

Table 4.16 – Content Replacement Factors

Property Type	Content Replacement Values
Residential	50%
Commercial	100%
Educational	100%
Government	100%
Religious	100%
Industrial	150%

Table 4.17 details the estimated losses for the 1%-annual-chance flood event, calculated using Hazus methodologies for value of contents based on occupancy type. The loss value is based on the total of improved building value and contents value. Land value is not included in any of the loss estimates as generally land is not subject to loss from floods.

Table 4.17 – Estimated Building Damage and Content Loss for 1%-Annual-Chance Flood

Occupancy Type	Number of Buildings with Loss	Total Value (Building & Contents)	Estimated Building Damage	Estimated Content Loss	Estimated Total Damage	Loss Ratio
Agriculture	9	\$1,685,266	\$229,525	\$453,654	\$683,178	41%
Commercial	12	\$9,372,784	\$545,746	\$1,434,518	\$1,980,265	21%
Educational	0	\$0	\$0	\$0	\$0	0%
Government	35	\$31,672,290	\$1,450,944	\$9,124,967	\$10,575,911	33%
Industrial	82	\$307,809,585	\$7,249,002	\$18,132,817	\$25,381,819	8%
Religion/Non-Profit	2	\$1,357,376	\$75,773	\$584,703	\$660,475	49%
Residential	2,514	\$1,128,609,267	\$184,344,243	\$100,409,445	\$284,753,689	25%
Total	2,654	\$1,480,506,568	\$193,895,233	\$130,140,104	\$324,035,337	22%

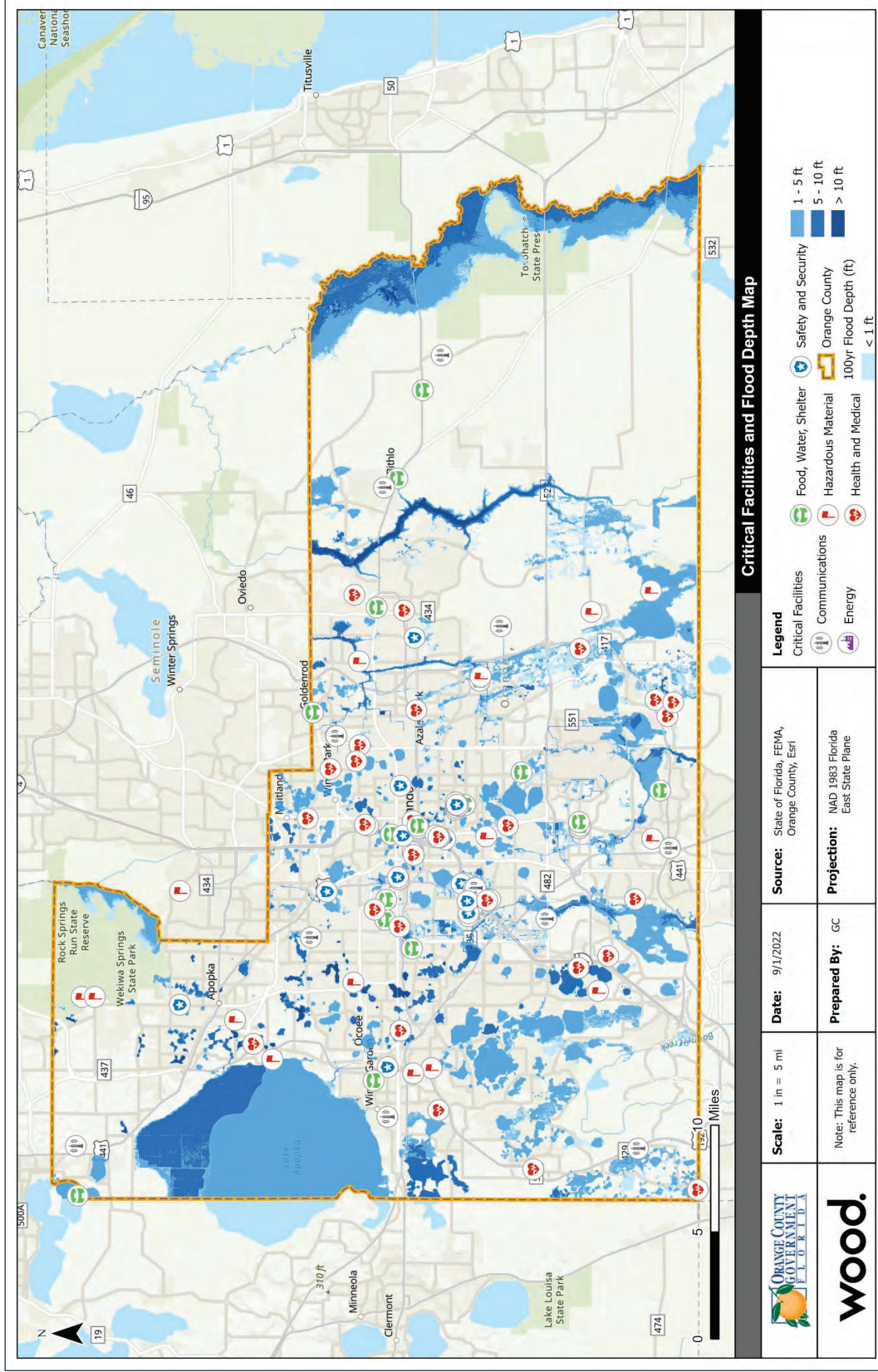
Table 4.18 details the critical facilities within the County that are exposed to the 1%-annual-chance flood event. There are no critical facilities exposed to the 0.2%-annual-chance flood event.

Table 4.18 – Critical Facilities at Risk to 1% and 0.2% Annual-Chance Floods

Facility Name	Address	Facility Type	Estimated 100-Yr Flood Depth (Ft)
Zone AE			
Blanchard Park Lift Station	2451 N Dean Rd, Orlando, FL	Hazardous Material	0.79
Orlando Health Randal Park (Fsed)	10155 Dowden Rd	Health and Medical	Data Not Available
Zone A			
University Behavioral Center	2500 Discovery Dr, Orlando	Health and Medical	Data Not Available
Animal Services; ESF #17	2769 Americana Blvd, Orlando, FL	Health and Medical	Data Not Available

Figure 4.14 depicts critical facilities in relation to the 1%-annual-chance flood depths.

Figure 4.14 – 1%-Annual-Chance-Flood Depth and Critical Facilities



Flood Insurance Analysis

Flood insurance data on active policies and past claims is a valuable source of information on flood hazards. Flood insurance is required as a condition of federal aid or a mortgage or loan that is federally insured for a building located in a FEMA flood zone.

Orange County has been a regular participant in the NFIP since December 1981. Orange County has achieved a Class 5 flood insurance rating through participation in the NFIP’s Community Rating System which rewards all policyholders in the SFHA with a 25% reduction in their flood insurance premiums. Non-SFHA policies (Standard X Zone policies) receive a 10% discount, and preferred risk policies receive no discount. The following tables reflect NFIP policy and claims data for the County categorized by occupancy type, flood zone, Pre-FIRM and Post-FIRM.

Table 4.19 reflects current policies in force and all past paid flood insurance claims by structure type. In 2017, Orange County had 10,003 active policies and 233 paid claims. In the last five years, the County’s count of active policies has decreased by 27%, but total paid claims have more than tripled.

Table 4.19 – NFIP Policy and Claims Data by Occupancy Type

Structure Type	Number of Policies in Force	Total Premium	Total Coverage	Number of Closed Paid Losses	Total of Closed Paid Losses
Single Family	6,422	\$3,256,969	\$1,864,821,400	716	\$3,908,075.19
2-4 Family	81	\$40,689	\$17,544,700	6	\$28,318.99
All Other Residential	488	\$125,178	\$123,036,700	34	\$163,077.65
Non Residential	297	\$644,488	\$154,271,700	41	\$2,052,216.43
Total	7,288	\$4,067,324	\$2,159,674,500	797	\$6,151,688.26

Source: FEMA Community Information System, data as of May 2, 2022

Table 4.20 summarizes all active policies and past paid claims by flood zone. About 70% of active policies are for structures in B, C, and X Zones. Nearly 36% of paid claims have been for structures in B, C, and X Zones.

Table 4.20 – NFIP Policy and Claims Data by Flood Zone

Flood Zone ¹	Number of Policies in Force	Total Premium	Total Coverage	Number of Closed Paid Losses	Total of Closed Paid Losses
A01-30 & AE Zones	1,667	\$1,117,186	\$420,519,800	278	\$1,820,714.99
A Zones	626	\$508,016	\$158,945,000	130	\$735,175.06
B, C & X Zone					
Standard	712	\$462,982	\$213,668,800	115	\$1,081,361.56
Preferred	4,715	\$2,176,377	\$1,494,159,000	269	\$2,618,209.93
Total	7,720	\$4,264,561	\$2,287,292,600	792	\$6,255,461.54

Source: FEMA Community Information System, data as of May 2, 2022

¹Flood zone is indicative of historic policy zone. Zones B and C are historic policy zones.

Table 4.21 summarizes active policies and paid claims for pre-FIRM buildings, which are those built before December 1, 1981, the date of the community’s initial FIRM. Pre-FIRM buildings were built before detailed data on flood risk was available and before the community had enacted comprehensive regulations on floodplain development. Therefore, pre-FIRM buildings may be at greater risk because they were not built with flood protection in mind. Pre-FIRM buildings account for 26% of active policies but nearly 46% of paid claims.

Table 4.21 – NFIP Policy and Claims Data Pre-FIRM

Flood Zone ¹	Number of Policies in Force	Total Premium	Total Coverage	Number of Closed Paid Losses	Total of Closed Paid Losses
A01-30 & AE Zones	747	\$717,879	\$167,131,600	155	\$917,528.82
A Zones	184	\$219,233	\$39,450,000	49	\$442,069.14
B, C & X Zone	1,045	\$531,254	\$304,346,300	159	\$2,597,703.87
Standard	253	\$163,709	\$67,459,300	61	\$802,410.18
Preferred	792	\$367,545	\$236,887,000	98	\$1,795,293.69
Total	1,976	\$1,468,366	\$510,927,900	363	\$3,957,301.83

Source: FEMA Community Information System, data as of May 2, 2022

¹Flood zone is indicative of historic policy zone. Zones B and C are historic policy zones.

Table 4.22 summarizes active policies and paid claims for post-FIRM buildings, which are those built after December 1, 1981. Post-FIRM buildings account for about 74% of active policies but only 54% of paid claims.

Table 4.22 – NFIP Policy and Claims Data Post-FIRM

Flood Zone ¹	Number of Policies in Force	Total Premium	Total Coverage	Number of Closed Paid Losses	Total of Closed Paid Losses
A01-30 & AE Zones	920	\$399,307	\$253,388,200	123	\$903,186.17
A Zones	442	\$288,783	\$119,495,000	81	\$293,105.92
B, C & X Zone	4,382	\$2,108,105	\$1,403,481,500	225	\$1,101,867.62
Standard	459	\$299,273	\$146,209,500	54	\$278,951.38
Preferred	3,923	\$1,808,832	\$1,257,272,000	171	\$822,916.24
Total	5,744	\$2,796,195	\$1,776,364,700	429	\$2,298,159.71

Source: FEMA Community Information System, data as of May 2, 2022

¹Flood zone is indicative of historic policy zone. Zones B and C are historic policy zones.

4.3.5 Flood: Stormwater/Localized

Probability	Impact	Spatial Extent	Warning Time	Duration
Highly Likely	Limited	Small	12 to 24 hours	< 24 hours

Hazard Description

Localized stormwater flooding occurs when heavy rainfall and an accumulation of runoff overburden the stormwater drainage system. Orange County has relatively flat terrain and spans 12 drainage basins that comprise the larger St. Johns River System and the Kissimmee River System watersheds.

Orange County has a natural drainage system of creeks and streams as well as an extensive man-made drainage system. This secondary, man-made system includes grading to control runoff, storm sewers and inlets to intercept stormwater, ditches and canals to transmit large quantities of runoff, and detention ponds to retain runoff at specific sites. Orange County Public Works Stormwater Management Division maintains 18 pump stations, 52 control structures, and 85 drain wells as well as 95 miles of open channels, canals, and closed pipe systems. Flooding can still occur if conditions exceed the system’s design capacity or if the flood control systems are not sufficiently maintained.

Localized flooding may be caused by the following maintenance related issues:

- **Clogged Inlets** – debris covering storm drains and catch basin inlets may contribute to an inadequate flow of stormwater into the system which may cause flooding near the structure. Debris and sediment accumulations within the catch basins and stormwater pipes may also reduce the efficiency of the system by reducing the carrying capacity.
- **Blocked Drainage Outfalls** – debris blockage including sediment and vegetation or structural damage at drainage outfalls may prevent the system from discharging runoff which may lead to a back-up of stormwater within the system.
- **Improper Grade** – poor grading around catch basin inlets may prevent stormwater from entering the catch basin as designed.

Location

Figure 4.15 on the following page depicts a locator map for the areas of localized flooding within the unincorporated areas of Orange County identified by the FMPC.

Past Occurrences

Areas of localized flooding problems have been identified through resident 311 calls and through the Public Works Department’s regular inspections and problem site maintenance. All identified problem site areas shown in Figure 4.15 have experienced flooding issues in the past.

Probability of Future Occurrence

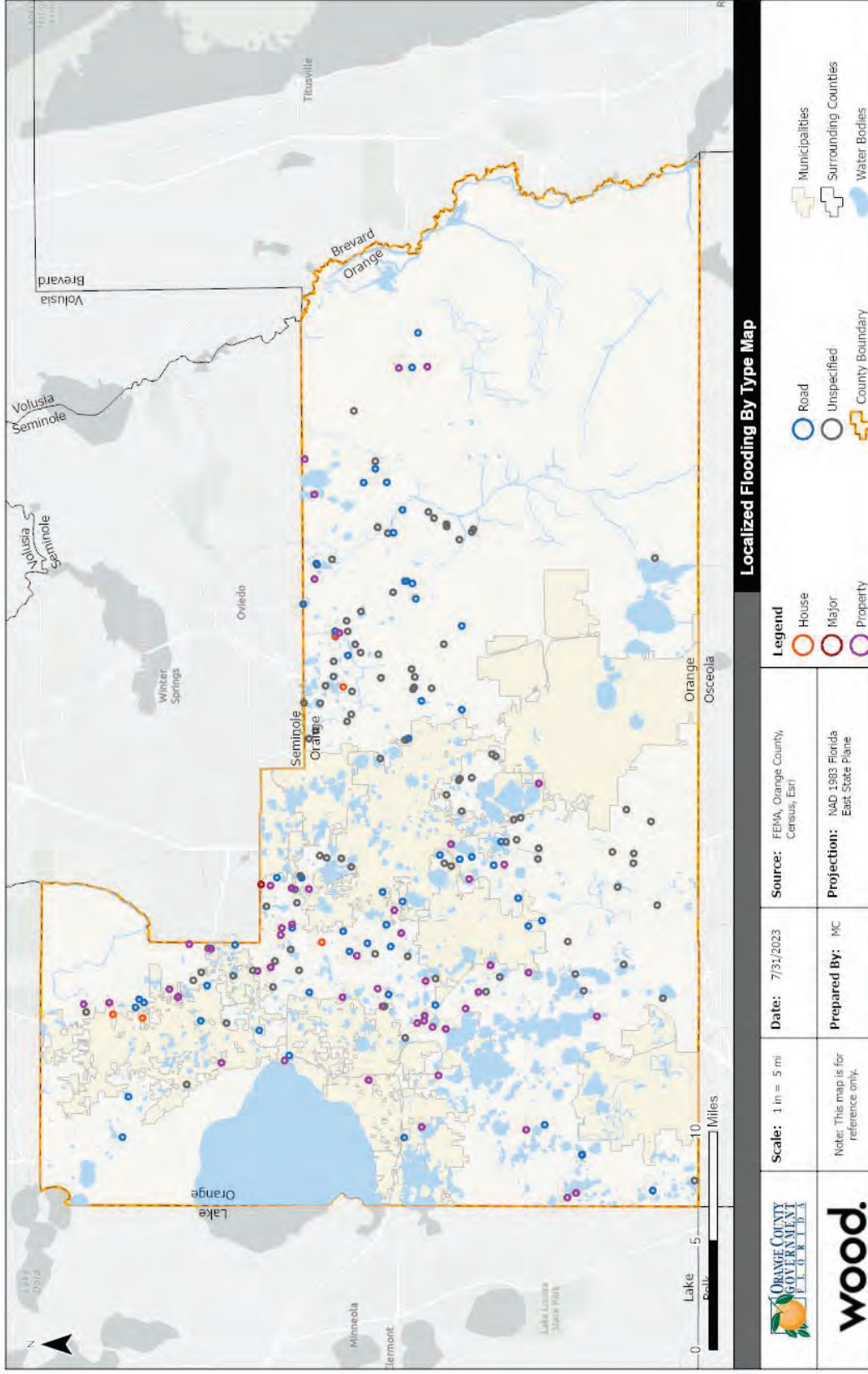
Highly Likely – Due to the County’s low elevations, flat terrain, and regular seasonally concentrated annual precipitation from heavy rainstorms, tropical storms, and hurricanes, it is highly likely that unmitigated properties and undersized or overburdened drainage systems will continue to experience localized flooding.

Climate Change and Future Conditions

Climate change is projected to increase the frequency and intensity of heavy rainfall events, which could increase localized stormwater flooding by overwhelming existing stormwater drainage systems.

New development can also affect the occurrence of localized flooding. As greenfield areas are developed, impervious surface increases, putting additional strain on existing stormwater infrastructure. Incorporating low-impact development techniques and other on-site stormwater management, and designing those systems for greater stormwater volumes, can help to mitigate the impacts of new development.

Figure 4.15 – Localized Flooding for Orange County



Vulnerability Assessment

Localized flooding occurs at various times throughout the year with several areas of primary concern to the County. Localized flooding and ponding affect streets and property. Figure 4.16 shows some possible correlation between localized flooding and repetitive losses. The areas of overlap suggest that localized flooding may contribute to NFIP repetitive loss claims. Areas of localized flooding were identified and further defined by the Orange County Public Works’ Roads & Drainage Division. These areas are monitored before and after a storm event.

Figure 4.17 shows the same localized flooding locations with a ½ mile buffer around each problem area and the critical facilities that fall within the buffered area. Facilities within the buffered area may be exposed to localized flooding issues. While many of these facilities are outside of the SFHA, they may need regular inspection to ensure they are not damaged by localized flooding that may occur. A list of the 36 critical facilities within the identified localized flooding areas are in Table 4.23.

Because the depth and extent of flooding during localized flooding events is unknown, property exposure and potential losses could not be calculated.

Table 4.23 – Critical Facilities within ½ mile of Localized Flooding Locations

Critical Facility	Function
Corrections A-Building (Command Center)	County Correctional Facility
FM Admin & Maint. Bldgs	Facilities Mgmt FOC
Ft Gatlin Park	Pet-friendly shelter
GOV Day Cottage	Youth residential facility
GOV Evans Dining Hall & Kitchen	Youth residential facility and hurricane shelter
GOV Highsmith Cottage	Youth residential facility
GOV Meyers Cottage	Youth residential facility
GOV Owles Cottage	Youth residential facility
GOV Soistsman Cottage	Youth residential facility
GOV Wittenstein Cottage	Youth residential facility
GOV Youth	Youth residential facility and hurricane shelter
Health Dept/EMS	Medical Services Headquarters
Juvenile Justice Center	Juvenile Courthouse
Mable Butler Building	Family Services
Medical Examiner	Coroner Operations
Public Defenter Building	Public Defender Office
Bithlo Radio Tower	Repeater, County Emergency Radio Network
Blanchard Park Lift Station	Sewage lift station
Goldenrod Park Recreation Center Gym	Recreation Center
Public Works Admin. ESF #3	Public Works FOC and support
Public Works Bldg. #2	Traffic FOC
Public Works Bldg. #3	Fiber and phone panels
Public Works Bldg. #7	Public Works FOC and support
Regional Computer Ctr	Data network center
FS 52 Radio Tower	Repeater, County Emergency Radio Network
Barnett Park	Pet friendly shelter
Barnett Park Lift Station	Lift Station
EMS Warehouse	Medical Warehouse
Hal Marston Community Ctr	Shelter

Critical Facility	Function
John Bridges Community Ctr - Bldg A	Shelter
John Bridges Comm Ctr (lift station)	Lift Station
Kelly Park (lift stations 1 & 2)	Lift Station
Orlo Vista Park	Pet-friendly shelter
West Orange Recreation Center Gym	Recreation Center
Select Specialty Hospital - Orlando (South Campus)	Hospital
Orlando Health Dr P Phillips Hospital	Hospital

Figure 4.16 – Localized Flooding and Repetitive Loss Areas

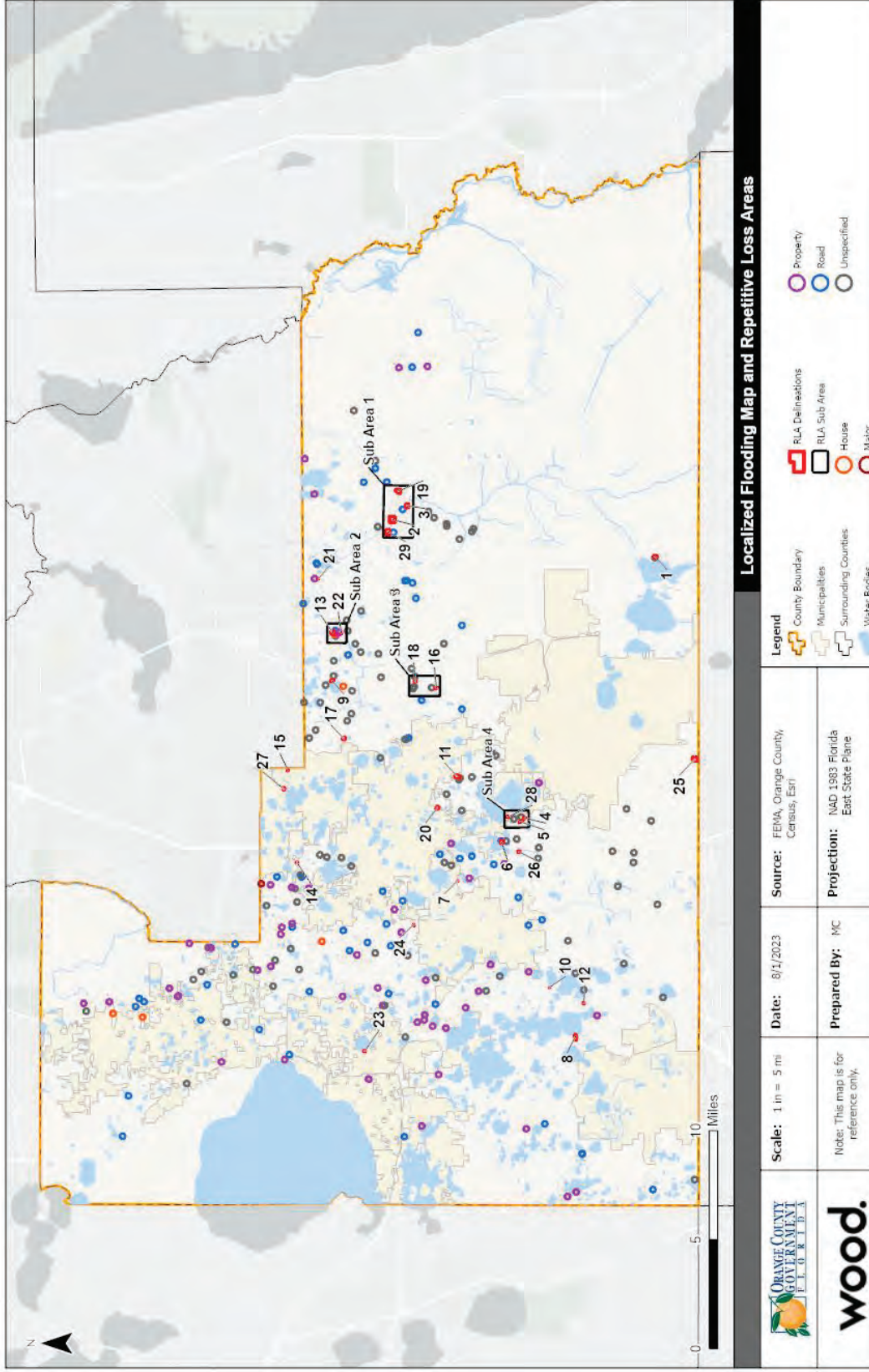
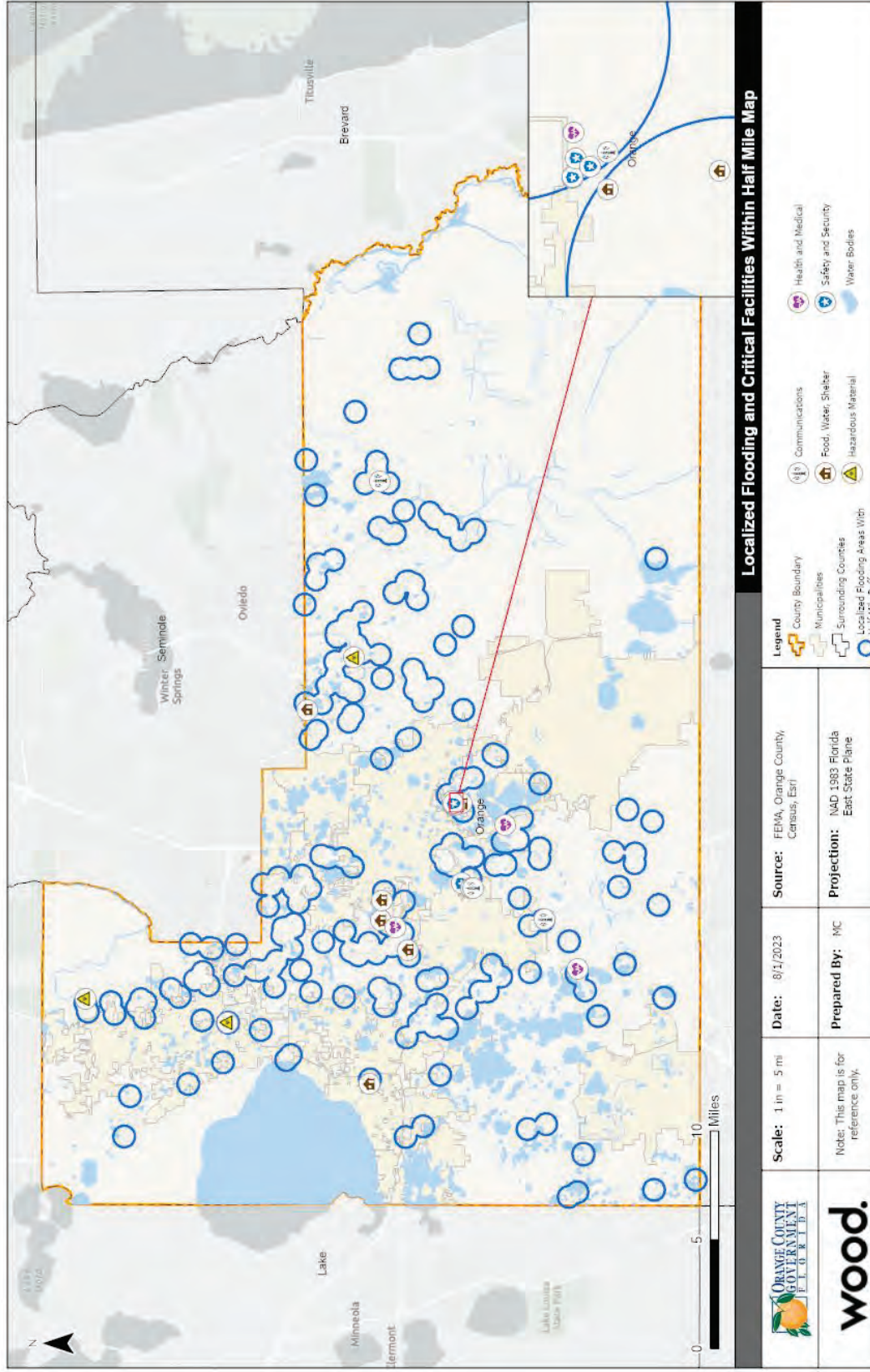


Figure 4.17 – Critical Facilities within 1/2 Mile of Localized Flooding Locations



4.3.6 Hurricane and Tropical Storm

Probability	Impact	Spatial Extent	Warning Time	Duration
Likely	Critical	Moderate	> 24 hours	<1 week

Hazard Description

A hurricane is a type of tropical cyclone that forms in the southern Atlantic Ocean, Caribbean Sea, Gulf of Mexico, and in the eastern Pacific Ocean. All Atlantic and Gulf of Mexico coastal areas are subject to hurricanes. The Atlantic hurricane season typically lasts from June to November, with the peak season from mid-August to late October.

While hurricanes pose the greatest threat to life and property, any tropical cyclone including tropical storms and depressions can be devastating. A tropical cyclone grows to a more intense stage through an increase in sustained wind speeds. The progression of a tropical disturbance is described below.

- **Tropical Depression:** A tropical cyclone with maximum sustained winds of 38 mph (33 kn) or less.
- **Tropical Storm:** A tropical cyclone with maximum sustained winds of 39-73 mph (34-63 kn).
- **Hurricane:** A tropical cyclone with maximum sustained winds of 74 mph (64 kn) or higher. In the western North Pacific, hurricanes are called typhoons; similar storms in the Indian Ocean and South Pacific Ocean are called cyclones.
- **Major Hurricane:** A tropical cyclone with maximum sustained winds of 111 mph (96 kn) or higher, corresponding to a Category 3, 4 or 5 on the Saffir-Simpson Hurricane Wind Scale.

The Saffir-Simpson Hurricane Wind Scale classifies hurricanes by intensity into one of five categories as shown in Table 4.24. This scale estimates potential property damage based on wind speed. Hurricanes reaching Category 3 and higher are considered major hurricanes because of their potential for significant loss of life and damage. However, Category 1 and 2 storms are still dangerous and require preventative measures.

Table 4.24 – Saffir-Simpson Hurricane Wind Scale

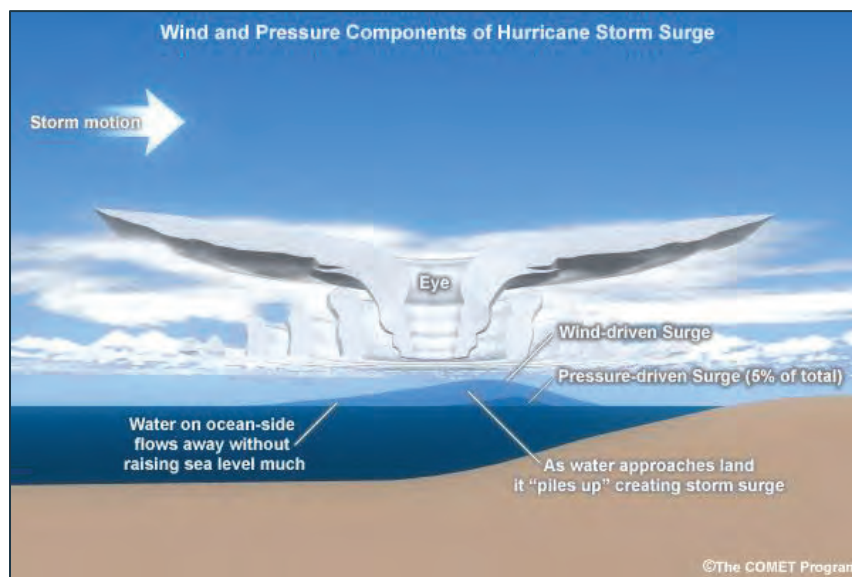
Category	Wind Speed	Potential Damage
1	74-95 mph	Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110 mph	Extremely dangerous winds will cause extensive damage: Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3	111-129 mph	Devastating damage will occur: Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4	130-156 mph	Catastrophic damage will occur: Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5	≥ 157 mph	Catastrophic damage will occur: A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Source: National Hurricane Center/NOAA

The greatest potential for loss of life related to a hurricane is from the storm surge. Storm surge is water that is pushed toward the shore by the force of the winds swirling around the storm as shown in Figure 4.18. This advancing surge combines with the normal tides to create the hurricane storm tide, which can increase the mean water level to heights impacting roads, homes and other critical infrastructure. In addition, wind driven waves are superimposed on the storm tide. This rise in water level can cause severe flooding in coastal areas, particularly when the storm tide coincides with the normal high tides.

The maximum potential storm surge for a particular location depends on a number of different factors. Storm surge is a very complex phenomenon because it is sensitive to the slightest changes in storm intensity, forward speed, size (radius of maximum winds-RMW), angle of approach to the coast, central pressure (minimal contribution in comparison to the wind), and the shape and characteristics of coastal features such as bays and estuaries. Other factors which can impact storm surge are the width and slope of the continental shelf. A shallow slope will potentially produce a greater storm surge than a steep shelf.

Figure 4.18 – Components of Hurricane Storm Surge



Source: NOAA/The COMET Program

The Sea, Lake and Overland Surges from Hurricanes (SLOSH) model is a computerized numerical model developed by the National Weather Service (NWS) to estimate storm surge heights resulting from historical, hypothetical, or predicted hurricanes by taking into account the atmospheric pressure, size, forward speed, and track data. These parameters are used to create a model of the wind field which drives the storm surge. The SLOSH model consists of a set of physics equations which are applied to a specific locale's shoreline, incorporating the unique bay and river configurations, water depths, bridges, roads, levees and other physical features. The model creates outputs for all different storm simulations from all points of the compass. Each direction has a MEOW (maximum envelope of water) for each category of storm (1-5), and all directions combined result in a MOMs (maximum of maximums) set of data.

SLOSH model surge elevations for a Category 1 through a Category 5 hurricane were reviewed by the FMPC to evaluate the potential risk of this hazard to Orange County. Based on the SLOSH model, Orange County does not face any risk of storm surge inundation. Even in the Category 5 scenario, depicting the maximum possible storm surge scenario for the area, Orange County is far enough inland to remain untouched. FMPC members reviewed the possibility that storm surge could impact the County via the St. John's River, a tidally influenced river running along the eastern portion of Orange County. However, they found that this does not pose a major flood risk to the County, as tidal influences on the St. John's River have not been found to

have a substantial impact beyond Lake Harney. The greatest risk of flooding along the St. John’s River during and following a hurricane event remains rainfall. Therefore, hurricane storm surge is not considered a flood risk in Orange County.

Past Occurrences

Orange County is vulnerable to hurricane damage from high winds, rain-induced flooding, and hurricane-spawned tornadoes. According to NOAA’s International Best Track Archive for Climate Stewardship (IBTrACS) dataset of global tropical cyclone data, as of August 2022, 38 named hurricane and tropical storm tracks have passed within 60 miles of Orange County since 1950. Table 4.25 summarizes these storms by intensity and frequency. These storms are listed in Table 4.26 noting the highest intensity reached and the date the storm first entered within a 60 mile radius of the County. Figure 4.19 shows these storm tracks in relation to the County.

Table 4.25 – Hurricane and Tropical Storm Frequency

Storm Intensity	Number of Occurrences	Rate of Occurrence
Tropical Depression	8	1 in 9 years
Tropical Storm	18	1 in 4 years
CAT I Hurricane	6	1 in 12 years
CAT II Hurricane	4	1 in 18 years
CAT III Hurricane	1	1 in 72 years
CAT IV Hurricane	1	1 in 72 years
CAT V Hurricane	0	n/a
TOTAL	38	1 in 1.9 years

Source: NOAA IBTrACS v04 database, retrieved August 2022

Table 4.26 – Hurricane Tracks Passing within 60 Miles of Orange County (1950 – 2021)

Storm Name	Max Saffir-Simpson	Date
Easy	Category 2	9/6/1950
King	Category 1	10/18/1950
Hazel	Category 1	10/9/1953
Donna	Category 2	9/11/1960
Florence	Tropical Storm	9/24/1960
Alma	Tropical Depression	8/26/1962
Cleo	Tropical Storm	8/27/1964
Abby	Tropical Storm	6/4/1968
Brenda	Tropical Depression	6/19/1968
Dolly	Tropical Depression	8/10/1968
Gladys	Category 2	10/19/1968
Gerda	Tropical Depression	9/7/1969
Jenny	Tropical Storm	10/3/1969
Dottie	Tropical Storm	8/19/1976
David	Category 2	9/3/1979
Dennis	Tropical Storm	8/18/1981
Barry	Tropical Storm	8/25/1983
Isidore	Tropical Storm	9/27/1984
Bob	Tropical Storm	7/24/1985
Chris	Tropical Depression	8/28/1988
Keith	Tropical Storm	11/23/1988
Gordon	Tropical Storm	11/16/1994
Erin	Category 1	8/2/1995

Storm Name	Max Saffir-Simpson	Date
Jerry	Tropical Storm	8/24/1995
Irene	Category 1	10/16/1999
Gabrielle	Tropical Storm	9/14/2001
Edouard	Tropical Storm	9/4/2002
Henri	Tropical Depression	9/6/2003
Charley	Category 4	8/13/2004
Frances	Category 1	9/5/2004
Jeanne	Category 2	9/26/2004
Tammy	Tropical Storm	10/5/2005
Ernesto	Tropical Storm	8/30/2006
Fay	Tropical Storm	8/19/2008
Debby	Tropical Depression	6/27/2012
Julia	Tropical Depression	9/13/2016
Matthew	Category 3	10/7/2016
Emily	Tropical Storm	7/31/2017
Irma	Category 1	9/11/2017

Source: NOAA IBTrACS v04 database, retrieved August 2022

It should be noted that this is not a comprehensive list of all hurricanes to have impacted Orange County. The parameters used here are intended to capture those storms most likely to have impacted the County and to set standardized criteria for estimating local frequencies and future probabilities. Other unnamed storms may have passed through or near the county, bringing rainfall to the area. It is also possible that large storm systems passing further than 60 miles from the County could bring rainfall to the area. For example, Hurricane Ivan resulted in a disaster declaration for Orange County but was not captured by this list.

Table 4.27 lists hurricane and tropical storm events reported by NCEI since 1996 for Orange County.

Table 4.27 – NCEI Reported Hurricane/Tropical Storm Events for Orange County, 1996-2022

Date	Event Type	Deaths/ Injuries	Injuries	Property Damage	Crop Damage
09/14/1999	Hurricane	0	0	\$500,000	\$0
08/21/2008	Tropical Storm	0	0	\$0	\$0
10/7/2016	Tropical Depression	0	0	\$0	\$0
9/10/2017	Tropical Storm	0	0	\$110,000,000	\$0
9/2/2019	Tropical Depression	0	0	\$0	\$0
Total		0	0	\$110,500,000	\$0

Source: NCEI Storm Events Database

NCEI’s available data is not comprehensive, as many of the hurricanes and tropical storms listed in Table 4.26 caused damages in the County. Any hurricane flooding that has occurred has been the result of heavy rains.

The following is a description of past occurrences of hurricanes and tropical storms as provided by the NCEI Storm Events database and the 2021 Orange County LMS:

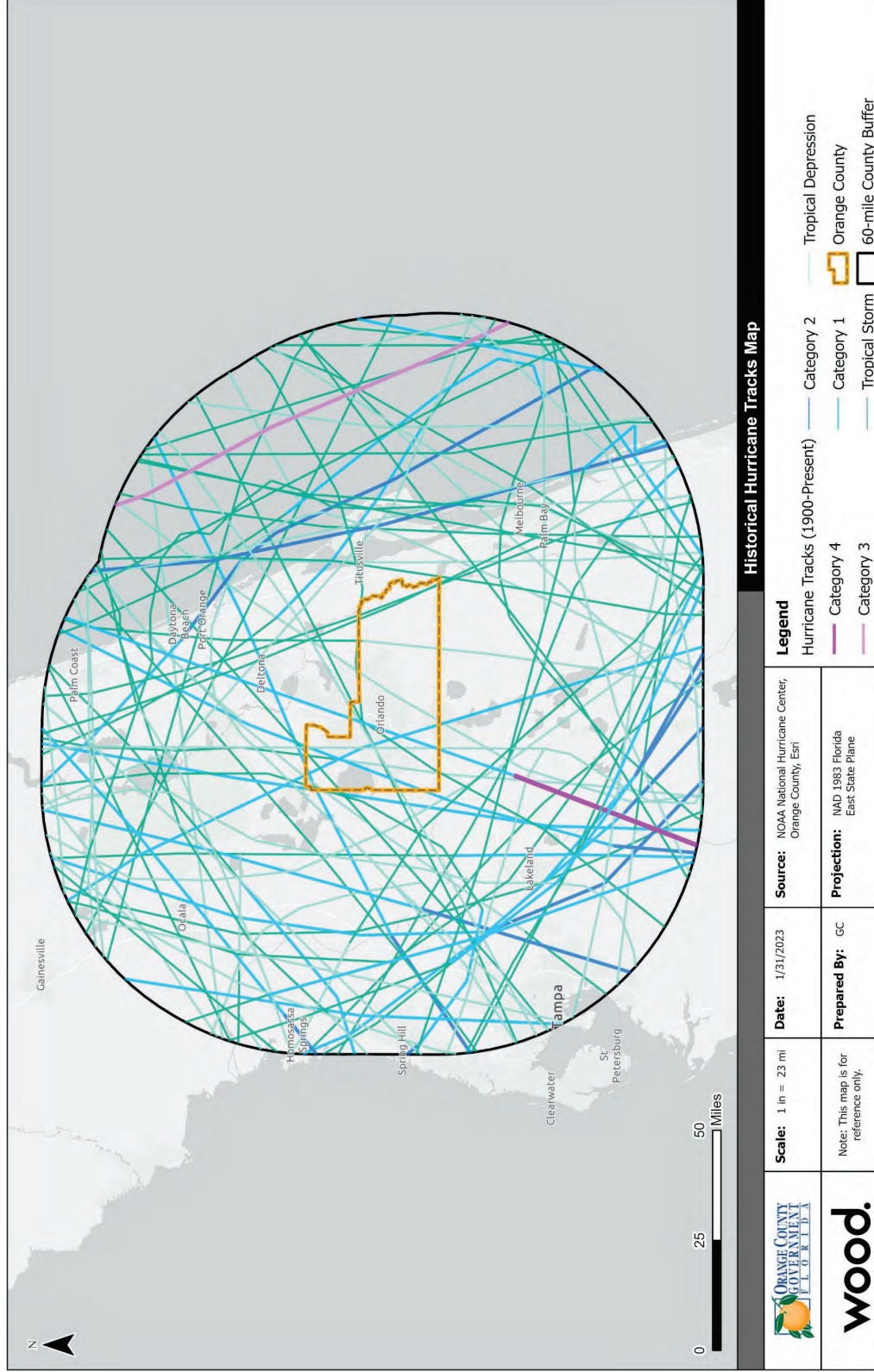
Hurricane Charley: Hurricane Charley was one of three hurricanes during the 2004 season to affect Orange County. Charley had the most significant impact, including leaving 265,000 Progress Energy customers and 150,000 Orlando Utilities Commission (OUC) customers without power. Power losses also affected 400 lift stations, resulting in sewage backups across the county, and 425 traffic signals. The Orange County Property Appraiser’s Office estimated \$881.5 million in property damages to 26,700 parcels.

Tropical Storm Fay: Tropical Storm Fay hit in 2008 and brought significant rain creating areas of flooding, causing property damage to homes and private wells. In Orange County, heavy rain of 10 to 13 inches fell, flooding 5 homes. Total damages were estimated at \$100,000.

Hurricane Irma: During the planning process for the development of this plan, Orange County, along with much of the State of Florida, was hit by Hurricane Irma on September 11, 2017. Irma resulted in severe flooding and a major disaster declaration for the County. Rainfall totals of 10-15 inches were widespread across east-central Florida. During the early morning hours of September 11, flooding breached several hundred homes and resulted in the rescue of 200 residents in Orlo Vista (Orange County) when a lake and adjacent retention ponds overflowed. The total estimated damage cost was \$110 million. Damage occurred primarily to roof shingles, soffits, awnings, and pool enclosures. Numerous trees were uprooted or snapped, some falling onto homes resulting in additional structural damage.

Hurricane Dorian: In Orange County, wind gusts to minimal tropical storm force occurred in squalls throughout much of the county. There were three indirect hurricane-related fatalities that occurred on September 2 during the evacuation and preparedness phases of the storm. A 72-year-old man who evacuated to a hotel, collapsed while moving luggage and later died at a hospital. A 62-year-old man who evacuated to a resort, went into cardiac arrest while moving luggage and was pronounced dead at a local hospital. A 56-year-old man fell from a tree while cutting limbs prior to the weather event.

Figure 4.19 – Historical Hurricane Tracks within 60 Miles of Orange County (1950-2022)



Source: NOAA IBTRACS v04

Probability of Future Occurrence

Likely – Given the 38 hurricane and tropical storm occurrences recorded by NOAA as passing near Orange County over a period of 72 years (1950-2022), a hurricane or tropical storm affects Orange County on average more than once every two years. Measuring based on reported impacts from the NCEI database and the Orange County LMS, Orange County has experienced impacts from 6 hurricanes or tropical storms over the 26-year period from 1996 to 2022, which corresponds to a 23% annual probability of occurrence.

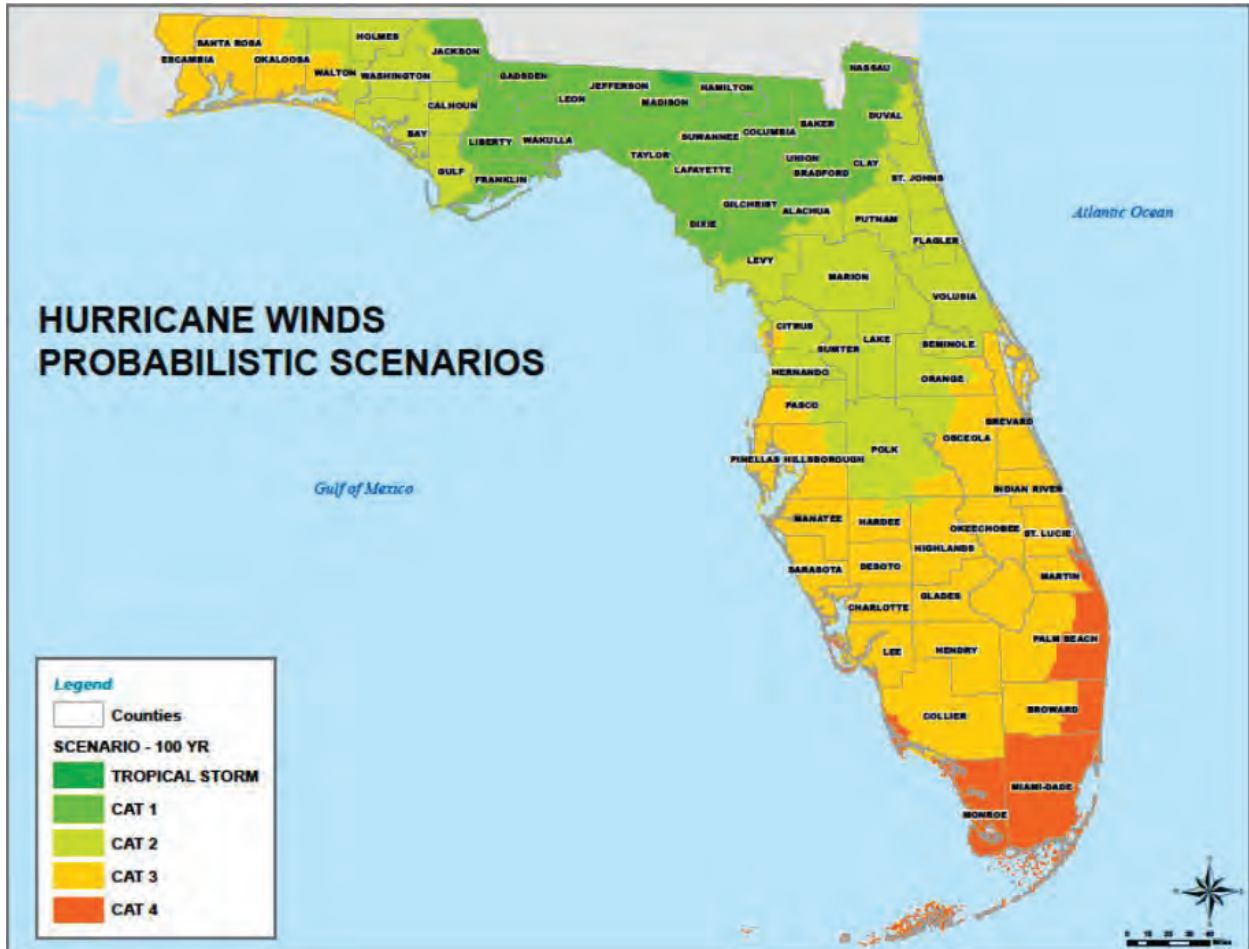
Figure 4.20 from the State plan summarizes the 20-year return period for hurricane winds across Florida; Orange County has a probability of experiencing between a Category 1 hurricane at least once every 20 years. Figure 4.21 summarizes the 100-year return period for hurricane winds across Florida; Orange County has a probability of experiencing up to a Category 2 hurricane at least once every 100 years.

Figure 4.20 – Hurricane 20-Year Return Period



Source: State of Florida Enhanced Hazard Mitigation Plan

Figure 4.21 – Hurricane 100-Year Return Period



Source: State of Florida Enhanced Hazard Mitigation Plan

Climate Change and Future Conditions

One of the primary factors contributing to the origin and growth of tropical storm and hurricanes systems is water temperature. Sea surface temperature may increase significantly in the main hurricane development region of the North Atlantic during the next century as well as in the Gulf of Mexico. According to NOAA, weather extremes will likely cause more frequent, stronger storms in the future due to rising surface temperatures. NOAA models predict that while there may be less frequent, low-category storm events (Tropical Storms, Category 1 Hurricanes), there will be more, high-category storm events (Category 4 and 5 Hurricanes) in the future. This means that there may be fewer hurricanes overall in any given year, but when hurricanes do form, it is more likely that they will become large storms that can create massive damage.

Hurricanes and other coastal storms may result in increased flooding, injuries, deaths, and extreme property loss. According to the US Government Accountability Office, national storm losses from changing frequency and intensity of storms is projected to increase anywhere from \$4-6 billion soon.

Vulnerability Assessment

For the purpose of this plan, this assessment of vulnerability to hurricanes and tropical storms is limited to rainfall from these events. As such, the estimated building damage and content loss as well as critical facilities at risk mirrors what is detailed for riverine and flash flooding in Section 4.3.4.

Hurricanes and tropical storms are expected to pass through Orange County, on average, once every two years. According to research provided by the NOAA Weather Prediction Center, the heaviest rainfall from hurricanes and tropical storms typically occurs in the 12-hr period starting 6 hours prior to a storm's landfall. Rainfall is not correlated with the intensity of a storm but is related to the velocity and length of the storm along its axis of movement.

4.4 Risk and Vulnerability Conclusions

4.4.1 Priority Risk Index Results

Table 4.28 summarizes the Priority Risk Index (PRI) risk rating assigned to each identified hazard using the PRI method. Hazards with a PRI rating of moderate or high risk were considered by the FMPC to be priority hazards for the County.

Table 4.28 – Summary of PRI Results

Hazard	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Climate Change	Highly Likely	Limited	Large	> 24 hours	>1 week	3.1
Channel Bank Erosion	Likely	Minor	Negligible	> 24 hours	> 1 week	1.9
Dam/Levee Failure	Unlikely	Critical	Moderate	6 to 12 hours	<1 week	2.4
Flood: Riverine and Flash	Likely	Critical	Moderate	12 to 24 hours	<1 week	2.9
Flood: Stormwater/ Localized	Highly Likely	Limited	Small	12 to 24 hours	<24 hours	2.7
Hurricane & Tropical Storm	Likely	Critical	Moderate	> 24 hours	<1 week	2.6

Based on the results from the PRI scoring, the hazards have been classified into three categories based on the assigned risk value which are summarized in Table 4.29 below:

- **Low Risk** – Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium Risk** – Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High Risk** – Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread.

Table 4.29 – Summary of Hazard Risk Classification

High Risk (≥ 3.0)	Climate Change
Moderate Risk (2.0 – 2.9)	Flood: Riverine and Flash Flood: Stormwater/Localized Hurricane and Tropical Storm Dam/Levee Failure
Low Risk (≤ 2.0)	Channel Bank Erosion

High and moderate risk hazards are considered a priority for the County. A vulnerability assessment is provided in Chapter 5 for priority hazards only.

4.4.2 Assessment of Areas Likely to Flood

Based on the flood hazard profiles, the following areas have been identified by the FMPC as areas likely to flood in the future. Some of these areas are already experiencing flooding. Changes in floodplain development, the watershed, and the population, in combination with climate change, will make these areas more likely to flood in the future.

Identified Area #1: Special Flood Hazard Areas and 0.2% Annual Chance Floodplains

According to the Effective FEMA FIRM maps dated September 24, 2021, 36.6% of the County is within the SFHA and 1.8% is located in the 0.2%-annual-chance floodplain. The SFHA and the moderate-risk 0.2%-annual-chance floodplain are likely to continue flooding in the future. Changes in floodplain development and future development within the watershed in general as well as climate change-driven changes in rainfall probabilities and intensities may increase the size of the SFHAs in the future. Refer to Section 4.3: Flood: Riverine and Flash, and the maps in Figure 4.12 and Figure 4.13.

Public input throughout the planning process indicated several sources of flooding. Common sources included flooding from the Little Econ River, Whipoorwill Lake, and Wekiva River. Most accounts were from residents whose properties are in close proximity to the waterbodies. However, responses from the public survey found that 27% of respondents do not know if they are in a floodplain, which may indicate a need for further outreach about flood risk.

Identified Area #2: Areas of Localized Stormwater Flooding

Due to a relatively flat terrain and a consistent level of annual precipitation, it is likely that unmitigated areas will continue to experience localized flooding. Future population increases will likely lead to new development. An increase in impervious area will exacerbate localizing flooding issues unless measures are taken to reduce the volume of runoff. Furthermore, the intensity of individual rainfall events is likely to increase in the future due to climate change which may further overwhelm stormwater drainage systems. Refer to Section 4.2: Flood: Stormwater/Localized.

The County completed several Capital Improvement Projects (CIP) that support flood mitigation in Fiscal Year 2021 – 2022. Projects include the following:

- Pond remediation for Summer Woods Pond (Pond 6621 & 6604), Signature Lakes, and B-14 Boggy Creek Pipeline – Segment C are under construction.
- Stormwater improvements for Orlo Vista/Westside Manor and Big Sand Lake Outfall Improvements (by FDOT) and under construction.
- Stormwater improvements for Bulova Pond 6115 Improvements E-14 A/B Canal Slope Stabilization, 18th Street Drain-well Improvements (DW-060A) are advertised or scheduled for construction.
- B-14 Boggy Creek Pipeline – Segment D and Little Wekiva River – Sheet Pile Restoration are under design.

Additional projects conducted by the Public Works department included cleaning of over 55 miles of stormwater pipes, cleaned about four miles of roadside ditches, repaired about two miles of stormwater conveyance pipes, and installed over 25,000 linear feet of underdrain.

Identified Area #3: Repetitive Loss Areas

It is very likely that unmitigated repetitive loss properties will continue to flood in the future. Repetitive loss properties have a greater need for flood protection. Repetitive loss can be attributed to development within the SFHA as well as localized stormwater flooding. As mentioned above, riverine flooding and localized stormwater flooding could increase in the future if measures are not taken to mitigate the effects of development.

Repetitive Loss Analysis

An analysis of repetitive loss was completed for Orange County to examine repetitive loss properties against FEMA flood zones and understand where the highest risk properties in the County are located. A repetitive loss property is a property for which two or more flood insurance claims of more than \$1,000 have been paid by the NFIP within any 10-year period since 1978. A severe repetitive loss property is a repetitive loss property that has had four or more claims of more than \$5,000 or at least two claims that cumulatively exceed the building's value.

According to 2023 NFIP records, there are a total of 30 unmitigated repetitive loss properties and 5 mitigated repetitive loss properties within unincorporated Orange County. Table 4.30 details unmitigated repetitive loss properties by FEMA flood zone, building type and current insurance coverage status.

Table 4.30 – Unmitigated Repetitive Loss Summary

Flood Zone ¹	Building Type		Insurance Coverage		Total Building Payment	Total Content Payment	Total Paid
	Commercial	Residential	Insured	Uninsured			
C		X		X	\$46,135.36	\$0.00	\$46,135.36
AE		X		X	\$19,699.53	\$0.00	\$19,699.53
X		X	X		\$220,389.95	\$30,688.36	\$251,078.31
X		X		X	\$3,192.28	\$0.00	\$3,192.28
AE		X		X	\$20,878.61	\$1,106.73	\$21,985.34
C		X		X	24,028.53	\$0.00	\$24,028.53
AE		X		X	\$8,224.20	\$0.00	\$8,224.20
AE		X		X	\$59,329.27	\$18,675.82	\$78,005.09
AE		X		X	\$112,804.53	\$43,882.24	\$156,686.77
X	X			X	\$112,481.30	\$30,313.03	\$142,794.33
C		X		X	\$3,491.43	\$0.00	\$3,491.43
X		X		X	\$14,314.78	\$76.93	\$14,391.71
AE		X	X		\$179,187.73	\$0.00	\$179,187.73
X		X	X		\$16,037.20	\$9,628.72	\$25,665.92
X		X		X	\$12,126.91	\$0.00	\$12,126.91
X		X	X		\$11,805.13	\$5,870.63	\$17,675.76
X	X		X		\$90,457.85	\$1,062.25	\$91,520.10
X		X	X		\$6,362.88	\$0.00	\$6,362.88
AE		X	X		\$7,424.31	\$0.00	\$7,424.31
AE		X	X		\$7,420.30	\$0.00	\$7,420.30
X		X	X		\$174,844.65	\$51,465.84	\$226,310.49
AE		X	X		\$7,850.01	\$0.00	\$7,850.01
AE		X	X		\$92,429.15	\$14,184.02	\$106,613.17
X		X	X		\$10,809.22	\$1,805.12	\$12,614.34
AE		X	X		\$67,233.00	\$0.00	\$67,233.00
X		X	X		\$42,316.92	\$1,135.29	\$43,452.21
X		X	X		\$124,413.88	\$4,733.14	\$129,147.02
X		X	X		\$88,345.41	\$24,062.68	\$112,408.09
AE		X	X		\$7,049.82	\$11,976.65	\$19,026.47
AE		X	X		\$143,429.41	\$0.00	\$143,429.41
Total	2	28	18	12	\$1,734,513.55	\$250,667.45	\$1,985,181.00

Source: NFIP Repetitive Loss Data, January 2023

¹Flood Zone is based on current Effective DFIRM.

Figure 4.22 on the following page illustrates repetitive loss areas within Orange County. The repetitive loss areas were created by identifying the unmitigated repetitive loss properties, surrounding historic loss

properties and additional properties that are likely to experience the same or similar flood conditions but not have had any claims paid against the NFIP.

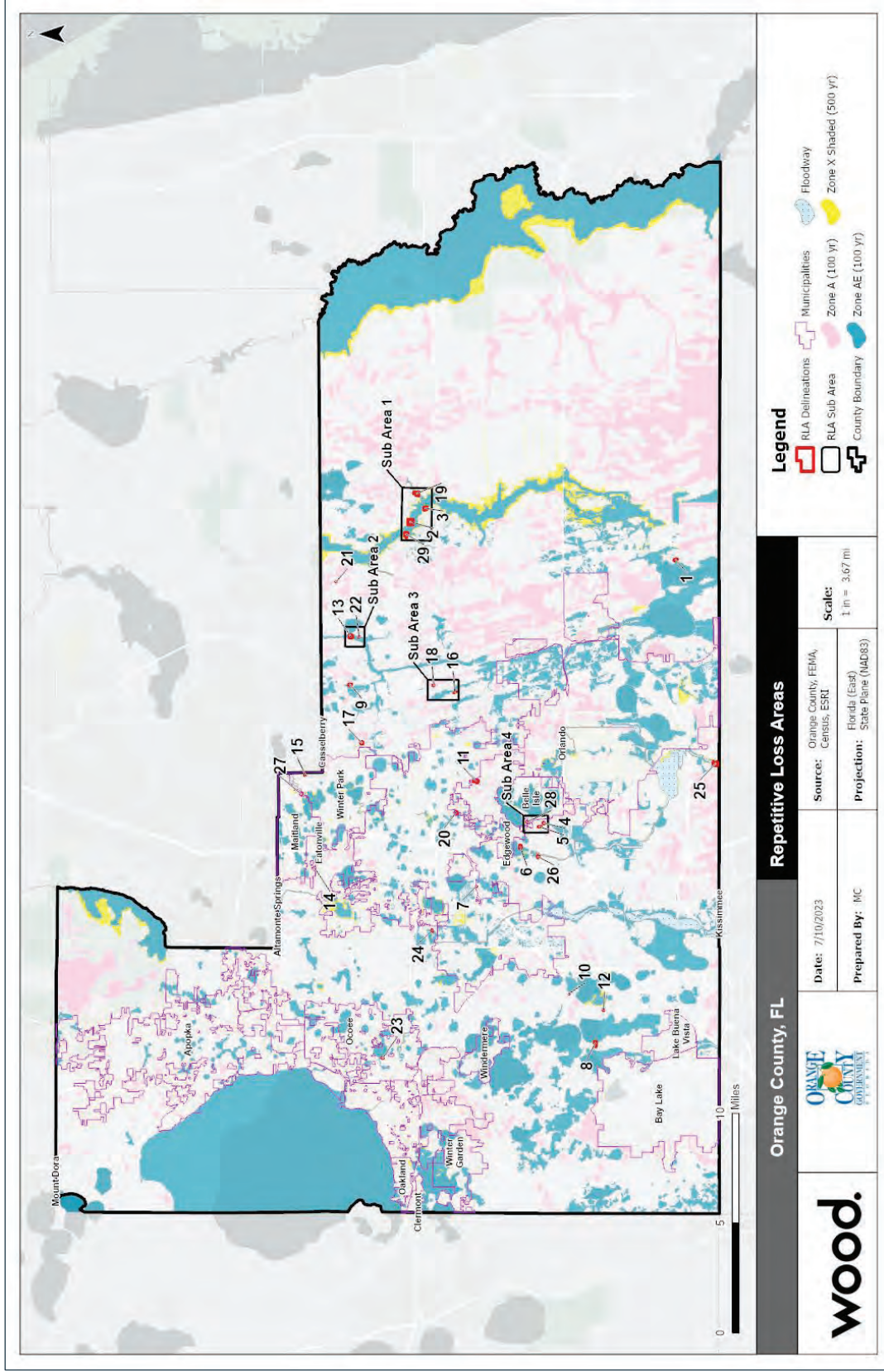
Repetitive Loss Area Mapping

The list of unmitigated repetitive loss properties is not a complete list of properties at risk of repeat flood events. There are likely other properties that have not filed flood insurance claims but that have flood conditions similar to those on the repetitive loss list. To account for these buildings, Orange County identified repetitive loss areas. In accordance with the principles outlined in the CRS guidance titled Mapping Repetitive Loss Areas dated August 15, 2008, 29 repetitive loss areas were identified in Orange County. The FMPC and consulting team created the repetitive loss areas by identifying the unmitigated repetitive loss properties, surrounding historic loss properties (those with one claim paid against the NFIP) and additional properties that are likely to experience the same or similar flood conditions but have not yet had any claims paid against the NFIP. The resulting 29 repetitive loss areas are shown together in Figure 4.22. The structure count within each repetitive loss area is detailed in Table 4.31 below.

Table 4.31 – Count of Structures in Repetitive Loss Areas

Repetitive Loss Area	Number of Structures
1	7
2	8
3	3
4	6
5	3
6	4
7	3
8	4
9	5
10	3
11	28
12	3
13	6
14	3
15	4
16	4
17	2 (23 units)
18	5
19	6
20	10
21	3
22	4
23	4
24	2
25	3
26	11
27	7
28	3
29	6
Total	160

Figure 4.22 – Repetitive Loss Areas



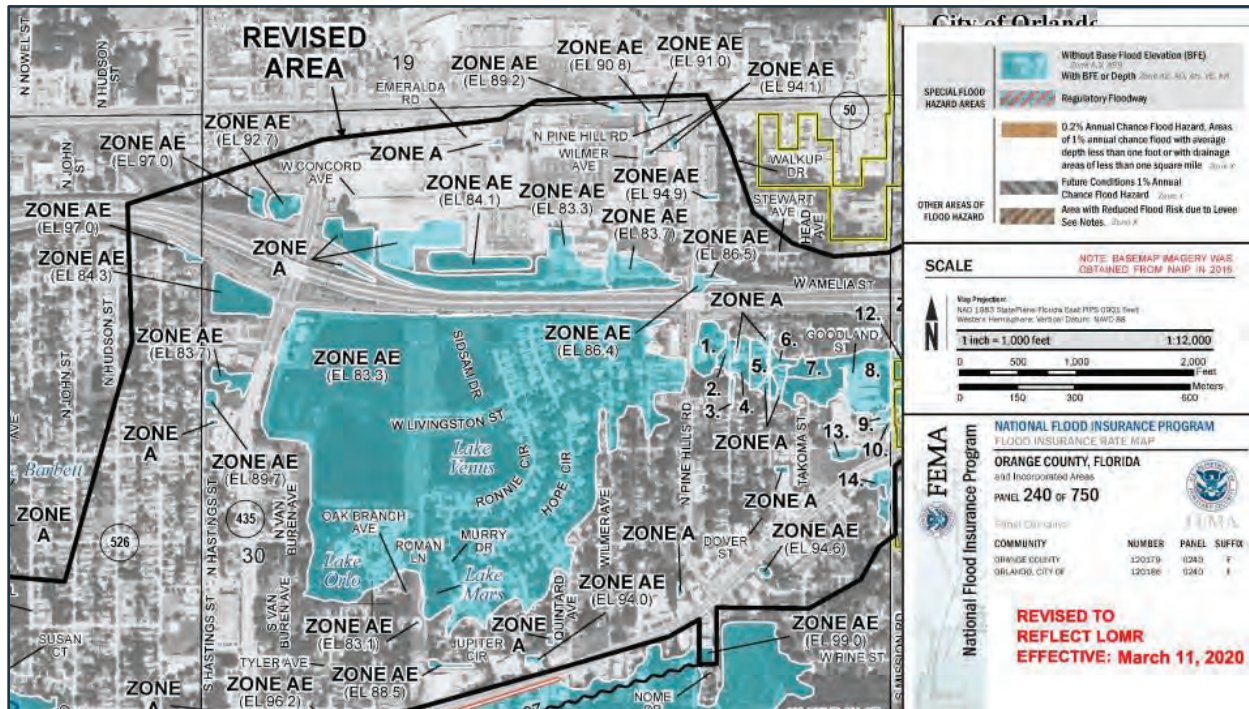
Identified Area #4: Orlo Vista

The heavy rainfall brought by Hurricane Irma on September 11, 2017 revealed serious vulnerability to flooding in Orlo Vista, a neighborhood west of downtown Orlando. Since the storm in 2017, the County has established an updated floodplain elevation through the FEMA Letter of Map Revision Process to better define the level of flood risk in the area (shown in Figure 4.22). Portions of the neighborhood just north of the lakes, south, and east of the lakes are within the 1%-annual-chance flood.

Orlo Vista previously experienced major flooding from Hurricane Donna in 1960, but a series of stormwater management projects, including retention ponds, canals, and pumps, were thought to have mitigated flood risk in the area. The pumps were designed for the 25-year/24-hour storm. However, heavy rains from Hurricane Irma caused the overtopping of Lake Venus, shown in Figure 4.23, which flooded an estimated 150 homes and necessitated the evacuation of approximately 200 people from the Orlo Vista neighborhood according to reports in the Orlando Sentinel. Since Hurricane Irma, 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.

While these mitigation actions lessened the impact, Hurricane Ian, in 2022, brought continued flood challenges. Since then, the County has completed the design for drainage improvement 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 2025. While mitigation efforts continue to be implemented the Orlo Vista Community continues to be an area vulnerable to future flooding.

Figure 4.23 – Orlo Vista Flood Risk



Source: Orlo Vista Flood Mitigation Project Update, 2022

4.4.3 Impact of Future Flood

Changes in floodplain development, development in the 12 watersheds that encompass the County, and changes associated with climate change make future flood problems worse in the above identified areas that are likely to flood.

Changes In Floodplain Development

New development or redevelopment, if it occurs in or near the SFHA or localized flooding areas, could increase exposure of people and property to flood impacts.

Development in the floodplain affects natural floodplain functions by removing needed flood storage capacity and forcing floodwaters elsewhere, also contributing to expansion of the floodplain and an increase in future flood risk. This process can have similar effects on the likelihood and magnitude of stormwater flooding. Stormwater drainage systems can manage limited capacities. As development occurs and increases stormwater runoff, stormwater system capacities can be exceeded more quickly, resulting in more frequent and/or more severe stormwater flooding.

Additionally, unregulated changes in the floodplain and development within the watershed may increase the base flood elevation in SFHAs. The 1%-annual-chance flood could become more severe as a result of increased development, and the floodplain of the 1%-annual-chance flood could expand. Consequently, existing development in those areas would become exposed to flood risk, meaning more people and property would be at risk.

Orange County has grown significantly in population and property over the past decade and this trend is expected to continue. Orange County is projected to increase by nearly 40% between 2021 and 2050 (medium range projection). As noted in Section 1.4, the unincorporated County's population grew by 15.3% between 2015 and 2021. Additionally, per U.S. Census Building Permits Survey data summarized in Growth and Development in Section 1.4, Orange County has added 112,103 housing units over the past 12 years.

To evaluate the potential for new development in the SFHA, unimproved parcels (those that are vacant, have no building footprint, or have no improved value) were compared with the SFHA and the County's future land use – shown in Table 4.32. There are approximately 10,496 parcels with 107,677 acres of unimproved area within SFHA in Orange County; 22% of that acreage is in Zone A and 77% is in Zone AE. Within Zone AE, most of the unimproved acreage is planned for traditional and suburban neighborhood/residential, the Horizon West special planning area, and rural areas. Within Zone A, most unimproved acreage is planned for suburban neighborhoods and rural uses.

Suburban neighborhoods often entail widespread development and an increase in roadways connecting the residential areas. As a result, larger subdivisions can contribute to increased impervious surface cover and can further contribute to stormwater challenges like excessive runoff. However, the maintenance of rural land helps preserve exiting open space which minimizes potential increases in flooding and associated impacts on existing development. Cluster development, stream buffers, and other growth management techniques could be used in these areas to minimize the exposure of the new development. Without preventive mitigation, exposure to flood risk within the SFHA could increase in the future.

The County has several regulatory tools in place, including the updated comprehensive plan and the County's floodplain regulations, which help County staff minimize the potential for new development in the floodplain.

Table 4.32 – Future Land Use of Unimproved Parcels in the SFHA

Future Land Use	Zone AE		Zone A		Zone AH	
	Parcel Count	Total Acreage	Parcel Count	Total Acreage	Parcel Count	Total Acreage
(none)	99	159.7	60	84.2	3	11.1
Avalon Park	52	377.7	14	96.2	--	--
Educational	9	32.5	11	45.7	--	--
Horizon West	710	4,165.6	314	1,157.0	44	758.3
I-Drive District Regional Center	8	31.7	17	147.7	--	--
Industrial	220	1,089.3	61	525.8	1	4.2
Innovation Way	24	1,525.6	2	0.2	--	--
Institutional	32	494.5	37	310.4	--	--
Lake Pickett	3	163.8	3	131.5	--	--
Neighborhood Center	45	95.9	20	81.1	--	--
Parks & Recreation / Open Space	53	13,356.1	75	3,397.7	--	--
Preservation	375	7,048.3	24	1,090.6	--	--
Rural	560	39,337.9	1,275	8,426.4	--	--
Rural Center	6	13.1	6	12.8	--	--
Rural Residential Enclave	23	94.0	3	35.3	--	--
Rural Settlement 1/1	333	3,802.5	137	297.5	6	32.4
Rural Settlement 1/2	55	168.4	25	250.3	--	--
Rural Settlement 1/5	49	335.0	6	6.6	--	--
Suburban Corridor	10	35.0	--	--	--	--
Suburban Mixed Neighborhood	364	1,220.6	444	1,789.9	--	--
Suburban Neighborhood	1,682	5,418.5	1,281	4,860.8	--	--
Tourist Activity Center	225	902.8	66	414.6	--	--
Traditional Neighborhood	1,158	2,318.4	242	844.1	8	173.3
UCF Regional Center	9	28.6	--	--	--	--
Urban Center	78	320.5	29	67.0	1	0.0
Urban Corridor	85	84.2	13	4.2	1	0.2
Total	6,267	82,620.1	4,165	24,077.6	64	979.6

Changes In the Watershed

Changes in the watershed, particularly an increase in impervious area, could make these identified areas more likely to flood in the future. Additionally, as development in the watershed occurs, the amount of runoff sent to drainage features often increases. The County’s current zoning reflects that over 104,615 acres (22% of the County) is zoned for planned development. Future land use designations in these areas include a range of land uses including rural designation, suburban neighborhoods, and main street uses. Lower densities may minimize the potential for increases in runoff.

Based on the County’s future land use map, 527 parcels and 24,892 acres designated as parks and recreation/open space, and preservation are within the SFHA and around 19 parcels and 2,075 acres are

within the Shaded X Zone. Open space and low-density parcels within these flood zones should remain as open space or land uses with minimal development like parks or agricultural uses.

According to U.S. Census Building Permits Survey data, single family homes are by far the most common type of new residential construction in the County. Compared to multi-unit structures, which typically have a smaller per-unit footprint and house more dwelling units per acre by building up rather than out, single family homes have a large per unit building footprint. Their space requirements also result in increased infrastructure needs such as roads and sidewalks. These large building footprints and infrastructure requirements create impervious surface which contributes to flood hazards by increasing stormwater runoff and reducing the potential for infiltration. Thus, the dominance of single-family home construction in the County and the projections for continued population growth suggests that future flood increases as a result of development in the watershed are likely.

Figure 4.24 shows the location of these planned developments, which is dispersed across the watersheds that cover the County. Upper St. Johns and Kissimmee watersheds will likely experience the brunt of new development.

The County's Stormwater Standards and Floodplain Management regulations in the code of ordinances allows County staff to regulate development both in and out of the floodplain in an effort to protect the watersheds. Within these watersheds there are requirements for detention to mitigate new development increased impervious cover within the watersheds. As long as these rules are in place, development in the watershed should be controlling their increased runoff to pre-existing levels and not adversely affect the flood prone areas.

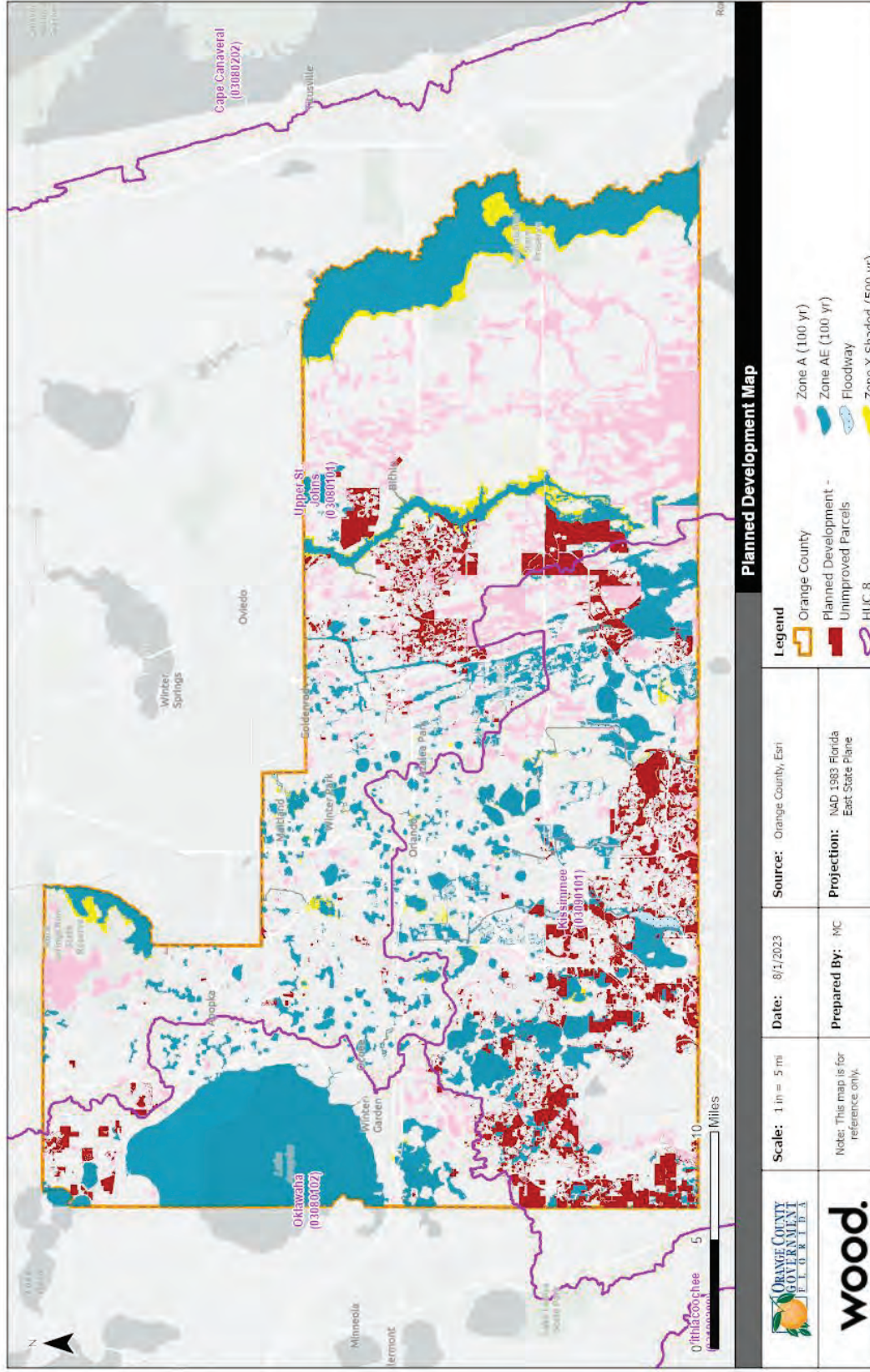
Climate Change

As discussed in Section 4.3.1, climate change is expected to cause an increase in frequency and intensity of heavy precipitation events. Climate-driven hazards such as hurricanes and flooding are likely to increase in intensity, and possibly frequency, in the future. In general, the potential impacts of climate change include increased flooding frequency, potential damage to critical infrastructure, and increasing public costs associated with flood insurance claims, infrastructure repair and maintenance, environmental impacts and increased costs associated with emergency management efforts.

In 2022 there were 18 weather and climate-related disaster events in the U.S. with losses exceeding \$1 billion each. All of the 10 costliest disasters to affect Florida have been hurricane and flood related. Some of the recent storms to have impacted the region include, Hurricane Ian (2022), Hurricane Ida (2021), Hurricane Michael (2018), and Hurricane Irma (2017). The cost of these storms exceeds \$270 billion. Throughout the planning process, the public indicated several flooding challenges as a result of the rainfall during Hurricanes Ian and Nicole in 2022. Residents detailed experiences with localized flooding throughout the County, and personal flood challenges around their properties. The localized flooding map in Figure 4.15 include some of the flooding problem areas identified by the community as a result of Hurricane Ian.

The trend of costly disasters is attributed to many factors. For one, there have been more disaster declarations in recent years as well as increased cost for disaster response and recovery, in part due to population growth and development in hazardous areas which has increased exposure. However, while as storms of similar magnitude increase in frequency the County must plan for mitigation because the costs of response and recovery are growing, and many events are predictable or repetitive.

Figure 4.24 – Planned Development



Planned Development Map

	<p>Scale: 1 in = 5 mi</p> <p>Note: This map is for reference only.</p>	<p>Date: 8/1/2023</p> <p>Prepared By: MC</p>	<p>Source: Orange County, Esri</p> <p>Projection: NAD 1983 Florida East State Plane</p>	<p>Legend</p> <ul style="list-style-type: none">  Orange County  Planned Development - Unimproved Parcels  HUC 8  Zone A (100 yr)  Zone AE (100 yr)  Floodway  Zone X Shaded (500 yr)
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4.4.4 Health & Safety

Flooding poses a significant risk to life and safety, including the threat of injury or drowning during a flood event as well as numerous health risks during and after an event.

Life Safety

Flood waters may prevent access to areas in need of response or to the critical facilities themselves which may prolong response time. The public must understand that they should never drive through flooded streets. The Centers for Disease Control and Prevention report that over half of flood-related drownings occur when a vehicle is driven into flood water, and the next highest percentage of deaths is due to people walking into or near flood waters. The National Weather Service warns that just 6 inches of fast-moving flood water can knock down an adult, 12 inches can carry away a small car, and 2 feet can carry away most vehicles. When someone drives through floodwaters, they put their life and the lives of first responders at risk. First responders are at risk when attempting to rescue people from floodwaters. They are subject to the same health hazards as the public and are more likely to be exposed to these hazards during their response efforts.

Residential, commercial, and public buildings, as well as critical infrastructure such as transportation, water, energy, and communication systems may be damaged or destroyed by flood waters. Floods can severely disrupt normal operations, especially when there is a loss of power. This can affect the operations of critical facilities, which affects response times. Loss of power also puts the public at risk. Downed power lines pose a serious hazard and should always be treated as if they are still energized. When a building loses power during a flood, electricity should be turned off and not used until the wiring can be inspected, to avoid risk of electrocution or fire. Damage to electrical equipment can also result from exposure to flood waters contaminated with chemicals, sewage, oil, and other debris.

Warning and Evacuation

This risk to life and safety necessitates establishing warning and evacuation procedures to ensure that both residents and visitors are aware of flood events and able to move to safety.

Orange County has multiple public warning systems established to ensure that residents and visitors are notified of flood events. These systems include the following:

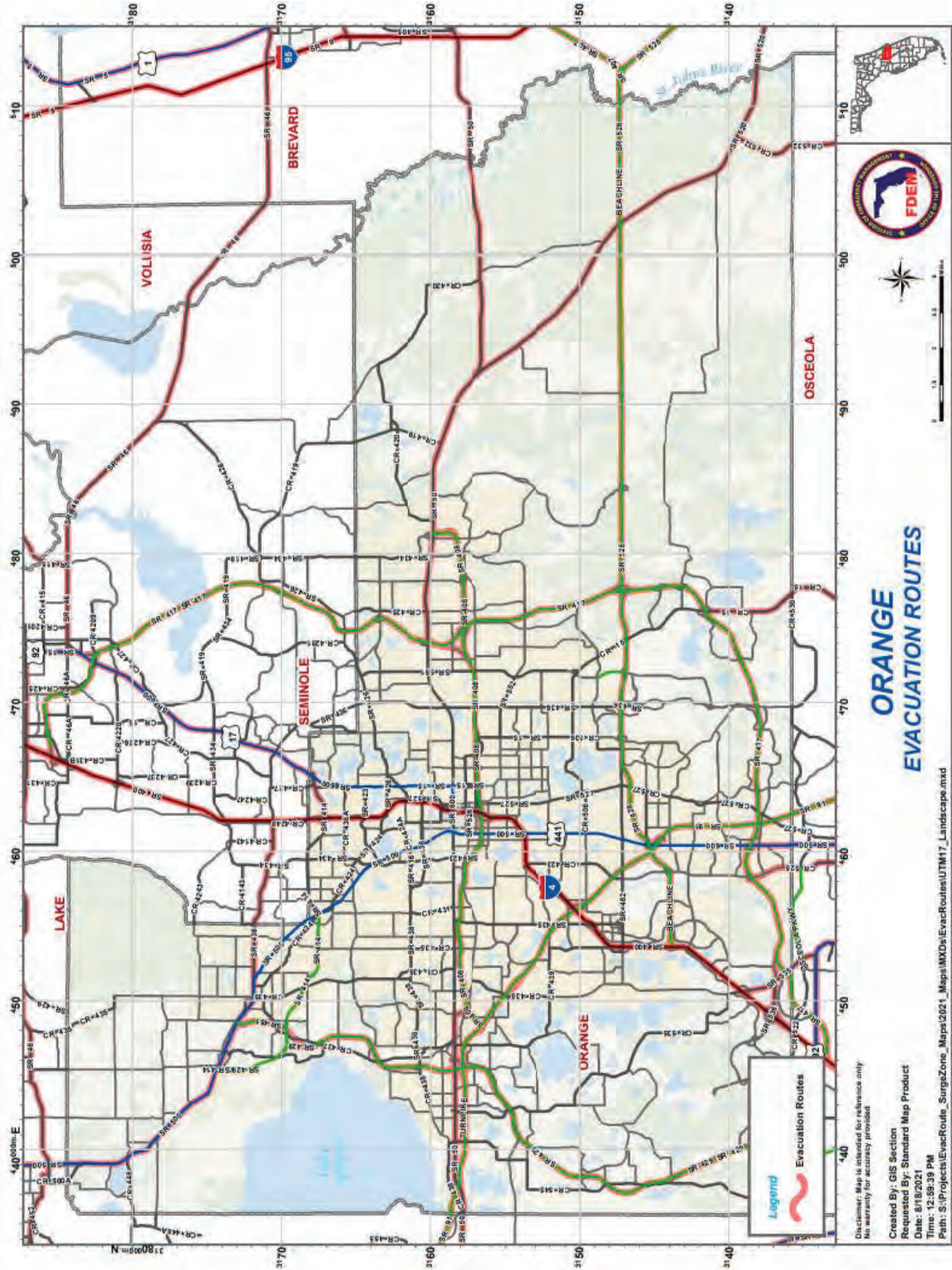
- NOAA Weather Radio
- OCAAlert.net
- OCFL Alert Smartphone Apps
- Media Coordination
- Orange County Government Website
- Partners such as 2-1-1
- Door-to-door Notification by First Responders
- Code Red (Reverse Dialing)
- Emergency Alert System
- Orange County 3-1-1
- FEMA Smartphone App
- Orange TV
- Facebook
- Twitter

The County's warning systems are coordinated by the Office of Emergency Management through the Orange County Fire Rescue Communications Center and the Orange County Emergency Operations Center. Information shared on these systems includes emergency actions to be taken, shelter locations and status, evacuation zones, and evacuation routes.

The County does not have any storm surge evacuation zones but does serve as a sheltering location for evacuees from coastal locations. Evacuation routes intended to funnel evacuees to shelters within the County are shown in Figure 4.25 on the following page. Major routes in this plan include:

- Interstate 4
- State Route 50
- U.S. 441
- State Route 528
- John Young Parkway
- Florida Turnpike
- State Route 417

Figure 4.25 – Orange County Evacuation Routes



Flood Warning Procedures

The Orange County Alerting Methods are established based on the following levels of flooding:

- Level 1: within the SFHA (the 1% annual chance flood (100-year)
- Level 2: within the 0.2% annual chance flood (500-year)
- Level 3: within the 30 repetitive loss areas

All of these areas are identified in this 2023 Orange County, FL Floodplain Management Plan and are covered by the Notification, Emergency Situations and Physical and Human Intervention actions discussed below. Orange County Emergency Management also monitors the dam inundation mapping areas prepared by Orange County Stormwater Management and included in this 2023 Orange County, FL Floodplain Management Plan. Additionally, if flooding occurs elsewhere in the County, such as an X-zone, these same notification and action procedures will also apply.

Emergency Procedures for **Level 1** (100-year or 1% annual chance flood as shown in this plan in Figure 4.12 on page 65):

1. Upon notification by NWS, the monitoring of Orange County Gages (approaching flood stage), the Orange County Stormwater Flood Notification System (OCSFNS), Orange County Emergency Rescue Personnel, Orange County Law Enforcement Officer or a report by a property owner, Orange County OEM will do the following:
 - Activate the OC Alert system, which will send text and email warnings to subscribers in area(s) which can be impacted by flooding, and/or
 - Activate OCFL Alert, which is a smartphone app which anyone can download to their phone,
 - Mass Dialing, where we can send a pre-recorded message to every phone number in area(s) potentially impacted by flooding, and/or
 - Notify affected residents through door-to-door visits or PA announcement from officials (fire, law enforcement, volunteers) in area(s) at risk to flooding
2. If the event is an urgent, life or death event due to flooding (such as flash flooding) Orange County OEM will:
 - Activate the Wireless Emergency Alert system (WEA) which will sound an alert on most cell phone in the area, and/or
 - Activate the Emergency Alert System (EAS) which will display a message on every TV station and sound a message on every radio station

Due to the urgency of flash flood emergencies, some of the above systems are configured to automatically retransmit Flash Flood Warnings with no human intervention.

3. In concert with Orange County OEM, Orange County Law Enforcement Officials will assess safe passage of roads and determine which roads and routes will need to be closed to vehicle traffic. Barricades will be placed at these locations to block traffic from entering. In some cases, police and other emergency vehicles may be used as temporary barriers.
4. In anticipation of heavy rainfall, Orange County will promote the locations where the sandbagging program stations are strategically located throughout the County via local news and social media. Residents can locate the station closest to their property.

<http://www.ocfl.net/EmergencySafety/EmergencyInformation.aspx>

Emergency Procedures for **Level 2** (0.2% annual chance flood as shown in this plan in Figure 4.12 on page 65):

1. Upon notification by NWS, the monitoring of Orange County Gages (approaching flood stage), the Orange County Stormwater Flood Notification System (OCSFNS), Orange County Emergency Rescue

Personnel, Orange County Law Enforcement Officer or a report by a property owner, Orange County OEM will do the following:

- Activate the OC Alert system, which will send text and email warnings to subscribers in area(s) which can be impacted by flooding, and/or
 - Activate OCFL Alert, which is a smartphone app which anyone can download to their phone,
 - Mass Dialing, where we can send a pre-recorded message to every phone number in area(s) potentially impacted by flooding, and/or
 - Notify affected residents through door-to-door visits or PA announcement from officials (fire, law enforcement, volunteers) in area(s) at risk to flooding
2. If the event is an urgent, life or death event due to flooding (such as flash flooding) Orange County OEM will:
- Activate the Wireless Emergency Alert system (WEA) which will sound an alert on most cell phone in the area, and/or
 - Activate the Emergency Alert System (EAS) which will display a message on every TV station and sound a message on every radio station

Due to the urgency of flash flood emergencies, some of the above systems are configured to automatically retransmit Flash Flood Warnings with no human intervention.

3. In concert with Orange County OEM, Orange County Law Enforcement Officials will assess safe passage of roads and determine which roads and routes will need to be closed to vehicle traffic. Barricades will be placed at these locations to block traffic from entering. In some cases, police and other emergency vehicles may be used as temporary barriers.
4. In anticipation of heavy rainfall, Orange County will promote the locations where the sandbagging program stations are strategically located throughout the County via local news and social media. Residents can locate the station closest to their property.

<http://www.ocfl.net/EmergencySafety/EmergencyInformation.aspx>

Emergency Procedures for **Level 3** (Repetitive Loss Areas are shown in this plan in Figure 4.22 on page 93):

1. Upon notification by NWS, the monitoring of Orange County Gages (approaching flood stage), the Orange County Stormwater Flood Notification System (OCSFNS), Orange County Emergency Rescue Personnel, Orange County Law Enforcement Officer or a report by a property owner, Orange County OEM will do the following:
- Activate the OC Alert system, which will send text and email warnings to subscribers in area(s) which can be impacted by flooding, and/or
 - Activate OCFL Alert, which is a smartphone app which anyone can download to their phone,
 - Mass Dialing, where we can send a pre-recorded message to every phone number in area(s) potentially impacted by flooding, and/or
 - Notify affected residents through door-to-door visits or PA announcement from officials (fire, law enforcement, volunteers) in area(s) at risk to flooding
2. If the event is an urgent, life or death event due to flooding (such as flash flooding) Orange County OEM will:
- Activate the Wireless Emergency Alert system (WEA) which will sound an alert on most cell phone in the area, and/or
 - Activate the Emergency Alert System (EAS) which will display a message on every TV station and sound a message on every radio station

Due to the urgency of flash flood emergencies, some of the above systems are configured to automatically retransmit Flash Flood Warnings with no human intervention.

3. In concert with Orange County OEM, Orange County Law Enforcement Officials will assess safe passage of roads and determine which roads and routes will need to be closed to vehicle traffic. Barricades will be placed at these locations to block traffic from entering. In some cases, police and other emergency vehicles may be used as temporary barriers.
4. In anticipation of heavy rainfall, Orange County will promote the locations where the sandbagging program stations are strategically located throughout the County via local news and social media.
<http://www.ocfl.net/EmergencySafety/EmergencyInformation.aspx>

Public Health

In addition to the threat to life safety that people face during flood events, certain health hazards are also common. While such problems are often not reported, the following general types of health hazards may arise during and after floods:

- Floodwaters carry anything that was on the ground that the upstream runoff picked up, including dirt; oil; human and livestock waste; household, medical, and industrial hazardous waste; coal ash waste that can contain carcinogenic compounds; or lawn, farm and industrial chemicals. Pastures and areas where farm animals are kept or their wastes are stored can contribute polluted waters to the receiving streams.
- Flood-borne debris, including lumber, vehicles, or smaller sharp objects such as glass or metal fragments, can cause injury and subsequent infection.
- Floodwaters saturate the ground, which leads to infiltration into sanitary sewer lines. When wastewater treatment plants are flooded, there is nowhere for the sewage to flow. Infiltration and lack of treatment can lead to overloaded sewer lines that can back up into low-lying areas and homes. Even when it is diluted by flood waters, raw sewage can be a breeding ground for bacteria such as e.coli and other disease causing agents.
- Stagnant pools can become breeding grounds for mosquitoes and other disease vectors.
- Floodwaters can also displace insects, rodents, snakes, and other animals, potentially bringing them into contact with people. Animals can spread disease and can bite people and pets. They may also cause asthma or allergic reactions in some people.
- Wet areas of a building that have not been properly cleaned breed mold and mildew. Mold and mildew can pose a severe a health hazard, especially for small children and the elderly.
- Building utilities can harbor health hazards if not properly cleaned. When a furnace or air conditioner is turned on after a flood, the sediments left in the ducts are circulated throughout the building and breathed in by the occupants. If the County water system loses pressure, a boil order may be issued to protect people and animals from contaminated water.
- Flooding can affect mental health due to trauma or stress. People can experience a long-term psychological impact of having been through a flood and seen their home damaged and personal belongings destroyed. The cost and labor needed to repair a flood-damaged home puts a severe strain on people, especially the unprepared and uninsured. There is also a long-term problem for those who know that their homes can be flooded again. The resulting stress on floodplain residents takes its toll in the form of aggravated physical and mental health problems.

5 Capability Assessment

This Chapter discusses the County's existing mitigation capabilities, including planning, programs, policies and land management tools. The purpose of conducting a capability assessment is to determine the community's ability to implement feasible mitigation actions based on an understanding of the capacity of those agencies or departments tasked with their implementation. The process of conducting a capability assessment includes developing an inventory of relevant plans, ordinances, or programs already in place and assessing the community's resources and ability to implement existing and/or new policies. Through the capability assessment, a community can identify any gaps or weaknesses in existing programs and policies as well as positive measures already in place which should be supported through additional mitigation efforts.

5.1 Regulatory Mitigation Capabilities

Table 5.1 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in Orange County. Excerpts from applicable policies, regulations, and plans and program descriptions follow to provide more detail on existing mitigation capabilities.

Table 5.1 – Regulatory Mitigation Capabilities

Regulatory Tool (ordinances, codes, plans)	Y/N	Date*	Comments
Comprehensive Plan	Y	2023	Plan update underway
Zoning Ordinance	Y	2023	
Subdivision Ordinance	Y	2023	
Floodplain Ordinance	Y	2021	
Stormwater Ordinance	Y	2000	
Building Code	Y	2020	
BCEGS Rating	Y	2023	3/3
Erosion or Sediment Control Program	Y	2013	Addressed in Stormwater Design Standards in County Code of Ordinances; follows guidance from Florida Erosion and Sediment Control Designer and Reviewer Manual
Stormwater Management Program	Y	2016	NPDES Permit #FLS000011, discussed in Stormwater Management Report
Site Plan Review Requirements	Y		
Capital Improvement Plan	Y		
Economic Development Plan	Y	2016	Economic Element of Comprehensive Plan
Local Emergency Operations Plan	Y	2013	Comprehensive Emergency Management Plan
Flood Insurance Study or Other Engineering Study for Streams	Y	2021	Effective FIS 2021
Repetitive Loss Plan	Y	2018	Plan update underway
Elevation Certificates	Y		

* Most recent version (includes latest amendments)

Below is a summary of key regulatory tools in place in Orange County that already provide for flood risk reduction and/or could support the implementation of additional flood mitigation activities.

Orange County Comprehensive Plan, Adopted 2016, Plan Update Underway

Florida's Growth Management Act requires the state's counties and municipalities to adopt Comprehensive Plans that guide future growth and development. A Comprehensive Plan establishes goals, policies and

objectives for the implementation of the plan. The County is currently working on a plan update, Vision 2050. With the plan update, the County will adopt a new Land Development Code that reflects the desired development characteristics outlined in the comprehensive plan. Vision 2050 seeks to prioritize a sustainable path forward over the next 30 years with a focus on resiliency and development that balances the need to support environmental resources.

Relevant goals, objectives and/or policies in the Vision 2050 Plan include:

Land Use, Mobility, & Neighborhoods

- The Urban Service Area (USA) promotes and guides infill development and allows for a timed development of vacant lands, while protecting green, agricultural and preservation lands within the Rural Service Area (RSA).

Natural Resources, Conservation, and Resiliency

- Orange County shall conserve, protect, and enhance the County's natural resources including air, surface water, groundwater, vegetative communities, imperiled species, soils, floodplains, recharge areas, wetlands, uplands adjoining wetlands, environmentally sensitive lands, priority habitats, and energy resources to ensure that these resources are managed for the benefit of current and future generations.
- Sustainability and Resiliency: Orange County shall create, promote, and maintain conditions under which humans and nature can exist in productive harmony, that allow for the fulfillment of the social, economic and other requirements of present and future generations. The County shall enhance environmental resiliency as a key component of community resiliency and means to mitigate the impacts of climate change.
- Wetlands and Buffers: Orange County shall protect wetland areas, associated upland buffers, and native flora and fauna and their habitat to ensure their long-term environmental, economic, and recreational values and to enhance environmental resiliency.
- Orange County shall identify wetlands and surface waters of most significant value based on acreage, functionality, connectivity to wildlife corridors, groundwater recharge capacity, floodplain position, location on or near public lands and other factors. The County shall discourage impacts to wetlands or surface waters that have significant value and shall incorporate regulations into County Code that limit impacts to these systems.
- Floodplain Management: Orange County shall protect and minimize adverse impacts to the natural functions of floodplains and flood zone areas to maintain flood-carrying and flood-storage capacities and to protect life and property, and Orange County shall continue to maintain its eligibility in the National Flood Insurance Program.

Recreation and Open Space

- Orange County shall continually pursue public/private partnerships for funding land acquisition of environmentally sensitive lands and natural open spaces.
- Orange County shall consider acquiring natural undeveloped land areas via public/private ventures to address development impacts on wetlands, protecting wetland buffers and uplands with rare or sensitive habitat. Land areas acquired for these purposes shall accommodate the development of greenways and wildlife corridors in the County.
- The Land Development Code shall include tree canopy enhancement, open space and green space requirements for both public and private development to enhance the urban environment.

Community Facilities and Services

- Orange County shall not approve for construction any road, street, or facility proposed to be constructed within a designated flood hazard area, unless mitigation measures, as identified in the applicable regulations, have been installed by the developer to overcome an identified flood hazard. All measures installed by the developer must be certified acceptable by the County prior

to project completion. This policy shall be included in the floodplain regulations of the Land Development Code.

- Orange County shall require stormwater management systems within all development to be designed and installed to provide adequate flood protection for all primary structures and to protect the structural integrity of all roadways.
- Orange County shall require the design of stormwater management systems to be compatible with those natural terrain or landscape barriers that protect the site against flooding. Natural drainage design (low impact development) shall be preserved and utilized to the maximum extent practicable.
- Orange County shall continue to participate in the Community Rating System (CRS) and strive to attain maximum discounts for the residents of Orange County.
- Orange County shall investigate reports of flooding in a timely manner. Response times, frequencies, durations and locations shall be noted and reported as requested by the Board of County Commissioners.

Orange County Local Mitigation Strategy, Updated 2021

The Orange County Local Mitigation Strategy is a multi-jurisdictional, multi-hazard mitigation plan, developed with input from a wide variety of stakeholders comprising the Local Mitigation Strategy Working Group. The plan includes Orange County, 11 incorporated municipalities, the University of Central Florida, the Greater Orlando Aviation Authority, and the University of Central Florida. The LMS addresses diseases and pandemic, extreme temperatures, floods, severe thunderstorms, sinkholes / land subsidence, hazardous materials, terrorism/CBRNE, cyberterrorism, tropical storms, and wildfire.

Orange County Comprehensive Emergency Management Plan (CEMP), 2013

The Orange County CEMP is an emergency operations framework for the County, which establishes the Orange County Emergency Response Team (OCERT) responsible for incident management and ensures integration of emergency management efforts across the County and its municipalities. The plan is intended to address prevention, preparedness, mitigation, response, and recovery for identified hazards.

Floodplain Management Ordinance

A floodplain management ordinance is perhaps a community's most important flood mitigation tool. Orange County updated and adopted its current floodplain management ordinance in 2021 in conjunction with the adoption of its current effective flood insurance rate maps. The objectives of Orange County's current Floodplain Management ordinance are to:

- Minimize unnecessary disruption of commerce, access and public service during times of flooding;
- Require the use of appropriate construction practices in order to prevent or minimize future flood damage;
- Manage filling, grading, dredging, mining, paving, excavation, drilling operations, storage of equipment or materials, and other development that may increase flood damage or erosion potential;
- Manage the alteration of flood hazard areas, watercourses, and shorelines to minimize the impact of development on the natural and beneficial functions of the floodplain;
- Minimize damage to public and private facilities and utilities;
- Help maintain a stable tax base by providing for the sound use and development of flood hazard areas;
- Minimize the need for future expenditure of public funds for flood control projects and response to and recovery from flood events; and

- Meet the requirements of the National Flood Insurance Program ("NFIP") for community participation as set forth in Section 59.22 of Title 44 of the Code of Federal Regulations.

Orange County's Floodplain Management Ordinance establishes a requirement that all construction in the regulatory floodplain be elevated with a one-foot freeboard above base flood elevation. The minimum elevation requirements for critical facilities, is at or above the base flood elevation plus two feet or the elevation required by the Florida Building Code, whichever is higher.

Zoning and Subdivision Regulations

Site Development Ordinance

Ensures compliance with all site development requirements, including establishing consistency with the conservation element of the Comprehensive Plan.

Stormwater Standards

Categorizes development based on size and impervious surface coverage and sets design standards for each category. Design standards include pollution abatement, recharge, rate of discharge, and protection from flooding, as well as additional stipulations for development in SFHAs, which include providing compensatory storage.

Flood Insurance Study (Effective, 2021)

A Flood Insurance Study (FIS) dated September 24, 2021 was prepared by FEMA for Orange County, Florida and Incorporated Areas. The FIS identifies areas within Orange County that are subject to flooding from the 100-year storm event. This information is used by Orange County to implement floodplain regulations as part of participation in the NFIP and to promote sound land use and floodplain development within the community.

This FIS was used in the development of this FMP to identify FEMA flood hazard areas and to calculate the associated flood depths for the 100-year storm event. The flood depths were then used to prepare the risk assessment for Orange County. Based on the flood depth, a depth damage factor was applied to each building based on its occupancy class in order to calculate an accurate damage assessment for each building located within the 100-year flood hazard area.

Florida Building Code

Orange County enforces the 2020 Florida Building Code which includes provisions for all buildings and structures constructed in whole or in part in a flood hazard area to be constructed in accordance with specific elevation requirements. The Florida Building Code also includes provisions for high-velocity hurricane zones to mitigate wind damage from hurricanes and other windstorms.

Sustainable Operations and Resilience Action Plan

The County developed and adopted a 2030 Orange County Sustainable Operations and Resilience Action Plan to clearly outline measurable actions that ensure sustainability, resilience, and environmental preservation are considered in every County decision. The plan includes six focus areas, Energy and Climate, Buildings and Infrastructure, Water Use and Quality, Mobility and Fleet, Supply Chain and Materials Management, and Trees and Land. This plan aims to reduce the County's greenhouse gas emissions, increase natural resource protection, and protect critical infrastructure – all key factors important to increasing the County's capacity for flood mitigation. Relevant project goals and actions are listed below include:

- **Goal 6: Reduce risks for county services and infrastructure based on regional resilience indicators and updated mitigation plans**
 - Amend the scope of Orange County's facility condition assessment contracts and in-house preventative maintenance activities to include checklist items related to weather-related

risks, infrastructure resilience, energy/ water efficiency, building envelope, roof, waterproofing, flooding, coatings and glazing, basic indoor air quality, pollution prevention, flood mitigation, safety and hazards

- Create a comprehensive five-year Buildings & Infrastructure Resilience Plan to complete facility hardening and risk mitigation projects across County facilities. Identify critical services and functions of County departments to update the emergency-management plans, disaster-management procedures, and continuity plans to take an all-hazard and threat approach. Conduct planning, preparation, and recovery scenarios that focus on future strategies to sustain programs that are essential community services and programs.
- **Goal 7: Protect water quality through innovative technology and integrated water management audits at county facilities**
 - Complete a Comprehensive Stormwater Infrastructure Plan (CSIP) to identify specific basin requirements, impairments and erosion control. Complete an inventory in GIS. Implement a Stormwater Inventory & Maintenance Data Management System (SIMMS).
 - Identify and approve Low Impact Design strategies that benefit the County’s system and make additions to design requirements.
- **Goal 16: Preserve an additional 23,000 acres of environmentally sensitive lands and increase county natural land assets by 2030**
 - Expand strategic partnerships with public, private, land trusts, and non-profit partners to preserve natural lands.
 - Determine the need to acquire additional lands to meet watershed protection goals. Acquire lands that include watershed protections for downstream receiving waters that are impaired. Align Parks development strategy to include lands with areas that buffer lakes/rivers.
 - Evaluate County-owned properties to identify multi-use opportunities that can increase the per capita access to green space.
- **Goal 17: Protect and enhance tree canopy and wildlife habitats on county properties**
 - Create a standardized list of Right Tree, Right Place for County projects to include diversity criteria and points allocation to meet stormwater and carbon mitigation goals. Identify contracts for landscaping, tree planting and grounds maintenance that require scope and specification updates to meet goal

Political Support for Mitigation

A key factor affecting regulatory capabilities is the local political climate and political support for mitigation. Orange County has a mayor who serves as Chair of the Board of County Commissioners. Members of the Orange County Board of Commissioners are independently elected from six districts and serve in a legislative capacity. Political support for flood mitigation and other related initiatives has been demonstrated by the Mayor and County Commissioners by adopting and continuously supporting County participation in the Community Rating System (CRS) through the passage of resolutions and allocations of funding. Additionally, the Mayor and County Commissioners have recently supported the adoption of the Orange County Sustainable Operations and Resilience Action Plan which is the first phase of Orange County working to become a “top-ranked community for sustainability”.

5.2 Administrative/Technical Mitigation Capabilities

Table 5.2 identifies personnel responsible for activities related to mitigation and loss prevention in Orange County.

Table 5.2 – Administrative/Technical Capabilities

Resource	Y/N	Responsible Department
Planner/Engineer with knowledge of land development/land management practices	Y	Planning & Development Department
Engineer/Professional trained in construction practices related to buildings and/or infrastructure	Y	Division of Building Safety
Planner/Engineer/Scientist with an understanding of natural hazards	Y	Stormwater Management Division, Planning & Development Department
Personnel skilled in GIS	Y	Planning & Development Department
Full time building official	Y	Division of Building Safety
Floodplain Manager	Y	Public Works
Emergency Manager	Y	Office of Emergency Management
Grant writer	Y	Office of Management and Budget (two full-time staff)
GIS data – Hazard areas	Y	Planning & Development Department
GIS data – Critical facilities	Y	Planning & Development Department
GIS data – Land use	Y	Planning & Development Department
GIS data – Building footprints	Y	Planning and Development
GIS data – Links to Assessor’s data	Y	www.octaxcol.com
Warning Systems/Services	Y	Systems: Television, radio, cell/smart phones, email, and dedicated radio receivers; Services: Emergency Alert System (EAS), OTV, OCAAlert, OCFL Alert, NOAA Weather Radio, Amateur Radio, PulsePoint Respond, Pulse Point AED

Based on a review of the County’s administrative resources and departments with responsibilities related to mitigation, the County is well-equipped to implement flood mitigation. There are staff across multiple departments that can support a variety of projects through planning, development regulations and code enforcement, engineering, public education and outreach, and grant writing. In addition to in-house capabilities, County staff have relationship and memberships with area organizations and stakeholders that can support local mitigation efforts.

5.3 Fiscal Mitigation Capabilities

Table 5.3 identifies financial tools or resources that the County could potentially use to fund mitigation.

Table 5.3 – Fiscal Mitigation Capabilities

Resource	Accessible/Eligible to Use (Y/N)
Community Development Block Grants	Y
Capital improvements project funding	Y
Authority to levy taxes for specific purposes	Y
User fees for water, sewer, gas or electric services	Y
Impact fees for new development	Y
Incur debt through general obligation bonds	Y
Incur debt through special tax bonds	Y
Incur debt through private activity bonds	Y
Withhold spending in hazard prone areas	Y*
SFWMD & SJRWMD Cooperative Funding Program	Y

*According to the Comprehensive Plan Future Land Use Element Policy FLU1.3.1, Orange County can refuse expansions of the Urban Service Area on the basis of an amendment failing to meet Comprehensive Plan goals, including if that proposed amendment “fails to adequately protect and conserve natural resources, such as wetlands, floodplains... and other significant natural systems.”

The County has strong fiscal capability with several methods for allocating funds to mitigation projects and programs. Orange County also has a stormwater utility, which enables stormwater assessments based on impervious surface area on developed properties to generate a dedicated funding source for stormwater management projects within the stormwater service area through the Municipal Service Benefit Unit (MBSU) Program. The MBSU for maintenance and drainage projects can reduce future flood losses. Other funding sources noted in the 2021 Local Mitigation Strategy that may be relevant to projects identified as part of this Floodplain Management Plan include:

- Homeland Security Grants
- Florida’s State Homeland Security Grant Program (SHSGP)
- Emergency Management Preparedness & Assistance (EMPA) Base Grant Program
- Florida Division of Emergency Management Residential Construction Mitigation Program grant (RCMP)

5.4 Mitigation Partnerships and Outreach

Partnerships

Local

Orange County coordinates with many other government and agencies to plan and carry out emergency preparedness, emergency response, and hazard mitigation activities. To prepare for natural disasters such as flooding, the County and 11 of its incorporated municipalities participate in the Orange County Local Mitigation Strategy Working Group. The group is composed of members drawn from county and municipal governments as well as from interested citizens from around Orange County. The purpose of the LMS Working Group is to identify new mitigation opportunities, techniques and, if necessary, reprioritize existing mitigation projects. This group meets at least annually and after every disaster event that causes significant damages to infrastructure.

The following is a list of partners identified in the 2013 Orange County Comprehensive Emergency Management Plan (CEMP) to help mitigate natural hazards through mutual aid agreements, memoranda of understanding, and other agreements:

- Lake County
- Osceola County
- Polk County
- Seminole County
- Brevard County
- Greater Orlando Aviation Authority
- Kissimmee Fire Department
- Maitland Fire Department
- Orlando Fire Department
- Oviedo Fire Department
- Central Florida Tourism Oversight District Fire Department
- Winter Garden Fire Department
- Apopka Fire Department
- Lynx
- Salvation Army
- American Red Cross
- Progress Energy
- OUC
- TECO Gas

Regional

Orange County is part of the East Central Florida Regional Planning Council (ECFRPC) which is an area-wide association of governments represented by 32 Council Members and skilled staff. The Council provides technical assistance to governments and organizations within the 8-County East Central Florida region. ECFRCP has several programs and projects. Orange County participates on the Regional Resilience Collaborative, working with the more than 37 stakeholders to ensure the Health and Equity, Built