# City of
# Apalachicola
## Vulnerability Assessment and Resiliency Analysis
## DRAFT

**Prepared for:**
City of Apalachicola

**Funded by:**
Florida Department of Environmental Protection
(FDEP) Grant #22PLN10

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**Assessment Disclaimer**

The City of Apalachicola Vulnerability Analysis data and maps are for planning, education and awareness purposes only. The information contained herein should not be used for site-specific analysis, navigation and flood rates or permitting. The City of Apalachicola makes no warranty explicit or implied, regarding the accuracy or use of this information. The data and maps in this report illustrate the scale of potential flooding, not the exact location. The inundation areas depicted in the SLR analysis are not as precise as they may appear. The data, maps and information provided should be used only as a screening-level tool for management decisions.

Maps generated from these models provide the basis for applying the sea level rise and projected storm scenarios to assess potential extent and severity of flooding. While they have many limitations and should not be used for site-specific analysis, bathtub models are useful for visualizing potential extents of future high water levels for initial consideration of vulnerabilities. These data illustrate the scale of potential flooding, not the exact location, and do not account for erosion, subsidence, or future construction. These data should be used strictly as a planning reference and not for navigation, permitting, or other legal purposes.

# Background

The City of Apalachicola is located in Northwest Florida, west of the junction of the Apalachicola River and Apalachicola Bay. The influx of freshwater from the Apalachicola River forms the Apalachicola National Estuary and is considered to be one of the most resource rich ecological systems in the United States. The Apalachicola Bay estuarine system constitutes the most environmentally sensitive area within Franklin County. Apalachicola is located approximately 60 miles east of Panama City and approximately 80 miles southwest of Tallahassee. Access to Apalachicola can only be achieved via State Highway 98 which runs east to west through the City. State Highway 98 is the only means of evacuation from the City.

The City covers approximately 2.0 square miles, approximately 1,050 acres. It is bound on the east by the Apalachicola River, on the south by Apalachicola Bay, on the north by Scipio Creek, and the west by rural development and undeveloped forest land.

Elevations within the City generally range between 0 and 16 feet. The City is generally low relief in terms of elevation. Some areas are located in lower elevations close to sea level and some areas are on broad, low hills. The higher elevations coincide with sandy, well drained hills. The lower elevations are generally poorly drained. The lower elevations are also more prone to flooding. The lower elevations are along the shoreline and inland for two blocks, generally. The City has approximately 20,000 linear feet of shoreline.

# Data Acquisition

**Task 2: Acquire Background Data.**

**Description:** The Grantee will research and compile the data needed to perform the VA, based on the requirements as defined in Section 380.093, F.S. Three main categories of data are required to perform a VA: 1) critical and regionally significant asset inventory, 2) topographic data, and 3) flood scenario-related data. GIS metadata should incorporate a layer for each of the four asset types as defined in paragraphs 380.093(2)(a) 1-4, F.S. GIS files and associated metadata must adhere to the Resilient Florida Program's GIS Data Standards (Exhibit I), and raw data sources shall be defined within the associated metadata. Sea level rise projection data shall include the 2017 National Oceanic and Atmospheric Administration (NOAA) intermediate-high and intermediate-low projections for 2040 and 2070, at a minimum. Other projections can be used at the Grantees discretion. Storm surge data used must be equal to or exceed the 100-year return period (1% annual chance) flood event. In the process of researching background data, the Grantee shall identify data gaps, where missing data or low-quality information may limit the VA's extent or reduce the accuracy of the results. The Grantee shall rectify any gaps of necessary data. Eligible activities for this task may include critical asset inventory and identification of data gaps, GIS files and metadata of asset types, sea level rise and storm surge and wave projection data, and digital elevation surveying of elevation of assets. Asset datasets that have been already submitted to the Department need not to be resubmitted; only new or updated assets shall be submitted.

**Deliverables:** The Grantee will provide the following:

2.1: A technical report to outline the data compiled and findings of the gap analysis; (Appendix 1)
2.2: A summary report to include recommendations to address the identified data gaps and actions taken to rectify them, if applicable;
2.3: GIS files with appropriate metadata of the data compiled, to include locations of critical assets owned or maintained by the Grantee as well as regionally significant assets that are classified and as defined in paragraphs 380.093(2)(a) 1-4, F.S.
2.4: A final technical report identifying which data gaps were rectified and the actions taken to address them; and
2.5: The GIS files generated to rectify identified data gaps with appropriate metadata of the data compiled, to include locations of critical assets owned or maintained by the Grantee as well as regionally significant assets that are classified and as defined in paragraphs 380.093(2)(a) 1-4, F.S.

**Status:** Task 2 DEP-approved.

# Exposure Analysis

**Task 3 - Exposure Analysis**

**Description:** The Grantee will perform an exposure analysis to identify the depth of water caused by each sea level rise, storm surge, and/or flood scenario. The water surface depths (i.e. flood scenarios) used to evaluate assets shall include the following data: tidal flooding, current and future storm surge flooding, rainfall-induced flooding, and compound flooding, all as applicable, as well as the scenarios and standards used for the exposure analysis shall be pursuant to s. 380.093, F.S. GIS files and associated metadata must adhere to the Resilient Florida Program's GIS Data Standards (Exhibit I), and raw data sources shall be defined within the associated metadata. Included in this exposure analysis are requirements outlined in agreement 22PLN10 Task 3.

**Deliverables:** The Grantee will provide the following: 3.1: A draft VA report that provides details on the modeling process, type of models utilized, and resulting tables and maps illustrating flood depths for each flood scenario; and 3.2: GIS files with results of the exposure analysis for each flood scenario as well as the appropriate metadata that identifies the methods used to create the flood layers.

**Status:** Task 3 deliverables included in Appendix 2 (Tables) and Table 3 (Maps), GIS files on file with DEP.

Status: Task 3 DEP approved.

# Methodology

**The 2024 vulnerability assessment update uses hazard-specific data and risk modeling to determine the short and long-term vulnerabilities resulting from combined sea level rise and storm surge to Apalachicola's critical assets.**

The exposure and sensitivity analysis was prepared using Geographic Information System (GIS) data provided by the City of Apalachicola Planning Department and the Franklin County Property Appraiser's Office. Sea level rise and storm surge model data were sourced from the National Oceanic and Atmospheric Administration (NOAA), along with Digital Elevation Model (DEM) data from the United States Geological Survey (USGS).

Flood hazard model runs were initialized to represent the 2023, 2040, 2070 and 2100 sea level projections with 10-, 50-, 100-, and 500-year storm surges. For the purposes of this report, the 2023, No Sea Level Rise (SLR); 2040, Intermediate-Low; 2040, Intermediate-High; 2070, Intermediate-Low; 2070, Intermediate-High; 2100, Intermediate-Low; and 2100, Intermediate-High storm intensity models (NOAA, 2017) are illustrated. After consultation with representatives at NOAA, these models were deemed as representative of likely impacts.

The economic impact of flood damage to buildings, in dollars, and the number of households at risk displacement due to flood damage were quantified using the Stanford Urban Risk Framework . A separate discussion of that methodology follows.

**The updated assessment differs from the 2017 study in that it includes storm surge data, includes all required storm scenarios and includes innovative flood risk data modeling efforts by HighTide Intelligence that provide building-level economic impact results that will help the City and residents identify potential risks and plan for appropriate risk management.**

The NOAA sea level rise and storm surge models were overlaid with the City GIS data to produce the following analysis:

Citywide Anticipated Impact. This series of GIS-based maps show the anticipated impacts of SLR and Surge on the City as evidenced by the 2023 No SLR (present day) intermediate Low and Intermediate High.

Critical Asset Exposure. This analysis details the critical facilities within the City that will be impacted. A review of the 2022 Apalachee Regional Planning Council report on the nine county Vulnerability Analysis also identifies regional assets.

Property Exposure. This map and data details City-owned and publicly-owned properties that will be impacted by No SLR Intermediate Low and Intermediate High inundation levels.

Historic Resource Exposure. This analysis identifies the impact to the City's historic resources as identified on the Florida State Master Site File within the No-SLR Intermediate Low and Intermediate High inundation areas.

Additional data analysis for regional assets and precipitation model projections reference the 2022 Apalachee Regional Vulnerability Assessment for the nine county region.

## Overview

The National Oceanic and Atmospheric Administration (NOAA) created predictive models that are used to estimate impacts to coastal communities based on various scenarios of impact. The models are characterized as follows based on three classifications.

**1. Severity of the Storm Model.** NOAA has organized the storms into classifications of severity models. The classification system continues to evolve, but basically is scenarios of Low, Intermediate-Low, Intermediate-High, and Extreme. At the direction of NOAA, the "outlier" models of Low and Extreme were not considered, instead relying on the Intermediate-Low and Intermediate-High for reasonable interpretation of data. In this way reasonable preparedness can be achieved by the community by relying on what NOAA considers reasonable.

**2. Annual Exceedance Probability.** The probability of a storm occurring is classified into 10-year, 50-year, 100-year, and 500-year storms. Said another way, these are a 10%, 2%, 1%, and 0.2% annual exceedance probability scenarios, i.e. the 10- year, 50- year, 100- year, and 500-year floodplains. It is worth noting that the 100-year flood is defined as the flood that has a 1% probability of occurring or being exceeded any given year, and not a flood that only occurs once every 100 years.

**3. Initial (present day) and Future Predictions.** The models are characterized using environmental data for the present-day (2023), 2040, 2070, and 2100.

The above criteria are used to create flood scenarios in which depths and extents of flooding are characterized. Examples of scenarios include the 2040, Intermediate-High, 100-year event and the 2100, Intermediate-Low, 50-year event. The scenarios for present day events are typically characterized as 2023, No-Sea Level Rise (SLR), 10-year event.

Stated differently, NOAA's classification can be broadly categorized as 2023, No Sea Level Rise, which represents the scenario for present day conditions, impacts using the NOAA model for an Intermediate-Low scenario, and impacts using the NOAA model for an Intermediate-High scenario.

All scenarios have model representations of 10-year (10% chance), 50-year (2% chance), 100-year (1% chance), and 500 year (0.2% chance) storms. Representation of Tidal flooding for all scenarios and storm types are represented, as well. The Intermediate-Low and Intermediate-High models show flooding scenarios for present day (2023), 2040, 2070, and 2100 for all storm types.

Generally, the models show an increasing severity of flooding based on NOAA's modelling. That is, the Intermediate-Low model is more severe than the 2023 present day model and the Intermediate-High model is more severe than the Intermediate-Low model. In addition, as expected storm types increase with severity based on the lower probability of occurrence.

NOAA's probability-based terminology offers an alternative to the traditional hurricane category classification system, though the two can be loosely correlated. For example, tropical storms and Category 1 hurricanes are generally associated with higher-probability events, while Category 5 hurricanes represent lower-probability occurrences. However, precise correlations between these systems can only be established after a storm, once its impacts are analyzed. This report does not attempt to correlate the two systems in detail. Additionally, factors such as the distance from the storm's center at landfall and the storm's landfall direction relative to the city introduce further complexity, which is also beyond the scope of this report.

**The above criteria were used to produce the 35 storm scenarios that are used in this report. These 35 scenarios are listed below and are reflected in the Figures Appendix 3.**

- 2023_No Sea Level Rise_10-year
- 2023_ No Sea Level Rise _50-year
- 2023_ No Sea Level Rise _100-year
- 2023_ No Sea Level Rise _500-year
- 2023_ No Sea Level Rise _Tidal
- 2040_Intermediate-Low_10-year
- 2040_I Intermediate-Low _50-year
- 2040_ Intermediate-Low _100-year
- 2040_ Intermediate-Low _500-year
- 2040_ Intermediate-Low _Tidal
- 2070_ Intermediate-Low _10-year
- 2070_ Intermediate-Low _50-year
- 2070_ Intermediate-Low _100-year
- 2070_ Intermediate-Low _500-year
- 2070_ Intermediate-Low _Tidal
- 2100_Intermediate-Low _10-year
- 2100_ Intermediate-Low _50-year
- 2100_ Intermediate-Low _100-year
- 2100_Intermediate-Low _500-year
- 2100_ Intermediate-Low _Tidal
- 2040_Intermediate-High_10-year
- 2040_ Intermediate-High _50-year
- 2040_ Intermediate-High _100-year
- 2040_Intermediate-High _500-year
- 2040_Intermediate-High _Tidal
- 2070_Intermediate-High _10-year
- 2070_ Intermediate-High _50-year
- 2070_ Intermediate-High _100-year
- 2070_ Intermediate-High _500-year
- 2070_Intermediate-High _Tidal
- 2100_Intermediate-High _10-year
- 2100_Intermediate-High _50-year
- 2100_ Intermediate-High _100-year
- 2100_ Intermediate-High _500-year
- 2100_ Intermediate-High _Tidal

Below is a discussion of the methodology and specific data sources used to develop the geospatial data and metadata files. Datasets used in the assessment were obtained from a variety of State, Federal and locally-created sources. Many of the data sources were merged to incorporate locally-sourced point data not represented in other datasets. A spreadsheet of Critical Assets is included in the table appendix as a separate file which includes metadata link data for each dataset.

Combined, these data sources enabled the project team to evaluate the spatial extent of storm surge, tidal flooding, and sea level rise on critical assets within the City.

**Flood Scenario Data**

The flood hazard models were developed using data from Federal agencies, including the National Oceanic and Atmospheric Administration (NOAA), Federal Emergency Management Agency (FEMA), and the United States Geological Survey (USGS).

**Digital Elevation Model**

This assessment used a digital elevation model USGS Lidar: Florida Panhandle DEM from NOAA's National Centers for Environmental Information[1] as it offers a 1 meter horizontal resolution, exceeding FDEP's requirement. The elevation of the DEM is relative to the North American Vertical Datum of 1988 (NAVD88). (DEM) Given that the flood modeling in this vulnerability assessment is based on elevation and hydraulic connectivity, an accurate and high-resolution Digital Elevation Model (DEM) is essential. The DEM's Non-vegetated Vertical Accuracy is 0.132 meters at a 95% confidence level, which is satisfactory for this application.

*1. OCM Partners, 2023: 2018 USGS Lidar: Florida Panhandle from 2010-06-15 to 2010-08-15. NOAA National Centers for Environmental Information, https://www.fisheries.noaa.gov/inport/item/58298.*

**Tidal Datums**
This assessment used a NOAA active tidal station; Apalachicola (Station ID:8728690), with daily measurements within the Project site. Large scale hydrodynamics, influenced by astronomical tides, cause sea levels to vary from location to location. Tide gauges provide measurements over time of sea levels at specific locations. In many studies like this, the area of interest is between two tide gauges that are far apart, and it is common practice to interpolate Mean Sea Level (MSL) and other tidal information, such as the Mean Higher High Water (MHHW). The NOAA tide gauge (Station ID: 8728690)[2], established in 1967, is located less than a mile from the city center. The other nearest tide gauge is in Panama City, approximately 50 miles away. We verified that the mean sea level at the Apalachicola tide gauge was higher than that of the Panama City tide gauge, per FDEP's guidelines, and proceeded to use the Apalachicola tide gauge exclusively, as it did not appear beneficial to interpolate with the Panama City tide gauge. At the Apalachicola tide gauge, relative to NAVD88, MSL is 0.15 feet and MHHW is 0.85 feet.

*2. CO-OPS, 2023: Apalachicola, FL - Station ID: 8728690. NOAA Tides and Currents, https://tidesandcurrents.noaa.gov/stationhome.html?id=8728690.*

**Sea Level Rise and Tidal Flooding**
380.093, F.S. requires the use of the 2017 NOAA Intermediate-High and Intermediate-Low sea level rise projection curves[3] for the 2040 and 2070 planning horizons. This assessment also includes sea level rise projection curves for the 2100 planning horizon. Sea level rise projections were adopted from the NOAA Technical Report NOS CO-OpS 083 - Global and Regional Sea Level Rise Scenarios for the U.S.

To model sea level rise and tidal flooding, a bathtub model in which the boundary condition is simulated for all combinations of years (2023/present day, 2040, 2070, 2100) and sea level rise projections (NOAA 2017 Intermediate-Low and Intermediate-High), generating 7 flood depth raster files and 7 accompanying flood extent vector files.

*3. Sweet et al., 2017, Global and Regional Sea Level Rise Scenarios for the US., NOAA Technical Report NOS CO-OPS 083, NOAA CO-OPS, https://doi.org/10.7289/v5/tr-nos-coops-083.*

**Storm Surge and Waves**
To model storm surge combined with sea level rise, the assessment utilized the elevation-based bathtub model approach again, but this time the boundary condition was modified for all combinations of years (2023/present, 2040, 2070, 2100), sea level rise projections (NOAA 2017 Intermediate-Low and Intermediate-High), and storm surge return periods (10-year, 50-year, 100-year), as provided by the gridded extreme water level probability data provided by NOAA's 2022 technical report[4], which were interpolated. While the 500-year return period is optional, the Apalachicola assessment included it using results from a Bayesian Hierarchical Model (BHM) developed by researchers from Princeton and the University of Central Florida, who implemented the methodology published by Calafat and Marcos, 2020[5]. While the BHM is complex, it can be described at a high-level as a method to help overcome short tide gauge records, which are generally insufficient to predict a 100-year flood, let alone a 500-year flood, by sharing information between nearby tide gauges and applying extreme value theory. Finally, to account for some of the nonlinearity that is missed by the elevation-based bathtub model, specifically waves, we leverage floodplain management practices for incorporating waves by adding 2 feet and 4 feet of flood depth, or "freeboard", in FEMA's AE and VE flood zones[6], respectively. Overall, the project team generated 28 flood depth raster files and 28 accompanying flood extent vector files.

*4. Sweet et al., 2022, Global and Regional Sea Level Rise Scenarios for the United States: Updated Mean Projections and Extreme Water Level Probabilities Along U.S. Coastlines., NOAA Technical Report NOS 01, NOAA NOS, https://oceanservice.noaa.gov/hazards/sealevelrise/sealevelrise-tech-report.html.*
*5. Calafat and Marcos, 2020, Probabilistic reanalysis of storm surge extremes in Europe., PNAS, https://doi.org/10.1073/pnas.1913049117.*
*6. FEMA, 2014, National Flood Hazard Layer, FIRMs 12037C0526F and 12037C0528F, Effective February 5, 2014, https://msc.fema.gov/portal/search?AddressQuery=apalachicola*

**FEMA Special Flood Hazard Areas**
Regulatory floodplain data provided by FEMA was used to conduct a regulatory floodplain analysis of critical assets. Critical assets were analyzed to determine their proximities to FEMA flood hazard layers. Assets were initially selected for further review if any of their parcels intersected with the 100 year or 500 FEMA flood zones.

**Future Precipitation**
This assessment incorporates by reference model data prepared as part of the Franklin County Vulnerability Assessment prepared in 2022 by the Apalachee Regional Planning Council for the nine-county North Florida region as it encompasses the Apalachicola area. In the "Apalachee Regional Vulnerability Assessment",[7] pre-

pared by Halff Associates and Cummins Cederberg for the Apalachee Regional Planning Council and approved by FDEP in 2022. Halff Associates conducted a comprehensive analysis of future precipitation and compound flooding using spatiotemporal analysis and hydrologic and hydraulic modeling.

That ARPC project team utilized the NEX-GDDP-CMIP6 dataset (Thrasher et al.,, 2021; Thrasher et al., 2022), a statistically downscaled dataset of the General Circulation Model (GCM) runs conducted under Phase 6 of the Coupled Model Intercomparison Project (CMIP6). As referenced in the ARPC model run for Franklin County the downscaled dataset is produced by the National Aeronautics and Space Agency (NASA) across four "Tier 1" greenhouse gas emission scenarios known as Shared SocioeconomicPathways (SSPs). The NEX-GDDP-CMIP6 dataset provides daily precipitation data for the historical (1950 to 2014) and SSP forecast (2015-2100) periods for 35 CMIP6 GCMs. The downscaling and bias-correction methods used to produce this dataset follow the procedure of Thrasher et al. (2012). All appropriate datasets from the ARPC report are incuded.
*7. 2022 Apalachee Regional Vulnerability Assessment - An evaluation of Current and Future Flood Risks across the nine county region*

**Compound Flooding**
This assessment incorporates by reference model data prepared as part of the Franklin County Vulnerability Assessment prepared in 2022 by the Apalachee Regional Planning Council for the nine-county North Florida region[8] as it encompasses the Apalachicola area.

As referenced in the 2022 ARPC report, there are a general lack of hydrology and hyudraulic models available for the region. The 2022 ARPC Vulnerability Assessment used measured streamflow and storm surge based on the approach of Couasnon et al. (2020). The regional report used US Geological Survey (USGS) streamflow monitoring station as the source of streamflow data while water levels reported at NOAA tides and stations were used to generate storm surge. Discharge data were acuired for the USGS sites and maximum discharge timeseries were generated from the data. Period of discharge data availability is variable across the USGS stations. Non-tidal residuals were calculated as the diffeence between actual and predicted water levels at the NOAA tides and currents stations. Storm surge was determined as the maximum daily non-tidal residual from the hourly timeseries datasets at each NOAA station. All appropriate datasets from the ARPC report are included in the ARPC report.
*8. 2022 Apalachee Regional Vulnerability Assessment - An evaluation of Current and Future Flood Risks across the nine county region*

## An Overview of HighTide's Methodology for determining economic impact of flood damage to buildings, property values and households at risk.

**Economic Impact of Flood Damage to Buildings, Property Values and Households at Risk**
The traditional risk framework used to quantify the economic impact of flood damage to buildings has long been used by engineers and the insurance industry. Take Hazus from the US Army Corps of Engineers (USACE), for example. Though Hazus has evolved since its release in 1997, it does not incorporate any of the numerous state-of-the-art uncertainty quantification methods developed in recent years to rigorously understand complex and uncertain geospatial problems. Furthermore, the majority of existing socioeconomic impact models are based on arbitrary indices, and do not quantify risk to households with real-world metrics.

This means that existing technologies are unable to directly use modeled economic impacts to quantify the vulnerability of households to financial shocks caused by flooding or other disasters. While sophisticated models exist, they are generally inaccessible to traditional engineering firms, consultants, and the communities they are contracted by. The Stanford Urban Risk Framework (SURF), which High Tide Intelligence developed and published while conducting research at Stanford University, was designed to resolve this issue.

By quantifying both the economic impact of flood damage to buildings, in dollars, and the number of households at risk of displacement due to flood damage in a given Census blockgroup, SURF provides actionable intelligence in a common language for stakeholders to interpret risk. SURF first combines models for hazard, exposure, and vulnerability to quantify the economic impact of flood damage to buildings. The hazard model is a set of elevation-based flood maps created using combinations of sea level rise and storm surge scenarios. This analysis considered years 2023, 2040, 2070, 2100 and storm surge return periods (10-, 50-, 100-, 500-) storms.

The results shown correspond to the Intermediate-Low and Intermediate-High scenario from NOAA's 2017 Sea Level Rise Technical Report. The exposure model uses proprietary data pipelines to assign a first floor elevation and construction replacement cost to each building. The vulnerability model overlays the hazard and exposure model to determine depths of flooding at each building and quantify the damage in dollars with USACE depth-damage curves. The results derived from these layers were then used to calculate property tax impacts using local tax millages. The procedure described thus far is then repeated thousands of times in a Monte Carlo simulation, where all the variables are sampled randomly from different distributions based on the uncertainty of each variable. The result of this, if sufficient simulations are run, is a comprehensive understanding of how the uncertainty present on each input variable impacts the model outputs. This then allows for a more comprehensive understanding of the economic flood risk facing each property as well as the certainty associated with that risk estimate.

The socioeconomic impact model then estimates household discretionary income with data from the United States Bureau of Labor Statistics and the United States Census Bureau. The building-level economic impacts, the uncertainty estimated using the Monte Carlo method, and the Census blockgroup-level household discretionary income model are then used to quantify the number of households at risk of displacement in another Monte Carlo simulation that is fully described in the methodology section of the published research.

**High Tide Intelligence Modeling results created the following analysis:**
Building level economic impact results, including first floor height. The exposure model uses proprietary data pipelines to assign a first floor elevation and construction replacement cost to each building.

Households at Risk for Displacement. The building-level economic impacts and the Census blockgroup-level household discretionary income model were used to quantify the number of households at risk of displacement.

# Critical Asset Identification

## Critical Assets

The City collected data for the four required types of Critical Assets: Transportation; Infrastructure, Natural, Cultural and Historic; and Community and Emergency Facilities. Much of the data was collected from the FGDL inventory as well as other sources including the FDOT, FWC, FWRI, FDEM, FDEP, and Geoplan. A significant number of point data was muncipal- sourced when appropriate data was not available from other sources. In some instances, the data files were merged to create a more complete data file.

Raw data collected was processed in accordance with DEP's Geographic Information System (GIS) infrastructure and tools and mapping coordinate reference systems. The files, along with all associated metadata and attribute requirements were submitted in the required GIS digital file format. Critical Asset files were submitted to DEP, reviewed and approved as part of the required technical report portion of the project. A link to the raw data used for the asset inventory is located in the attached table appendix.

Assets that were inventoried using statewide data were processed and clipped to the City boundaries or were merged with locally-sourced data obtained through local source maps that were then groundtruthed.

Table 69 (Appendix 3, Tables) represents a list of all required assets and identifies those assets that are either missing through data gaps or have been identified as regional assets not located within the City. Table 70 (Appendix 3, Tables) references source files used as the raw data for the critical asset inventory. A spreadsheet version of Table 70 is included as part of the Appendix 3 that includes links to raw data assets and also to the regional assets identified by the ARPC regional analysis.

### Data Gaps

In analyzing the City's critical asset layers, the project team found that the City does not currently have georeferenced shapefiles of the City's water, sewer or stormwater utility conveyance system. Additionally, georeferenced data identifying the City's sewer lift stations is not available digitally.

The City received supplemental funding to address the data gaps and those critical assets have been identified, documented, mapped and incorporated into the model for analysis purposes. That data gap has been resolved and the appropriate data collected and analyzed.

The following assets were identified as data gaps and resolved through data collection and analysis.

**Critical Infrastructure**
Stormwater Treatment Conveyances and Facilities
Water Utility Conveyance System
Waste Water Conveyance System and Lift Stations

### Regional Assets

The City of Apalachicola is a muncipality within Franklin County. It is bordered by the County and does not share any other boundaries with any other geopolitcal unit. For those assets required by statute that do not exist within the city boundaries, this report references the 2022 Apalachee Regional Planning Council's Vulnerability Analysis that includes Franklin County and surrounding counties. Those regional assets have been inventoried and the vulnerabilities analyzed by the Apalachee Regional Planning Council (ARPC) as part of its 2022 *"Apalachee Regional Vulnerability Assessment- An Evaluation of Current and Future Flood Risks Across the Nine-County Region."*

The following is a count of each critical asset not found within the City but which was identified in the ARPC Regional Vulnerability Analysis.

**Community and Emergency Facilities**
Colleges and Universities
Correctional Facilities
Disaster Recovery Centers
Logistical Staging Area
Risk Shelter Inventory

**Transportation & Evacuation**
Bus Terminal
Ports
Rail Facilities
Railroad Bridges

**Critical Infrastructure**
Electric Production and Supply Fac.
Solid and Hazardous Waste Facilities
Military Installations
Disaster Debris Management Sites

**Asset Identification**
The following is a list of each critical asset type within each required category and the number of assets within each type. Applicable asset types not identified have either been identified in the ARPC Regional Vulnerability Analysis or are not applicable to this analysis.

## Critical Community and Emergency Facilities

Assets included in the Critical Community and Emergency Facilities (CCEF) include Schools, Community Centers, Emergency Operations Centers, Fire Stations, Health Care Facilities, Hospitals, Law Enforcement Facilities, Local Government Facilities, Affordable Public Housing and State Government Facilities.
The assets include publically-owned buildings and privately-owned businesses, such as medical offices, that meet the definition of a critical community facility. The following is a list of identified assets within the Community and Emergency Facilities category.

**Schools**
First Baptist Church School
Apalachicola Bay Charter School

**Community Centers**
Apalachicola Community Center
Harbormaster House
Holy Famly Senior Center

**Emergency Medical Facilities**
Weems Memorial Hospital

**Fire Stations**
Apalachicola Fire Department

**Healthcare Facilities**
Sacred Heart Healthcare
Weems Memorial Hospital
Tallahassee Orthopedics and Physical Therapy
Cardiology and Internal Medicine Group
CVS Pharmacy
Buy Rite Drugs

**Hospitals**
Weems Memorial Hospital

**Law Enforcement Facilities**
Apalachicola Police Department

**Local Government Facilities**
Apalachicola City Hall
Franklin County Courthouse
Fort Coombs Armory
DET 1CP A 3rd BTN
Apalachicola Muncipal Library

**State Government Facilities**
Florida Dept. of Agriculture Shellfish Center
St. Vincent NWR Office

**Affordable Public Housing**
Public Housing Complexes (10)

*Separate documents of tables and maps for exposure analysis of the Critical Community and Emergency Facilities are included as part of this report.*

## Transportation and Evacuation Routes

Critical assets within the transportation and evacuation routes classification include airports and airport access roads, bridges, major roadways, marinas, and evacuation routes. There are no bus terminals, ports, rail facilities or railroad bridges within the City limits. Those assets are addressed in the 2022 ARPC Regional VA.

**Major Roadways**
The major transportation route within Apalachicola is U.S. Highway U.S. 98. It is the primary route through Apalachicola leading to Tallahassee on the east or Panama City, to the west. This two-lane arterial road includes a left turn lane (going West) in the center of Apalachicola at the corner of Market Street and Highway 98 (Avenue E). A left turn lane exists at Market and Avenue D going East. With these exceptions, the rest of the roads are only two lanes. The first four blocks of Market Street leading to Gorrie Bridge and Avenue E make up the main through-route within the city proper. The primary north to south circulation pattern occurs on 12th Street. There is one four way lighted intersection in Apalachicola at the intersection of Highway 98 and 12th Street and a blinking four way light at the intersection of Highway 98 and Market Street. Apalachicola streets are set in a grid pattern. The newer streets of Apalachicola were laid out in a grid pattern but have been set at a slightly different angle. The avenues run

east to west in alphabetical order. The streets run north to south in numerical order. Water, Commerce, and Market street represent first, second, and third street and these streets are laid out north to south.

There are 51 roads listed in the attribute table for major road assets within the City.

**Airports**
The Cleve Randolph Airport is located approximately three miles west of the city of Apalachicola. Some of the higher land around, it still has swales that flood at somewhat low impact events.

The airport has three runways. They are oriented N-S, NE-SW, and NW/SE. The models show the N/S and NW/SE runways impacted on the all 500-year events. The NE/SW runway is shown as being impacted in the 2100, Intermediate-High, 500-year event.

At the request of the City Commission, the study includes one non-major access road.

**Bridges**
The study area has one bridge, the Apalachicola River Bridge. The bridge abutment within the city is elevated and ascends at an abrupt rise. As such, the impacts shown in the table below include areas around the reinforced earth wall and the overhead bridge that are not impacted on the bridge deck that is high above the impact area.

**Marinas**
There are 14 marinas listed in the attribute table for assets under marinas.

**Evacuation Routes**
The attribute table for evacuation routes lists Highway 98 as the sole evacuation route. Evacuation is to the east across Apalachicola Bay or to the west towards Port St Joe. Table 4.1P quantifies the impacts to Highway 98. The maps identify the specific areas in which flooding is anticipated with each scenario.

**Boat Ramps**
There are 4 boat ramps listed in the attribute table for boat ramp assets for Apalachicola. Since boat ramps are located near sea level, the boat ramps are impacted by nearly all scenarios.

## Critical Infrastructure

There are four identified types of assets within the Critical Infrastructure category: communications towers, wastewater treatment facility, water treatment facilities, water utility conveyance system, stormwater utility conveyance system, wastewater conveyance system.

**Communication Towers**
One communication tower is present in the city. The GT Com, Inc tower is located northwest of the downtown area in a sparsely developed part of the downtown. The base of the tower and equipment is built on a filled pad that elevates the critical equipment. Flood scenarios are based on flood elevation and do not consider the elevation of any onsite equipment. GT Com would have to be contacted for information regarding onsite elevation of critical operational equipment to determine specifics of impacts during the various scenarios.

The GT Com Land equipment facility is located at the south corner of Avenue E and 4th Street. This facility was added to the attribute table. The facility is a grade level structure. Impacts for the facility are summarized in the Tables and Maps.

**Wastewater Treatment Facility**
The wastewater treatment facility for the City of Apalachicola is located approximately 2 miles west of the western city limit north of Highway 98. The facility is located on moderately high ground that has been engineered and filled to facilitate operation.

The wastewater conveyance system is located throughout the city. The wastewater conveyance system is two systems that were assessed separately. The system is a newer vacuum system and an older gravity system. The newer vacuum system is operated by a sequence of lift station that transports the sewerage to the centrally located sewage vacuum/pump station at the corner of Avenue F and 9th Street. The gravity sewage system also transports waste to the pump station. The pump station then pumps the sewage to the wastewater treatment facility to the west of the city.

The wastewater conveyance system GIS components are lines that represent the pipes that transport to the pump station and a line file that portrays the pipes that transport the sewage to the treatment facility. The gravity system and the vacuum lift system are mapped in two separate GIS files. Each lift station has a calculated depth of inundation for each scenario, as each lift station contains sensitive vacuum components and monitoring software that could be critically impacted by the various storm scenarios. Impacts are summarized in the Tables and Maps.

**Water Treatment Facility**
The City Water Treatment facility is located on Chapman Road, west of the City and north of Highway 98, south of the airport. The facility is located on fairly high ground and as such is not impacted by any but the most severe storms. The facility is a grade level structure.

The water utility conveyance system is located throughout the city and consists of pipes, meters, valves, fire hydrants and various fittings. The water conveyance GIS system consists of lines which represent the pipes and points that represent the other various components. Portions of the water conveyance are affected by most storm scenarios and are summarized in the Tables and Maps.

**Stormwater Utility Conveyance System**
The stormwater utility conveyance system is located throughout the city and consists of pipes, culverts, storm boxes, curb inlets, manholes, and treatment boxes. In the stormwater utility conveyance system GIS, the pipes are located as lines and the other components are mapped as points. In addition, the stormwater outfalls are mapped in a separate file. Impacts to the outlets are shown as true depths in the Tables. Impacts to the stormwater conveyance system as well as outfalls are summarized in the Tables and Maps.

## Natural Resources and Historical Assets

Assets of Natural, Cultural, and Historical Resources include Conservation Lands, Parks, Shorelines, Surface Waters, Wetlands, Historic and Cultural Assets. Upon the request of the City commission, parcel inundation impacts to lots based on zoning designation are included in this classification.

**Parks**
The City of Apalachicola currently has seventeen (17) parks. The Surface Waters GIS Attribute Table lists two surface waters; Apalachicola Bay and the Apalachicola River. These two assets are continuously flooded and are impacted by all scenarios.

**Shoreline**
The shoreline of the City of Apalachicola is located in the supratidal zone, which is flooded currently by alternating incoming/outgoing tidal action. The shoreline is impacted by almost all scenarios.

**Wetlands**
Wetlands occur at all elevations within the study area. The preponderance of wetlands occurs fringing the shoreline at the riverside and bayside, but some occur in the higher elevations due to collection of stormwater in closed depressions, ponding in swale impoundments, with generally very poorly drained soils.

**Conservation Lands**
Fourteen conservation lands were included in the assessment. These include parks and lands owned by the local and state governments. Also included is the City's RC zone for research and Conservation. The impacts of the various storm scenarios are summarized in the Tables and Maps.

**Historic and Cultural Assets**
The Historic and Cultural Assets include all local, state, and federally owned properties. There is overlap between the affordable housing section, as some of these properties are listed as historic resources on the Florida State Master Site File list of historic properties.

## Additional Parameters Analyzed

### Zoning

As requested by the City Commission during the public meeting associated with the project and a requirement of the project, an assessment was done on the various zoning districts within the city. The impacts of the various storm scenarios are summarized in the Tables and Maps.

**Airport Access Routes**
As requested by the City Commission during the public meeting associated with the project and a requirement of the project, an assessment was done on the access roads to the airport. The impacts of the various storm scenarios are summarized in the Tables and Maps.

## Table 69 Inventory of Critical Assets (from Appendix 2 Tables)

| Asset Type | Asset Class | Inventoried |
|---|---|---|
| Airports | Transportation and Evacuation Routes | yes |
| Bridges | Transportation and Evacuation Routes | yes |
| Bus Terminals | Transportation and Evacuation Routes | ARPC regional source |
| Ports | Transportation and Evacuation Routes | ARPC regional source |
| Major Roadways | Transportation and Evacuation Routes | yes |
| Marinas | Transportation and Evacuation Routes | yes |
| Rail Facilities | Transportation and Evacuation Routes | ARPC regional source |
| Railroad Bridges | Transportation and Evacuation Routes | ARPC regional source |
| Evacuation Routes | Transportation and Evacuation Routes | yes |
| | | |
| Wastewater Treatment Fac. & Lift Stations | Critical Infrastructure | yes |
| Stormwater Treatment Fac. &Pump Stations | Critical Infrastructure | Data Gap |
| Drinking Water Facilities | Critical Infrastructure | yes |
| Water Utility Conveyance Systems | Critical Infrastructure | Data Gap |
| Electric Production and Supply Facilities | Critical Infrastructure | ARPC regional source |
| Solid and Hazardous Waste Facilities | Critical Infrastructure | ARPC regional source |
| Military Installations | Critical Infrastructure | ARPC regional source |
| Communications Facilities | Critical Infrastructure | yes |
| Disaster Debris Management Sites | Critical Infrastructure | ARPC regional source |
| | | |
| Schools | Critical Community and Emergency Facilities | yes |
| Colleges and Universities | Critical Community and Emergency Facilities | ARPC regional source |
| Community Centers | Critical Community and Emergency Facilities | yes |
| Correctional Facilities | Critical Community and Emergency Facilities | ARPC regional source |
| Disaster Recovery Centers | Critical Community and Emergency Facilities | yes |
| Emergency Medical Service Facilities | Critical Community and Emergency Facilities | yes |
| Emergency Operation Centers | Critical Community and Emergency Facilities | yes |
| Fire Stations | Critical Community and Emergency Facilities | yes |
| Health Care Facilities | Critical Community and Emergency Facilities | yes |
| Hospitals | Critical Community and Emergency Facilities | yes |
| Law Enforcement Facilities | Critical Community and Emergency Facilities | yes |
| Local Government Facilities | Critical Community and Emergency Facilities | yes |
| Logistical Staging Areas | Critical Community and Emergency Facilities | ARPC regional soure |
| Affordable Public Housing | Critical Community and Emergency Facilities | yes |
| Risk Shelter Inventory | Critical Community and Emergency Facilities | ARPC regional source |
| State Government Facilities | Critical Community and Emergency Facilities | yes |
| | | |
| Conservation Lands | Natural, Cultural, and Historical Resource | yes |
| Parks | Natural, Cultural, and Historical Resource | yes |
| Shorelines | Natural, Cultural, and Historical Resource | yes |
| Surface Waters | Natural, Cultural, and Historical Resource | yes |
| Wetlands | Natural, Cultural, and Historical Resource | yes |
| Historical and Cultural Assets | Natural, Cultural, and Historical Resource | yes |

# Sensitivity Analysis

**Task 4 - Sensitivity Analysis**

**Description:** The Grantee will perform the sensitivity analysis to measure the impact of flooding on assets and to apply the data from the exposure analysis to the inventory of critical assets created in the Exposure Analysis Task. The sensitivity analysis should include an evaluation of the impact of flood severity on each asset type and at each flood scenario and assign a risk level based on percentages of land area inundated and number of critical assets affected.

**Deliverables:** The Grantee will provide the following:
4.1: A draft VA report that provides details on the findings of the exposure analysis and the sensitivity analysis, and includes visual presentation of the data via maps and tables, based on the statutory-required scenarios and standards; and
4.2: An initial list of critical and regionally significant assets that are impacted by flooding, prioritized by area or immediate need, specifying for each asset which flood scenario(s) it was impacted by. The list of critical and regionally-significant assets must be prioritized by area or immediate need and must identify which flood scenario(s) impacts each asset.

## OVERALL FINDINGS AND IMPACTS

NOAA predictive models (explained in the methodology section) were used to estimate impacts to the City based on intermediate low and intermediate high scenarios for a 10-year, 50-year, 100-year, and 500-year storm. The models projected data for the present-day (2023), 2040, 2070, and 2100 scenarios.

Not surprisingly, the models show an increasing risk of flooding for the more severe model runs. That is, the Intermediate-Low model is more severe than the 2023 present day model and the Intermediate-High model is more severe than the Intermediate-Low model.

In general, the assumptions inherent in the NOAA models conclude that storm impacts will rise with time. The four timeframes of present-day, 2040, 2070, and 2100 show an increasing level of impacts with time. In addition, the Intermediate-High model is more severe than the Intermediate-Low model. The storm events of 10-year, 50-year, 100-year and 500-year also increase the severity of the outcome. Consequently, this report uses 35 scenarios provided by NOAA to assess impacts to the City of Apalachicola.

### Citywide flood depth projections - Elevation Matters

The total acreage of the City study area is 1015.08 acres. Depending on location and elevation within the City flood depths within the City are projected to range from zero to to more than 24 feet in flood depth for the most most severe 2100 intermediate high 500 year scenario. Table 22 from the Exposure Analysis Table Series shows the flood depth projections per scenario.

All of the exposure maps and tables can be found in the map and table series found within Appendix 2 and 3. Critical assets are identified within each scenario map. An analysis of those impacts on land area and assets follows.

### Table 22 - Flood Depth Projections Per Scenarios

| FLOOD DEPTH PROJECTIONS PER SCENARIO | | | |
|---|---|---|---|
| | | | |
| NOTE: The total acreage for the Study Area of The City of Apalachicola is1015.08 acres. | | | |
| **SCENARIO** | **SF** | **ACRES** | **DEPTH (feet)** |
| 2023_No_SLR_10-yr | 5,555,313.06 | 127.53 | 0- 9.56' |
| 2023_No-SLR_50-yr | 7,410,083.6 | 170.11 | 0 - 12.45' |
| 2023_No-SLR_100-yr | 10,033,358.7 | 230.33 | 0 - 14.40' |
| 2023_No-SLR_500-yr | 27,877,539.3 | 639.98 | 0 - 20.38' |
| 2023_NoSLR_Tidal | 119,185.8 | 2.74 | 0 - 1.26' |
| 2040_IntLo_10-yr | 5,839,165.5 | 134.05 | 0 - 9.84' |
| 2040_IntLo_50-yr | 7,895,613.8 | 181.26 | 0 - 12.73' |
| 2040_IntLo_100-yr | 10,530,582.4 | 241.75 | 0 - 14.68' |
| 2040_IntLo_500-yr | 29,399,936.3 | 674.93 | 0 - 20.66' |
| 2040_IntLo_Tidal | 194,373.4 | 4.46 | 0 - 1.54' |
| 2070_IntLo_10-yr | 6,230,623.6 | 143.04 | 0 - 10.40' |
| 2070_IntLo_50-yr | 8,360,082.5 | 191.92 | 0 - 13.29' |
| 2070_IntLo_100-yr | 11,852,049.6 | 272.09 | 0 - 15.24' |
| 2070_IntLo_500-yr | 29,399,936.3 | 674.93 | 0 - 21.22' |
| 2070_IntLo_Tidal | 773,113.1 | 17.75 | 0 - 2.10' |
| 2100_IntLo_10-yr | 6,547,033.8 | 150.30 | 0 - 10.89' |
| 2100_IntLo_50-yr | 8,769,330.3 | 201.32 | 0 - 13.78' |
| 2100_IntLo_100-yr | 12,650,330.8 | 290.41 | 0 - 15.73' |
| 2100_IntLo_500-yr | 36,337,527.6 | 834.19 | 0 - 21.71' |
| 2100_IntLo_Tidal | 1,474,211.2 | 33.84 | 0 - 2.59' |
| 2040_IntHi_10-yr | 6,052,852.3 | 138.95 | 0 - 10.13' |
| 2040_IntHi_50-yr | 8,150,302.1 | 187.11 | 0 - 13.02' |
| 2040_IntHi_100-yr | 11,291,545.8 | 259.22 | 0 - 14.97' |
| 2040_IntHi_500-yr | 31,279,661.5 | 718.08 | 0 - 20.95' |
| 2040_IntHi_Tidal | 419,261.2 | 9.62 | 0 - 1.83' |
| 2070_IntHi_10-yr | 7,004,547.4 | 160.80 | 0 - 11.74' |
| 2070_IntHi_50-yr | 10,462,507.4 | 240.19 | 0 - 14.63' |
| 2070_IntHi_100-yr | 14,120,037.1 | 324.15 | 0 - 16.58' |
| 2070_IntHi_500-yr | 40,005,236.7 | 918.39 | 0 - 22.56' |
| 2070_IntHi_Tidal | 2,389,009.6 | 54.84 | 0 - 3.44' |
| 2100_IntHi_10-yr | 9,440,504.4 | 216.72 | 0 - 14.06' |
| 2100_IntHi_50-yr | 14,622,527.2 | 335.69 | 0 - 16.95' |
| 2100_IntHi_100-yr | 19,900,462.5 | 456.85 | 0 - 18.90' |
| 2100_IntHi_500-yr | 43,809,582.9 | 1,005.73 | 0 - 24.88' |
| 2100_IntHi_Tidal | 5,782,014.7 | 132.74 | 0 - 9.77' |

# Risk Assessment

Performing a Sensitivity Analysis requires measuring the impact of flooding on assets by applying the data from the exposure analysis to the inventory of assets and then evaluating the impact of flood severity on each assest type and at each flood scenario by assigning a risk level based on percentage of land area inundated and number critical assets affected.

The sensitivity analysis requires two sets of risk assessment - one for land area inundation and the other for assets.

**Determining Land Area Risk Assessment**
The overall risk assessment established for land area inundation ranges from none to extreme and is based on percentages ranging from 0 to more than 75% inundation of the land area. See Table 59. The table establishes a uniform assessment in order to simplify ranges of varying percentages into a standardized evaluation to compare impacts across the range of storm scenarios.

**Determining Asset Risk Assessment**
Similarily, the assets potentially impacted by each storm scenario were ranked based on their location and flood depth within each flood scenario. A percentage of the critical assets affected within each asset class determined the risk assessment of none to extreme. See Table 59. Each asset was assigned the appropriate risk designation within each storm scenario. A comprehensive risk assessment was then assigned to each storm scenario based on the aggregate of designations of assets within each storm scenario. Generally, the more severe of each designation guided the designation. For instance, if a storm scenario had 3 low designations wand 2 medium designations, the storm scenario would be assigned a medium designation, as this is more severe. This was necessary to ensure that risk was not being overlooked or downplayed.

**Understanding Why there is Risk**
The City of Apalachicola is located west of the junction of the Apalachicola River and Apalachicola Bay. The City covers approximately 2.0 square miles, approximately 1,050 acres. It is bound on the east by the Apalachicola River, on the south by Apalachicola Bay, on the north by Scipio Creek, and the west by rural development and undeveloped forest land.

Elevations within the City generally range between 0 and 16 feet. The City is generally low relief in terms of elevation. Some areas are located in lower elevations close to sea level and some areas are on broad, low hills. The higher elevations coincide with sandy, well drained hills. The lower elevations are generally poorly drained. The lower elevations are also more prone to flooding. The lower elevations are along the shoreline and inland for two blocks, generally. The City has approximately 20,000 linear feet of shoreline.

As in the 2017 Vulnerability Assessment, the vulnerabile land areas within the City are those tracts that lie along the river, the bay or fall within an ancient streambed that are floodprone during storm events. Tables 24 through 58 identify the percentage of land areas inundated during all storm scenarios along with the risk assessment assigned based on the methodology discussed earlier.

Maps 1 through 312 in the map series show the depths of inundation possible in each storm scenario.

Maps beginning with 332 in the map series show the inundation and extent to which the water flow would spread.

**Table 59 (from Appendix 3 Maps) - Risk Assessment Ranking - Land Area Inundation**

| Overall Risk Assessment | Land Area Inundated (% of census tract or neighborhood) | Critical Assets Affected (%-age of total assets within each Asset Type) |
|---|---|---|
| None | 0% | 0% |
| Low | <25% | <25% |
| Medium | 25 - 50% | 25 - 50% |
| High | 50 - 75% | 50 - 75% |
| Extreme | >75% | >75% |

**Risk Levels Percentages**
Risk levels percentage are designated into the categories shown in Table 59. The designations are meant to group similar flooding events that happen across time projections, scenario models, and occurrence probability that produce similar impacts. Increasing impact risk levels are an elevation phenomenon in that low elevation areas will experience progressively more severe impacts in depth of flooding. Higher elevation areas will not experience the impacts of the lower Risk Level events, but higher Risk Levels will produce similar impacts.

The risk level percentages refer to the inundation area of the City Limits of the City. As discussed above, areas of lower elevation are more prone to flooding. The City has three (3) areas of low elevation.
1) The commercial waterfront, located on the eastern area of the city;
2) The residential waterfront, located on the south side of the city, which is fringed with a marsh, and;
3) The relict creek bed, located in the south and east central area of the city. This area has been historically partially filled, which causes more severe flooding to the unfilled areas.

Likewise, the city has higher elevated areas, which are less prone to flood, except during the higher risk scenarios. The City has two (2) areas of higher elevation.
4) The higher commercial downtown area, and:
5) The remaining majority of the city generally at elevations above 10'.

The percentage of flooded area was calculated without respect to depth for the risk level percentages. Impacts to the areas listed above will be discussed later in the report.

**Low - Less Than 25%**
Based on the Risk Assessment Table 59, a 2023 NSLR Rise 100-Year Storm could produce an inundation considered low yet could inundate an estimated 22.7% of the City's land area. That area is visualized on Map 332. (Appendix 3 Maps).

During a Low Level Risk event, flooding impacts occur on the low elevation commercial area west of the Apalachicola River, the low elevation residential area north of Apalachicola Bay, and the L-shaped relict creek bed residential area in the east-central part of the town. Flooding also occurs in the northern part of the city that backs up low drainage areas.

**Medium - 25-50%**
Based on the Risk Assessment Table 59, a 2100 IntHi 100-Year Storm could produce a flood that might inundate up to 45% of the City's land area. That area is visualized on Map 333. (Appendix 3 Maps).

In addition to the flooding impacts that occur in the Low Risk areas discussed above, during a Medium Risk event, the flood prone areas expand landward from the boundaries of a Low Risk event. The low elevation commercial downtown area has expanded into the higher elevation commercial downtown area.

The low elevation residential area north of Apalachicola Bay has expanded into the higher elevation residential area, and the L-shaped relict creek bed residential area has also expanded.

**High - 50- 75%**
Based on the Risk Assessment Table 59, a 2040 IntHi 500-Year Storm could produce a flood that may inundate more than 70% of the City's land area. That area is visualized on Map 334. (Appendix 3 Maps).

A high Risk Level produces flooding in all but the highest areas located generally between Avenue G and Avenue M and 5th Street through 16th Street and the area in the northwest city between Bluff Road and Timothy Simmons Street. There are other small islands of non-flooded areas, as well.

**Extreme - >75%**
Based on the Risk Assessment Table 59 (Found in Table series and on Page 18) a 2100 IntHi 500-Year Storm could produce a flood that could inundate more than 99% of the City's land area. That area is visualized on Map 335. (Appendix 3 Maps).

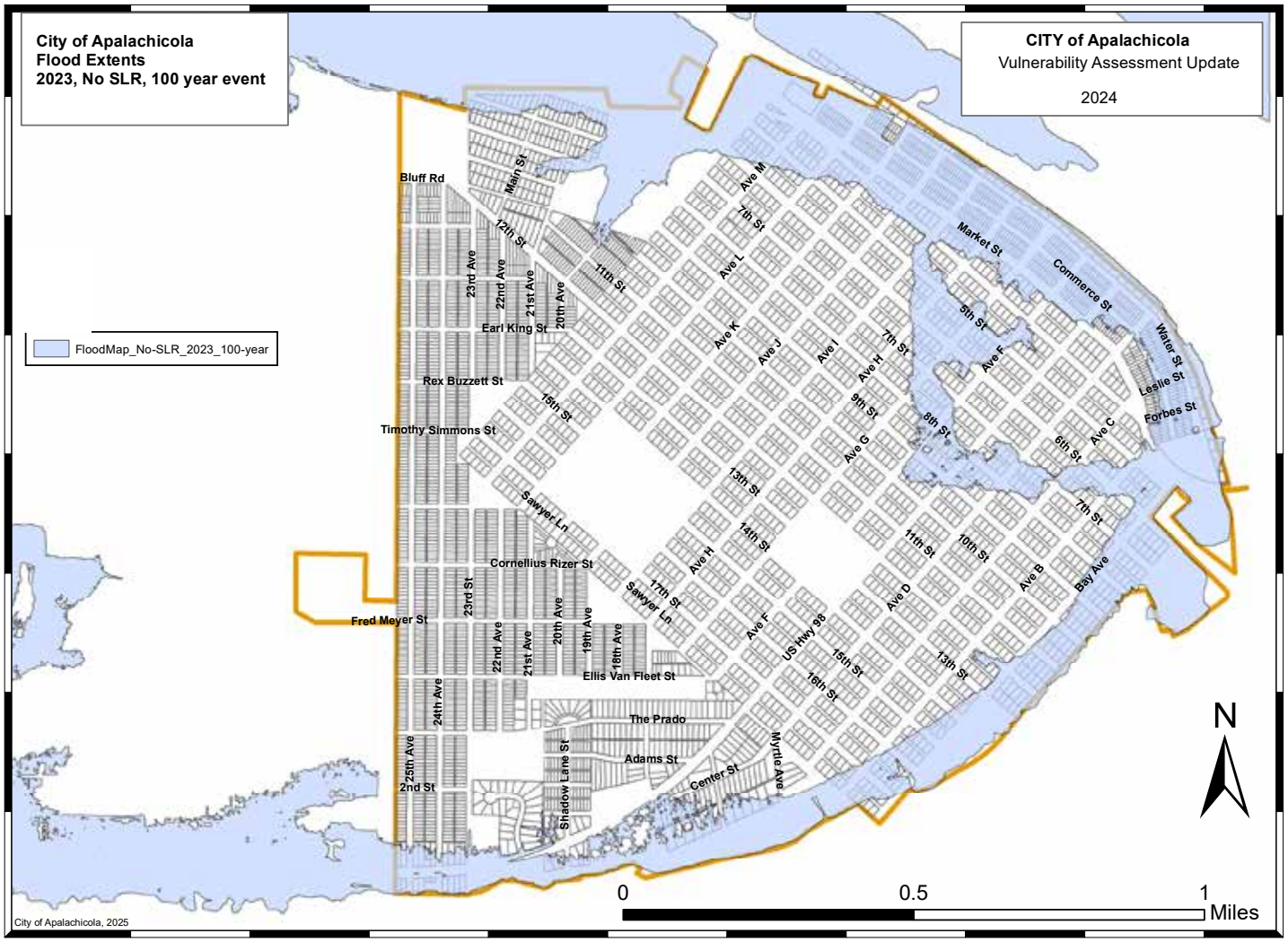
An extreme Risk Level produces a total, catastrophic inundation of the City of Apalachicola.

**Asset Risk Assessment**
Tables 24 -58 also identify the critical assets affected within each storm scenario and determine the percentage of that asset class and assigns a risk assessment for that asset class.

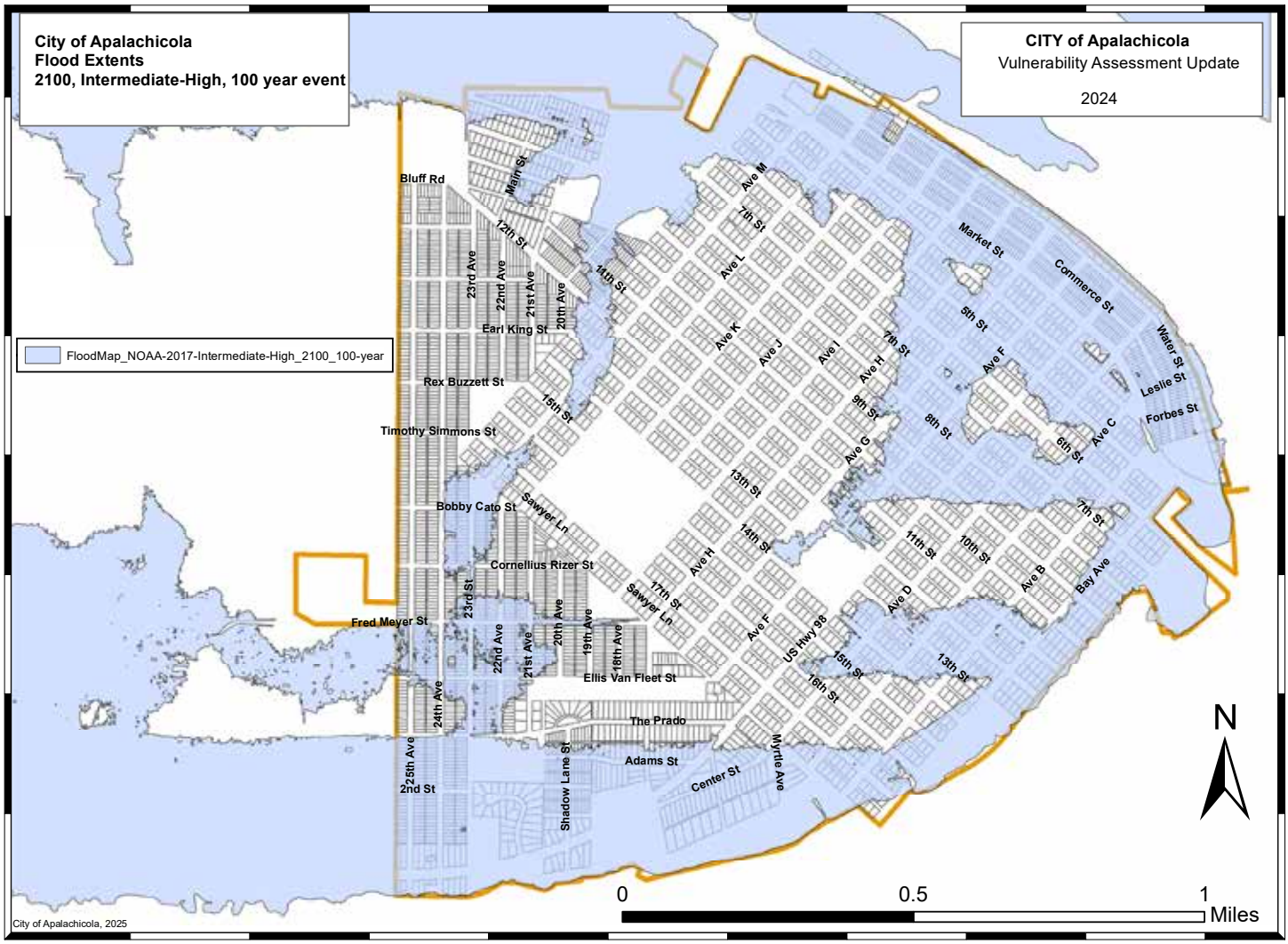
**Table 59 - Risk Assessment Summary - Land Area Inundation and Risk Assessment**

| SCENARIO | Land Area Inundated<br><br>%-age of asset tract | Risk Assessment |
|---|---|---|
| 2023_No_SLR_10-yr | 12.6 | Low |
| 2023_No-SLR_50-yr | 16.8 | Low |
| 2023_No-SLR_100-yr | 22.7 | Low |
| 2023_No-SLR_500-yr | 63.0 | High |
| 2023_NoSLR_Tidal | 0.3 | Low |
| 2040_IntLo_10-yr | 13.2 | Low |
| 2040_IntLo_50-yr | 17.9 | Low |
| 2040_IntLo_100-yr | 23.8 | Low |
| 2040_IntLo_500-yr | 66.5 | High |
| 2040_IntLo_Tidal | 0.4 | Low |
| 2070_IntLo_10-yr | 14.1 | Low |
| 2070_IntLo_50-yr | 18.9 | Low |
| 2070_IntLo_100-yr | 26.8 | Medium |
| 2070_IntLo_500-yr | 66.5 | High |
| 2070_IntLo_Tidal | 1.7 | Low |
| 2100_IntLo_10-yr | 14.8 | Low |
| 2100_IntLo_50-yr | 19.8 | Low |
| 2100_IntLo_100-yr | 28.6 | Medium |
| 2100_IntLo_500-yr | 82.2 | Extreme |
| 2100_IntLo_Tidal | 3.3 | Low |
| 2040_IntHi_10-yr | 13.7 | Low |
| 2040_IntHi_50-yr | 18.4 | Low |
| 2040_IntHi_100-yr | 25.5 | Medium |
| 2040_IntHi_500-yr | 70.7 | High |
| 2040_IntHi_Tidal | 0.9 | Low |
| 2070_IntHi_10-yr | 15.8 | Low |
| 2070_IntHi_50-yr | 23.7 | Low |
| 2070_IntHi_100-yr | 31.9 | Medium |
| 2070_IntHi_500-yr | 90.5 | Extreme |
| 2070_IntHi_Tidal | 5.4 | Low |
| 2100_IntHi_10-yr | 21.4 | Low |
| 2100_IntHi_50-yr | 33.1 | Medium |
| 2100_IntHi_100-yr | 45.0 | Medium |
| 2100_IntHi_500-yr | 99.1 | Extreme |
| 2100_IntHi_Tidal | 13.1 | Low |

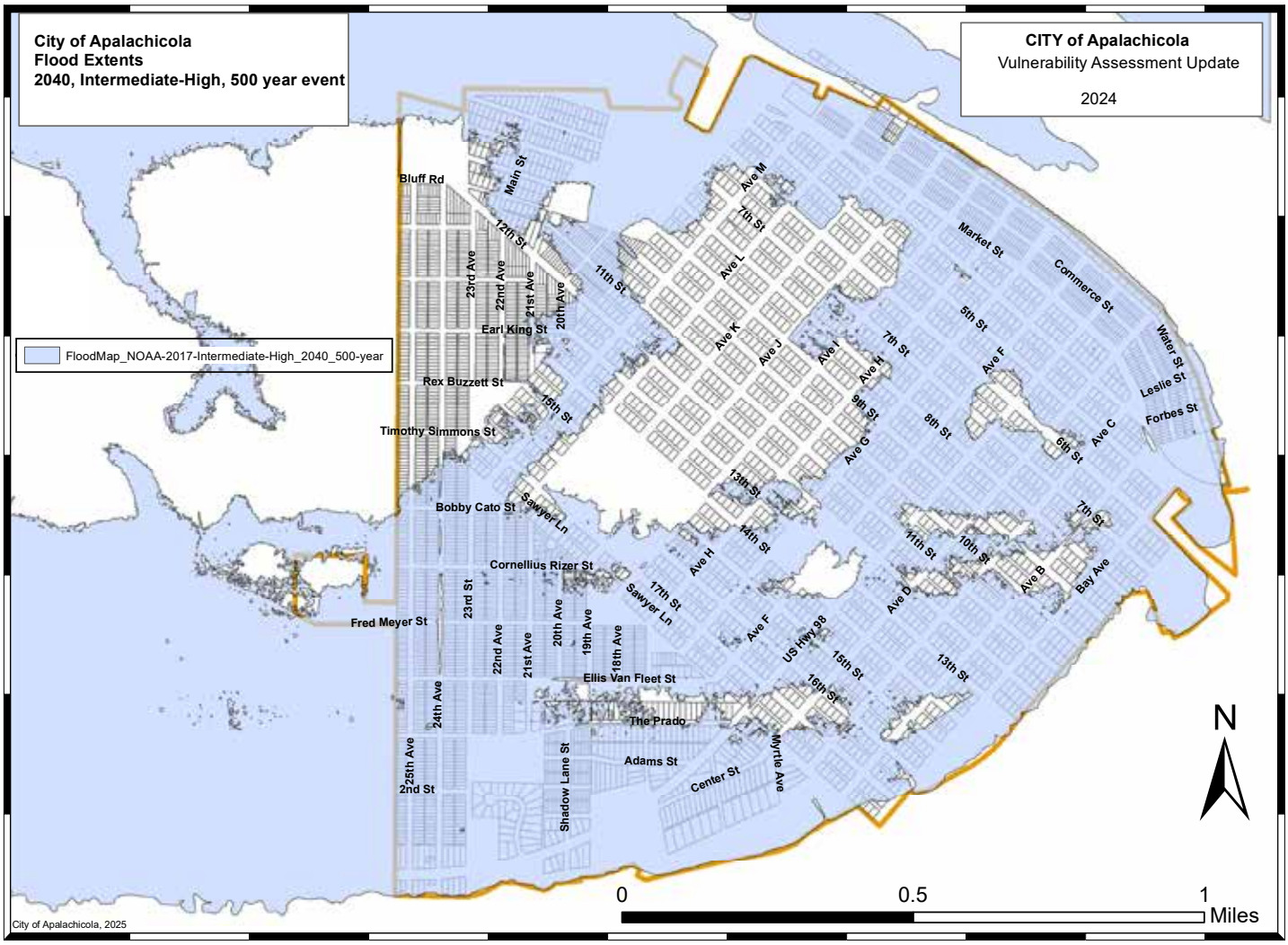
## Map 332 2023 No Sea Level Rise 100-Year Storm - Low Inundation



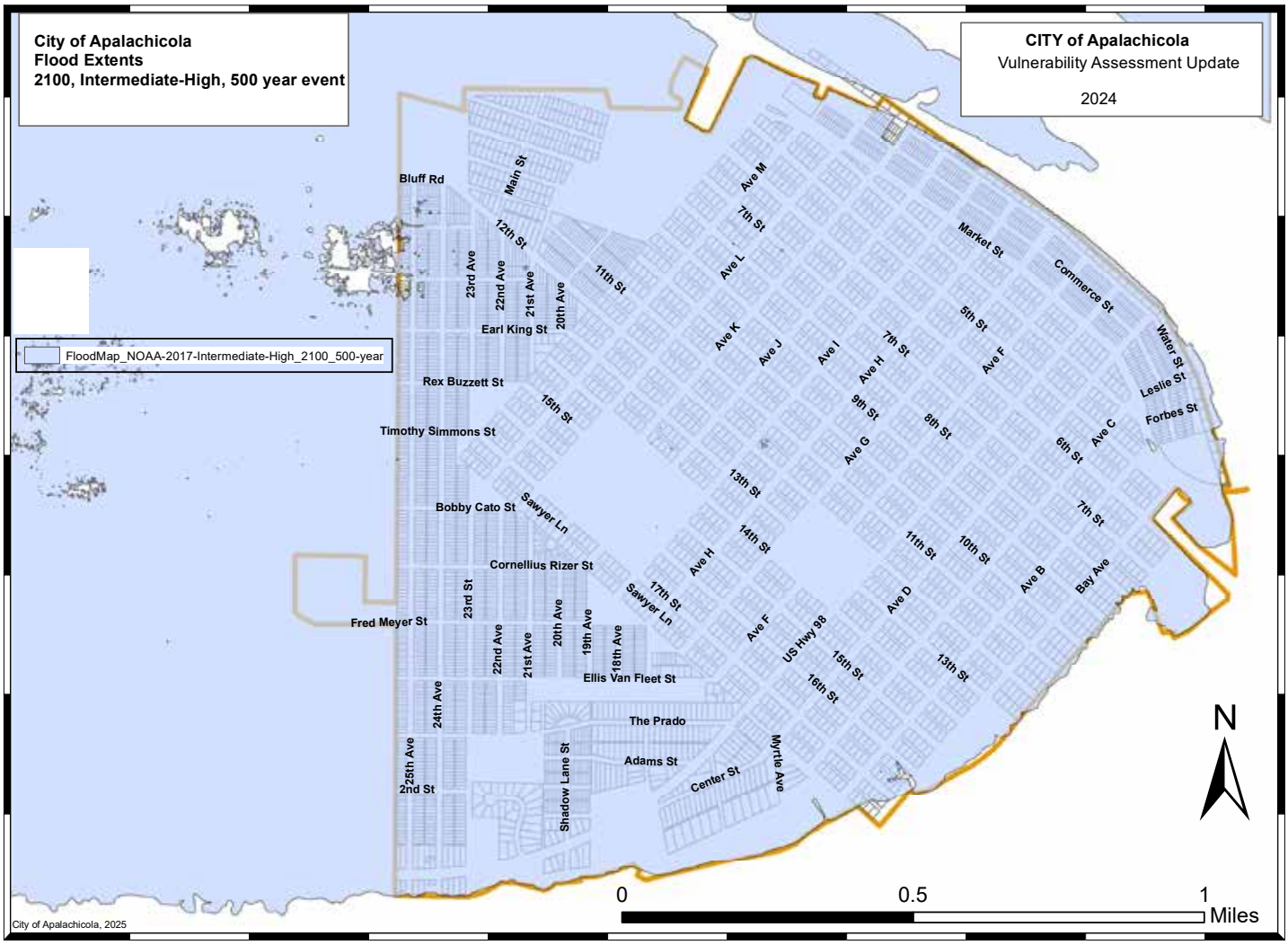
## Map 333 - 2100 IntHi 100-Yr Storm - Medium Inundation



## Map 334 - 2040 IntHi 500-Yr Storm - High Inundation



## Map 335 2100 IntHi 500-Yr Storm - Extreme Inundation



# Impacts to Assets

The table and map series (Appendix 2 and 3) identify and illustrate the impacts to the critical assets within the City for each model run and scenario. Additionally, the map and table series identify and illustrate which assets fall within the low, medium and high storm events.

The following is a summary of the potential projected impact of flooding on each asset.

In general, the assumptions inherent in the NOAA models conclude that storm impacts will rise with time. The four timeframes of present-day, 2040, 2070, and 2100 show an increasing level of impacts with time. In addition, the Intermediate-High model is more severe than the Intermediate-Low model. The storm events of 10-year, 50-year, 100-year and 500-year also increase the severity of the outcome. Consequently, this report uses 35 scenarios provided by NOAA to assess impacts to the City of Apalachicola.

## IMPACTS TO CRITICAL COMMUNITY AND EMERGENCY FACILITIES

*Assets included in the Critical Community and Emergency Facilities include Schools, Community Centers, Emergency Medical Service facilities, Emergency Operations Centers, Fire Stations, Health Care Facilities, Hospitals, Law Enforcement Facilities, Local Government Facilities, Affordable Public Housing and State Government Facilities.*

The flood impacts to the Critical Community and Emergency Facilities are summarized in Table 4 (Appendix 2) and Maps 1-29 (Appendix 3) Impacts to the identified Critical Community and Emergency Facilities are discussed below.

The point at which the asset shows impacts for each year and scenario is listed; more severe storms will also show impacts but are assumed since impacts are present in the lower intensity storms. All assets in this category are treated as points, except the Affordable Public housing, which is treated as an area. Table ...tabulates the Affordable Housing asset impact square footage and acreage since the asset is an area in the GIS attribute table.

**Asset Impacts**

• *The Harbormasters House* is impacted at 2100 Intermediate-High Tidal and at 2023 No-SLR 10-year as well as all more severe scenario storms. The Harbormaster's House is an elevated structure.

• *The Apalachicola Community Center* is not impacted by any Tidal scenarios. It is impacted at 2023 No-SLR 50-year, 2040 Intermediate Low 50 year, 2070 Intermediate Low 50-year, 2100 Intermediate Low 10-year, 2040 Intermediate High 50-year, 2070 Intermediate High 10-year, and 2100 Intermediate High 10-year as well as all more severe scenario storms. The Community Center is an elevated structure.

• *The Franklin County Courthouse* is not impacted by any Tidal scenarios. It is impacted at the 2023 No-SLR 100-year, 2040 Intermediate-Low 100-year, 2040 Intermediate High 100-year, 2070 Intermediate Low 100-year, 2100 Intermediate Low 100-year, 2040 Intermediate High 100-year, 2070 Intermediate High 100-year, 2100 Intermediate High 50-year and all more severe scenarios.

• *Buy Rite Drugs* is not impacted by any Tidal scenarios. It is impacted at 2023 No-SLR 100-year, 2040 Intermediate Low 100-year, 2070 Intermediate Low 100-year, 2100 Intermediate Low 100-year, 2040 Intermediate High 100-year, 2070 Intermediate High 50-year, 2100 Intermediate High 50-year and all more severe scenarios.

• The Department of Ag Shellfish Center is not impacted by any Tidal scenarios. It is impacted at 2023 No-SLR 500-year, 2040 Intermediate Low 500-year, 2070 Intermediate Low 500-year, 2100 Intermediate Low 500-year, 2040 Intermediate High 500-year, 2070 Intermediate High 500-year, 2100 Intermediate High 500-year and all more severe scenarios.

• *Sacred Heart Healthcare* is not impacted by any Tidal scenarios. It is impacted at 2023 No-SLR 500-year, 2040 Intermediate Low 500-year, 2070 Intermediate Low 500-year, 2100 Intermediate Low 500-year, 2040 Intermediate High 500-year, 2070 Intermediate High 100-year, 2100 Intermediate High 50-year and all more severe scenarios.

• *The Fort Coombs Armory* is not impacted by any Tidal scenarios. It is impacted at 2023 No-SLR 500-year, 2040 Intermediate Low 500-year, 2070 Intermediate Low 500-year, 2100 Intermediate Low 500-year, 2040 Intermediate High 500-year, 2070 Intermediate High 500-year, 2100 Intermediate High 500-year and all more severe scenarios.

• *The DET 1 CO A 3rd BTN* facility is not impacted by any Tidal scenarios. It is impacted at 2023 No-SLR 500-year, 2040 Intermediate Low 500-year, 2070 Intermediate Low 500-year, 2100 Intermediate Low 500-year, 2040 Intermediate High 500-year, 2070 Intermediate High

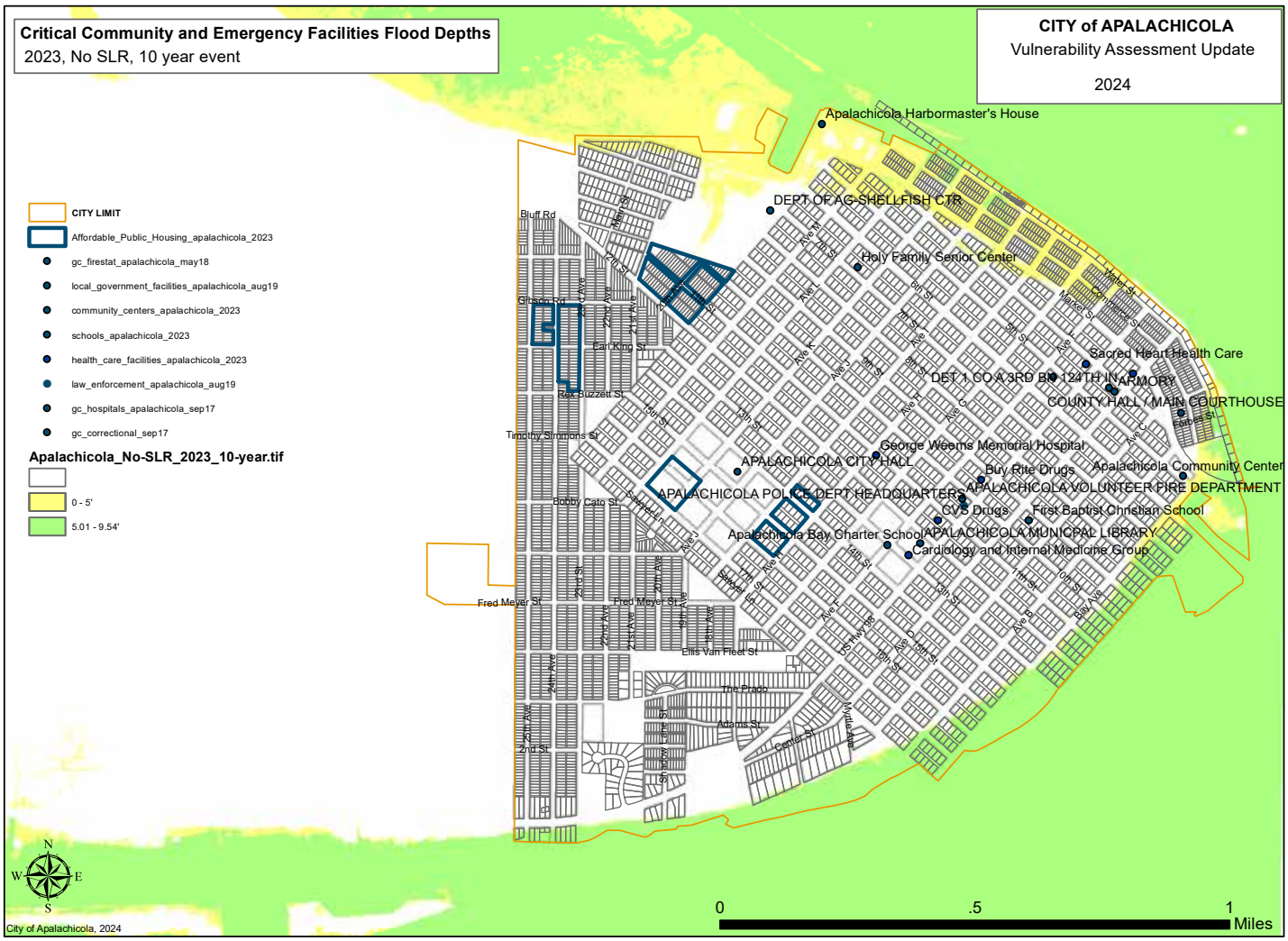
500-year, 2100 Intermediate High 500-year and all more severe scenarios.
• *The Tallahassee Orthopedics and Physical* Therapy is not impacted by any Tidal scenarios. It is impacted at 2023 No-SLR 500-year, 2040 Intermediate Low 500-year, 2070 Intermediate Low 500-year, 2100 Intermediate Low 500-year, 2040 Intermediate High 500-year, 2070 Intermediate High 500-year, 2100 Intermediate High 500-year and all more severe scenarios.
• *St Vincent NWR Office* is not impacted by any Tidal scenarios. It is impacted at 2023 No-SLR 500-year, 2040 Intermediate Low 500-year, 2070 Intermediate Low 500-year, 2100 Intermediate Low 500-year, 2040 Intermediate High 500-year, 2070 Intermediate High 500-year, 2100 Intermediate High 500-year and all more severe scenarios.
• *CVS Drugs* is not impacted by any Tidal scenarios. It is impacted at 2023 No-SLR 500-year, 2040 Intermediate Low 500-year, 2070 Intermediate Low 500-year, 2100 Intermediate Low 500-year, 2040 Intermediate High 500-year, 2070 Intermediate High 500-year, 2100 Intermediate High 500-year and all more severe scenarios.
• *The Apalachicola Police Department* is not impacted by any Tidal scenarios. It is impacted at 2023 No-SLR 500-year, 2040 Intermediate Low 500-year, 2070 Intermediate Low 500-year, 2100 Intermediate Low 500-year, 2040 Intermediate High 500-year, 2070 Intermediate High 500-year, 2100 Intermediate High 500-year and all more severe scenarios.
• *The Apalachicola Volunteer Fire Dept* is not impacted by any Tidal scenarios. It is impacted at 2023 No-SLR 500-year, 2040 Intermediate Low 500-year, 2070 Intermediate Low 500-year, 2100 Intermediate Low 500-year, 2040 Intermediate High 500-year, 2070 Intermediate High 500-year, 2100 Intermediate High 500-year and all more severe scenarios.
• *The First Baptist Church School* is not impacted by any Tidal scenarios. It is impacted at 2023 No-SLR 500-year, 2040 Intermediate Low 500-year, 2070 Intermediate Low 500-year, 2100 Intermediate Low 500-year, 2040 Intermediate High 500-year, 2070 Intermediate High 500-year, 2100 Intermediate High 500-year and all more severe scenarios.
• *The Apalachicola Bay Charter School* is not impacted by any Tidal scenarios. It is impacted at 2023 No-SLR 500-year, 2040 Intermediate Low 500-year, 2070 Intermediate Low 500-year, 2100 Intermediate Low 500-year, 2040 Intermediate High 500-year, 2070 Intermediate High 500-year, 2100 Intermediate High 500-year and all more severe scenarios.
• *The Apalachicola Municipal Library* is not impacted by any Tidal scenarios. It is impacted at 2023 No-SLR 500-year, 2040 Intermediate Low 500-year, 2070 Intermediate Low 500-year, 2100 Intermediate Low 500-year, 2040 Intermediate High 500-year, 2070 Intermediate High 500-year, 2100 Intermediate High 500-year and all more severe scenarios.
• *Cardiology and Internal Medicine Group,* which is located in the former Apalachicola Elementary School Auditorium is not impacted by any Tidal scenarios. It is impacted at 2023 No-SLR 500-year, 2040 Intermediate Low 500-year, 2070 Intermediate Low 500-year, 2100 Intermediate Low 500-year, 2040 Intermediate High 500-year, 2070 Intermediate High 500-year, 2100 Intermediate High 500-year and all more severe scenarios.
• *The Holy Family Senior Center* is not impacted by any Tidal scenarios. It is impacted at 2023 No-SLR 500-year, 2040 Intermediate Low 500-year, 2070 Intermediate Low 500-year, 2100 Intermediate Low 500-year, 2040 Intermediate High 500-year, 2070 Intermediate High 500-year, 2100 Intermediate High 500-year and all more severe scenarios.
• *Apalachicola City Hall* is not impacted by any Tidal scenarios. It is impacted at 2023 No-SLR 500-year, 2040 Intermediate Low 500-year, 2070 Intermediate Low 500-year, 2100 Intermediate Low 500-year, 2040 Intermediate High 500-year, 2070 Intermediate High 500-year, 2100 Intermediate High 500-year and all more severe scenarios.
• *Affordable Public Housing* is not impacted by any Tidal scenarios. They are impacted at 2023 No-SLR 500-year, 2040 Intermediate Low 500-year, 2070 Intermediate Low 500-year, 2100 Intermediate Low 500-year, 2040 Intermediate High 500-year, 2070 Intermediate High 500-year, 2100 Intermediate High 500-year and all more severe scenarios.

**Observed Impact Notes by Asset**
Schools, Community Centers, Emergency Medical Service Facilities, Emergency Operation Centers, Fire Stations, Health Care Facilities, Hospitals, Law Enforcement Facilities, Local Government Facilities, and Affordable Public Housing are all structures and are impacted by the severity of the scenario and hence depth of the storm surge.

Some of the structures are elevated and consideration must be shown by deducting the elevation of the structure from the impact depth.

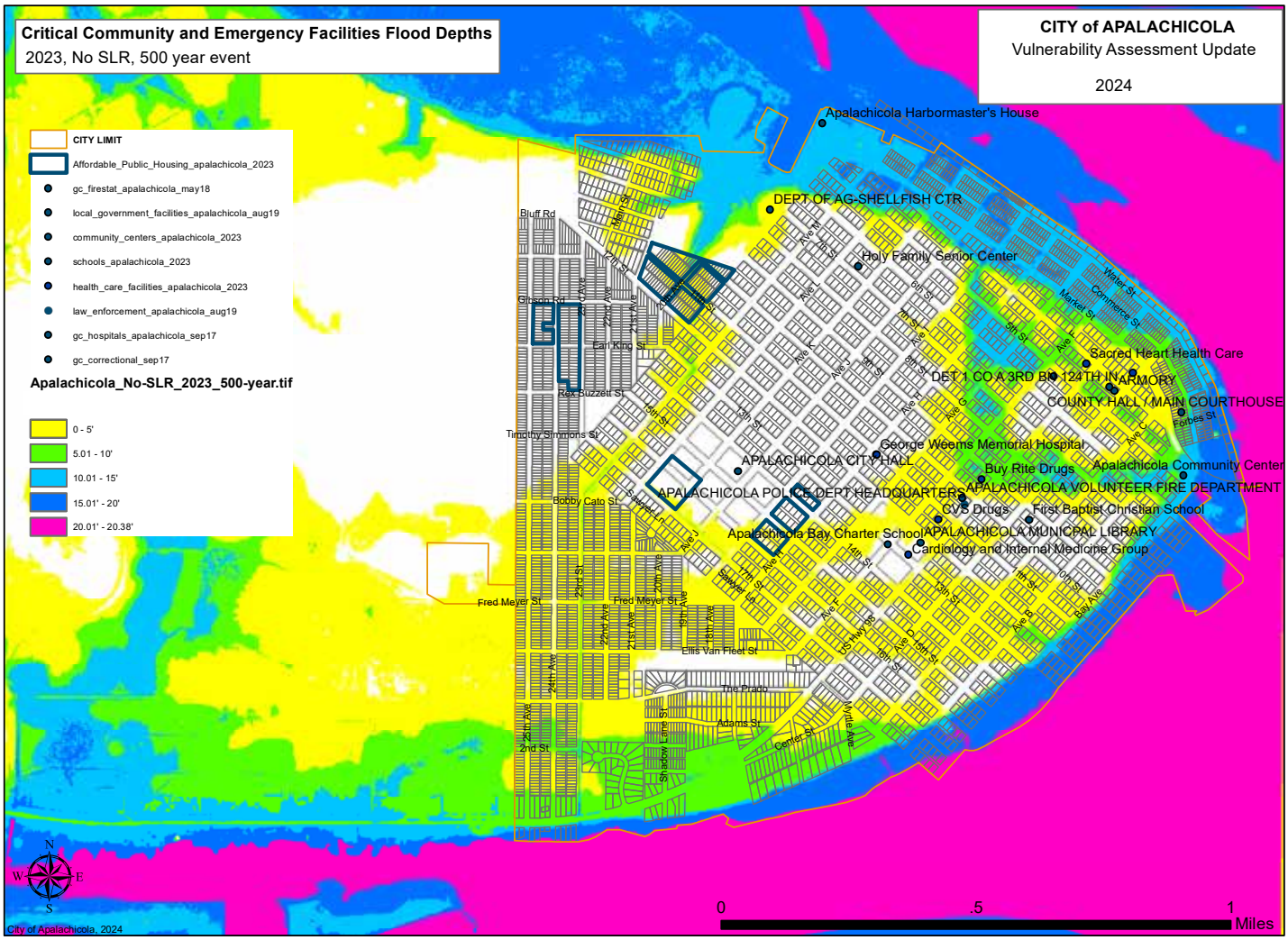
NOTE: Harbormaster's House is approximately 8' above grade to the lowest structural member and approximately 10' above grade to the finished floor.

## Map 2 (from Appendix 3) Critical Community and Emergency Facilities 2023 No SLR - 10-YR



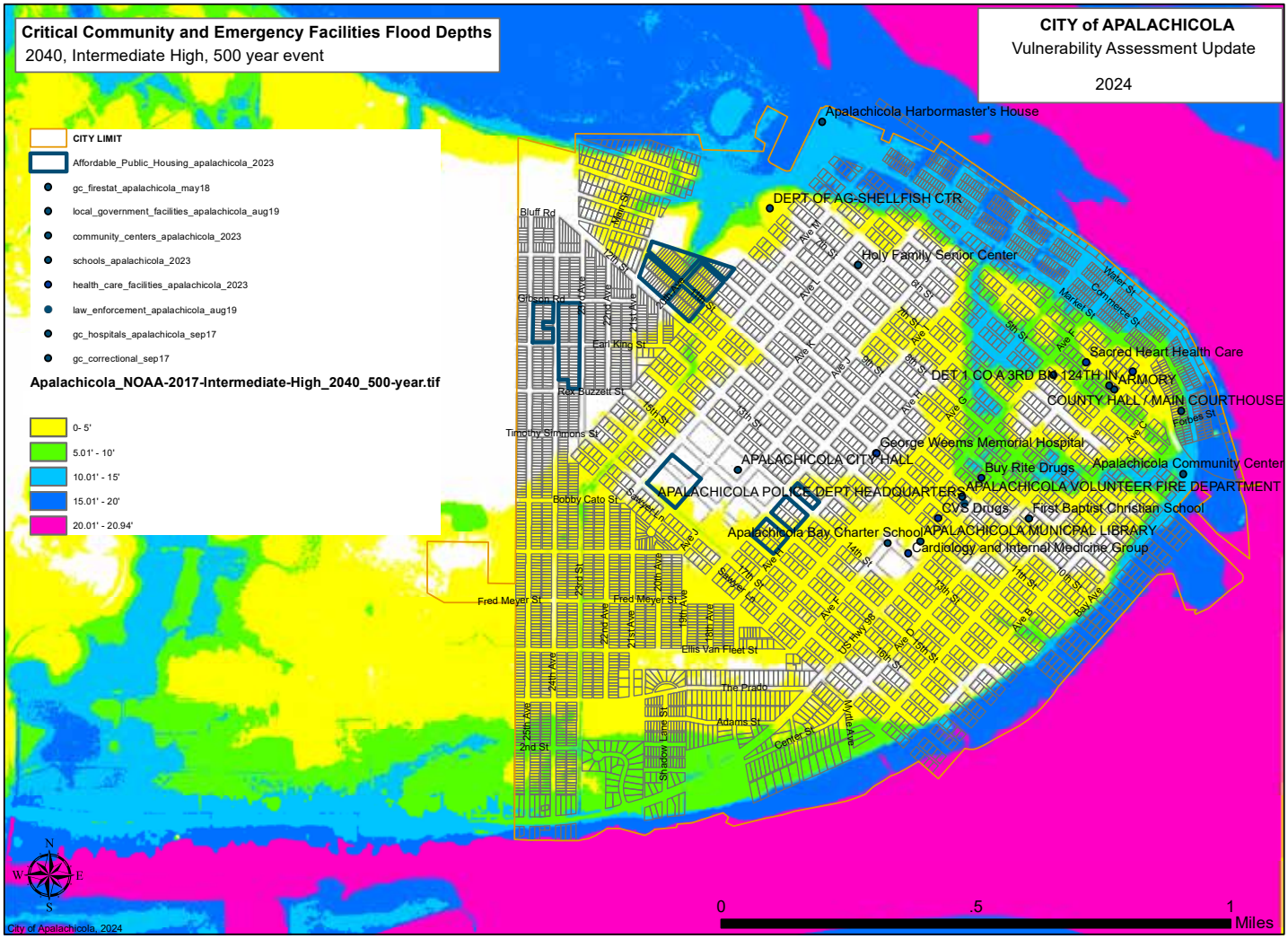

Map 2 Represents a Low Risk Assessment (Less Than 25% Critical Assets Affected) within the Community and Emergency Facilities Category for selected model run.

## Map 5 (from Map Series) Critical Community and Emergency Facilities 2023 No SLR 500-YR



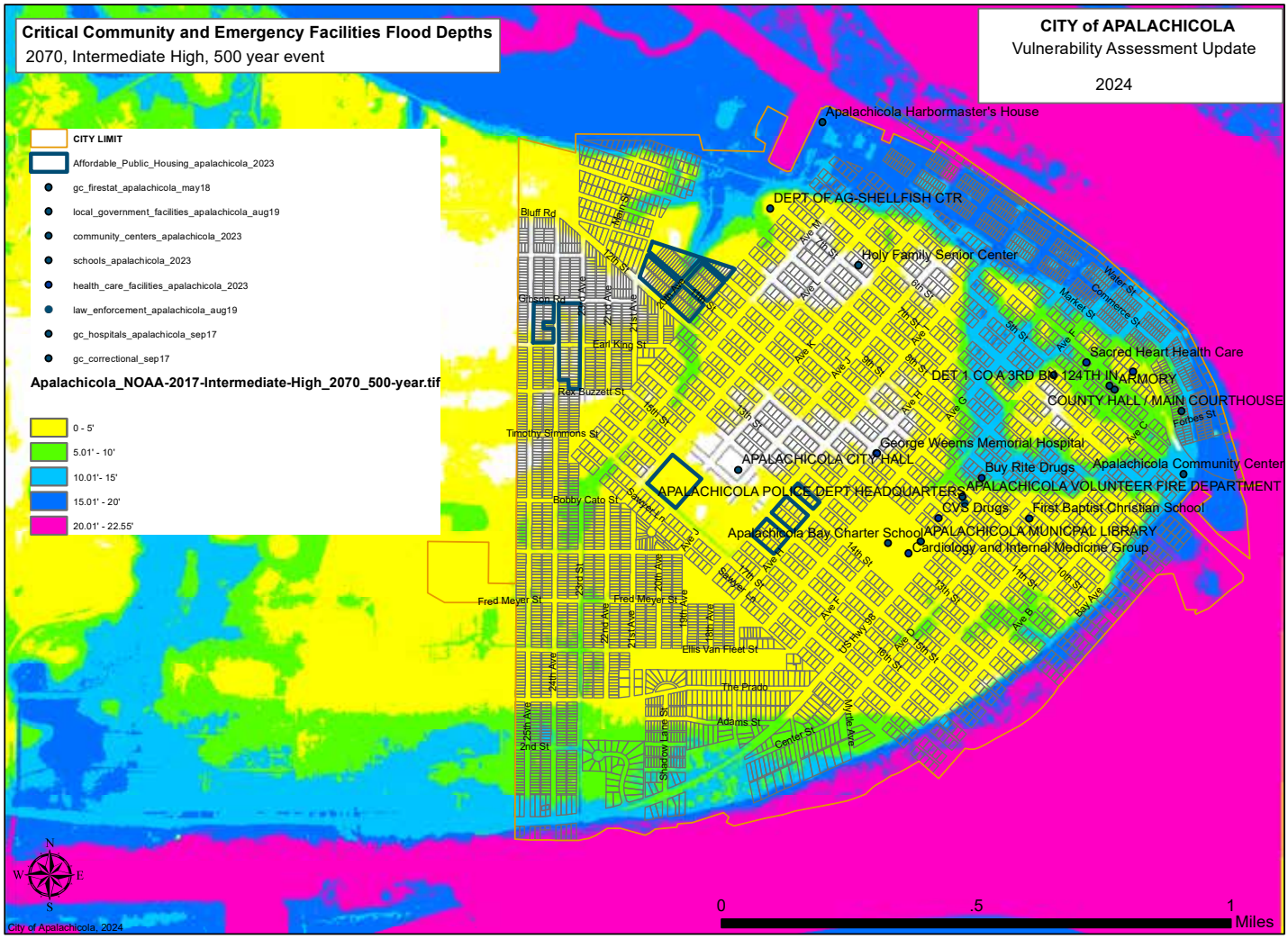

Map 5 Represents a Medium Risk Assessment (Between 25-50% Critical Assets Affected) within the Community and Emergency Facilities Category for selected model run.

## Map 13 (from Map Series) Critical Community and Emergency Facilities 2040 IntHi - 500-YR




Map 13 Represents a High Risk Assessment (Between 50-75%% Critical Assets Affected) within the Community and Emergency Facilities Category for selected model run.

## Map 21 (from Map Series) Critical Community and Emergency Facilities Depth - 2070 IntHi 500 Year




Map 21 Represents an Extreme Risk Assessment (More than 75% Critical Assets Affected) within the Community and Emergency Facilities Category for selected model run.

## IMPACTS TO CRITICAL INFRASTRUCTURE FACILITIES

*There are four identified types of assets within the Critical Infrastructure category: communications towers, wastewater treatment facility, water treatment facilities, water utility conveyance system, stormwater utility conveyance system, wastewater conveyance system.*

The flood impacts to the Critical Infrastructure Facilities are summarized in Tables 2-7 (Appendix 2) and illustrated in Map series 30-139 (Appendix 3). The point at which the asset shows impacts for each year and scenario is listed; more severe storms will also show impacts but are assumed since impacts are present in the lower intensity storms.

**Projected Impacts**

• The asset for Communication is the GT Com tower located at Commerce Street between Avenue G and Avenue H. It is impacted by the 2100, Intermediate High Tidal Flooding scenario, but no other tidal scenarios. It is impacted by all other storm scenarios.
• The asset for wastewater treatment facilities is the wastewater treatment facility. It is located approximately two miles west of the western city limit, north of the highway, on Highway 98. It is not impacted by any tidal flooding scenarios. It is impacted by all 500-year scenarios. It is also impacted by the 2100, Intermediate High, 50-year and 100-year scenarios.
• The assets for Public Water Supply are the water tower and well at 5th Street between Avenue J and Avenue K and the water treatment facility at Chapman Road in Greater Apalachicola. The water treatment plant and the water tower are both impacted by 2100, Intermediate-Low, 500-year, 2070, Intermediate-High, 500-year and 2100, Intermediate-High, 500-year scenarios.

**Observed Impact Notes by Asset**

For minor storms, City personnel in charge of the post-storm cleanup remain, monitor, and make changes to the infrastructure, such as valve closure that has shown to be beneficial in the past towards preventing damage to the infrastructure. However, in more major storms or major storms that are projected to impact the City, City personnel might be evacuated and there could be a delay of a day or two in their resuming duties. Upon their return delays such as power and communication outages cause delays to the repair and resuming of services.

*WWTP and Lift Stations*

Impacts to the WWTP are documented in the maps and tables. The components of the sewage collection and treatment system that would be impacted are as follows:
• The WWTP located west of the City. The extents and depths of impacts to the WWTP will be assessed by the City personnel who have expertise in the workings and repair of the system. it is beyond the scope of work to document impacts occurring based on all scenarios;
• The vacuum pump station located at the intersection of Avenue F and 10th Street. The vacuum pump system collects effluent from the city and pumps it to the WWTP. It is a critical element in the collection system. The station is located in the relic creek bed at a fairly low elevation. Even though the pump itself and the controls are elevated within the building, this component is thought to be a weak link in the post-storm recovery. Plans are in the works for another vacuum pump station to be constructed.
• The vacuum left stations distributed in the large portion of the City that is on the vacuum system contain sensitive electronics that monitor sewage flow and operation of the vacuum system. As such, they are a critical link in the operation of the system. As documented in the maps and tables, lift stations are affected by all storm surge scenarios. The protection of these devices are paramount in the protection and repair during storm events.
• The gravity system made up of manholes and piping. The manholes are a source of leakage of stormwater in flooding events and piping of the gravity sewage system is primarily composed of old terra cotta pipe that is cracked in places. The infiltration of the manhole and piping causes complications of volume at the WWTP that tax the ability of the facility to treat the effluent.

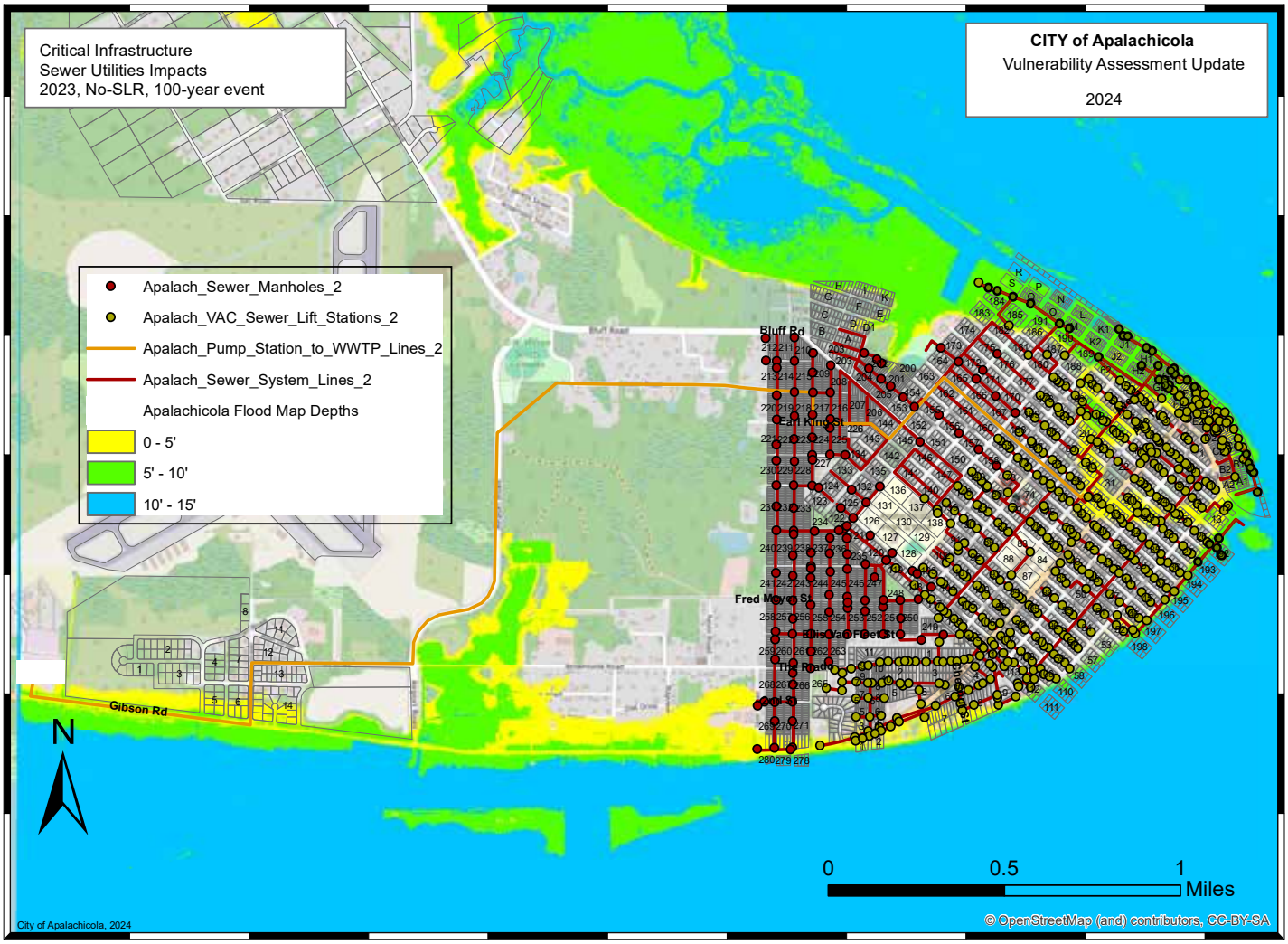
*Stormwater*

The stormwater system is a passive system based on the flow from gravity. Stormwater from a scenario will back-up through the piping and rise to the elevation of the flooding event. One major drainage basin outfall is equipped with a backflow preventer device that prevents stormwater infiltration through the piping. However, during all but minor storm events, flooding occurs when stormwater rises over the containment structure or land and floods the surrounding areas. Consideration should be given to assessing whether these devices could be added to other outfalls, as feasible.

*Drinking Water Facilities*
The water treatment plant is at a fairly high elevation and will not be impacted except in the more severe events. The water piping and valves and meters are for the most part buried, however there are several valves that rely on electricity, but that can be manually operated. As such, the water treatment facility is considered low risk.

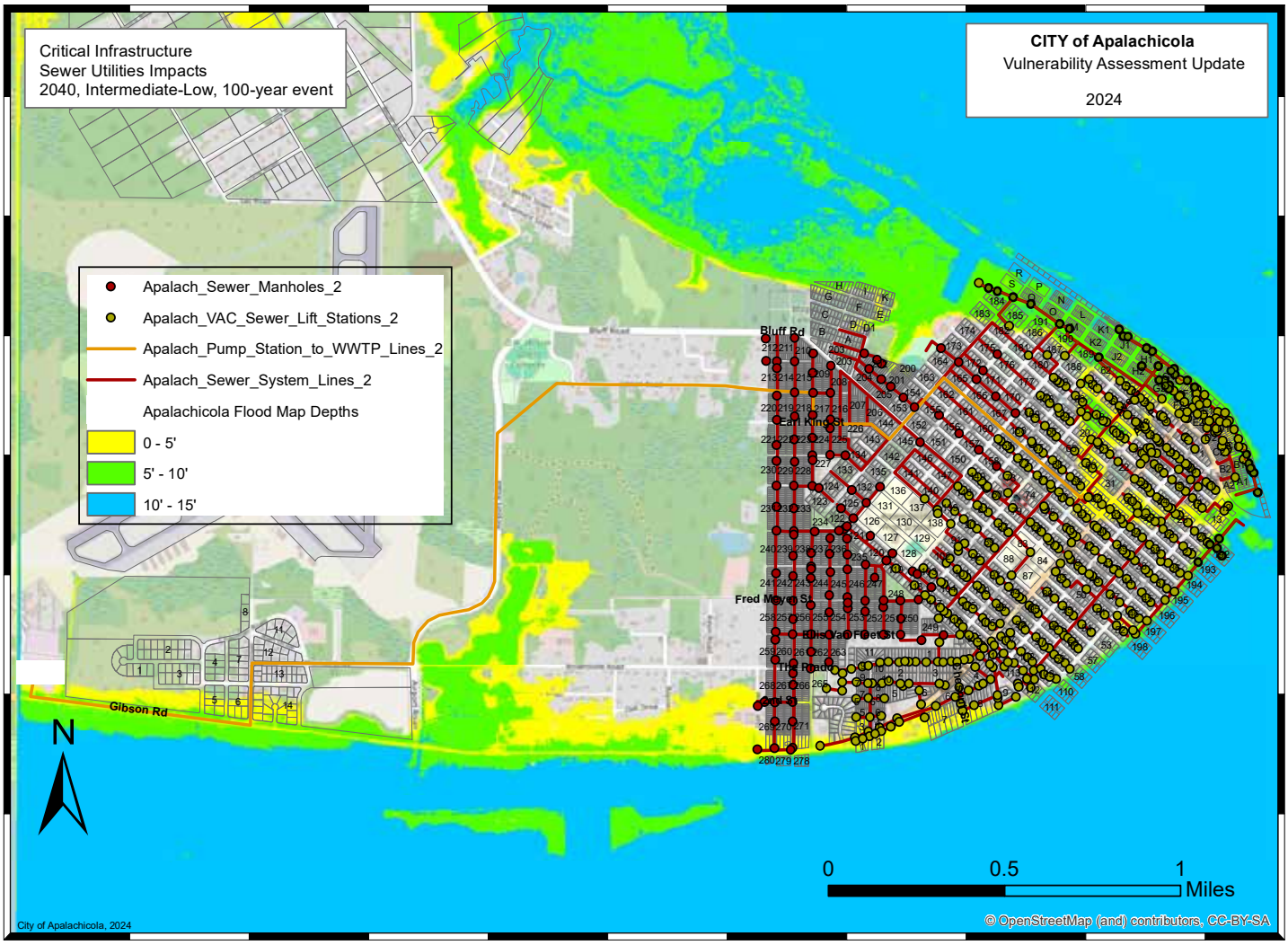
*Communication Facilities*
Impacts to the two communication facilities are documented in the maps and tables..

**Map 32 (from Map Series)** Critical Infrastructure Sewer Depth - 2023 No SLR 100 Year



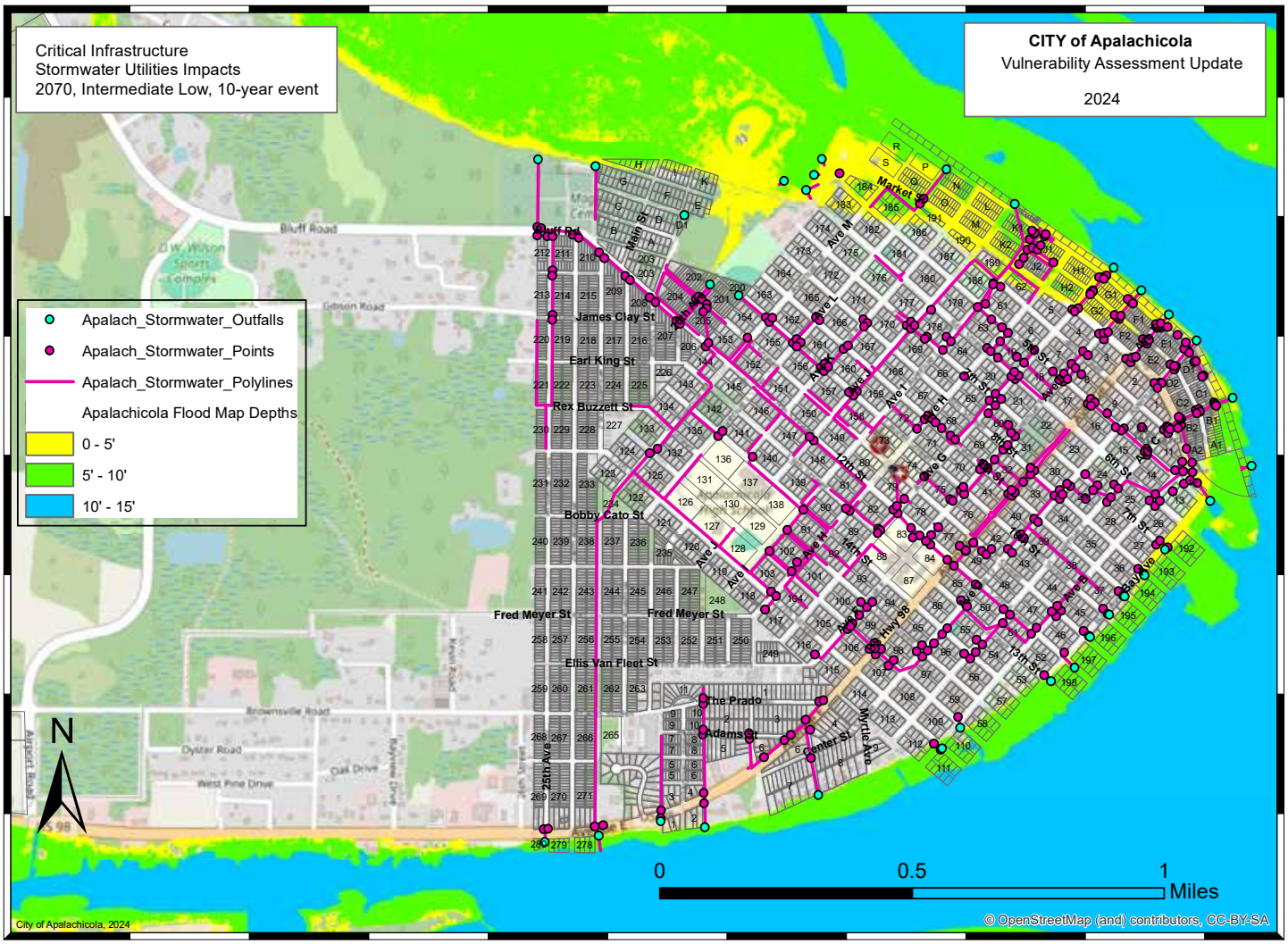

Map 32 Represents a Low Risk Assessment (Less than 25% Critical Assets Affected) within the Critical Infrastructure Sewer Facilities Category for selected model run.

**Map 38 (from map series) Critical Infrastructure Sewer Depth - 2040 IntLo 100 Year**



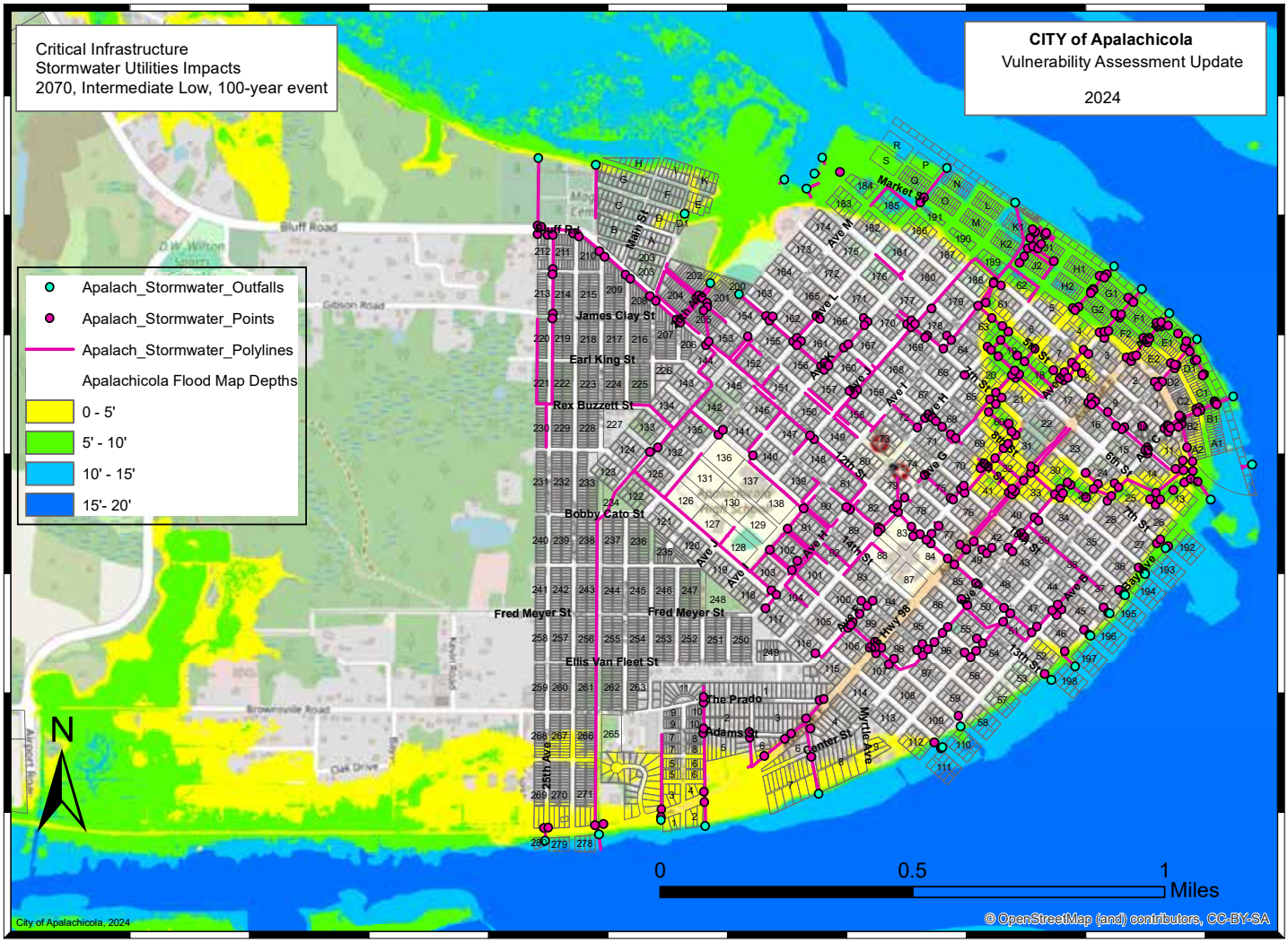

Map 38 represents a Medium Risk Assessment (between 25-50% Critical Assets Affected) within the Critical Infrastructure Stormwater Facilities Category for selected model run.

**Map 83 (from map series) Critical Infrastructure Stormwater Depth - 2070 IntLo 10 Year**




Map 38 represents a High Risk Assessment (between 50-75% Critical Assets Affected) within the Critical Infrastructure Stormwater Facilities Category for selected model run.

**Map 85 (from map series)** Critical Infrastructure Stormwater Depth - 2070 IntLo 100 Year




Map 85 represents an Extreme Risk Assessment (more than 75% Critical Assets Affected) within the Critical Infrastructure Stormwater Facilities Category for selected model run.

## IMPACTS TO NATURAL, CULTURAL AND HISTORICAL FACILITIES

*Assets of Natural, Cultural, and Historical Resources include Conservation Lands, Parks, Shorelines, Surface Waters, Wetlands, Historic and Cultural Assets. Upon the request of the City commission, parcel inundation impacts to lots based on zoning designation are included in this classification.*

The flood impacts to the Natural, Cultural and Historical Facilities are summarized in Tables 8-13 (Appendix 2) and illustrated in Map series 140-203 (Appendix 3). Impacts to the identified Natural, Cultural and Historical Facilities are discussed below.

The point at which the asset shows impacts for each year and scenario is listed; more severe storms will also show impacts but are assumed since impacts are present in the lower intensity storms.

**Parks**

Chapman Square Park: The park is located on 14th Street between Avenue C and Avenue D. It is on moderately high land. It is impacted by all 500-year storm scenarios and the 2100 Intermediate-High, 100-year storm scenario.

Basketball Court: The park is located on 6th Street between Avenue K and Avenue L. It is on high land. It is impacted by all 500-year storm scenarios and the 2100 Intermediate-High, 100-year storm scenario.

Franklin Square: The park is located on 6th Street between Avenue K and Avenue L. It is on high land. The park is impacted by all 500-year storm scenarios.

Apalachicola Ballfield: The park is located on moderately high land. It is impacted by all 500-year storm scenarios.

Scipio Creek Boardwalk Trailhead: The park is located over wetlands that fringe the Apalachicola River. The area is impacted by all 100-year and 500-year scenarios.

St. Vincent National Wildlife Refuge (visitor center): The park is located on 5th Street, between Avenue E and Avenue F on relatively high land. It is impacted by all 500-year storm scenarios.

City Square and Community Garden: The park is located adjacent to the Chestnut Street cemetery on moderately high land. The area is impacted by all 100-year and 500-year scenarios. It is also impacted by the 2070 Intermediate-Low and Intermediate-High, 50-year scenarios.

Riverfront Park: The park is located on the riverfront downtown. Its location makes it prone to flooding events. It is impacted by all 50-year, 100-year and 500-year events. It is also impacted by 10-year events of 2070, Intermediate-High, 2100, Intermediate-High and 2100, Intermediate-Low scenarios.

Battery Park & Marina: The park is located around the marina and is generally a low area of the city, however, it slopes higher to the northwest. Consequently, the depths of flooding have a wide range of depths in each scenario. The park has flood impacts in every scenario except Tidal Flooding impacts. It does get impacted for the 2100, Intermediate-High, Tidal-Flooding scenario.

Bayside Park: The park is located adjacent to fringing wetlands of Apalachicola Bay. As such, it is located on very low land and is impacted by all scenarios except the tidal scenarios. It is, however, impacted by the 2070 and 2100 Intermediate-High, Tidal Flooding scenarios.

Madison Square/Justin B. Griffin Skate Park: The park is located adjacent to the City Hall complex on some of the highest land in Apalachicola. The park is impacted at the level of 2070 and 2100 Intermediate-High, 500-year events.

Dog Park: The park is located adjacent to the City Hall complex on some of the highest land in Apalachicola. The park is impacted at the level of 2070 and 2100 Intermediate-High, 500-year events.

John Gorrie Museum State Park: The park is located on high land within Gorrie Square, one of the historic squares. It is impacted at the level of 2070 and 2100 Intermediate-High, 500-year events and 2100 Intermediate-Low, 500-year events.

John Gorrie Museum State Park (Main Entrance): The park is located on high land within Gorrie Square, one of the historic squares. It is impacted at the level of 2070 and 2100 Intermediate-High, 500-year events and 2100 Intermediate-Low, 500-year events.

Orman House Historic State Park (Main Entrance): The park is located on a bluff above the Apalachicola River. The park is impacted at the level of 2070 and 2100 Intermediate-High, 500-year events.

Mayor Van Johnson Splash Pad/Playground: The park is located at some of the highest land in Apalachicola. It is not impacted until the 2100 Intermediate-High, 500-year scenario.

Lafayette Park/Fishing Pier: The park is located on a bluff just above the fringing wetlands on Apalachicola Bay on the south side of the city. The fishing pier goes from the park southward into the bay. The fishing pier is elevated variably eight feet above the wetlands and the bay water surface. As such, the fishing pier is impacted on the map by all scenarios. However, due to the height of the pier, it is beyond the scope of this investigation. The park itself, being on high ground is not impacted until the 2100 Intermediate-High, 500-year scenario.

**Surface Waters**
The Surface Waters GIS Attribute Table lists two surface waters; Apalachicola Bay and the Apalachicola River. These two assets are continuously flooded and are impacted by all scenarios.

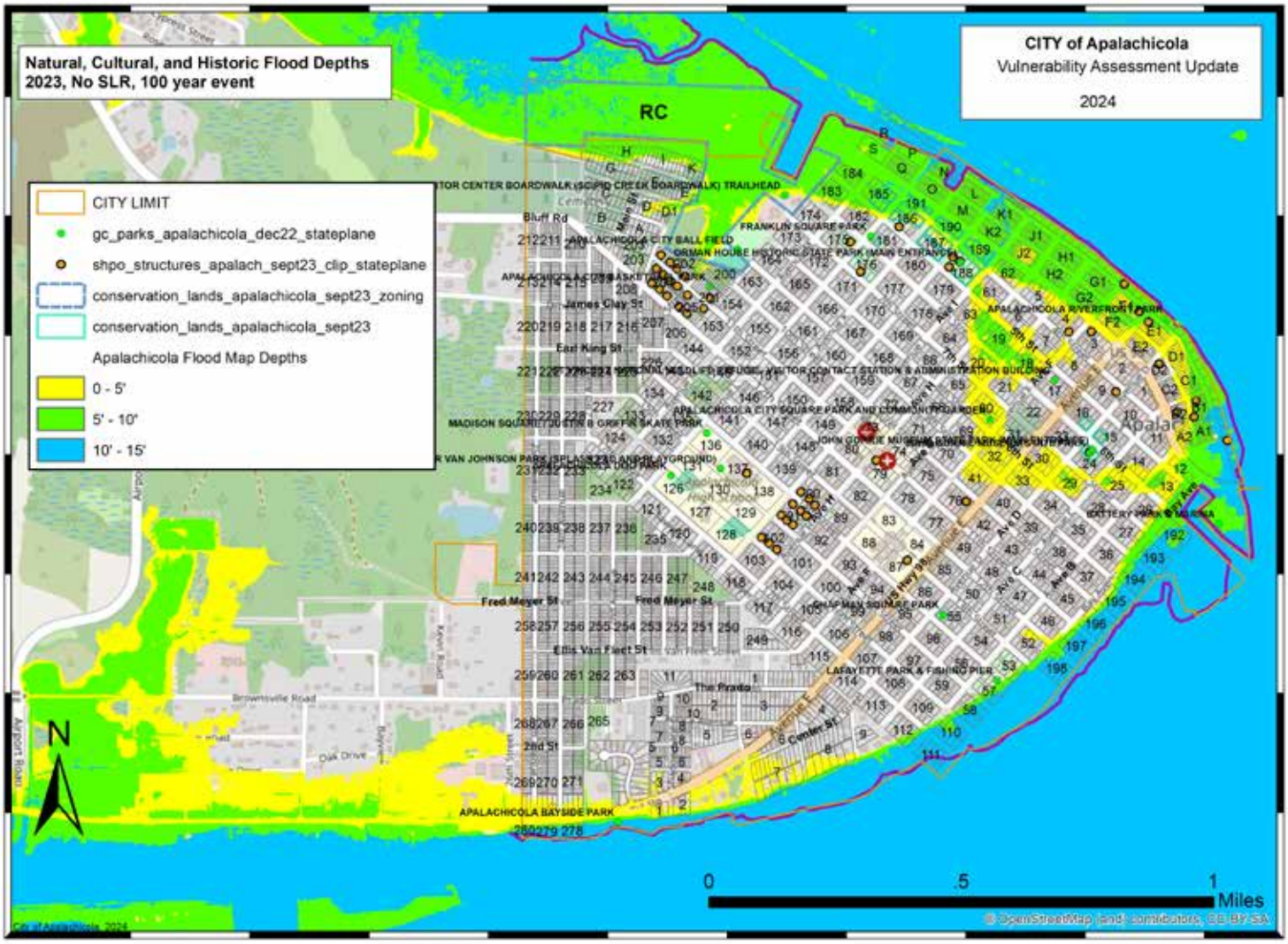
**Shoreline**
The shoreline of the City of Apalachicola is located in the supratidal zone, which is flooded currently by alternating incoming/outgoing tidal action. The shoreline is impacted by almost all scenarios. Only two of the lowest impact scenarios (2023, No SLR, Tidal Flooding and 2040, Intermediate-Low, Tidal Flooding) showed an incomplete total impact to the shoreline. Impacts to shoreline are shown in Table 4.1F, below.

**Wetlands**
Wetlands occur at all elevations within the study area. The preponderance of wetlands occurs fringing the shoreline at the riverside and bayside, but some occur in the higher elevations due to collection of stormwater in closed depressions, ponding in swale impoundments, with generally very poorly drained soils.

**Historic and Cultural Assets**
The Historic and Cultural Assets include all local, state, and federally owned properties. There is overlap between the affordable housing section, as these properties are locally owned and are on the State Master Site File list of historic properties.

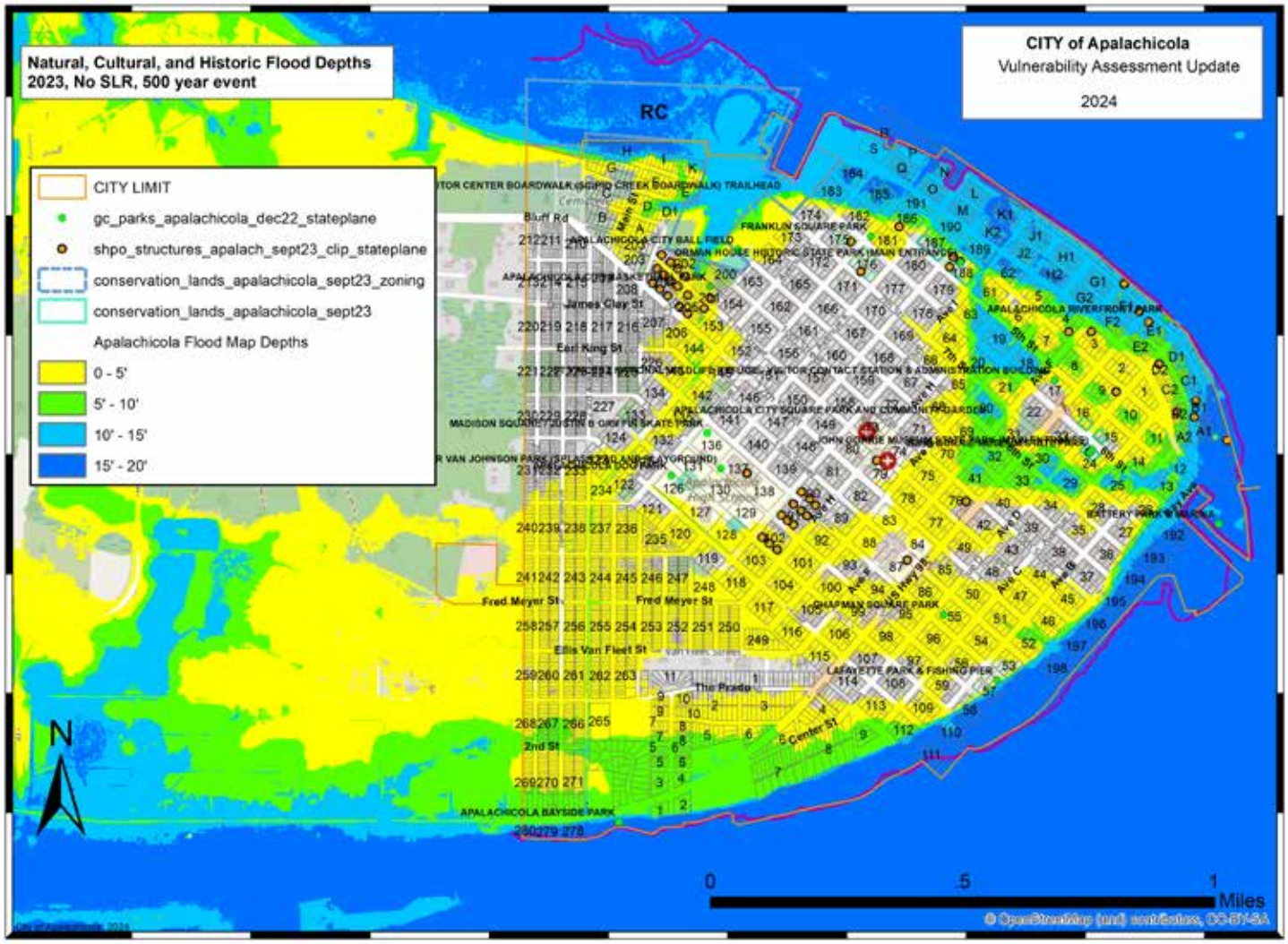
**Observed Impact Notes by Asset**
The impacts for Conservation Lands, Parks, Shorelines, Surface Waters, and Wetlands are well documented in the maps and tables. For the purposes of this report, they will be considered as temporary impacts and will not be regarded in the sensitivity assessment.

**Map 143 - Natural, Cultural & Historical Depth -2023 NSL 100 Year**



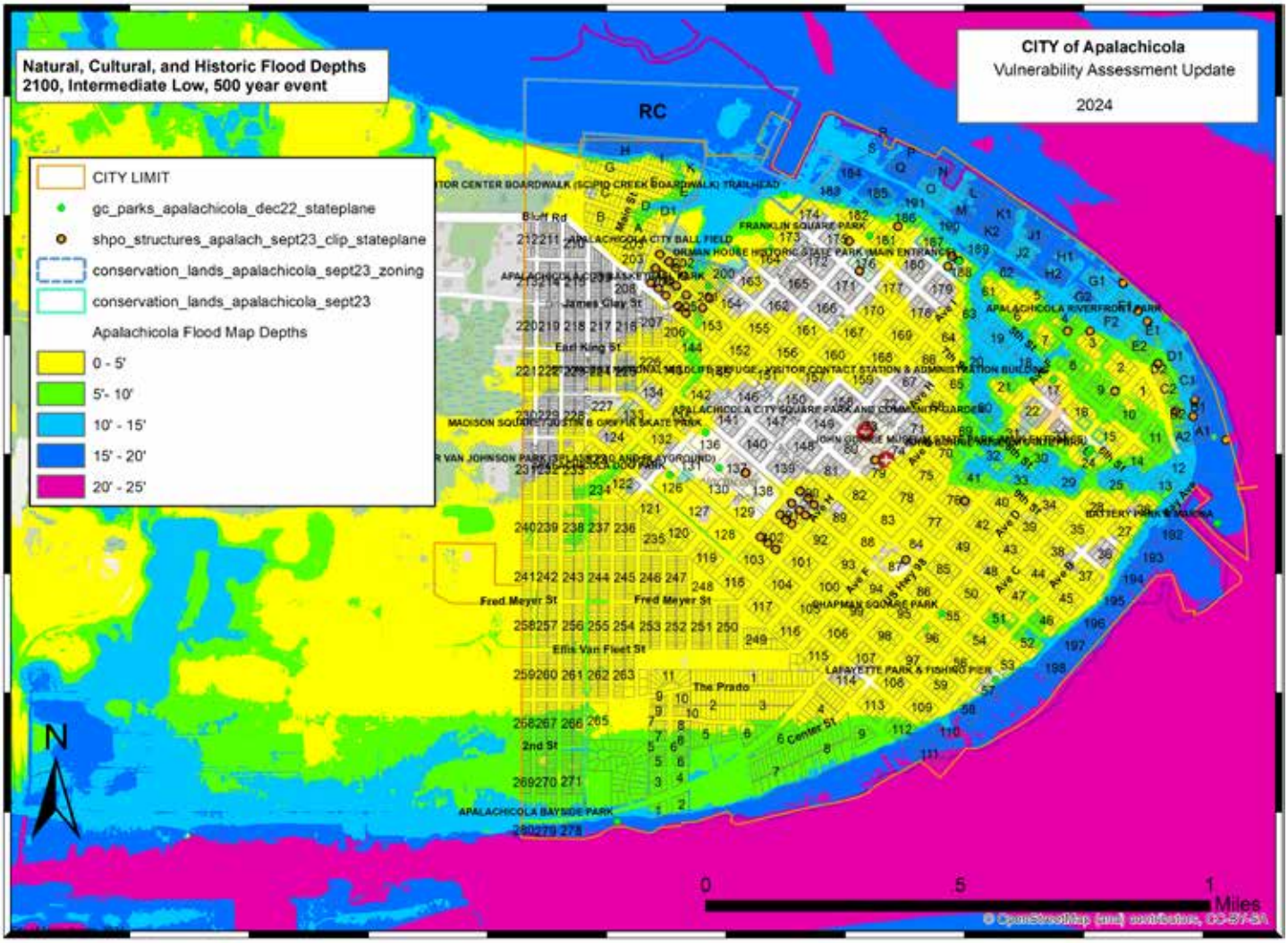

Map 143 represents a Low Risk Assessment (less than 25% Critical Assets Affected) within the Natural, Cultural & Historical Infrastructure Facilities Category for selected model run.

**Map 144 - Natural, Cultural & Historical Depth - 2023 NSL 500 Year**



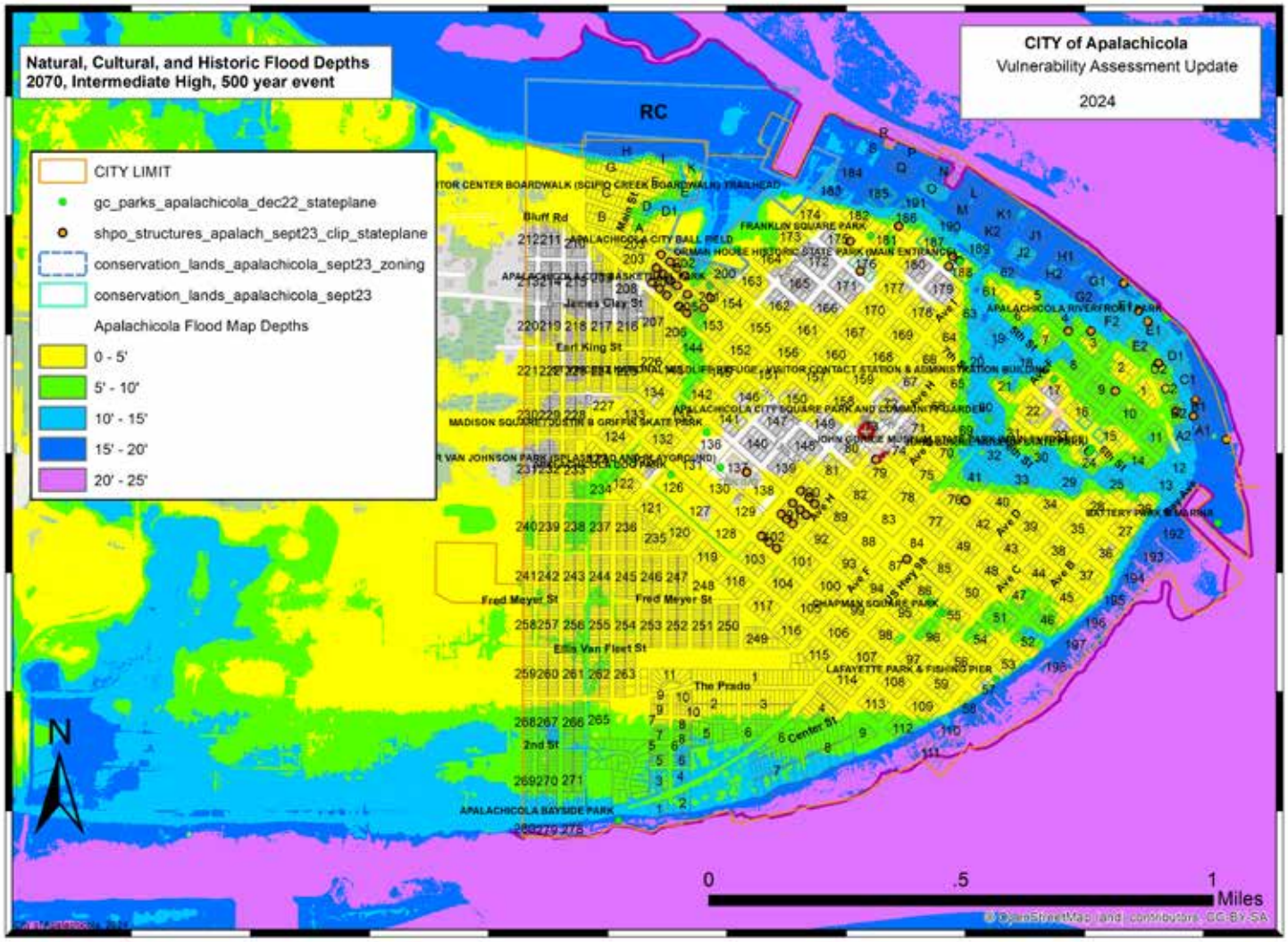

Map 144 represents a Medium Risk Assessment (between a 25-50% Critical Assets Affected) within the Natural, Cultural & Historical Infrastructure Facilities Category for selected model run.

**Map 169 - Natural, Cultural & Historical Depth - 2100 Intlo 500 Year**




Map 169 represents a High Risk Assessment (between a 50-75% Critical Assets Affected) within the Natural, Cultural & Historical Infrastructure Facilities Category for selected model run.

**Map 164 - Natural, Cultural & Historical Depth - 2070 InHi 500 Year**




Map 164 represents an Extreme Risk Assessment (more than 75% Critical Assets Affected) within the Natural, Cultural & Historical Infrastructure Facilities Category for selected model run.

## IMPACTS TO TRANSPORTATION FACILITIES

*Critical assets within the transportation and evacuation routes classification include airports and airport access roads, bridges, major roadways, marinas, and evacuation routes. There are no bus terminals, ports, rail facilities or railroad bridges within the City limits. Those assets are addressed in the 2022 ARPC Regional VA.*

The flood impacts to the Transportation Facilities are summarized in Tables 14-19 (Appendix 2) and illustrated in Map series 207-277 (Appendix 3). Impacts to the identified Critical Infrastructure Facilities are discussed below.

The point at which the asset shows impacts for each year and scenario is listed; more severe storms will also show impacts but are assumed since impacts are present in the lower intensity storms.

**Bridges**
The study area has one bridge, the Apalachicola River Bridge. The bridge approach at Apalachicola is an elevated embankment. The impacts shown an all scenarios are flooded up the side of the reinforced earth walls. All impacts shown in all scenarios, are considered temporary. FDOT is responsible for both bridges and the causeway east of the City. These impacts are not considered in this report.

**Major Roadways**
There are 51 roads listed in the attribute table for major road assets. The impacts are listed in Table 15 (Appendix 2). Impacts to major roadways are quantified in linear feet and depth in this report. The impacts to major roadways are considered temporary in this report.

Note: City personnel management who are responsible for clearing of the roadways have stated that roadways are expected to be clear of debris such as trees, limbs, etc. within a week of the subsidence for minor storms. For more major storms during which City personnel have been evacuated the cleanup could be impaired by time taken for personnel to return to duty, damage sustained by clean-up equipment and the availability of staging areas to store debris in the event that the county landfill has sustained storm impacts that preclude the reopening.

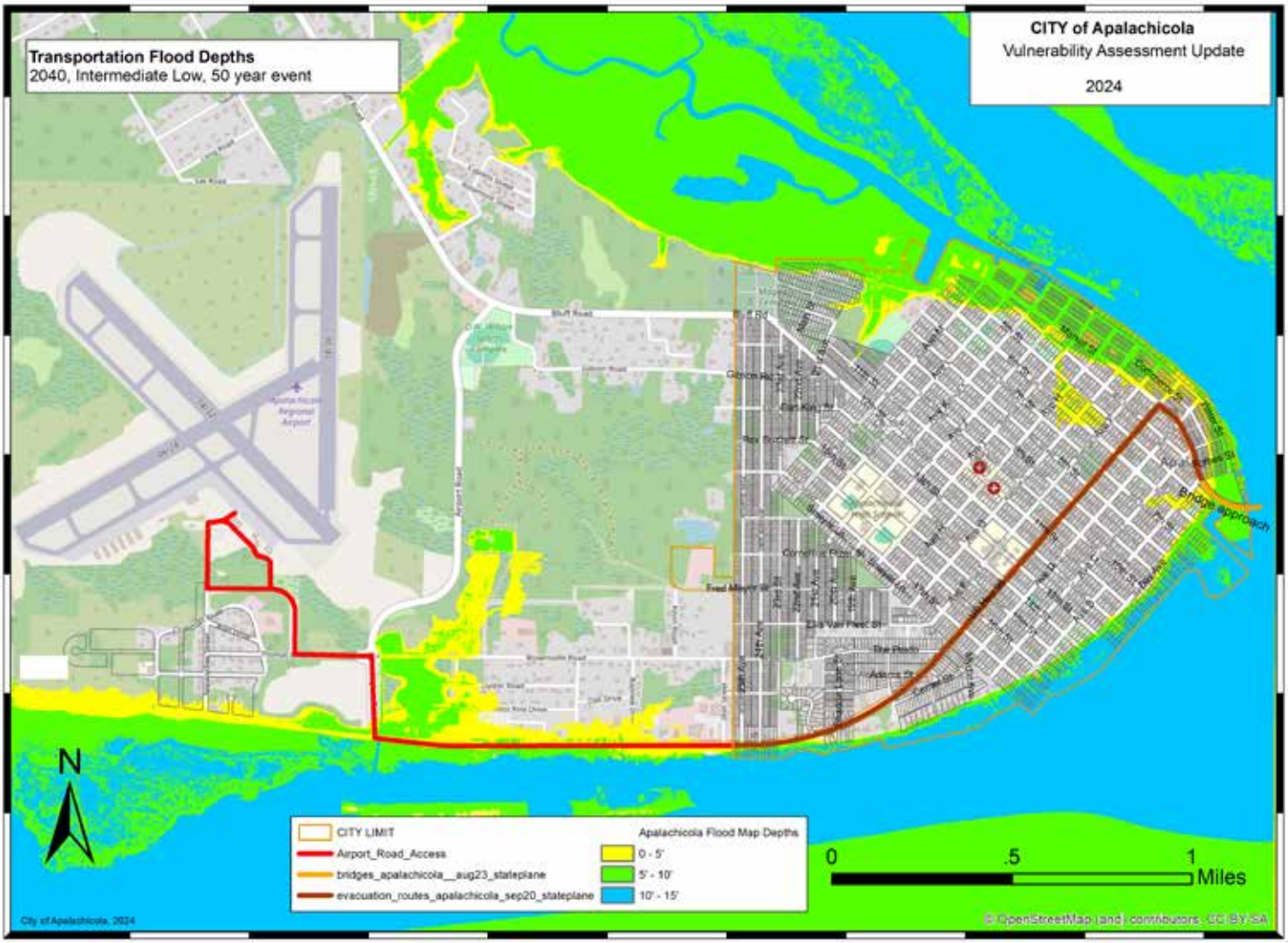
**Impacts to Evacuation Routes**
The attribute table for evacuation routes lists Highway 98 as the sole evacuation route. Evacuation is to the east across Apalachicola Bay or to the west towards Port St Joe. Table 4.1P quantifies the impacts to Highway 98. The maps identify the specific areas in which flooding is anticipated with each scenario.

**Boat Ramps**
There are 4 boat ramps listed in the attribute table for boat ramp assets for Apalachicola. Since boat ramps are located near sea level, the boat ramps are impacted by nearly all scenarios.

**Airports**
Impacts to the Cleve Randolph airport are twofold. 1) Impacts to the runways, which are considered temporary and 2) Impacts to structures. The airport complex structures include the terminal building, the Emergency Operations Center, hangars, and various storage buildings. Impacts under 5’ are considered low, 5’-10’ are considered severe and impacts 10’+ are considered high. High impacts in this case could be catastrophic.

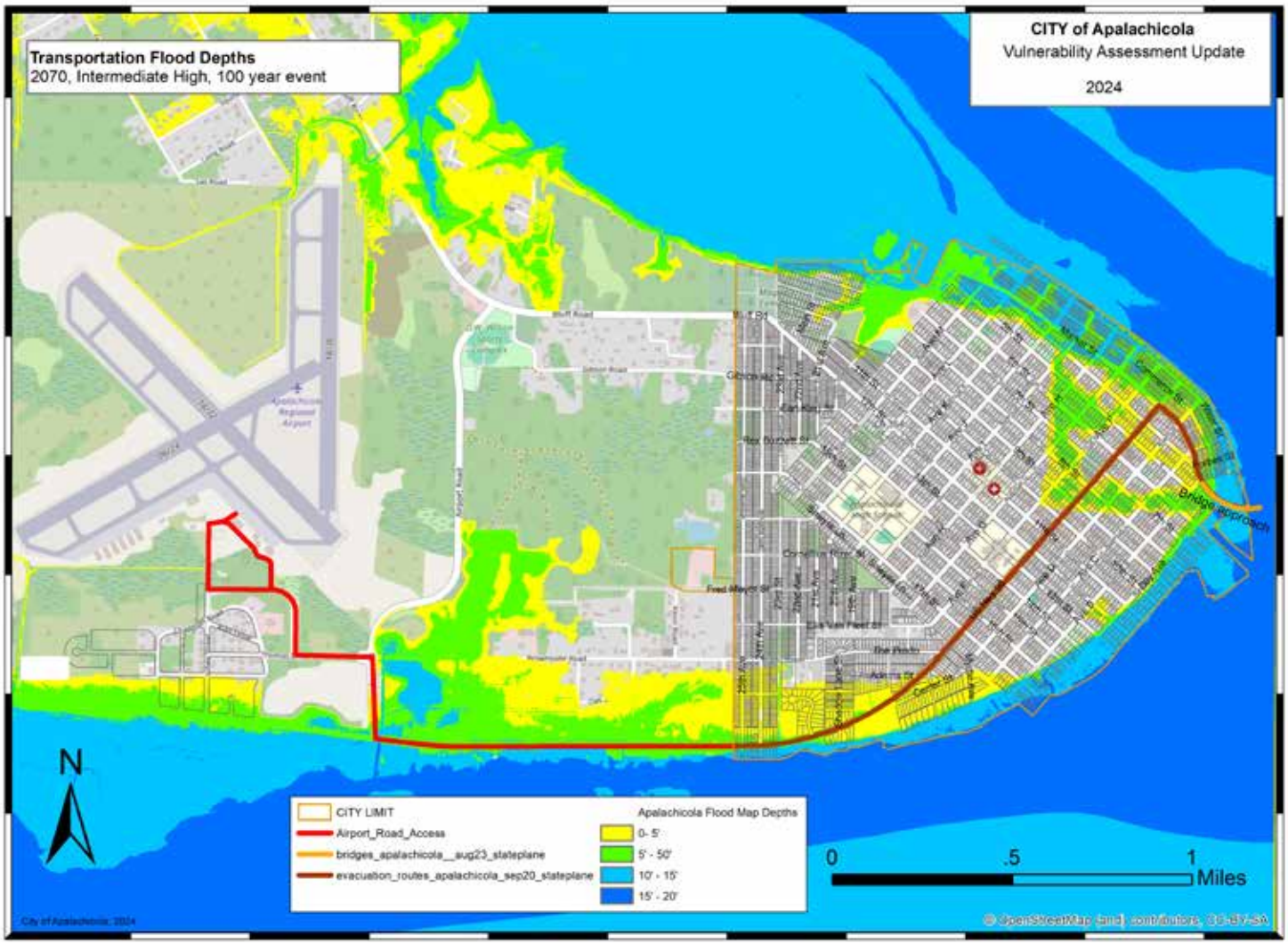
**Marinas**
All marinas are impacted by all storm surge events and to a lesser degree, all tidal events. It is assumed that boats moored there should be relocated prior to the storm. Boats not relocated could cause impacts that are well offsite of the marina and cause a delay in resuming operation of roadways. The impacts of marinas are considered as a given an any storm scenario.

**Map 215 -** Transportation Series (Airports, Bridges, Evacuation Routes) Depths 2040 IntLo 50 Year



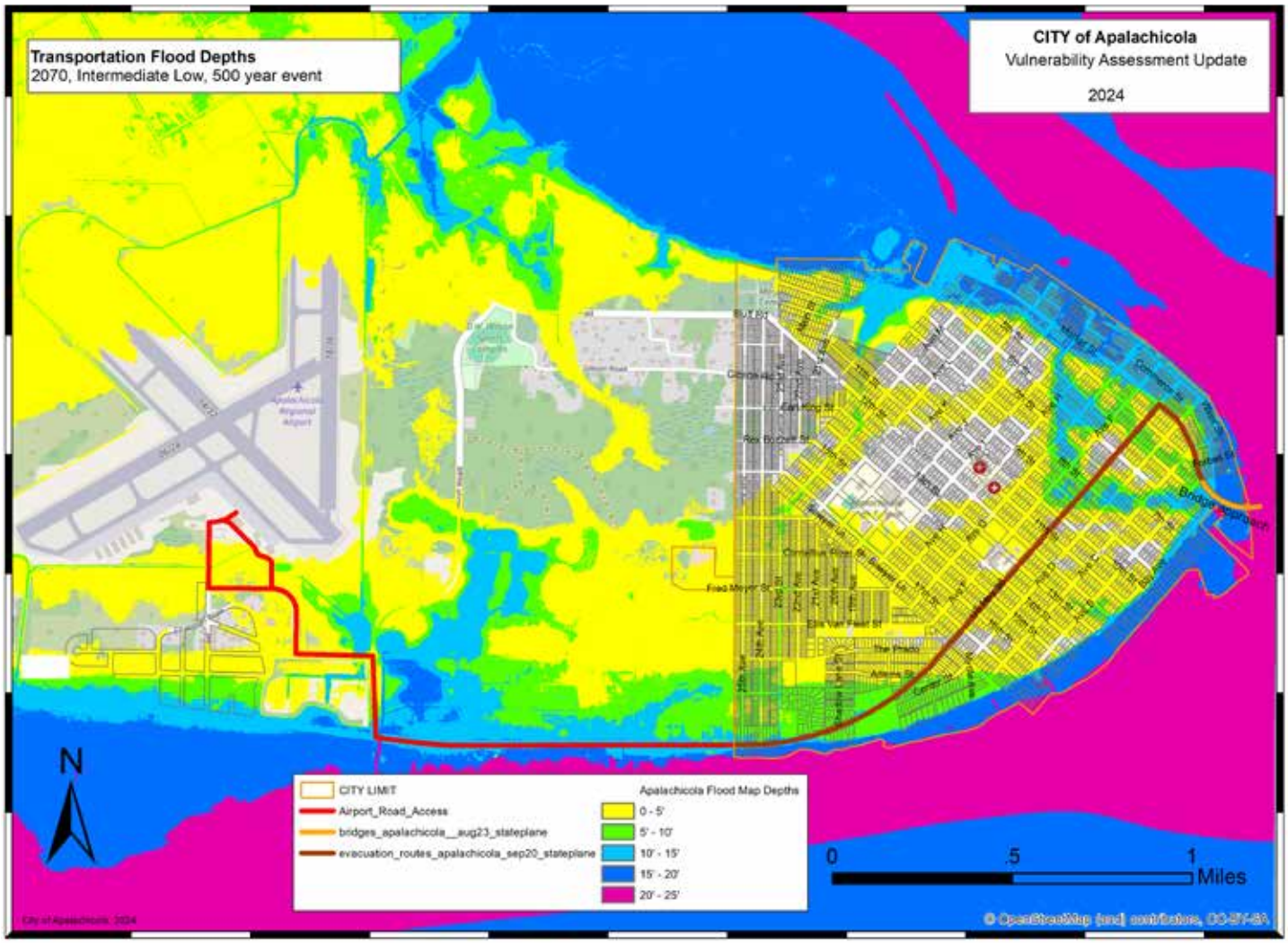

Map 215 represents a Low Risk Assessment (less than 25% Critical Assets Affected) within the Transportation Infrastructure Facilities Category for selected model run.

**Map 231 - Transportation Series Depths 2070 IntHi 100 Year**



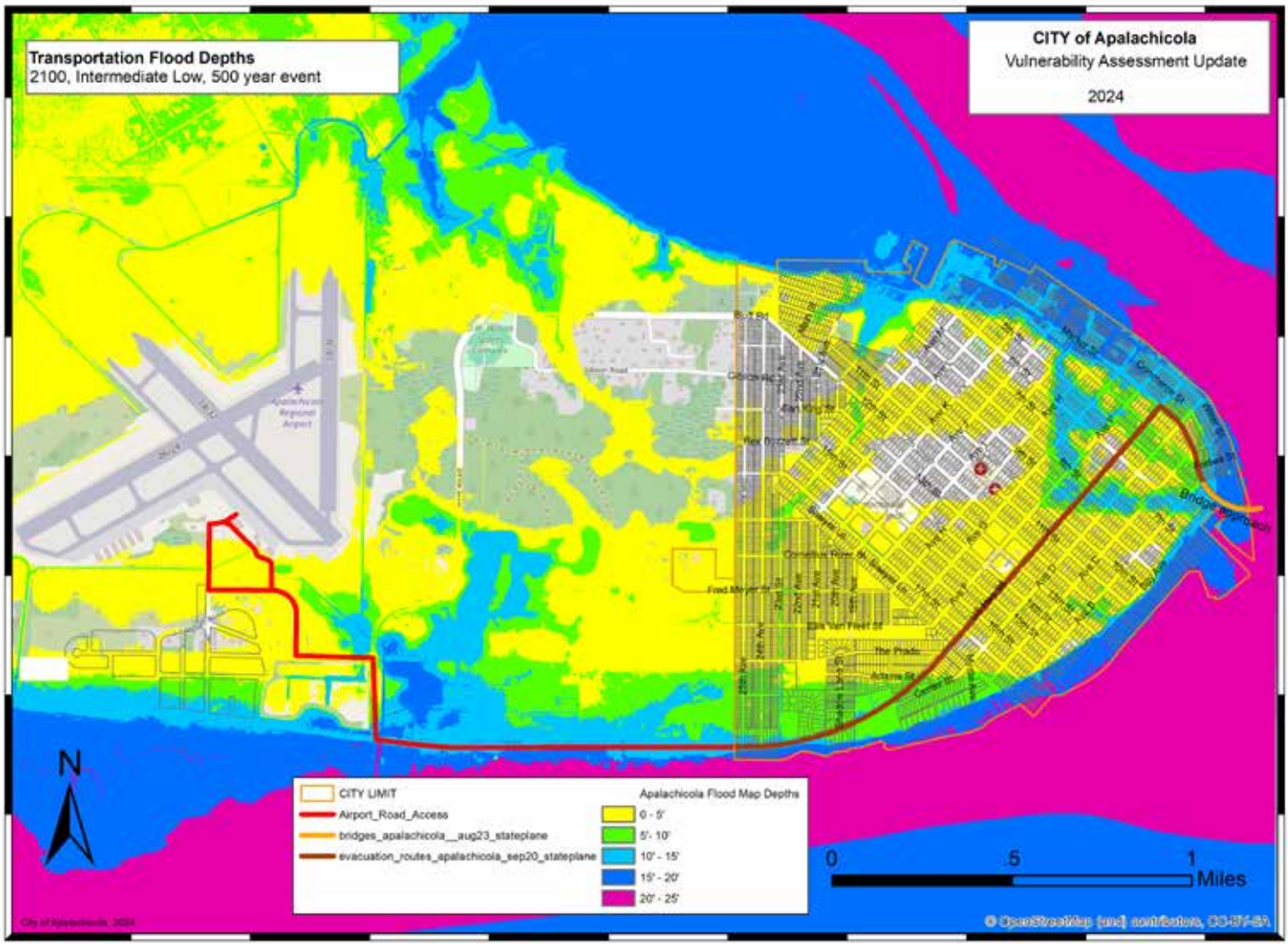

Map 231 represents a Medium Risk Assessment (between a 25-50% Critical Assets Affected) within the Transportation Infrastructure Facilities Category for selected model run.

**Map 227 -Transportation Series Depths 2070 IntLo 500**




Map 227 represents a High Risk Assessment (between a 50-75% Critical Assets Affected) within the Transportation Infrastructure Facilities Category for selected model run.

**Map 237 -** Transportation Series (Airports, Bridges, Evacuation Routes) Depths 2100 IntLo 500 Year




Map 237 represents an Extreme Risk Assessment (more than 75% Critical Assets Affected) within the Transportation Infrastructure Facilities Category for selected model run.

# Prioritized Assets

The City's assets projected to be impacted by flooding are prioritized by location and scenario in Table 66 ranging from medium to extreme. They have been prioritized by immediate need as they represent critical infrastructure assets.

**Table 66 (from Table series) Prioritized Assets by Location and Scenario**

| SCENARIO | CRITICAL ASSET CLASS | CRITICAL ASET TYPE | Focus Area Location | Risk Assessment |
|---|---|---|---|---|
| 2023_No-SLR_500-yr | | | | |
| | | Wastewater Treatment Facilities (1 unit) | 6 | Extreme |
| | | Wastewater Lift Stations (546 units) | 6 | High |
| | | Stormwater Treatment Facilities and Pump Stations (32 Outfalls) | 1, 3 | Extreme |
| | | Drinking Water Facilities (1 unit) | 6 | Extreme |
| | | Communication Facilities (2 units) | 1, 5 | Extreme |
| | Critical Community and Emergency Facilities | 20 units | | High |
| 2040_IntLo_100-yr | | | | |
| | Critical Infrastructure | | | |
| | | Wastewater Treatment Facilities (1 unit) | 6 | Extreme |
| | | Stormwater Treatment Facilities and Pump Stations (32 Outfalls) | 1, 3 | Extreme |
| 2040_IntLo_500-yr | | | | |
| | Critical Infrastructure | | | |
| | | Wastewater Treatment Facilities (1 unit) | 6 | Extreme |
| | | Wastewater Lift Stations (546 units) | 6 | Extreme |
| | | Stormwater Treatment Facilities and Pump Stations (32 Outfalls) | 1, 3 | Extreme |
| | | Drinking Water Facilities (1 unit) | 6 | Extreme |

## Table 66 (from Table series) Prioritized Assets by Location and Scenario

| SCENARIO | CRITICAL ASSET CLASS | CRITICAL ASET TYPE | Focus Area Location | Risk Assessment |
|---|---|---|---|---|
| | | Communication Facilities (2 units) | 1, 5 | Extreme |
| | Critical Community and Emergency Facilities | 20 units | 1, 5 | High |
| | Critical Community and Emergency Facilities | Affordable Public Housing (28 units) | 1, 5 | High |
| 2070_IntLo_50-yr | | | | |
| | Critical Infrastructure | | | |
| | | Stormwater Treatment Facilities and Pump Stations (32 Outfalls) | 1, 5 | Extreme |
| 2070_IntLo_100-yr | | | | |
| | Critical Infrastructure | | | |
| | | Wastewater Treatment Facilities (1 unit) | 6 | Extreme |
| | | Stormwater Treatment Facilities and Pump Stations (32 Outfalls) | 1, 3 | Extreme |
| 2070_IntLo_500-yr | | | | |
| | Critical Infrastructure | | | |
| | | Wastewater Treatment Facilities (1 unit) | 6 | Extreme |
| | | Wastewater Lift Stations (546 units) | 5 | Extreme |
| | | Stormwater Treatment Facilities and Pump Stations (32 Outfalls) | 1, 3 | Extreme |
| | | Drinking Water Facilities (1 unit) | 6 | Extreme |
| | | Communication Facilities (2 units) | 1, 5 | Extreme |
| | Critical Community and Emergency Facilities | 20 units | | Extreme |
| | Critical Community | Affordable Public Housing | | High |

| SCENARIO | CRITICAL ASSET CLASS | CRITICAL ASET TYPE | Focus Area Location | Risk Assessment |
|---|---|---|---|---|
| | and Emergency Facilities | (28 units) | | |
| | Natural, Cultural, and Historical Resources | Historical and Cultural Assets 49 | | High |
| 2100_IntLo_10-yr | | | 14.8 | |
| | | Stormwater Treatment Facilities and Pump Stations (32 Outfalls) | 1, 3 | High |
| 2100_IntLo_50-yr | | | 19.8 | |
| | | Stormwater Treatment Facilities and Pump Stations (32 Outfalls) | 1, 3 | Extreme |
| 2100_IntLo_100-yr | | | 28.6 | |
| | Critical Infrastructure | | | |
| | | Wastewater Treatment Facilities (1 unit) | 6 | Extreme |
| | | Wastewater Lift Stations (546 units) | 6 | Medium |
| | | Stormwater Treatment Facilities and Pump Stations (32 Outfalls) | 1, 3 | Extreme |
| 2100_IntLo_500-yr | | | | |
| | | Airports | | |
| | | Cleve Randolph Airport (970.8 acres) | 6 | High |
| | | Weems Heliport (0.23 acres) | | Extreme |
| | | Major Roadways | | Extreme |
| | Critical Infrastructure | | | |
| | | Wastewater Treatment Facilities (1 unit) | 6 | Extreme |
| | | Wastewater Lift Stations (546 units) | 6 | Extreme |
| | | Stormwater Treatment Facilities and Pump Stations (32 Outfalls) | 1, 3 | Extreme |
| | | Drinking Water | 6 | Extreme |

## Table 66 (from Table series) Prioritized Assets by Location and Scenario

| SCENARIO | CRITICAL ASSET CLASS | CRITICAL ASET TYPE | Focus Area Location | Risk Assessment |
|---|---|---|---|---|
| | | (1 unit) | | |
| | | Communication Facilities (2 units) | 1, 3 | Extreme |
| | Critical Community and Emergency Facilities | 20 units | 5 | Extreme |
| | Critical Community and Emergency Facilities | Affordable Public Housing (28 units) | 5 | Extreme |
| | Natural, Cultural, and Historical Resources | Historical and Cultural Assets 49 | 1, 2 | High |
| 2040_IntHi_100-yr | | | | |
| | Critical Infrastructure | | | |
| | | Wastewater Treatment Facilities (1 unit) | 6 | Extreme |
| | | Stormwater Treatment Facilities and Pump Stations (32 Outfalls) | 1, 3 | Extreme |
| 2040_IntHi_500-yr | | | | |
| | Transportation and Evacuation Routes | | | |
| | | Major Roadways | | High |
| | Critical Infrastructure | | | |
| | | Wastewater Treatment Facilities (1 unit) | 6 | Extreme |
| | | Wastewater Lift Stations (546 units) | 1, 5 | Extreme |
| | | Stormwater Treatment Facilities and Pump Stations (32 Outfalls) | 1, 3 | Extreme |
| | | Drinking Water Facilities (1 unit) | 6 | Extreme |
| | | Communication Facilities (2 units) | 1, 3 | Extreme |
| | Critical Community and Emergency Facilities | 20 units | | High |
| | Critical Community and Emergency Facilities | Affordable Public Housing (28 units) | | High |
| | Natural, Cultural, and Historical Resources | Historical and Cultural Assets 49 | 1, 2 | High |
| 2070_IntHi_10-yr | | | | |
| | Critical Infrastructure | | | |
| | | Stormwater Treatment Facilities and Pump Stations (32 Outfalls) | 1, 3 | High |
| 2070_IntHi_50-yr | | | | |
| | Critical Infrastructure | | | |
| | | Wastewater Treatment Facilities (1 unit) | 6 | Extreme |
| | | Stormwater Treatment Facilities and Pump Stations (32 Outfalls) | 6 | Extreme |
| 2070_IntHi_100-yr | | | | |
| | Critical Infrastructure | | | |
| | | Wastewater Treatment Facilities (1 unit) | | Extreme |
| | | Stormwater Treatment Facilities and Pump Stations (32 Outfalls) | | Extreme |
| | | Communication Facilities (2 units) | | Extreme |
| 2070_IntHi_500-yr | | | | |
| | Transportation and Evacuation Routes | | | |
| | | Airports | | |
| | | Cleve Randolph Airport (970.8 acres) | | High |
| | | Weems Heliport (0.23 acres) | | Extreme |
| | | Major Roadways | | Extreme |
| | Critical Infrastructure | | | |

## Table 66 (from Table series) Prioritized Assets by Location and Scenario

| SCENARIO | CRITICAL ASSET CLASS | CRITICAL ASET TYPE | Focus Area Location | Risk Assessment |
|---|---|---|---|---|
| | | Wastewater Treatment Facilities (1 unit) | 6 | Extreme |
| | | Wastewater Lift Stations (546 units) | 5 | Extreme |
| | | Stormwater Treatment Facilities and Pump Stations (32 Outfalls) | 1, 3 | Extreme |
| | | Drinking Water Facilities (1 unit) | 6 | Extreme |
| | | Communication Facilities (2 units) | 1, 3 | Extreme |
| | Critical Community and Emergency Facilities | 20 units | | Extreme |
| | Critical Community and Emergency Facilities | Affordable Public Housing (28 units) | 5 | Extreme |
| | Natural, Cultural, and Historical Resources | Historical and Cultural Assets 49 | 1, 2 | Extreme |
| 2100_IntHi_10-yr | | | | |
| | Critical Infrastructure | | | |
| | | Stormwater Treatment Facilities and Pump Stations (32 Outfalls) | 1, 3 | Extreme |
| 2100_IntHi_50-yr | | | | |
| | Critical Infrastructure | | | |
| | | Wastewater Treatment Facilities (1 unit) | 6 | Extreme |
| | | Stormwater Treatment Facilities and Pump Stations (32 Outfalls) | 1, 3 | Extreme |
| | | Communication Facilities (2 units) | | Extreme |
| 2100_IntHi_100-yr | | | | |
| | Critical Infrastructure | | | |

| SCENARIO | CRITICAL ASSET CLASS | CRITICAL ASET TYPE | Focus Area Location | Risk Assessment |
|---|---|---|---|---|
| | | Wastewater Treatment Facilities (1 unit) | | Extreme |
| | | Wastewater Lift Stations (546 units) | | High |
| | | Stormwater Treatment Facilities and Pump Stations (32 Outfalls) | | Extreme |
| | | Communication Facilities (2 units) | | Extreme |
| 2100_IntHi_500-yr | | | | |
| | Transportation and Evacuation Routes | | | |
| | | Airports | | |
| | | Cleve Randolph Airport (970.8 acres) | 6 | Extreme |
| | | Weems Heliport (0.23 acres) | 5 | Extreme |
| | | Major Roadways | 5 | Extreme |
| | Critical Infrastructure | | | |
| | | Wastewater Treatment Facilities (1 unit) | 6 | Extreme |
| | | Wastewater Lift Stations (546 units) | 6 | Extreme |
| | | Stormwater Treatment Facilities and Pump Stations (32 Outfalls) | 1, 3 | Extreme |
| | | Drinking Water Facilities (1 unit) | 6 | Extreme |
| | | Communication Facilities (2 units) | 1, 3 | Extreme |
| | Critical Community and Emergency Facilities | 20 units | | Extreme |
| | Critical Community and Emergency Facilities | Affordable Public Housing (28 units) | 5 | Extreme |
| | Natural, Cultural, and Historical Resources | Historical and Cultural Assets 49 | | Extreme |

# Zoning Parcel Impacts

In a public outreach meeting in which the project was discussed, commissioners of the Apalachicola City Commission requested that zoning lot impacts be included with the project. Table 68 (Appendix 2) documents impacts to zoning lots.

Zoning lot impacts are lots within the City of Apalachicola that are impacted by the various scenarios that are broken down by Zoning designation.

The zoning designations of the City of Apalachicola are:

C-1: General Commercial;
C-2: Neighborhood Commercial;
C-3: Highway Commercial;
C-4: Riverfront Commercial;
R-1: Single family Residential;
R-2: Multi-Family Residential;
R-3: Mobile Home Residential;
R-4: Mixed Use Residential;
OR: Office Residential;
RF: Riverfront;
RC: Research Conservation.

Lots impacted by the NOAA storm scenarios are shown in the Table Series and illustrated in the accompanying map series. Discussion of zoning impacts follows.

C-1: General Commercial – The C-1 district is located in the downtown area of Apalachicola. The district is generally moderately high, but parts are impacted by the 2100, Intermediate-High, Tidal scenario. The impacts by the storm scenarios are shown in the table above and in the accompanying maps.

C-2: Neighborhood Commercial – The C-2 zoning district is two small districts. One is located adjacent to Highway 98 in the central part of the city. The other is located surrounded by R-1 in the central part of the city. Both areas are on high land. No tidal scenarios impact either area. The impacts by the storm scenarios are shown in the table above and in the accompanying maps.

C-3: Highway Commercial – The C-3 district is located adjacent to Highway 98 on the west end of the city. The district is located on moderately high land. It is not impacted by any tidal scenario. The impacts by the storm scenarios are shown in the table above and in the accompanying maps.

C-4: Riverfront Commercial – The C-4 district is located on low lying land on the northeast part of the city. As such, it is impacted by most scenarios. The impacts by the storm scenarios are shown in the table above and in the accompanying maps.

R-1: Single family Residential – The R-1 zoning district is located in two broad areas of the city. The first is on the southeast side of the city. The second is in the central part of the city. The districts are very variable in elevation so impacts are very much location dependent. The area on the southeast side is impacted by all scenarios, however, the tidal scenario impacts are in the lower marsh areas that are platted as lots. The centrally located part of the district includes a low area that was once a creek. This area is easily discerned by looking at most scenarios. This area is impacted by no tidal scenarios, but impacts for most storm scenarios can be seen starting at the 2040, Intermediate-Low, 50 year storm. The impacts by the storm scenarios are shown in the table above and in the accompanying maps.

R-2: Multi-Family Residential – The R-2 zoning district is north of Highway 98 on the west part of the city. The land gradually increases in height with distance from the bayfront. The district is impacted by no tidal scenarios. The southern parts show more impacts than the northern parts due to elevation differences. The impacts by the storm scenarios are shown in the table above and in the accompanying maps.

R-3: Mobile Home Residential – The R-3 district is located north of the R-2 district in the west part of town. It is generally higher land. It is not impacted by any tidal scenarios. It increases in elevation with distance from the bayfront. The impacts by the storm scenarios are shown in the table above and in the accompanying maps.

R-4: Mixed Use Residential – The R-4 district is a small district located on higher land. The district is not impacted by tidal scenarios and is only impacted by the most severe storms. The impacts by the storm scenarios are shown in the table above and in the accompanying maps.

OR: Office Residential – The OR district straddles Highway 98 for most of the city. Generally higher in elevation, there are some moderately high areas, as well. Impacted by no tidal scenarios, it is impacted by the most severe storms. The impacts by the storm scenarios are shown in Table 68 and in the accompanying maps.

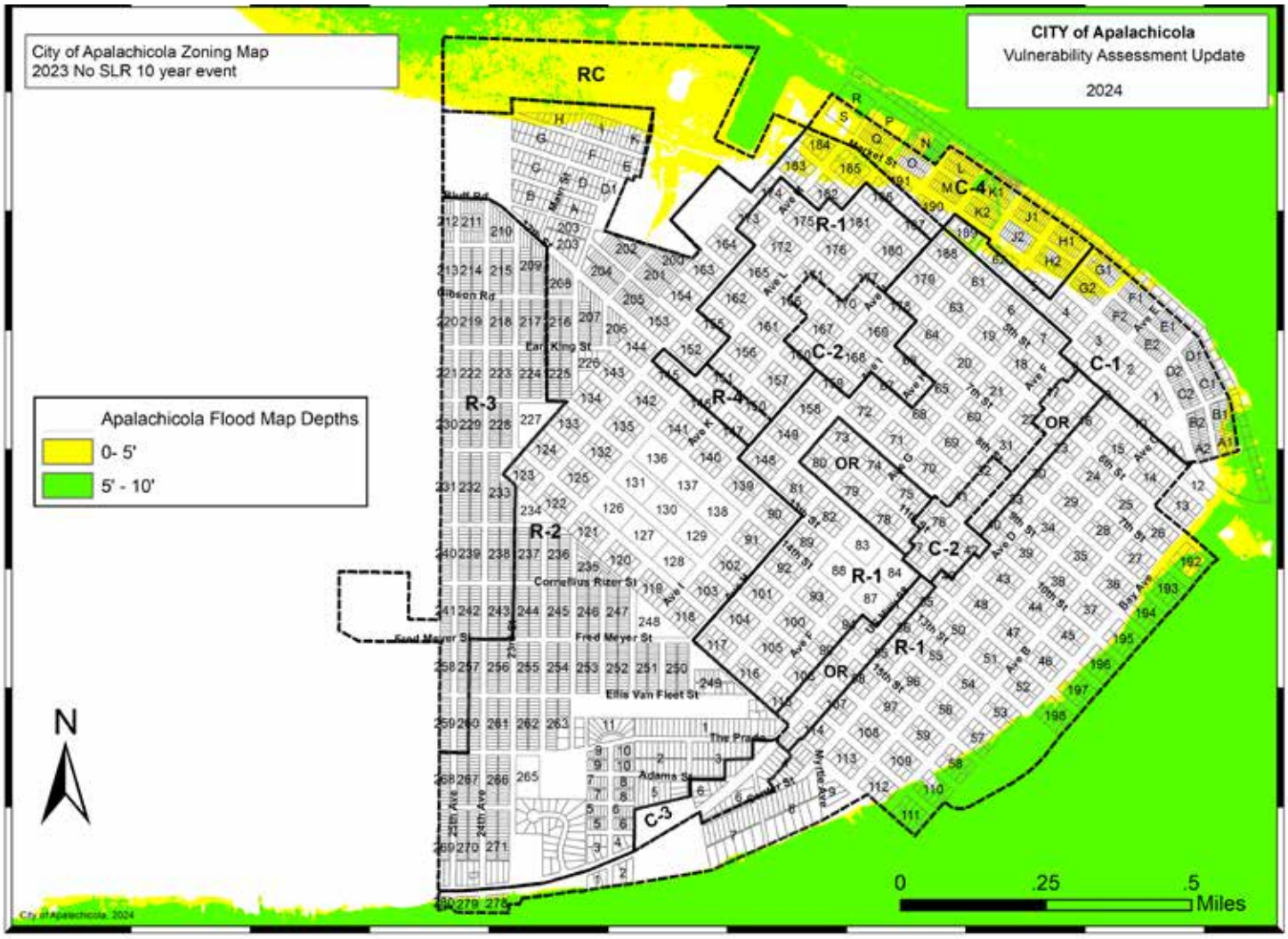
RF: Riverfront – The RF district is along the river on the northeastern shore. The land is low and impacted in all tidal and storm scenarios. The impacts by the storm scenarios are shown in the table above and in the accompanying maps.

RC: Research Conservation - The RC district is mostly along the river on the northern shore. It includes an area that slopes much higher in elevation to a bluff over the river. The land near the river is low and impacted in almost all tidal and storm scenarios. The bluff area, however is only impacted by the most severe storm scenarios. The impacts by the storm scenarios are shown in Table 68 and in the accompanying maps.

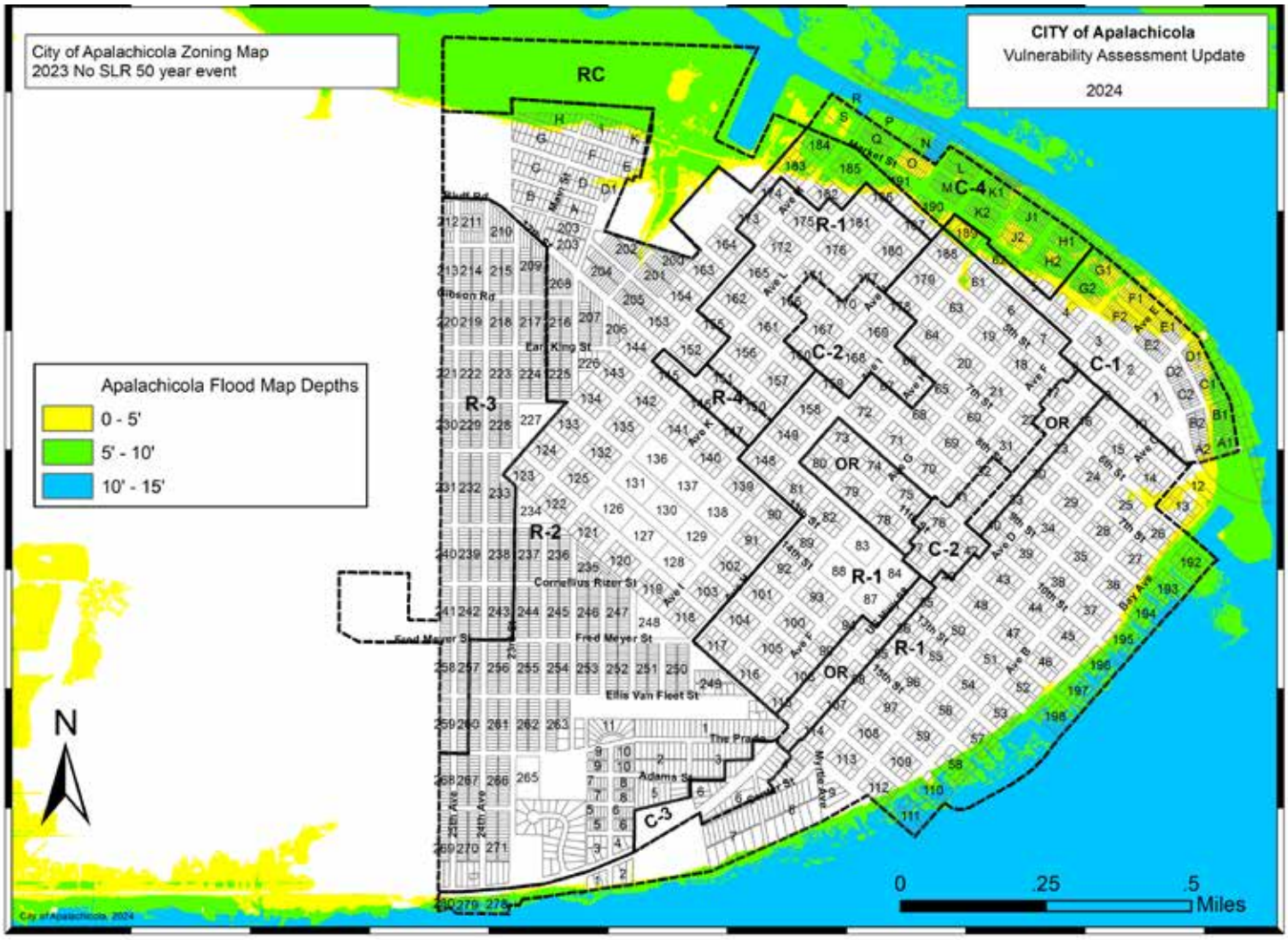
**Table 68 Zoning Parcel Impacts - Depth**

| SCENARIOS | R-3 | R-3 Depth | R-4 | R-4 Depth | OR | OR Depth | RF | RF Depth | RC-SF | RC-ACRES | RC Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2023_No_SLR_10-yr | 0 | None | 0 | None | 0 | None | 115 | 0-10’ | 2,038,355.10 | 46.79 | 0-10’ |
| 2023_No-SLR_50-yr | 0 | None | 0 | None | 0 | None | 132 | 5’-15’ | 2,348,910.60 | 53.92 | 0-10’ |
| 2023_No-SLR_100-yr | 0 | None | 0 | None | 8 | 0-5’ | 132 | 5’-15’ | 2,408,719.08 | 55.30 | 0-15’ |
| 2023_No-SLR_500-yr | 269 | 0-5’ | 4 | 0-5’ | 87 | 0-10’ | 132 | 10’-20’ | 2,536,272.84 | 58.22 | 0-20’ |
| 2023_NoSLR_Tidal | 0 | None | 0 | None | 0 | None | 34 | 0-5’ | 1,858.49 | 0.04 | None |
| 2040_IntLo_10-yr | 0 | None | 0 | None | 0 | None | 118 | 0-10’ | 2,105,636.26 | 48.34 | 0-10’ |
| 2040_IntLo_50-yr | 0 | None | 0 | None | 0 | None | 132 | 0-15’ | 2,360,802.83 | 54.20 | 0-10’ |
| 2040_IntLo_100-yr | 0 | None | 0 | None | 8 | 0-5’ | 132 | 5’-15’ | 2,413,916.53 | 55.42 | 0-15’ |
| 2040_IntLo_500-yr | 275 | 0-10’ | 4 | 0-5’ | 95 | 0-10’ | 132 | 10’-20’ | 2,545,624.46 | 58.44 | 10’-20’ |
| 2040_IntLo_Tidal | 0 | None | 0 | None | 0 | None | 36 | 0-5’ | 2,281.63 | 0.05 | None |
| 2070_IntLo_10-yr | 0 | None | 0 | None | 0 | None | 124 | 0-10’ | 2,186,799.37 | 50.20 | 0-10’ |
| 2070_IntLo_50-yr | 0 | None | 0 | None | 0 | None | 132 | 10’-15’ | 2,379,292.53 | 54.62 | 0-10’ |
| 2070_IntLo_100-yr | 0 | None | 0 | None | 10 | 0-5’ | 132 | 5’-15’ | 2,424,247.80 | 55.65 | 0-15’ |
| 2070_IntLo_500-yr | 285 | 0-10’ | 8 | 0-5’ | 102 | 0-15’ | 132 | 10’-20’ | 2,563,811.35 | 58.86 | 0-20’ |
| 2070_IntLo_Tidal | 0 | None | 0 | None | 0 | None | 48 | 0-5’ | 6,193.00 | 0.14 | None |
| 2100_IntLo_10-yr | 0 | None | 0 | None | 0 | None | 124 | 0-10’ | 2,245,545.45 | 51.55 | 0-10’ |
| 2100_IntLo_50-yr | 0 | None | 0 | None | 0 | None | 132 | 5’-15’ | 2,393,488.92 | 54.95 | 0-10’ |
| 2100_IntLo_100-yr | 0 | None | 0 | None | 11 | 0-10’ | 132 | 5’-15’ | 2,433,323.96 | 55.86 | 0-15’ |
| 2100_IntLo_500-yr | 396 | 0-10’ | 13 | 0-5’ | 108 | 0-15’ | 132 | 10’-20’ | 2,585,623.30 | 59.36 | 0-20’ |
| 2100_IntLo_Tidal | 0 | None | 0 | None | 0 | None | 61 | 0-5’ | 62,015.55 | 1.42 | 0-5’ |
| **SCENARIOS** | **R-3** | **R-3 Depth** | **R-4** | **R-4 Depth** | **OR** | **OR Depth** | **RF** | **RF Depth** | **RC-SF** | **RC-ACRES** | **RC Depth** |
| 2040_IntHi_10-yr | 0 | None | 0 | None | 0 | None | 124 | 0-10’ | 2,151,522.96 | 49.39 | 0-10’ |
| 2040_IntHi_50-yr | 0 | None | 0 | None | 0 | None | 132 | 0-15’ | 2,371,268.38 | 54.44 | 0-15’ |
| **ZONING LOT IMPACTS** | | | | | | | | | | | |
| **SCENARIOS** | **R-3** | **R-3 Depth** | **R-4** | **R-4 Depth** | **OR** | **OR Depth** | **RF** | **RF Depth** | **RC-SF** | **RC-ACRES** | **RC Depth** |
| 2040_IntHi_100-yr | 0 | None | 0 | None | 9 | 0-5’ | 132 | 5’-15’ | 2,418,803.75 | 55.53 | 0-15’ |
| 2040_IntHi_500-yr | 281 | 0-10’ | 6 | 0-5’ | 99 | 0-15’ | 132 | 10’-20’ | 2,554,010.79 | 58.63 | 0-20’ |
| 2040_IntHi_Tidal | 0 | None | 0 | None | 0 | None | 40 | 0-5’ | 3,483.80 | 0.08 | None |
| 2070_IntHi_10-yr | 0 | None | 0 | None | 0 | None | 125 | 0-10’ | 2,313,482.23 | 53.11 | 0-10’ |
| 2070_IntHi_50-yr | 0 | None | 0 | None | 8 | 0-5’ | 132 | 5’-15’ | 2,413,030.25 | 55.40 | 0-15’ |
| 2070_IntHi_100-yr | 0 | None | 0 | None | 16 | 0-10’ | 132 | 5’-15’ | 2,447,225.31 | 56.18 | 0-15’ |
| 2070_IntHi_500-yr | 564 | 0-10’ | 20 | 0-5’ | 125 | 0-15’ | 132 | 15’-25’ | 2,630,085.20 | 60.38 | 0-20’ |
| 2070_IntHi_Tidal | 0 | None | 0 | None | 0 | None | 88 | 0-5’ | 1,055,161.85 | 24.22 | 0-5’ |
| 2100_IntHi_10-yr | 0 | None | 0 | None | 5 | 0-5’ | 132 | 5’-15’ | 2,401,091.05 | 55.12 | 0-15’ |
| 2100_IntHi_50-yr | 0 | None | 0 | None | 18 | 0-10’ | 132 | 5’-15’ | 2,453,296.65 | 56.32 | 0-15’ |
| 2100_IntHi_100-yr | 112 | 0-5’ | 1 | None | 50 | 0-10’ | 132 | 10’-20’ | 2,492,643.34 | 57.22 | 0-20’ |
| 2100_IntHi_500-yr | 735 | 0-10’ | 25 | 0-10’ | 139 | 0-15’ | 132 | 15’-25’ | 2,651,511.58 | 60.87 | 0-25’ |
| 2100_IntHi_Tidal | 0 | None | 0 | None | 0 | None | 118 | 0-10’ | 2,092,101.32 | 48.03 | 0-10’ |

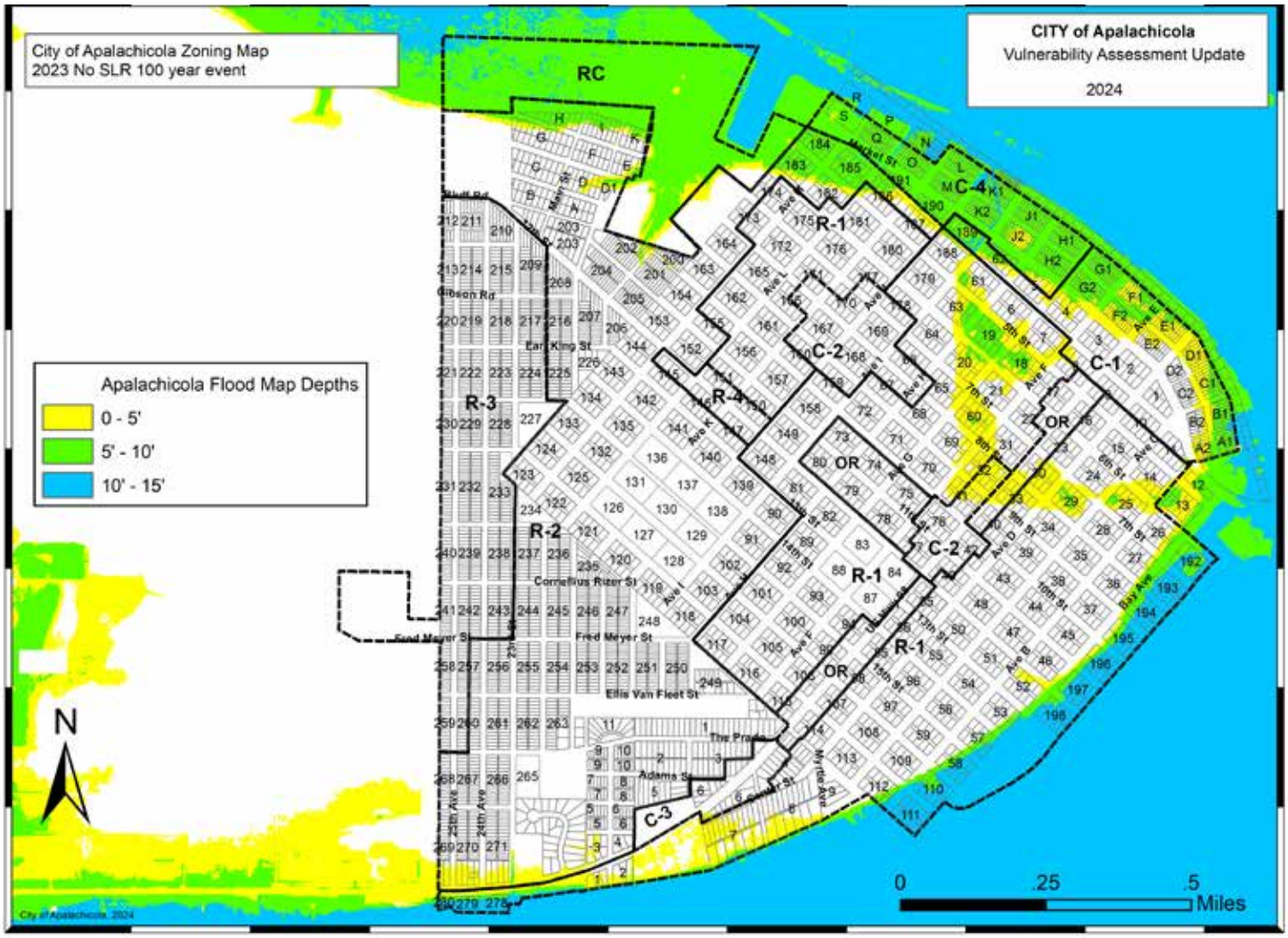
**Map 336 - Zoning - 2023 No SLR 10-Yr Inundation**



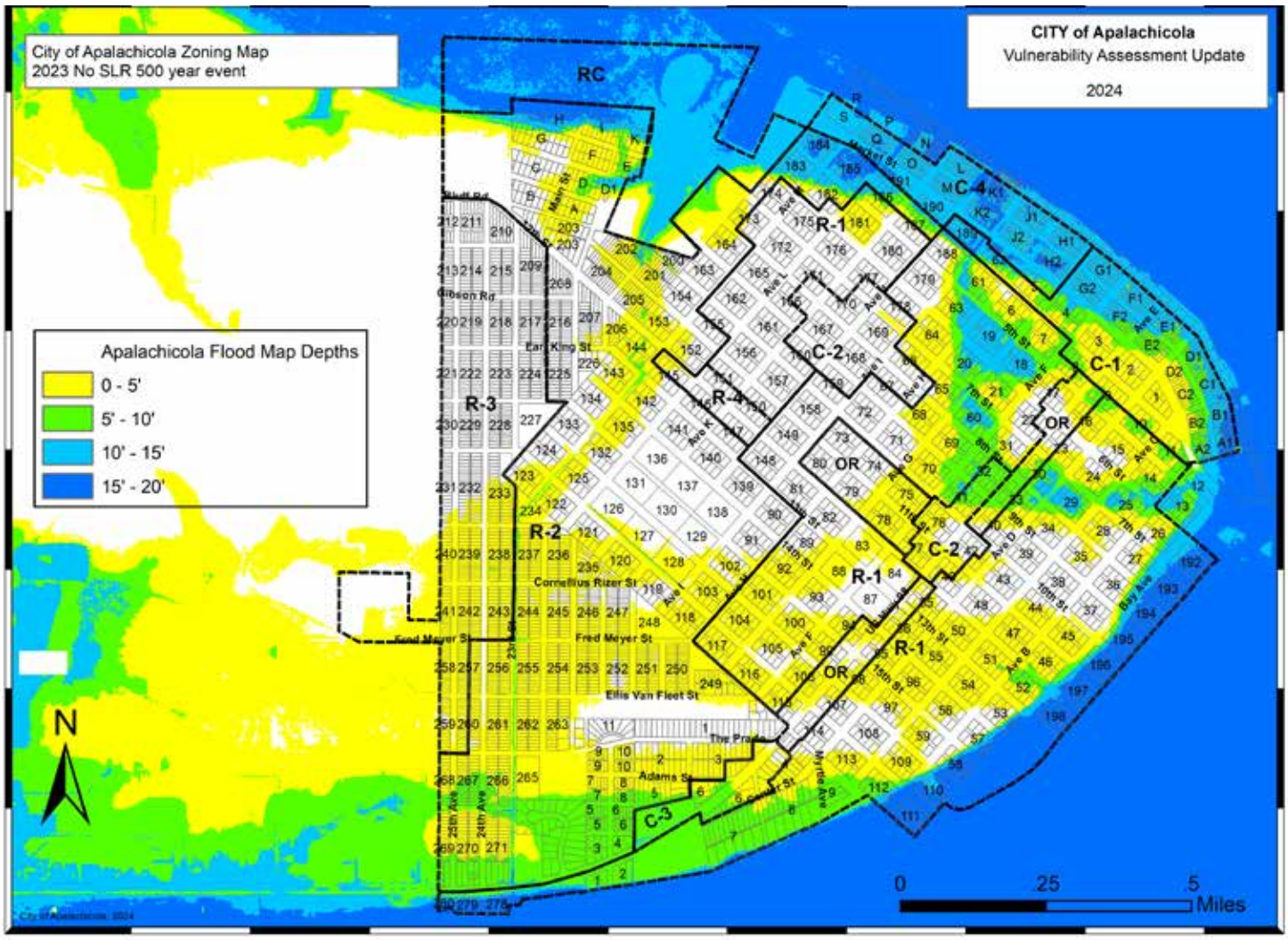
**Map 337 - Zoning - 2023 No SLR 50-Yr Inundation**



**Map 338 - Zoning - 2023 No SLR 100-Yr Inundation**



**Map 339 - Zoning - 2023 No SLR 500-Yr Inundation**



# Economic Impacts

Table 67 (Appendix 2 - Tables) shows the economic impact of the various storm surge scenarios to structures in the City of Apalachicola. It should be noted that dollar values shown in the table are estimates and do not reflect local labor costs and should be adjusted for inflation to the cost of building materials.

The table is arranged by storm scenario and shows losses in dollars, number of structures impacted, tax base impact in dollars and as a percentage, and number of households at risk of displacement.

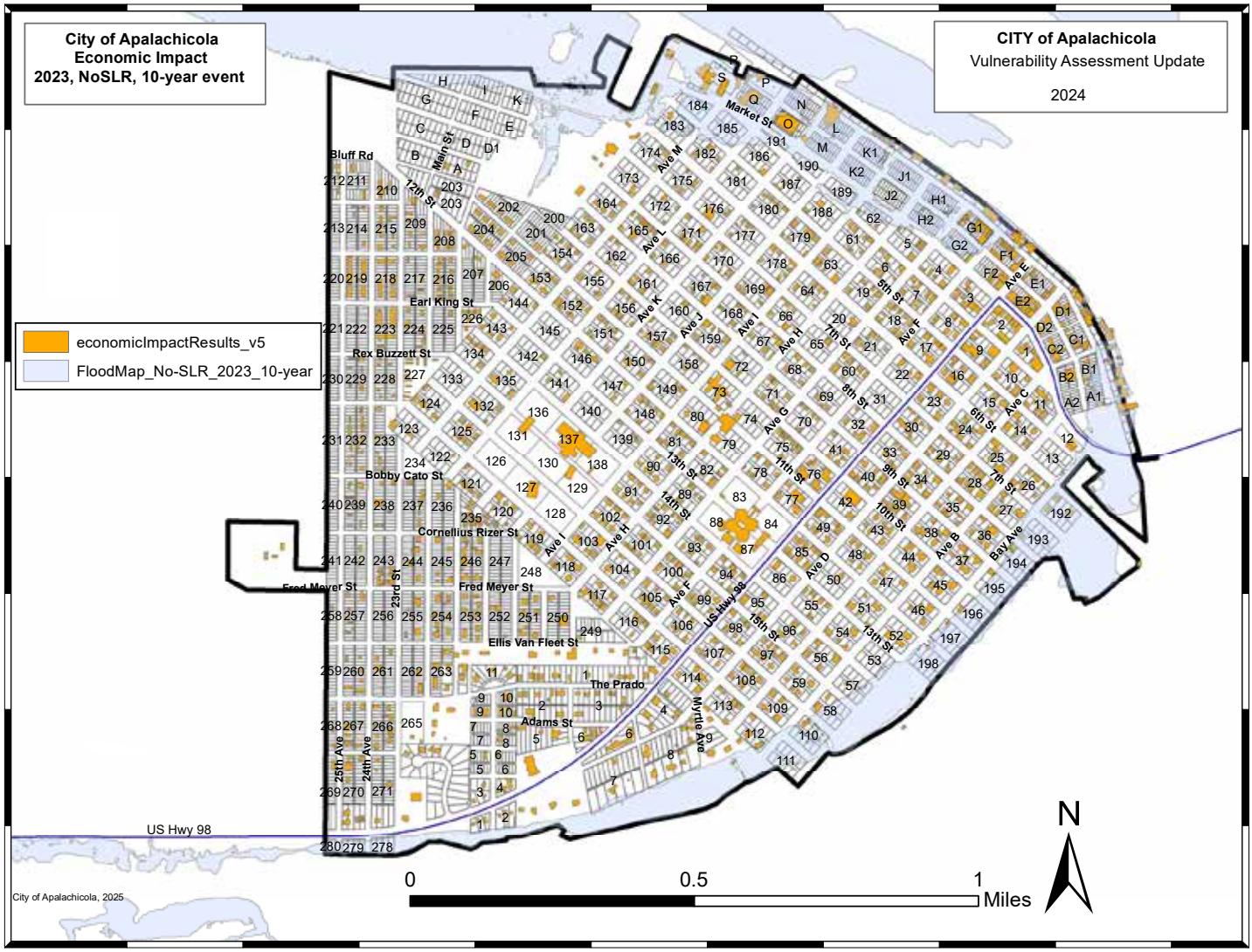
The table shows that, as anticipated, all costs and loss increase with storm severity. The lowest losses being those of tidal impacts and increasing with storm severity with the highest being those of a 500-year storm.

The table was developed by High Tide Intelligence from USACE and insurance industry sources to be used as a baseline for anticipated economic impacts for future storm surge events.

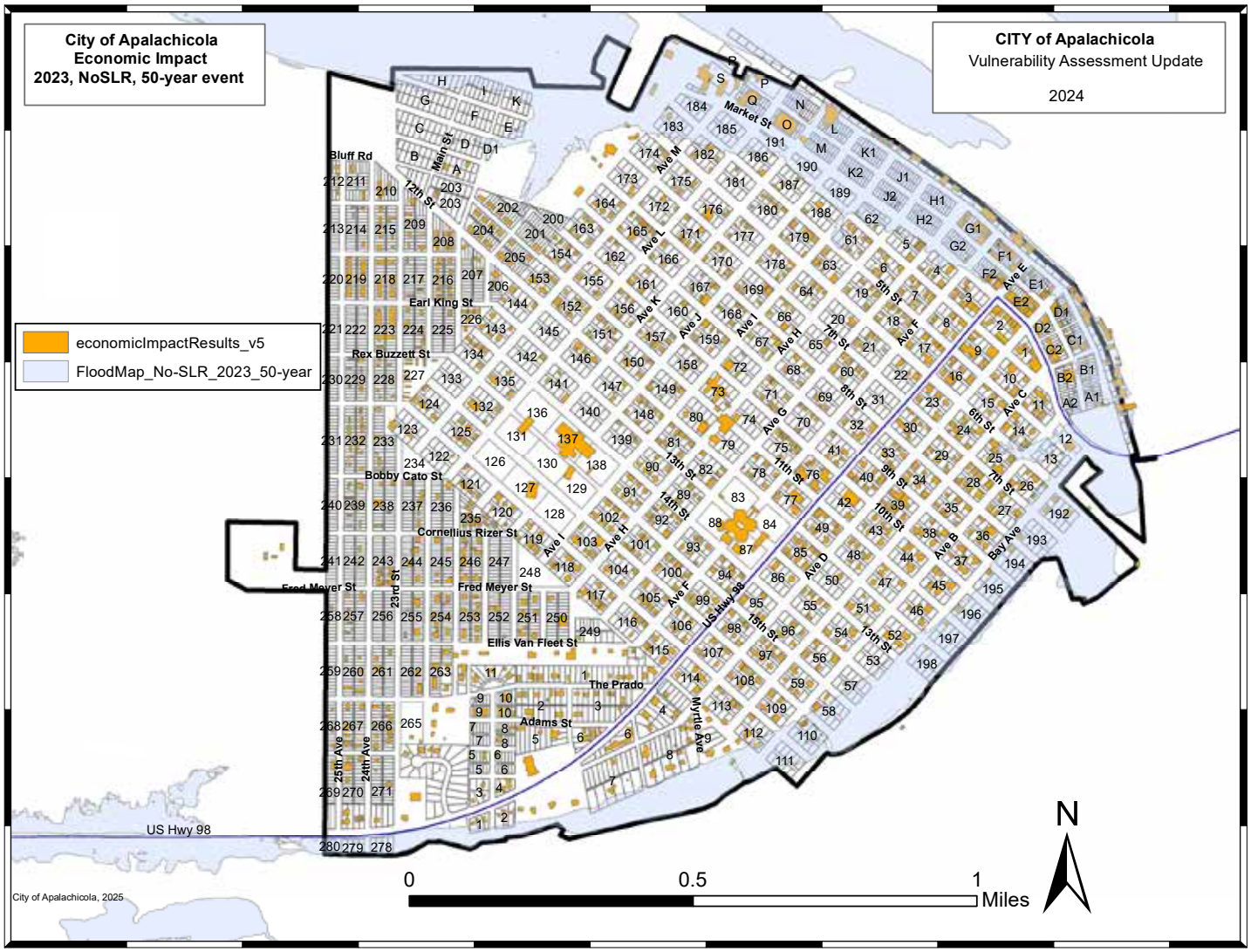
**Table 67 Economic Impacts**

| Sea Level Rise Scenario | Aggregate Economic Loss | Number of Total Loss Buildings | Aggregate Tax Impact | Aggregate Tax Impact Percent | Number of Households at Risk of Displacement |
|---|---|---|---|---|---|
| **2023, No-SLR, Tidal Flooding** | $1,246,972 | 31 | $1,239 | 0.1 | 829 |
| **2023, No-SLR, 10-year event** | $6,005,377 | 58 | $13,678 | 1.3 | 832 |
| **2023, No-SLR, 50-year event** | $14,934,652 | 104 | $42,072 | 3.9 | 834 |
| **2023, No-SLR, 100-year event** | $25,822,016 | 179 | $91,065 | 8.4 | 866 |
| **2023, No-SLR, 500-year event** | $84,110,861 | 629 | $354,237 | 32.9 | 1088 |
| **2040, Int High, Tidal Flooding** | $1,308,630 | 31 | $1,239 | 0.1 | 829 |
| **2040, Int High, 10-year event** | $8,232,613 | 75 | $26,300 | 2.4 | 832 |
| **2040, Int High, 50-year event** | $19,074,486 | 127 | $59,768 | 5.5 | 837 |
| **2040, Int High, 100-year event** | $29,167,501 | 208 | $110,310 | 10.2 | 885 |
| **2040, Int High, 500-year event** | $95,852,637 | 727 | $407,910 | 37.8 | 1132 |
| **2070, Int High, Tidal Flooding** | $1,776,456 | 32 | $1,625 | 0.2 | 829 |
| **2070, Int High, 10-year event** | $12,973,568 | 97 | $38,050 | 3.5 | 833 |
| **2070, Int High, 50-year event** | $27,022,081 | 185 | $95,141 | 8.8 | 871 |
| **2070, Int High, 100-year event** | $41,292,316 | 282 | $154,408 | 14.3 | 933 |
| **2070, Int High, 500-year event** | $137,651,438 | 1100 | $609,042 | 56.5 | 1222 |
| **2100, Int High, Tidal Flooding** | $6,555,975 | 64 | $15,672 | 1.5 | 832 |
| **2100, Int High, 10-year event** | $23,980,684 | 161 | $77,209 | 7.2 | 860 |
| **2100, Int High, 50-year event** | $44,230,022 | 298 | $166,294 | 15.4 | 941 |
| **2100, Int High, 100-year event** | $61,590,035 | 411 | $243,892 | 22.6 | 1007 |
| **2100, Int High, 500-year event** | $202,501,071 | 1437 | $830,675 | 77 | 1231 |
| **2040, Int Low, Tidal Flooding** | $1,271,328 | 31 | $1,239 | 0.1 | 829 |
| **2040, Int Low, 10-year event** | $6,806,589 | 64 | $15,672 | 1.5 | 832 |
| **2040, Int Low, 50-year event** | $16,958,304 | 117 | $51,290 | 4.8 | 836 |
| **2040, Int Low, 100-year event** | $27,180,067 | 187 | $97,816 | 9.1 | 873 |
| **2040, Int Low, 500-year event** | $89,849,638 | 681 | $386,073 | 35.8 | 1104 |
| **2070, Int Low, Tidal Flooding** | $1,353,313 | 32 | $1,625 | 0.2 | 829 |
| **2070, Int Low, 10-year event** | $9,151,781 | 76 | $28,480 | 2.6 | 832 |
| **2070, Int Low, 50-year event** | $20,038,498 | 133 | $61,916 | 5.7 | 839 |

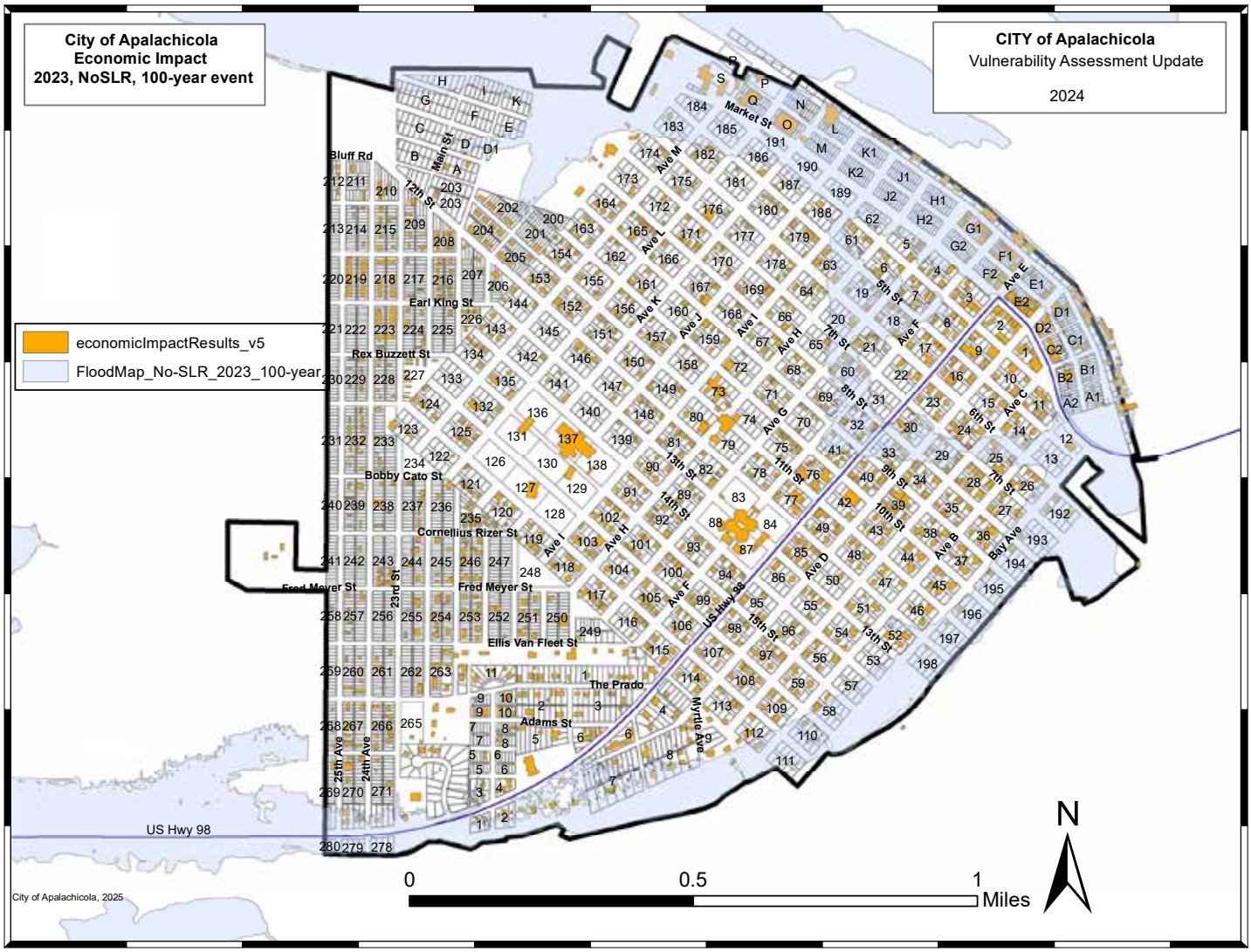
## Map 340 - Economic Impacts - 2023 No SLR 10-Yr Inundation



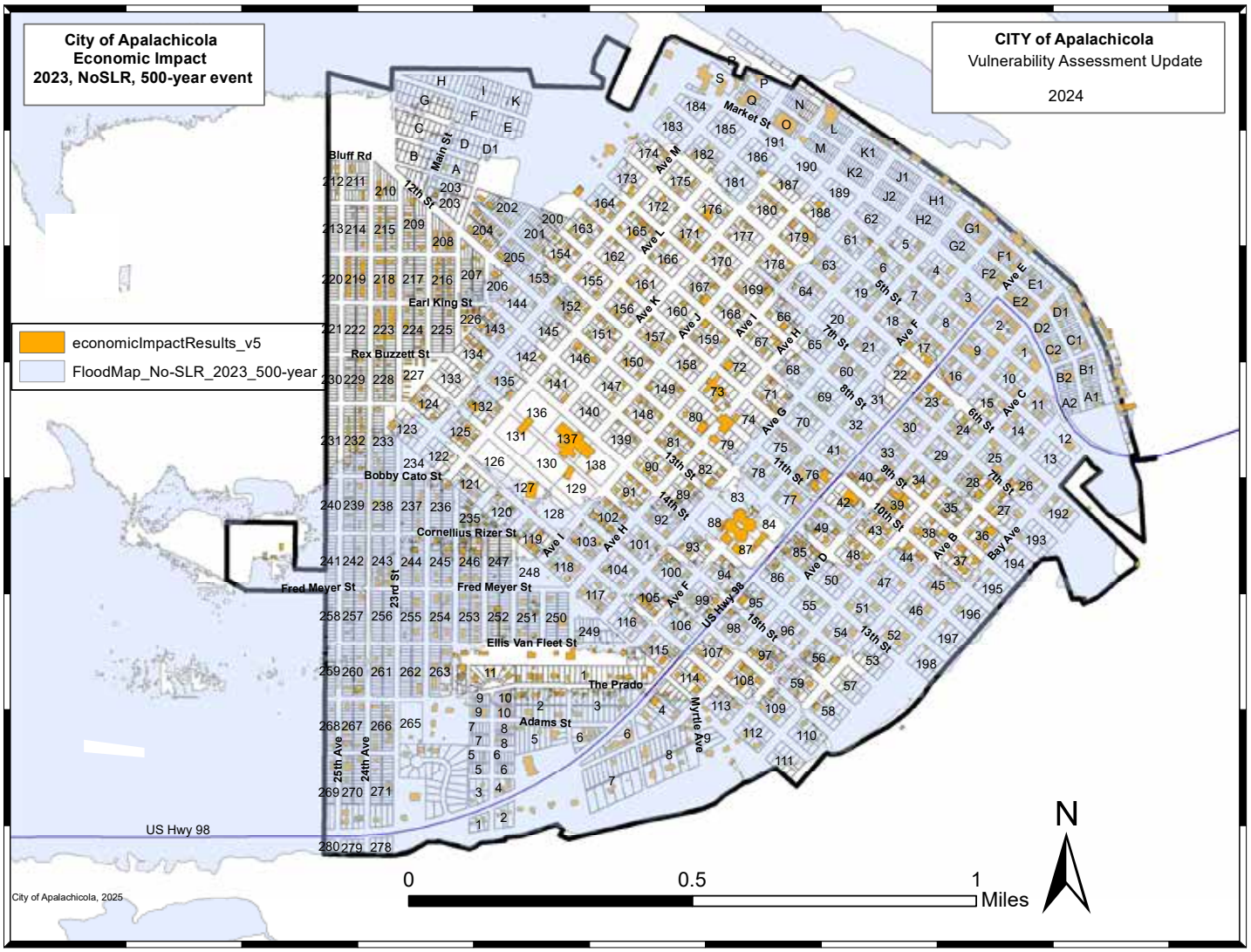
## Map 341 - Economic Impacts - 2023 No SLR 50-Yr Inundation



## Map 342 - Economic Impacts - 2023 No SLR 100-Yr Inundation



## Map 343 - Economic Impacts - 2023 No SLR 500-Yr Inundation



# Focus Area Analysis

**Task 4 - Sensitivity Analysis**

**Description:** The Grantee will perform the sensitivity analysis to measure the impact of flooding on assets and to apply the data from the exposure analysis to the inventory of critical assets created in the Exposure Analysis Task. The sensitivity analysis should include an evaluation of the impact of flood severity on each asset type and at each flood scenario and assign a risk level based on percentages of land area inundated and number of critical assets affected.

**Deliverables:** The Grantee will provide the following:
4.1: A draft VA report that provides details on the findings of the exposure analysis and the sensitivity analysis, and includes visual presentation of the data via maps and tables, based on the statutory-required scenarios and standards; and
4.2: An initial list of critical and regionally significant assets that are impacted by flooding, prioritized by area or immediate need, specifying for each asset which flood scenario(s) it was impacted by. The list of critical and regionally-significant assets must be prioritized by area or immediate need and must identify which flood scenario(s) impacts each asset.

## Focus Area Identification

In 2017, the City considered that the the downtown commercial district could be considered a focus area for adaptation planning. Understandably, the downtown district was the area adjacent to the riverfront and susceptible to tidal and surge flooding during storm events.

## Justification

The 2024 updated analysis identifies six separate focus areas that contain critical assets important to the City. Apalachicola's updated Exposure Analysis Map and Table series provides an illustrative look at each storm scenario and the potential impact to land area and assets.

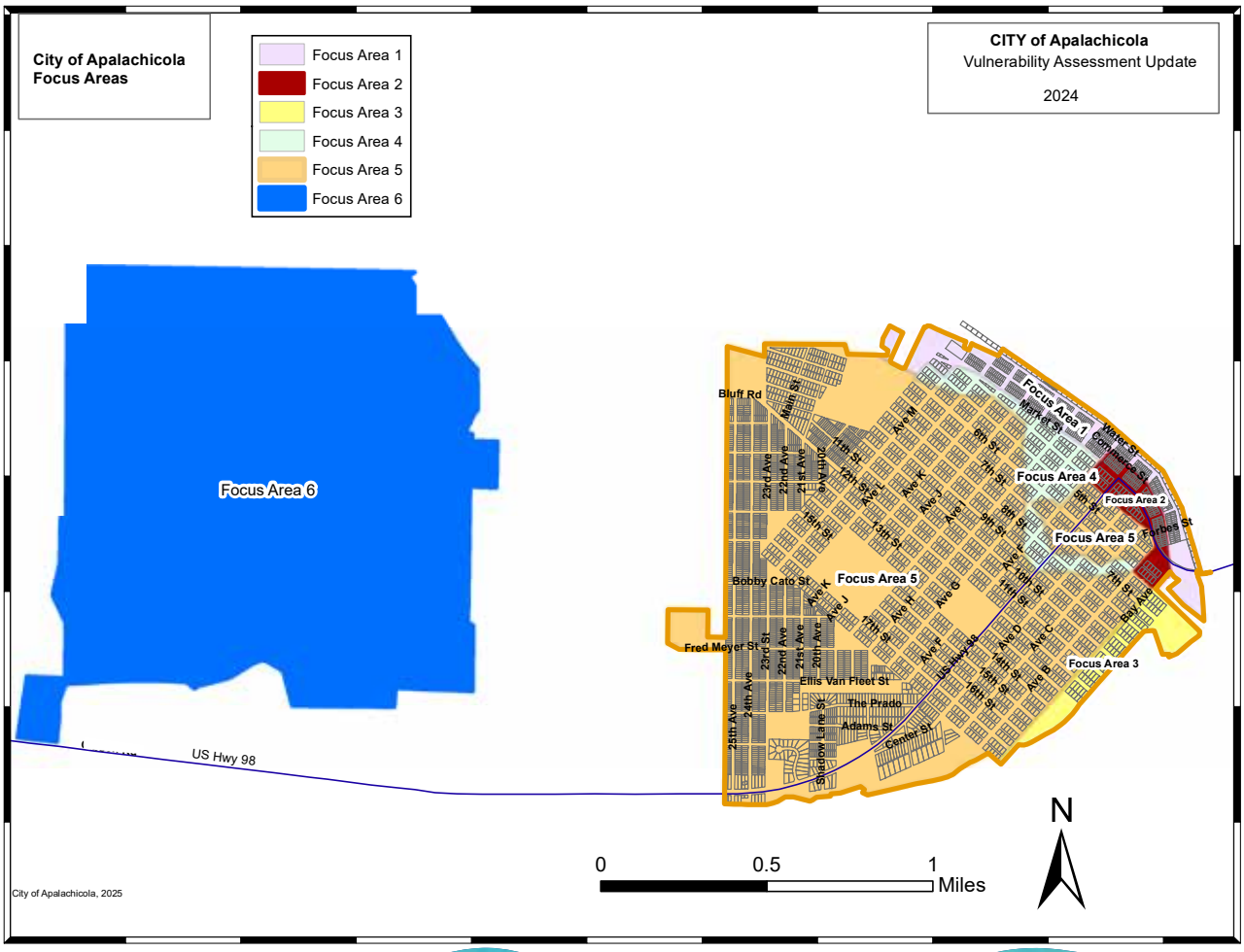
This data, along with elevation data, was used to establish the risk assessment ranking and used to update the focus areas first identified in the 2017 Vulnerability Assessment.

Three of the six Focus Areas are at the lower elevation areas of town. However, each Focus Area, ranked by vulnerability to storm surge flooding, has also been prioritized by the number and importance of the publicly-owned assets contained within each area. A synopsis of flood probabilities and effect upon assets is provided for each Focus Area. It should be noted that in a small town, such as Apalachicola, a higher ranking should not be considered as less of a consideration when managing vulnerable assets.

The 2024 updated analysis identifies six separate focus areas that contain critical assets important to the City. Each focus area, ranked by vulnerability to storm surge flooding, has also been prioritized by the number and importance of the publicly-owned assets contained within each area.

Assets that are contained within the Focus Areas drive the rankings. As all Focus Areas contain some assets such as Major Roads and Vacuum Lift Stations, these are of less

**Map 313 Focus Area Citywide**



consideration in ranking the Focus Areas that other assets. The City will have a plan to manage vacuum lift stations, regardless of which Focus Area is involved. The same applies to Major Roads and Stormwater Outfalls.

The Focus Areas are ranked from 1 to 6 in priority in the Table 70 (Appendix 2). A justification for their prioritization is found within the discussion that follows impacts to assets.

1: Focus Area #5 As a result of Focus Area #5 containing so many of the City's assets, it ranks the highest. The area is impacted by major storm surge events.
2: Focus Area #6 As a result of Focus Are #6 containing 3 critical facilities, it also ranks highly. The area is impacted by major storm surge events.
3: Focus Area #2 Focus Area #2 contains assets that rank the area highly. The area is essentially tied with Focus Area #1.
4: Focus Area #1 Focus Area #1 contains assets that rank the area highly. The area is essentially tied with Focus Area #2.
5: Focus Area #4 Focus Area #4 contains 1 Historic and Cultural Asset and is ranked lower. As stated above the Vacuum Pump Station will be considered separately.
6: Focus Area #3 Even though the area is prone to storm surge, it contains no assets considered in this report.

**Table 70 Ranking of Focus Areas by Vulnerability**

| Focus Area | Priority Ranking |
|---|---|
| 1 | 5 |
| 2 | 6 |
| 3 | 2 |
| 4 | 1 |
| 5 | 4 |
| 6 | 3 |

## FOCUS AREA 1

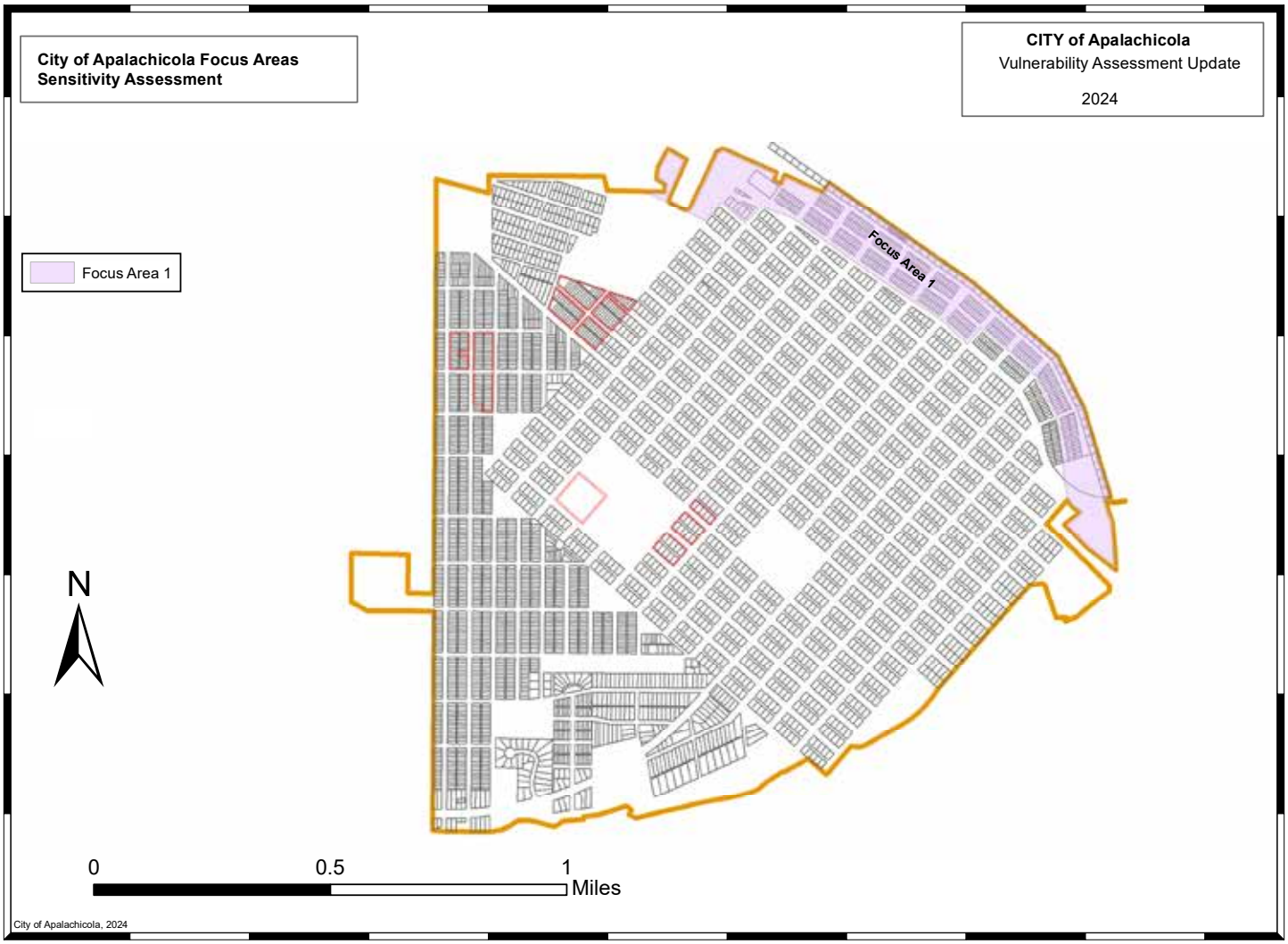
Map 313 (Appendix 3) shows Focus Area 1.
Table 60 (Appendix 2) identifies assets and impacts within Focus Area 1.

Focus Area 1 (73.4 acres) is the lower elevation commercial area located along the riverfront. The area is an Area of Special Flood Hazard and much of the riverfront is a rated velocity zone, which means it is subject to direct wave action. The area is projected to receive impacts from all storm surge and tidal events due to the low elevation and its location adjacent to the river. The area contains, Major Roads, Vacuum Lift Stations, Stormwater Outfalls, a Communication Tower, a Community Center, and six Historical and Cultural Assets. The topography, FEMA flood zones and repetitive flooding that has occured within this area from past hurricanes makes this a particularly vulnerable area. The area's vulnerability and number of critical assets ranks important but not the most critical.

**Focus Area 1 Critical Assets:**

- 2905.1 LF of major roads;
- 60 vacuum sewage lift stations;
- 13 Stormwater outfalls;
- Community Center: Harbormaster's House
- Six Historic Structures: FR00288-Oyster Packing House; FR00339-Harrison and Raney Warehouse; FR00344-City Hall; FR00643-Franklin County Jail; FR02434-239 Water Street; FR02451-33 Commerce Street.

**Map 314 - Focus Area 1**



## FOCUS AREA 1 ASSET IMPACTS

### Transportation/Roads

• 10-year events impact major roads in an increasing percentage from 97.4% in a 2023, No-SLR scenario to 100% for 2100,_IntHi scenario in Focus Area #1.
• All 50-year, 100-year and 500-year events impact 100% of the major roads in Focus Area #1.
• Tidal flooding impacts range from 0% to 5.1%, except 2100,_IntHi which impacts 90.3% of major roads in Focus Area #1.

### Critical Infrastructure / Lift Stations

• 60 Lift Stations
• 10-year events impact vacuum lift stations in an increasing %age from 48.3% in a 2023, No-SLR event to 73.3% in a 2100_IntHi event in Focus Area #1.
• 50-year events impact vacuum lift stations in an increasing %age from 85% for a 2023, No-SLR event to 100% in a 2100_IntHi event in Focus Area #1.
• 100-year events impact vacuum lift stations in an increasing percentage from 98.3% for a 2023, No-SLR event to 100% in a 2100_IntHi event in Focus Area #1.
• All 500-year events impact 100% of vacuum lift stations in Focus Area #1.
• Tidal flooding impacts range from 0% in 2023, No-SLR to 55% in a 2100_IntHi event in Focus Area #1.

### Critical Infrastructure / SW Outfalls

• 13 Outfalls
• All 10-year, 50-year, 100-year, and 500-year events impact 100% of stormwater outfalls in Focus Area #1.
• All Tidal flooding impact 100% of stormwater outfalls in Focus Area #1.

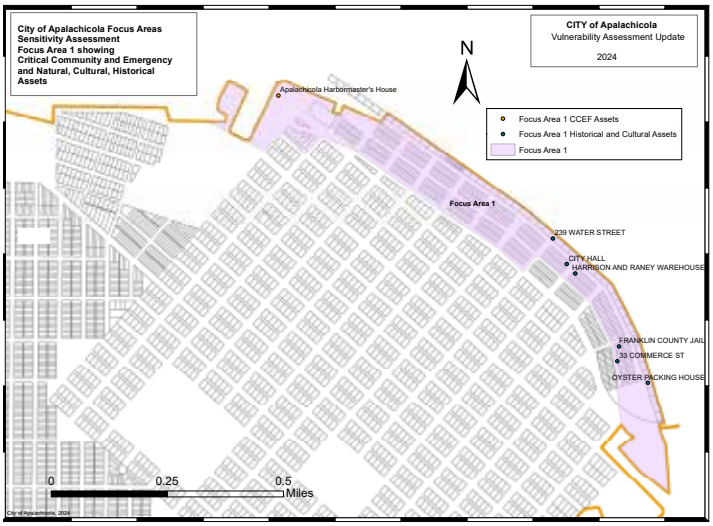
### Critical Infrastructure / Communications

• GT Com Tower
• No 10-year events impact the GT Com cell tower.
• 50-year, 100-year, and 500-year events impact the GT Com cell tower.
• No Tidal events impact the GT Com cell tower.

### CCEF / Community Centers

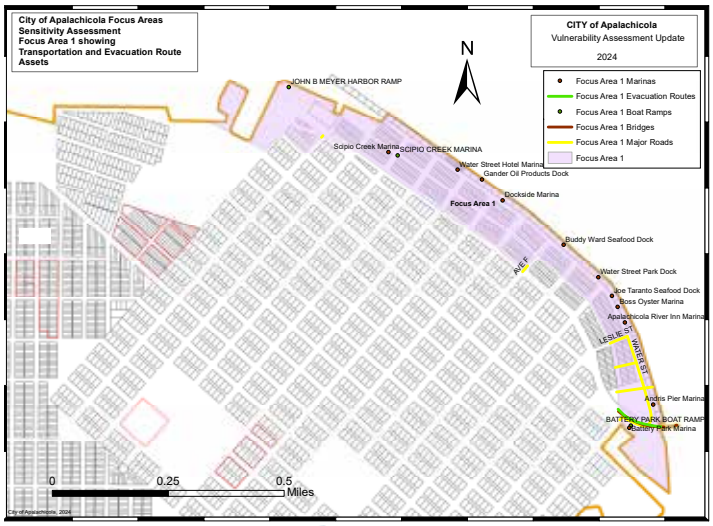
• Harbormaster's House. The Harbormaster's House is elevated approximately 8' above grade to the lowest horizontal structural member and 10' above grade to the finished floor. The Depth Impact Tables will have to be consulted to deduct the proper footage to determine impacts.
• All 10-year, 50-year, 100-year, and 500-year events impact the Harbormaster's House. See Note above.
• No Tidal scenarios affect the Harbormaster's House except 2100_IntHi_Tidal.

**Map 315 - Focus Area 1 - CCEF Impacts, NCH Assets**




**Map 316 - Focus Area 1 - Critical Infrastructure**

**Map 317 - Focus Area 1 - Transportation**



**NCH / Historical and Cultural Assets**

*MSF FR00288-Oyster Packing House*

• All 10-year, 50-year, 100-year, and 500-year events impact FR00288.
• All Tidal scenarios impact FR0028 except 2023, No-SLR, Tidal.

*MSF FR00339-Harrison and Raney Warehouse*

• No 10-year scenarios except 2100_IntLo_10-yr, 2070_IntHi_10-yr, and 2100, IntHi, 10-yr impact FR00339.
• All 50-year, 100-year, and 500-year events impact FR00339.
• No Tidal scenarios affect FR00339.

*MSF FR00344-City Hall*

• No 10-year scenarios except 2100_IntLo_10-yr, 2070_IntHi_10-yr, and 2100_IntHi_10-yr impact FR00344.
• All 50-year, 100-year, and 500-year events impact FR00344.
• No Tidal scenarios affect FR00344.

*MSF FR00643-Franklin County Jail*

• No 10-year scenarios except 2070_IntHi_10-yr, and 2100_IntHi_10-yr impact

*MSF FR00643.*

• All 50-year, 100-year, and 500-year events impact FR00643.
• No Tidal scenarios affect FR00643.

*MSF FR02434-239 Water Street*

• All 10-year, 50-year, 100-year, and 500-year events impact FR00288.
• No Tidal scenarios except 2100_IntHi_Tidal impact FR02434.

*MSF FR02451-33 Commerce St*

• No 10-year scenarios except 2070_IntHi_10-yr and 2100 IntHi, 10-yr affect

*MSF FR02451.*

• All 50-year, 100-year, and 500-year events impact FR00643.
• No Tidal scenarios affect FR02451.

See Map series 313-318 (Appendix 3) for projected depths for assets in this area.

## FOCUS AREA 2

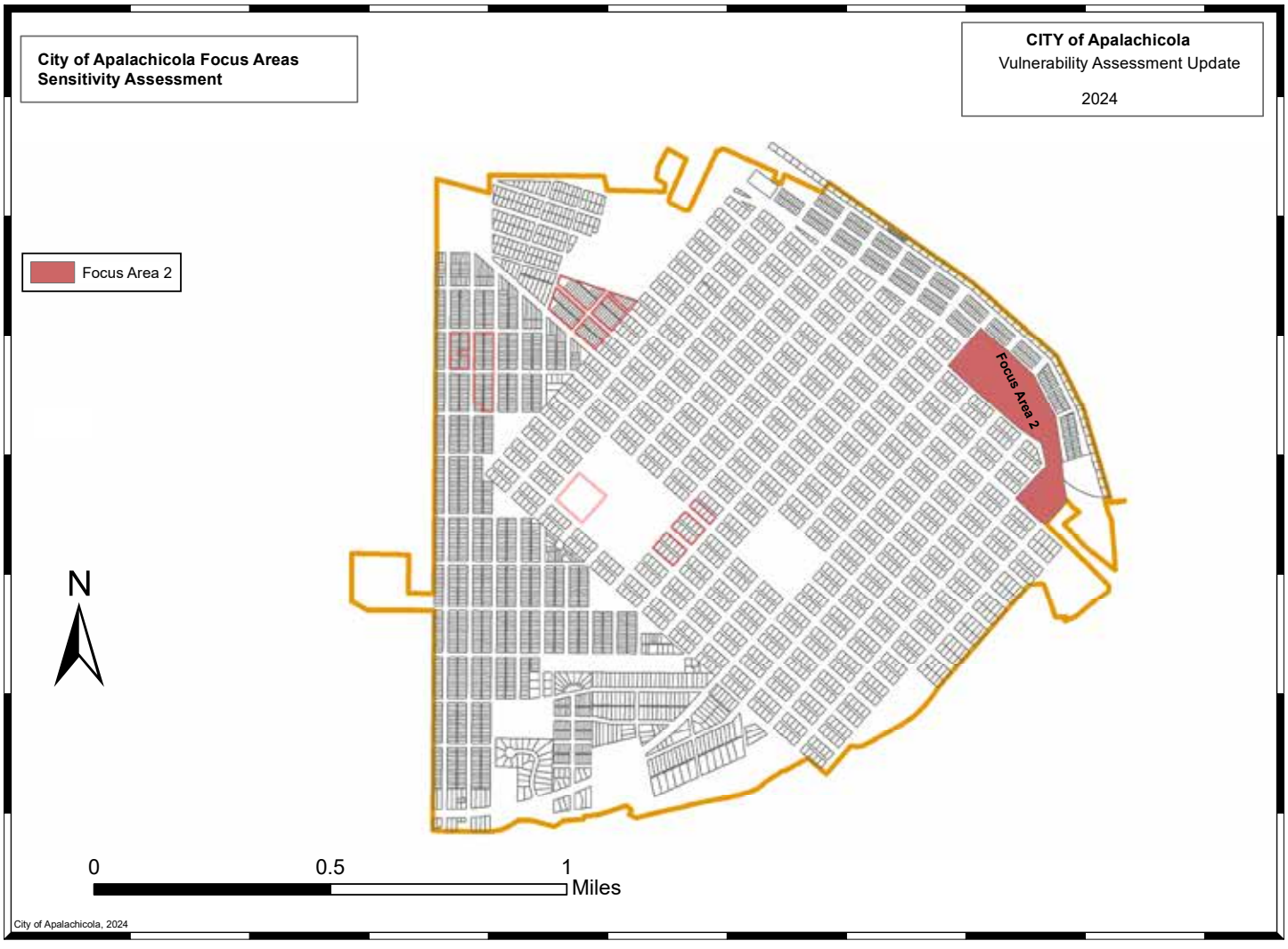
Map 318 (Appendix 3 - Maps) shows prioritized Focus Area 2. Table 61 (Appendix 2 - Tables) identifies assets within Focus Area 2.

Focus Are #2 (22.8 acres) is another low elevation commercial downtown area east of the riverfront and west of Focus Area 1. It is slightly higher in elevation than focus area #1 and contains Major Roads, Vacuum Lift Stations, a Community Center, a Local Government Facility, an Emergency Medical Health Facility, and two Historical and Cultural Assets. In addition, it is the predominant commercial hub of the City. It is ranked #2 priority.

**Focus Area 2 Critical Assets:**

- 3794.7 LF Roads
- 26 Vacuum Lift Stations
- 2 Critical Community and Emergency Facilities
- 2 Natural, Cultural & Historical Assets

**Map 318 - Focus Area 2 Boundaries**



## FOCUS AREA 2 ASSET IMPACTS

### Transportation/Major Roads

• 3794.7 LF
• 10-year events impact major roads in an increasing percentage from 10.7% in a 2023, No-SLR scenario to 36.6% for a 2100_IntHi scenario in Focus Area #2.
• 50-year events impact major roads in an increasing %age from 27.5% in a 2023, No-SLR scenario to 65.1% for a 2100_IntHi scenario in Focus Area #2.
• 100-year events impact major roads in an increasing %age from 39.3% in a 2023, No-SLR scenario to 96.0% for a 2100_IntHi scenario in Focus Area #2.
• 500-year events impact major roads in an increasing %age from 97.1% in a 2023, No-SLR scenario to 100% for a 2100_IntHi scenario in Focus Area #2.
• Tidal flooding impacts of major roads range from 0% for a 2023, No-SLR event to 13.4% for 2100_IntHi in Focus Area #2.

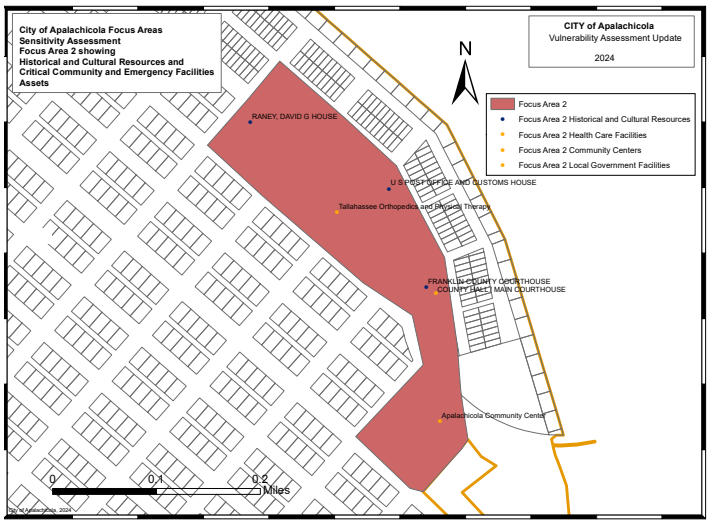
### Infrastructure/WWTP and Lift Stations

• 26 Vacuum Lift Stations
• 10-year events impact lift stations in an increasing %age from 0% in a 2023, No-SLR scenario to 57.7% for a 2100_IntHi scenario in Focus Area #2.
• 50-year events impact lift stations in an increasing %age from 34.6% in a 2023, No-SLR scenario to 73.1% for a 2100_IntHi scenario in Focus Area #2.
• 100-year events impact lift stations in an increasing %age from 57.7% in a 2023, No-SLR scenario to 92.3% for a 2100_IntHi scenario in Focus Area #2.
• All 500-year events impact 100% of the lift stations in Focus Area #2.
• No Tidal scenarios affect Lift Stations in Focus Area #2

### Critical Community and Emergency Facilities

*Community Centers: Apalachicola Community Center*
• 10-year events do not affect Apalachicola Community Center except 2100_IntLo, 2070_IntHi, and 2100_IntHi. See Note above. All 50-year, 100-year, and 500-year events impact the Apalachicola Community Center. See Note above.
• No Tidal scenarios affect Apalachicola Community Center.

**Map 319 - Area 2 - Historical, Cultural, CCEF Assets**




**Map 320 - Area 2 - Critical Infrastructure Assets**

**Map 321 - Area 2 - Transportation Assets**

*Local Government Facilities: Franklin County Courthouse*
• 10-year events do not impact Franklin County Courthouse.
• 50-year events do not impact Franklin County Courthouse except 2070, Int-Hi and 2100 Int-Hi.
• All 100-year, and 500-year events impact the Franklin County Courthouse.
• No Tidal scenarios affect Franklin County Courthouse.

**Emergency Medical Health Facilities**
*Tallahassee Orthopedics and Physical Therapy (TOSPT)*
• No 10-year, 50-year or 100-year events impact TOSPT.
• All 500-year events impact TOSPT.
• No Tidal scenarios affect TOSPT.

**Natural, Cultural, and Historical Resources/Historical and Cultural Assets**
*MSF FR00066 Raney House*
• No 10-year scenarios affect Raney House.
• No 50-year scenarios affect Raney House except 2100_IntHi.
• 100-year scenarios that affect Raney House are 2070, IntHi and 2100, IntHi.
• All 500-year scenarios affect Raney House.
• No Tidal scenarios affect FR00066.

*MSF FR00274 US Post Office and Customs House*
• No 10-year scenarios affect US Post Office and Customs House.
• No 50-year scenarios affect US Post Office and Customs House except 2100_IntHi.
• 100-year scenarios that affect US Post Office and Customs House are 2070, IntHi and 2100, IntHi.
• All 500-year scenarios affect US Post Office and Customs House.
• No Tidal scenarios affect FR00274.

See Map series 313 through 331 (Appendix 3 - Maps) for projected depths for assets in this area.

## FOCUS AREA 3

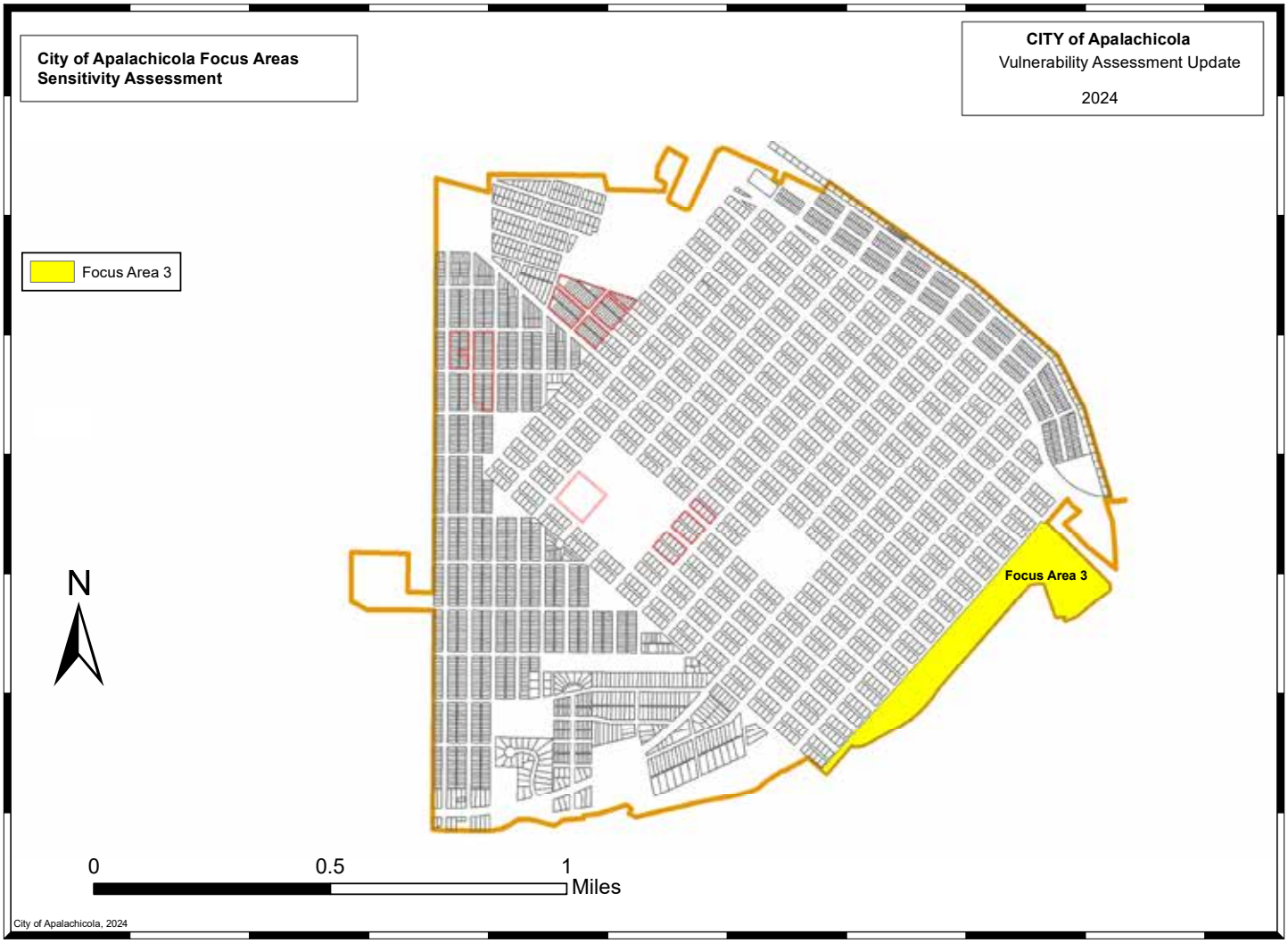
Map 322 (Appendix 3- Maps) shows Focus Area 3. Table 62 (Appendix 2 - Tables) identifies assets within Focus Area 3.

Focus Area #3 (34.9 acres) is the low elevation area along Bay Avenue, south of the sharp increase in elevation to the north of Bay Avenue. The area is entirely residential and subject to coastal flooding. Although there are several lift stations and outfalls that work to drain stormwater from the other basins in the City the area is prioritized low because it does not contain many public assets.

**Focus Area 3 Critical Assets:**

- 1890.1 LF Major Roads
- 9 Lift Stations
- 7 Outfalls

**Map 322 - Focus Area 3 Boundaries**



## FOCUS AREA 3 ASSET IMPACTS

### Transportation/Major Roads

• 1890.1 LF
• 10-year events impact major roads in an increasing percentage from 26.2% in a 2023, No-SLR scenario to 63.2% for 2100_IntHi scenario in Focus Area #3.
• 50-year events impact major roads in an increasing %age from 57.7% in a 2023, No-SLR scenario to 71.1% for 2100_IntHi scenario in Focus Area #3.
• 100-year events impact major roads in an increasing %age from 63.7% in a 2023, No-SLR scenario to 79.9% for 2100_IntHi scenario in Focus Area #3.
• 500-year events impact 100% of the major roads in Focus Area #3.
• Tidal flooding affects no major roads except 2100_IntHi, Tidal in Focus Area #3.

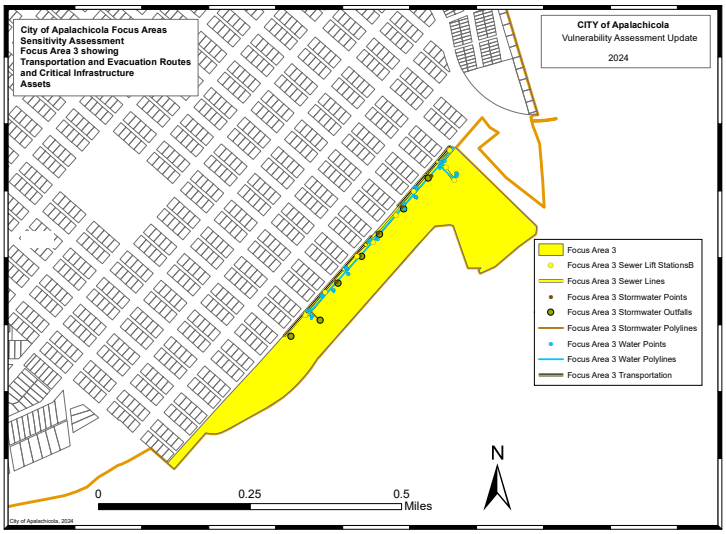
### Critical Infrastructure / Lift Stations

• 9 Lift Stations
• 10-year events impact vacuum lift stations in an increasing percentage from 44.4% in a 2023, No-SLR scenario to 77.8% for 2100_IntHi scenario in Focus Area #3.
• 50-year events impact vacuum lift stations in an increasing %age from 66.7 % in a 2023, No-SLR scenario to 88.9% for 2100_IntHi scenario in Focus Area #3.
• 100-year events impact vacuum lift stations in an increasing percentage from 77.8% in a 2023, No-SLR scenario to 100% for 2100_IntHi scenario in Focus Area #3.
• 500-year events impact 100% of the vacuum lift stations in Focus Area #3.
• Tidal flooding affects no major roads except 2100_IntHi, Tidal, which impacts 44.4% of vacuum lift stations in Focus Area #3.

### Critical Infrastructure / SW Outfalls

• 7 Outfalls
Synopsis of Impacts:
• 10-year events impact stormwater outfalls in an increasing %age from 57.1% in a 2023, No-SLR scenario to 100% for 2100_IntHi scenario in Focus Area #3.
• 50-year events impact stormwater outfalls in an increasing %age from 85.7 % in a 2023, No-SLR scenario to 100% for 2100_IntHi scenario in Focus Area #3.
• All 100-year and 500-year events impact 100% of the stormwater outfalls in Focus Area #3.
• Tidal flooding affects no major roads except 2070_IntHi (28.6%) and 2100_IntHi (57,1%) of stormwater outfalls in Focus Area #3.

**Map 323 - Focus Area 3 Assets**



## FOCUS AREA 4

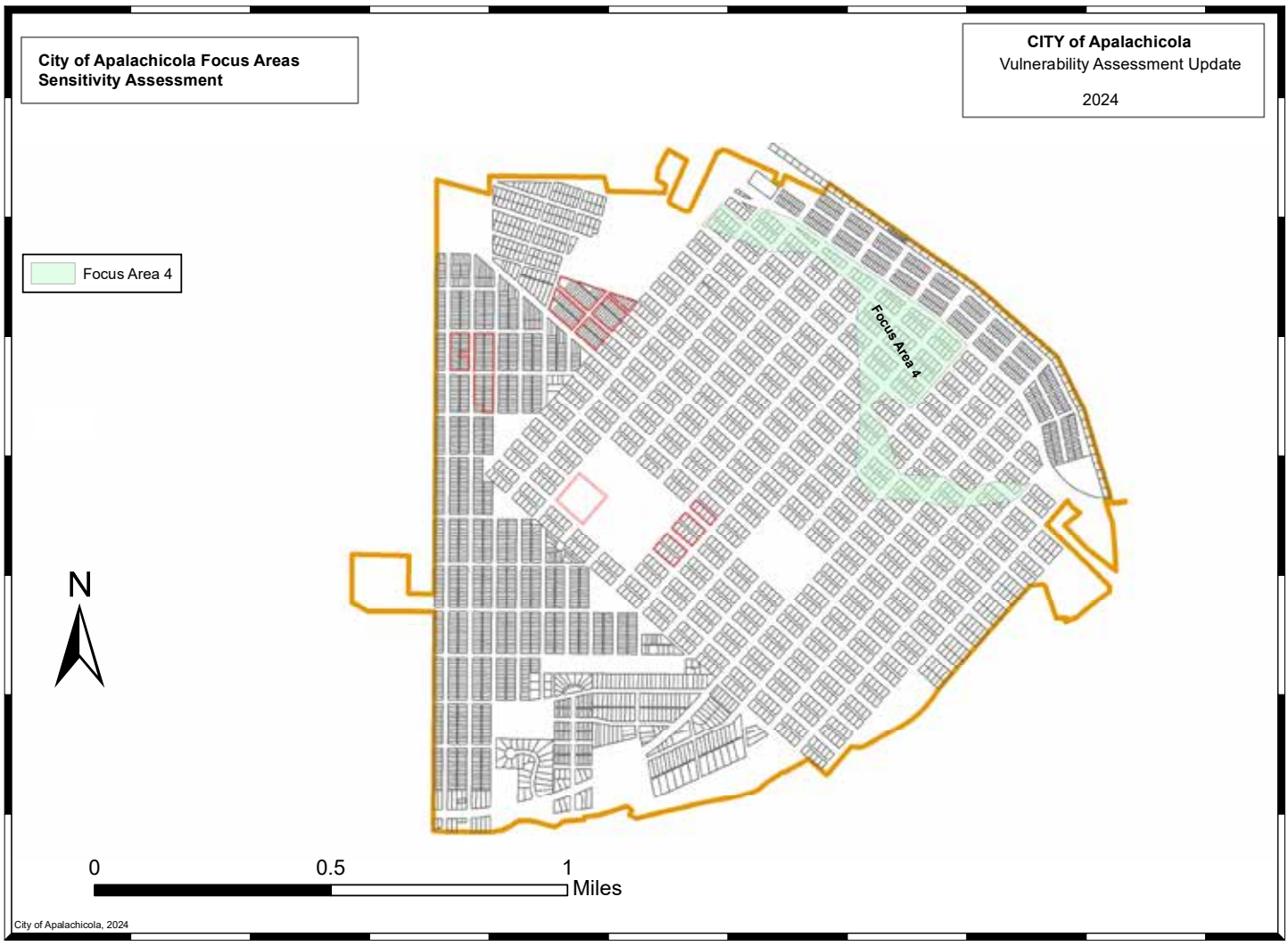
Map 324 (Appendix 3 - Maps) shows prioritized Focus Area 4. Table 63 (Appendix 2 - Tables) identifies assets within Focus Area 4.

Focus Area #4 (55.3 acres) is the area of the relict creek bed that is roughly between Avenue B and Avenue M and 9th Street and Market Street. This area is significant because it is subject to nuisance flooding mainly due to haphazard filling of some areas that cause unfilled areas to flood. The area contains Major Roads, Vacuum Lift Stations, and one Historical and Cultural Asset. A special note of consideration is that mapped as a vacuum lift station is the Vacuum Pump Station, located at the intersection of Avenue F and 9th Street. The facility transports all of the sewerage effluent to the WWTP. This facility is worthy of special consideration and has been parceled out in the analysis below. The area will receive a low ranking, but the PS1 Sewage Pump Station will be considered separately.

**Focus Area 4 Critical Assets:**

- 10,830.0 LF Major Roads
- 49 Lift Stations
- 1 Historical Resource: FR002617

**Map 324 - Focus Area 4 Boundaries**



## FOCUS AREA 4 ASSET IMPACTS

### Transportation/Major Roads

• 10,830.0 LF
• 10-year events impact major roads in an increasing %age from 3.9% in a 2023_No-SLR event to 64.3% in a 2100_IntHi event in Focus Area #4.
• 50-year events impact stormwater outfalls in an increasing %age from 11.6% in a 2023_No-SLR event to 100% in a 2100_IntHi event in Focus Area #4.
• 100-year events impact major roads in an increasing %age from 73.2% in a 2023_NoSLR event to 100% for a 2100_IntHi event in Focus Area #4.
• All 500-year events impact 100% of the major roads in Focus Area #4.
• Tidal flooding affects no major roads except 2100_IntHi, which affects 4.3% of major roads in Focus Area #4.

### Critical Infrastructure / Lift Stations

• 49 Lift Stations
• 10-year events impact vacuum lift stations in an increasing %age from 2.0% in a 2023, No-SLR scenario to 61.2% for 2100_IntHi scenario in Focus Area #4.
• 50-year events impact vacuum lift stations in an increasing %age from 6.1 % in a 2023, No-SLR scenario to 93.9% for 2100_IntHi scenario in Focus Area #4.
• 100-year events impact vacuum lift stations in an increasing %age from 69.4% in a 2023, No-SLR scenario to 100% for 2100_IntHi scenario in Focus Area #4.
• 500-year events impact 100% of the vacuum lift stations in Focus Area #4.
• Tidal flooding affects no major roads except 2100_IntHi, Tidal, which impacts 2.0% of vacuum lift stations in Focus Area #4.

*PS1 Sewage Pump Station*

• No 10-year surge events impact PS1 Sewage Pump Station.
• No 50-year events impact PS1 Sewage Pump Station except 2070, Int-Hi and 2100_IntHi.
• All 100-year and 500-year surge events impact PS1 Sewage Pump Station.

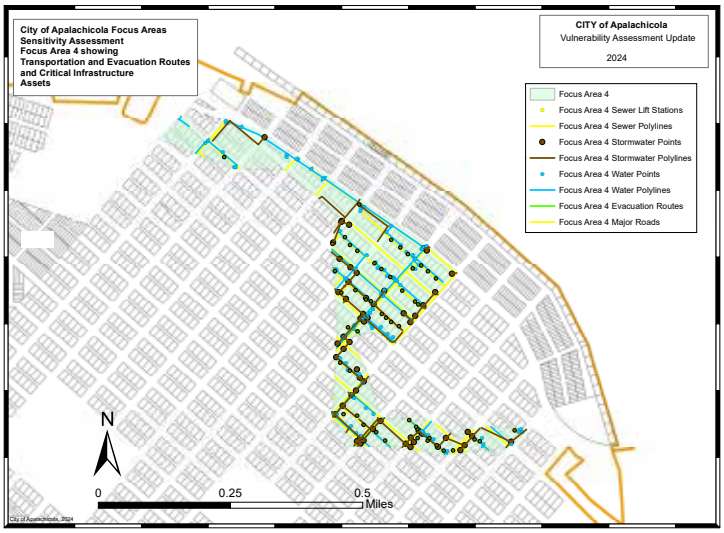
### Natural, Cultural and Historical Assets

*MSF FR02617-47 Ave F*

• No 10-year events affect FR02617.
• No 50-year events affect FR02617 except 2100_IntHi.
• No 100-year events affect FR02617 except 2070_IntHi and 2100_Int_Hi.
• All 500-year events effect FR02617.
• No Tidal flooding events affect FR02617.

Map ... (from map series) shows Focus Area 4. Table ... from table series) identifies assets from Focus Area 4.

**Map 325 - Focus Area 4 Assets**



## FOCUS AREA 5

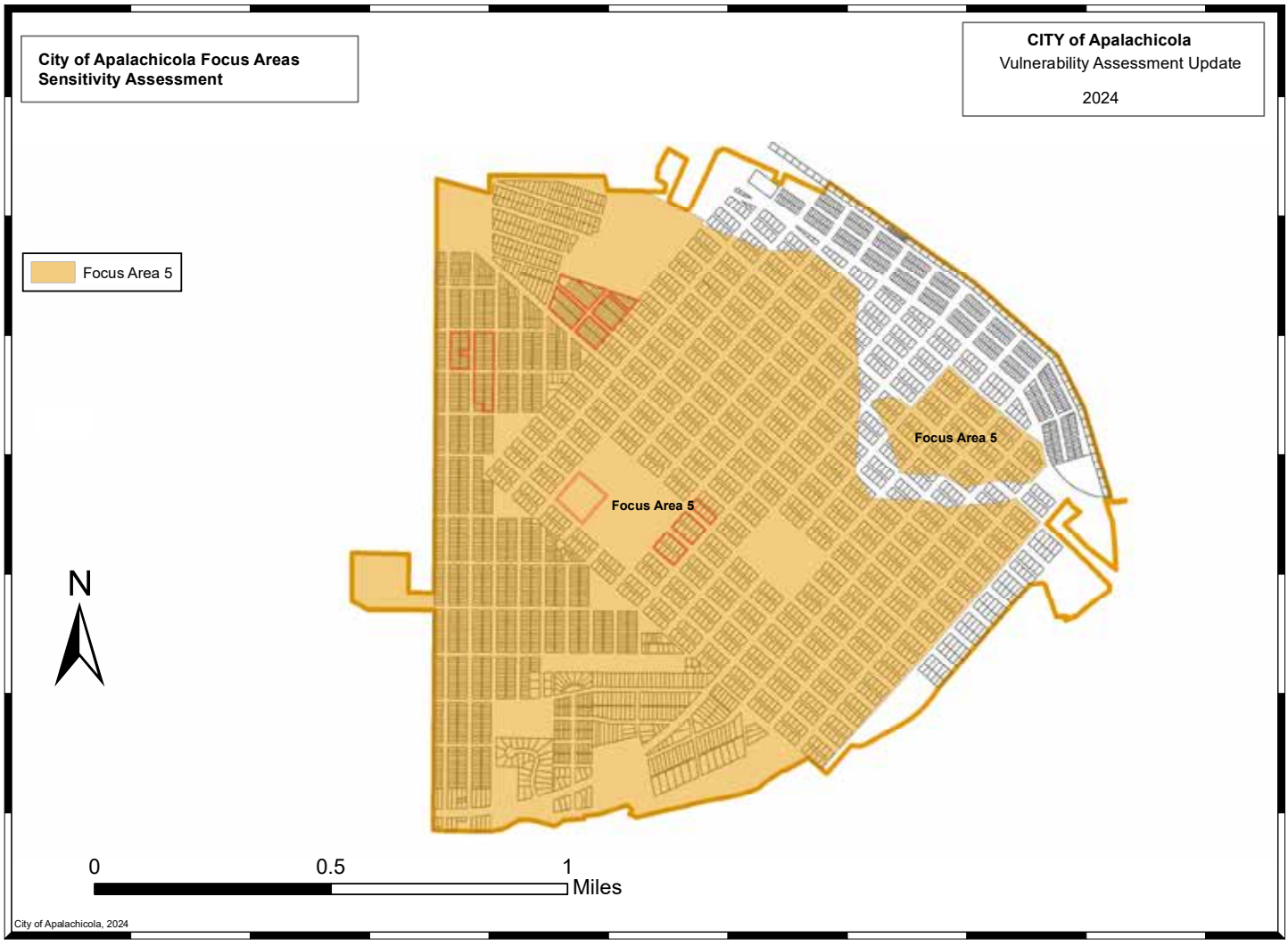
Map 326 (Appendix 3 - Maps) shows prioritized Focus Area 5. Table 64 (Appendix 2 - Tables) identifies assets within Focus Area 5.

Focus Area 5 (829.1 acres) is the largest area and comprises a mix of both residential and commercial property. It is also the highest in elevation and contains the most critical assets. The area contains Major Roads, a hospital heliport, Vacuum Lift Stations, Stormwater Outfalls, a Communication Facility, Public Housing, a Community Center, an Emergency Medical Service Facility/Hospital, six government facilities, the Fire Station, the Law Enforcement Facility, four other Health Care Facilities besides the hospital, 2 schools, and 40 Historical and Cultural Assets. The Focus Area will rank very high.

**Focus Area 5 Critical Assets**

- 88,620.7 LF Major Roads
- Weems Heliport
- 402 Lift Stations
- 12 Outfalls

**Map 325 - Focus Area 5 Boundaries**



## FOCUS AREA 5 ASSET IMPACTS

### Transportation/Major Roads

• 88,620.7 LF
• 10-year events impact major roads in an increasing %age from 0.03% in a 2023_No-SLR event to 2.5% in a 2100_IntHi event in Focus Area #5.
• 50-year events impact stormwater outfalls in an increasing percentage from 1.4% in a 2023_No-SLR event to 14.9% in a 2100_IntHi event in Focus Area #5.
• 100-year events impact major roads in an increasing %age from 3.0% in a 2023_NoSLR event to 29.2% for a 2100_IntHi event in Focus Area #5.
• 500-year events impact major roads in an increasing %age from 50.7% in a 2023_NoSLR event to 100% for a 2100_IntHi event in Focus Area #5.
• There are no Tidal impacts for any events except 2100_IntHi, which has a 0.03% of roads affected.

### Transportation/Airports

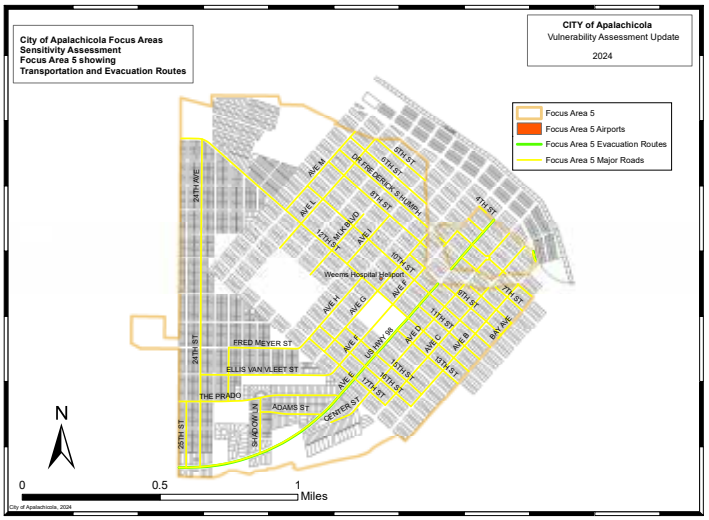
*Weems Heliport*

• 10-year, 50-year, and 100-year event have no impacts on Weems Heliport.
• All 500-year events impact Weems Heliport, except 2023_NoSLR and 2040_IntLo.
• No Tidal scenarios affect Weems Heliport.

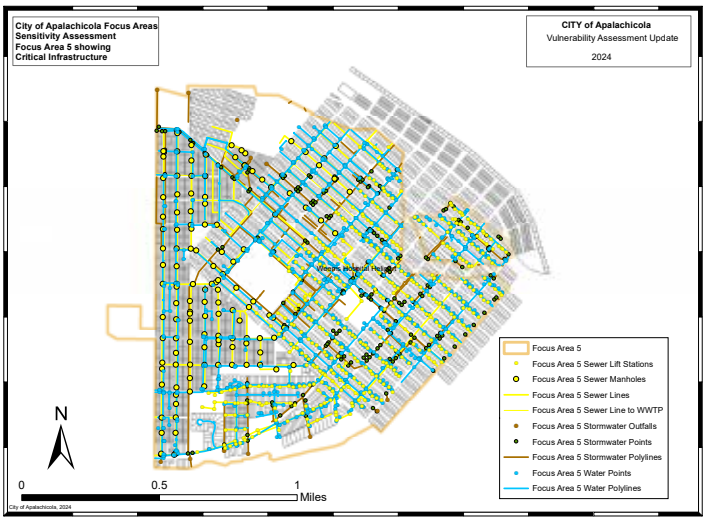
### Critical Infrastructure / Lift Stations

• 402 Lift Stations
• All 10-year events affect 0.25% of lift stations in Focus Area #5.
• 50-year events impact vacuum lift stations in an increasing %age from 0.8 % in a 2023, No-SLR scenario to 1.2% for 2100_IntHi scenario in Focus Area #5.
• 100-year events impact vacuum lift stations in an increasing %age from 2.7% in a 2023, No-SLR scenario to 12.7% for 2100_IntHi scenario in Focus Area #5.
• 500-year events impact vacuum lift stations in an increasing %age from 63.2% in a 2023, No-SLR scenario to 100% for 2100_IntHi scenario in Focus Area #5.
• Most Tidal scenarios have no impact on vacuum lift stations, except 2100_IntHi impacts 0.3% of vacuum lift stations in Focus Area #5.

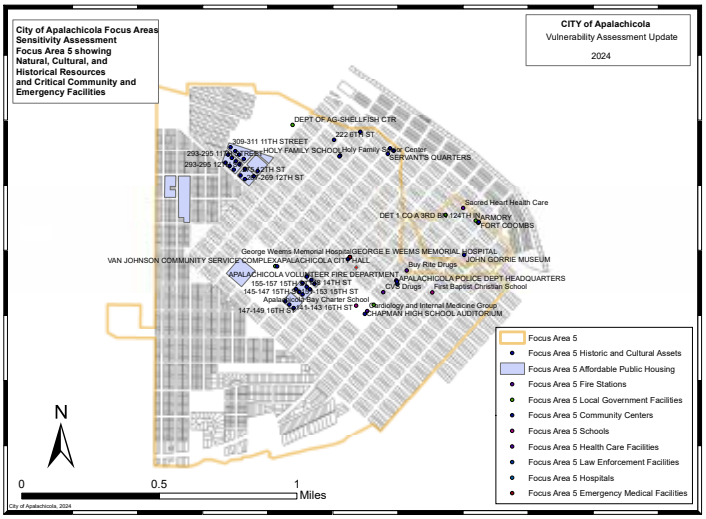
**Map 329 - Focus Area 5 Transportation Assets**




**Map 328 - Focus Area 5 Critical Infrastructure Assets**




**Map 327 - Area 5 Historical, Cultural, CCEF Assets**



**Critical Infrastructure / SW Outfalls**
• 12 Outfalls
• All 10-year events affect 41.7% of stormwater outfalls in Focus Area #5.
• 50-year events impact stormwater outfalls in an increasing %age from 58.3% in a 2023, No-SLR scenario to 83.3% for 2100_IntHi scenario in Focus Area #5.
• All 100-year events affect 83.3% of stormwater outfalls in Focus Area #5.
• All 500-year events affect 100% of stormwater outfalls in Focus Area #5.
• Most Tidal scenarios have no impact on stormwater outfalls, except 2100_IntLo impacts 0.2%, 2070_IntHi impacts 0.5%, and 2100_IntHi impacts 1.2% of stormwater outfalls in Focus Area #5.

**Critical Infrastructure/Communications Facilities**
*GT Com Land*
• No 10-year events impact GT Com Land.
• No 50-year events impact GT Com Land.
• No 100-year events impact GT Com Land.
• All 500-year events impact GT Com Land.
• No Tidal scenarios impact GT Com Land.

**CCEF/Affordable Public Housing**
12.28 Acres
• 10-year events impact Affordable Public Housing acreage in an increasing percentage from 0% in a 2023, No-SLR scenario to 5.7% for 2100_IntHi scenario in Focus Area #4.
• 50-year events impact Affordable Public Housing acreage in an increasing %age from 1.1% in a 2023, No-SLR scenario to 1.9% for 2100_IntHi scenario in Focus Area #5.
• 100-year events impact Affordable Public Housing acreage in an increasing percentage from 2.4% in a 2023_NoSLR event to 3.9% for a 2100_IntHi event in Focus Area #5.
• 500-year events impact Affordable Public Housing acreage in an increasing percentage from 49.3% in a 2023_NoSLR event to 100% for a 2100_IntHi event in Focus Area #5.
• No Tidal events impact Affordable Public Housing.

**CCEF/ Community Centers**
*Holy Family Senior Center*
• No 10-year, 50-year, or 100-year events impact Holy Family Senior Center.
• No 500-year events impact Holy Family Senior Center, except 2100_IntHi.
• No Tidal events impact Holy Family Senior Center.

**CCEF/ Emergency Medical Service Facilities**
*George E. Weems Memorial Hospital*
• No 10-year, 50-year, or 100-year events impact George E. Weems Memorial Hospital.
• The 500-year storm surge events that impact George E. Weems Memorial Hospital are the 2070_IntHi and 2100_Int Hi.
• No Tidal events impact George E. Weems Memorial Hospital.

**CCEF/ Local Government Facilities**
*Apalachicola Muncipal Library*
• No 10-year, 50-year, or 100-year events impact Apalachicola Municipal Library.
• All 500-year events impact Apalachicola Municipal Library except 2023_NoSLR, and 2040_IntLo.
• No Tidal events impact Apalachicola Municipal Library.

*St. Vincent National Wildlife Refuge*
• No 10-year, 50-year, or 100-year events impact St Vincents National Wildlife Refuge.
• All 500-year events impact St Vincents National Wildlife Refuge.
• No Tidal events impact St Vincents National Wildlife Refuge.

*Fort Coombs Armory*
• No 10-year, 50-year, or 100-year events impact the Armory.
• All 500-year events impact the Armory.
• No Tidal events impact the Armory.

*Florida Department of Agriculture*
• No 10-year, 50-year, or 100-year events impact the Department of Agriculture Shellfish Center.
• All 500-year events impact the Department of Agriculture Shellfish Center.
• No Tidal events impact the Department of Agriculture Shellfish Center.

*DET 1 CO A 3RD BN 124TH IN*
• No 10-year, 50-year, or 100-year events impact DET 1 CO A 3RD BN 124TH IN.
• All 500-year events impact DET 1 CO A 3RD BN 124TH IN.
• No Tidal events impact DET 1 CO A 3RD BN 124TH IN.

*Apalachicola City Hall*
• No 10-year, 50-year, or 100-year events impact Apalachicola City Hall.
• The 500-year storm surge events that affect Apalachicola City Hall are the 2070_IntHi and 2100_IntHi events.
• No Tidal events impact Apalachicola City Hall.

**CCEF/ Fire Stations**
*Apalachicola Volunteer Fire Department*
• No 10-year, 50-year, or 100-year events impact Apalachicola Volunteer Fire Department.
• The 500-year storm surge events that affect Apalachicola Volunteer Fire Department is the 2100_IntHi event.
• No Tidal events impact Apalachicola Volunteer Fire Department.

**CCEF/ Health Care Facilities**
*Sacred Heart Health Care*
Synopsis of Impacts:
• No 10-year or 50-year scenarios impact Sacred Heart Health Care.
• 100-year scenarios that impact Sacred Heart Health Care are the 2100_IntLo, 2070_IntHi, and the 2100_IntHi events.
• All 500-year scenarios 500-year scenarios impact Sacred Heart Health Care.
• No Tidal events impact Sacred Heart Health Care.

*Buy Rite Drugs*
• No 10-year scenarios impact Buy Rite Drugs.
• The 50-year scenarios that impact Buy Rite Drugs are the 2070_IntHi and 2100_IntHi events.
• All 100-year and 500-year scenarios impact Buy-Rite Drugs.
• No Tidal events impact Buy-Rite Drugs.

*CVS Drugs*
• No 10-year or 50-year scenarios impact CVS Drugs.
• 100-year events that impact CVS Drugs are the 2100_IntLo and 2100_IntHi scenarios.
• All 500-year scenarios 500-year scenarios impact CVS Drugs.
• No Tidal events impact CVS Drugs.

*Cardiology and Internal Medicine*
• No 10-year, 50-year, or 100-year scenarios impact Cardiology and Internal Medicine.
• 500-year scenarios that impact Cardiology and Internal Medicine are the 2070_IntLo, 2100_IntLo, 2070_IntHi, and 2100_IntHi events.
• No Tidal events impact Cardiology and Internal Medicine.

*George Weems Memorial Hospital*
• No 10-year, 50-year, or 100-year events impact George E. Weems Memorial Hospital.
• The 500-year storm surge events that impact George E. Weems Memorial Hospital are the 2070_IntHi and 2100_Int Hi.
• No Tidal events impact George E. Weems Memorial Hospital.

**CCEF/ Hospitals**
*George Weems Memorial Hospital*
• No 10-year, 50-year, or 100-year events impact George E. Weems Memorial Hospital.
• The 500-year storm surge events that impact George E. Weems Memorial Hospital are the 2070_IntHi and 2100_Int Hi.
• No Tidal events impact George E. Weems Memorial Hospital.

**CCEF/ Law Enforcement Facilities**
*Apalachicola Police Department Headquarters*
• No 10-year, 50-year, or 100-year events impact Apalachicola Police Department Headquarters.
• The 500-year storm surge events that affect Apalachicola Police Department Headquarters is the 2100_IntHi event.
• No Tidal events impact Apalachicola Police Department Headquarters.

**CCEF/ Schools**
*Bay Area Charter School*
• No 10-year, 50-year, or 100-year events impact Bay Area Charter School.
• All 500-year events impact Bay Area Charter School.
• No Tidal events impact Bay Area Charter School.

*First Baptist Christian School*
• No 10-year, 50-year, or 100-year events impact Bay Area Charter School.
• All 500-year events impact except 2023_NoSLR and 2040_IntLo.
• No Tidal events impact First Baptist Christian School.

**Natural, Cultural Resources/ Historical and Cultural Assets**

*FR00396 Orman, Thomas House*
• No 10-year, 50-year, or 100-year events impact FR00396.
• The 500-year events that impact FR00396 are the 2070_IntHi and the 2100_IntHi. No Tidal events impact FR00396.

*FR01263 MULE BARN*
• No 10-year, 50-year, or 100-year events impact FR01263.
• The 500-year events that impact FR01263 are the 2070_IntHi and the 2100_IntHi.
• No Tidal events impact FR01263.

*FR00065 JOHN GORRIE MUSEUM*
• No 10-year, 50-year, or 100-year events impact FR00065.
• The 500-year events that impact FR00065 are the 2100_IntLo, 2070_IntHi, and 2100_IntHi.
• No Tidal events impact FR00065.

*FR01264 SERVANTS QUARTERS*
• No 10-year, 50-year, or 100-year events impact FR01264.
• The 500-year events that impact FR01264 are the 2070_IntHi and the 2100_IntHi.
• No Tidal events impact FR01264.

*FR01281 WEEMS MEMORIAL HOSPITAL*
• No 10-year, 50-year, or 100-year events impact FR01281.
• The 500-year events that impact FR01281 are the 2070_IntHi and 2100_Int Hi.
• No Tidal events impact FR01281.

*FR00958 HOLY FAMILY SCHOOL*
• No 10-year, 50-year, or 100-year events impact FR00958.
• The 500-year events that impact FR00958 are the 2100_IntHi.
• No Tidal events impact FR00958.

*FR00230 CITY PUMPING STATION*
• No 10-year, 50-year, or 100-year events impact FR00230.
• All 500-year events impact FR00230.
• No Tidal events impact FR00230.

*FR00246 CHAPMAN HIGH SCHOOL AUDITORIUM*
• No 10-year, 50-year, or 100-year events impact FR0246.
• The 500-year events that impact FR0246 are the 2070_IntHi and 2100_Int Hi.
• No Tidal events impact FR0246.

*FR00249 FORT COOMBS*
• No 10-year, 50-year, or 100-year events impact FR00249.
• All 500-year events impact FR00249.
• No Tidal events impact FR00249.

*FR02851 127 AVENUE E*
• No 10-year, 50-year, or 100-year events impact FR02851.
• The 500-year events that impact FR02851are the 2070_intLo, 2100_IntLo, 2070_IntHi, and 2100_IntHi.
• No Tidal events impact FR02851.

*FR02502 309-311 11TH STREET*
Synopsis of Impacts:
• No 10-year, 50-year, or 100-year events impact FR02502.
• The 500-year events that impact FR02502 are the 2070_intLo, 2100_IntLo, 2070_IntHi, and 2100_IntHi.
• No Tidal events impact FR02502.

*FR02503 308-310 11TH STREET*
• No 10-year, 50-year, or 100-year events impact FR02503.
• The 500-year events that impact FR02503 are the 2070_intLo, 2100_IntLo, 2070_IntHi, and 2100_IntHi.
• No Tidal events impact FR02503.

*FR02504 303-305 11TH STREET*
• No 10-year, 50-year, or 100-year events impact FR02504.
• The 500-year events that impact FR02504 are the 2070_intLo, 2100_IntLo, 2070_IntHi, and 2100_IntHi.
• No Tidal events impact FR02504.

*FR02505 304-306 11TH STREET*
• No 10-year, 50-year, or 100-year events impact FR02505.
• All 500-year events impact FR02505.
• No Tidal events impact FR02505.

*FR02506 299-301 11TH STREET*
• No 10-year, 50-year, or 100-year events impact FR02506.
• All 500-year events impact FR0 2506.
• No Tidal events impact FR02506.

*FR02507 298-300 11TH STREET*
• No 10-year, 50-year, or 100-year events impact FR02507.
• All 500-year events impact FR02507 except the 2023_NoSLR scenario.
• No Tidal events impact FR02507.

*FR2508 293-295 11TH STREET*
• No 10-year, 50-year, or 100-year events impact FR02508.
• All 500-year events impact FR02508.
• No Tidal events impact FR02508.

*FR02509 292-294 11TH STREET*
• No 10-year, 50-year, or 100-year events impact FR02509.
• All 500-year events impact FR02509.
• No Tidal events impact FR02509.

• FR02510 276 11TH ST
• No 10-year, 50-year, or 100-year events impact FR02510.
• All 500-year events impact FR25100.
• No Tidal events impact FR02510.

*FR02511 263 11TH ST*
• No 10-year, 50-year, or 100-year events impact FR02511.
• All 500-year events impact FR02511.
• No Tidal events impact FR02511.

*FR02512 266 11TH ST*
• No 10-year, 50-year, or 100-year events impact FR02512.
• All 500-year events impact FR02512.
• No Tidal events impact FR02512.

*FR02533 153 14TH ST*
• No 10-year, 50-year, or 100-year events impact FR02533.
• The 500-year events that impact FR02533 are the 2070_IntHi and the 2100_IntHi.
• No Tidal events impact FR02533.

*FR02534 147-149 14TH ST*
• No 10-year, 50-year, or 100-year events impact FR02534.
• The 500-year events that impact FR02534 are the 2070_IntHi and the 2100_IntHi.
• No Tidal events impact FR02534.

*FR02535 141-143 14TH ST*
• No 10-year, 50-year, or 100-year events impact FR02535.
• The 500-year events that impact FR02535 are the 2070_IntHi and the 2100_IntHi.
• No Tidal events impact FR02535.

*FR02536 152-154 14TH ST*
• No 10-year, 50-year, or 100-year events impact FR02536.
• The 500-year events that impact FR02536 is the 2100_IntHi.
• No Tidal events impact FR02536.

*FR02537 148 14TH ST*
• No 10-year, 50-year, or 100-year events impact FR02537.
• The 500-year events that impact FR02537 are the 2070_IntHi and the 2100_IntHi.
• No Tidal events impact FR02537.

*FR02538 142-144 14TH ST*
• No 10-year, 50-year, or 100-year events impact FR02538.
• The 500-year events that impact FR02538 is the 2100_IntHi.
• No Tidal events impact FR02538.

FR02547 145-147 15TH ST
• No 10-year, 50-year, or 100-year events impact FR02547.
• The 500-year events that impact FR02547 are the 2100_IntLo, 2070_IntHi, and the 2100_IntHi scenarios.
• No Tidal events impact FR02547.

*FR02549 151-153 15TH ST*
• No 10-year, 50-year, or 100-year events impact FR02549.
• The 500-year events that impact FR02549 are the 2070_IntHi and the 2100_IntHi scenarios.
• No Tidal events impact FR02549.

*FR02551 155-157 15TH ST*
• No 10-year, 50-year, or 100-year events impact FR02551.
• The 500-year events that impact FR02551 are the 2070_IntLo, 2100_IntLo, 2070_IntHi, and 2100_IntHi.
• No Tidal events impact FR02551.

*FR02552 153-155 16TH ST*
• No 10-year, 50-year, or 100-year events impact FR02552.
• The 500-year events that impact FR02552 are the 2100_IntLo, 2070_IntHi, and 2100_IntHi.
• No Tidal events impact FR02552.

*FR02553 147-149 16TH ST*
• No 10-year, 50-year, or 100-year events impact FR02553.
• The 500-year events that impact FR02553 are the 2100_IntLo, 2070_IntHi, and 2100_IntHi.
• No Tidal events impact FR02553.

*FR02554 141-143 16TH ST*
• No 10-year, 50-year, or 100-year events impact FR02554.
• All 500-year events impact FR02554 except the 2023_NoSLR scenario.
• No Tidal events impact FR02554.

*FR02606 VAN JOHNSON COMMUNITY SERVICE COMPLEX*
• No 10-year, 50-year, or 100-year events impact FR02606.
• The 500-year events that impact FR02606 is the 2100_IntHi.
• No Tidal events impact FR02606.

*FR02417 309-311 12TH ST*
• No 10-year, 50-year, or 100-year events impact FR02417.
• The 500-year events that impact FR02417 is the 2100_IntHi scenario.
• No Tidal events impact FR02417.

*FR02418 299-301 12TH ST*
• No 10-year, 50-year, or 100-year events impact FR02418.
• The 500-year events that impact FR02418 are the 2070_IntHi and 2100_IntHi scenarios.
• No Tidal events impact FR02418.

*FR02419 293-295 12TH ST*
• No 10-year, 50-year, or 100-year events impact FR02419.
• The 500-year events that impact FR02419 are the 2070_IntHi and 2100_IntHi scenarios.
• No Tidal events impact FR02419.

*FR02420 275 12TH ST*
• No 10-year, 50-year, or 100-year events impact FR02420.
• The 500-year events that impact FR02420 are the 2100_Int_Lo, 2070_IntHi, and the 2100_IntHi scenarios.
• No Tidal events impact FR02420.

*FR02421 267-269 12TH ST*
• No 10-year, 50-year, or 100-year events impact FR02421.
• The 500-year events that impact FR02421 are the 2070_IntLo, 2100_IntLo, 2070_IntHi, and the 2100_IntHi scenarios.
• No Tidal events impact FR02421.

*FR02467 222 6TH ST*
• No 10-year, 50-year, or 100-year events impact FR02467.
• The 500-year events that impact FR02467 are the 2070_IntLo, 2100_IntLo, 2070_IntHi, and the 2100_IntHi scenarios.
• No Tidal events impact FR02467.

## FOCUS AREA 6

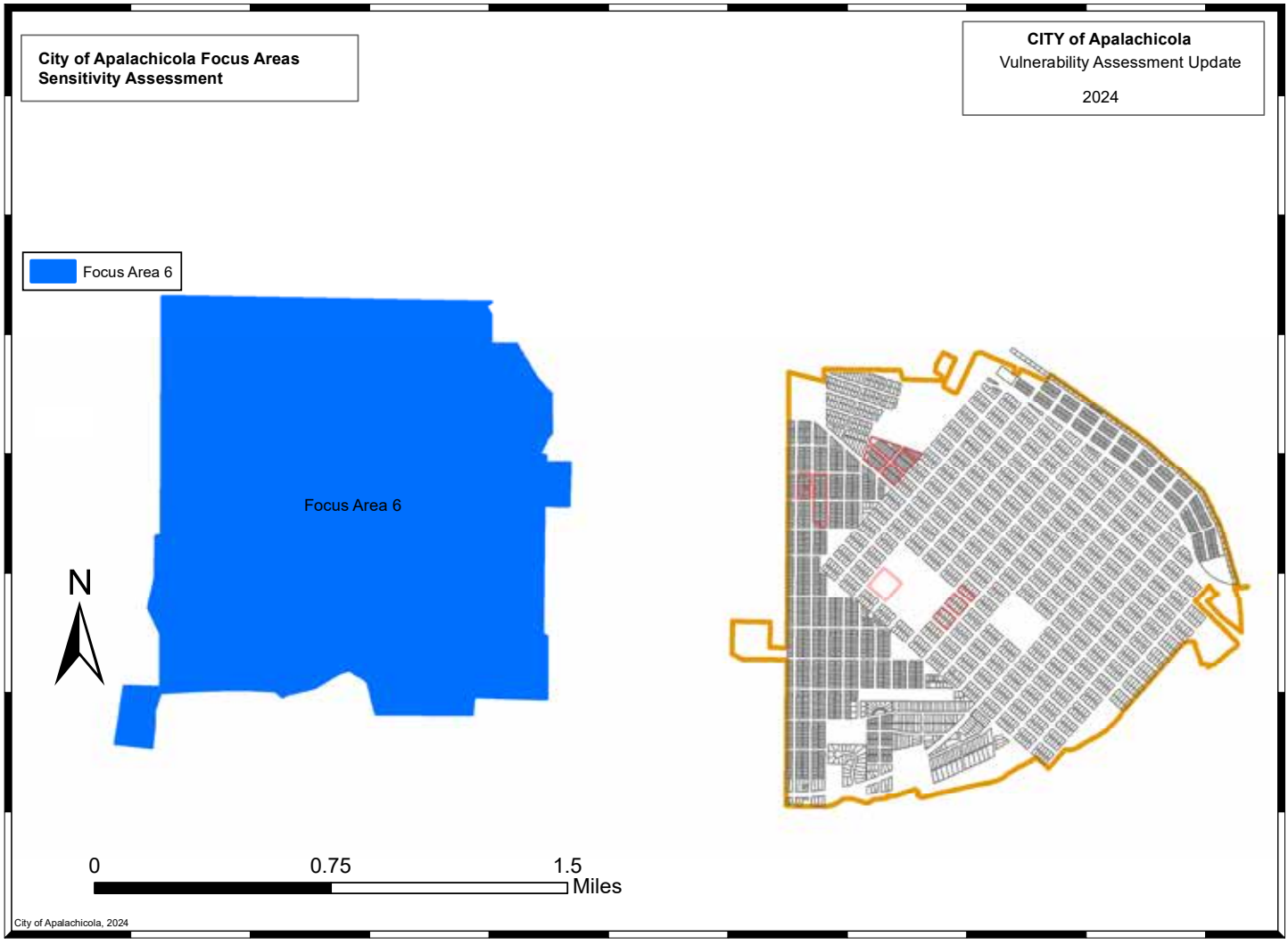
Map 330 (Appendix 3 - Maps) shows prioritized Focus Area 6. Table 65 (Appendix 2 - Tables) identifies assets within Focus Area 6.

Focus Area 6 is a 985.7 acre parcel west of the City that houses the City's two main critical utility assets: the wastewater treatment plant and the City drinking water facility.

**Focus Area 6 Critical Assets**

- Wastewater Treatment Facility
- Water Treatment Plan

**Map 330 - Focus Area 6 Boundaries**



## FOCUS AREA 6 ASSET IMPACTS

### Transportation/Airports

*Cleve Randolph Airport*

• 10-year events do not affect Cleve Randolph Airport except 2100_IntHi impacts vegetated areas of the airport complex.
• All 50-year storm events impact vegetated areas of the airport complex.
• All 100-year storm events impact vegetated areas of the airport complex.
• All 500-year storm events have major impacts on Cleve Randolph Airport.
• No Tidal scenarios affect Cleve Randolph Airport.

### Infrastructure/Wastewater Treatment Facilities and Lift Stations

*Apalachicola Wastewater Treatment Facility*

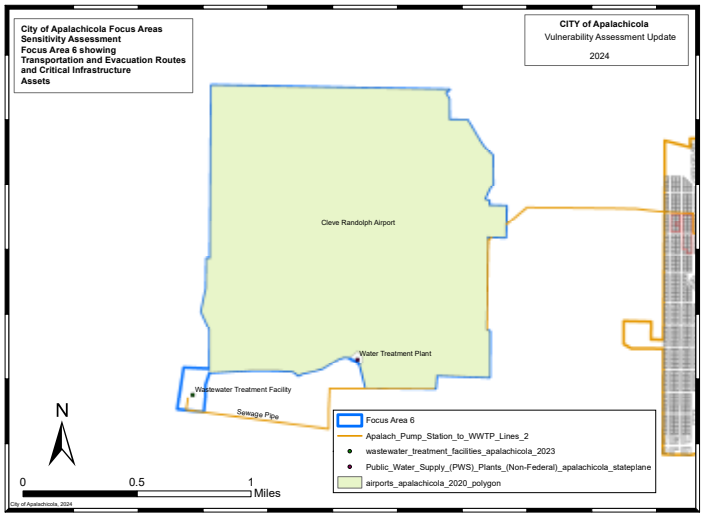
• No 10-year events impact Apalachicola Wastewater Treatment Facility except the 2100_IntLo and 2070_IntHi scenarios have some flooding of south side vegetation.
• The 2100_IntHi scenario has floodwaters against south side of southwest tank.
• The 50-year events 2023_NoSLR, 2040_IntLo, and 2070_IntLo have some flooding of south side vegetation. 50-year events 2100_IntLo and 2040_IntHi have floodwaters against south side of southwest tank. 50-year event 2070_IntHi has flooding of southwest tank. 50-year 2100_Int Hi has major flooding of south 1/2 of WWTP site.
• The 100-year events 2023_NoSLR, 2040_IntLo, 2070_IntLo, 2040_IntHi causes flooding of the southwest tank. 2100_IntLo and 2070_IntHi causes major flooding of south side of WWTP site. A 2100_IntHi event causes major flooding of southern 3/4 of WWTP site.
• All 500-year events produce major impacts on Apalachicola Wastewater Treatment Facility.
• No Tidal scenarios affect Apalachicola Wastewater Treatment Facility.

### Infrastructure/Drinking Water Facilities

*Apalachicola Water Treatment Facility*

• No 10-year, 50-year, or 100-year scenarios impact the Apalachicola Water Treatment Facility.
• These 500-year scenarios impact the Apalachicola Water Treatment Facility 2070_IntLo, 2100_IntLo, 2040_IntHi, 2070_IntHi, and 2100_IntHi.
• No Tidal scenarios affect Apalachicola Water Treatment Facility.

**Map 331 - Focus Area 6 Infrastructure Assets**



# Adaptation Planning Overview

Adaptation planning is a series of steps a community takes to become more resilient to the impacts of sea level rise.

Apalachicola, like most small Florida coastal communities, must work with a limited personnel and budget constraints to coordinate hazard mitigation planning. Often unforeseen infrastructure emergencies arise during storm events and unexpected flooding can occur in unexpected areas. In short, no manner of long term planning can account for the unexpected.

Listed below are the four main categories of adaptation strategies a community may use to adapt to storm surge.

**Protection**
Strategies that involve "hard" and "soft" structurally defensive measures to mitigate impacts of rising seas in order to decrease vulnerability while allowing structures and infrastructure to remain unaltered. Two examples are shoreline armoring and beach renourishment. Protection strategies may be targeted for areas of a community that are location-dependent and cannot be significantly altered or relocated, such as downtown centers, areas of historical significance, or waterdependent uses.

**Accommodation**
Strategies that do not act as a barrier, but rather alter the design through measures such as elevation or stormwater improvements, to allow the structure of infrastructure system to stay intact. Rather than preventing flooding or inundation, these strategies aim to reduce potential risks.

**Managed Retreat**
Strategies that involve the actual removal of existing development, their possible relocation to other areas, and/or the prevention of future development in high-risk areas. Retreat strategies usually involve the acquisition of vulnerable land for public ownership, but may include other strategies such as transfer of development rights, purchase of development right, rolling and conservation easements.

**Avoid**
involves ensuring development does not take place in areas subject to coastal hazards associated with sea level rise or where the risk is low at present but will increase over time. This may involve identifying future "limited development" areas within local government planning documents. A wide range of planning tools may be involved, leading to adecision to avoid development in areas subject to moderate to high risk. Regulatory tools may include the designation or zoning of lands for limited development or non-habitable uses. An avoid strategy may include land acquisition or restriction tools such as aland trust, or the transfer of development potential to areas with low or no risk due to sea level rise.

## UPDATED ADAPTATION STRATEGIES

The City's original 2017 Vulnerability Analysis outlined a suggestion that included incorporating the City's downtown commercial district, particularly near the waterfront, as an Adaptation Action Area. See Map ... Focus Area 1.

The implementation of an Adaptation Action Area within Apalachicola's C-1, C-4 and RF district would allow the City to gradually plan for adaptation to current and future sea level rise and other potential impacts.

The four strategies (protection, accommodation, retreat and avoidance) could be modified to provide an avenue for the City to address the four major impacts of floodingconcern.

**Protection strategies** may be appropriate for the downtown areas that are location-dependent and cannot be significantly altered or relocated, such as historical resources, or water- dependent uses. Protection could include shoreline armoring that is either natural or man-made. Examples include: living shorelines, tide gates and saltwater intrusion barriers. Vulnerable resources such as the Historic Middlebrook Building and Harrison Raney Building would benefit from the flood-protection barriers methods such as Tiger Dams which are intended to protect against up to three feet of storm flooding. Protection can also refer to the infrastructure within the floodprone areas within the City that can be affected by storm surge or sea level rise. Stormwater outfalls, water utilities, communication lines, etc.

**Accommodation strategies** aim to reduce potential risks rather than seeking to prevent flooding or inundation entirely. Examples include: the flood proofing of nonresidential structures, vertical elevation of structures; using structural fill to raise grade elevations; limit development in projected hazard zones; planting salt water tolerant plant species. If a critical facility in a high risk area requires substantial upgrades, it might be cost-effective in terms of hazard avoidance to relocate the facility.

**Managed Retreat or Relocation strategies** may involve the transition of vulnerable lands from private to public ownership, but may also include a combination other strategies such as transfer of development rights (TDRs), purchase of development rights and conservation easements. Examples include infrastructure relocation/removal; and, transfer of development rights to upland sending areas that are characterized by lower vulnerabilities to coastal hazards.

**Avoidance strategies** may involve identifying opportunities for future conservation or low density development areas within local government planning documents. A wide range of planning tools may be identified, facilitating a local decision to limit development in areas subject to moderate to high risk. Regulatory tools may include the designation of lands for low density or passive uses. An avoidance strategy may include land acquisition or tools such as a land trusts, zoning codes, and overlay zones.

## INFRASTRUCTURE PROTECTION

In addition to the Adaptation Action Area identification, (Focus Area Map Series) the City has identified focus Area 5 as a priority because of the vulnerable infrastructure located within this area that should be protected. Table 65 (Appendix 2 - Tables) identifies important infrastructure including the wastewater treatment facility, stormwater outfalls, drinking water facility and several critical community and emergency facilities.

A more indepth analysis and community outreach effort is expected in coming months as the City prepares to conduct a Adaptation Action Plan.