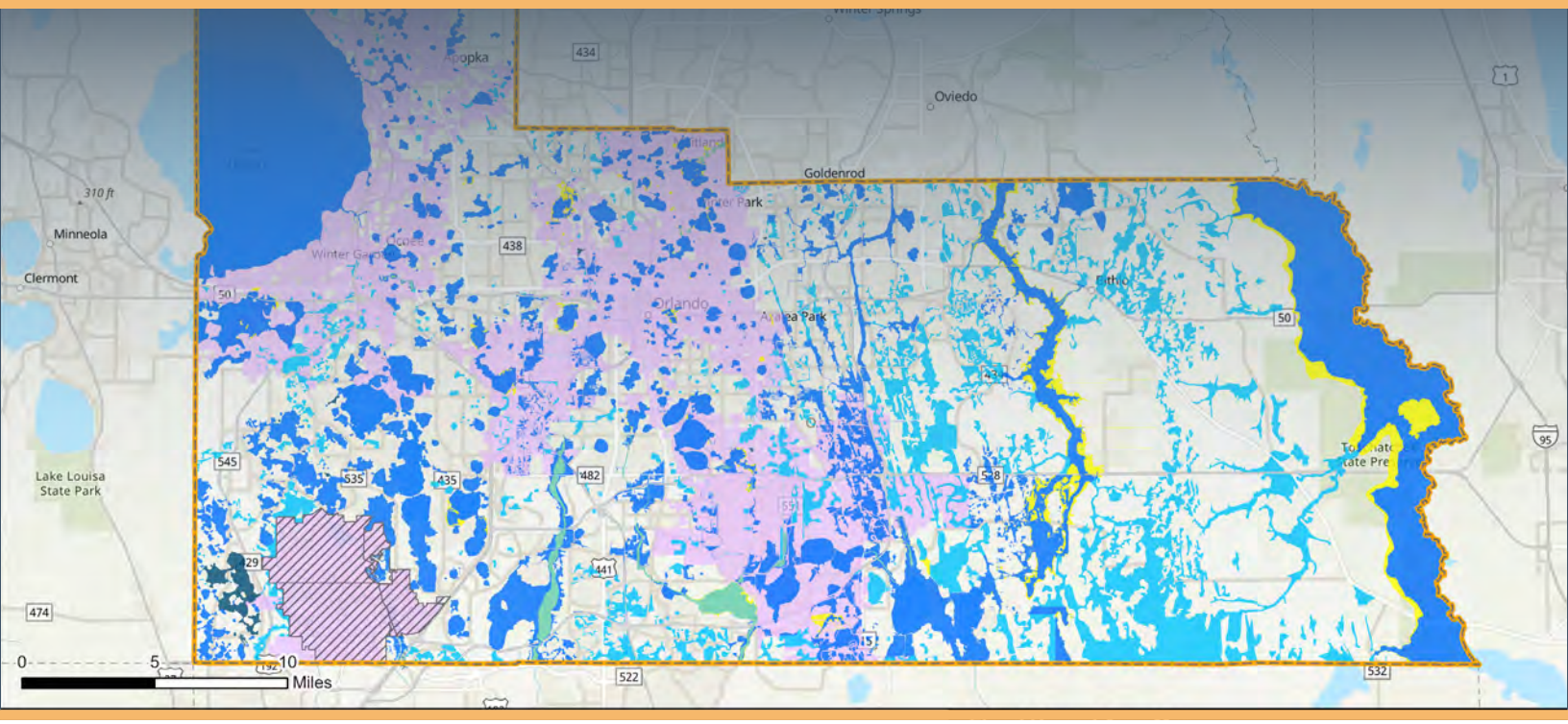
ORANGE COUNTY, FL

Repetitive Loss Area Analysis



2025

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1 REPETITIVE LOSS AREA ANALYSIS

1.1 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 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. According to a 2008 Government Accountability Office (GAO) report, repetitive loss properties represent only 1 percent of all policies, but have accounted for about 30 percent of claims paid. A 2014 follow up GAO report found that the number of repetitive loss structures is growing.

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. However, 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 show on Flood Insurance Rate Maps (FIRMs).

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

Orange County (CID-120179) has been a regular participant in the NFIP since December 1, 1981. 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. Orange County is currently a CRS Class 5 which rewards all policyholders in the SFHA with a 25 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. Orange County has been participating in the CRS program since October 1, 1991.

As of June 30, 2023, there are currently 6,275 NFIP Polices in force in Orange County with insurance coverage of nearly $1.885 billion. The County has 1,341 paid losses against the NFIP totaling more than $35.7 million with 104 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. Sixty percent of repetitive loss buildings in Orange County are currently insured (see the Repetitive Loss Requirement Section).

According to repetitive loss data received from FEMA in January 2023 there are a total of 30 unmitigated and 5 mitigated repetitive loss properties within Orange County. Two of these properties are classified as severe repetitive loss and remain 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 Orange County and does not assess individual properties, the County has opted to complete a Repetitive Loss Area Analysis (RLAA) using the 2017 *CRS Coordinator's Manual*. The RLAA will benefit the County by examining potential mitigation measures for specific repetitive loss areas and increasing its credit in the CRS Program.

1.2 SETTING

Orange County is an inland county in central Florida, home to 22 unincorporated communities in addition to the City of Orlando, which is the County seat, and 12 other incorporated municipalities. This analysis covers only the unincorporated areas of Orange County. The County is bordered to the north and northwest by Seminole and Volusia Counties; south and southwest by Osceola and Polk Counties; east by Brevard County, and west by Lake County. According to the U.S. Census Bureau, Orange County (including all incorporated areas) has a total area of 1,003 square miles, of which 903 square miles is land and 100 square miles (9.9% of total area) is water.

Figure 1.1 depicts Orange County's location within the State as well as the incorporated municipalities. Figure 1.2 depicts the major drainage basins that cover the County.

Figure 1.1 – Orange County Location Map

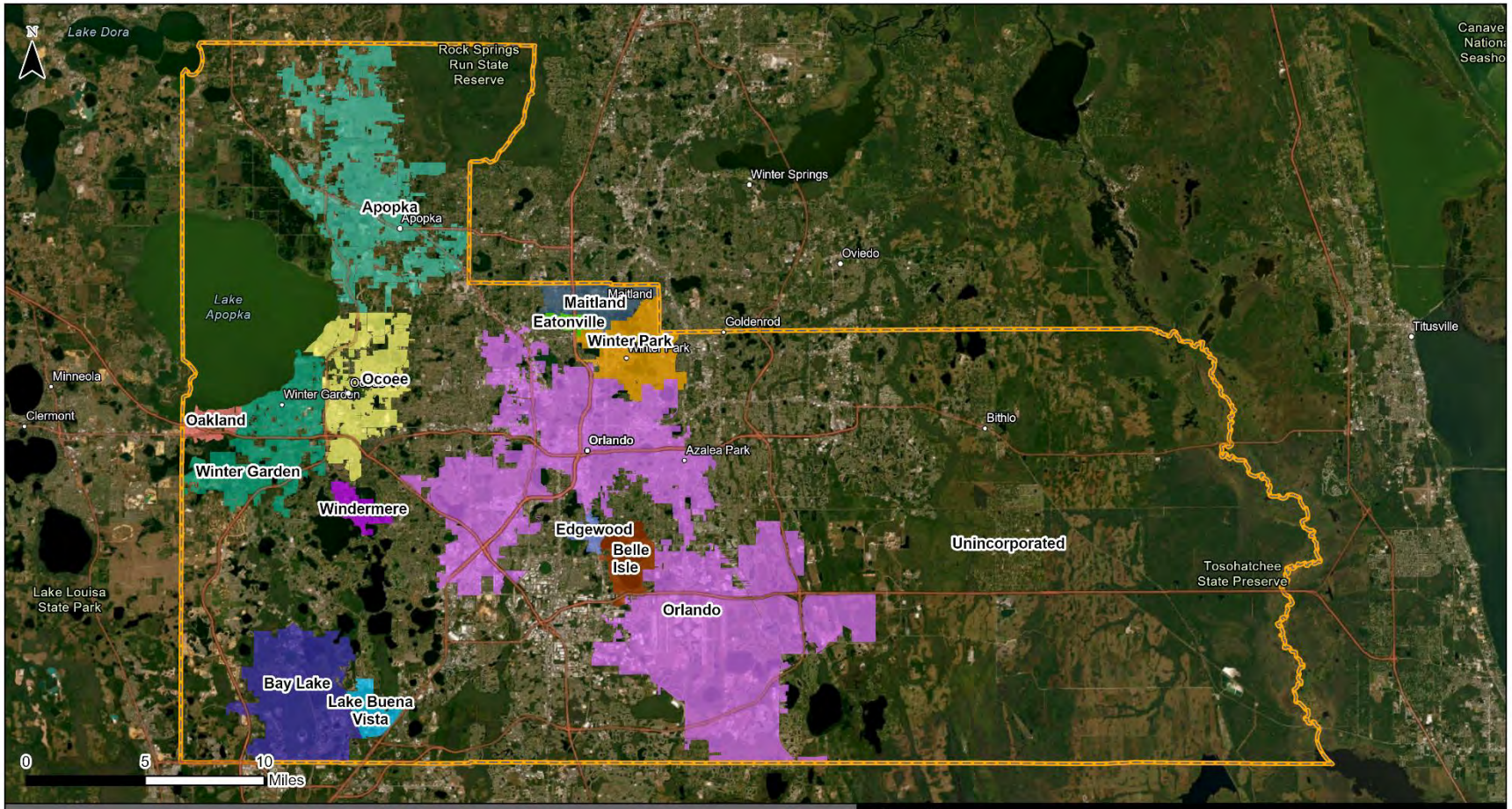
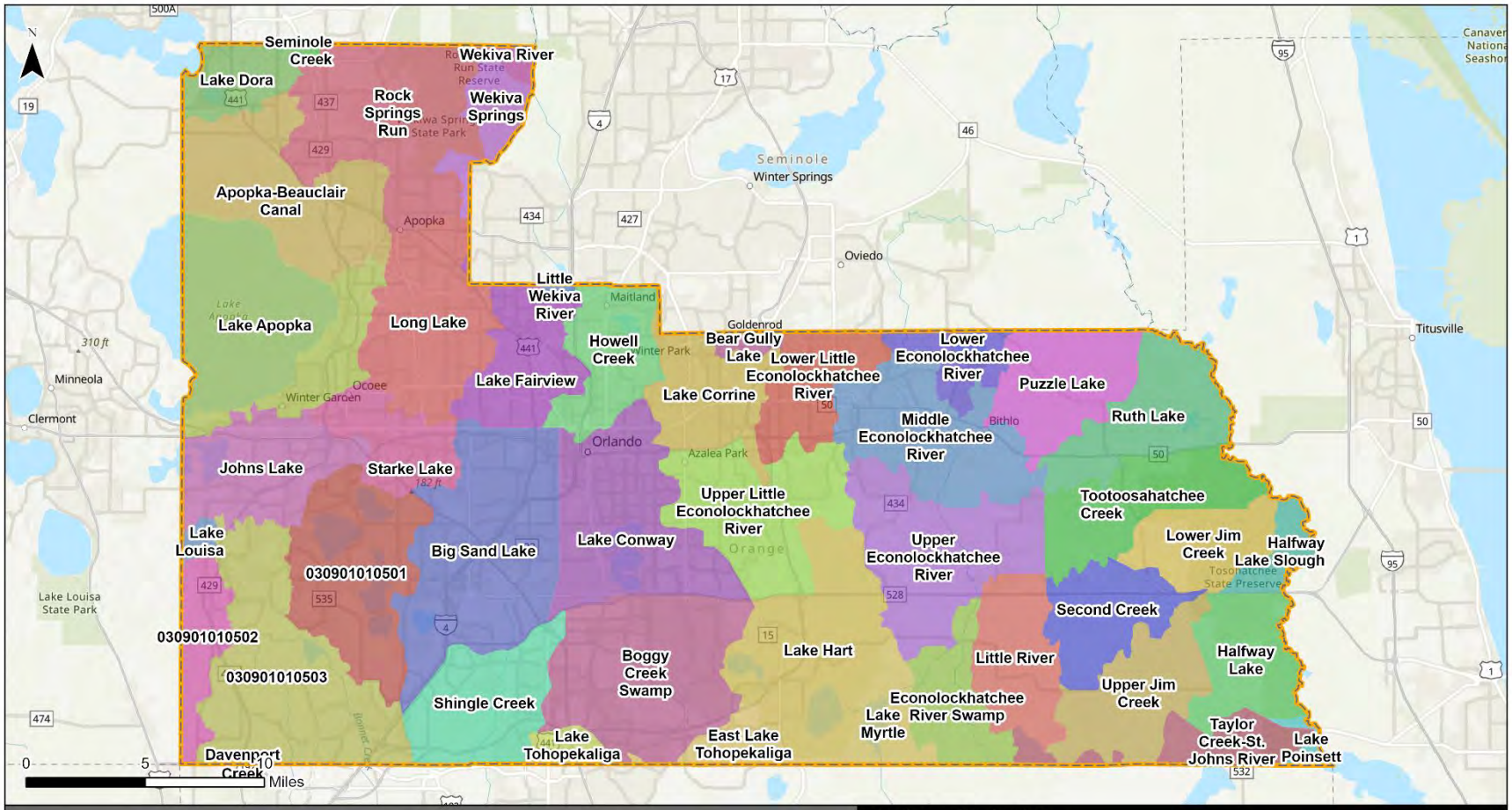


Figure 1.2 – Orange County Drainage Map



1.3 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.

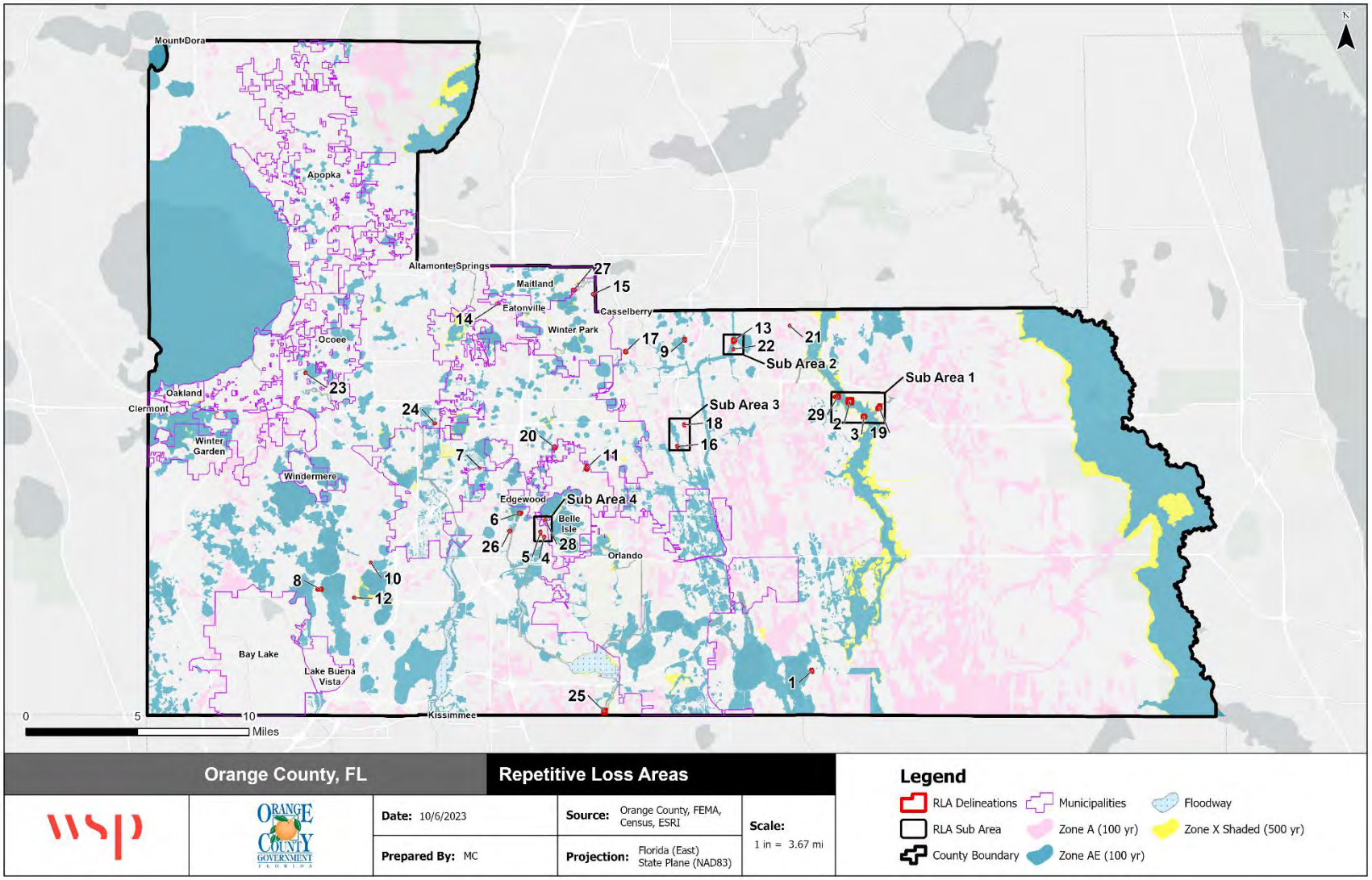
Since the latest repetitive loss data obtained from FEMA for Orange County contained a total of 30 unmitigated repetitive loss properties, the County is designated as a Category B repetitive loss community. Note: five additional properties were identified as repetitive loss properties but have already undergone mitigation. Therefore, for the purpose of this assessment, there are considered to be 30 unmitigated repetitive loss properties.

MAPPING REPETITIVE LOSS AREAS

Twenty-Nine Repetitive Loss Areas were identified within Orange 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 30 unmitigated repetitive loss properties and an additional 19 properties identified by reviewing historic loss properties (those with one paid claim against the NFIP) and 132 properties that have the same or similar flood conditions but have not had any claims paid against the NFIP. Therefore, a total of 181 properties were included within this RLAA.

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

Figure 1.3 – Orange 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.

2.1 STEP 1. ADVISE ALL PROPERTY OWNERS

Before field work began on the RLAA, individual letters were mailed to property owners within the nine identified Repetitive Loss Areas. Figure 2.1 on the following page shows an example of the property owner notification letter. Letters were mailed to property owners of all 181 identified properties within the repetitive loss areas, including 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. The letters were mailed on August 8, 2023. Copies of all mailed letters are maintained on file with the Orange County Stormwater Management Division. In accordance with the Privacy Act of 1974, the letters will not be shared with the general public.

2.1.1 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 Figures 2.2 and 2.3 on the following pages.

Figure 2.1 – Example RLAA Property Notification Letter

[DATE]

[NAME]
[ADDRESS]
[CITY], FL

Property Address: If Different than Owner Address **Parcel Number:** 1234567890

Dear Property Owner:

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

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

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

In addition, Orange County and its contractor will analyze each property to assess the flood risk. Using Google Street View, the surveyors 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 Public Works Department or by calling (407) 836-7743.

You can help us perform this analysis by **completing this questionnaire and returning to me at Stormwater Management Division, 4200 South John Young Parkway, Orlando, FL 32839.** If you have any questions, please call me at (407) 836-7743.

Sincerely,

Daniel Negron, M.Eng., P.E., CFM
Senior Engineer
Orange County Public Works

Figure 2.2 – RLAA Survey, Page 1

REPETITIVE LOSS PROPERTY QUESTIONNAIRE

Name: _____

Property Address: _____

1. How many years have you lived in the home/building at this address?
   - ☐ Less than 1
   - ☐ 1-5 years
   - ☐ 5-10 years
   - ☐ 10+ years

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

3. What type of foundation does the home/building have?
   - ☐ Slab
   - ☐ Crawl Space
   - ☐ Basement
   - ☐ Other: _____

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

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

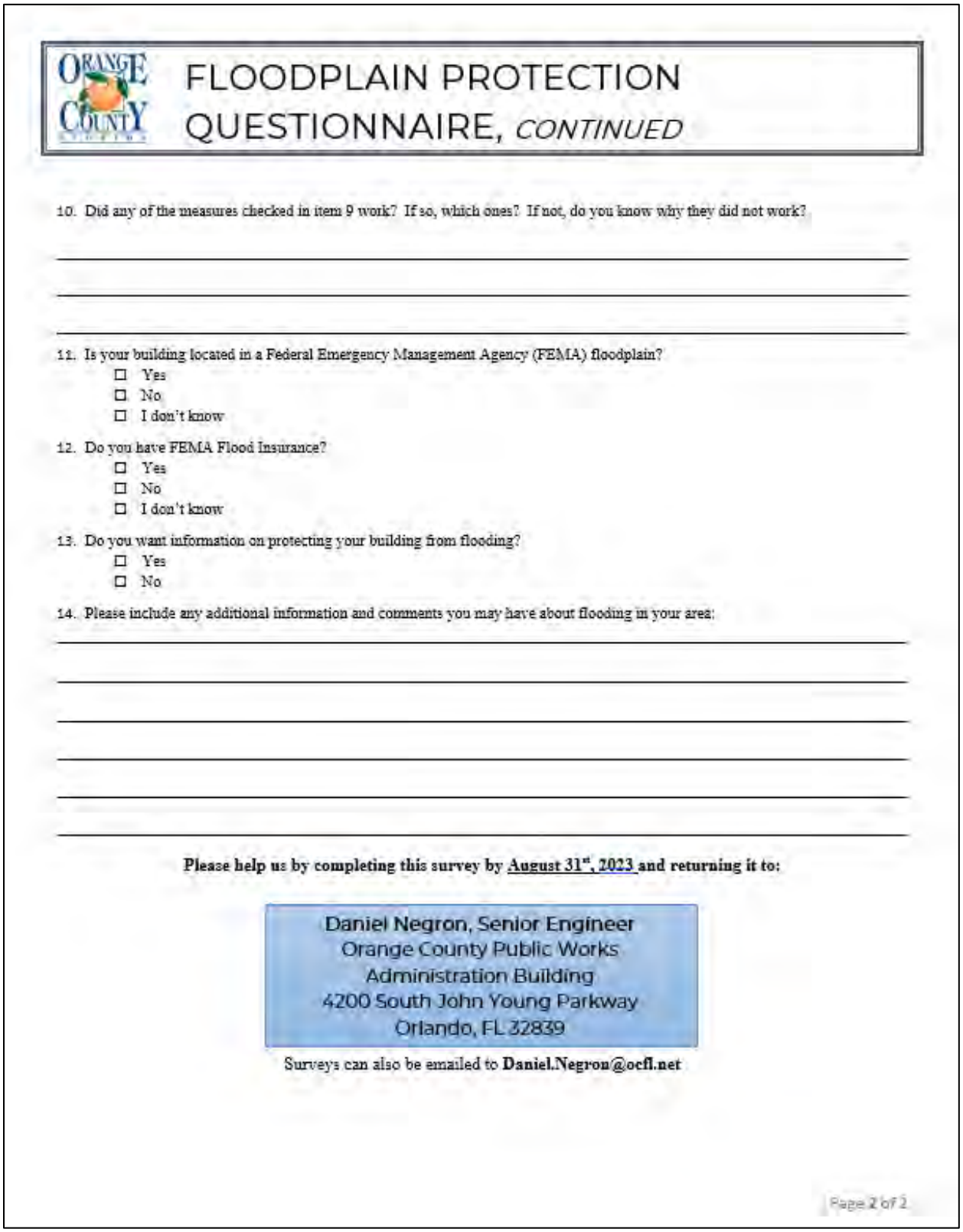
6. Where did you get water and how deep did it get?
   - ☐ In basement: _____ deep
   - ☐ In crawl space: _____ deep
   - ☐ Over 1st floor: _____ deep
   - ☐ In yard only: _____ deep
   - ☐ Water was kept out of house by sandbagging, sewer valve, or other protective measure

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

8. What do you feel was the cause of your flooding? Check all that affect your home/building.
   - ☐ Storm sewer backup
   - ☐ Sanitary sewer backup
   - ☐ Standing water next to house/building
   - ☐ Drainage from nearby properties
   - ☐ Saturated ground / leaks in basement walls
   - ☐ Overbank flooding from: _____
   - ☐ Other: _____

9. Have you installed any flood protection measures on the property?
   - ☐ Sump pump
   - ☐ Waterproofed the outside walls
   - ☐ Re-graded yard to keep water away
   - ☐ Moved things out of basement
   - ☐ Backup power system / generator
   - ☐ Sandbagged
   - ☐ Other: _____

Figure 2.3 – RLAA Survey, Page 2



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 your 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 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 August 31st, 2023 and returning it to:

Daniel Negron, Senior Engineer
Orange County Public Works
Administration Building
4200 South John Young Parkway
Orlando, FL 32839

Surveys can also be emailed to **Daniel.Negron@ocfl.net**

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Of the 153 mailed notification letters and questionnaires, Orange County received 15 responses which corresponds to a response rate of approximately nine 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	Number Responding
Less than 1	0
1-5	3
5-10	2
10+	10
Total	**15**

Q2: Do you rent or own this building?

Answer Choices	Number Responding
Rent	0
Own	14
Total	**14**

Q3: What type of foundation does the building have?

Answer Choices	Number Responding
Slab	11
Crawl Space	4
Basement	0
Other	0
Total	**15**

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

Answer Choices	Number Responding
Yes	12
No	3
Total	**15**

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

- 2015
- 2017: 4 responses
- 2018
- 2022: 11 responses
- 2023

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

Answer Choices	Number Responding
In basement	0
In crawl space	2

Over 1st floor	10
In yard only	3
Water was kept out of house by sandbagging, sewer valve, or other protective measure	0
Total	**15**

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

- 3 hours
- 12-14 hours
- 24 hours
- 2 days
- 3 days
- 2-3 days
- 3-4 days
- 8 days
- 12 days

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

Answer Choices	Number Responding
Storm sewer backup	8
Sanitary sewer backup	2
Standing water next to house/building	5
Drainage from nearby properties	7
Saturated ground / leaks in basement walls	3
Overbank flooding from: _____	4 (Glendora Ave, Creek behind home, Lake Condel,
Other	2
Total	**15**

Other: Hurricane Ian, unmaintained drainage

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

Answer Choices	Number Responding
Sump pump	3
Waterproofed the outside walls	5
Re-graded yard to keep water away	2
Moved things out of basement	1 (garage)
Backup power system / generator	2
Sandbagged	6
None	5
Other	2
Total	**15**

Other:

- Drainage pipes from downspouts directed to back culvert on property. Added yard drain and directed to back of property at culvert. Made two retention areas on property.
- Planted trees

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?

- Occasionally. Only temporary solutions.
- Not really for Ian. Flood waters were overflowed from canal for three months.
- Did work after 2023. We had not had any flooding from prior storms. New drain on east side of lake added to problem.
- Our garage floods during a heavy rain so there isn't much we can do to stop a large flood. Our house sits too low on the street.
- The forest sucks up the water. The grass does not.
- During rainstorms our streets flood from high elevation from Harriet dr. to Dublin st. the water then drains through our yards then to Lake Condel
- Haven't fully been tested yet. The only heavy rain we have had several months ago we only had water in yard.
- They all helped some during Ian we had the most water on property of all flooding and had only 3-4" inside house compared to closer to 6" during previous floods.
- We have never flooded. Lived in this house since 1995
- I tried to sandbag water level rose above them.
- Resealing and sandbagging have helped.

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

Answer Choices	Number Responding
Yes	3
No	6
I don't know	5
Total	**14**

Q12: Do you have FEMA Flood Insurance?

Answer Choices	Number Responding
Yes	9
No	3
I don't know	2
Total	**14**

Q13: Do you want information on protecting your building from flooding?

Answer Choices	Number Responding
Yes	8
No	2
Total	**10**

Q14: Please include any additional information and comments you may have about flooding in your area:

- Our home would not have flooded if water had not been pumped into it from another area.
- During heavy rainwater flows from Glendora Ave and down into out driveway ultimately flooding our carport and into our laundry room.
- Canal overflowed on grass - not to the extent of Ian
- I am in contact with county and city about our concerns. Think flooding of lake water caused more by inappropriate water flow management from hurricane Ian.
- We had our house surveyed and apparently our front door is 6" above the road on street level. It should be 16". During a heavy rain/hurricane, the drain can't keep up with all of the water and the street floods, hence our driveway and garage floods into the house during a hurricane.
- When you build on wetlands you get flooding.
- Would stormwater drains be an option for our community?
- City failure to properly maintain ditches. Cemetery at end of street allowed to build above street grade. Seminole County screw up of drain well at Magnolia and N Lamont
- All of our neighbors' property are higher than ours so we take all their runoff. The street easement on Marinell St also overflows during hurricane and back up into our property. Our property acts like a retention pond for the area during hurricanes or at the end of an extremely wet season when ground is completely saturated it seems to head our way.
- We had to get flood insurance after Charlie, we had land surveyed and only air conditioner was low but could never get anyone to help. We have paid 300-400 bucks per year. Now they say we have to get flood insurance equal to our house insurance. Not sure how we are going to afford. It's sad.
- FDOT pollution control drain has caused higher water levels since installed. OC not maintaining street drains. City of Orlando not maintaining drop wells. Water being pumped into Lake Tennessee from adjacent properties.

2.2 STEP 2. CONTACT AGENCIES AND ORGANIZATIONS

Orange 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 reports which were analyzed and reviewed included:

- Orange County Code of Ordinances
  - Zoning Ordinance
  - Subdivision Regulations
  - Open Space Ordinance
  - Floodplain Management Ordinance
  - Stormwater Management Ordinance
- Orange County Local Mitigation Strategy, 2016
- Orange County Florida Comprehensive Plan, 2015
- Orange County Comprehensive Plan Stormwater Management Element, 2015
- Orange County Stormwater Management Report, 2016
- State of Florida Hazard Mitigation Plan, 2018
- Little Econ Dam Report and Emergency Action Plan
- Orange County Flood Insurance Study, 2021
- Orange County Capital Improvement Program, 2023
- Orange County Repetitive Loss Analysis, 2027
- FEMA/ISO – Repetitive Loss and Flood Insurance Data, 2022

2.2.1 SUMMARY OF STUDIES AND REPORTS

2.2.1.1 FEMA FLOOD INSURANCE STUDY

FEMA most recent FIS for Orange County, FL is dated September 24, 2021. 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.

2.2.1.2 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.

2.2.1.3 ORANGE COUNTY COMPREHENSIVE PLAN, ADOPTED 2009, UPDATED 2016

The Orange County 2010 - 2030 Comprehensive Plan is intended to ensure that in the future, Orange County develops and grows in ways that enhance the community's vitality and overall quality of life. It builds on the existing conditions and trends in the community and lays out objectives and policies to meet the community's goals. The Plan addresses numerous facets of the community, including future land use, conservation, open space, and stormwater management. A comprehensive is currently underway.

2.2.1.4 ORANGE COUNTY LOCAL MITIGATION STRATEGY, UPDATED 2021

The primary reason for developing a hazard mitigation plan is to reduce a community's exposure to natural hazards by taking proactive, pre-disaster planning steps to limit development in hazard sensitive areas,

particularly floodplain or flood hazard areas. The second reason is to comply with the hazard mitigation planning requirements established by the Federal Emergency Management Agency (FEMA) and the Florida Division of Emergency Management. Orange County adopted its updated Local Mitigation Strategy 2021. The LMS contains multiple new mitigation actions for the County related to flood hazards, including improving stormwater drainage measures, retrofitting flood control devices, elevating structures in the floodplain, and clearing waterways of debris.

2.2.1.5 ORANGE COUNTY COMPREHENSIVE EMERGENCY OPERATIONS PLAN, 2013

The purpose of the County's Comprehensive Emergency Operations Plan (CEMP) is to establish the operations protocol for all emergencies and disasters in Orange County. The CEMP defines responsibilities for all levels of emergency response. The plan is not limited to response and recovery activities, but instead addresses all five phases of emergency management, including prevention, preparedness, and mitigation. Mitigation is also built into the process for post-disaster recovery through development regulations, planning, and funding limitations.

2.2.1.6 ORANGE COUNTY REPETITIVE LOSS AREA ANALAYSIS, 2017

The previous Repetitive Loss Analysis, developed by Wood, previously Amec Foster Wheeler, in 2017 provides a detailed analysis of nine repetitive loss properties in the county and recommends mitigation options. The findings of this report were used to supplement the research and field observations conducted for this Repetitive Loss Area Analysis.

2.3 STEP 3. BUILDING DATA COLLECTION

The on-site field survey for this analysis was conducted on June 21, 2023 through June 29, 2023. The National Tool Limited View was not utilized in this effort, but most of the information required by the National Tool was incorporated into the mobile application survey. The mobile application generated data collection forms are included in Appendix A. (Note: In accordance with the Privacy Act of 1974, Appendix A will not be shared with the general public).

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

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

Table 2.1 details the percentage of each repetitive loss area that falls within the 100-year, 500-year or Unshaded Zone X flood zone.

Table 2.1 – Repetitive Loss Area Percentage by Flood Zone

Repetitive Loss Area	Percentage of Area		
	Zone AE or Zone A 100-yr	Zone X Shaded 500-yr	Zone X Unshaded
1			100% (4.37 ac)
2	91.6% (35.16 ac)	3.6% (1.4 ac)	4.8% (1.85 ac)
3	89.7% (10.24 ac)	10.3% (1.18 ac)	
4			100% (1.53 ac)
5			100% (1.56 ac)
6	46.4% (3.96 ac)		53.6% (4.57 ac)
7			100% (0.29 ac)
8	20.3% (1.63 ac)		79.7% (6.41 ac)
9	19.2% (0.7 ac)		80.8% (2.94 ac)
10			100% (0.43 ac)
11	88.4% (10.5 ac)		11.6% (1.38 ac)
12			100% (1.06 ac)
13	100% (12.37 ac)		
14			100% (0.5 ac)
15			100% (0.87 ac)
16	4.7% (0.07 ac)		95.3% (1.33 ac)
17			100% (5.43 ac)
18	90.2% (1.28 ac)		9.8% (0.14 ac)
19	70.8% (12.26 ac)	15.8% (2.73 ac)	13.5% (2.33 ac)
20	96.6% (5.46 ac)		3.4% (0.19 ac)
21	7.2% (0.02 ac)		92.8% (0.32 ac)

Repetitive Loss Area	Percentage of Area		
	Zone AE or Zone A 100-yr	Zone X Shaded 500-yr	Zone X Unshaded
22			100% (0.77 ac)
23			100% (1.13 ac)
24	100% (1.16 ac)		
25	62.3% (10.28 ac)	17% (2.81 ac)	20.6% (3.4 ac)
26	86% (2.36 ac)		14% (0.39 ac)
27	23.7% (0.82 ac)	22.4% (0.77	53.9% (1.86 ac)
28			100% (1.12 ac)
29	100% (14.19 ac)		100% (4.37 ac)

Source: 9/24/2021 DFIRM

2.4 PROBLEM STATEMENT 1

Riverine Flooding

Four of the Repetitive Loss Areas are located within the Big Econ Drainage Basins along the Econlockhatchee River. All or portions of these Repetitive Loss Areas are located within the 100-/500-year floodplain. The approach to reducing repetitive flooding in these areas will require a combination of floodproofing techniques, education, and drainage improvement projects. Alternatively, acquisition or relocation may also be appropriate in these areas.

Much of the repetitive loss flooding in these areas results from prolonged heavy rainfall and causes damage to residential and commercial buildings. Flash flooding can occur if conveyance is obstructed by debris, sediment and other materials that limit the volume of drainage.

Some losses are due to heavy rainfall associated with hurricanes and tropical storms. Orange County was recently affected by Hurricane Ian in 2022, Hurricane Matthew in 2016, and Hurricane Irma in 2017. Some of the losses also date back to Hurricane Charlie in 2004 and before.

2.4.1 SUBAREA 1

Repetitive Loss Area 2 is located almost completely within the 100-yr and 500-yr floodplain. The Econlockhatchee River flows directly through this Repetitive Loss Area. Seven properties are located in this repetitive loss area; further investigation during field data collection found that these nearby properties faced similar flood conditions.

Repetitive Loss Area 3 is located entirely within the 100-yr and 500-yr floodplain. The Econlockhatchee River flows northeast of this Repetitive Loss Area. A drainage canal runs along the road in front of these properties.

Repetitive Loss Area 19 is located entirely within the 100-yr, 500-yr, and the floodway. There are six properties located in this repetitive loss area. Two properties have commercial/industrial land use. A large portion of these parcels are within the 100-yr floodplain and the floodway – both high risk areas. With the exception of one masonry property, many of the homes could use optional repairs. The structures sit on large grassy lots and most properties have drainage canals that run along the roads in front of the property.

Repetitive Loss Area 29 is located entirely within the 100-yr floodplain. There are six properties located in this repetitive loss area. Five of the six properties have a drainage canal that runs under the driveway. On home is elevated and has multiple drainage and water management techniques including gutters that drain to a gravel and vegetated bed, however, the other properties are at grade and lack gutters for additional drainage.

Table 2.2 – Subarea 1 Overview

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
2	1	1	6	8	Hamilton Drive, Lockwood Drive
3	1	0	2	3	Bearle Road
19	1	0	5	6	Seminole Trail, Cochran Trail
29	1	2	3	6	Buist Street
Total	**4**	3	16	23	--

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

One occupant in this subarea stated that during the 2017 hurricane there was 5 feet of water on their property. Of those structures observable from the street, two have their first-floor elevation below grade. All of the observable structures are wood frame, masonry or manufactured with a mix of crawlspace, pier/post/column, and slab on grade foundations. One HVAC unit was seen elevated above the first-floor elevation.

Subarea 1 contains 23 properties. The Repetitive Loss Areas are shown in relation to FEMA flood zones in Figure 2.4 through Figure 2.7 on the following pages.

Figure 2.4 – Repetitive Loss Area 2

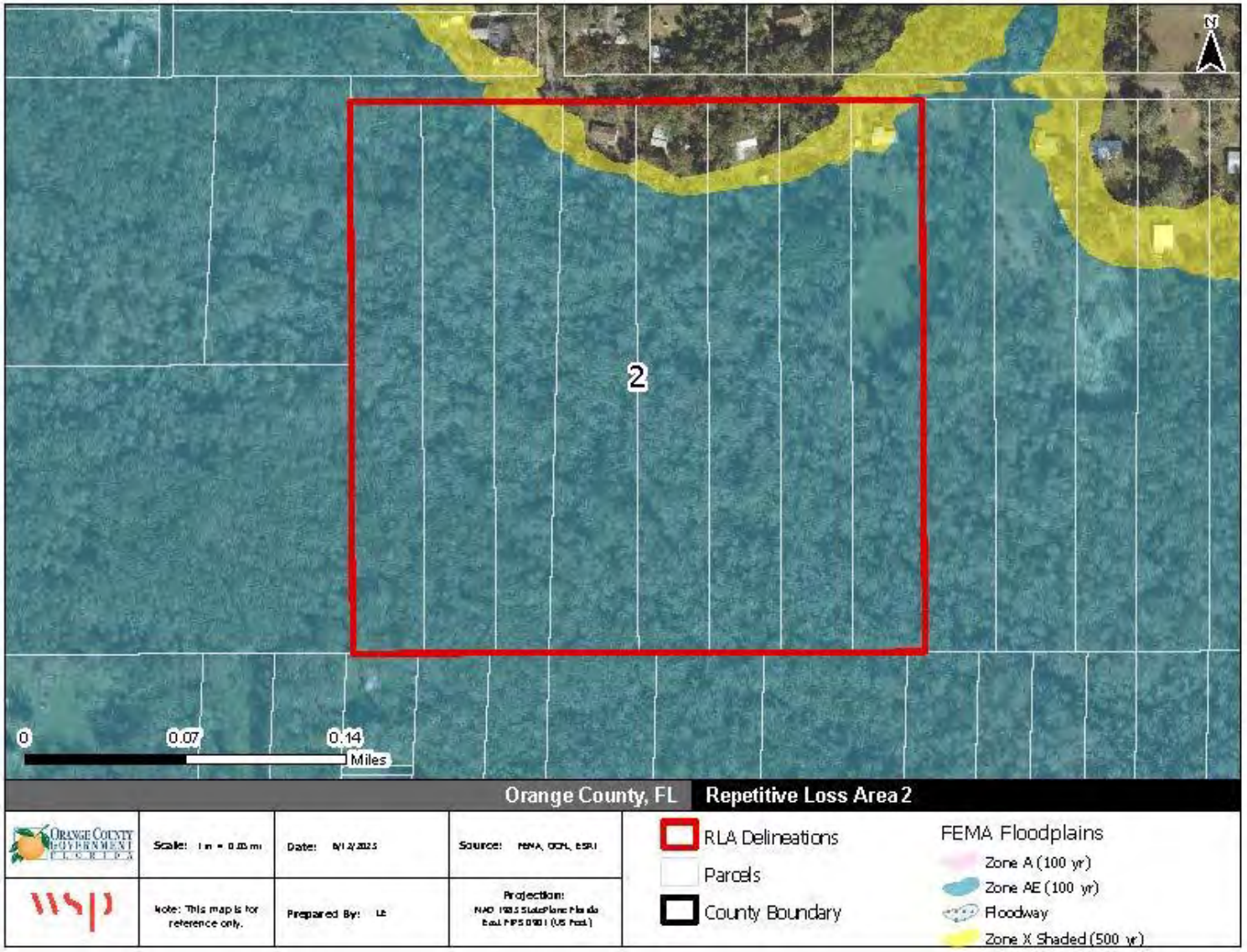


Figure 2.5 – Repetitive Loss Area 3

Figure 2.6 - Repetitive Loss Area 19

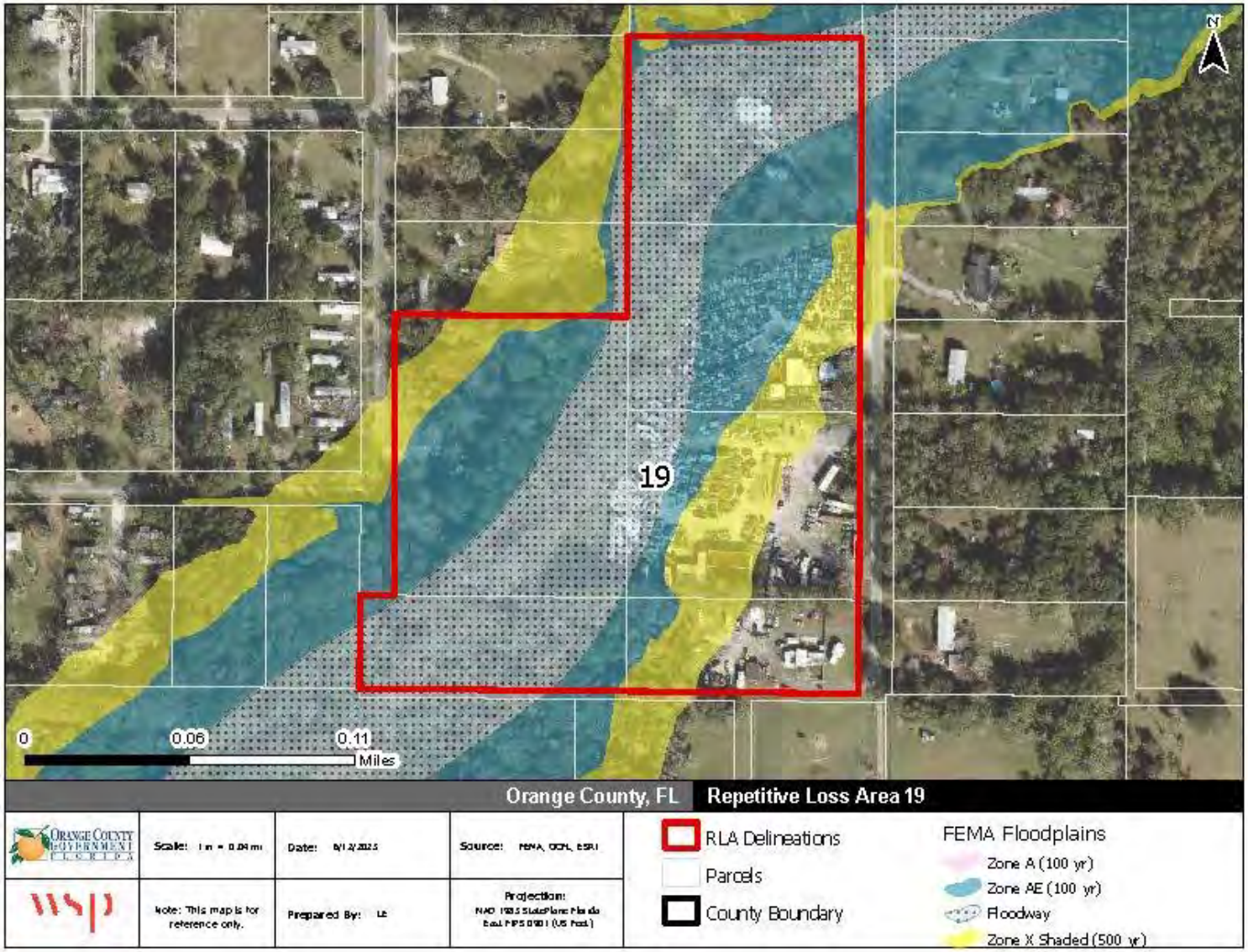


Figure 2.7 - Repetitive Loss Area 29

Example Properties

Structure elevated above grade with crawl space

Drainage ditch along roadway

Split-level structure with first-floor below grade

2.4.2 SUBAREA 2

Repetitive Loss Area 13 is located completely within the 100-yr floodplain. The Little Econlockhatchee River flows directly through this Repetitive Loss Area. There are two repetitive loss properties in this area and four additional properties that face similar flood conditions. The river runs through the back of each of the properties, with the houses located toward the front of the parcels closer to the road. Of the structures observable from the street, most appear to be at grade. The structures are a mix of manufactured homes,

masonry, and wood frame with crawlspace or slab on grade foundations. One HVAC unit was seen elevated above the first-floor elevation. None of the houses have gutters however almost all properties have drainage canals along the roadway in front of the properties.

Repetitive Loss Area 22 is located just outside the 100-yr floodplain, however, the parcels in this area closely border the 100-yr floodplain. The Little Econlockhatchee River flows just 350-400ft from the four properties in this repetitive loss area. There are also two large retention ponds on either side of the repetitive loss area. All of the homes in this area are masonry structures with slab on grade foundations and appear to be in very good condition. All the observable properties have gutter but no additional drainage on or around the properties. One property is slightly above grade.

Table 2.3 – Subarea 2 Overview

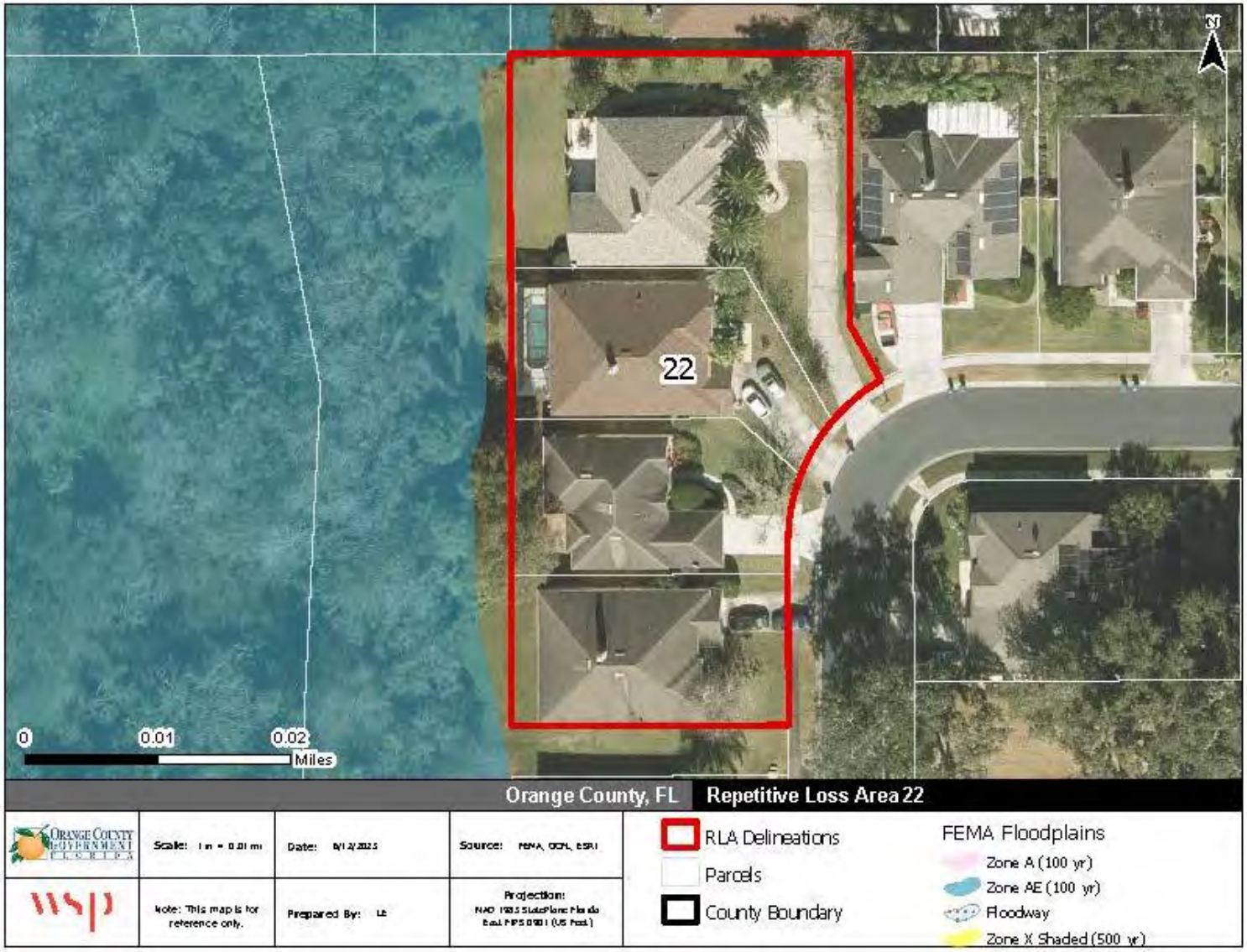
Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
13	2	3	1	6	Riverdale Road
22	1	0	3	4	Piping Rock Circle
Total	**3**	**3**	**4**	**10**	--

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

Subarea 2 contains 10 properties. The Repetitive Loss Areas are shown in relation to FEMA flood zones in Figure 2.8 and Figure 2.9 on the following pages.

Figure 2.8 – Repetitive Loss Area 13

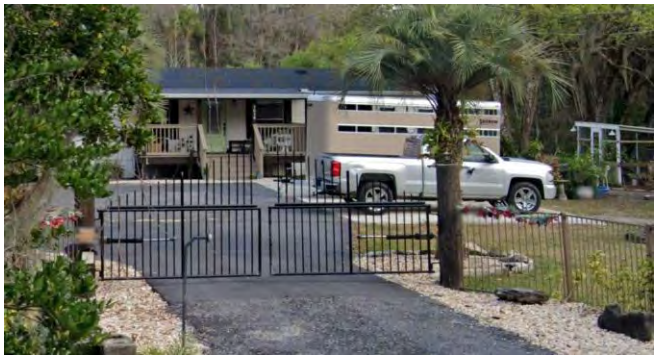
Figure 2.9 - Repetitive Loss Area 22



Example Properties

House slightly above grade

Drainage canal along roadway



Elevated manufactured home

2.4.3 SUBAREA 3

Repetitive Loss Area 16 is located partially within the 100-yr floodplain. Several small creeks are in close proximity to this Repetitive Loss Area. Four properties are located in this repetitive loss area; further investigation during field data collection found that these nearby properties faced similar flood conditions. The structures in this repetitive loss area are newer houses in good condition. All of the houses have gutters and three of the properties have curbs and storm drains that run along the road in front of the houses.

Repetitive Loss Area 18 is located entirely in the 100-yr floodplain. All five properties in this repetitive loss area a masonry structures with slab on grade foundations in good condition. All of the houses have gutters – one property directs drainage toward a plant bed that helps infiltrate rainwater. The properties in this neighborhood have curbs and storm drains that run along the road in front of the houses.

Table 2.4 – Subarea 3 Overview

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
16	1	1	2	4	Billingshurst Court
18	1	0	4	5	Gran Paseo Drive
Total	**2**	**1**	**6**	**9**	--

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

Subarea 3 contains nine properties. The Repetitive Loss Areas are shown in relation to FEMA flood zones in Figure 2.10 and Figure 2.11 on the following pages.

Example Properties

Storm drain in front of property

Newer home with gutters

Figure 2.10 – Repetitive Loss Area 16

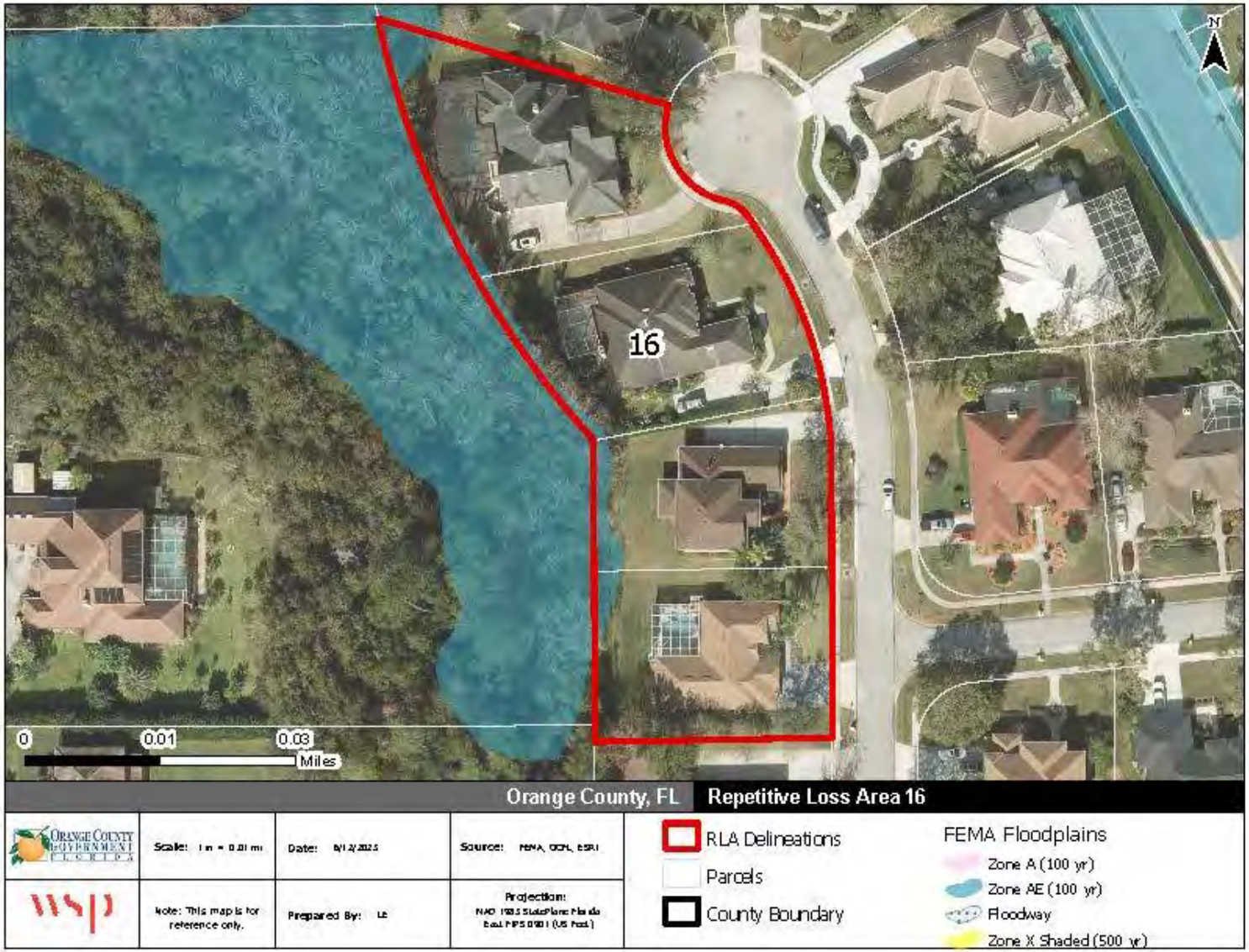


Figure 2.11 - Repetitive Loss Area 18

2.4.4 AREA 21

Repetitive Loss Area 21 is located partially in the 100-yr flood zone. A tributary or the Little Econlockhatchee River flows behind the houses in this area. There are three properties in this repetitive loss area. All of the single-family residential houses are masonry structures with slab on grade foundations. All three properties have gutters however the direct drainage toward their neighbor's property or toward the property's entrance. This could cause water to accumulate in undesirable areas. Two properties have storm drains in the road adjacent to the houses.

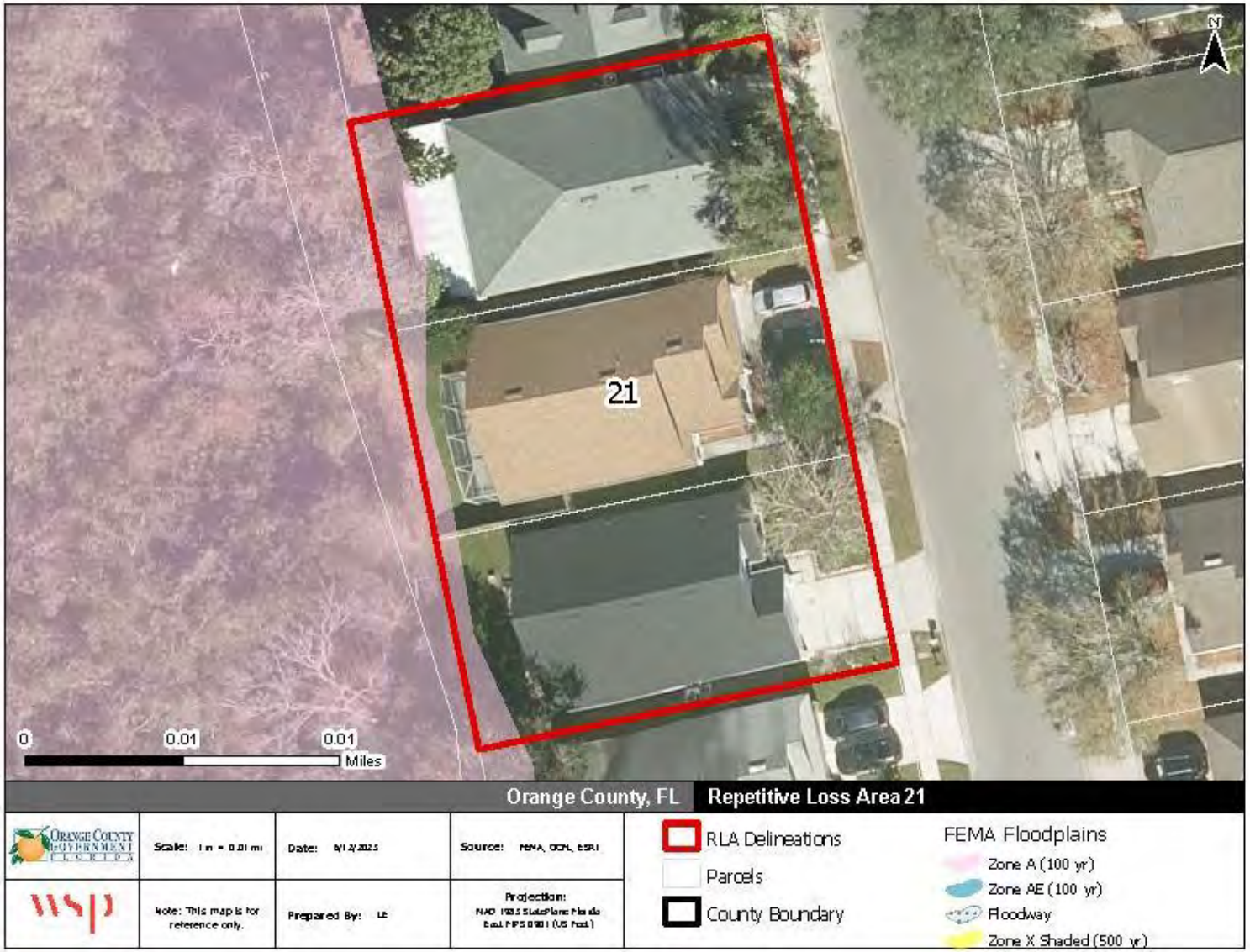
Table 2.5 – Area 21 Overview

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
21	1	1	1	3	Boca Woods Drive
Total	**1**	**1**	**1**	**3**	--

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

Area 21 contains three properties. The Repetitive Loss Areas are shown in relation to FEMA flood zones in Figure 2.22 on the following pages.

Figure 2.12 – Repetitive Loss Area 21



Example Properties

Storm drain along roadway

Driveway slightly below grade

House backs up close to lake

2.4.5 AREA 24

Repetitive Loss Area 24 is located entirely in the 100-yr flood zone. A canal runs around the back and along one of the properties. There are two properties in this repetitive loss area. Both are single-family residential houses with slab on grade foundations. One property has a drain under the driveway and the other has a similar drainage canal along the front of the property and a grated drain in the lawn at the end of the canal. Only one HVAC unit was visible, and it was not elevated.

Table 2.6 – Area 24 Overview

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
24	1	0	1	2	W South Street
Total	**1**	**0**	**1**	**2**	--

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

Area 24 contains three properties. The Repetitive Loss Areas are shown in relation to FEMA flood zones in Figure 2.17 on the following pages.

Figure 2.13 – Repetitive Loss Area 24

Example Properties

Canal alongside of property

Drainage under driveway

Drainage canal in front of property

2.4.6 AREA 25

Repetitive Loss Area 25 is located in the floodway and 100-yr and 500-yr floodplains. There are three properties in this repetitive loss area. Boggy Creek runs through the back of all three properties and a drainage runs along the side of two of the properties and into a large pond across the street from the repetitive loss area. overflow from the pond, creek, or canal would likely cause flooding. Two of the three properties are masonry homes. One property is not visible from the right of way.

Table 2.7 – Area 25 Overview

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	Ward Road
Total	**1**	**0**	**2**	**3**	--

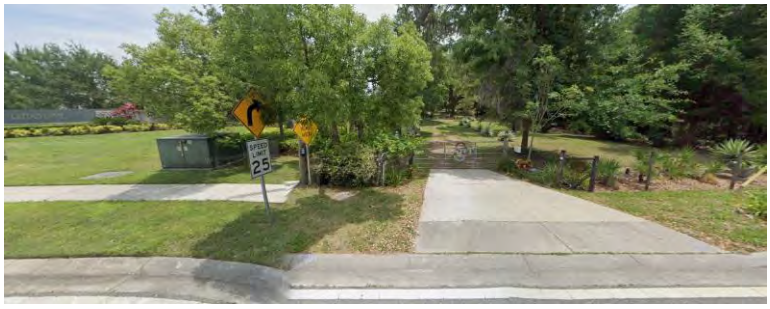
Note: Additional data on buildings within each repetitive loss area is located on the field survey forms in Appendix A.

Area 25 contains three properties. The Repetitive Loss Areas are shown in relation to FEMA flood zones in Figure 2.18 on the following pages.

Figure 2.14 – Repetitive Loss Area 25

Example Properties

Storm drain along roadway



Canal at front of property

2.4.7 AREA 26

Repetitive Loss Area 26 is located entirely in the 100-yr flood zone. There are eleven properties in this repetitive loss area. All of the single-family residential houses are masonry structures with slab on grade foundations. Most properties have gutters however a few lack gutters or other drainage mechanisms. All properties have curbs structured for street drainage, but there are no drains within the repetitive loss area.

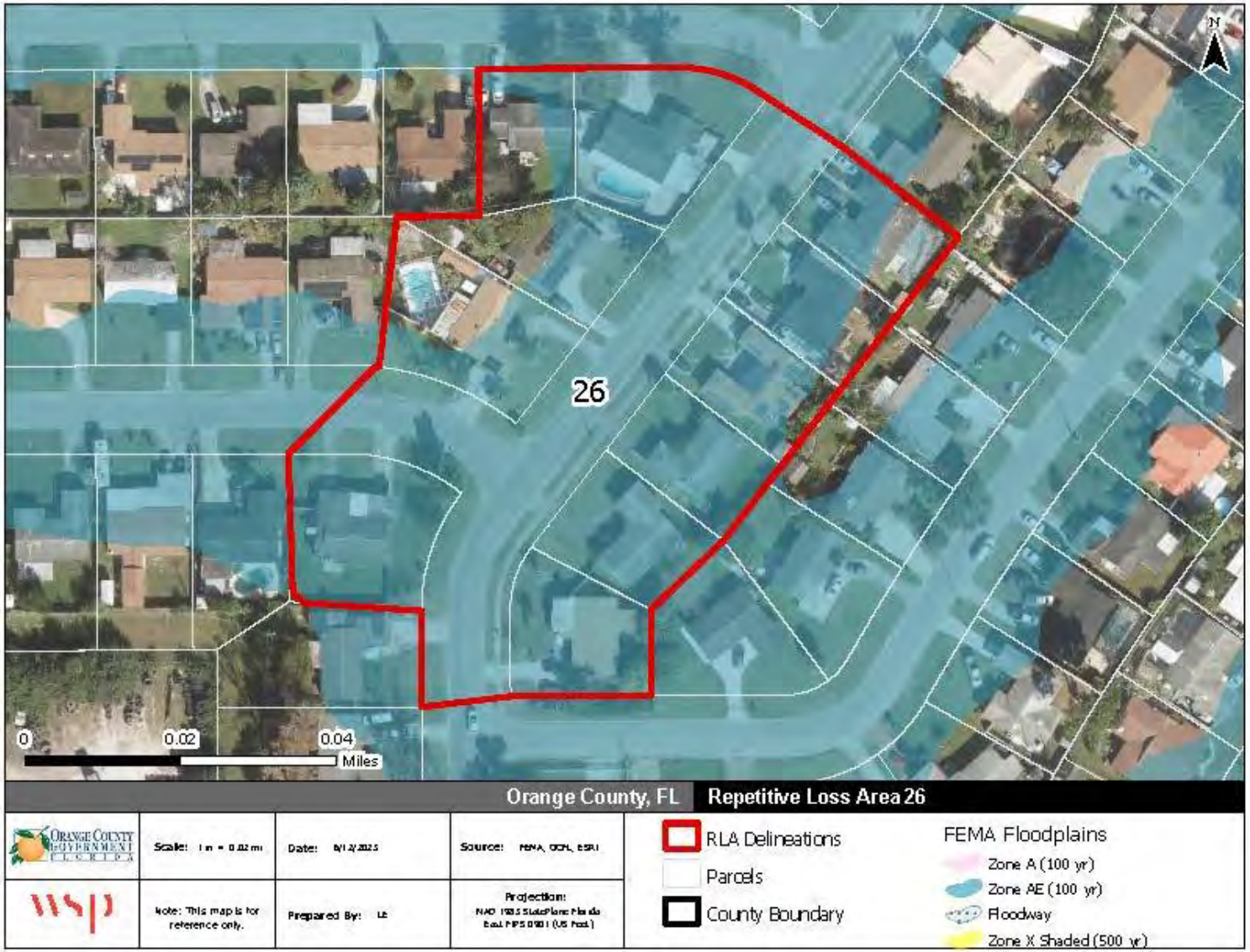
Table 2.8 – Area 26 Overview

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
26	1	0	6	7	Iron Oak Drive, Luzon Drive, Rock Oak Drive
Total	**1**	**0**	**6**	**7**	--

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

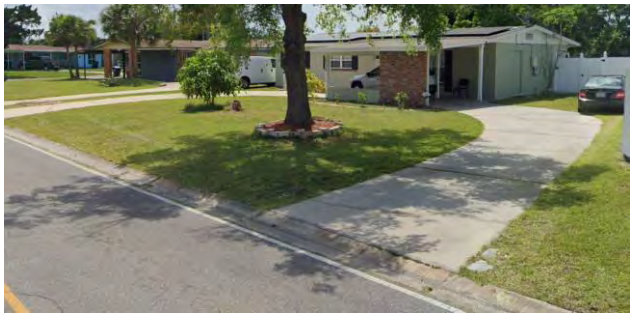
Area 26 contains seven properties. The Repetitive Loss Areas are shown in relation to FEMA flood zones in Figure 2.15 on the following pages.

Figure 2.15 – Repetitive Loss Area 26



Example Properties

House with gutters



Curb for drainage

2.4.8 AREA 27

Repetitive Loss Area 27 is located in the floodway, 100-yr, and 500-yr floodplain. Howell Creek runs through the properties in this repetitive loss area. There are seven properties in this repetitive loss area. All of the single-family residential houses are masonry structures with slab on grade foundations. The properties back up to Howell Creek and sit 50-100ft from the creeks edge. Three of the properties are below grade. Properties below grade and close to the creek likely experience regular flooding.

Table 2.9 – Area 27 Overview

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	Howell Branch Road
Total	**1**	**1**	**1**	**3**	--

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

Area 27 contains three properties. The Repetitive Loss Areas are shown in relation to FEMA flood zones in Figure 2.16Figure 2.22 on the following pages.

Figure 2.16 – Repetitive Loss Area 27

Example Properties

House below grade

House backs up to creek

House below grade

2.5 PROBLEM STATEMENT 2

Lake Flooding

Three of the nine identified Repetitive Loss Areas are located near or adjacent to the following lakes: Lake Mary Jane, Lake Irma, Little Sand Lake, Hourglass Lake, Lake Condel, Lake Tennessee, Starke Lake, and Lake Sheen. These Repetitive Loss Areas are located partially within the 100-/500-year floodplain but are generally subject to periodic flooding from heavy rains causing high lake stages and overbank flooding.

In many cases, flooding in these areas is also the result of inadequate lake outfall and drainage systems. These deficiencies, when coupled with prolonged heavy rainfall, result in flash flooding. Specifically, flash flooding can occur when the capacity of the lake or lake outfall is exceeded or if conveyance is obstructed by debris, sediment and other materials that limit the volume of drainage. In these areas, heavy rains can overwhelm the capacity of the lakes and lake outfalls, causing damage to surrounding buildings and infrastructure.

Some losses are due to heavy rainfall associated with hurricanes and tropical storms. Orange County was recently affected by Hurricane Ian in 2022, Hurricane Matthew in 2016 and Hurricane Irma in 2017. Some of the earlier losses can be attributed to Hurricane Charlie in 2004.

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

2.5.1 AREA 1

Repetitive Loss Area 1 is not located in a floodplain and is just off the eastern shore of Lake Mary Jane. Frequent wet and/or flooded conditions with standing water levels 2" to 3" above the ground have been reported in this area. One property owner indicated that drainage from nearby properties and insufficient ditch maintenance causes flooding issues in the area and that up to three feet of water have flooded the yard. The western portion of this area contains some wetland area, which is also where the drainage outfall for Devonshire Road to Lake Mary Jane is located. Flooding in this area was reported to have occurred in 2004, 2005, and 2017.

Table 2.10 – Area 1 Overview

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
1	1	1	5	7	Devonshire Road, S Lake Mary Jane Road
Total	**1**	**1**	**5**	**7**	--

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

Area 1 contains seven properties. The Repetitive Loss Area is shown in relation to FEMA flood zones in Figure 2.17 on the following page.

Figure 2.17 – Repetitive Loss Area 1

Example Properties

Drainage feature in front of property near roadway; HVAC unit not elevated

Drainage feature in from of property near roadway

Elevated deck and slab-on-grade foundation

2.5.2 AREA 6

Repetitive Loss Area 6 is located partially within the 100-yr floodplain. The area is adjacent to Lake Jessamine but flooding occurs typically from the eastern side of the area as a result of inadequate drainage to the lake. These properties all contain residential concrete structures with slab-on-grade foundations. Structures in this area are all elevated less than a foot above grade; however, in one case the surrounding

front yard sits higher than the structure. One property owner in this area has attempted to improve drainage on their property by excavating a ditch and removing barriers to the flow of water away from the structure.

Table 2.11 – Area 6 Overview

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
6	1	0	3	4	Parkdale Drive, Kenmore Circle
Total	**1**	**0**	**3**	**4**	--

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

There are four properties in total in Area 6. The Repetitive Loss Area is shown in relation to FEMA flood zones in Figure 2.18 on the following page.

Figure 2.18 – Repetitive Loss Area 6

Example Properties

HVAC unit not elevated

Front yard at higher elevation than structure

2.5.3 AREA 8

Repetitive Loss Area 8 is located partially located in the 100-yr floodplain near Lake Sheen. Flooding in this area likely occurs during flash flooding events as a result of inadequate drainage to Lake Sheen. Properties in this area were not sufficiently visible from the road for assessment of structural and site characteristics. Based on a review of 2022 Google imagery, all four properties appear to be residential structures, and two of the structures are large, multi-story buildings. A drainage feature runs along the road in front of part of this area.

Table 2.12 – Area 8 Overview

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
8	1	0	3	4	Winter Garden Vineland Road
Total	**1**	**0**	**3**	**4**	--

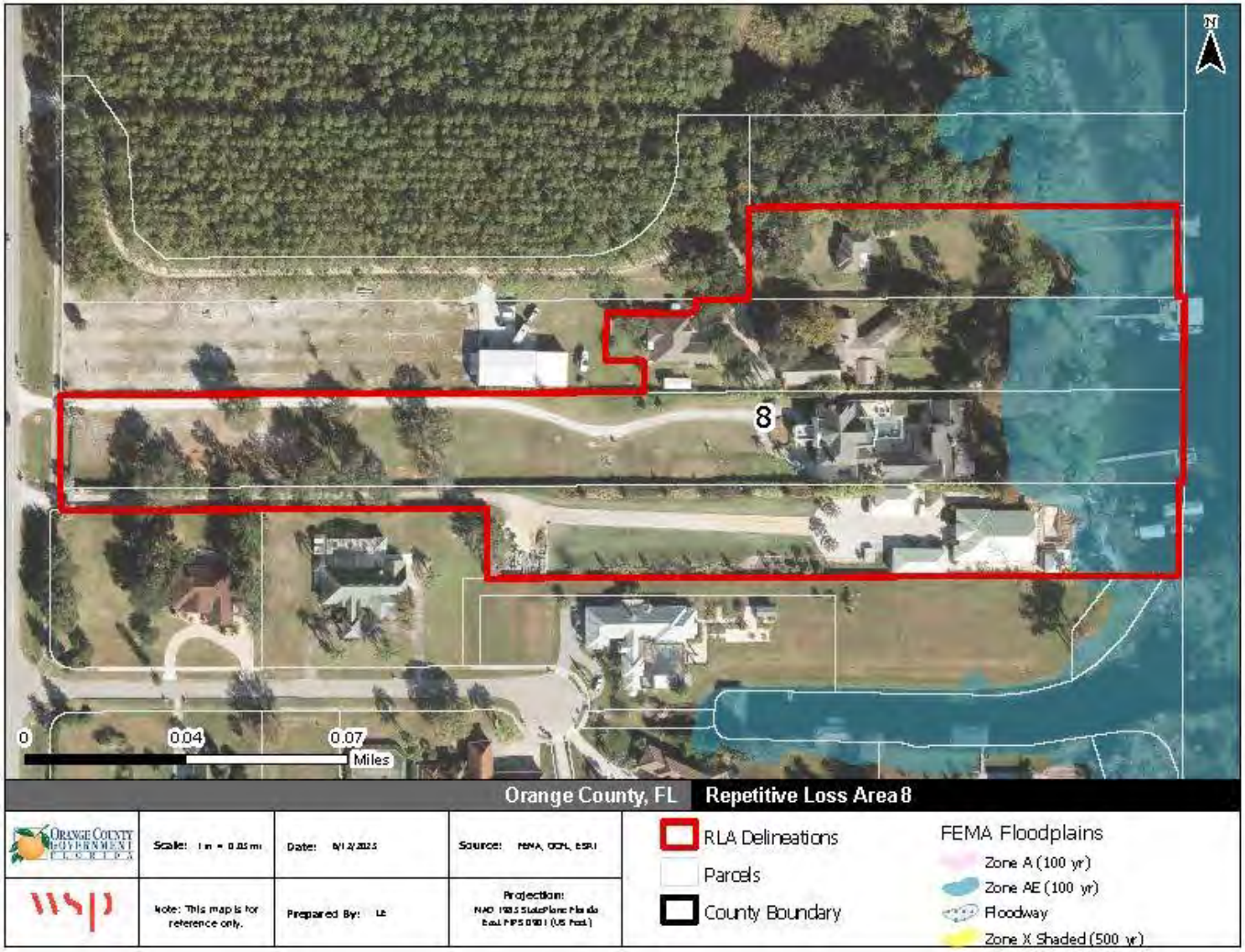
Note: Additional data on buildings within each repetitive loss area is located on the field survey forms in Appendix A

Area 8 contains a total of four properties. The Repetitive Loss Area is shown in relation to FEMA flood zones in Figure 2.19 on the following page.

Example Properties

Drainage ditch and culverts along roadway and under driveways

Figure 2.19 – Repetitive Loss Area 8



2.5.4 AREA 9

Repetitive Loss Area 9 is primarily located outside of the floodplain; however, the area is adjacent to Lake Irma and part of the area falls within the 100-yr floodplain. One property owner who has owned their home for less than 5 years reported that they have not experienced any flooding on their property. Of the four homes that were observable from the street, three have their first-floor elevation at grade and one is between 1-2 feet above the street elevation. All five structures are concrete with slab on grade foundations.

Table 2.13 – Area 9 Overview

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
9	1	0	4	5	N. Econlockhatchee Trail
Total	**1**	**0**	**4**	**5**	--

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

There are five properties located in Area 9. The Repetitive Loss Area is shown in relation to FEMA flood zones in Figure 2.20 on the following page.

Figure 2.20 – Repetitive Loss Area 9

Example Properties

Drainage swale in front yard

Drainage feature along road and under driveway

Drainage swale in front yard along road

2.5.5 AREA 10

Repetitive Loss Area 10 is not located in a floodplain, however, the area is one block west from Little Sand Lake. There is one repetitive loss properties in this area and two additional properties that face similar flood conditions. All three structures are masonry houses with slab on grade foundations. The structures are newer home in good condition.

Table 2.14 – Area 10 Overview

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	Via Rosa
Total	**1**	**0**	2	3	--

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

There are three properties located in Area 10. The Repetitive Loss Area is shown in relation to FEMA flood zones in Figure 2.21 on the following page.

Example Properties

Newer home with gutters

Figure 2.21 – Repetitive Loss Area 10

2.5.6 AREA 11

Repetitive Loss Area 11 is located almost completely within the 100-yr floodplain. Several of the properties back up to Lake Tennessee and Lake Condel. Twenty-Eight properties are located in this repetitive loss area; further investigation during field data collection found that these nearby properties faced similar flood conditions. Of those structures observable from the street, two have their first-floor elevation below grade. All of the observable structures are masonry or block, with a mix of slab on grade and a few crawlspace foundations. None of the observed HVAC units are elevated. Half of the houses do not have gutters and most lacked other forms of drainage around the properties.

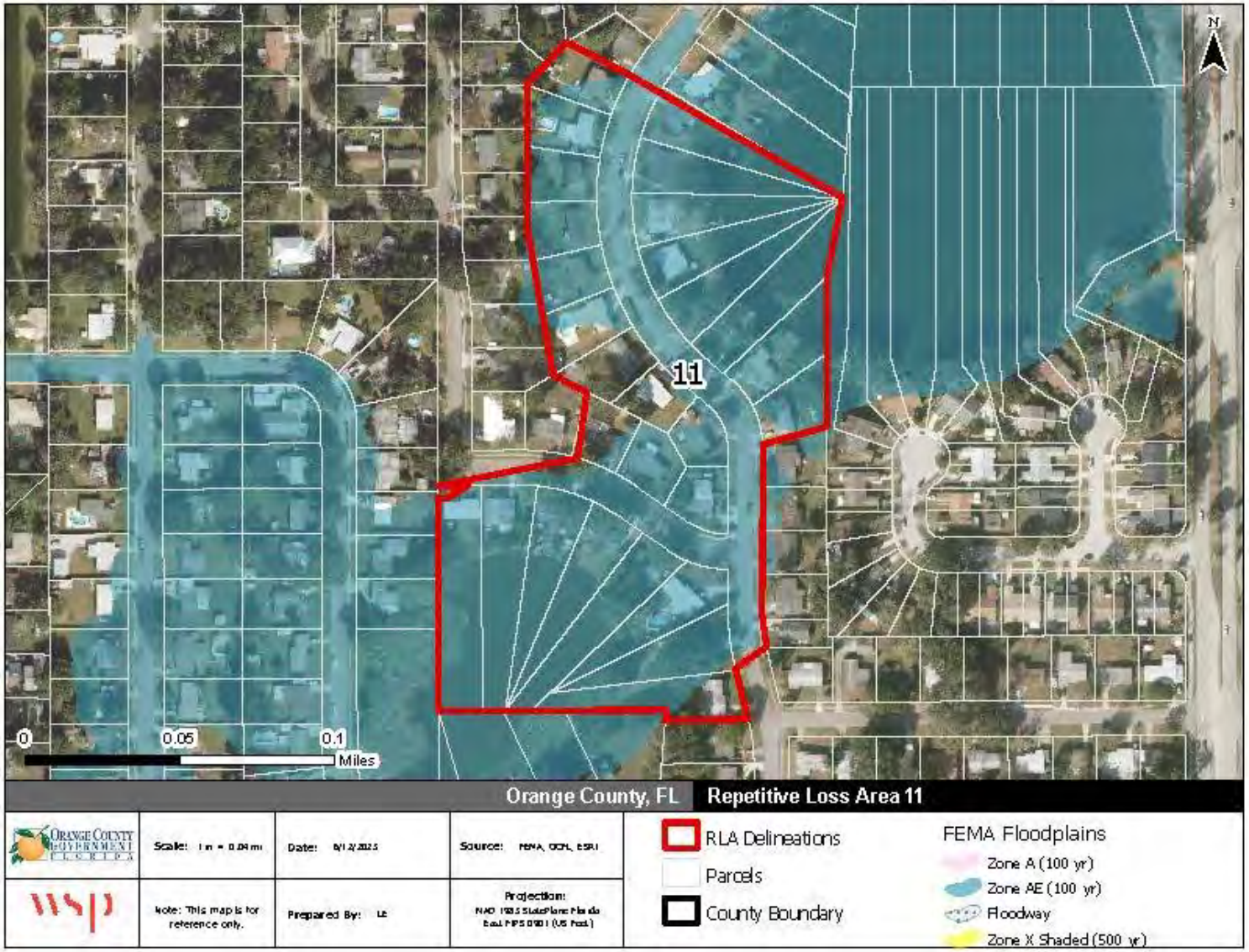
Table 2.15 – Area 11 Overview

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
11	1	4	23	28	Rogan Road, Dublin Street
Total	**1**	**4**	**23**	**28**	--

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

Area 11 contains 28 properties. The Repetitive Loss Areas are shown in relation to FEMA flood zones in Figure 2.22 on the following pages.

Figure 2.22 – Repetitive Loss Area 11



Example Properties

Storm drain along roadway

Driveway slightly below grade

House backs up close to lake

2.5.7 AREA 20

Repetitive Loss Area 20 is located entirely in the 100-yr floodplain and borders Hourglass Lake. There are 10 properties in this area and all of the houses back up to the lake. The back of the houses are between 180-60 ft from the shores edge. Close proximity to the lake is likely the primary source of flooding for this area. Most of the houses are wood frame or masonry with slab on grade or crawlspace foundations. Only one house is elevated and has vents.

Table 2.16 – Area 20 Overview

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names

17	1	2	7	10	Hourglass Drive, Hull Circle
Total	**1**	**2**	7	**10**	--

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

Area 20 contains 10 properties. The Repetitive Loss Area is shown in relation to FEMA flood zones in Figure 2.30 Figure 2.23 Figure 2.31 on the following page.

Example Properties

Elevated home with vents

Home backs up to lake

Figure 2.23 – Repetitive Loss Area 20

2.5.8 AREA 23

Repetitive Loss Area 23 is located just outside of the 100-yr floodplain and borders Starke Lake. There are four properties in this area three of which back up to the lake. The back of the houses are between 130-100 ft from the shores edge. Close proximity to the lake and subsequent overbank flooding is likely the primary source of flooding for this area. All of the structures are masonry houses with slab on grade or crawlspace foundations. One property has vents around the base of the structure. Another structure close to the lakes edge has a backyard below grade.

Table 2.17 – Area 23 Overview

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
23	1	0	3	4	N Lakeshore Drive, E McKey Street
Total	**1**	**0**	**3**	**4**	--

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

Area 23 contains four properties. The Repetitive Loss Area is shown in relation to FEMA flood zones in Figure 2.30 Figure 2.24Figure 2.31 on the following page.

Example Properties

Backyard below grade

House close to Lake Starke

Figure 2.24 – Repetitive Loss Area 23

2.6 PROBLEM STATEMENT 3

Localized/Stormwater Flooding

Eight Repetitive Loss Areas are located outside the 100-/500-year floodplain in areas subject to periodic flooding from heavy rains and localized stormwater flooding. The approach to reducing repetitive flooding in these areas will require a combination of floodproofing techniques, education, and drainage improvement projects.

Most of the repetitive loss flooding in these areas results from prolonged heavy rainfall that produces flash flooding, causing damage to residential and commercial buildings as well as numerous street closures due to floodwaters overtopping the roadway. Flash flooding can occur when the capacity of the stormwater system is exceeded or if conveyance is obstructed by debris, sediment and other materials that limit the volume of drainage.

Some losses are due to heavy rainfall associated with hurricanes and tropical storms. Orange County was recently affected by Hurricane Ian in 2022 and additional past storms, Hurricane Matthew in 2016 and Hurricane Irma in 2017. Some of the past flood losses were due to Hurricane Charlie in 2004 and other previous events.

2.6.1 SUBAREA 4

Repetitive Loss Area 4 is located outside of any flood zones. Structures in this area are primarily concrete buildings with slab on grade foundations. Most structures are 2-family residential buildings, with the exception of a single-family residential structure. All buildings sit at least 1-2 feet above street elevation and most have front lawns sloping down toward the street. Two HVAC units were observed elevated to the first-floor elevation; however, two others seen were not elevated at all. A retention pond sits to the southeast of this area, and may be a potential source of flooding. Several properties have drainage swales between lots; however, not all swales are observable due to fencing, and some are blocked additions. Those properties without clear drainage pathways between lots may be more vulnerable to flooding.

Repetitive Loss Area 5 is located outside of the floodplain. There are three commercial buildings in this area with slab on grade foundations and a mix of concrete and wood frame construction. One HVAC unit was seen not elevated, while on another property all HVAC units were elevated well above the first-floor.

Repetitive Loss Area 28 is located outside of the floodplain. There are three properties in this area all of which are single-family masonry homes with slab on grade foundations. All properties are in good condition. Two properties have gutters that direct water away from the structures and one has a grated drain in the grass in front of the property. Another property has a driveway slightly above grade.

Table 2.18 – Subarea 4 Overview

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
4	1	0	5	6	Pot O Gold Lane
5	1	0	2	3	S. Orange Avenue
28	1	0	2	3	Hoffner Avenue
Total	**3**	0	**9**	**12**	--

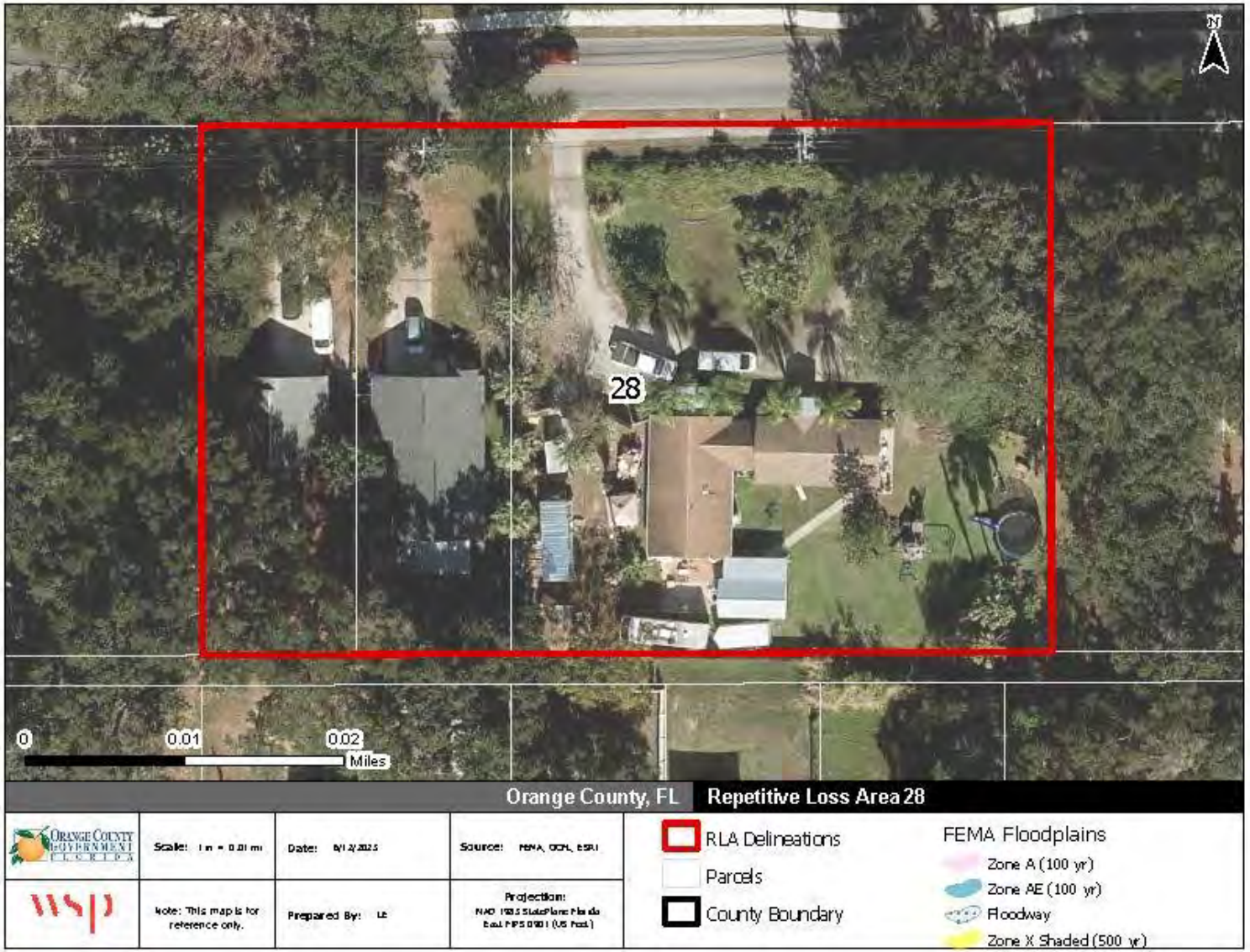
Note: Additional data on buildings within each repetitive loss area is located on the field survey forms in Appendix A

There are 12 properties in total in Subarea 4. The Repetitive Loss Areas are shown in relation to FEMA flood zones in Figure 2.25 through Figure 2.27 on the following pages.

Figure 2.25 – Repetitive Loss Area 4

Figure 2.26 – Repetitive Loss Area 5

Figure 2.27 – Repetitive Loss Area 28



Example Properties

Drainage swale between lots

HVAC unit elevated to first-floor elevation; drainage area filled by addition

HVAC unit not elevated

HVAC elevated above first-

2.6.2 AREA 7

Repetitive Loss Area 7 is located outside of any flood zones. All properties in this area are manufactured homes with crawlspace foundations. None of the three properties have their HVAC units elevated. All three properties have gutters. These properties sit just south of Interstate 4 and there is a drainage ditch along the interstate and behind these manufactured homes most likely contributed to the flooding of these properties.

Table 2.19 – Area 7 Overview

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	Mo Ho Drive
Total	**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 three properties. The Repetitive Loss Area is shown in relation to FEMA flood zones in Figure 2.28 on the following page.

Figure 2.28 – Repetitive Loss Area 7

2.6.3 AREA 12

Repetitive Loss Area 12 is located outside of the floodplains. All properties in this area are newer structures – two are masonry and one is a wood frame property. All three structures have a slab on grade foundation. All three properties have gutters, however only one property has an additional storm drain. When overwhelmed, this storm drain may contribute to flooding of these properties. Lack of other drainage may cause this drain to become inundated during heavy rainfall events.

Table 2.20 – Area 12 Overview

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
12	1	0	2	3	Camberley Circle
Total	**1**	0	**2**	**3**	--

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

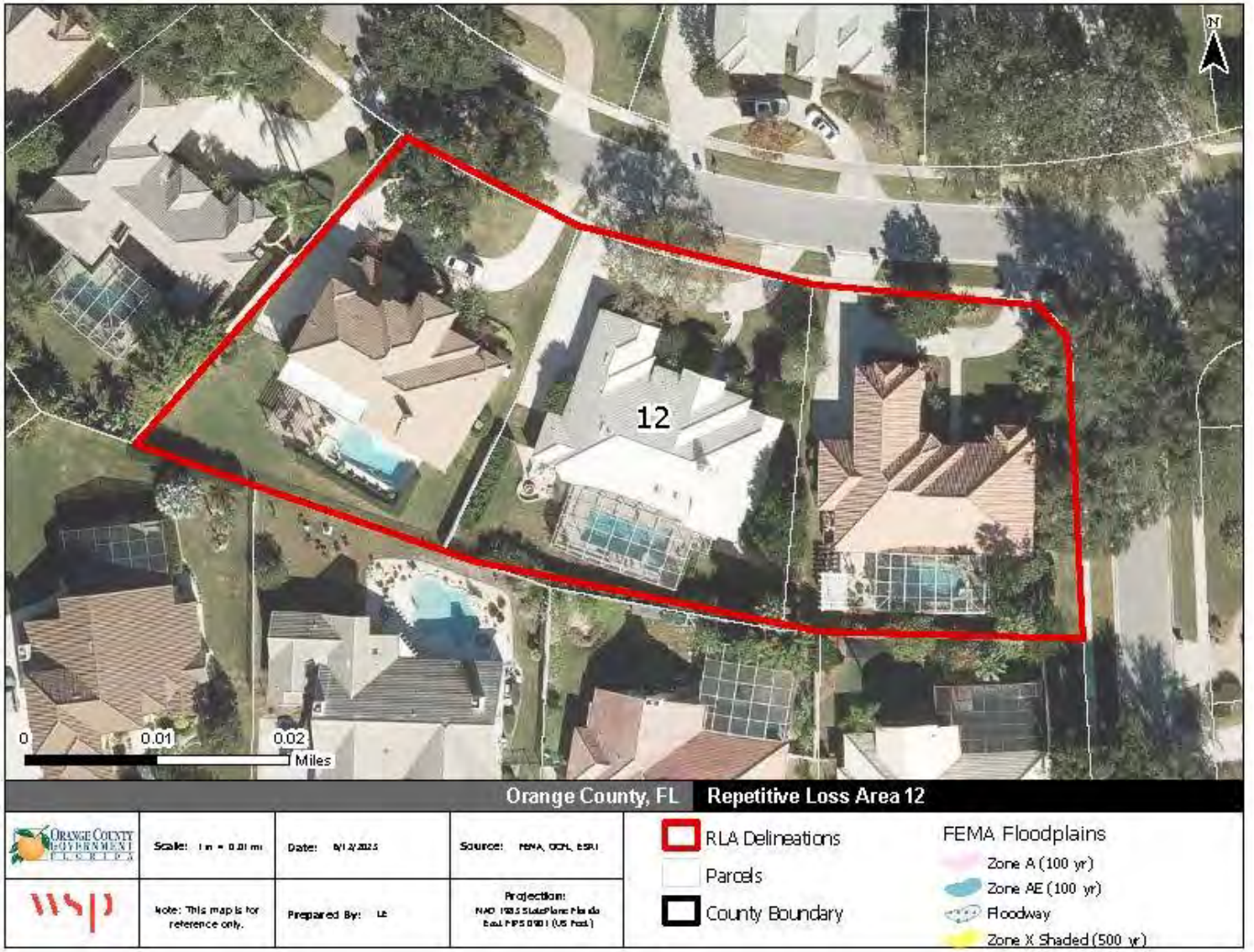
Area 12 contains three properties. The Repetitive Loss Area is shown in relation to FEMA flood zones in Figure 2.29 on the following page.

Example Properties

Two story home with adequate gutters

Drainage feature along road

Figure 2.29 – Repetitive Loss Area 12



2.6.4 AREA 14

Repetitive Loss Area 14 is located outside of the floodplain. Structures in this area are masonry buildings with slab on grade foundations. All buildings sit at grade. The buildings in this area do not have gutters however the curbs in front of the homes direct water to a storm drain in the road in front of one of the properties. Without rain gutters, water can collect any low areas around the property and contribute to flooding.

Table 2.21 – Area 14 Overview

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
14	1	0	2	3	Stull Avenue
Total	**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 14 contains three properties. The Repetitive Loss Area is shown in relation to FEMA flood zones in Figure 2.30 on the following page.

Example Properties

Drainage feature along road

Masonry home without gutters

Figure 2.30 – Repetitive Loss Area 14

2.6.5 AREA 15

Repetitive Loss Area 15 is located outside of any flood zones. There are four properties in this area. The structures are either masonry or wood frame single family houses with slab on grade or crawlspace foundation. All of the homes are in good condition. All of the properties have gutters and either a drainage canal under the driveway or a grated drain in the front lawn.

Table 2.22 – Area 15 Overview

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
15	1	1	2	4	Madeline Avenue
Total	**1**	**1**	**2**	**4**	--

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

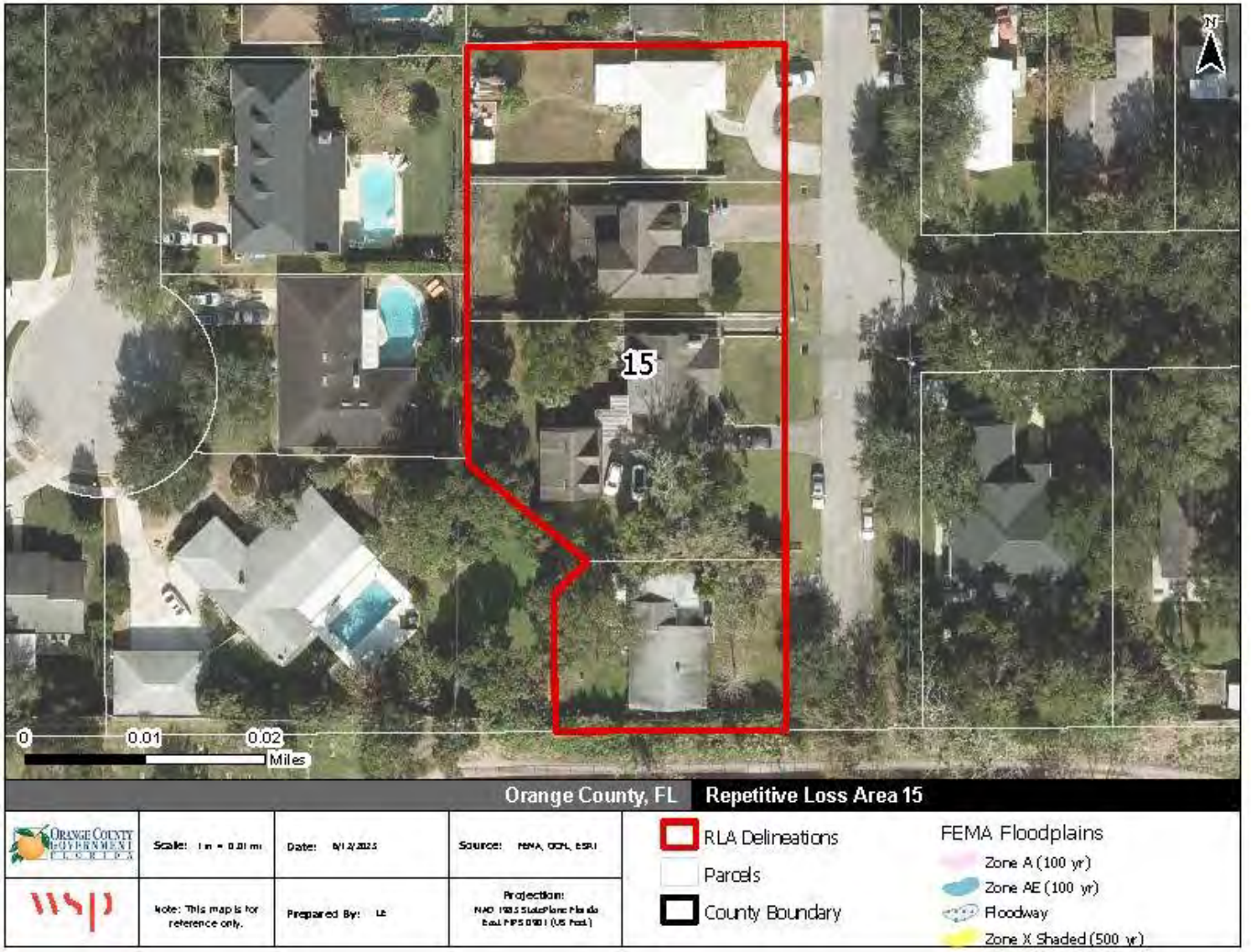
Area 15 contains three properties. The Repetitive Loss Area is shown in relation to FEMA flood zones in Figure 2.30 Figure 2.31 on the following page.

Example Properties

Drainage canal under driveway

Grated drain in front lawn

Figure 2.31 – Repetitive Loss Area 7



2.6.6 AREA 17

Repetitive Loss Area 17 is located outside of the floodplain, however, the repetitive loss area is close to the 100-yr floodplain. There are two commercial buildings with 23 individual units in this area. The two buildings are masonry/brick structures with slab on grade foundations. Both structures have gutters along the buildings that drain toward the back of the building. The gutters drain into a vegetated bed and toward each of the adjacent buildings. Water is directed to a paved parking lot behind the two building which could cause flooding.

Table 2.23 – Area 17 Overview

Repetitive Loss Area	# of RL Properties	# of Historic RL Properties	# of Additional Properties	Total # of Properties in RL Area	Road Names
17	1	1	21	23	Madeline Avenue
Total	**1**	**1**	**21**	**23**	--

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

Area 17 contains 23 properties. The Repetitive Loss Area is shown in relation to FEMA flood zones in Figure 2.30 Figure 2.32 on the following page.

Example Properties

Drainage between the two buildings

Figure 2.32 – Repetitive Loss Area 17

2.7 STEP 4. REVIEW ALTERNATIVE MITIGATION APPROACHES

2.7.1 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 2.33 below, found in the 2017 CRS Coordinator's Manual, lists typical property protection measures.

Figure 2.33 – 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.

Source: 2017 CRS Coordinators Manual

For this riverine flooding problem area, undergoing significant property protection measures to remove the properties from flood risk, either through elevation or through acquisition and demolition, is the only way to avoid future flood losses. Providing flood protection through structural projects may eliminate some building damage and road closures in these areas but cannot guarantee that future flood losses will be avoided. These structural methods require large capital expenditures and cooperation from private property owners and therefore may be difficult to implement. 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, and press releases can help get these messages out to residents.

2.7.2 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	BRIC	SRL	ICC	SBA
Acquisition of the entire property by a gov't agency	✓	✓	✓	✓		
Relocation of the building to a flood free site	✓	✓	✓	✓	✓	✓
Demolition of the structure	✓	✓	✓	✓	✓	✓
Elevation of the structure above flood levels	✓	✓	✓	✓	✓	✓
Replacing the old building with a new elevated one	✓			✓	✓	✓
Local drainage and small flood control projects	✓			✓		
Dry floodproofing (non-residential buildings only)		✓	✓	✓	✓	✓
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

2.7.3 POTENTIAL MITIGATION MEASURES

2.7.3.1 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. This alternative is limited in central Florida.
- For basements, especially with combined storm sewer and sewer systems, backflow preventer valves can prevent storm water and sewer from entering crawlspaces and basements. Not viable in central Florida.
- 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).
- Construct elevated walkways.
- 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.
- Install drain pumps in lakes to reduce lake levels.

2.7.3.2 NON-STRUCTURAL ALTERNATIVES:

- Relocate internal supplies especially chemicals and other products/goods above the flooding depth.
- Improve the County's floodplain and zoning ordinances to expand conservation and open space areas.
- Consider expanding riparian impervious surface setbacks.
- Increase public education through posting information about local flood hazards on County website, posting signs at various locations in neighborhoods, or discussing flood protection measures at homeowner's association meetings and other County events.
- Promote the purchase of flood insurance even in X or C Zones.
- Implement volume control and runoff reduction measures in the County's Stormwater Management Ordinance.

2.7.4 CURRENT MITIGATION PROJECTS

2.7.4.1 WATERSHED MASTER PLANS

The County maintains master plans on all major watersheds in the County. Updating the plans involves surveying and studying the watersheds using LiDAR data, modeling the flood conditions, mapping the floodplains, and evaluating their level of service. Once complete, the plans serve as a valuable tool for understanding flood risk in the County and planning drainage improvements and other mitigation measures.

2.7.4.2 STORMWATER RETROFITS

The County is currently completing multiple projects related to stormwater issues in the watersheds that contain these repetitive loss areas. The Public Works department continues to develop a Comprehensive Structural Inventory plan for stormwater infrastructure. Underway and planned projects include Hurricane Ian slope restoration and stormwater retrofit of E-6 Borrow Pit, pond improvements of Bulova Pond, ponds in Andover Lakes Village, and Buena Vista & Observatory.

2.7.4.3 ORLO VISTA/WESTSIDE MANOR FLOOD MITIGATION

During Hurricane Irma in 2017, excessive rainfall over the Orlo Vista/Westside Manor caused extensive flooding. Since the storm, the County has implemented several mitigation measures including clog prevention and canal sediment cleaning, pump station inspections and maintenance, and development of a flood warning system. The County completed a drainage improvement design for three existing ponds to increase the depth and capacity of the ponds and the implementation of a new pump station. Construction of the mitigation measures is currently underway and estimated to be complete in 2024.

2.7.5 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.

2.7.5.1 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
• 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.	• 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 three 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.

2.7.5.2 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
• 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.	• 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

2.7.5.3 *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
• Relative cost of mitigation is less expensive than other alternatives. • No alterations to the actual structure or foundation are required. • Homeowners can typically construct their own barriers that will complement the style and functionality of their house and yard.	• 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 sandbag or otherwise close any openings in the barrier during the entire flood event

2.7.5.4 *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
• Often less costly than other mitigation measures. • Allows internal and external hydrostatic pressures to equalize, lessening the loads on walls and floors.	• 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
• Often less costly than other retrofitting methods • Does not require additional land. • May be funded by a FEMA mitigation grant program.	• 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
• 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.	• 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.

2.7.5.5 *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
• 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.	• 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.

NOTE: Elevating a structure with a slab-on-grade foundation can cost over 30 percent more than elevating a structure on a crawlspace foundation. Many of the properties located in Orange County's Repetitive Loss Areas have slab-on-grade foundations, which may mean this mitigation alternative will be cost-prohibitive.

2.7.5.6 *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
• 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.	• Cost may be prohibitive. • Policyholders may have trouble understanding policy and filing claims. • Does not prevent or mitigate damage.

2.8 STEP 5. CONCLUSION AND RECOMMENDATIONS

2.8.1 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, it is recommended that Orange County implement additional mitigation measures for these Repetitive Loss Areas. Table 2.33 examines past and current mitigation actions throughout the County that may be relevant in this area.

Table 2.33 – Past and Current Mitigation Actions

	Past and Current Mitigation Actions
1	The County is completing stormwater retrofits through its capital improvements program and is undergoing watershed master planning to better plan for future drainage improvements.
2	The County has previously eliminated four properties from the repetitive loss list through flood protection.
3	Property owners are aware of flooding causes. Some property owners have undertaken specific floodproofing measures at their own expense, such as elevating HVAC equipment and digging drainage ditches, as well as one property owner building a floodwall on their property.
4	The County has undertaken capital improvement projects to improve drainage and conducts stormwater drainage system maintenance including installation of drain pumps in lakes to lower levels.

2.8.2 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 Requirement

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 completed within 4 to 5 years): Score of 4.00 – 5.00

2.8.3 RECOMMENDATIONS

The following recommendations detail the actions the County will take to reduce flooding and flood losses in these Repetitive Loss Areas. Flood protection measures will be the most effective in these areas; therefore, the County will target these Repetitive Loss Areas for building acquisition and demolition projects. The County will also discuss the possibility of building elevation with homeowners who don't want to sell their homes. Given that acquisition can be a lengthy process and floods can occur at any time, the County will pursue other alternatives in the interim, including encouraging 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.

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 continue, on an **annual basis**, to target all properties in the repetitive loss areas reminding them of the advantages of maintaining flood insurance through its annual outreach effort. Repetitive Loss Areas are a target area in the County's Program for Public Information (PPI).

Responsibility: The County's Public Works Department Stormwater Management Division 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 Orange County's operating budget.

Priority: High

Areas: All repetitive loss areas

Mitigation Action 2: Property Protection Outreach

Property owners should not store personal property in basements and crawl spaces and lower levels of buildings 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 Public Works Department Stormwater Management Division will provide suggestions of floodproofing techniques to all property owners within the repetitive loss areas.

Funding: The cost will be paid for from Orange County's operating budget.

Priority: High

Areas: All repetitive loss areas

Mitigation Action 3: Floodproofing

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

Responsibility: The County's Public Works Department Stormwater Management Division will promote effective flood protection and floodproofing measures and provide advice and assistance to property owners who may wish to implement such measures in an **on-going** 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

Areas: All repetitive loss areas

Mitigation Action 4: Acquisition and Demolition

Pursue the acquisition and/or demolition mitigation of high-risk flood-prone properties. The properties in these riverine flooding problem areas that face the greatest flood risk are the highest priorities for this type of mitigation because drainage improvements, barriers, and other major projects are unlikely to provide an adequate level of protection.

Responsibility: The County's Public Works Department Stormwater Management Division will continue to target properties for acquisition/demolition.

Funding: The acquisition and demolition will be paid for using FEMA mitigation grant funds like the Hazard Mitigation Grant Program (HMGP) and Flood Mitigation Assistance program (FMA). Staff time to develop the list of target properties will require funds from the County's operating budget.

Priority: Low

Areas: All repetitive loss areas

Mitigation Action 5: Drainage-Related CIP Projects

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

Responsibility: The County's Public Works Department Stormwater Management Division.

Funding: The cost will be paid for by the County's operating budget.

Priority: Medium

Areas: All repetitive loss areas

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 such as elevating HVAC units.

Responsibility: The County's Public Works Department Stormwater Management Division will promote effective flood protection measures in an **on-going** program by providing advice and assistance to property owners who may wish to implement such measures.

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

Priority: Medium

Areas: All repetitive loss areas

Mitigation Action 7: Watershed Master Plans

Complete the updates to the Boggy Creek and Lake Hart Watershed Master Plans. The floodplain modeling and mapping involved in these projects may assist in better understanding the flood dynamics affecting the repetitive loss areas in these watersheds and help to identify further steps for flood prevention.

Responsibility: The County's Public Works Department Stormwater Management Division will lead the watershed master planning process for all of the County's watersheds.

Funding: The cost will be paid for by the County's operating budget.

Priority: Medium

Areas: 2 and 3

Mitigation Action 8: Drainage Maintenance Outreach

Property owners should keep drainage features, including drainage swales between lots, open and clear of debris. Permanent structures and storage should not be located in these areas, as any obstructions may reduce the capacity and efficacy of the drainage features.

Responsibility: The County's Public Works Department Stormwater Management Division will incorporate information on the importance of drainage maintenance and building responsibly into flood protection outreach and assistance services.

Funding: The cost will be paid for by the County's operating budget.

Priority: Medium

Areas: 1, 6, 8, 9

Mitigation Action 9: Lake Drainage Wells

Where flooding is caused by lake overtopping, Orange County will install lake drainage wells to lower lake flood levels. This option may be appropriate for Lake Mary Jane, Lake Sheen, and Lake Irma, but requires further investigation.

Responsibility: The County's Public Works Department Stormwater Management Division will assess the need for lake drain pumps and implement where appropriate.

Funding: The cost will be paid for by the County's stormwater utility and capital improvements funding.

Priority: Medium

Areas: 1, 6, 8, 9

Mitigation Action 10: Elevation

Encourage property owners of manufactured homes and structures with crawlspace foundations to consider elevating their homes.

Responsibility: The County's Public Works Department Stormwater Management Division will promote elevation, where appropriate and cost effective, through targeted outreach.

Funding: Funding may be available through FEMA HMGP and Orange County's Stormwater Utility. Outreach and assistance will require staff time and additional funds from the County's operating budget.

Priority: Medium

Areas: 4, 5, and 7

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	3	5	3	4	**4.10**
5: Drainage-related CIP projects	4	2	2	3	4	**2.95**
6: Flood protection assistance	2	2	3	2	1	**2.10**
7: Watershed Master Plans	5	2	1	2	3	**2.80**

Mitigation Action #	Prioritization Variables (Weight)					Total
	Cost (30%)	Funding Availability (25%)	Property Owner Willingness (20%)	Staff Resources (15%)	Planning Needs (10%)	
8: Drainage maintenance outreach	2	2	4	2	2	**2.40**
9: Lake Drain Pumps	3	2	1	3	2	**2.25**
10: Elevation	4	3	4	3	4	**3.60**

3 REFERENCES

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- Federal Emergency Management Agency, National Flood Insurance Program, Community Rating System CRS Coordinator's Manual. FIA-15/2017. Section 510.
- Federal Emergency Management Agency, National Flood Mitigation Data Collection Tool and RLP Viewer, User's Guide. FEMA 497/August 2008.
- Federal Emergency Management Agency, Reducing Damage from Localized Flooding: A Guide for Communities. FEMA 511/June 2005. Part III Chapter 7.
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- Federal Emergency Management Agency, Flood Insurance Study, Orange County, Florida and Incorporated Areas, September 24, 2021.
- Federal Emergency Management Agency, National Flood Insurance Program, Community Rating System, Mapping Repetitive Loss Areas, October 2015.
- 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.