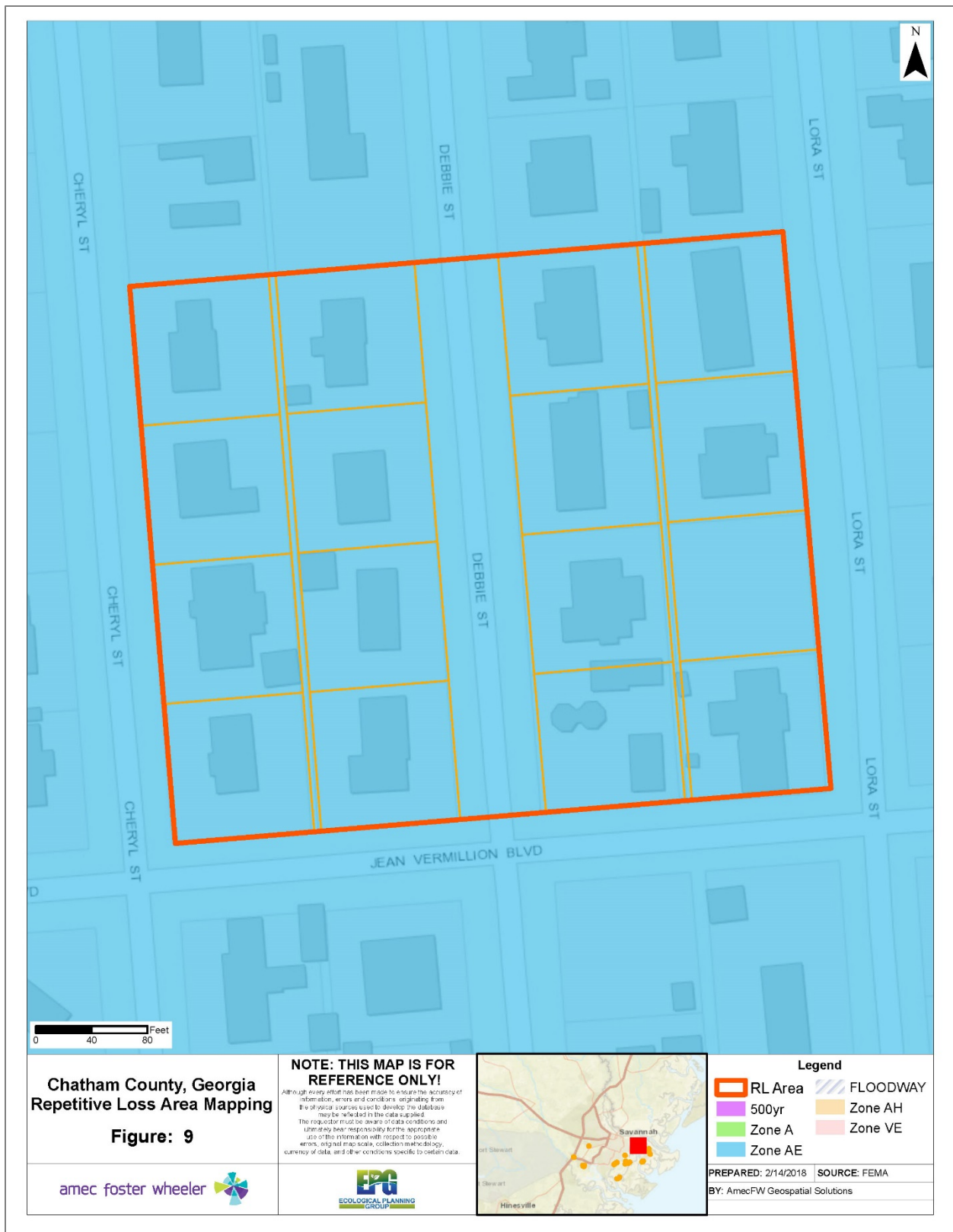


Figure 2.12 – Repetitive Loss Area 9

Example Properties in Repetitive Loss Area 9



Drainage feature in yard



Drainage feature in yard



Drainage feature in yard



Drainage feature in yard

Repetitive Loss Area 10

Repetitive Loss Area 10 is located completely within the 100-yr floodplain. Richardson Creek flows north and east of this Repetitive Loss Area. The area is residential with a mix of crawlspace and slab on grade foundation types. Several homes did not have guttering and HVAC systems were not elevated. One property owner indicated that one rear room and a secondary structure in back had moisture damage during Hurricane Matthew. They elevated the secondary structure on concrete block afterwards as a mitigation measure.

Table 2.11 – Repetitive Loss Overview for Area 10

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
10	1	0	2	3	Wilma St, Perry Cv

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

Area 10 contains a total of three properties. There were no vacant lots discovered during the field survey.

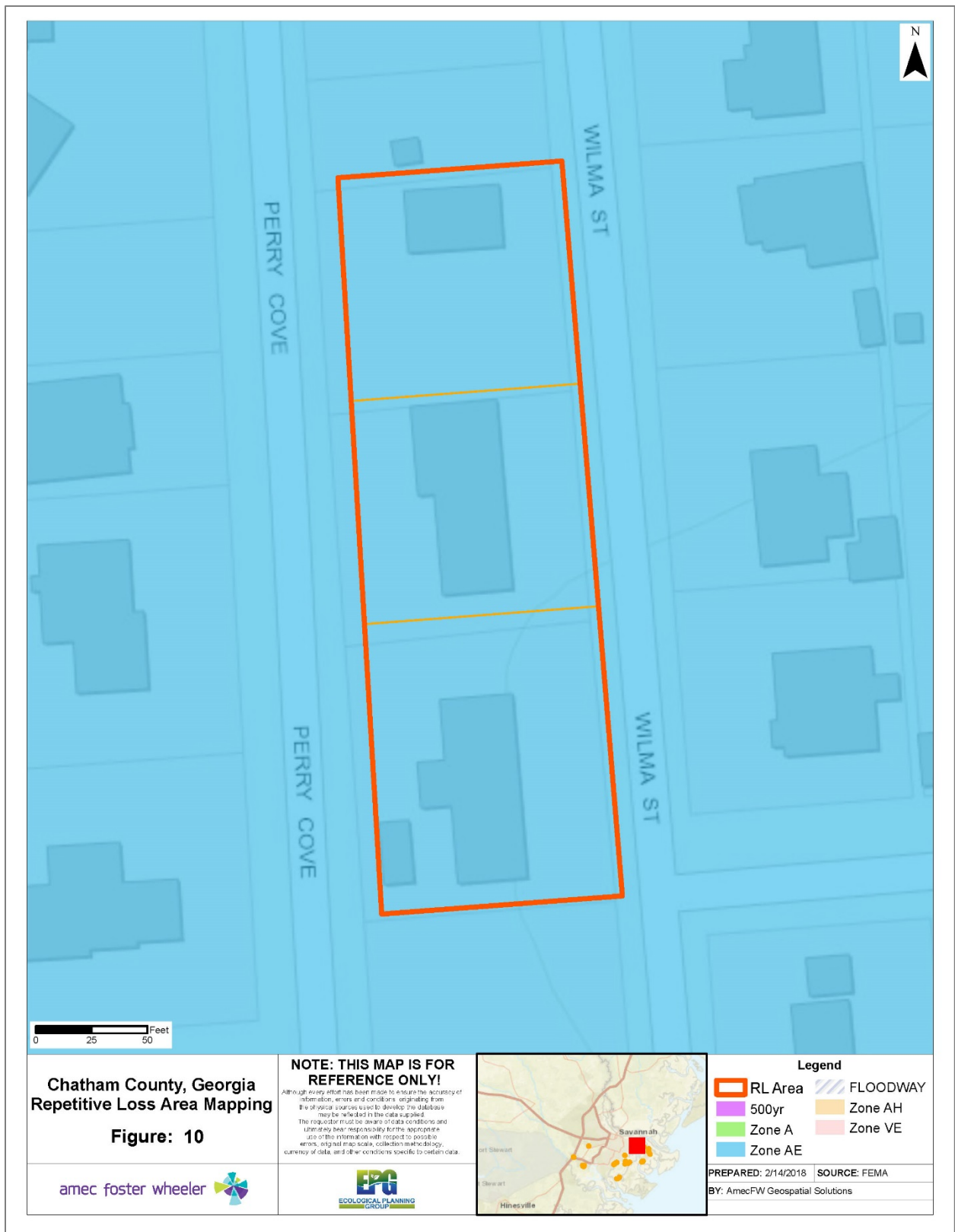


Figure 2.13 – Repetitive Loss Area 10

Example Properties in Repetitive Loss Area 10



Elevated secondary structure



Drainage feature in yard

Repetitive Loss Area 11

Repetitive Loss Area 11 is located almost completely within the 100-yr floodplain. The Wilmington River flows directly east of this Repetitive Loss Area, and a tributary to the Wilmington River runs directly behind the area. The area is residential with slab on grade foundation types. Several homes did not have guttering and visible HVAC systems were not elevated.

Table 2.12 – Repetitive Loss Overview for Area 11

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
11	1	0	3	4	Woodhull Rd, Woodhull Cir

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

Area 11 contains a total of four properties. There were no vacant lots discovered during the field survey.

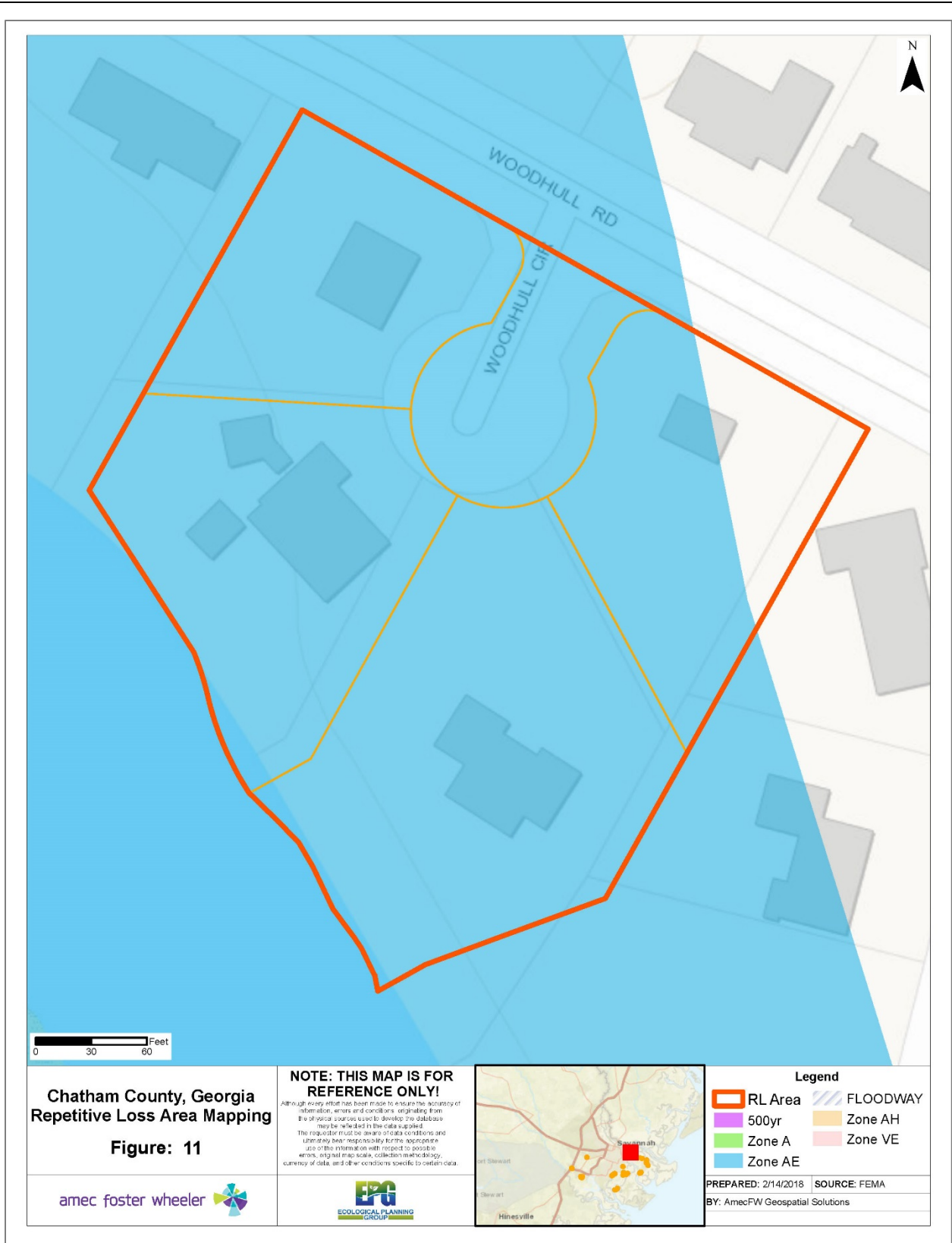


Figure 2.14 – Repetitive Loss Area 11

Example Properties in Repetitive Loss Area 11



HVAC system not elevated



Repetitive Loss Area 13

Repetitive Loss Area 13 is located completely within the 100-yr floodplain. An unnamed channel flows directly south of this Repetitive Loss Area. The area is residential with a mix of crawlspace and slab on grade foundation types. One property owner indicated that the home as had flooding during the last two hurricanes as well as sometime in the past before current owner lived here. Some repairs are currently under way from flooding from last hurricane.

Table 2.13 – Repetitive Loss Overview for Area 13

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
13	2	0	3	5	Easy St

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

Area 13 contains a total of five properties. One vacant lot was discovered during the field survey.

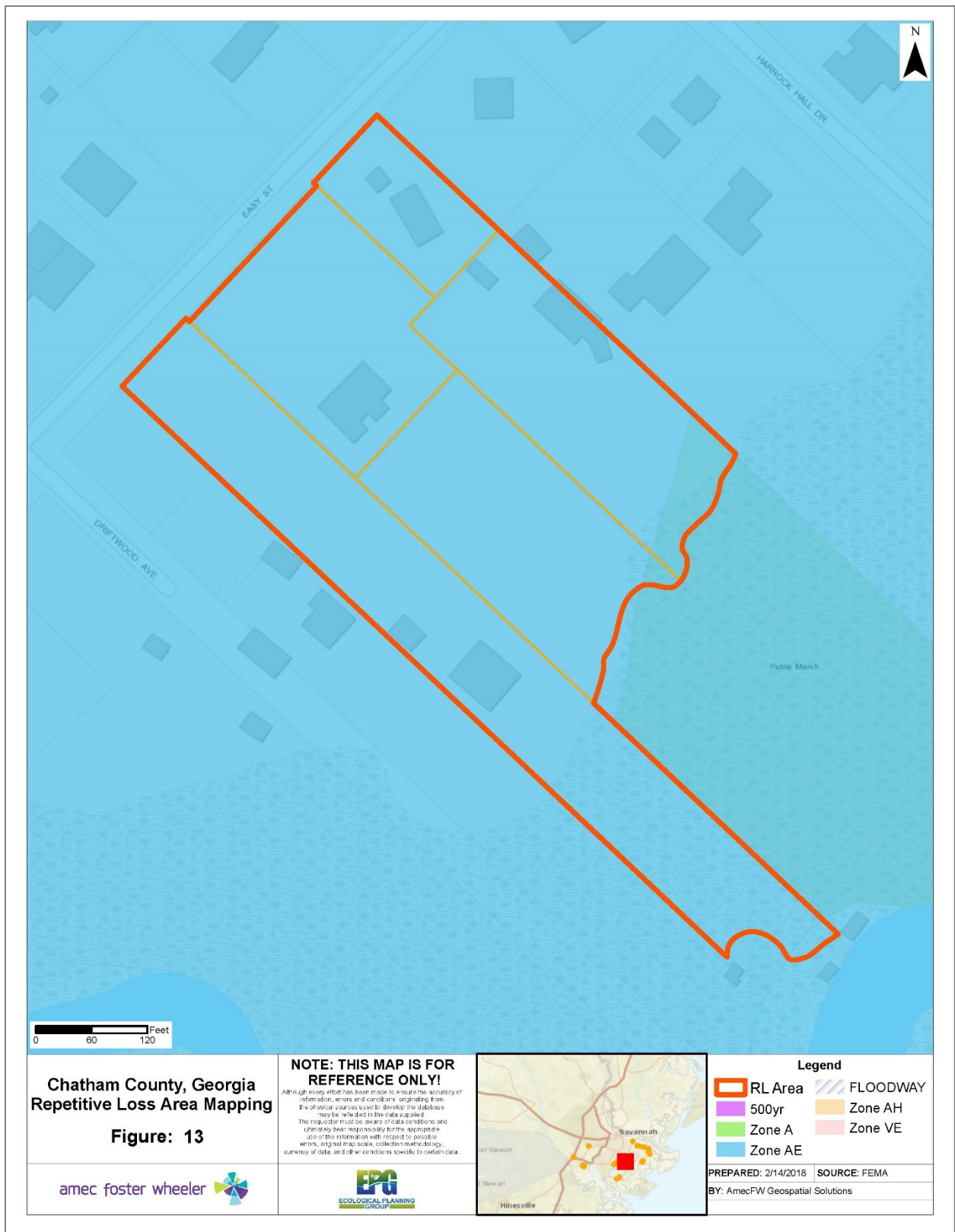


Figure 2.15 – Repetitive Loss Area 13

Example Properties in Repetitive Loss Area 13



Repetitive Loss Area 14

Repetitive Loss Area 14 is located completely within the 100-yr floodplain. The Intracoastal Waterway flows directly south of this Repetitive Loss Area. The area is residential with a mix of crawlspace and slab on grade foundation types. HVAC systems are not elevated.

Table 2.14 – Repetitive Loss Overview for Area 14

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
14	1	0	4	5	Gale Break Cir

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

Area 14 contains a total of five properties. No vacant lots were discovered during the field survey.

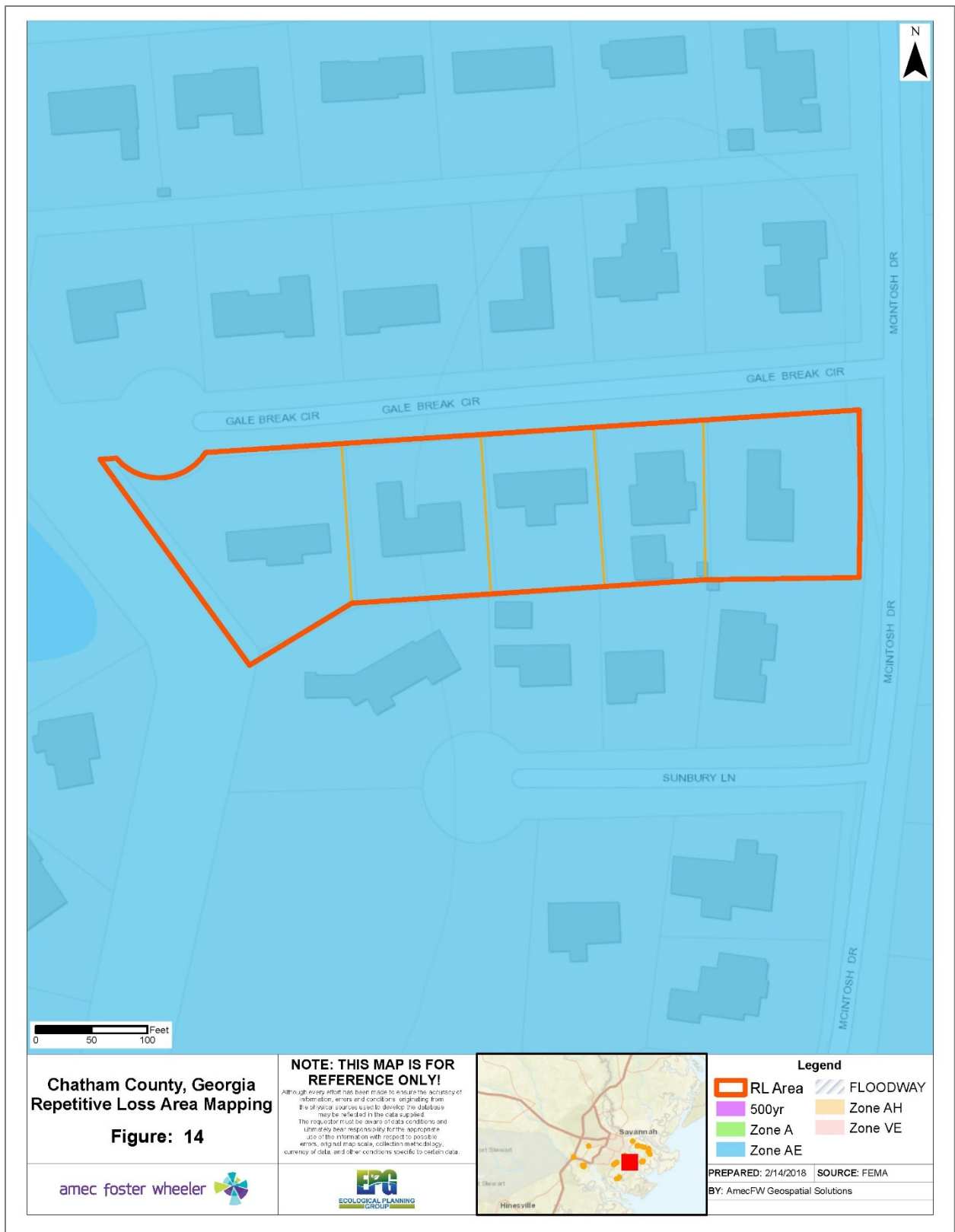


Figure 2.16 – Repetitive Loss Area 14

Example Properties in Repetitive Loss Area 14



Repetitive Loss Area 15

Repetitive Loss Area 15 is located completely within the 100-yr floodplain. The Skidaway River flows directly south of this Repetitive Loss Area. The area is residential with a mix of crawlspace and piling with enclosure foundation types. One property owner has owned home for three years with no flood issues, but is aware of past flood issues approximately 20 years ago. This owner has recently renovated home including improving property's drainage by installing yard inlets. The neighbor says past flood damage here was due to poor drainage on property. Another owner has lived in their home since 1944 with no flood damage ever occurring.

Table 2.15 – Repetitive Loss Overview for Area 15

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
15	1	1	1	3	Bluff Dr, Laroche Ave

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

Area 15 contains a total of three properties. No vacant lots were discovered during the field survey.

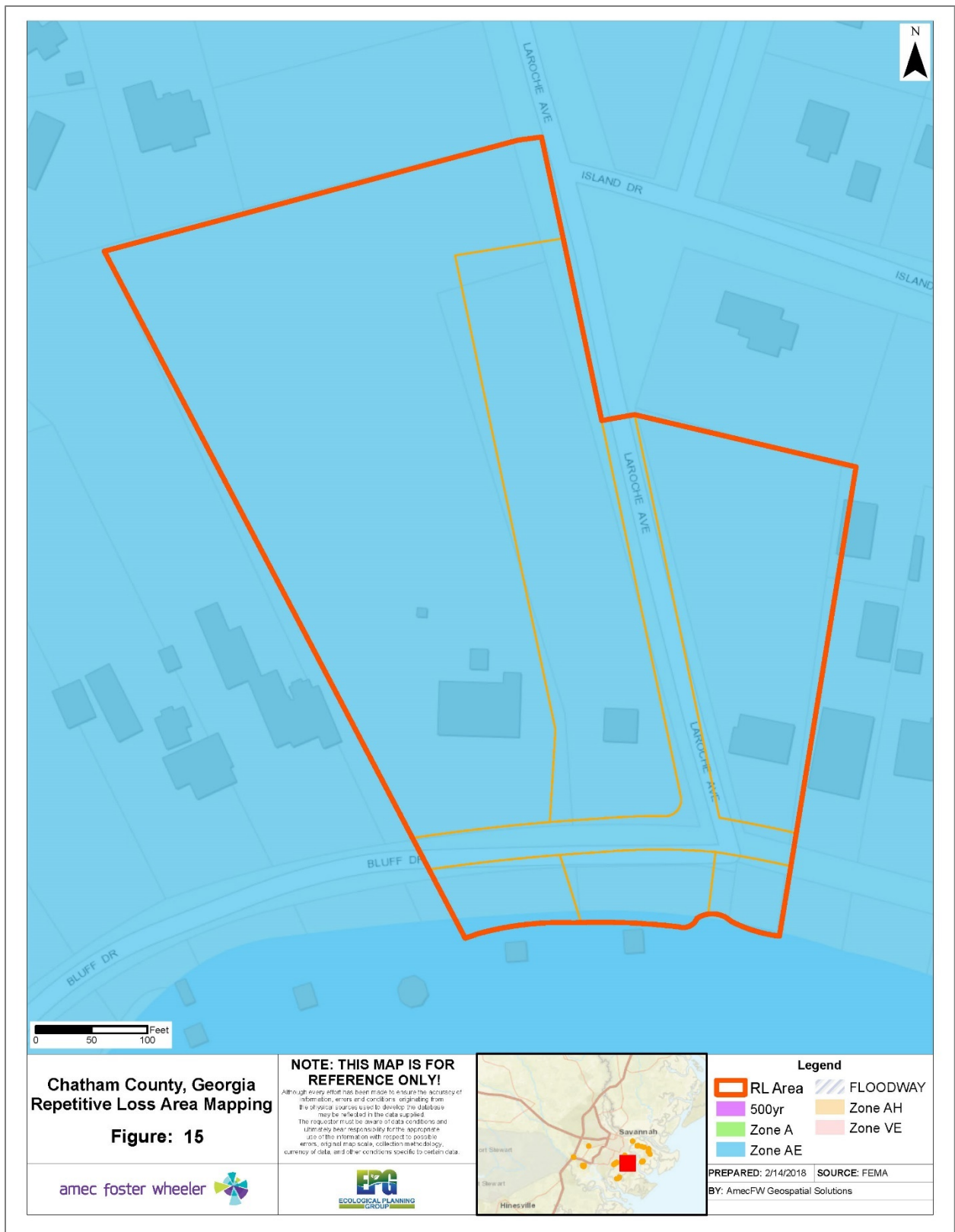


Figure 2.17 – Repetitive Loss Area 15

Example Properties in Repetitive Loss Area 15



Repetitive Loss Area 16

Repetitive Loss Area 16 is located completely within the 100-yr floodplain. The Skidaway River flows east and south of this Repetitive Loss Area, and the Herb River flows north and west. The area is single-family residential with slab on grade foundation types. None of the homes have guttering.

Table 2.16 – Repetitive Loss Overview for Area 16

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
16	1	0	4	5	Lynes Ct

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

Area 16 contains a total of 5 properties. There are no vacant lots in this subarea.

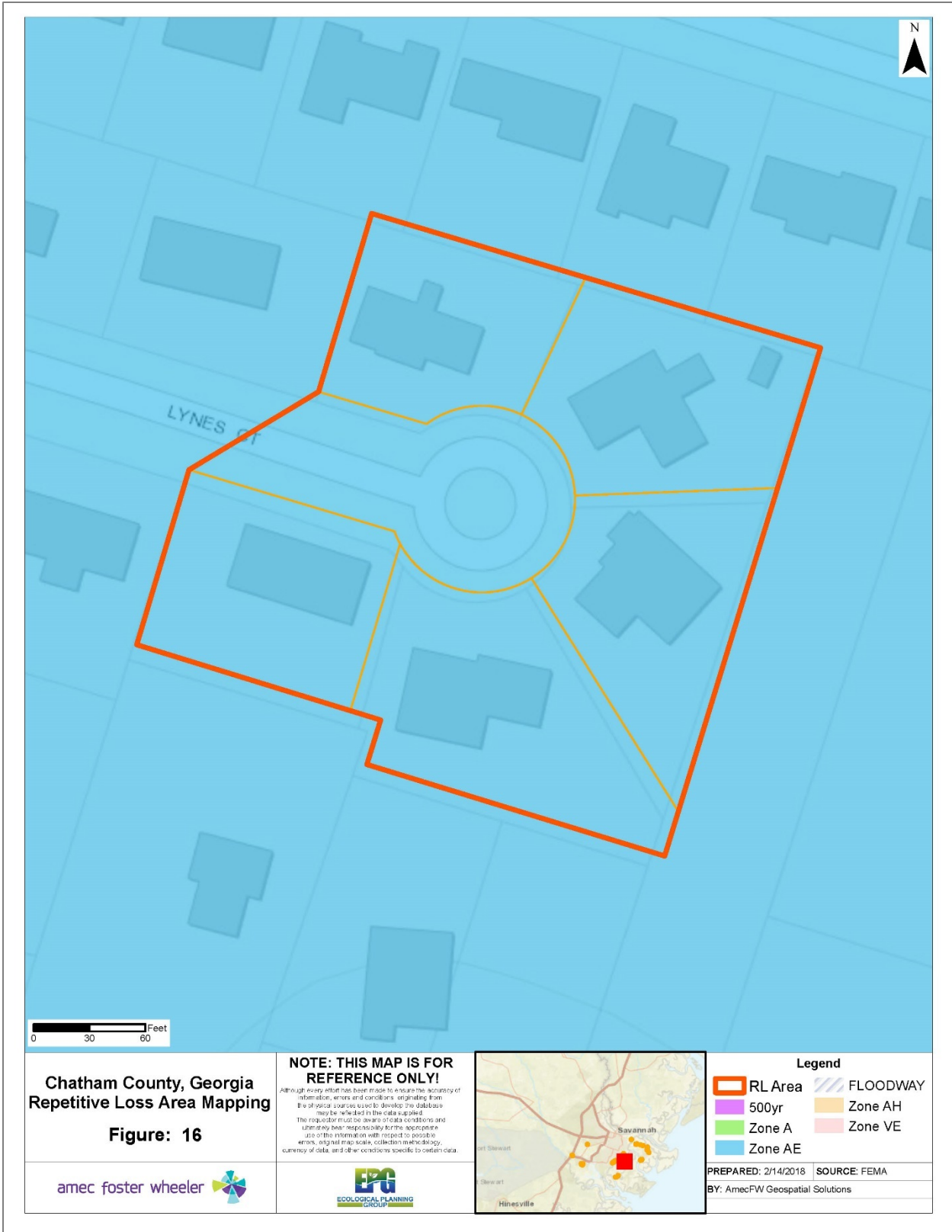


Figure 2.18 – Repetitive Loss Area 16

Example Properties in Repetitive Loss Area 16



Repetitive Loss Area 17

Repetitive Loss Area 17 is located completely within the 100-yr floodplain. The Skidaway River flows directly east of this Repetitive Loss Area, and marshlands sit to the west of this area along the Herb River. The area is residential with slab on grade foundations. Several homes did not have guttering. One property owner indicated that their property is up a hill and has never had flooding problems. However, he noted that a drainage ditch behind his home is overgrown and has never been maintained, which prevents proper drainage.

Table 2.17 – Repetitive Loss Overview for Area 17

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
17	1	0	3	4	S Paxton Dr, Bransby Dr,

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

Area 17 contains a total of 4 properties. There are no vacant lots in this subarea.

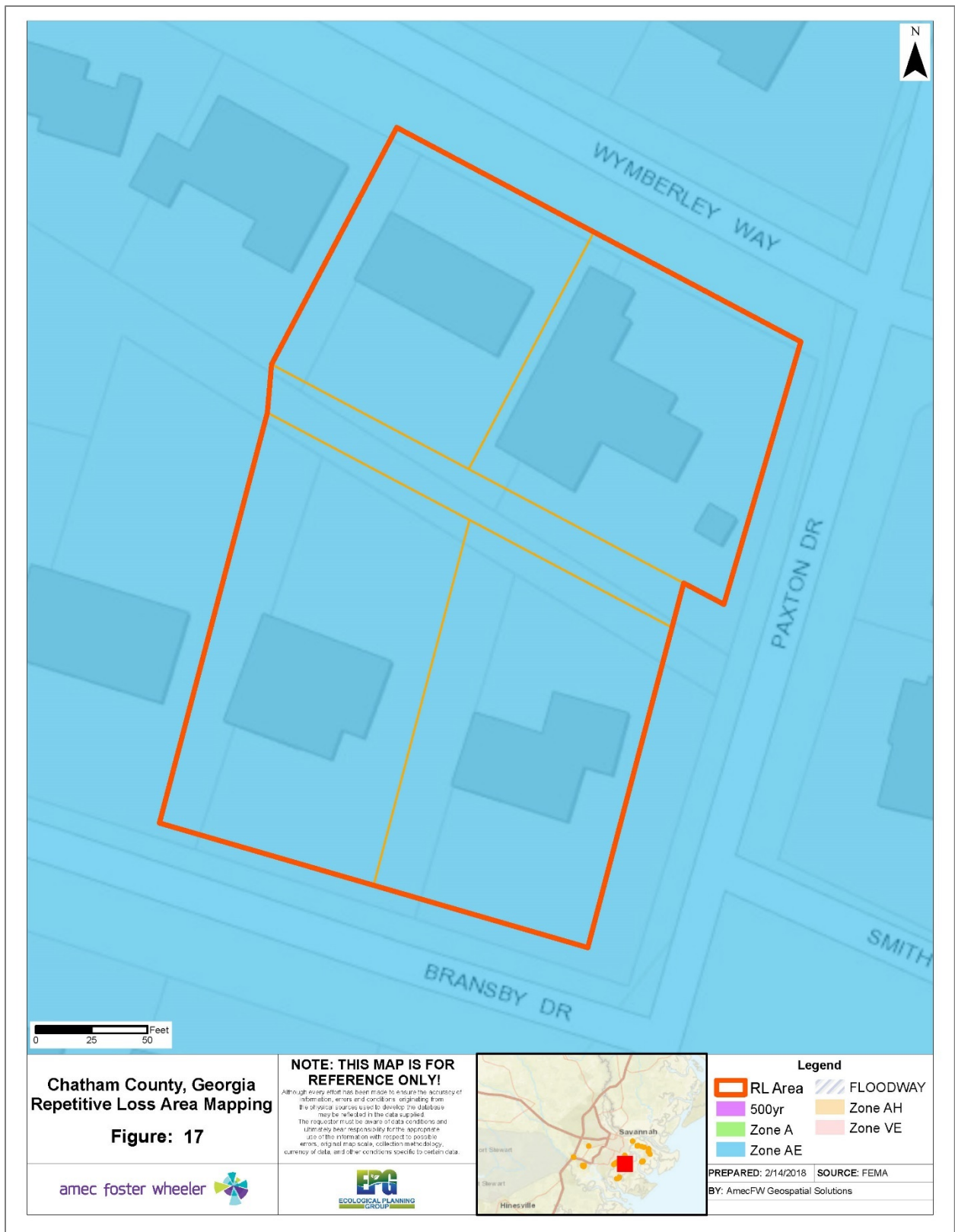


Figure 2.19 – Repetitive Loss Area 17

Example Properties in Repetitive Loss Area 17



Drainage ditch along S. Paxton Drive

Repetitive Loss Area 22

Repetitive Loss Area 22 is located completely within the 100-yr and 500-yr floodplain. Shipyard Creek flows directly northwest of this Repetitive Loss Area. The area is residential with a mix of crawlspace and slab on grade foundation types. Several homes did not have guttering. One property owner had renovated their carport due to minor flood damages sustained from Hurricane Irma. Another property was undergoing renovation due to wind damage from Irma but had not experienced any flooding. Another property owner reported nearly three feet of flooding resulting from Hurricane Irma but noted that their property sits at a low point in the neighborhood.

Table 2.18 – Repetitive Loss Overview for Area 22

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
22	1	0	6	7	Moon River Ct, Moon River Dr.

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

Area 22 contains a total of 7 properties. There are no vacant lots in this subarea.

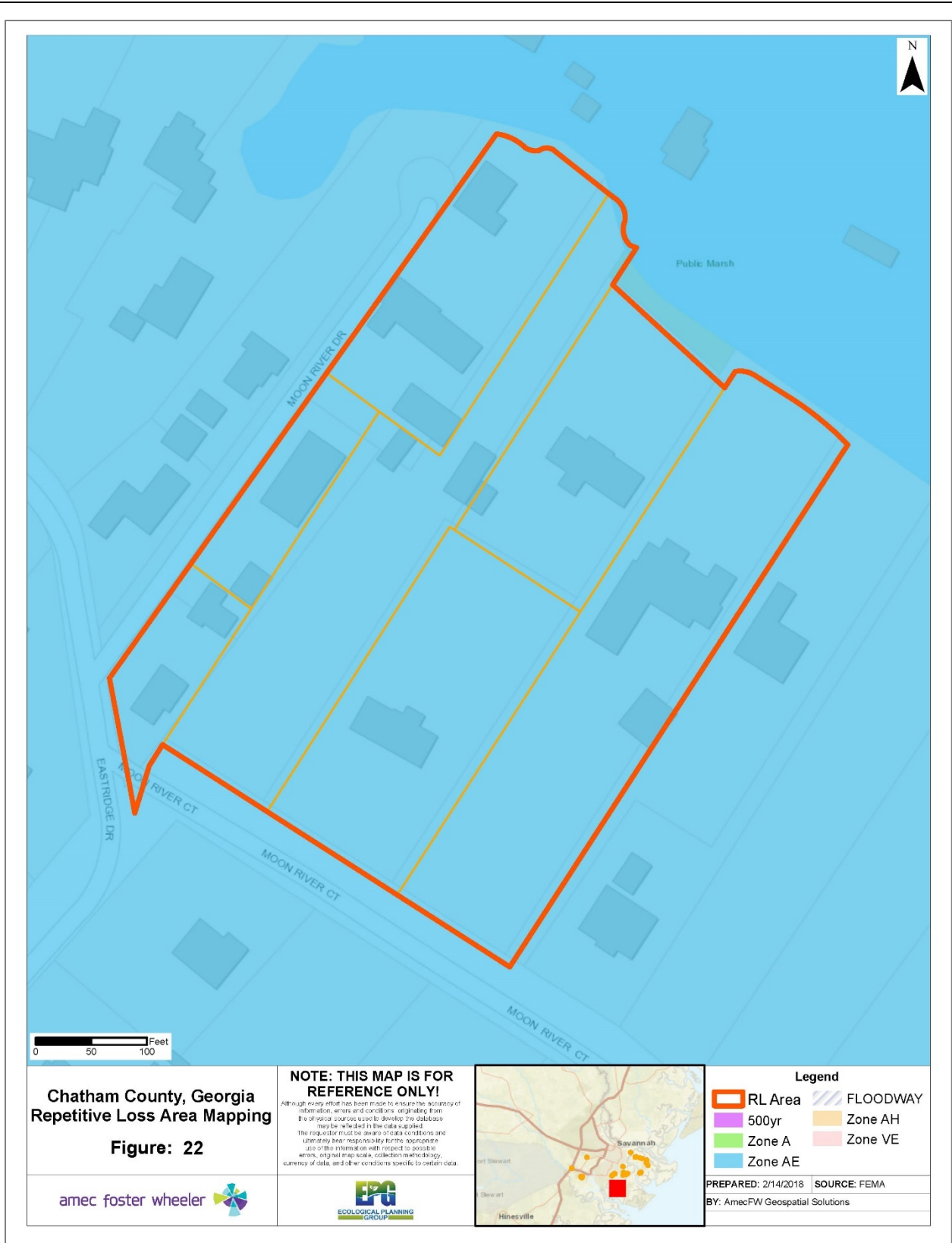


Figure 2.20 – Repetitive Loss Area 22

Example Properties in Repetitive Loss Area 22



HVAC unit not elevated

Repetitive Loss Area 23

Repetitive Loss Area 23 is located completely within the 100-yr floodplain. The Moon River flows directly south of this Repetitive Loss Area with marshland and a tributary to the Moon River to the west. The area is residential with slab on grade foundations. One HVAC unit was observed to be at grade. One property owner stated they had no history of flood damage.

Table 2.19 – Repetitive Loss Overview for Area 23

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
23	1	0	2	3	Center Dr

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

Area 23 contains a total of 3 properties. There are no vacant lots in this subarea.

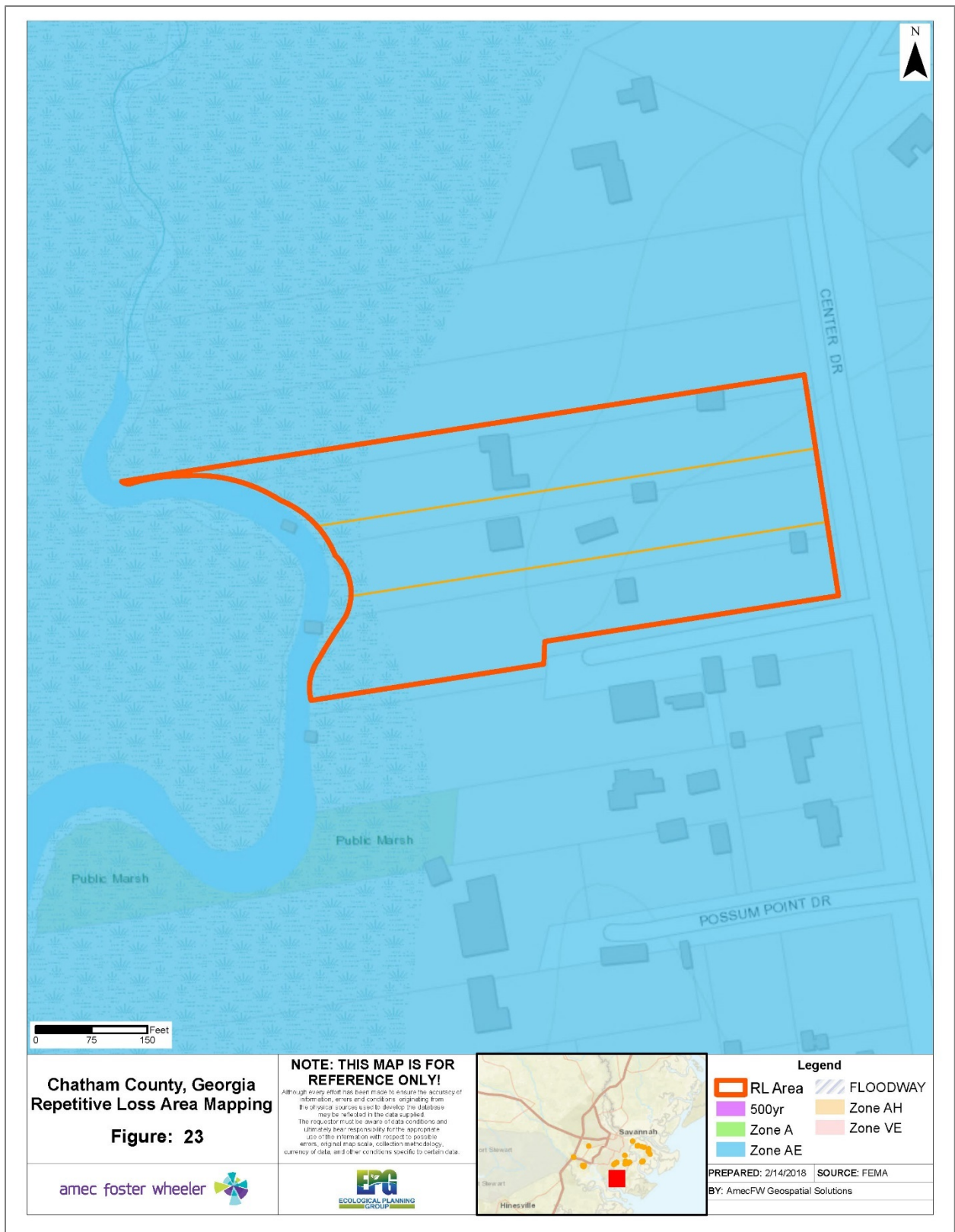


Figure 2.21 – Repetitive Loss Area 23

Example Properties in Repetitive Loss Area 23



Repetitive Loss Area 24

Repetitive Loss Area 24 is located completely outside the 100-yr and 500-yr floodplain in the unshaded Zone X. A retention pond sits directly east of this Repetitive Loss Area. The area is residential with slab on grade foundations and a mix of masonry and wood frame construction. Several homes did not have guttering.

Table 2.20 – Repetitive Loss Overview for Area 24

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
24	1	1	4	6	E Sagebrush Ln

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

Area 24 contains a total of 6 properties. There are no vacant lots in this subarea.

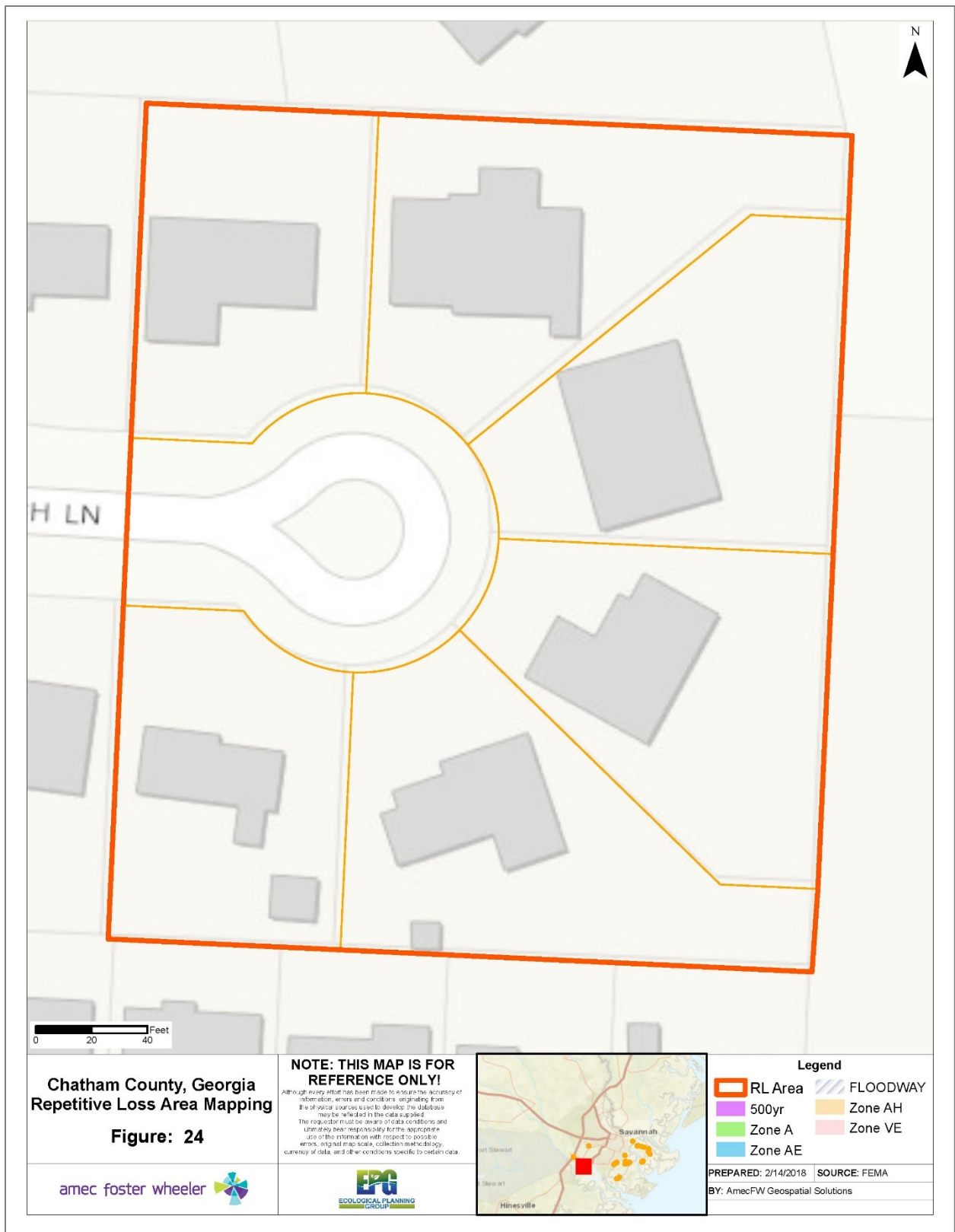


Figure 2.22 – Repetitive Loss Area 24

Example Properties in Repetitive Loss Area 24



Repetitive Loss Area 25

Repetitive Loss Area 25 is located completely outside the 100-yr and 500-yr floodplain in the unshaded Zone X. The area is residential with slab on grade foundations and wood frame construction.

Table 2.21 – Repetitive Loss Overview for Area 25

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
25	1	0	2	3	Dovetail Xing

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

Area 25 contains a total of 3 properties. There are no vacant lots in this subarea.



Figure 2.23 – Repetitive Loss Area 25

Example Properties in Repetitive Loss Area 25



Repetitive Loss Area 26

Repetitive Loss Area 26 is located completely outside the 100-yr and 500-yr floodplain in the unshaded Zone X. The area is residential with slab on grade foundations and wood frame construction. Several homes did not have guttering. One property owner recently moved to the area and is unaware of any flood history or flooding issues.

Table 2.22 – Repetitive Loss Overview for Area 26

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
26	1	0	5	6	Red Fox Dr, Goldfinch Ct,

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

Area 26 contains a total of 6 properties. There are no vacant lots in this subarea.

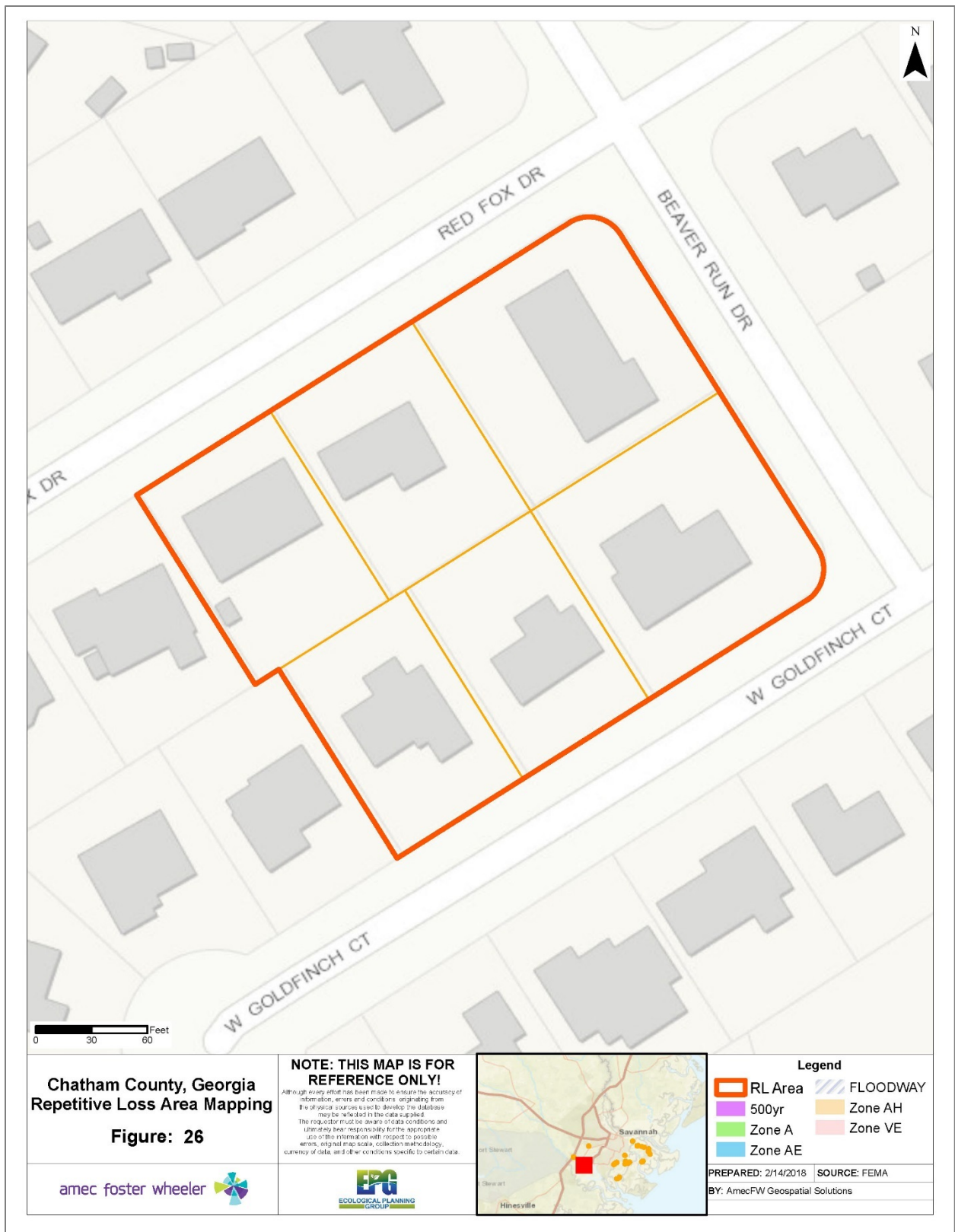


Figure 2.24 – Repetitive Loss Area 26

Example Properties in Repetitive Loss Area 26



Repetitive Loss Area 27

Repetitive Loss Area 27 is located completely outside the 100-yr and 500-yr floodplain in the unshaded Zone X. The Atlantic Coast Line railroad runs directly north of this Repetitive Loss Area, separating the area from a large pond. The area is residential with slab on grade foundation types. One property owner has been in their home for a year and is not aware of any drainage or flooding issues.

Table 2.23 – Repetitive Loss Overview for Area 27

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
27	1	1	1	3	W White Hawthorne Dr

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

Area 27 contains a total of 3 properties. There are no vacant lots in this subarea.



Figure 2.25 – Repetitive Loss Area 27

Example Properties in Repetitive Loss Area 27



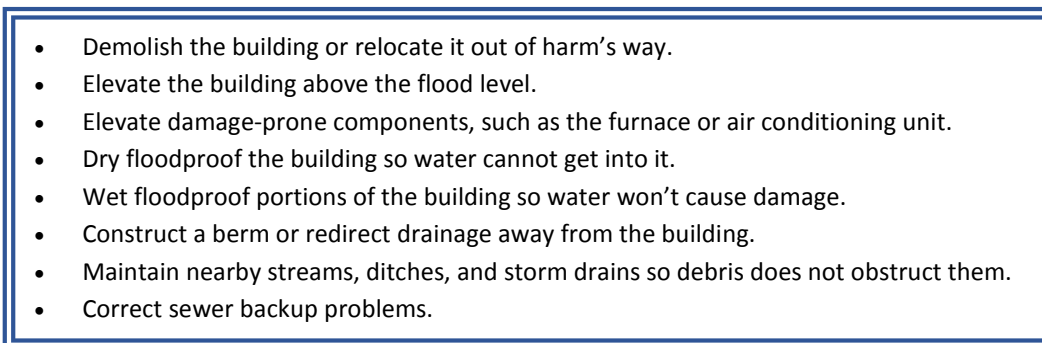
STEP 4. Review Alternative Mitigation Approaches

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

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 2.26 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 2.26 – Typical Property Protection Measures

Improving stormwater drainage and storage capacity throughout Chatham County can eliminate some building damage and road closures in these areas. Similarly, improving and protecting natural floodplain functions can help manage tidal floodwaters and reduce flood damages resulting from high tides, storm surge, and sea level rise. These structural and large-scale mitigation methods require large capital expenditures and cooperation from private property owners. Promoting floodproofing techniques and flood insurance coverage and increasing public education and awareness of the flood hazards can be the next best alternative for property owners in this area. The County’s websites, e-mail distribution lists, and press releases can help get these messages out to business owners and residents.

Mitigation Funding

There are several types of mitigation measures, listed in Table 2.24, 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 2.24 – Mitigation Grant Programs

Types of Projects Funded	HMGP	FMA	PDM	SRL	IIC	SBA
Acquisition of the entire property by a gov't agency	D	D	D	D		
Relocation of the building to a flood free site	D	D	D	D	D	D
Demolition of the structure	D	D	D	D	D	D
Elevation of the structure above flood levels	D	D	D	D	D	D
Replacing the old building with a new elevated one	D			D	D	D
Local drainage and small flood control projects	D			D		
Dry floodproofing (non-residential buildings only)		D	D	D	D	D
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 base flood elevation 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:

- Relocate internal supplies, products/goods above the flooding depth.

-
- Improve the County's floodplain and zoning ordinances.
 - Consider expanding riparian impervious surface setbacks.
 - Provide public education through posting information about local flood hazards on County websites, posting signs at various locations in neighborhoods or discussing flood protection measures at local neighborhood association meetings.
 - Promote the purchase of flood insurance.
 - Implement volume control and runoff reduction measures in the County's Stormwater Management Ordinance.

Current Mitigation Projects

Road and Drainage Capital Improvement Programs

The Chatham County Department of Engineering manages road and drainage improvements throughout the county which are funded with the 1% Special Purpose Local Option Sales Tax (SPLOST). None of the current projects directly address drainage issues in the identified repetitive loss areas; however, the nature of the SPLOST funding ensures a continued implementation mechanism for these drainage improvement projects. Therefore, specific drainage issues in the identified repetitive loss areas may be addressed in the future through this existing mitigation program.

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 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 2.25 – 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 2.26 – 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



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 2.27 – Advantages and Disadvantages of Barriers

Advantages	Disadvantages
<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 2.28 – 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 2.29 – 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 2.30 – Advantages and Disadvantages of Drainage Improvements

Advantages	Disadvantages
<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.

Table 2.31 – 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 2.32 – 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, Chatham County proposes that the following projects should be implemented for the Repetitive Loss Areas. Table 2.33 examines past and current mitigation actions in this area.

Table 2.33 – 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 County has previously eliminated 4 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	The County has undertaken capital improvement projects to improve drainage throughout the county.

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 2.34. Each of the above prioritization variables was rated on a scale of 1 to 5, with 5 indicating the greatest difficulty for implementation. The weight of each variable is indicated in the prioritization table. Those mitigation actions with the lowest overall priority scores are expected to be the easiest to implement and should therefore 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 be completed within 4 to 5 years): Score of 4.00 – 5.00

Recommendations

The County will encourage property owners to use floodproofing measures to help protect lower levels of their property. The County 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 County will work with property owners, citizens, 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: Flood Insurance Outreach

Property owners should obtain and keep a flood insurance policy on their structures (building and contents coverage). The County will target all properties in the repetitive loss areas on an **annual basis** to remind them of the advantages of maintaining flood insurance. The County will also educate the public on Increased Cost of Compliance (ICC) coverage through this and other outreach efforts.

Responsibility

The County's Department of Engineering 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 County's operating budget.

Priority: High

Mitigation Action 2: Property Protection Outreach

Property owners should not store personal property in basements and crawl spaces since personal property is not covered by a flood insurance policy without contents coverage. The County 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 County's Department of Engineering 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 County's operating budget.

Priority: High

Mitigation Action 3: Floodproofing

When appropriate, property owners should consider floodproofing measures such as flood gates or shields, flood walls, hydraulic pumps, and elevating electrical services including electrical outlets.

Responsibility

The County's Department of Engineering 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 for protection measures 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 County's operating budget.

Priority: Medium

Mitigation Action 4: Acquisition and Demolition

Continue acquisition and/or 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. This effort can be coordinated with the County's intention to develop a long-range sea level rise adaptation plan in order to specifically target the properties in these repetitive loss areas that will also be most likely to experience continued and worsening flooding as a result of sea level rise.

Responsibility

The County's Department of Engineering will continue to target properties for acquisition/demolition and integrate this effort with the sea level rise adaptation plan once it has been developed.

Funding

The acquisition and demolition can be paid for using FEMA's Hazard Mitigation Grant Program (HMGP). Staff time to develop the list of target properties will require funds from the County's operating budget.

Priority: Low

Mitigation Action 5: Drainage-Related CIP Projects

Prioritize CIP projects to focus on drainage improvement projects in the watersheds which contain the identified repetitive loss areas.

Responsibility

The County's Department of Engineering already manages the roads and drainage capital improvements and will work to prioritize repetitive loss areas for drainage improvements.

Funding

The cost will be paid for by the County's Special Purpose Local Option Sales Tax (SPLOST) funding.

Priority: Medium

Mitigation Action 6: Flood Protection Assistance

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

Responsibility

The County's Department of Engineering will promote effective flood protection measures and provide advice and assistance to property owners who may wish to implement such measures in an **ongoing** program.

Funding

The cost of flood protection measures 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 County's operating budget.

Priority: Medium

Mitigation Action 7: Elevate Lift Stations and Electrical Equipment

Lift stations provide flood protection by moving water from low-lying areas that would not normally drain on their own. However, this equipment cannot operate if it is flooded. Lift stations and other electrical equipment should be elevated to the BFE or higher to ensure that they are operable in the event of at least a 100-year or lesser flood.

Responsibility

The County's Department of Engineering and Public Works Department will coordinate to make these

improvements to the drainage maintenance system.

Funding

The cost will be paid for by the County's SPLOST funding.

Priority: Medium

Mitigation Action 8: Natural Drainage Maintenance

Blockages in natural channels can cause upstream drainage issues and flooding. If natural floodplains and drainage features are blocked or filled they lose their ability to manage floodwaters, forcing those waters elsewhere where they may cause property damage. Chatham County should create a new drainage maintenance SOP to include natural drainage features within the county. Expanding drainage maintenance to include natural channels will ensure the entire drainage system is functioning properly.

Responsibility

The County's Public Works Department will make these changes and continue inspecting and managing to the drainage maintenance system.

Funding

The cost will be paid for by the County's SPLOST funding.

Priority: Medium

Prioritization Table

Table 2.34 – 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: Flood insurance outreach	2	2	1	1	1	1.55
2: Property protection outreach	2	2	1	1	1	1.55
3: Floodproofing	2	3	4	2	2	2.65
4: Acquisition and demolition	5	4	5	3	4	4.35
5: Drainage-related CIP projects	4	2	2	3	4	2.95
6: Flood protection assistance	2	2	3	2	1	2.10
7: Elevate lift stations and electrical equipment	3	3	3	3	3	3.00
8: Natural drainage maintenance	3	2	3	2	3	2.60

Problem Statement:**Areas of Inland and Localized Stormwater Flooding**

Of the 29 identified Repetitive Loss Areas, seven are located in inland locations with stormwater drainage issues. These areas are primarily subject to periodic flooding from heavy rains and localized stormwater drainage problems. The approach to reducing repetitive flooding in these areas will require a combination of floodproofing techniques, education, and drainage improvement projects.

Most repetitive loss flooding in these areas is considered flash flooding that causes damage to residential and commercial buildings as well as 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.

Repetitive Loss Area 12

Repetitive Loss Area 12 is located completely outside the 100-yr and 500-yr floodplain in the Unshaded Zone X. The area sits just northwest of the Herb River and its surrounding marshlands. The area is residential with a mix of slab on grade, crawlspace, and elevated foundation types. One HVAC unit was observed at grade. One occupant in the area is a renter and is unaware of any flood problems. A property owner in the area reported that their neighbor had flooding issues approximately 15 years ago due to landscaping performed by a tenant that blocked run off from draining properly, but that the issue was since fixed.

Table 2.35 – Repetitive Loss Overview for Area 12

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
12	1	0	3	4	Laroche Ave

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

Area 12 contains a total of 4 properties. There are no vacant lots in this subarea.

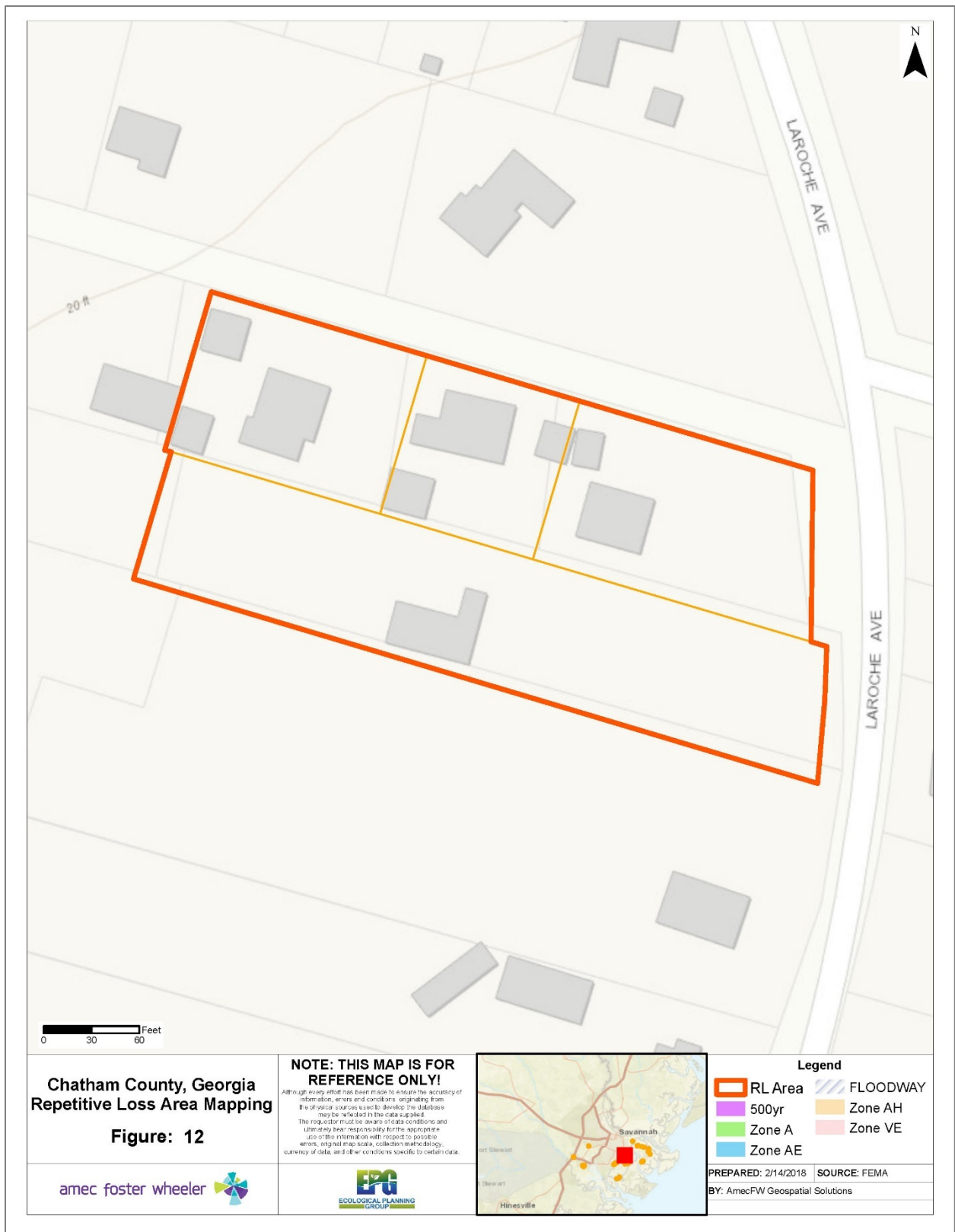


Figure 2.27 – Repetitive Loss Area 12

Example Properties in Repetitive Loss Area 12



Home on elevated foundation

Repetitive Loss Area 18

Repetitive Loss Area 18 is located completely outside the 100-yr and 500-yr floodplain in the Unshaded Zone X. The area is residential with slab on grade foundation types. One observable HVAC system is elevated to base flood elevation, however two others were seen to be at grade. All properties are built at grade. One property owner has been in their home for 50 years and never had flooding or drainage problems. Another property owner, who has been in their home for 9 years, has never had flooding, but noted that water does collect in the yard and at the doorway, which they think is because the property is so flat. In survey responses, one property owner noted that their neighbor has had flooding three times that they know of, but their property has never been affected.

Table 2.36 – Repetitive Loss Overview for Area 18

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
18	1	0	5	6	Rosewood Dr, Cresthill Ave

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

Area 18 contains a total of 6 properties. There are no vacant lots in this subarea.

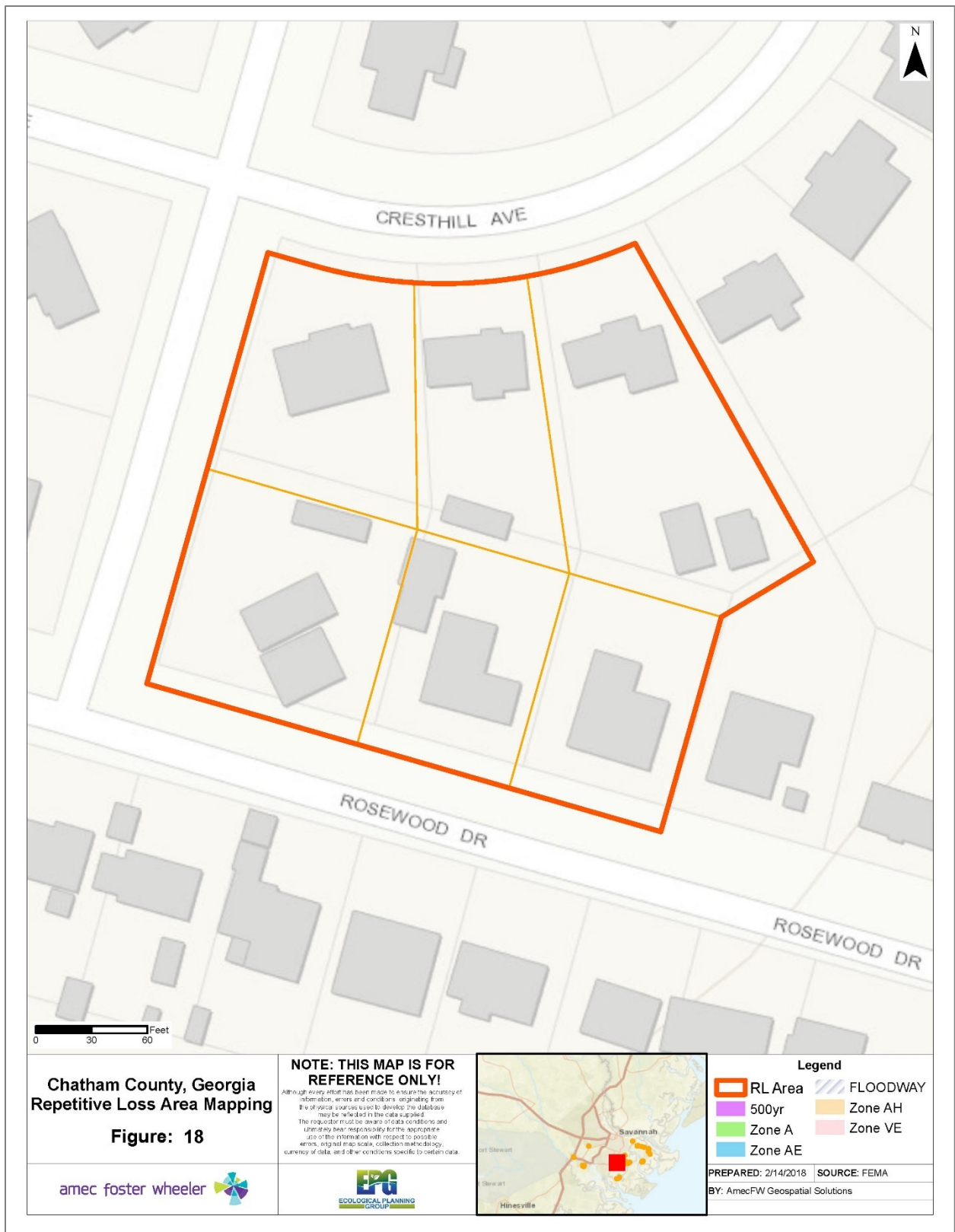


Figure 2.28 – Repetitive Loss Area 18

Example Properties in Repetitive Loss Area 18



HVAC at grade

Repetitive Loss Area 19

Repetitive Loss Area 19 is located completely outside the 100-yr and 500-yr floodplain in the Unshaded Zone X. The Casey Canal flows directly west of this Repetitive Loss Area. The area is sing-family residential with slab on grade foundation types. All properties are built at grade. One property has a storm drain in the street in front of the house. During the site visit, one resident said they had some minor flooding years ago due to poor drainage in the street but that the issue had since been resolved. In a survey response, a property owner in this area reported storm sewer backup and drainage from the St. James Church and its parking lot as the cause of flooding problems, with flooding occurring in 1996 and 1999 and reaching 18 inches above the first floor. This property owner also reported that water came extremely close to their home during Hurricane Matthew but did not flood the house and noted that they felt County maintenance of the drainage ditch behind their property could mitigate flooding issues.

Table 2.37 – Repetitive Loss Overview for Area 19

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
19	1	2	2	5	W Creighton Pl

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

Area 19 contains a total of 5 properties. There are no vacant lots in this subarea.

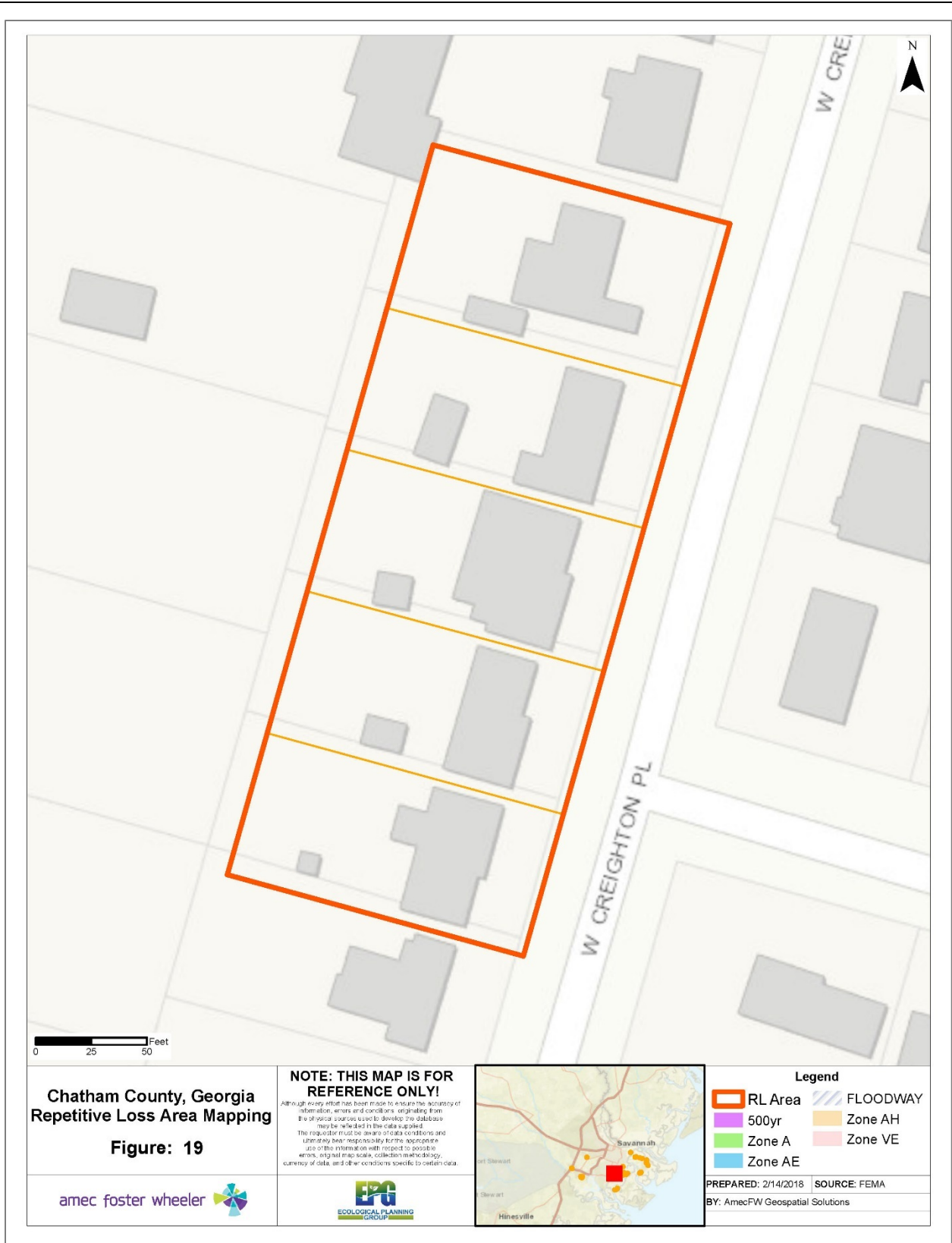


Figure 2.29 – Repetitive Loss Area 19

Example Properties in Repetitive Loss Area 19



Repetitive Loss Area 20

Repetitive Loss Area 20 is located completely within the 100-yr and 500-yr floodplain. An unnamed tributary of the Vernon River flows directly north and west of this Repetitive Loss Area and is surrounded by marsh land. The area is single family residential with slab on grade foundation types. Some HVAC systems are elevated at least some amount up to the first-floor elevation, while others were observed at grade. All properties are built at grade. Hurricane Irma appears to have caused flooding throughout the neighborhood, including in properties that have not otherwise had flooding or drainage issues. One property owner of a house located near the highpoint of the street said they have never had any flooding issues. Another property owner stated they have not had flooding issues in their three years in the neighborhood. Another owner reported during the site visit that flooding had never been a problem but that during Hurricane Irma flood waters reached just below the doorway. A property undergoing repairs was flooded with about two feet of water during Hurricane Irma, according to a neighbor whose own property was flooded up to the front door. The latter property was at the low point of the street and the ground was wet. A nearby neighbor also reported flooding from Hurricane Irma, in their case about halfway up their driveway. Similarly, a property owner who has not had flooding in their 50 years owning their home experienced two to three inches of flooding during Irma. In survey responses, one property owner felt that a drainage ditch near their home is inadequate and does not allow for effective storm drainage.

Table 2.38 – Repetitive Loss Overview for Area 20

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
20	3	2	27	32	Lavon Ave

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

Area 20 contains a total of 32 properties. There are no vacant lots in this subarea.

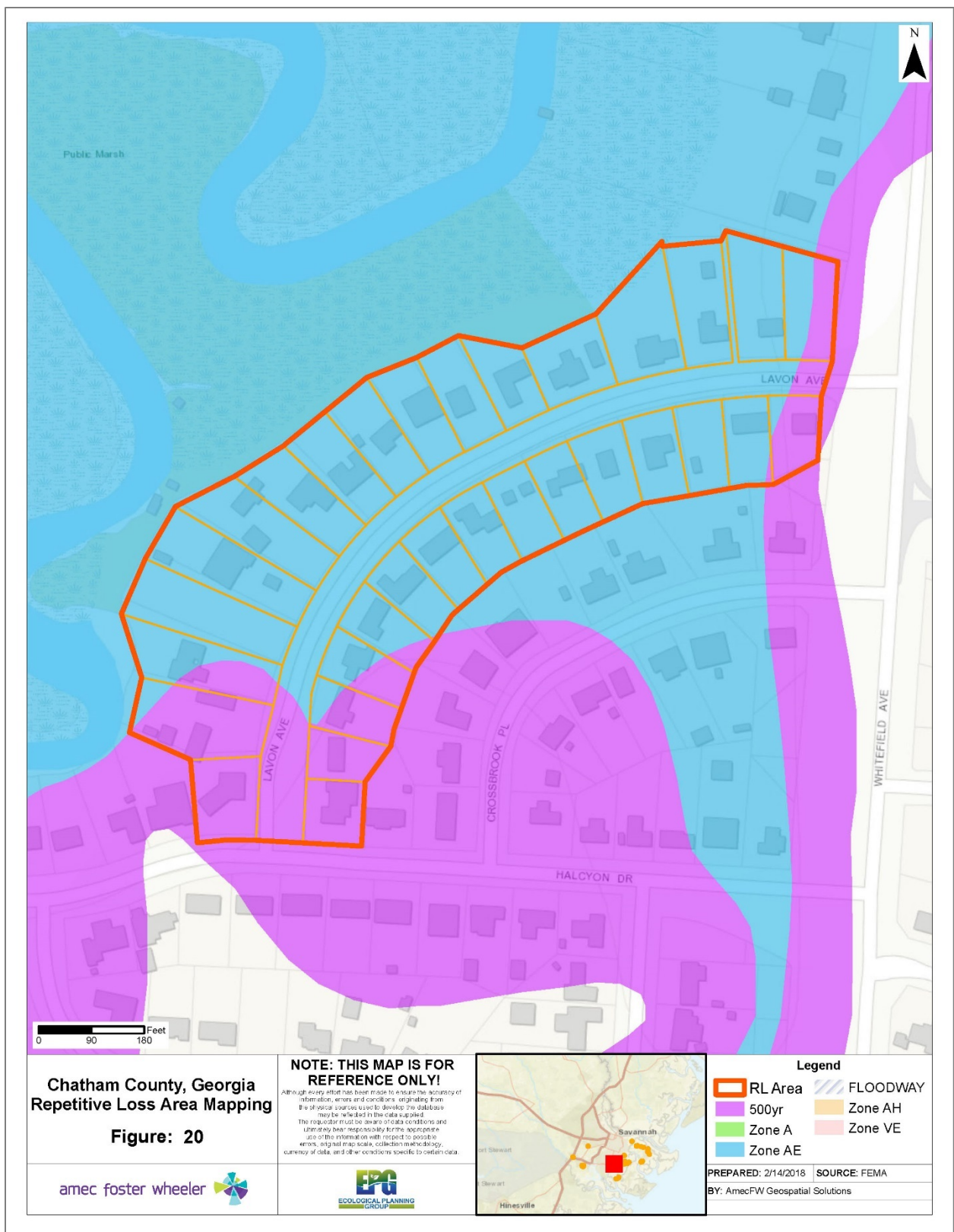


Figure 2.30 – Repetitive Loss Area 20

Example Properties in Repetitive Loss Area 20



Repetitive Loss Area 21

Repetitive Loss Area 21 is located completely within the 100-yr floodplain. The Vernon River flows northwest of this area, with surrounding marsh land. The area is residential with slab on grade foundation types built at grade. Three of the four property owners in this area were available during site visits and reported that Hurricane Irma caused varying levels of flooding but that flooding had previously not been an issue with the exception of some stormwater issues in the street due to debris in the drainage system. The fourth property looked to be under repairs and thus was likely to also have experienced some flooding during Irma. In survey responses, one property owner reported flooding during multiple years and that flood issues have continued despite their re-grading their yard. This property owner suspects that the construction of the Truman Parkway has caused some problems by changing water dispersion in this area.

Table 2.39 – Repetitive Loss Overview for Area 21

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
21	1	0	3	4	Melody Dr

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

Area 21 contains a total of 4 properties. There are no vacant lots in this subarea.

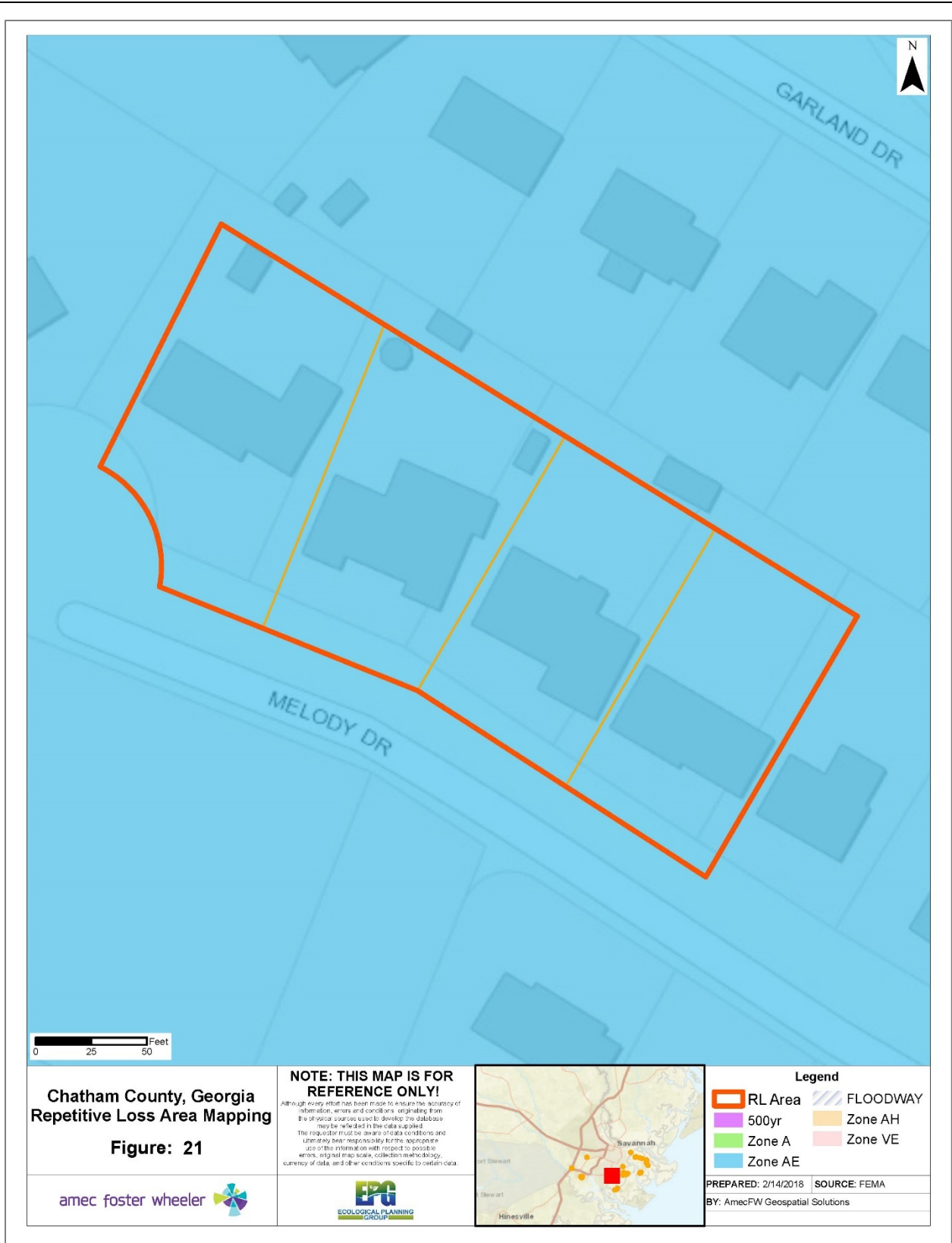


Figure 2.31 – Repetitive Loss Area 21

Example Properties in Repetitive Loss Area 21



Repetitive Loss Area 28

Repetitive Loss Area 28 is located completely outside the 100-yr and 500-yr floodplain in the Unshaded Zone X. A drainage canal runs to the northwest of this area, between the properties and Interstate 95. The area is commercial with two multi-story hotel structures with slab on grade foundations and large parking lots. The manager of one of the hotels says it was built in 2002 and she is unaware of any flooding issues.

Table 2.40 – Repetitive Loss Overview for Area 28

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
28	1	0	1	2	E Gateway Blvd

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

Area 28 contains a total of 2 properties. There are no vacant lots in this subarea.

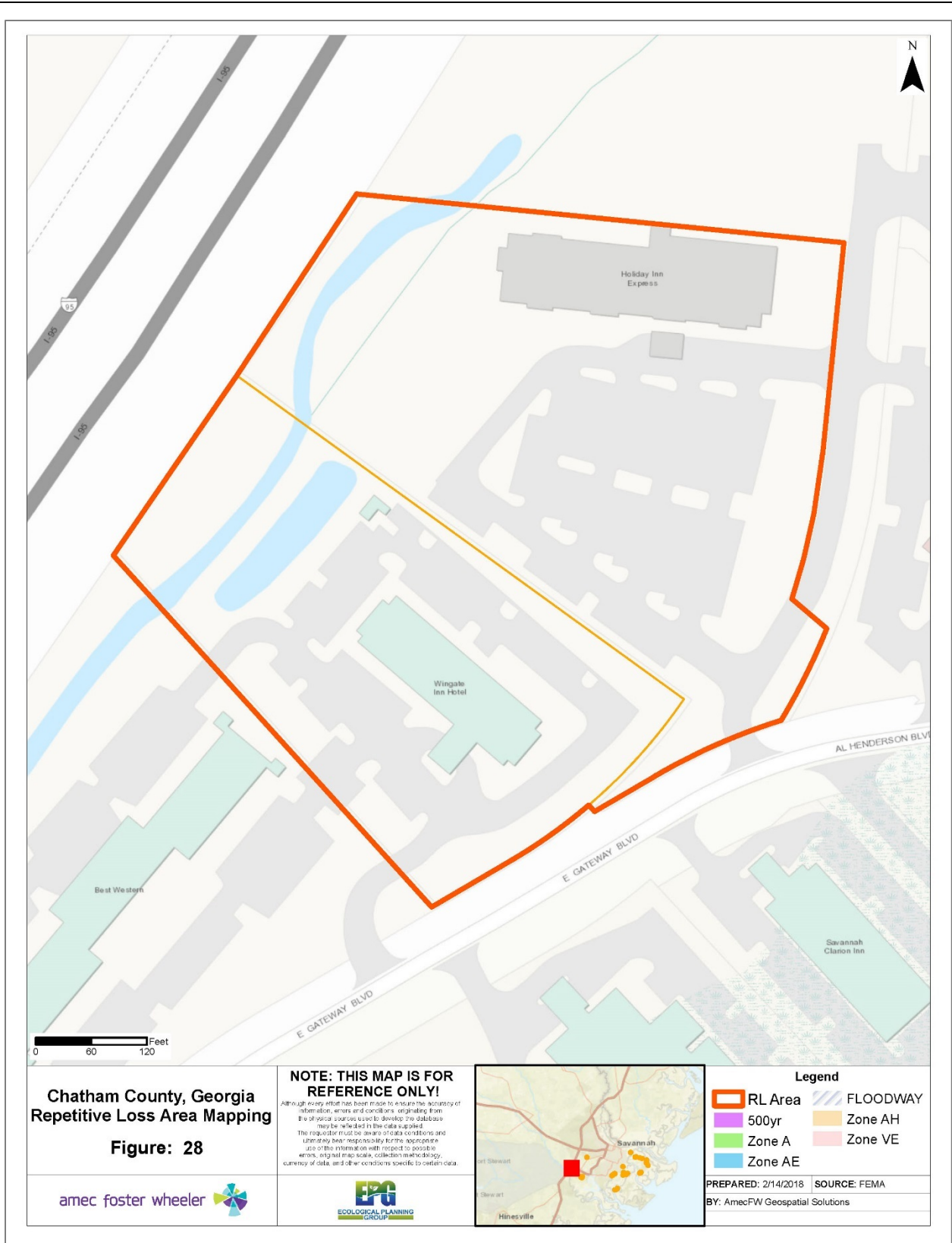


Figure 2.32 – Repetitive Loss Area 28

Example Properties in Repetitive Loss Area 28



Repetitive Loss Area 29

Repetitive Loss Area 29 is located completely within the 100-yr floodplain. The area sits along Dean Forest Road, with a drainage ditch running along the road. The area is residential with a mix of slab on grade and crawlspace foundation types. The homes are a mix of wood frame construction and manufactured housing. One observable HVAC system was elevated to the BFE. All properties are built at grade. One property reported having flood damage about 20 years ago but has not had any flooding since that time.

Table 2.41 – Repetitive Loss Overview for Area 29

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
29	1	0	2	3	Dean Forest Rd

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

Area 29 contains a total of 3 properties. There are no vacant lots in this subarea.

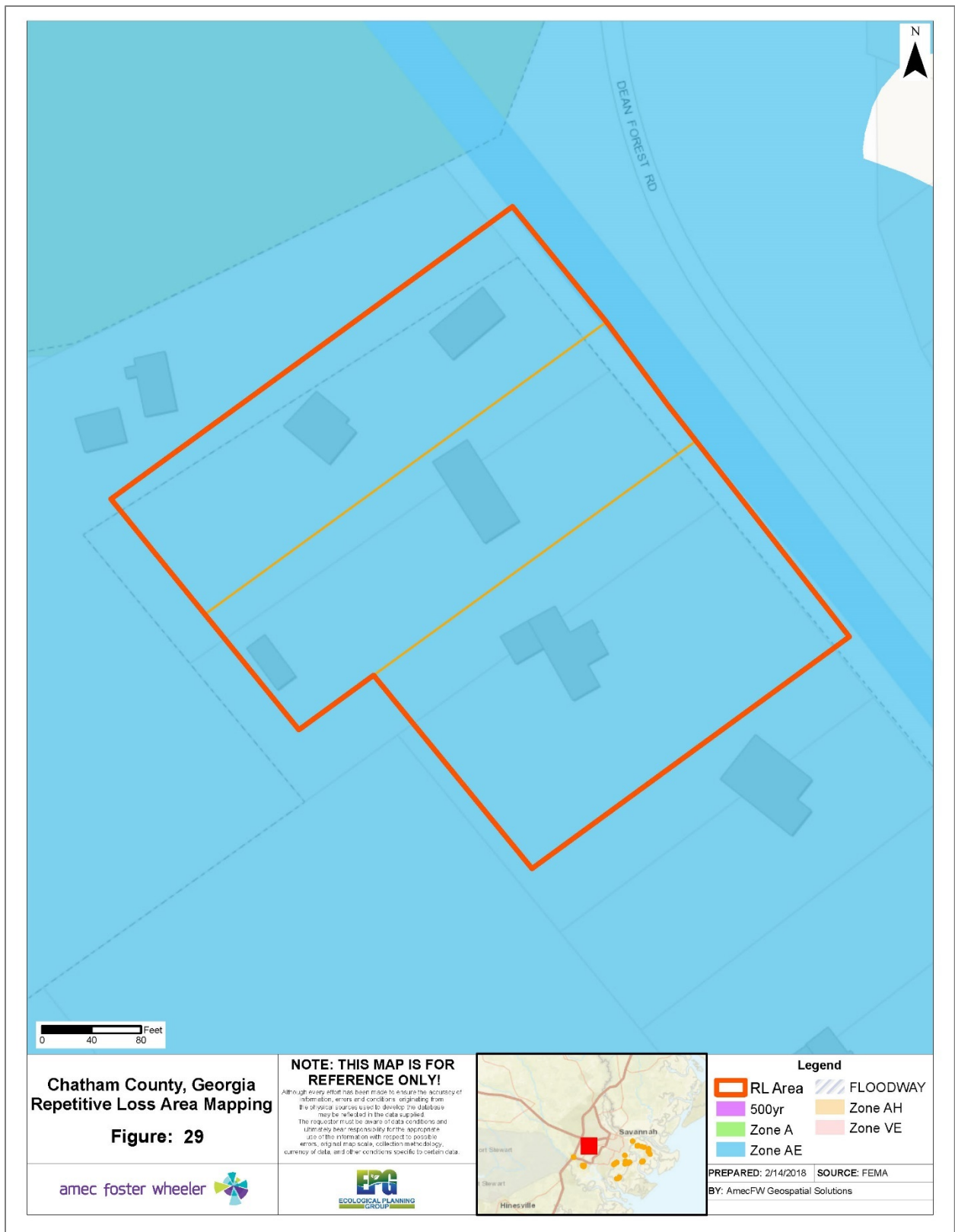


Figure 2.33 – Repetitive Loss Area 29

Example Properties in Repetitive Loss Area 29



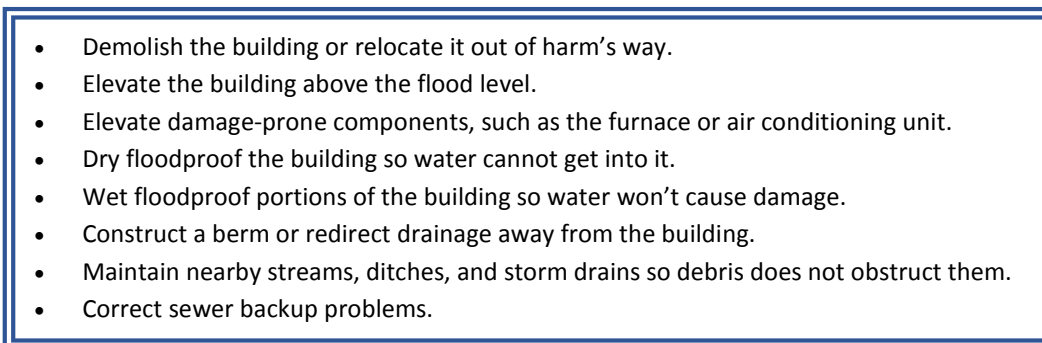
STEP 4. Review Alternative Mitigation Approaches

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

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 2.34 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 2.34 – Typical Property Protection Measures

Improving the stormwater drainage system and storage capacity throughout Chatham County can eliminate some building damage and road closures in these areas. Similarly, improving drainage outfalls can reduce stormwater flooding from heavy rains. These structural methods require large capital expenditures and cooperation from private property owners. Promoting floodproofing techniques and flood insurance and increasing public education and awareness of the flood hazards can be the next best alternative for property owners in this area. The County’s websites, e-mail distribution lists, press releases and variable message boards can help get these messages out to business owners and residents.

Mitigation Funding

There are several types of mitigation measures, listed in Table 2.42, 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 2.42 – Mitigation Grant Programs

Types of Projects Funded	HMGP	FMA	PDM	SRL	IIC	SBA
Acquisition of the entire property by a gov't agency	D	D	D	D		
Relocation of the building to a flood free site	D	D	D	D	D	D
Demolition of the structure	D	D	D	D	D	D
Elevation of the structure above flood levels	D	D	D	D	D	D
Replacing the old building with a new elevated one	D			D	D	D
Local drainage and small flood control projects	D			D		
Dry floodproofing (non-residential buildings only)		D	D	D	D	D
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 base flood elevation 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:

- Relocate internal supplies, products/goods above the flooding depth.
- Improve the County's floodplain and zoning ordinances.
- Consider expanding riparian impervious surface setbacks.

-
- Provide public education through posting information about local flood hazards on County websites, posting signs at various locations in neighborhoods or discussing flood protection measures at local neighborhood association meetings.
 - Promote the purchase of flood insurance.
 - Implement volume control and runoff reduction measures in the County's Stormwater Management Ordinance.

Current Mitigation Projects

Road and Drainage Capital Improvement Programs

The Chatham County Department of Engineering manages road and drainage improvements throughout the county which are funded with the 1% Special Purpose Local Option Sales Tax (SPLOST). None of the current projects directly address drainage issues in the identified repetitive loss areas; however, the nature of the SPLOST funding ensures a continued implementation mechanism for these drainage improvement projects. Therefore, specific drainage issues in the identified repetitive loss areas may be addressed in the future through this existing mitigation program.

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 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 2.43 – 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 2.44 – 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



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 2.45 – Advantages and Disadvantages of Barriers

Advantages	Disadvantages
<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 2.46 – 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 2.47 – 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 2.48 – Advantages and Disadvantages of Drainage Improvements

Advantages	Disadvantages
<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.

Table 2.49 – 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 2.50 – 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, Chatham County proposes that

the following projects should be implemented for the Repetitive Loss Areas. Table 2.51 examines past and current mitigation actions in this area.

Table 2.51 – 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 County has previously eliminated 4 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	County has undertaken capital improvement projects to improve drainage within the county.

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 2.53. 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 County will encourage property owners to use floodproofing measures to help protect lower levels of their property. The County 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 County will work with property owners, citizens, 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: Flood Insurance Outreach

Property owners should obtain and keep a flood insurance policy on their structures (building and contents coverage) even if they are not located in the Special Flood Hazard Area (SFHA). The County will target all properties in the identified repetitive loss areas on an **annual basis**, reminding them of the advantages to maintaining flood insurance. This outreach effort will also emphasize the availability of flood insurance for anyone, including those outside the floodplain. The County will also educate the

public on Increased Cost of Compliance (ICC) coverage through this and other outreach efforts.

Responsibility

The County's Department of Engineering 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 County's operating budget.

Priority: High

Mitigation Action 2: Property Protection Outreach

Property owners should not store personal property in basements and crawl spaces since personal property is not covered by a flood insurance policy without contents coverage. The County 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 County's Department of Engineering 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 County's operating budget.

Priority: High

Mitigation Action 3: Floodproofing

When appropriate, property owners should consider floodproofing measures such as flood gates or shields, flood walls, hydraulic pumps, and elevating electrical services including electrical outlets.

Responsibility

The County's Department of Engineering will promote effective flood protection measures and provide advice and assistance to property owners who may wish to implement such measures in an **ongoing** program.

Funding

The cost of flood protection measures 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 County's operating budget.

Priority: Medium

Mitigation Action 4: Acquisition and Demolition

Continue acquisition and/or 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 County's Department of Engineering will continue to target properties for acquisition/demolition.

Funding

The acquisition and demolition can be paid for using FEMA's Hazard Mitigation Grant Program (HMGP). Staff time to develop the list of target properties will require funds from the County's operating budget.

Priority: Low

Mitigation Action 5: Drainage-Related CIP Projects

Prioritize CIP projects to focus on drainage improvement projects in the watersheds which contain the identified repetitive loss areas.

Responsibility

The County's Department of Engineering already manages the roads and drainage capital improvements and will work to prioritize repetitive loss areas for drainage improvements.

Funding

The cost will be paid for by the County's Special Purpose Local Option Sales Tax (SPLOST) funding.

Priority: Medium

Mitigation Action 6: Flood Protection Assistance

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

Responsibility

The County's Department of Engineering will promote effective flood protection measures and provide advice and assistance to property owners who may wish to implement such measures in an **ongoing** program.

Funding

The cost of mitigation measures 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 County's operating budget.

Priority: Medium

Mitigation Action 7: Stormwater Conveyance Systems

The County should develop stormwater conveyance systems where water accumulates after heavy rains and has nowhere to drain and/or where existing drainage capacity is inadequate.

Responsibility

The County's Department of Engineering and Public Works Department will coordinate on this effort.

Funding

The cost will be paid for by the County's SPLOST funding.

Priority: Medium

Prioritization Table

Table 2.52 - 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: Flood insurance outreach	2	2	1	1	1	1.55
2: Property protection outreach	2	2	1	1	1	1.55
3: Floodproofing	2	3	4	2	2	2.65
4: Acquisition and demolition	5	4	5	4	4	4.50
5: Drainage-related CIP projects	4	2	2	3	4	2.95
6: Flood protection assistance	2	2	3	2	1	2.10
7: Stormwater conveyance systems	4	3	2	3	4	3.20

3 References

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Federal Emergency Management Agency, Reducing Damage from Localized Flooding: A Guide for Communities. FEMA 511/June 2005. Part III Chapter 7.

Federal Emergency Management Agency, Selecting Appropriate Mitigation Measures for Floodprone Structures. FEMA 551/March 2007.

Federal Emergency Management Agency, National Flood Insurance Program, Community Rating System, Mapping Repetitive Loss Areas, August 2008.

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.