Urban Land Institute

Southeast Florida/ Caribbean

CITY OF FORT LAUDERDALE

Building a Resilient Fort Lauderdale: DEVELOPING CRITERIA FOR ROAD ELEVATION

BRIEFING BOOK – March 2024

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Executive Summary

As a peninsula, the state of Florida and all its coastal communities are extremely vulnerable to sea level rise. Fort Lauderdale already faces a challenging problem of loss of service to low lying roadways throughout the City as tidal inundation increases the frequency, intensity, and duration of flooding. An extended King Tide season, rising groundwater table, intense rainfall, and sea level rise all contribute to roadway flooding, creating public safety and access concerns related to impassable roadways. The City has used several methods to reduce coastal flooding including raising seawalls and installing tidal valves. For those locations where these methods have not resolved the tidal flooding, roadway elevation has been proposed as the next potential solution.

The City's 2035 Vision Plan, Fast Forward Fort Lauderdale, imagines a future sustainable and resilient community. As the City population and tourist visitation grow, the impact of sea level rise on streets must be addressed in a strategic manner. Evacuation routes and popular roads such as commuter routes often are heavily used and the level of service in conjunction with climate impacts, highlight the need for improved resilience. Residential roadways are often located at the interface of the public right of way and private property, elevation of a roadway is complicated by the impact private driveways, private landscaping, utilities such as underground water and wastewater pipes, and overall drainage. By elevating or not elevating a roadway, the City may be subject to litigation for the consequences of impacting access to or flooding of private property. Criteria are needed to help set policy guidance for prioritizing what roads to elevate, how much to elevate them, when to elevate them and how to pay for the improvements. This last item requires a careful review of possible funding mechanisms for this costly approach to mitigate roadway flooding.

This briefing book has been developed to provide members of the Urban Land Institute's Advisory Service Panel convening on March 10-14, 2024, with an overview of the City and to frame the challenges of road elevation. The panel is expected to use this information to develop a set of criteria for road elevation. Recommendations from the panel will be presented to the City Commission as a basis for future policy guidance on road elevation. Implementation of roadway elevation criteria will help the City adapt to sea level rise meeting its long-term vision to be a sustainable and resilient community.

I. Introduction

With seven miles of shoreline; 300+ miles of waterway coastline; a flat topography; a shallow, porous aquifer; and a subtropical climate; Fort Lauderdale is vulnerable to the effects of climate change, particularly sea level rise and extreme rain events. The City Commission met on January 31, 2020, to identify and prioritize the initiatives for the City to focus on in 2020. One of the five identified top priorities was Resiliency, highlighting the City's efforts to continually increase its capacity to withstand and recover quickly from climate challenges and other stressors. Since that time, infrastructure and resilience have been on the Commission's annual priority list.

The City of Fort Lauderdale is a national leader on the topic of resiliency. The City has a dedicated program of seven staff working on sustainability and climate resilience. All the City's recent infrastructure master plans incorporate sea level rise and climate concerns into the long-term planning effort. An entire chapter in the City's Advance Fort Lauderdale Comprehensive Plan is dedicated to climate change policies.

Fort Lauderdale's strategic location and convenient access to global markets, its multilingual and multicultural professional workforce, and numerous education and employees training programs has allowed Fort Lauderdale to see an increase in population growth, infrastructure development and industries relocating to the area, providing economic expansion. The City of Fort Lauderdale is a warm and welcoming community famous for its beaches, arts, culture, and outdoor events. With all the allures and developing markets, this does present unique challenges for the City. Particularly, the need to address tidal flooding on City streets in low lying areas. While other solutions have been implemented, residence and the City Commission have requested staff to develop criteria for road elevation and make recommendations on how to fund those projects.

Fort Lauderdale infrastructure, specifically roadways, requires necessary improvements and, in tidal influenced locations, this can include elevation. Coupled with rising sea levels, some parts of the city are inundated with flooding on sunny days. Each neighborhood experiences tidal flooding and/or rain events separately, which only highlights why a one size fits all solution would not be beneficial.

This briefing book provides much of the background information necessary to tailor a solution to a city-wide problem. The overall trends in growth and development across multiple sectors show that climate adaptation is necessary to provide the level of service required on roadways and public safety. This document summarizes the City's goals, demographics, financing, and ongoing efforts to address coastal flooding. It provides the context and background for the need for criteria for road elevation.

II. The Assignment

A. Summary of the Problem

The City of Fort Lauderdale, Florida has asked the Urban Land Institute to convene an Advisory Services Panel to outline recommended criteria for a policy to equitably guide the selection of City-owned roadways for elevation and next steps the City can take towards implementing this policy. Fort Lauderdale is interested in understanding how to prioritize which roads to elevate and how to fund these improvements.

B. Questions to be Addressed by the Panel

1) What are the recommended criteria for a policy to equitably guide the selection of city owned roadways for elevation? What options should be evaluated before considering road elevation? Which elements take priority in the elevation criteria? Below are possible criteria to consider as a starting point.
   a. Physical: Amount of elevation required, current frequency of breaches of the road by nuisance flooding, road type (evacuation route, commuter, residential), base flood elevation of the surrounding area, current road elevations, impacts to underground infrastructure, impacts to drainage, impacts on historic structures, impact of adjacent properties
   b. Timing: When the improvements might occur, the City's resilience goals associated with sea level rise, staging
   c. Equity and Stakeholder Impact: number of parties benefiting from the elevation of the roadway, number, and value of the properties whose access is preserved
   d. Implementation: availability of funding, jurisdictional control

2) How does sea level rise impact the criteria and the City's actions?
   a. How high should the road be elevated?
   b. What are the city's legal obligations regarding street raising?
   c. When should the City consider other options including retreat versus elevating roadways as a strategy?

3) How can the City address harmonization – improvements on public versus private property needed after the roads are raised - and who covers the cost?

4) What is the estimated range of cost associated with these projects? How might the City fund these improvements? How should the City balance road raising needs within coastal districts of the city with other investments that may be needed in the city's inland districts?

III. City Overview

A. Overview and history of the City (including regional context)

Incorporated on March 27, 1911, the City of Fort Lauderdale is framed on the east coast of Florida by seven miles of golden sand beaches and by the Everglades on the west. Between the two, the Intracoastal Waterway, the New River, and a canal system reminiscent of Venice curve through the interior. Encompassing nearly 36 square miles with a population of over 189,000 in 2023, Fort Lauderdale is the largest of Broward County's 31 municipalities and one of the ten largest cities in Florida.

Fort Lauderdale, currently nicknamed "The Venice of America" was known as the "New River Settlement" prior to the 20th century pictured in blue in Figure 1. The introduction of the Florida East Cost Railroads in the mid-1890s initiated organized development in the area. After incorporation in 1911 Fort Lauderdale was designated the county seat of the newly formed Broward County in 1915. The first census after the City's incorporation, the 1920 census, documented a population of 2,065.

Figure 1. Map identifying the location of Fort Lauderdale, Fl.

Fort Lauderdale had its first considerable development that began in the 1920s amidst the Florida land boom. Fort Lauderdale became a major United States Naval Base during World War II. After the war ended, service members returned to the area and, in earnest, an enormous population explosion began. Today, the City of Fort Lauderdale is known as a major yachting capital, one of the nation's most popular tourist destinations, and the center of a metropolitan area with more than 18 million visitors annually.

The City of Fort Lauderdale is a warm and welcoming community famous for its beaches, arts, culture, and outdoor events. Fort Lauderdale is an outstanding place to live, work, and play. There is dining and shopping on Las Olas Boulevard, gondola rides on the canals, beautifully landscaped beachfront promenades, luxury hotels, historical districts, and mansions and yachts along Millionaires Row. Other attractions, such as the Arts and Entertainment District and the Riverwalk, make Fort Lauderdale a premier destination for people of all ages. The City is just a short drive away from America's Everglades, the largest subtropical wilderness in the United States.

B. Regional and city economic drivers; major employers; economic trends

Greater Fort Lauderdale ranked #2 best business climate by Business Facilities Magazine (mid-sized metro) in 2021 & 2022. If South Florida were a country, it would be the 33rd largest economy in the world with a $365 billion GDP.

A DESIRABLE CITY FOR A SUCCESSFUL BUSINESS

LARGEST PRIVATE EMPLOYERS—RANKED BY EMPLOYEES

COMPANY	ESTIMATED EMPLOYEES	TYPE OF BUSINESS
AutoNation	2,469	Automotive
Citrix	1,640	Telecommunication
Kemet Corporation	1,000	Manufacturing
Rick Case Automotive Group	968	Automotive
SDI International	800	Management Services
Zimmerman	781	Advertising
Convey Health Solutions	597	Pharmacies

Source: Greater Fort Lauderdale Alliance's Economic Sourcebook and Market Profile 2024

Table 1. Largest Private Employers in Fort Lauderdale Ranked By Employees

According to Greater Fort Lauderdale Alliance foundation, metropolitan Broward County is home to more than 200 corporate and international regional headquarters, including AutoNation, Chewy, Citrix, El Al Israel Airlines, Hotwire Communications, JetBlue Travel Products, Kaplan Inc., Magic Leap, Spirit Airlines, West Marine and UKG as shown in Table 1. It is the geographic and business center of South Florida and the largest metropolitan area in the Southeast United States with a population of 6.1 million and a workforce over 3.1 million. U.S. and international companies appreciate Greater Fort Lauderdale's strategic co-location of an international airport, major cargo, and cruise port with commercial rail service for the convenient access to global markets. Aviation, technology, business, financial and professional services, life sciences, manufacturing and other knowledge-based companies benefit from the region's large and growing pool of highly skilled, college-educated workers.

C. Metropolitan land use and development patterns; development trends

Land use in the City of Fort Lauderdale is governed by Broward County Land Use policies. This is important as the City goals must align with Broward County policy and ensure compliance when new or redevelopment is forthcoming. Broward County evaluates plan amendments within the County and strongly discourages those amendments which would place additional residential and non-residential development at risk of flooding from sea level rise. Standards are utilized to control the intensity or density of all uses within the City to ensure compliance. These standards include, but are not limited to, the regulation of the amount of open space surfaces required for a development to control the intensity of development, especially in areas of sensitive natural resources to reduce environmental impacts.

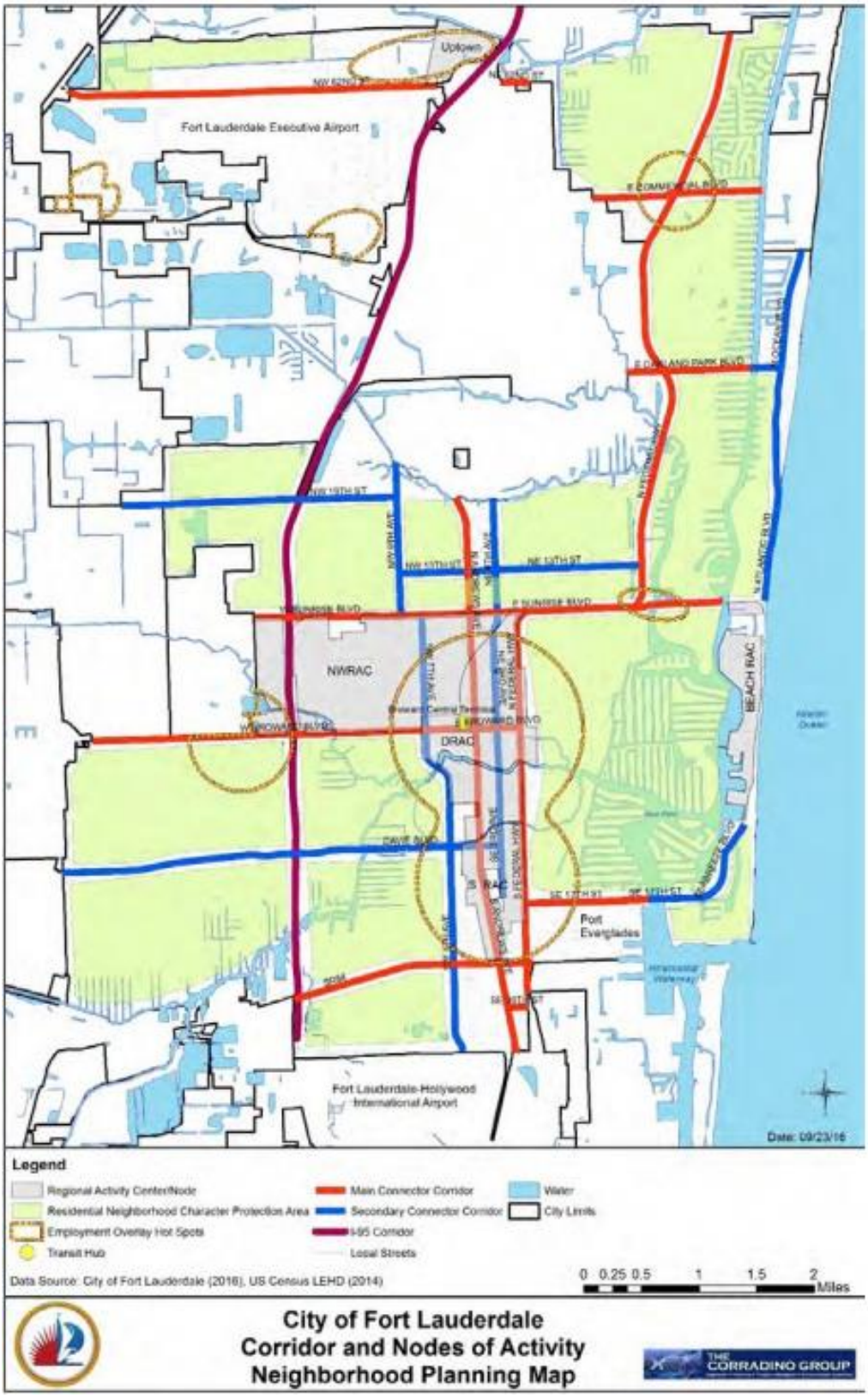
One of Broward County strategies is to increase the resilience of our community to the effects of climate change. Applying the unified sea level rise projection for Southeast Florida when considering land use (including areas of potential population growth, natural system restoration, and infrastructure adaptation) and long-term functionality of appurtenant infrastructure, especially water management, drainage, water supply and water treatment systems, both coastal and inland.

The City's short-term urban planning horizon is five (5) years, and the long term is 2040. The Future Land Use Map, depicted in Figure 4, contains an adequate supply of land in each district to meet the demands of the existing and future population up to the projected 2040 population. Future Land Uses are broad overlaying land use identifiers which encompass low density and high-density zones. An example is a Regional Activity Center as it is a high-intensity, high-density multi-use area that encourages attractive and functional mixed living, working, shopping, education, and recreational activities.

Local and Regional Activity Center land use designation is to support a balanced mix of land uses characterized by compactness, pedestrian-friendly design, neighborhood-scale and framed by architecture and landscape design appropriate to local history and ecology. Development patterns within these Centers reflect planning and design principles such as walkable neighborhoods oriented around the five-minute walk, primary orientation toward public transit systems, a centrally located community-serving land use or land uses and greater integration of housing, and employment. Figure 2 shows Future Land Use and Local and Regional Activity Planning. For large scale master plans depicting the City landscape, please see Urban Design and Planning link on City webpage.

To prevent urban sprawl, the City maximizes the use of existing public facilities and centralizes commercial, government, retail, residential uses in urban redevelopment and downtown revitalization areas. The City has previously engaged ULI to look at the relation of land elevation to targeted areas for future growth, planning future density for higher elevation which are more relative to sea level rise. With such a dense space of multi-functional uses, the roadways must also reflect those uses and adapt to the changing population growth and sea level rise. See Broward County Comprehensive Plan and Fort Lauderdale's Comprehensive Plan Volume II for additional information.

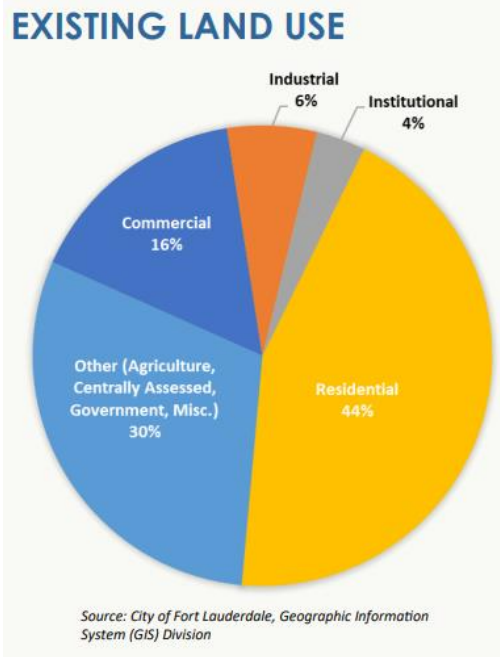
Figure 2. Future Land Use Element Data Updated September 2020: Neighborhood and Regional Activity Center Planning – Corridor and Nodes Map



D. Land use overview (percentage of uses within the city)

Fort Lauderdale encompasses approximately 36.29 square miles bounded by the Atlantic Ocean to the east; Hollywood, Dania Beach, and Davie, and the Fort Lauderdale-Hollywood International Airport to the south; Plantation, Lauderhill, Lauderdale Lakes, and North Lauderdale, and unincorporated sections on Broward County to the west; Pompano Beach to the north; and Lauderdale-by-the-Sea and Sea Ranch Lakes to the northeast. The City's boundaries almost surround the municipalities of Wilton Manors, Lazy Lakes, and Oakland Park, which are located between the Middle River area to the south and the Cypress Creek area to the north.

Chart 1. Percentage Distribution of City of Fort Lauderdale Land Use



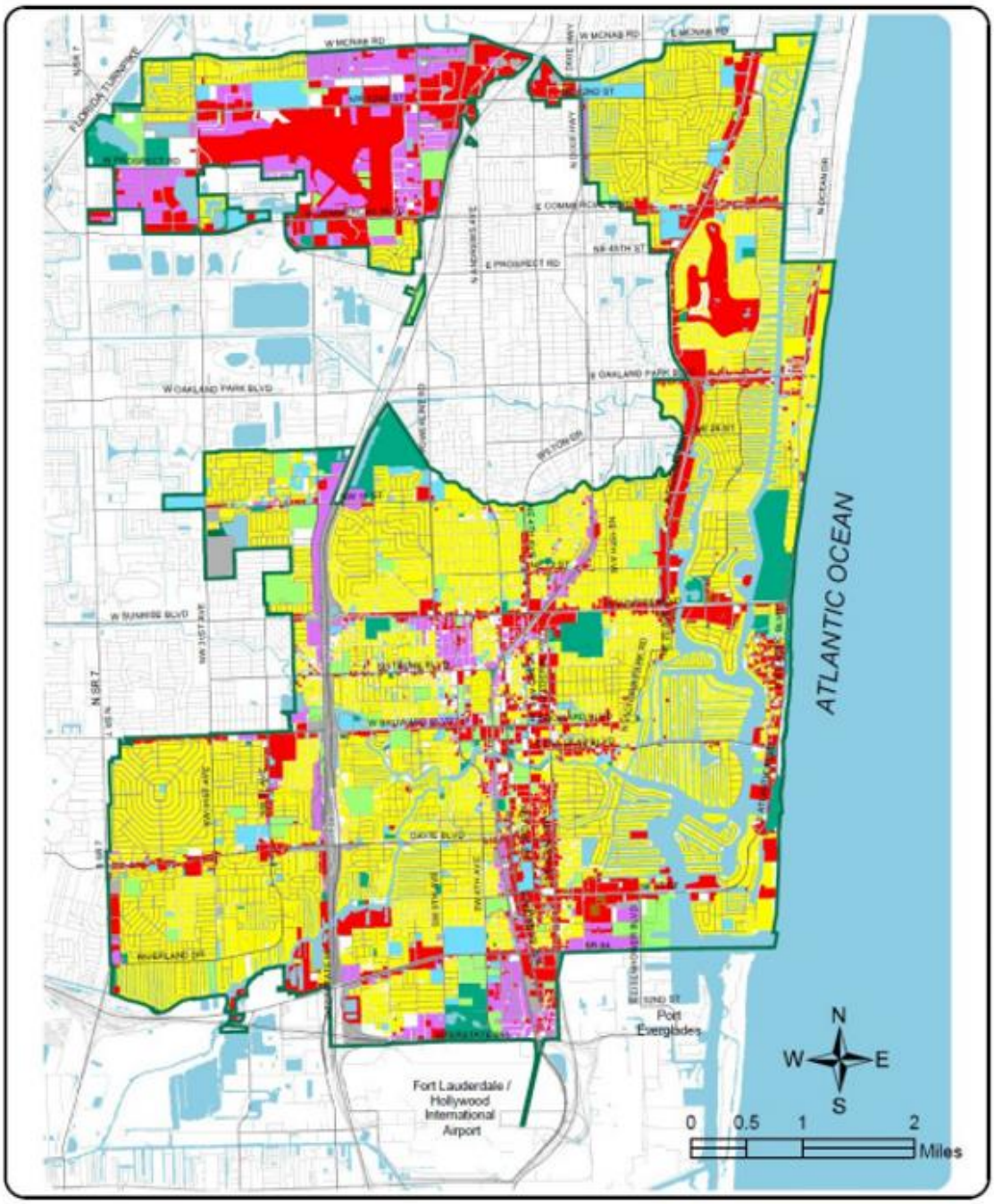
The City of Fort Lauderdale is perpetually growing and evolving. Although the trends are presented separately, the interactions between them influence the direction of the City's future. These constantly changing trends and demographics greatly influence the types and costs of governmental services provided to our neighbors.

Chart 1 highlights the current distribution of Land Use. Table 2 displays land use in the City of Fort Lauderdale in 2016. As illustrated, residential and commercial/business uses represent much of the City's land uses, with commercial uses concentrated in the Downtown core and along major transportation corridors. The City industrial lands are generally concentrated along the west side of Interstate 95, in the vicinity of Fort Lauderdale-Hollywood International Airport to the south, and in the Cypress Creek area in the north. (Figure 3 Land Use Map) Please see Fort Lauderdale Comprehensive Plan for details.

Table 2. 2016 Land Use Type by Acreage and Percentage in the City of Fort Lauderdale

Land Use	Acres	Percent of Land Area
Residential	10,085	40%
Commercial	5,411	22%
Industrial	2,167	9%
Agricultural	3	<1%
Institutional	703	3%
Government	3,159	13%
Miscellaneous (i.e. some water, irrigation ditches)	3,413	14%
Mixed Use	89	<1%
Centrally Assessed (i.e. utility lines, railroad tracks)	101	<1%
TOTAL	**25,131**	**100%**

Figure 3. 2016 Land Use Map of the City of Fort Lauderdale



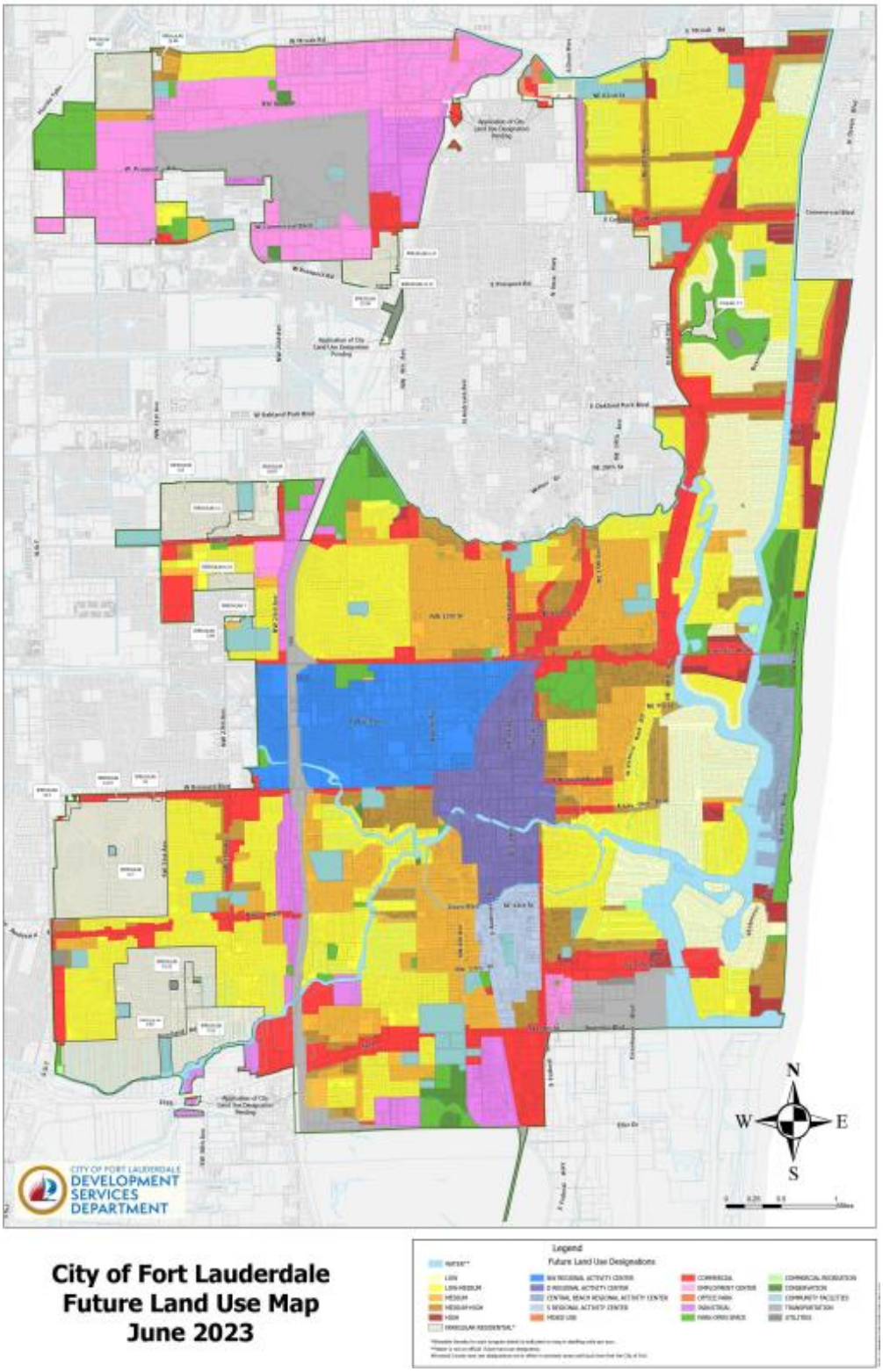
City Of Fort Lauderdale Existing Land Use

Legend

- Residential
- Commercial
- Mixed Use
- Industrial
- Institutional
- Parks, Forest & Recreation
- Government
- Agricultural
- Miscellaneous

MAP SOURCE: CITY OF FORT LAUDERDALE URBAN DESIGN & PLANNING DEPARTMENT

Figure 4. Future Land Use Map of the City of Fort Lauderdale updated 2023



E. Transportation and access

The City of Fort Lauderdale offers an extensive transportation network that includes Port Everglades, Fort Lauderdale/Hollywood International Airport (FLL), Fort Lauderdale Executive Airport (FXE), three major railways, highways, convenient ridesharing and carpool options, a mass transit system, water taxis, and community shuttles.

The predominant mode of transportation in Fort Lauderdale is by automobile highlighted in Chart 2. The City has a total of 537.4 miles of roadway. Annually, Fort Lauderdale sees over 300 million trips, associated with over 1.4 billion vehicle miles traveled. Part of the City 2035 Vision Plan calls for several initiatives and implementations within the Transportation and Mobility Department (TAM) to reduce single vehicular traffic.

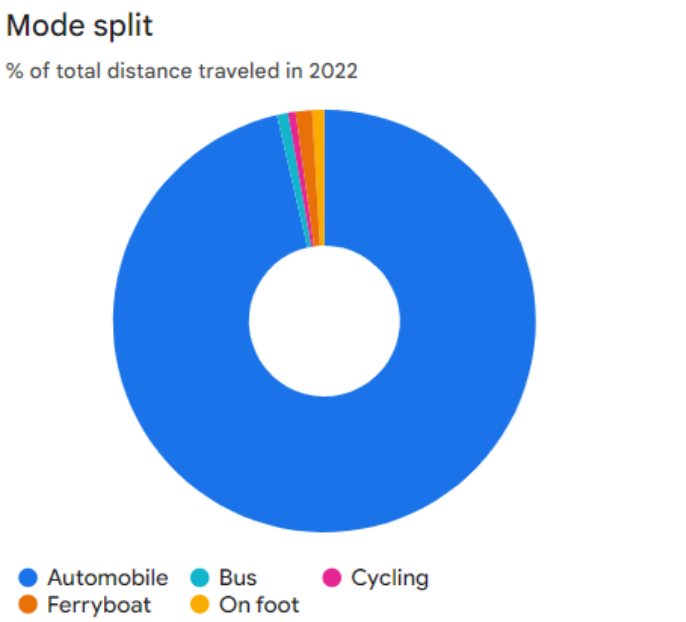


Chart 2. Mode of Transport in the City of Fort Lauderdale

Port Everglades is Florida's number one temperature-controlled cargo port, and one of the world's busiest seaports, generating more than $33 billion worth of economic activity. Almost 15% of all U.S./Latin America trade passes through Port Everglades, and the port services over 150 locations in 70 countries. Port Everglades processes more than 1.7 million cruise passengers and accounts for approximately one-third of containerized cargo transported to the Caribbean. Port Everglades generates big economic advantages that flow right into our community, making it an economic powerhouse. Annually, the Port supports over 7,000 jobs locally and over 200,000 statewide.

The Fort Lauderdale/Hollywood International Airport (FLL) is one of the fastest growing passenger and cargo hubs in the country and is centrally located between Fort Lauderdale and Dania Beach in the heart of Florida's Gold Coast. According to The Greater Fort Lauderdale Alliance, FLL has an annual economic impact of $37.5 billion. In 2020, FLL ranked sixth in the U.S. for total passenger traffic recovery and fourth in international traffic recovery, providing service for more than 16 million passengers annually, including nonstop service to 135 destinations in 33 countries.

The Fort Lauderdale Executive Airport (FXE) is home to one of the top ten busiest general aviation airports in the nation, providing more than 163,000 take-offs and landings each year. FXE boasts a state-of-the-art, 24-hour Federal Aviation Administration (FAA) Air Traffic Control Tower that monitors more than 450 flights per day. FXE is owned and operated by the City of Fort Lauderdale. A recent Florida Department of Transportation (FDOT) Economic Impact Study identified FXE as an economic engine with job creation at 22,900 jobs, payroll at $1.2 billion, and an overall economic impact of $3.9 billion. The Airport serves as the hub to Fort Lauderdale's Foreign Trade Zone 241, which encourages initiatives to promote development of the industrial airpark, serves businesses engaged in international commerce in the greater Fort Lauderdale area, and maximizes the City's business retention and attraction of emerging industries. The Foreign-Trade Zone allows facilities to defer, reduce, or eliminate customs duties on foreign products.

Brightline is the only privately funded express passenger rail system in the country, and Florida's only high-speed passenger rail service crossing more than 235 miles. Brightline connects downtown Fort Lauderdale with neighboring cities such as Miami and West Palm Beach, and as far north as Orlando. Located at 101 NW 2nd Avenue downtown, Brightline connects passengers to events, music, arts, and culture within a few minutes walking distance. Brightline is contributing to an influx of visitors to nearby emerging neighborhoods such as FAT (Fashion, Art, Technology) Village and the MASS (Music, Arts South of Sunset) District, featuring galleries, boutiques, cafes, nightlife, outdoor art, and the downtown Riverwalk Arts & Entertainment District.

The Tri-Rail is the region's primary commuter rail service, connecting the City of Fort Lauderdale with 17 other local municipalities within Broward, Palm-Beach, and Miami Dade Counties, across 73.5 miles of rail. In operation since 1989, Tri-Rail provides 50 weekday trains and services over 3.7 million riders annually.

Broward County (BC) bus services have an interconnected road map to ensure commuters have access to other destinations throughout south Florida. BC utilizes a system wide map so commuters can track stops and destinations. BC transit also maintains a community shuttle service and is designed to increase the number of destinations within city limits that residents can access through public transit. All community shuttles connect to Broward County Transit fixed routes and are wheelchair accessible and equipped with bike racks.

An overarching goal of the City is to create a pedestrian friendly, multi-modal, connected community where neighbors and visitors can walk, bike, and use transit or other alternatives to single-occupancy vehicles to get to their many destinations. The growing list of transportation options in Fort Lauderdale includes micro mobility and micro transit services, Broward BCycle bike-share, BCT bus service, LauderGO! Community Shuttle, Circuit electric shuttles, Water Taxi, and Riverwalk Water Trolley. More information regarding mobility can be found in Resources under Transit Master Plan.

F. Infrastructure and utilities - availability, location, capacity, condition

The City of Fort Lauderdale Public Works Department is a large provider of infrastructure services in Broward County and is responsible for delivering many of the critical services and programs that affect the daily lives of our neighbors. The department also produces high-quality drinking water; collects, and treats wastewater; manages solid waste through recycling, garbage, and yard waste; oversees construction projects that provide direct neighborhood benefits, including streets, stormwater utilities, sewers, parks, buildings, parking facilities, fire stations, streetscapes, neighborhood improvements, and more.

The Public Works Department is committed to operating in a sustainable manner that includes increased recycling, improved stormwater management, environmental enhancement, and effective fleet maintenance adaptation.

The Public Works Department is made up of four divisions: Engineering, Sustainability, Strategic Support and Utilities.

The Utilities Division of Public Works is responsible for maintaining and supporting the City's water and wastewater infrastructure. The Division provides water to 176,000 Neighbors, 300,000 part-time residents and tourists, and six neighboring municipalities. It also manages and operates a wastewater system that collects and treats an average of 36.3 million gallons per day (MGD) of wastewater at the George T. Lohmeyer (GTL) Wastewater Treatment facility. Through Large User Agreements, the City provides wastewater treatment services for Fort Lauderdale, Oakland Park, Wilton Manors, Port Everglades, and parts of Davie and Tamarac.

The City of Fort Lauderdale water and wastewater infrastructure is a large, networked system of pipes for both distribution of potable water and collection of sewer waste. It also includes water meters, raw water wells, well pumps, valves, and wastewater pump stations. The City has more than 1,400 miles of potable water mains, sanitary sewer force-mains, and sanitary sewer gravity lines throughout the 38 square miles of the City's service area.

Two water treatment plants and a regional wastewater treatment plant serve our neighbors 24/7.

- Fiveash Water Treatment Plant - capacity is 70 MGD
- Peele Dixie Water Treatment Plant – capacity is 20 MGD
- George T. Lohmeyer Wastewater Treatment Plant – capacity is 55.7 MGD

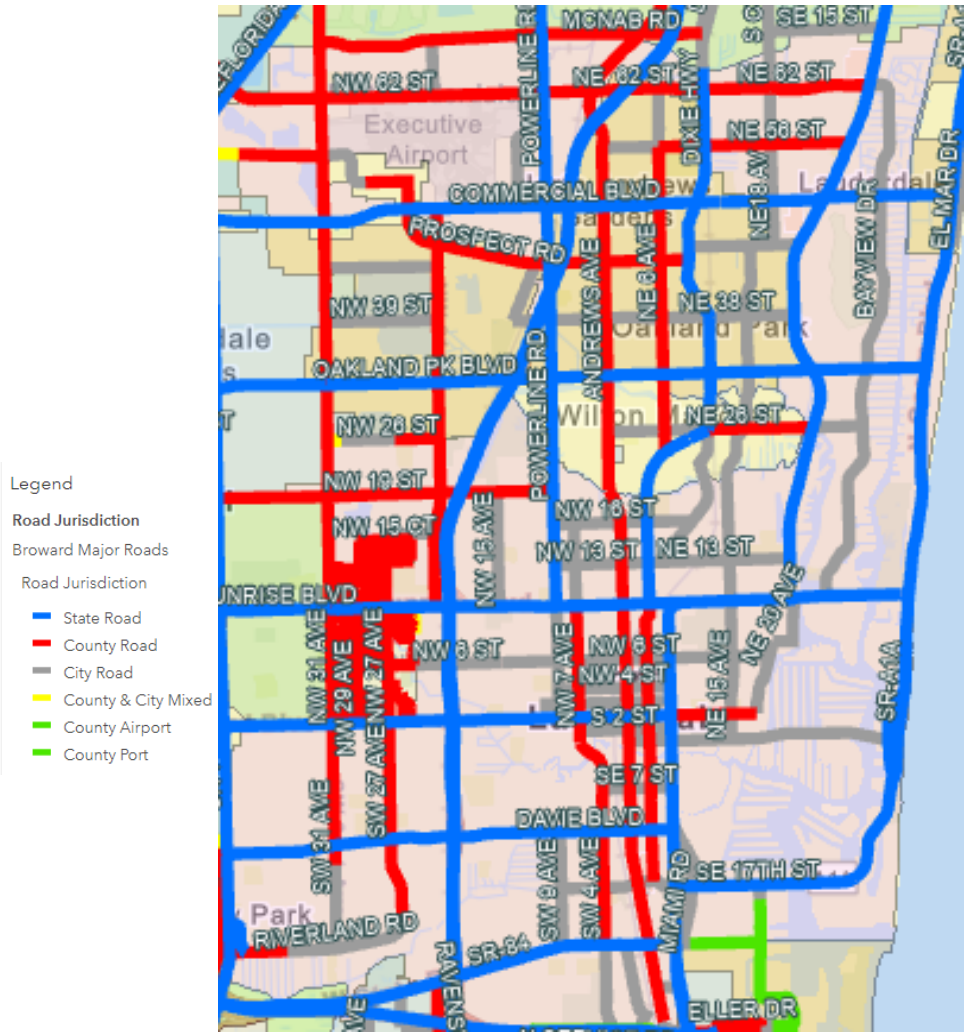
Electricity is provided to City residents by Florida Power & Light. Most of the power lines are above ground, but many residents have requested that their power lines be placed below ground for resilience and aesthetic reasons. Natural gas is provided by TECO-Peoples Gas and mulita-media communication networks such as Comcast and ATT. Additional information is available in utilities and stormwater master plans in Resources.

G. Special features, characteristics, and considerations

The City of Fort Lauderdale has intertwined urban master plans to help protect neighborhoods by ensuring that new developments adhere to well-balanced guidelines. The Downtown Master Plan protects residential neighborhoods by directing large-scale, high-rise, and high-density developments to the downtown core. The most intensive, commercially oriented development will be concentrated in the mixed-use urban center. The City is encouraging redevelopment that protects history and builds on the unique characteristics and distinct identities of our neighborhoods. The City aims to encourage redevelopment that is attractive, compatible with neighborhoods, pedestrian-friendly, and transit oriented.

Roadways are multi-jurisdictional citywide, shown in Figure 5. The state, county, and the City districts overlap with one another regarding streets and stormwater infrastructure. Scheduled maintenance of these assets varies depending upon who owns the system, with Fort Lauderdale having the most frequent scheduled inspections for stormwater.

Figure 5. Road Jurisdiction Map with the City of Fort Lauderdale



The South Florida Water Management District operates and maintains the regional water management system known as the Central and Southern Florida Project, which was authorized by Congress more than 60 years ago to provide flood control for a population of more than 9 million and protect residents and businesses from floods and droughts. This primary system of canals and natural waterways connects to community drainage districts and hundreds of smaller neighborhood systems to effectively manage floodwaters during heavy rain.

To achieve these goals, South Florida Water Management District (SFWMD) operations move water north and south of Lake Okeechobee to help protect coastal estuaries and to store water in other areas where it is needed depicted in Figure 6. Data collected throughout SFWMD is used in combination with computer simulation models to make operational decisions and to review and develop operating protocols and plans.

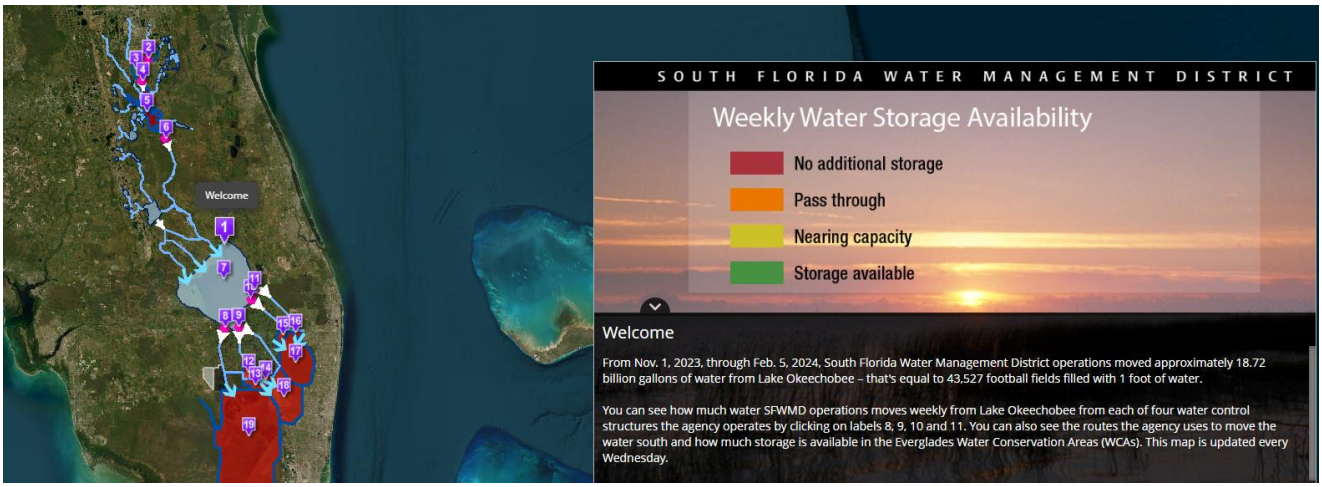


Figure 6. SFWMD Storage

As a result of this interconnected drainage system, flood control in South Florida is a shared responsibility between the SFWMD, county and city governments, local drainage districts, homeowners' associations, and residents. From November 1, 2023, through February 5, 2024, South Florida Water Management District operations moved approximately 18.72 billion gallons of water from Lake Okeechobee – that's equal to 43,527 football fields filled with 1 foot of water.

Water management in southeast Florida is a regional cross jurisdictional effort to move and maintain levels of water safely. During the April 2023 flood event, the SFWMD held water as the City was inundated from the 26 inches of rain fall in 8 hours, high tides, and saturated ground water table. Flow from the SFWMD would have overwhelmed the already exacerbated systems.

IV. Economics of the Study Area

A. Major employers and type/number of jobs (general)

Greater Fort Lauderdale, with a gross metro product of $81.3 billion, boasts a vibrant and diverse economy. Marine commerce is the area's leading industry, providing more than 134,000 jobs and an annual economic impact of $10.78 billion. (The Fort Lauderdale International Boat Show, the world's largest in-water boat show, alone has an annual economic impact of $650 million.) Tourism is the area's second largest industry, employing 114,386 and having an annual economic impact of $9.1 billion. Greater Fort Lauderdale is also an important center for international trade and business, has a strong manufacturing base, and serves as the corporate or regional headquarters for several corporations. The City's strong business climate and central location on South Florida's "Internet Coast", an emerging high-tech corridor that is home to more than 6,000 high technology firms, has made it a high-tech hotbed.

B. Employment types and trends

Fort Lauderdale's economy is based on several economic drivers. The tourism industry is largely centered on the City's seven miles of beaches and 165 miles of waterways. The 600,000-square-foot LEED certified Greater Fort Lauderdale Convention Center hosts numerous large conventions and smaller meetings annually. Fort Lauderdale-Hollywood International Airport is the nation's 21st busiest airport and includes a growing number of international flights. The airport and related business provide more than 44,000 jobs and have an annual economic impact of $2.6 billion. Fort Lauderdale's City-owned and operated Executive Airport is one of the nation's busiest general aviation airports. According to the Florida Department of Transportation's 2014 Statewide Economic Impact Study, the Executive Airport contributes to more than 5,100 jobs, and economic activity associated with FXE was reported to be $839 million annually. Port Everglades is ranked as the 11th busiest cargo port in the nation, and the second busiest cruise port in the world. Other major economic assets and employment centers include several major medical centers, Downtown, and the Cypress Creek Uptown business and technology district.

Employment serves as a gauge on the number of jobs existing in Fort Lauderdale. According to Figure 7, growth in both employment and the number of businesses occurred and generated increased tax revenues and additional expenditures for the City. Employment steadily increased over the years until 2020, due to the COVID-19 Pandemic. Since then, job gains occurred in 2021 and 2022.

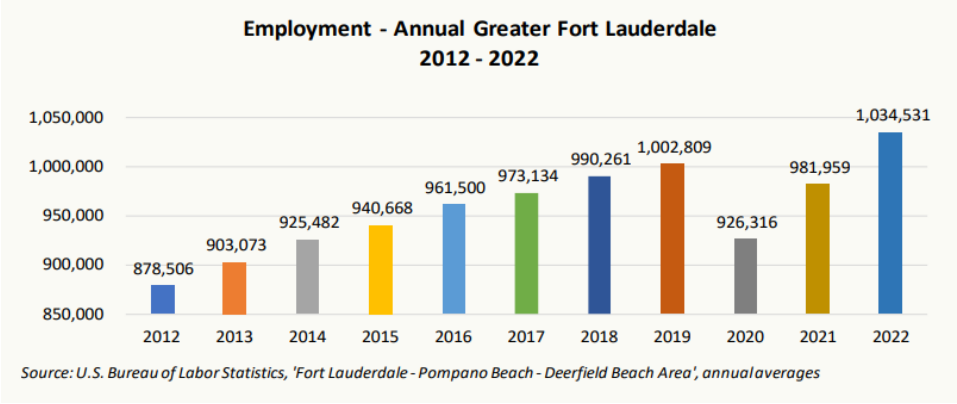


Figure 7. Employment Trends Greater Fort Lauderdale

Based on the U.S. Bureau of Labor Statistic, the City of Fort Lauderdale 2021 annual averages for unemployment rates is 4.9%, as shown in Figure 8. This is within the Federal Reserve unemployment rate range of 4.5% - 5% which indicates full employment.

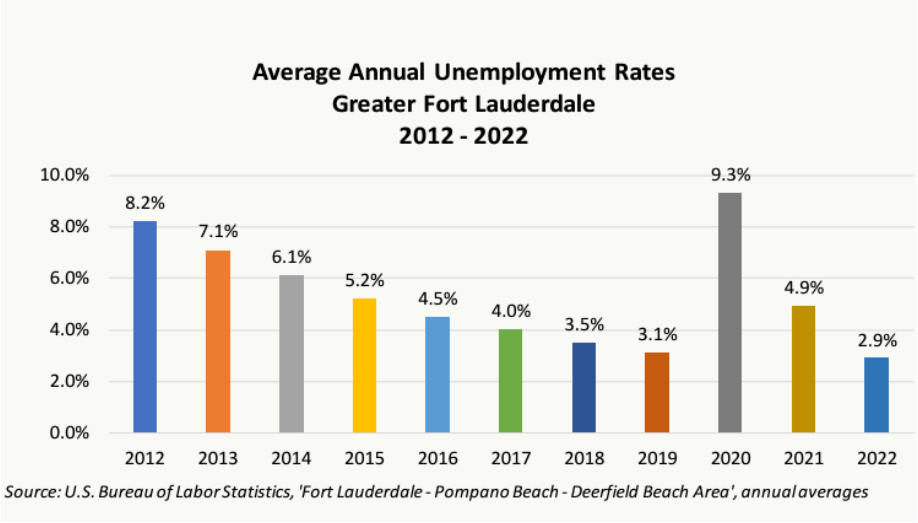


Figure 8. Unemployment Trends for Greater Fort Lauderdale

C. Income data

As shown in the Figure 9, the 2022 American Community Survey shows the median households' income in Fort Lauderdale is $81,544 which is substantially greater than the statewide median. The percentage of residents living below the poverty level was 18.5% greater than the statewide rate. This suggests that Fort Lauderdale has both residents more affluent and poorer than average. Household income over time is shown in Figure 10.

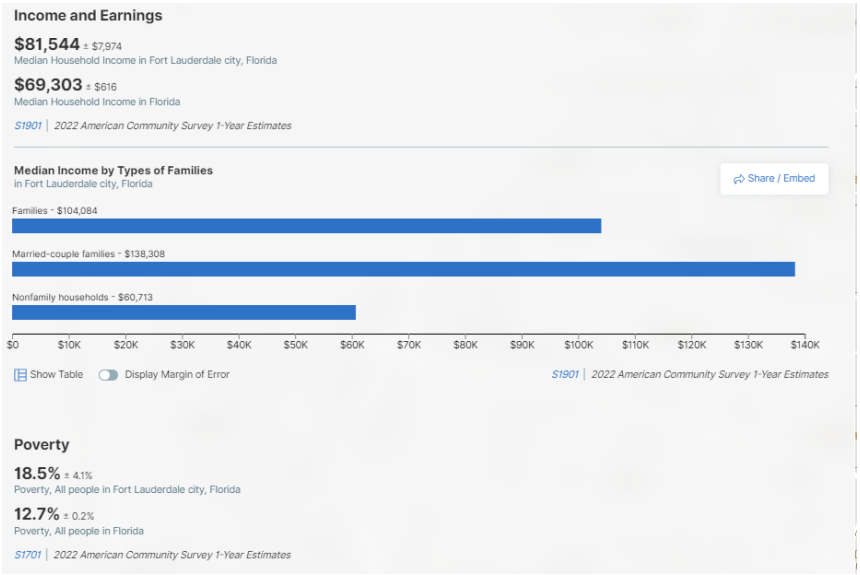


Figure 9. 2022 Household Income and Earnings in the City of Fort Lauderdale

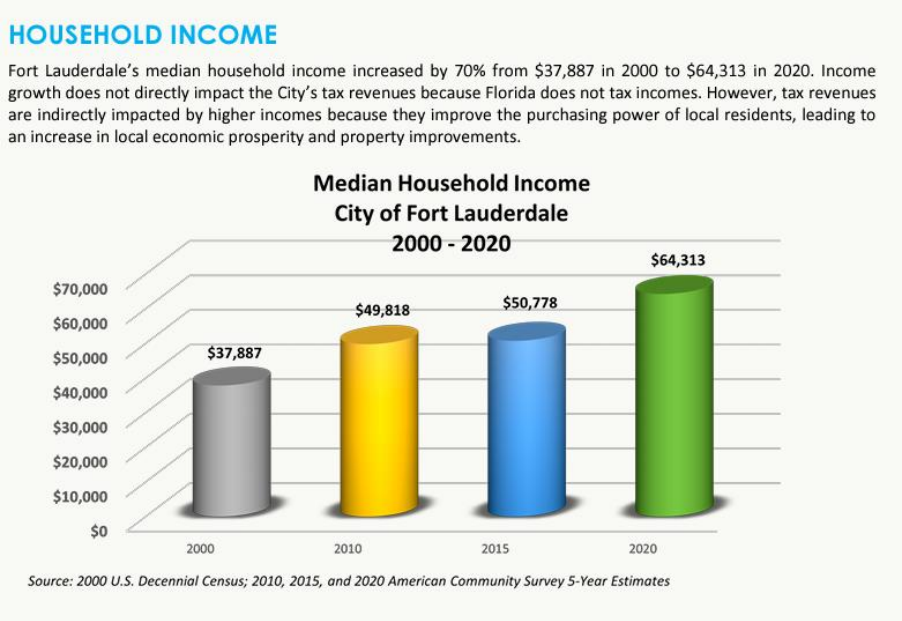
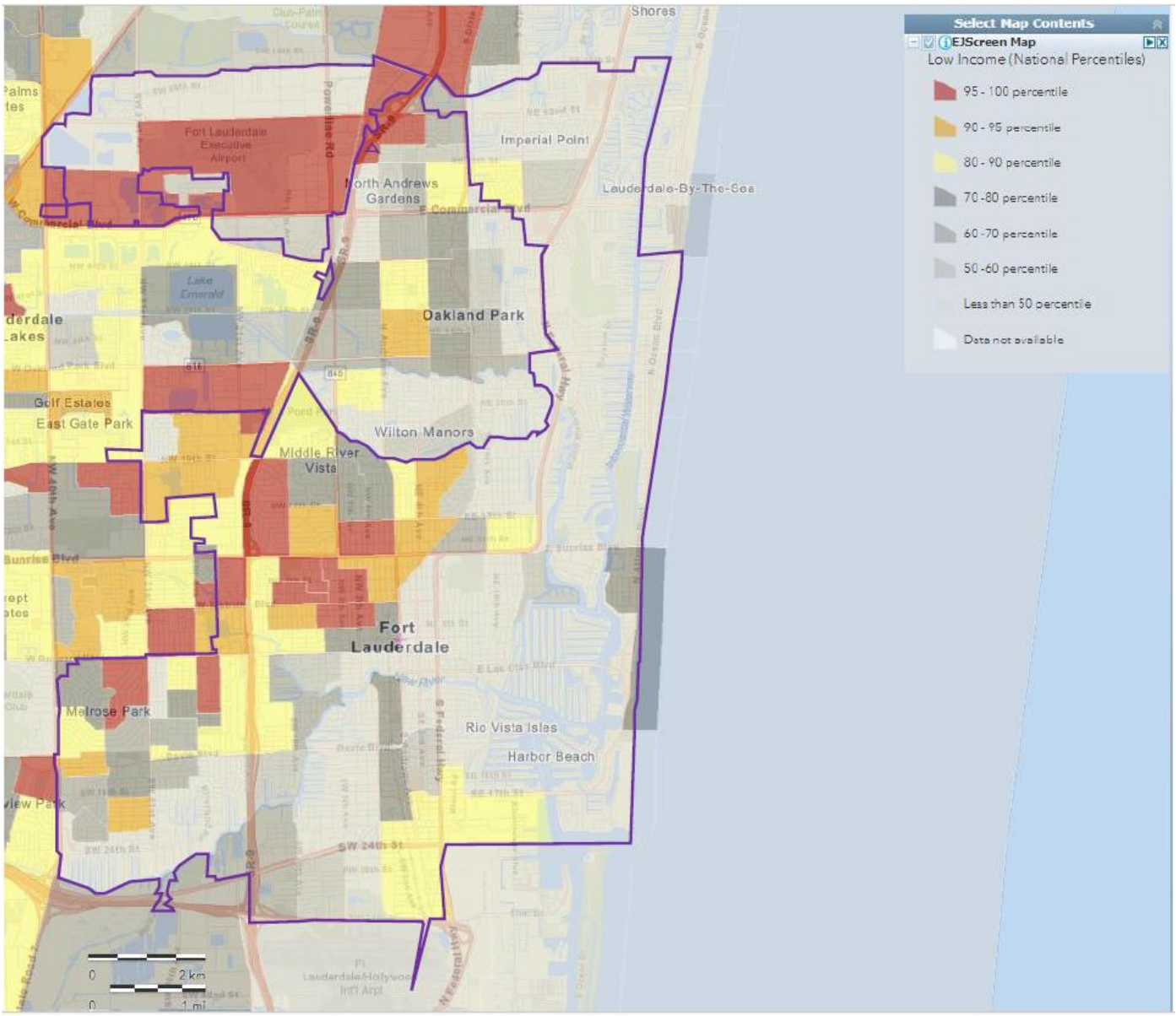


Figure 10. 2000-2020 Median Household Income Trends in the City of Fort Lauderdale

The greatest concentration of low income households is located in the western portion of the City, primarily in City Commission District 3 (Figure 11).

Figure 11. Low Income (National Percentiles) of City of Fort Lauderdale -EPA's Environmental Justice and Mapping Tool EJScreen (epa.gov)



V. Demographics

A. Overview of City trends

Fort Lauderdale possessed a diverse and vibrant resident population totaling 181,818 as of 2021. Population has steadily increased, and that trend is expected to continue for the foreseeable future, with a projected population of 247,613 in 2040 (Table 3).

The racial and ethnic composition of the City of Fort Lauderdale has been gradually changing. While the City's White Alone (48 percent) and Black or African American (31 percent) populations continue to comprise the largest shares of the City's racial composition, there has been a significant shift in the growth of the racial groups. The city's White Alone population decreased by three (3) percent since 2013 while the City's Black or African American population increased by 0.3 percent. Hispanic or Latino populations of any race continue to grow each year in Fort Lauderdale. Hispanic or Latinos now comprise about 18 percent of the City's population, a three (3) percent increase from 2013.

The racial and ethnic composition of the City is comparable to that of Broward County, both in terms of composition and population shifts. Most Fort Lauderdale citizens identify as a racial or ethnic minority in the United States. 40.9% of residents speak a language other than English at home. The racial makeup of Fort Lauderdale has significantly changed from before to post-covid. Since 2020, Fort Lauderdale has seen a large increase in its Hispanic and multiracial communities and a decline in the population identifying as Black or African American.

	2010	2015	2020	2025	2030	2035	2040
Fort Lauderdale	165,558	175,228	179,991	208,747	222,915	232,419	247,613
Broward County	1,748,128	1,827,005	1,894,285	1,990,171	2,051,056	2,110,602	2,199,813

Source: Broward County and Municipal Population Forecast Allocation Model (PFAM), 2017

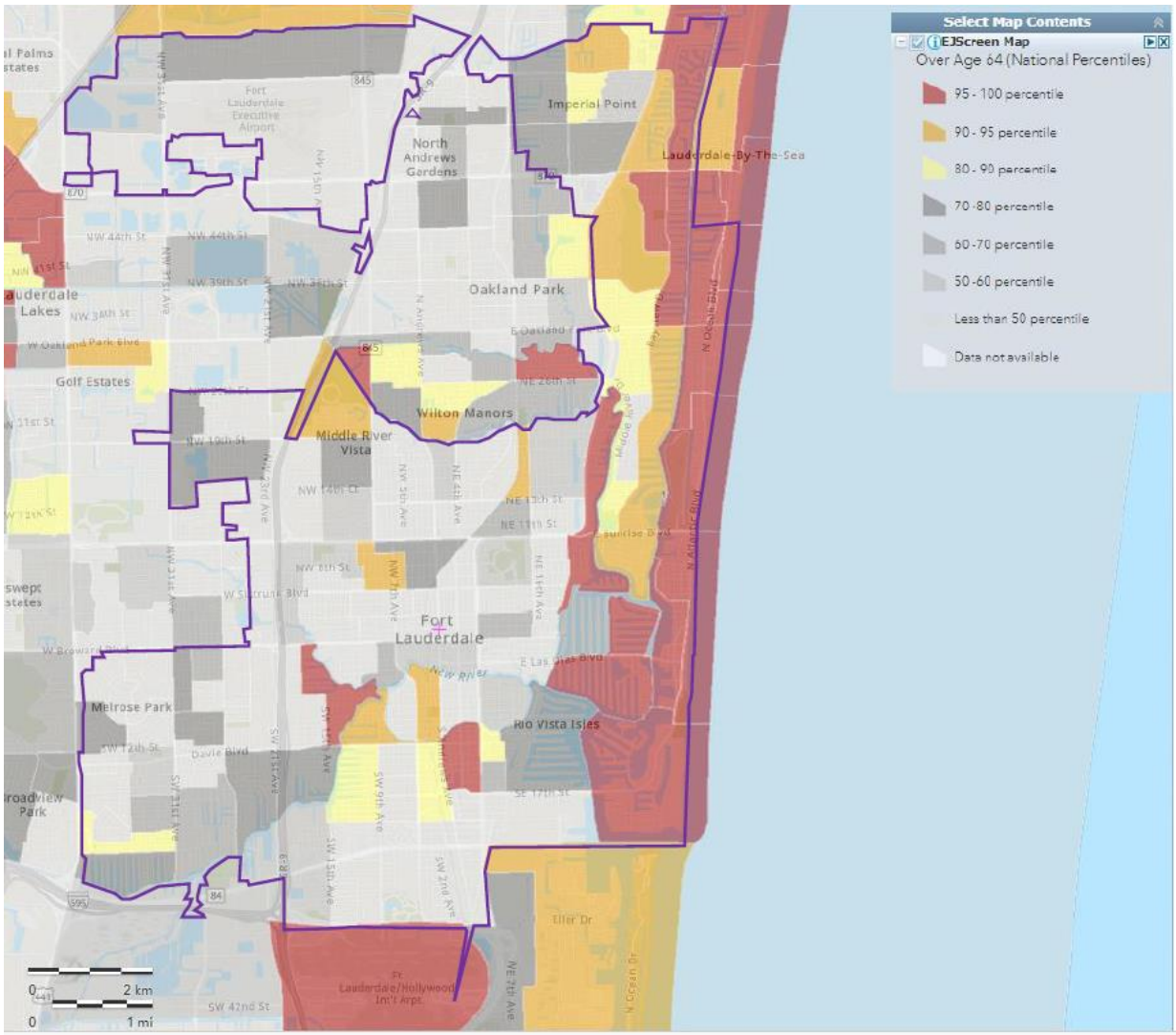
Table 3. Projected Population Growth 2040 in Fort Lauderdale and Broward County

B. Age distribution (by five-year cohorts), number of households, household size

According to ACS estimates, the current median age of the City of Fort Lauderdale's population has remained at 42 from 2013 to 2017. Significantly, however, is a 4 percent (2,504 persons) increase in the City's prime age (20- 44) worker population. The City's 45-74 age group continues to grow at a rapid pace. From 2013-2017 there was a 5 percent (3,492 person) increase in the population for that age range.

As per the U.S Census Bureau 2021: ACS 1-Year Estimates Data Profiles, Fort Lauderdale is an older City with 16.3% of the population under 18 years old and 20.7% of the population over 65. This distribution throughout the City is shown in Figure 12. The national average is 22.1% and 16.8% respectively.

Figure 12. Over age 64 (National Percentiles) of City of Fort Lauderdale-EPAs Environmental Justice and Mapping Tool EJScreen (epa.gov)



B. Educational Levels

According to 2013-2017 ACS estimates, 27 percent of the City of Fort Lauderdale's population 25 years of age and over have some college or an associate degree with 35 percent having a Bachelor's, graduate, or professional degree. The City's overall educational attainment is generally like Broward County with respect to the percentages of the 25+ population with some college or higher degrees including a Bachelor's, graduate, or professional degree.

Figure 13 illustrates the percentage of the City of Fort Lauderdale's trend towards college education and increasing degrees/certifications. Figure 14 illustrates that the distribution of residents with less than a College education are primarily in the western portions of the City.

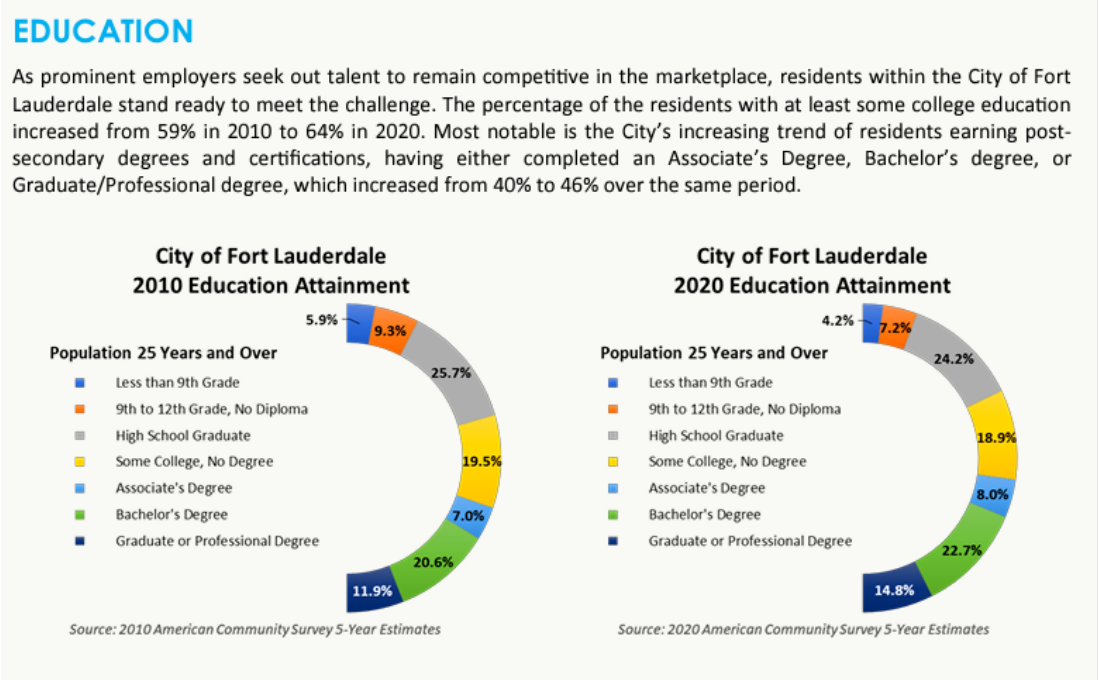
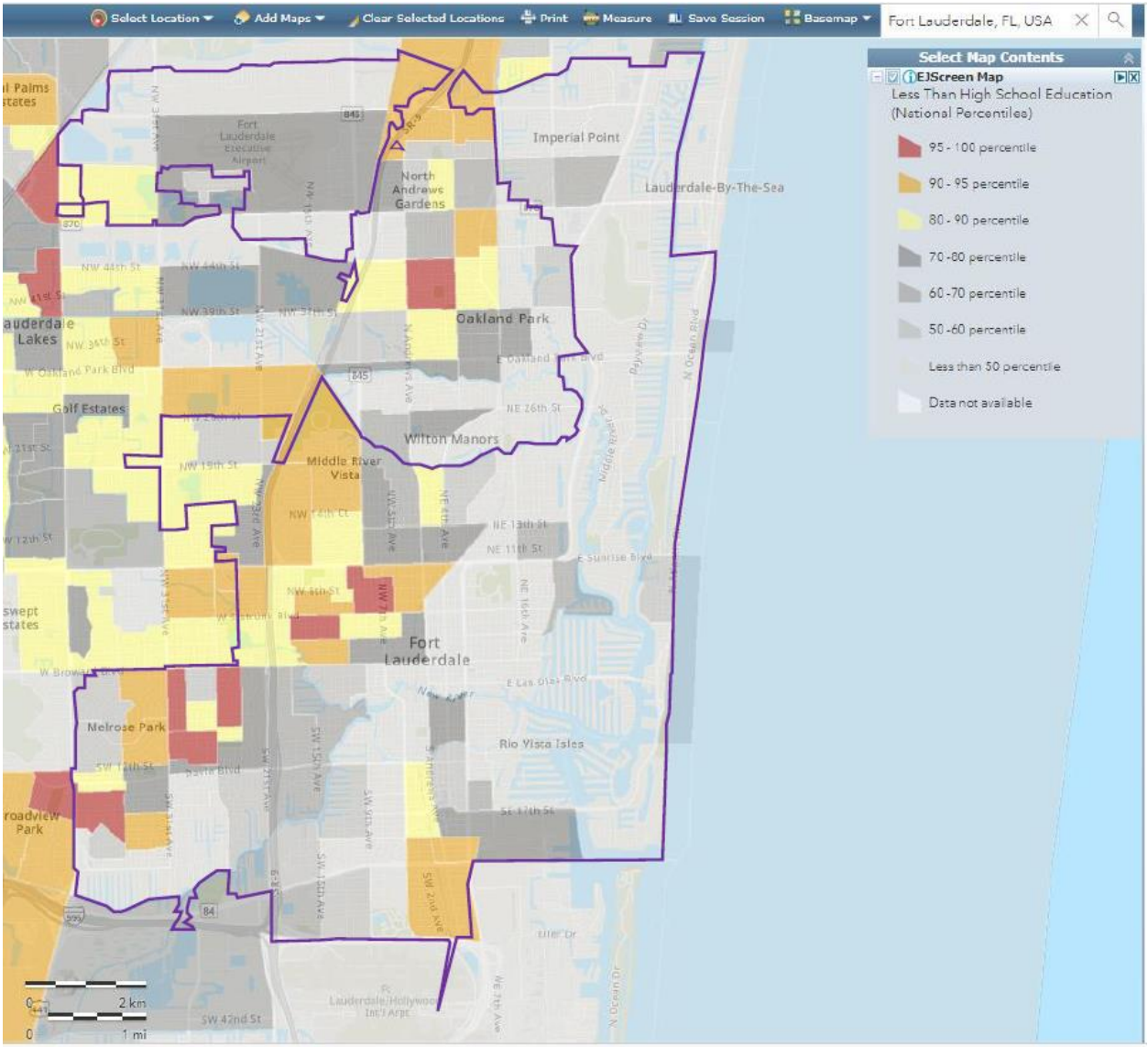


Figure 13. Trending Education Levels in the City of Fort Lauderdale

Figure 14. Less Than High School Education (National Percentiles) of City of Fort Lauderdale--EPA's Environmental Justice and Mapping Tool EJScreen (epa.gov)



VI. Overview of Market Trends

The 18-Hour Cities markets include Charlotte, Denver, Minneapolis/St. Paul, Portland (Oregon), Salt Lake City, San Diego, and Fort Lauderdale. Features common to all are active downtowns and urban-like suburban nodes. Fort Lauderdale was ranked as a leading "Magnet: 18-Hour City" for the third year in a row.

These cities are metro areas that faired relatively well during the pandemic recession, a testament to their enduring appeal. 18-Hour Cities are scattered throughout the country, comprising a more geographically diverse set of markets than the other subgroups. Fort Lauderdale ranked 21st overall on overall real estate prospects, continuing the city's upward climb since being ranked 33rd in 2021. This will significantly increase Fort Lauderdale's population as quality-of-life improvements with easy access to amenities are rising amongst residents.

- Fort Lauderdale was the only Florida city in the top 30 that performed better in 2023 rankings.
- "Six of the 10 Florida markets covered dropped in the rankings," except Fort Lauderdale.
- Four Florida cities are ranked closely together between 14th and 21st (Miami, Tampa/St. Petersburg, Orlando, Fort Lauderdale).

Downtown Fort Lauderdale's economy is on the rise with its annual output increasing by 20% since 2019. By comparison, in Figure 15 below, a recent report from the U.S. Bureau of Economic Analysis found that South Florida's GDP has increased by 12% since 2019. One major driver of Downtown Fort Lauderdale's economic growth is the urban core's strong concentration of high-wage jobs in sectors such as finance, banking, law, tech, and healthcare. 45% of all Downtown Fort Lauderdale's employment are in these sectors, outperforming downtowns like Nashville, West Palm Beach, Austin. Additional information on office trends, multifamily housing and hospitality is provided in Figures 16-18. Please see emerging Trends in Real Estate 2024 as well as Colliers 2023 Quarter 3 report in Resources.

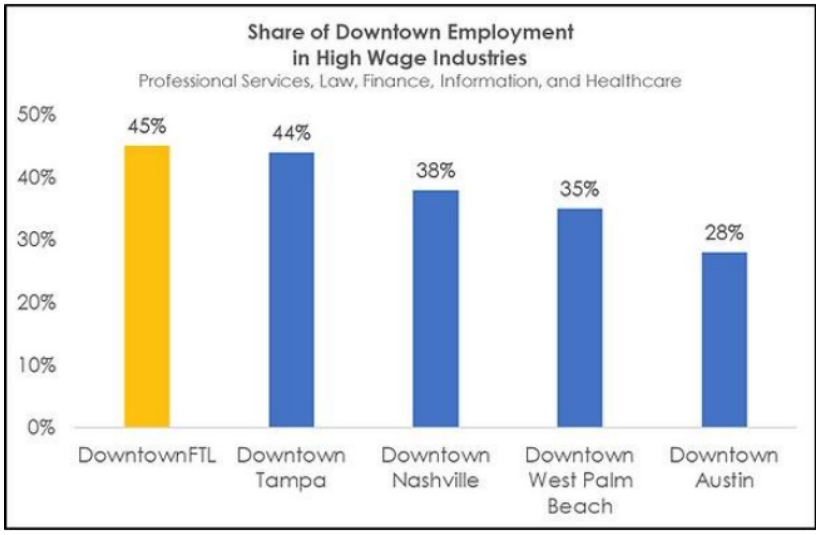


Figure 15. Fort Lauderdale Market Trends Compared to Similar Cities

Office Trends

Market Comparison

Market Indicators (Class A/B/C)	Fort Lauderdale CBD	Miami CBD	West Palm Beach CBD
Inventory	9.0 Million SF	21.4 Million SF	4.6 Million SF
Under Construction	385K SF	2.1 Million SF	604K SF
Net Absorption (Q3 2023)	+81K SF	+159K SF	-32K SF
Large Blocks Available (20K+ SF)	28	55	22
Vacancy Rate	12.8% Decrease 130 BPS YOY	11.5% Decrease 150 BPS YOY	12.9% Increase 290 BPS YOY
Asking Rates			
Full Service Rents	$51.84	$68.51	$66.02
5-Year Growth	+20.3%	+62.7%	+72.7%

Source: CoStar, Colliers, Q3 2023

Market Highlights & Outlook

Fort Lauderdale CBD

- Healthy tenant demand has pushed rental rates up to $51.84 per square foot full service, a 20.3 percent increase over the last 5 years. Additionally, the vacancy rate has dropped 130-basis points year-over-year. With limited new construction, it's expected ongoing interest in the market will continue to compress vacancy rates even further.

Miami CBD

- Heavy demand spurred by new-to-market tenant interest increased rental rates to a record-high of $68.51 per square foot full service, an increase of 62.7 percent over the last 5 years. As the flight to quality continues and an abundance of new construction comes to the market, rental rates are expected to increase further.

West Palm Beach CBD

- As new-to-market interest in the West Palm Beach CBD continues, rental rates have reached $66.02 per square foot full service, giving it the largest 5-year growth rate of the South Florida CBDs at 72.7 percent. On the contrast, the accumulation of negative absorption has pushed vacancy rates up to 12.9 percent, a 290-basis point increase year-over-year.

Accelerating success.

Figure 16. South Florida Office Trends Market Comparison 2023 3rd Quarter

Multifamily Trends
Market Comparison

Overall Multifamily Market Indicators	Fort Lauderdale CBD	Miami CBD	West Palm Beach CBD
Inventory (Units)	10,976	11,811	3,238
Occupancy	93.2%	95.1%	94.0%
Per Square Foot	$2.96	$3.48	$2.22
5 Year Rent Growth	+59.1%	+60.4%	+50.0%
Forecasted Annual Rent Growth	+3.1%	+1.4%	+3.7%
Deliveries			
Units (Q3 2023)	300	172	0
Units (2023 YTD)	777	732	708
Under Construction			
Units	5,515	8,423	2,890

Source: Costar, MPF, Colliers, Q3 2023

Market Highlights & Outlook

Fort Lauderdale CBD

- Fort Lauderdale offers a high quality of life and a growing number of amenities that rival neighboring counties contributing to the 59.1 percent five-year rent growth. With 5,515 units under construction, rents have a forecasted annual growth rate of 3.1 percent.

Miami CBD

- The Miami CBD continues to have the highest rents and occupancy of the South Florida CBDs. Miami's CBD has completed 732 units to-date in 2023 and currently has another 8,423 units under construction. The lease-up of new construction has contributed to the 5 year rent growth of 60.4 percent.

West Palm Beach CBD

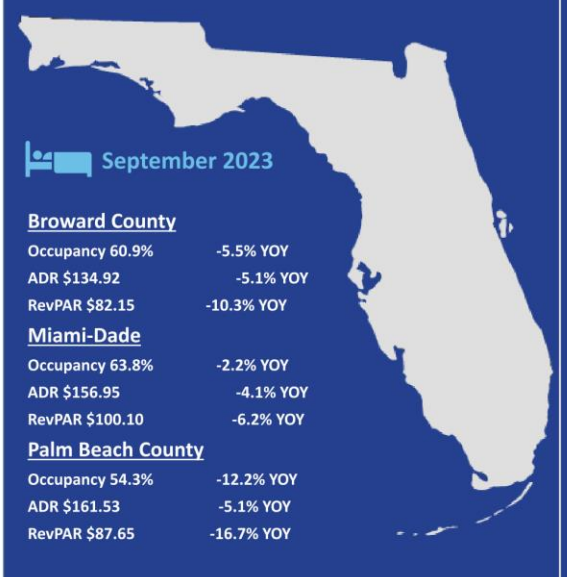
- The West Palm Beach CBD has been capitalizing on its growing population with a five-year rent growth of 50.0 percent. With a construction pipeline of 2,890 units to provide space options for new residents, the forecasted annual rent growth is 3.7 percent, the highest of the South Florida CBDs.

Accelerating success.

Figure 17. South Florida Multi Family Market Comparison 2023 3rd Quarter

Hospitality Trends
Road to Recovery – Everyone Under the Sun!

- **FLL is on track to exceed 2022 levels** with **total passenger counts** each month of 2023 (Jan-Aug) **surpassing the same month in 2022.**
- FLL welcomed **32 million total passengers in 2022**, a **12.9% increase from 2021.**
- FLL ranked **4th fastest-recovering airport** amongst the U.S. following the height of the pandemic.
- Cruise Lines International Association forecasts that the number of passengers this year will surpass 2019 numbers—with an anticipated 31.5 million passengers embarking on cruises in 2023.
- Miami International Airport reclaimed the title as **Florida's busiest airport** (surpassing Orlando), with a total of **50.6 million passengers in 2022.**
- The outlook remains somewhat positive for the Fort Lauderdale hospitality market, as tourism numbers continue to soar.



Accelerating success.

Figure 18. South Florida Hospitality Trends 2023 3rd Quarter

Compared to other national real estate market, Fort Lauderdale in a recovery phase with rental value growing (Figure 19).

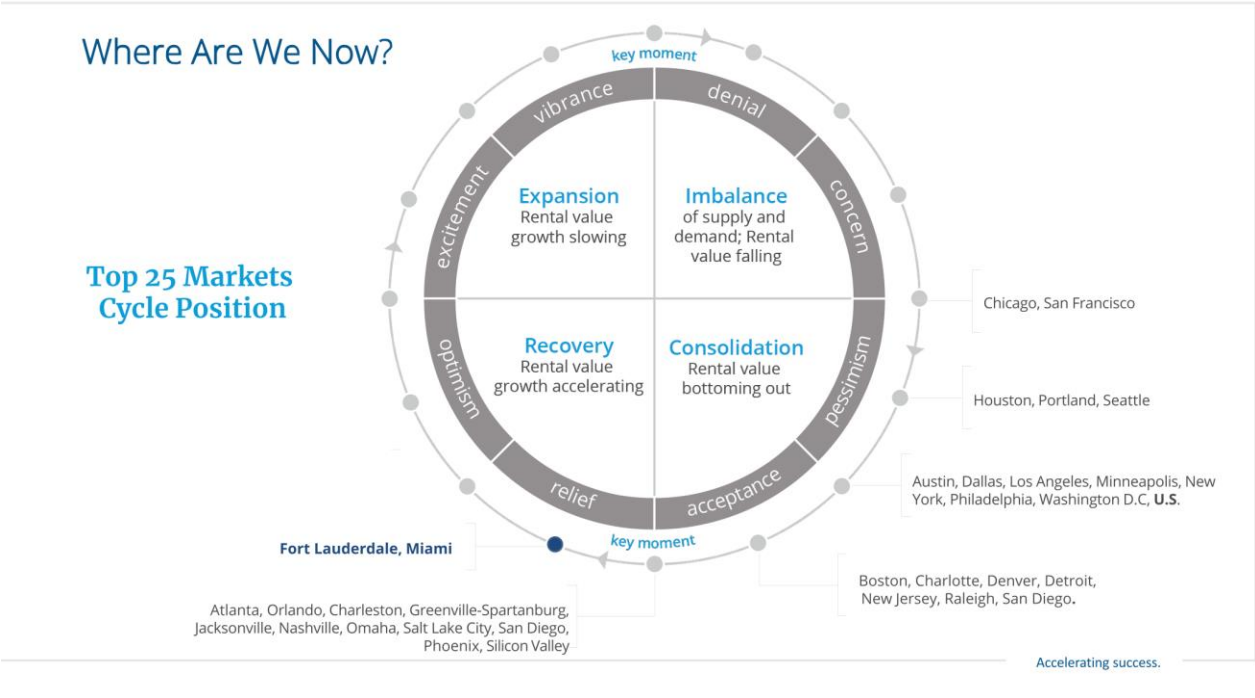


Figure 19. National Top 25 Markets Cycle Position

VII. Fort Lauderdale Budget and Community Investment Plan

A. Overall Budget

The overall FY 2024 Operating Budget is $1.1 Billion including $463,404,796 for the General Fund Operating Budget (Chart 3). The General Fund budget represents a $23.1 million or 5.3% increase from the FY 2023 Adopted Budget of $440,278,165. The FY 2024 Adopted Budget allows the City to fund its General Fund commitments including wages, insurances, and investments in infrastructure. The Adopted Budget invests in the City's priorities and lays the foundation for a financially sustainable future.

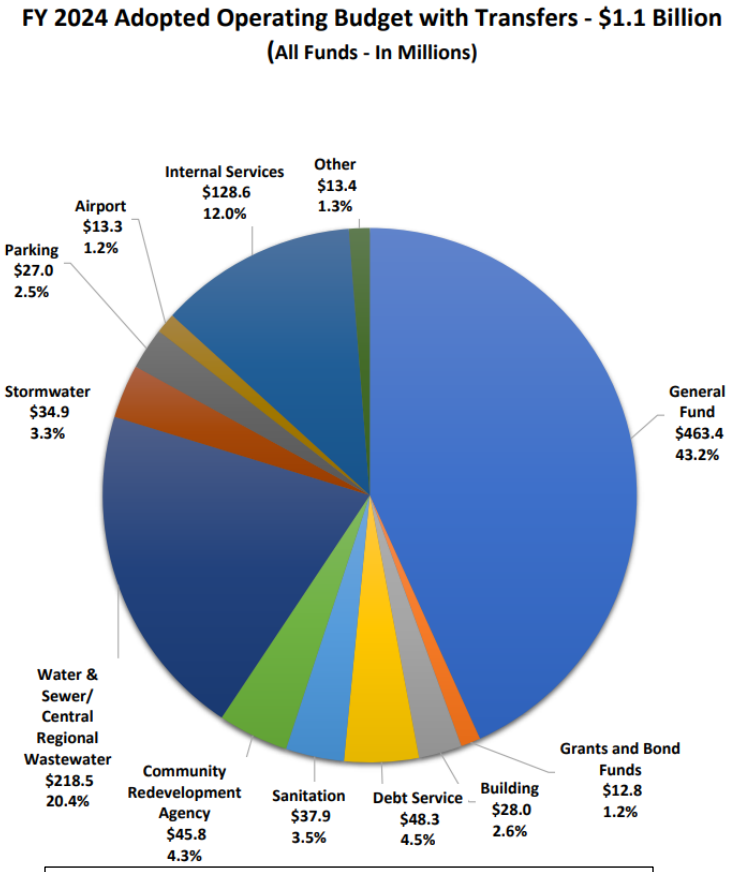


Chart 3. Fort Lauderdale Operating Budget FY24

The budget consists of Enterprise Funds which relies primarily upon revenues generated by fees for water, wastewater and stormwater utilities and services such as parking and the General Fund. Property taxes account for approximately 46.75% of ongoing General Fund Revenues (see Chart 4). Property values increased by 12.24%, adding $21.8 million in additional revenue to pay for its increasing expenses and to enhance service delivery. New construction and rising property values have resulted in Fort Lauderdale being the only city in Broward County that has been able to maintain the same millage rate for the past seventeen (17) years.

The General Fund Budget supports several core services. Public Safety accounts for nearly 60% of the General Fund budget with Parks and Recreation accounting for another 13% (Chart 4). This budget also accounts for elected and charter office expenses and for internal services such as budget and finance. The maintenance of critical infrastructure such as bridges, roads, sidewalks are funded through the General Fund.

B. Bond Ratings

A very strong economy, budgetary flexibility, management, and liquidity as well as future looking programs that reduce risk through addressing climate resilience and cyber security have led the City to achieve a Standard & Poor's (S&P) 'AAA' rating to both the City's special obligation refunding bonds and general obligation (GO) bonds. Moody's Investors

Service assigned ‘Aa2’ ratings and a positive outlook to the City’s 2020 special obligation refunding bonds. Moody's also affirmed the Aa1 rating on the City's outstanding general obligation unlimited tax (GOULT) debt.

C. Community Investment Plan

The Community Investment Plan sets forth the City’s capital improvements to ensure that municipal infrastructure and facilities are appropriate and adequate to serve the needs of the community. The five-year plan is balanced annually based on the available revenues. Many of the proposed projects are generated from comprehensive infrastructure master plans. While the overall CIP budget for FY24 is $292.5M, only $22.7M is allocated from the General Fund.

Fort Lauderdale’s high credit ratings translate into taxpayer savings of millions of dollars on reduced interest rates for the City’s comprehensive plan to invest in massive water and sewer infrastructure improvements. In January 2018, the City Commission approved the issuance of $200 million in Series 2018 Bonds to fund additional water and sewer improvements throughout the City. The $200 million bond issue is earmarked to fast-forward many of the improvements and upgrades identified in the CIP.

D. Funding for Roads

Basic roadway maintenance is performed by Public Works through the Road Services Team. Approximately $2.9M is provided through the General Fund into an operating budget. Capital investments in roads are supported through a variety of revenue sources. In FY2024, the following funds were allocated for road, bridge, and sidewalk related CIP projects $1.0 M from gas tax, $2.76M from county-wide penny surtax for transportation, 0.5M from Housing and Community Development Grants, and $3.5M in the General Fund for the repair and maintenance of sidewalks and roadways.

Currently no funding is ear-marked in the operating or capital improvement plan for road elevations.

FY 2024 Adopted Budget
October 1, 2023
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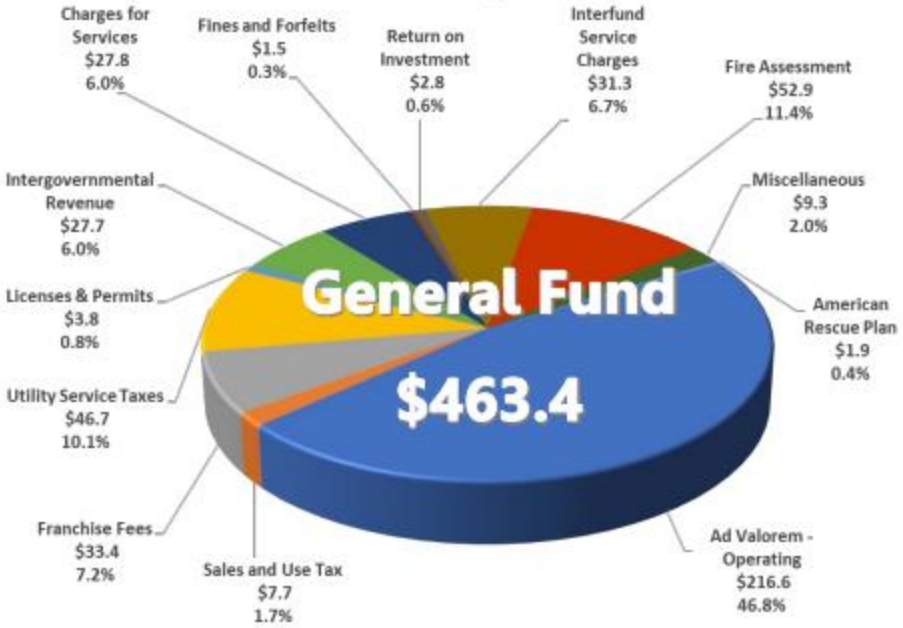
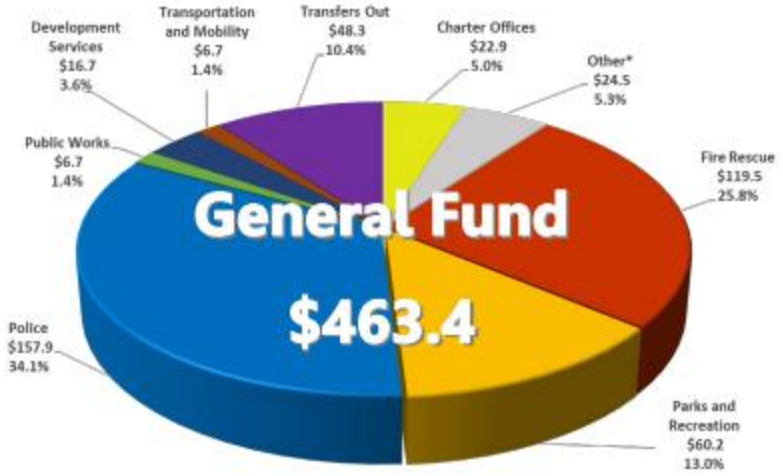
Where the Money Comes From



Where the Money Goes



**Other includes Finance, Human Resources, Debt Services, Office Management and Budget, and Other General Government Departments.*

Fort Lauderdale General Fund Revenue/Expenditures FY24

E. Potential Funding for Road Elevations

The annual CIP budget in the General Fund is in the range of $22M. There is strong competition for these dollars across the various programs. Given the expense of road raising, a variety of potential funding sources needs to be considered. Examples include, but certainly are not limited to:

1) Raise millage to increase available funding the General Fund CIP
2) Put out a referendum for General Obligation Bonds. This would prevent the millage rate from increasing but would result in a special assessment across the City on the property tax bill.
3) Seek out grants on a project-by-project basis
4) Interlocal agreement with Broward County for surtax for roadway elevation projects
5) Create special assessment districts for those locations targeted for road elevation

Prolonged inundation results in damaging of public roadways and property, loss of pedestrian and residential access, disruptions to traffic and commercial activity, and limitations to first responder access in times of emergency. Without functioning roadways and operational infrastructure, neighborhoods, and businesses cannot remain safe, secure, or viable. Funding is required to address needed infrastructure improvements. Figure 20 depicts Fort Lauderdale's tourism in numbers and highlights the necessity for roadway improvements to meet the demand. Figure 21-22 emphasize the tourist contributions to overnight expenditures and stays.

Figure 20. Fort Lauderdale Domestic Travel Market Size

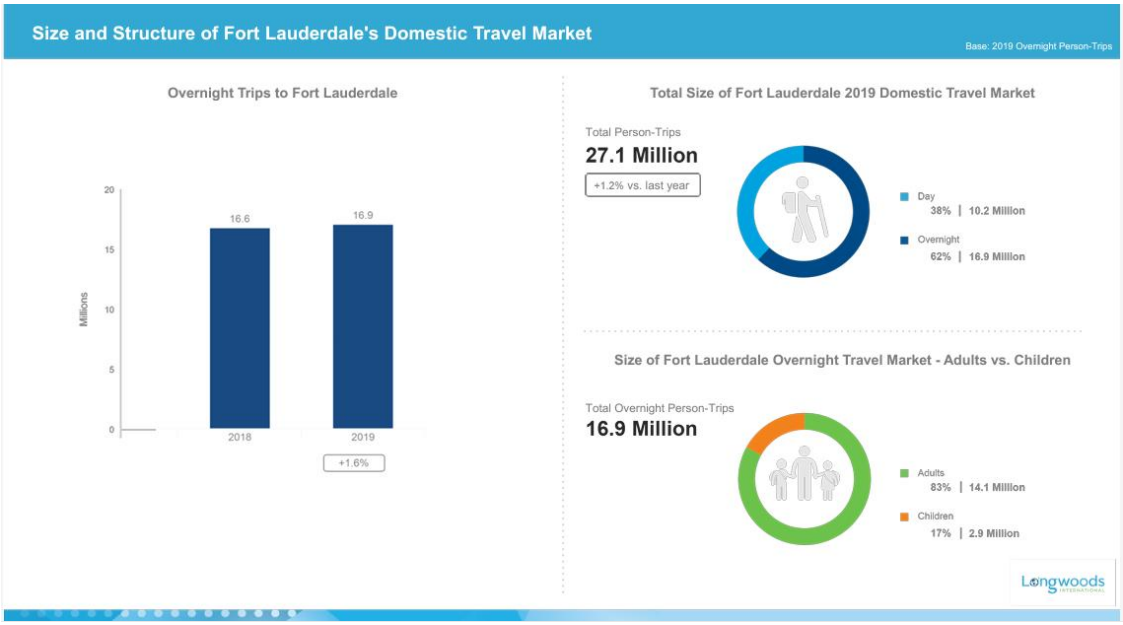


Figure 21. Fort Lauderdale Overnight Trips

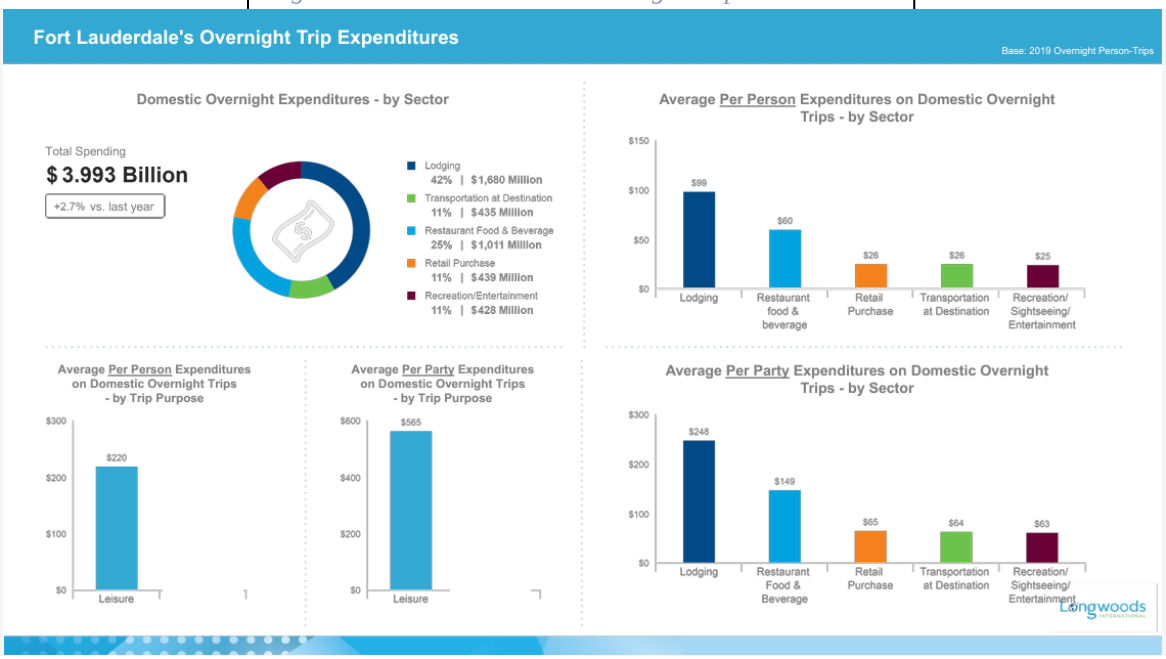
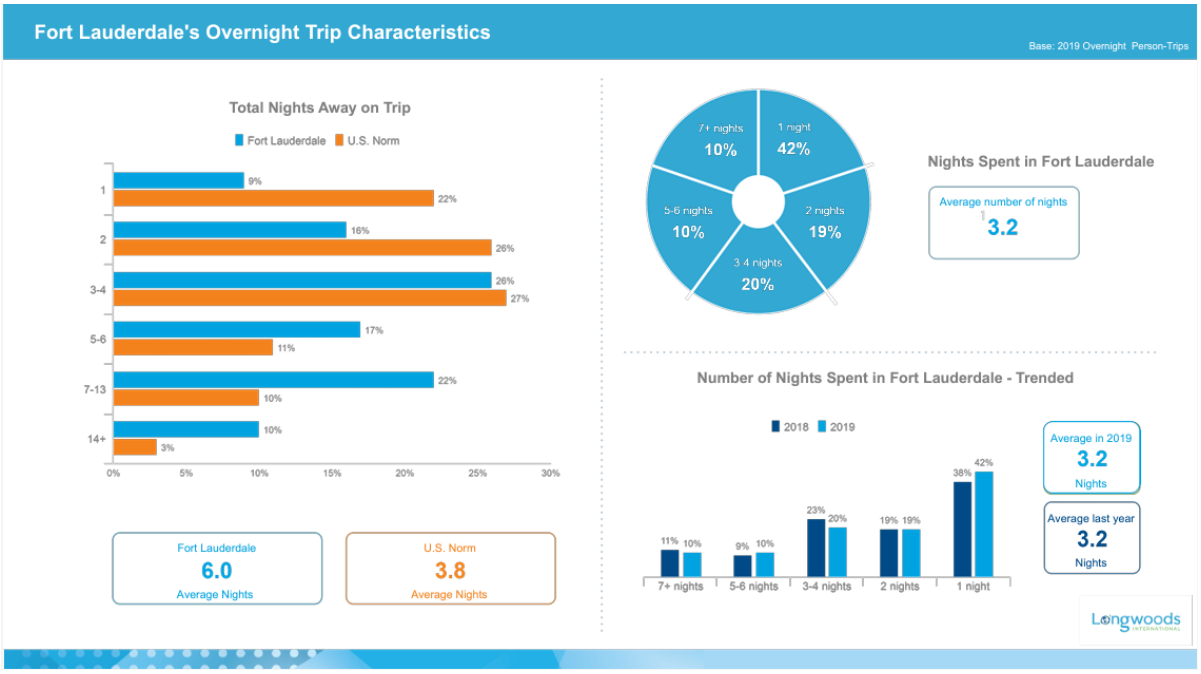


Figure 22. Fort Lauderdale Overnight Trip Characteristics



F. A Final Note on Roadway Elevation Funding

A challenging factor of funding road elevation is that associated above ground and underground infrastructure also requires adjustment. A decision must be made to determine what fund bears the cost of road elevation. For example, should a road elevation project be considered as holistic project where the General Fund bares the cost of the whole project including the underground utilities OR are allocations required from multiple funds (water, wastewater, stormwater, and General Fund) to accomplish the project? How does the road elevation impact the strategic allocation of funds previously reliant on existing master plans to determine prioritization of projects?
The additional complicating factor of road elevation is the improvements required on private property that are traditionally not borne by public funds.

Postponing such investment in the resilience and hardening of critical infrastructure like roads and transit for lack of funds will only be more costly for taxpayers, homeowners, and businesses. The City seeks to address these challenges before they become more expensive, and before they become actual interruptions to property values, business activity, and travel.

G. City Infrastrucutre Inititives

Fortify Lauderdale is a program to improve resilience to the impacts of climate change within the City's most vulnerable neighborhoods and communities. The program includes expansion and acceleration of the second phase of Citywide stormwater improvement projects. Improving climate resilience involves assessing how climate change will create new, or alter current, climate-related risks, and taking steps to better cope with these risks. The program envisions developing guidance for the infrastructure goals of the City and harmonizing private property resiliency efforts so private efforts and public infrastructure can integrate effectively. Figures 23 - 26 depict capacity improvements and public investment projects that were presented to the City Commission in December 2023.

Figure 23. Fortify Lauderdale Program - Resource and Budget Implication of Stormwater Improvements

Increasing Capacity – Resource and Budget Implications

Accelerated Stormwater System Improvements

Stormwater Engineering
Current: 1 x SPM and 4 x PM II
FY25: Increase 1 x Division Manager, 1 x SPM, 4 x PM II

Contractual
Increase Operational project budget $1M to $2M per year
Increase seawall funding from $1.25 to $3M per year

Funding
Accelerate $200M bond tranches

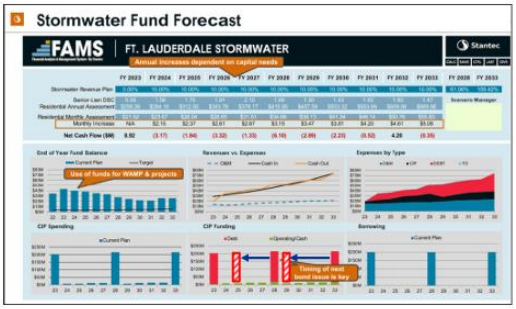


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Exhibit 1
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Figure 24. Fortify Lauderdale Program – Expansion of Operations and Emergency Response

Increasing Capacity – Resource and Budget Implications

Operations, Maintenance, and Emergency Response

Stormwater Operations
Currently 33 FTE
FY25-27: Increase 10 x FTE ($80,000/FTE)
2 x Pump Trucks, 2 x portable pumps ($1,500,000)
Additional $200,000 annual overtime budget
Initiate Construction of Stormwater Operations Facility ($10M)

Sustainability
FY25: Resilience Manager for Private Property program ($100,000) (General Fund)

Contractual
Emergency response contract: $2M per year

Funding
Seed money for Private Property Program match (General funding)

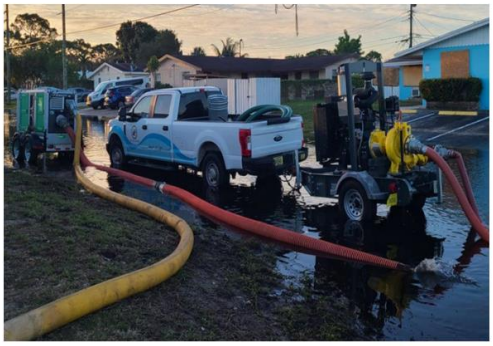

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Figure 25. Fortify Lauderdale Program Goals

Fort*ify* Lauderdale

Goal
Improve Resilience to Impacts of Climate Change Within Our Most Vulnerable Neighborhoods and Communities

Public Investments

- Citywide vulnerability assessment
- ULI panel to develop policy recommendations associated with low elevations and roadways
- Accelerate $500M in stormwater infrastructure improvements in **17 neighborhoods** with all construction to be completed in 10 years
- Increased funding for seawalls, roadways, and bridges
- Improved resilience standards for existing stormwater infrastructure
- Increased staffing and prioritization of stormwater program

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Exhibit 1
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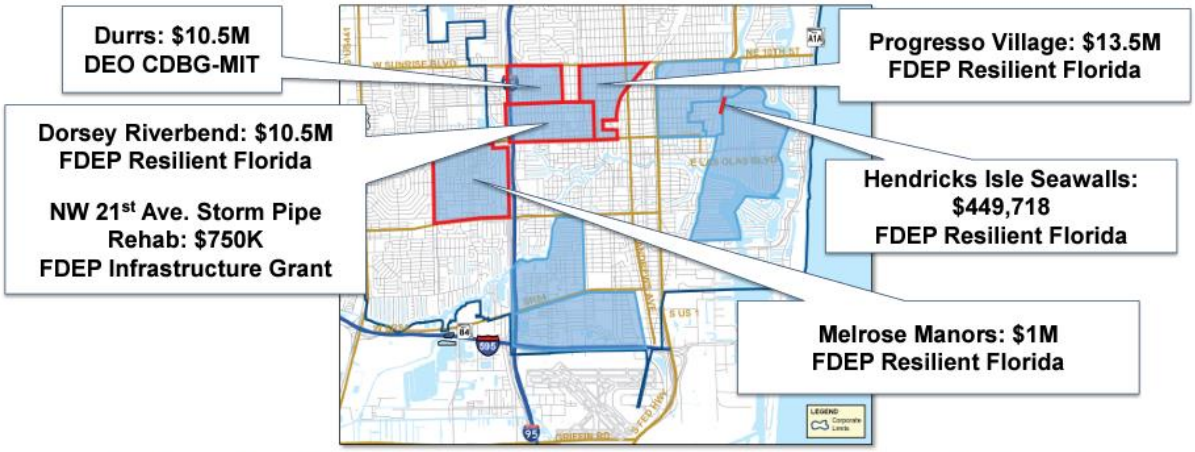
Figure 26. Current Stormwater Investments in Fort Lauderdale's Most Flood Vulnerable Neighborhoods

The City is working diligently to leverage its stormwater/resilience investment dollars



… having already secured $36.7 million in grants for Tranche 1 projects

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Exhibit 1
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The City recently broke ground on one of the most significant components of our ongoing effort to upgrade City utility infrastructure and ensure its resiliency. Figure 27 depicts construction of the Prospect Lake Clean Water Center near the Fort Lauderdale Executive Airport. This facility will provide clean, high-quality drinking water to the surrounding community for decades.

Figure 27. Groundbreaking at the Prospect Lake Clean Water Center

The new plant is part of more than $1.5 billion that the City will spend in the coming years to improve critical infrastructure. The City has been constructing new seawalls, replacing aging water and sewer pipes, and improving stormwater management system. The plant will replace the aging Fiveash Regional Water Treatment Plant to service most of the city's water needs.

VIII. Government Liabilities for Environmentally Compromised Roads: A Legal Perspective

According to Florida Department of Transportation (FDOT), flooding and sea level rise can cause permanent road closures and recurring road damage, which can significantly impact residents in that community. FDOT welcomes creative adaptations to protect communities and infrastructure and FDOT adopted a resilience policy that defines the principles of resilience as “the ability to adapt to changing conditions and prepare for, withstand, and recover from disruption” (FDOT, June 2023). For further review, the FDOT Resilience Action Plan is in Resources.

A literature review of Roads Under Water demonstrates that an adaptive duty to maintain the road system as a whole system for the benefit of the public can allow broader factors in legal obligations (Ruppert et., al, May 2023). Please review Roads Under Water: Legal Analysis in Resources for additional information.

Each government entity is responsible for maintaining and improving roads. A substantial portion of maintenance budget for roads to ensure safety is essential. To maintain serviceability governments must have a comprehensive program to address the needed upgrades. For further information, FDOT Greenbook is provided in Resources.

IX. Flood Mapping

A. 2014 FEMA FLOOD MAPPING

Elevation is the key factor in identifying areas most at risk for sea level rise and/or increased storm frequency impacts. Figure 28 shows previous flood zones in the City. However, FEMA has codified a new flood hazard determination for Broward County and Incorporated areas. These new maps took effect January 31, 2024. The City has in some areas, observed a rise in flood zone elevations and potentially, premium rates could increase city wide.

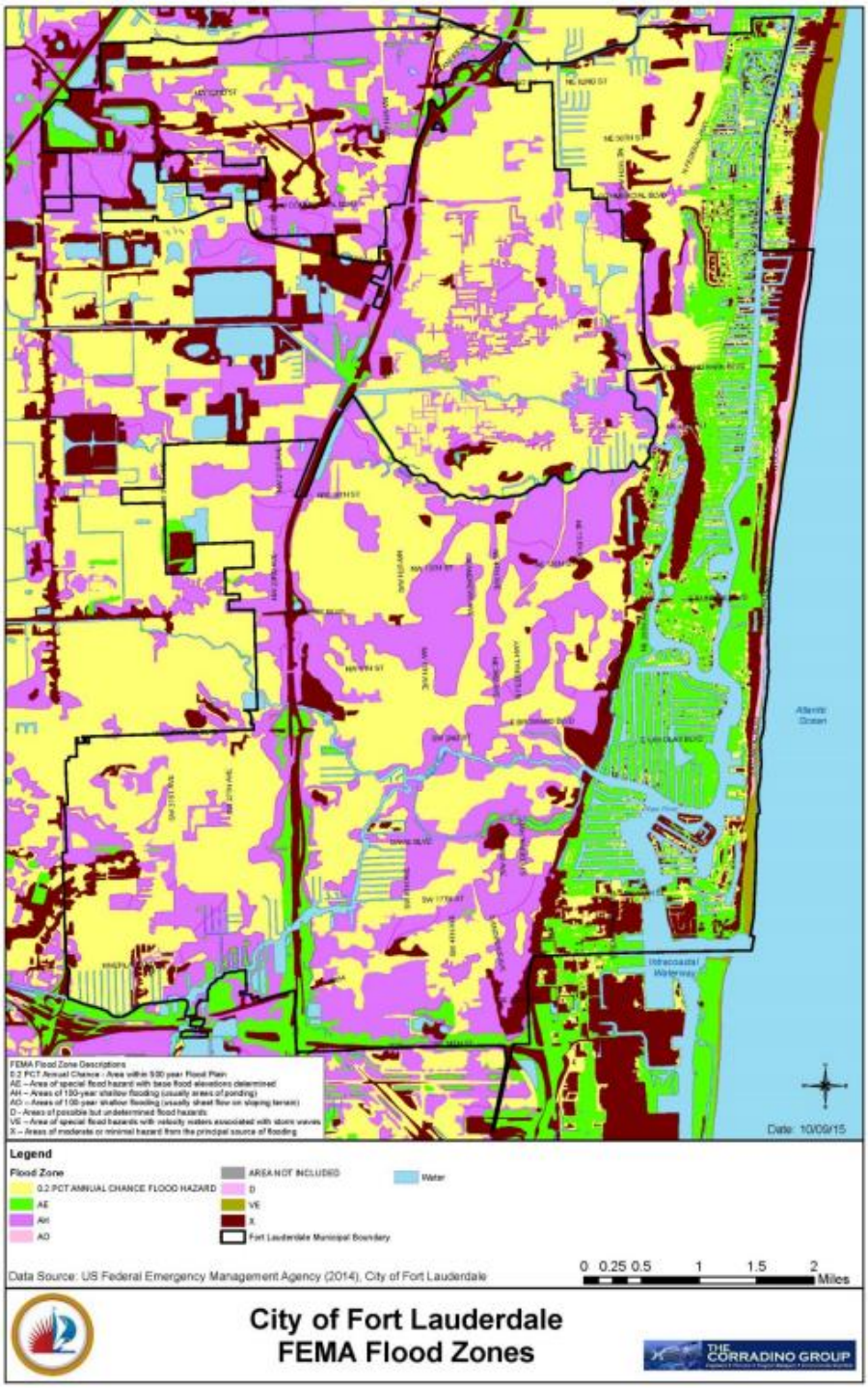


Figure 28. 2014 Fort Lauderdale Federal Emergency Management Agency (FEMA) Map

B. 2024 Current FEMA Flood Mapping

When compared to the previous 2014 FEMA mapping, there is an increase in the special flood hazard area (SFHA) and a decrease of the X zones or non SFHA in the newly codified Flood Insurance Rate Map (FIRM) (Figure 29). Flood zone elevations will increase near waterways, and in some cases that will mean two feet of additional elevations of water during a base flood event.

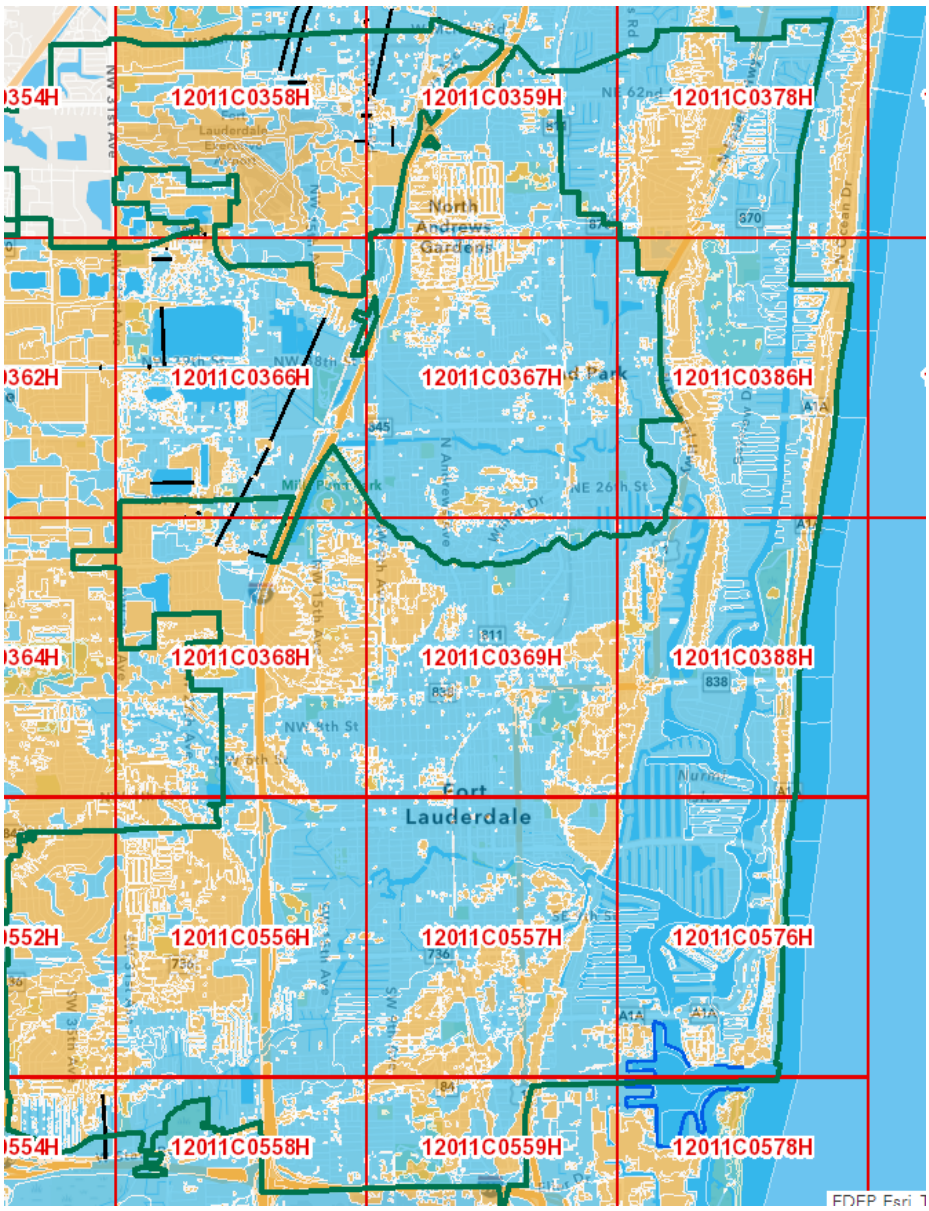


Figure 29. 2024 Fort Lauderdale Federal Emergency Management Agency (FEMA) Map

X. State Laws/Regulations Impacting Development in the City

On May 12, 2021, Governor Ron DeSantis signed Senate Bill 1954 into law. This comprehensive legislation established the Resilient Florida Grant Program and ensured a coordinated approach to Florida's coastal and inland resilience. The program enhances our efforts to protect our inland waterways, coastlines, and shores, which serve as invaluable natural defenses against sea level rise. The legislation will yield the largest investment in Florida's history to prepare communities for the impacts of sea level rise, intensified storms, and flooding. This legislation resulted in the two administrative rules described below.

2023 SLIP Rule Rulemaking: 62S-7 - Public Financing Coastal Construction "SLIP Study Rule": The Department of Environmental Protection amends this rule chapter to implement Section 380.0937, F.S., relating to public financing of construction projects within areas at risk due to sea level rise, as required by s.380.0937(3), F.S. Beginning July 1, 2024, a state-financed constructor may not commence construction of a potentially at-risk structure or infrastructure without conducting a Sea Level Impact Projection (SLIP) study that meets the requirements established by the Department.

Resilient Florida Rulemaking: 62S-8 - Statewide Flooding and Sea Level Rise Resilience Plan: The department created this rule chapter to implement section 380.093, F.S., relating to the Statewide Flooding and Sea Level Rise Resilience Plan and project submittal requirements. Entities for which this rule is relevant include coastal and inland communities including counties, municipalities, water management districts, flood control districts and regional resilience entities. The subject matters addressed by the rule will include sea level rise, flooding, infrastructure, planning, vulnerability, and resilience related to the development of the Statewide Flooding and Sea Level Rise Resilience Plan. This program offers Florida communities funding for resilience planning and for implementation of projects which increase resilience. It is a tiered point system that is based on project type. Critical infrastructure such as evacuation routes and commuter roads could have potential success at award ship; dependent on State budget the program can vary year to year. To be eligible for implementation funding municipalities must complete a vulnerability assessment complaint with state requirements. Fort Lauderdale currently expects to complete theirs in summer 2024.

XI. 2014 Vulnerability to Sea Level Rise Assessment

In the Broward County 2014 Vulnerability to Sea Level Rise Assessment, Fort Lauderdale' municipal infrastructure (fire rescue stations, police, roads, etc.) was overlaid with the SLR inundation grid to review which infrastructure may be located at or below projected SLR at a one (1) or two (2) foot scenario The following findings pertain to the vulnerability assessments performed for each of the City of Fort Lauderdale municipal infrastructures listed. The City is currently undertaking an update of this analysis. Detailed maps and tables follow.

A. Bridges:

Figure 30 provides the location of all 117 bridges located in the City of Fort Lauderdale overlaid by the inundation grid, and a focused view of the area in and around Downtown Fort Lauderdale. Sea level will reduce the clearance under these bridges thereby reducing the number and size of craft that can pass under them.

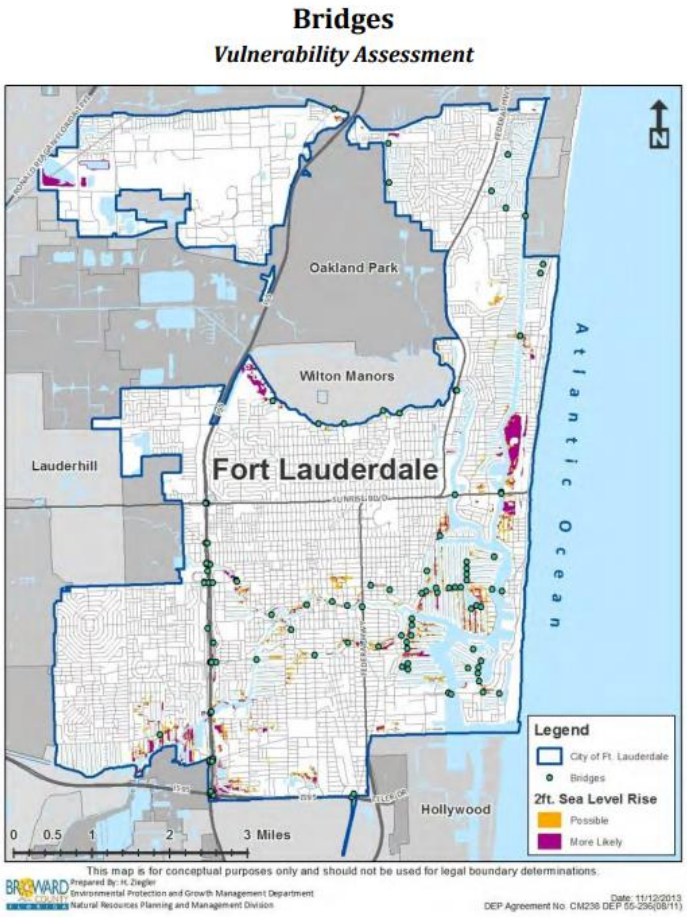


Figure 30. 2014 Bridges Vulnerability Assessment

B. City Arterial Roads

A total of nine (9) segments of arterial roads maintained by the City of Fort Lauderdale were found to be potentially vulnerable to sea level rise (Figure 31). Only one segment showed "possible" vulnerability at the one-foot scenario, amounting to 12% of the total length of the segment. Nine segments showed vulnerabilities in the two-foot scenario (Figure 32).

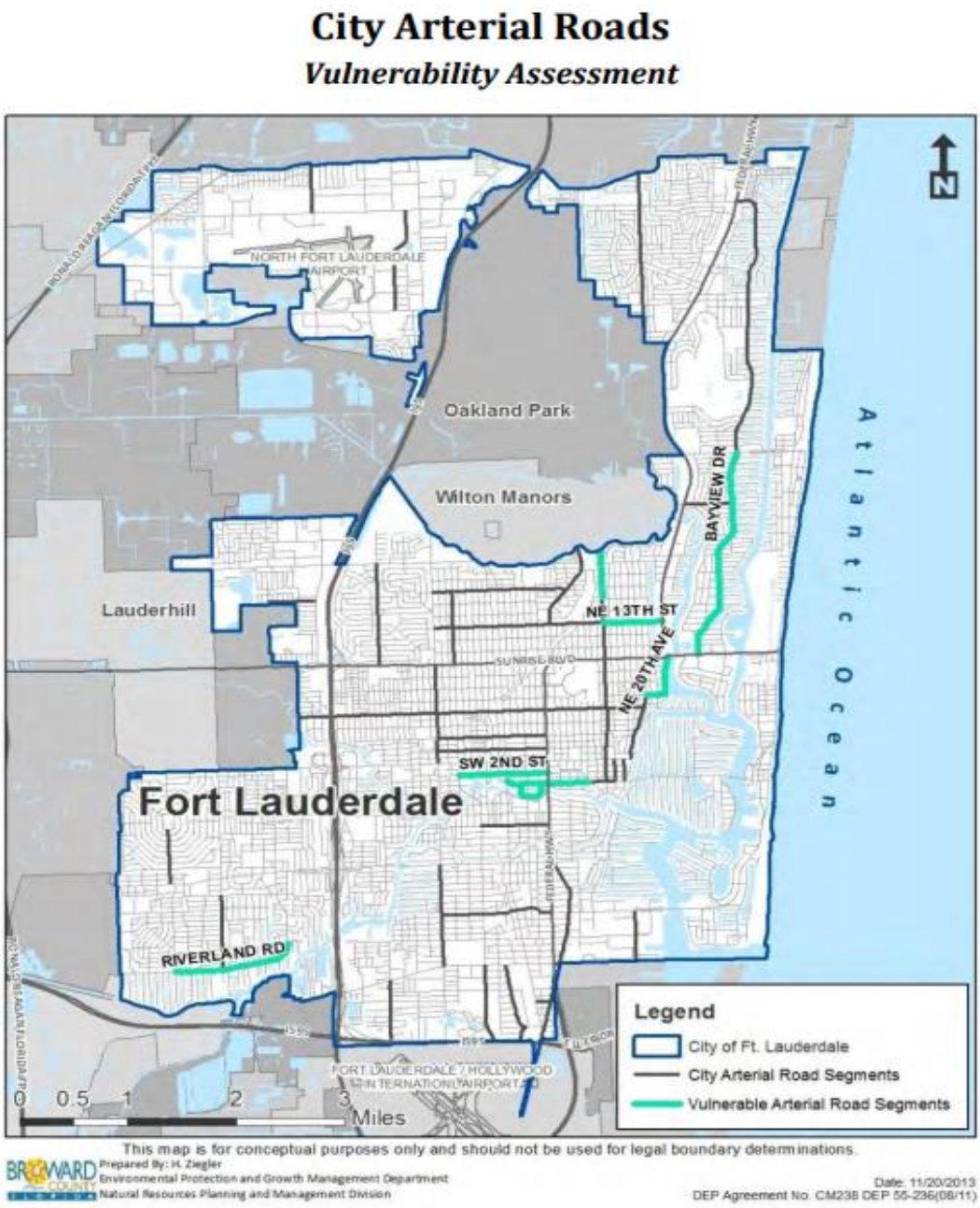


Figure 31. Arterial Roads Maintained by the City of Fort Lauderdale-2014 Vulnerability Assessment

City-Owned Arterial Roads in Downtown Fort Lauderdale

Two Foot Sea Level Rise Scenario

Downtown Fort Lauderdale

This map is for conceptual purposes only and should not be used for legal boundary determinations.

BROWARD COUNTY

Date: 10/23/2013

Several segments of arterial roads maintained by the City of Fort Lauderdale are vulnerable at the two foot sea level rise scenario. These include SW 2nd Street from Ave of the Arts to N Federal Hwy, E Las Olas Blvd from S Andrews Ave to SE 12th Ave, and Las Olas Way.

Figure 32. 2014 Vulnerability Assessment of Arterial Roads Maintained by the City of Fort Lauderdale

C. Evacuation Routes: Figure 33 below identifies vulnerable Evacuation Routes Portions of six roadways were determined to be vulnerable. Broward County evacuation map prior to storm event is depicted below.

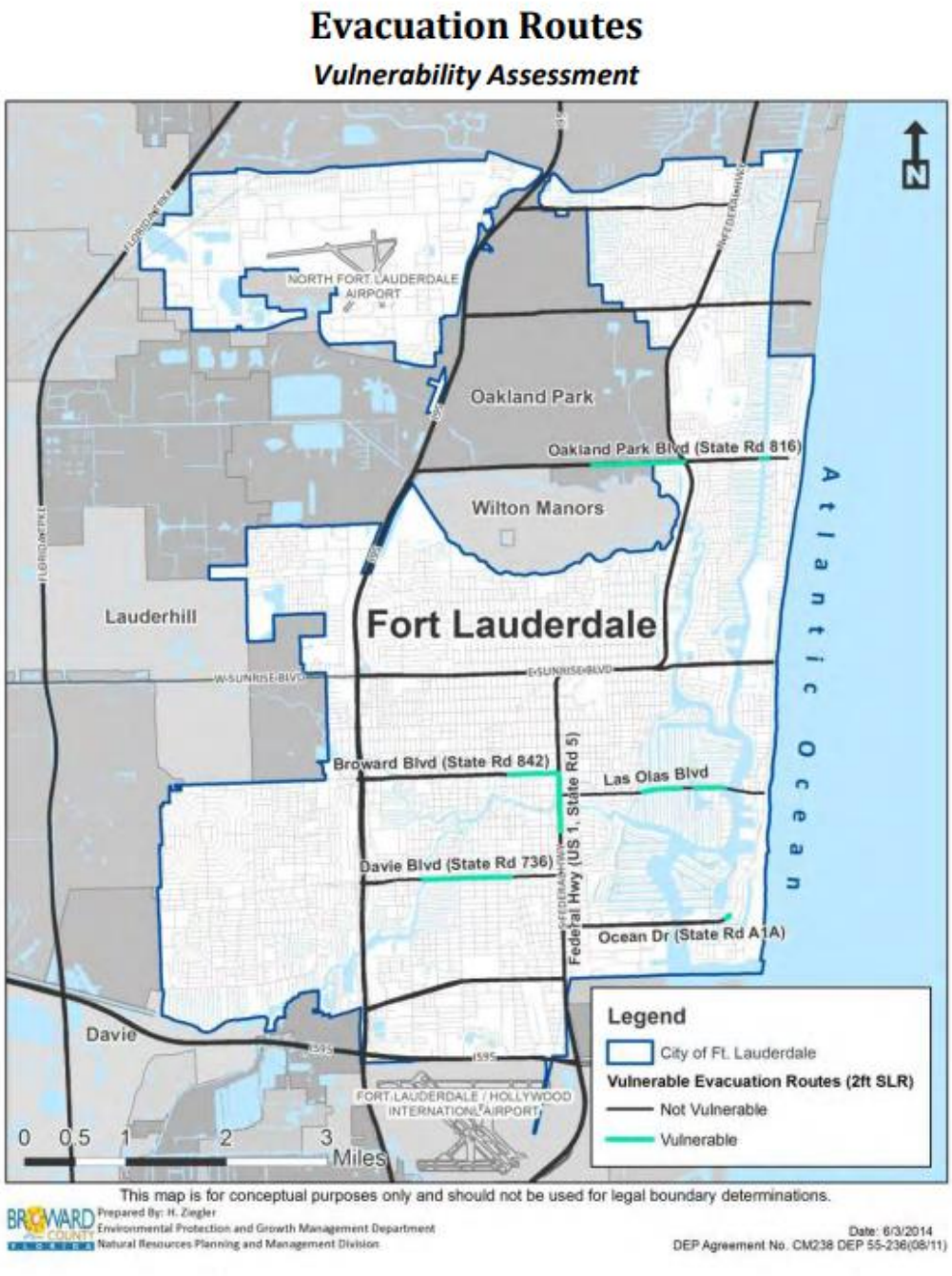


Figure 33. Evacuation routes maintained by the City of Fort Lauderdale-2014 Vulnerability Assessment

D. Fire Rescue Stations: Of the 12 fire rescue stations operated by the City of Fort Lauderdale, only two were found to be at risk by sea level rise. In addition, Broward County Fire Rescue Station 32, which is not operated by the City of Fort Lauderdale but is within the municipal boundary, may have street access issues under the one-foot sea level rise scenario (Figure 34).

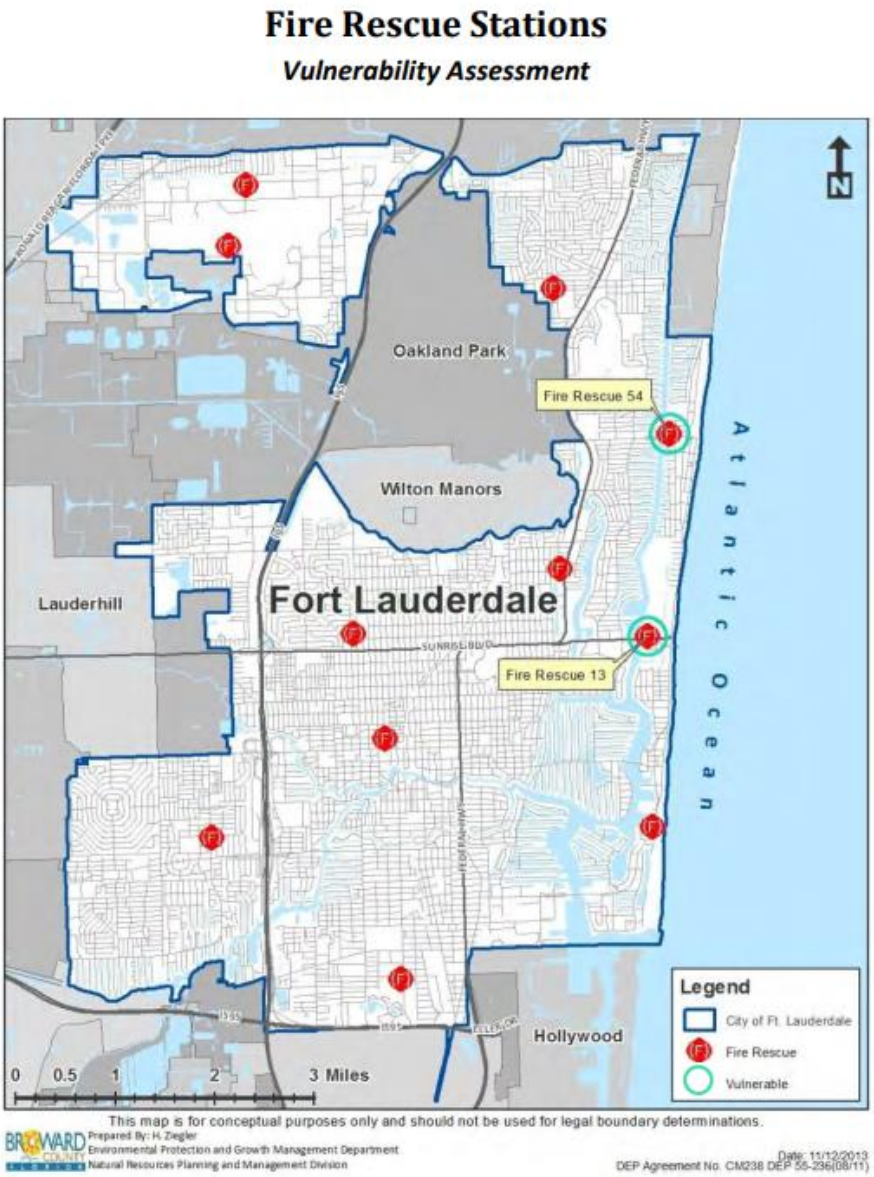


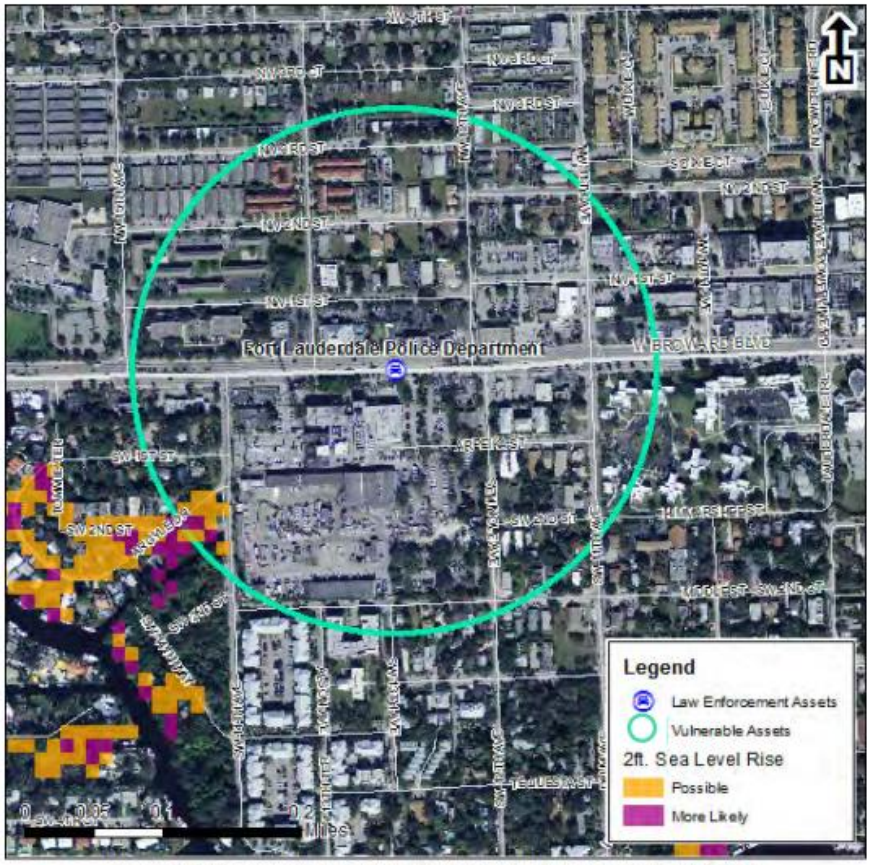
Figure 34. Fire Rescue Stations Maintained by the City of Fort Lauderdale-2014 Vulnerability Assessment

E. Law Enforcement Assets: One law enforcement asset maintained by the City of Fort Lauderdale, the Fort Lauderdale Police Station, may begin to have accessibility issues on streets South-West of the station during the two-foot scenario (Figure 35). Also notable, the Main Jail and Courthouse - which are not maintained by the City of Fort Lauderdale but are within municipal boundaries - also showed vulnerability due to sea level rise during the two-foot scenario. This report focuses only on municipally maintained assets.

Fort Lauderdale Police Station

Two Foot Sea Level Rise Scenario

1300 Broward Blvd., Fort Lauderdale 33312



This map is for conceptual purposes only and should not be used for legal boundary determinations.

BROWARD COUNTY

Prepared By: H. Ziegler
Environmental Protection and Growth Management Department
Natural Resources Planning and Management Division

Date: 6/3/2014
DEP Agreement No. OM238 DEP S9-036(08/11)

This map shows streets affected by a two foot sea level rise scenario within a 1000 - foot radius around the Fort Lauderdale Police Station. Inundation potentially occurs along Argyle Dr. and SW 14th Ave., South West of the station. No nearby streets are affected at a one foot scenario.

Figure 35. Police Asset Maintained by the City of Fort Lauderdale

XII. Resilience Challenges and Action

The City and its elected leaders have been dedicated to incorporating policies and planning for climate change. An entire chapter in the City's Advance Fort Lauderdale Comprehensive Plan is dedicated to climate change policies. A chapter in the annual Five-Year Community Investment Plan is dedicated to designating Adaptation Action Areas (AAAs), supporting a policy in the coastal management element of the comprehensive plan which identifies one or more areas that experience coastal flooding due to extreme high tides, rainfall, and/or storm surge. Designated locations include the ULI ASP Study area and is being prioritized for infrastructure and other improvements intended to reduce impacts to assets currently experiencing coastal flooding as well as reduce the areas' future risk and vulnerability to the effects of sea level rise. The City realizes that resilience is a community wide effort that occurs beyond the boundaries of the AAAs.

The City is investing over $1 billion in water, wastewater, and stormwater improvements to address the impacts of rising seas and other climate concerns. Funding for the infrastructure master plans is allocated in the 5-year Community Investment Plan. Revenue Bonds and low interest loans have been obtained to pay for improvements which are ultimately funded by the utility fee. Roadway, bridges, and sidewalks are paid for out of the General Fund, the state gas tax, and a local sales surtax for transportation. Currently, there are not adequate funds to perform the level of roadway maintenance required or demanded by the public and elected officials. Adding additional General Fund resources would require raising the millage rate or issuing General Obligations Bonds – both of which are not supported by the City Commission.

A. Addressing sea level rise impacts on roadways

1. Sea Level Rise Projections

The Southeast Florida Regional Climate Change Compact released their latest 2019 Unified Sea Level Rise Projections for Southeast Florida (see Resources) in 2019. From the 2000 baseline, 10-17 inches of sea level rise is possible by the year 2040 and 21-64 inches are possible by 2070, the 50-year planning horizon for most infrastructure installed today (see Figure 36). The Commission adopted this projection for planning purposes in 2020. The design of all infrastructure projects considers sea level rise, often compelled by changes in the Broward County Land Use Plan and regulatory tools such as Broward County's Future Groundwater Table Map. Future sea level rise will have significant impacts on the roadway network throughout the City, an issue being discussed at the municipal, county, state, and federal levels who practice transportation planning.

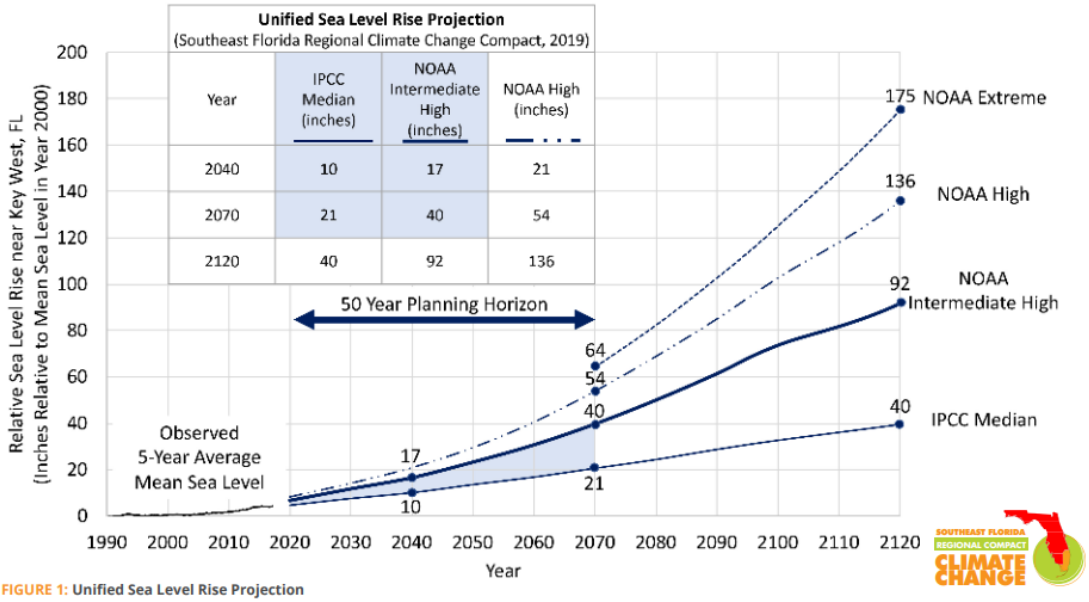


FIGURE 1: Unified Sea Level Rise Projection

These projections start from zero in year 2000 and are referenced to mean sea level at the Key West tide gauge. Based on the 5-year average of mean sea level, approximately 3.9 inches of sea level rise has occurred from 2000 to 2017 (see historic sea level section of guidance document). The projection includes global curves adapted for regional application: the median of the IPCC AR5 RCP 8.5 scenario (Growing Emissions Scenario) as the lowest boundary (solid thin curve), the NOAA Intermediate High curve as the upper boundary for short-term use until 2070 (solid thick line), the NOAA High curve as the upper boundary for medium and long-term use (dash dot curve). The shaded zone between the IPCC AR5 RCP 8.5 median curve and the NOAA Intermediate High is recommended to be generally applied to most projects within a short-term planning horizon. Beyond 2070, the adaptability, interdependencies, and costs of the infrastructure should be weighed to select a projection value between the IPCC Median and the NOAA High curves. The NOAA Extreme curve (dash curve) brackets the published upper range of possible sea level rise under an accelerated ice melt scenario. Emissions reductions could reduce the rate of sea level rise significantly.

Unified Sea Level Rise Projection: 2019 Update 10

Figure 36. Southeast Florida Regional Climate Change Compacts 2019 Unified Sea Level Rise for Southeast Florida Projection

2. King Tides

Ten years ago, the major challenges of sea level rise seemed far in the future except for nuisance flooding associated with autumnal King Tides. Today, we appear near a tipping point of nuisance flooding in several neighborhoods. The City experiences two high tides a day. King tides predictably occur in the fall when gravitational forces of the sun and moon combine to create greater than normal tides. The timing is more predictable than the observed peak height of the tides. Tidal elevation can be impacted by several other factors such as wind, tropical storm activity, and the speed of the Gulf Stream current offshore (see King Tide Briefing in Resources).

3. Current Impacts

During 2019, the City experienced the highest tide on record for the last 20 years (2.65 feet NAVD) and 170 high tides that exceeded the threshold for flooding in low-lying areas of the City. In 2023, the City experienced 180 tides that exceeded the City's threshold of 1.3 feet NAVD, see Figure 37. A recent trend is to experience those extreme high tides in nearly every month of the year.

Over the past several years, the City has used complaints and field observations to identify those locations impacted by nuisance flooding, see Figure 38. Whenever the City experiences a particularly high tide, we discover new locations that are impacted by tidal flooding. These locations consistently mirror the areas with the lowest elevations.

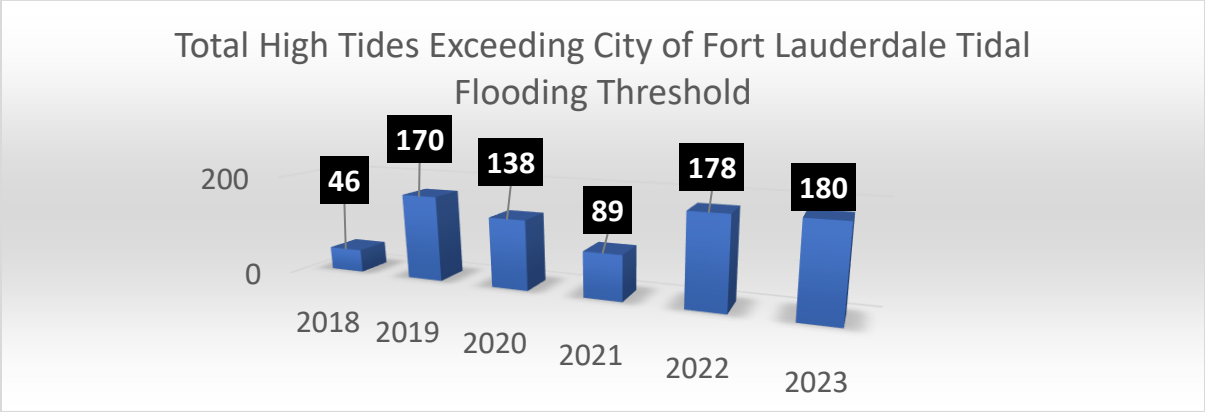


Figure 37. High Tide Trends from 2018 through 2023

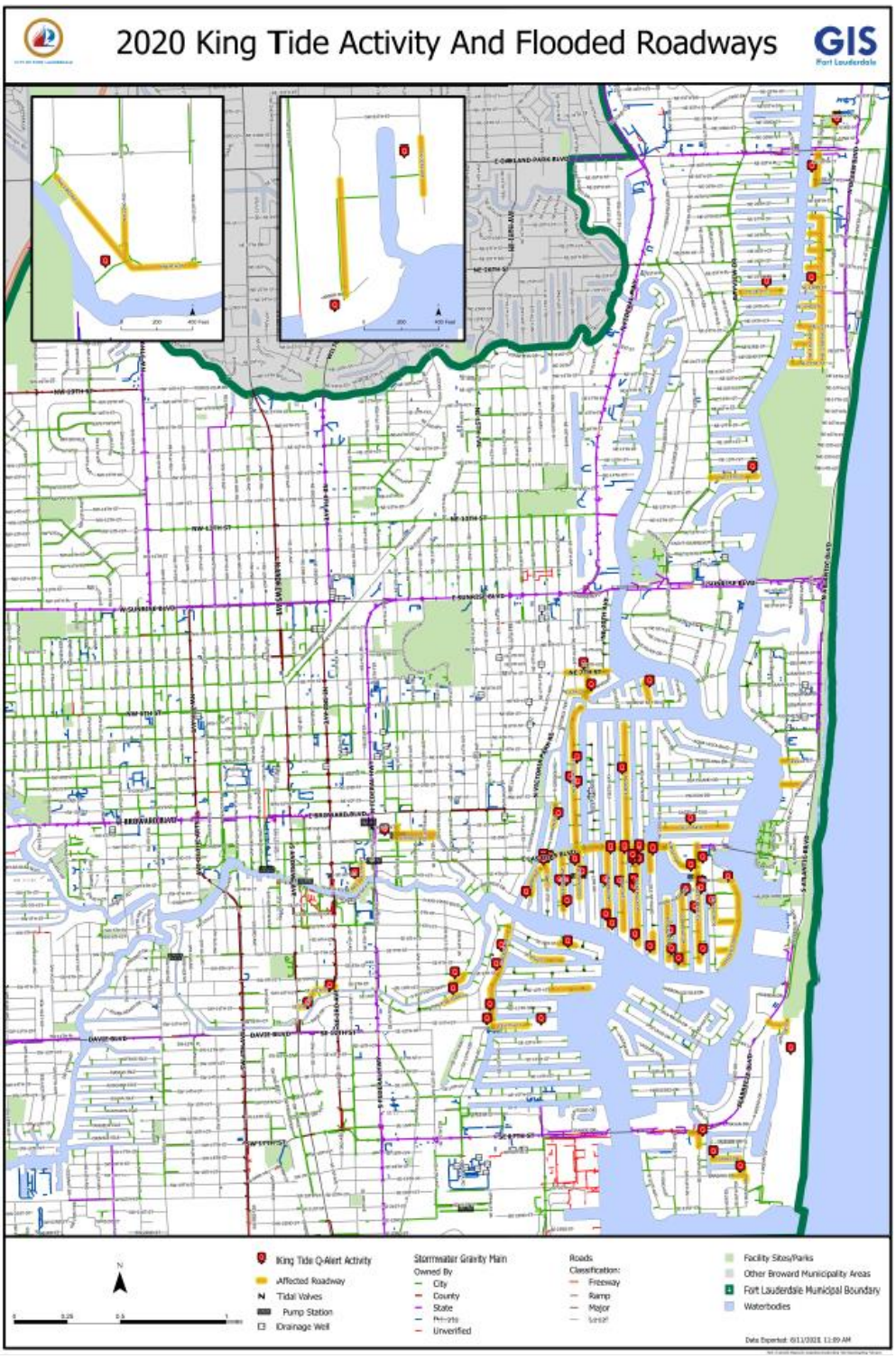


Figure 38. Areas Impacted by Yearly High Tides and 2020 King Tide Activity

4. Compound Flooding

Flooding on the roadways is compounded by several factors. Rain events that are concurrent with the high tide exacerbate flooding. Once the stormwater outfalls are covered by the tide, stormwater can no longer discharge until the tide goes out. Tidal flooding is worsened by a high groundwater table. Storm surge even of a few inches can dramatically increase the extent of the impacts in a City with little topographic variability. The City is also downstream from the regional stormwater management system to the west, receiving discharges of stormwater from the large region which raises the water level in the local waterways, once again preventing gravity discharges of stormwater from the City's stormwater system.

Climate change has also impacted regional rainfall. In April 2023, the City experienced a 26-inch rain event in approximately 8 hours resulting in flash flooding and water intrusion into more than 1,000 homes. Critical commuter roadways were impassable for 24-48 hours. Certain residential roads were flooded to 4-5 feet depth and took up to 6 days of action to remove enough of the flood waters to support traffic movement. A rain bomb event in September and another significant one in November again caused roadway flooding for over 48 hours.

B. Options to address flooding on roadways

The City has numerous options for addressing roadway flooding which may be short or long term, temporary or permanent, policy or infrastructure. The solution for any given roadway may be unique to that location, recognizing that road elevation is the most expensive and challenging of the available options. The simplest short term temporary option is to put out warning signs when the flooding threat is imminent or present. The City uses variable message boards at key locations to warn travelers of the potential for flooded roadways. The City also deploys "No Wake" signs to slow traffic down in specific locations to prevent waves from riding into private property and impacting structures. At one point, the City purchased and began to install automated signs that detected high water and initiated a flashing warning notice. These were immediately removed due to protests from property owners more concerned about the impact of the signs on property values than protecting travelers from hazardous conditions.

The City participates in the Community Rating System (CRS), a program which converts City actions related to flood protection into points toward discounts on National Flood Insurance Program flood policies. Fort Lauderdale currently has a CRS score of 7 which results in a 15% discount on flood insurance policies. To achieve a better score to further reduce flood risk, the City has updated its flood plain management ordinance and is currently developing a Watershed Management Plan which can qualify the City for several jumps in CRS score. These actions support risk transference through insurance to mitigate potential flood losses on private property.

An option that is more of a midterm (5-20 years) solution is tidal valves. The City has installed nearly 200 tidal valves, especially in the lowest lying streets. These devices are placed in the last catch basin (aka storm drain) before the discharge pipe to a waterway. They are one-way valves that close when tidal waters enter the discharge pipe thus preventing tidal waters from entering the roadway and causing nuisance flooding. The valves are designed to open when stormwater enters the catch basin. Much like an unprotected stormwater discharge pipe, a pipe with a tidal valve cannot discharge stormwater if the tidal waters hold the valve closed. This regularly causes ponding of stormwater on roadways when rainfall is concurrent with higher tides.

The City has invested in raising nearly two miles of City-owned seawalls, exclusively adjacent to coastal roadways. While this has substantially reduced the frequency, duration, and intensity of tidal flooding on these roadways, it has impacted vistas and required additional stormwater infrastructure to address drainage previously running off over the seawall. The City has also adopted an ordinance requiring all new seawalls to be built to a minimum elevation of 5.0 feet NAVD, protective of tidal flooding over the next 50-70 years. While the ordinance does not mandate that all seawalls be raised, it does have provisions that require seawalls in disrepair or those that allow tidal waters to impact adjacent property owners or the public right of way to be elevated within 365 days of citation.

In 2018, the City published its Stormwater Master Plan with stormwater improvements for seven neighborhoods identified as the most vulnerable to flooding due to tidal impacts, outdated or inadequate infrastructure. The Southeast Isles area is contained within the ULI study area. This plan invests tens of millions of dollars in each of the neighborhoods to address current and projected rainfall, tidal impacts, and sea level rise. Key components in the Southeast Isles are two large stormwater pumps, elevation of City-owned seawalls, and addition of more tidal valves. Additional information can be found in the master plans Resources.

The final infrastructure option is the elevation of a roadway. It is the more complex, expensive, and challenging of the options. It involves improvements at the interface of public and private infrastructure, has the potential to impact all underground pipes in the roadway and represents the access point to most individual's largest investment – their home. As described in the scope of this project, the challenges to road elevation are many from legal concerns to risk management to property rights to who pays and who benefits from the roadway improvements. These challenges include funding such improvements, harmonization between private and public property, impacts to underground infrastructure, drainage impacts, possibility of imposing eminent domain, and liability to the City.

The City has experienced or implemented road elevation in a few locations. A portion of east Las Olas Boulevard was raised due to an engineering issue when bridges on the north side of the road were being replaced by the Florida Department of Transportation. A small portion of Solar Isle Drive was elevated at the direction of the Public Works Director in front of a single property due to constant tidal ponding. Finally, Ponce de Leon Drive in front of half a dozen homes was elevated at the direction of the Public Works Director while other utility work was being conducted. The road elevation was not in the scope of services for the project nor was it vetted with the City Manager or Commission in advance of performing the work.

It should be noted that Broward County has land use authority over the City of Fort Lauderdale. While FEMA, the Broward County Priority Planning Area maps and the Broward County Future Groundwater Table are substantially dictating where and how high structures need to be built, these emerging regulations are silent on addressing the roadway elevations and if parcel owners will be able to access their properties using the existing roadways into the future.

The legal framework regarding municipal responsibilities is evolving as local flooding thresholds are met and exceeded by the rising seas. Case law supports both a municipalities obligation to maintain the existing infrastructure in a working state versus the requirement to adapt the infrastructure as conditions change (see legal summaries in Resources) to prevent impacting property rights and property values. For local projects, the core legal issues are:

1. Is the City required to elevate a road subject to frequent tidal flooding?

2. If the City raises a roadway, what additional liability does it take on for private property flooding due to stormwater runoff from the elevated right of way?

3. Does the additional liability warrant or require imposing eminent domain of properties at lower elevation reasonably anticipated to be impacted by stormwater run-off?

The final policy option is managed retreat; the consideration of abandoning portions of the community where the City has deemed it can no longer support the underlying infrastructure or provide key municipal services. It is more than a difficult conversation and certainly the option of last resort taken by the municipal governing body. Many property owners would litigate or expect a municipal buy-out even though the cost is not likely feasible for the municipality to bear.

The City began to look at elevating roadways option in the case of Mola Avenue. It is the most frequently flooded roadway in the City and provides access to less than 20 homes. The lowest point on the road is only at one foot of elevation. For the last few years, Mola Avenue has been tidal flooded every day in October during King Tides. After years of conversation with Mola homeowners (see Mola Avenue documents in Resources) and regular conversation with the District Commissioner, staff brought the issue of establishing a policy to address road elevation to the Commission in May of 2022 (see Resources). This presentation did not result in a policy debate but rather direction to staff to bring forth options. This was an impetus to engage ULI to convene the Advisory Panel and create guidance for establishing a policy on road elevation for the City of Fort Lauderdale.

C. Stakeholder Concerns With Road Raising

The topic of road raising has come up several times over the past ten years in the context of repeated roadway flooding primarily associated with tidal flooding. On Nurmi Drive, the concern was related to re-sloping the road so that water did not pond in front of the house with the lowest catch basin. On Solar Isle Drive, the issue was tidal water ponding in front of a specific property. On the Isle of Capri, road elevation was proposed to address both property access issues and the challenges of selling homes on that road during the fall months. On San Marco, the specific request was to elevate the intersection because ponded water was too deep for the homeowner's sports car to navigate. Most recently, on Flamingo Drive, tidal flooding caused primarily by a noncompliant seawall has spurred the conversation on raising the road. On Mola Ave, the extremely frequent flooding (estimated 180 tides in 2023) has brought this to the forefront. Stakeholder issues include, but are not limited to:

1. Timing: the immediate need to maintain access to their properties
2. Stormwater Runoff:
    i. the impact of road raising on properties with finished floors which would be below the future crown of the road
    ii. Demand for improving the drainage system when the road is raised
3. Elevation Amount: the height to which the road should be raised
4. Voluntary Buy-out: Request for the City to buy out owners with the lowest lying homes at or above market rate
5. Temporary Retaining Walls – The owner of the lowest lying house does not wish to be bought out and preferred for the City to erect a structure on their property to divert stormwater coming from the road.
6. Costs of Harmonization: Who pays to blend the private property (including landscaping, water meters and driveways) to account for the new road elevation.
7. Cost: Homeowners disagree with the City's estimate of the costs, which include replacement of the underground infrastructure.

D. City Staff Concerns on Mola Ave

1. Liability: Potential litigation of elevating the roads and impacting private property
2. Cost of Utility Upgrades: The weight of the additional road rock would result in complete replacement of the aging underground pipes. The additional elevation would require redesign of the stormwater system and the raising of the fire hydrants, wastewater lift station, and meter boxes.
3. Feasibility of Construction: Mola Ave is very narrow, not leaving adequate room to elevate the road, one lane at a time. The entire road would have to be shut down for 18 months or longer, eliminating access to the properties for the homeowners as well as essential services.
4. Cost/Benefit: High costs for a limited number of benefiting residents.
5. Competing Priorities for Funding: The existing 5-year Community Investment Plan is underfunded for basic roadway maintenance let alone road elevation. The additional utility costs would divert critical funds from planned utility projects.

XIII. Local Government

Figure 39. City of Fort Lauderdale Commission. From left to right: Warren Sturman, Steven Glassman, Dean J. Trantalis, Pamela Beasley-Pittman, and John C. Herbst

A. Form of Government

The City of Fort Lauderdale has been operating under a Commission-Manager form of government since 1925. The City Commission (Figure 39) is comprised of the Mayor, who is elected at-large, and four Commissioners, who are elected in non-partisan district races depicted in Figure 40. The District 1 commissioner is John C. Herbst, elected November 2022. The District 2 commissioner is Steven Glassman, elected March 2018. The District 3 commissioner is Pamela Beasley-Pittman, elected November 2022 and District 4 commissioner is Warren Sturman, elected November 2022. Mayor Dean J. Trantalis was previously a Commissioner and is now Mayor with several years of service. Elections are slated to occur every four years and each elected official is eligible to serve three consecutive four-year terms. The next election is scheduled for November 2024.

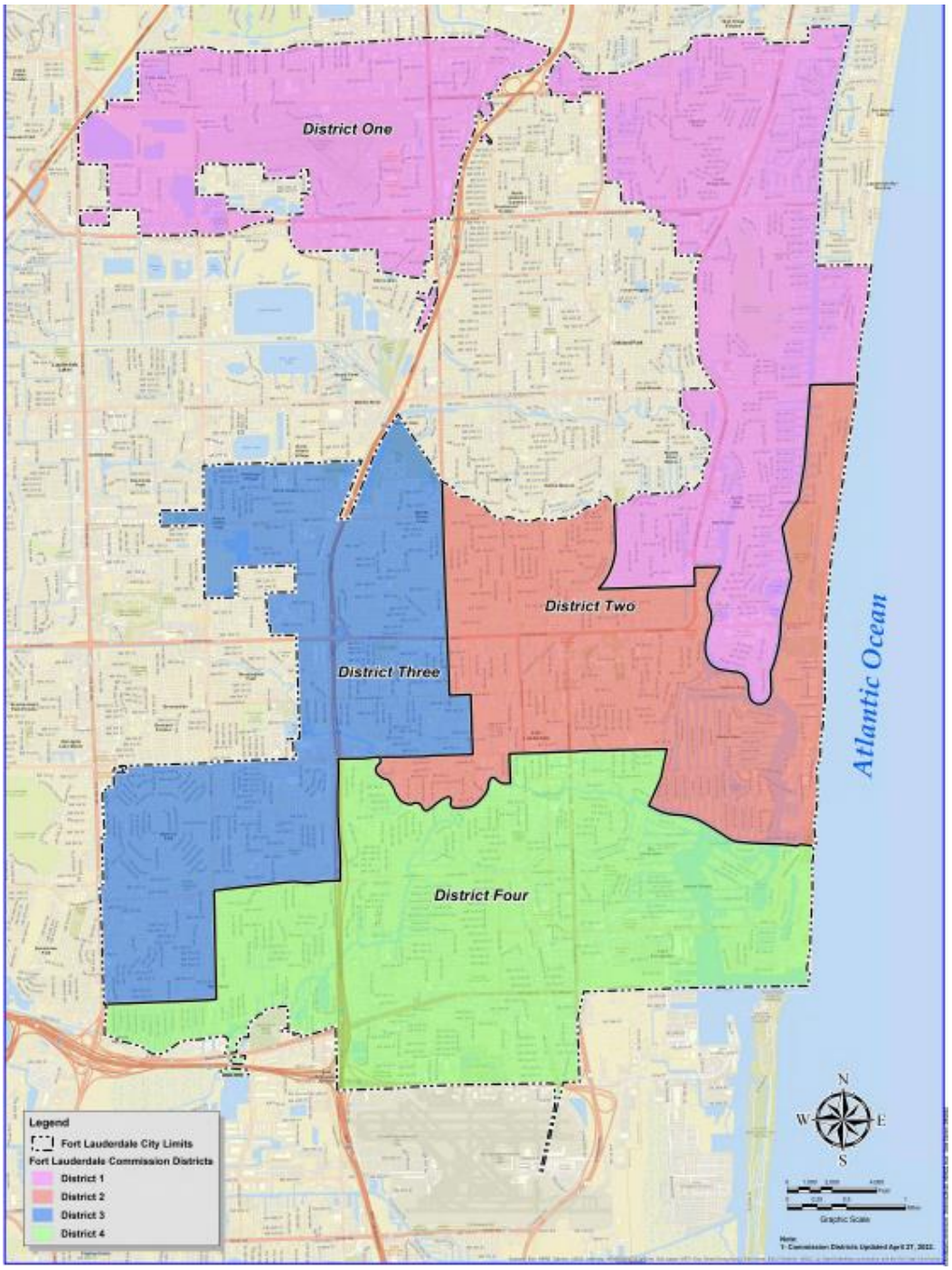


Figure 40. City of Fort Lauderdale Commission Districts

As the City's legislative body, the City Commission sets policy, passes ordinances, adopts resolutions, and makes appointments to advisory boards and committees. All five elected officials are voting members of the City Commission. The City Manager is appointed by and reports directly to the City Commission. As Chief Executive Officer, the City Manager is responsible for directing the City's day-to-day operations and carrying out the policies set forth by the Commission. Greg Chavarria, Fort Lauderdale's City Manager, began serving in July 2022.

The City of Fort Lauderdale's organizational structure is comprised of the offices of the City Commission, City Manager, City Attorney, City Auditor, and City Clerk, along with the following ten departments: Development Services, Finance, Fire Rescue, Human Resources, Information Technology Services, Office of Management and Budget, Parks and Recreation, Police, Public Works, and Transportation and Mobility. Figure 41 highlights the organizational chart of the City, and it employs a workforce of approximately 2,800 full-time employees.

As the City moves forward, it will continue to work in partnership with its most important asset, its neighbors, to develop the strategies necessary to ensure a safe and secure community; provide quality programs and services; enhance quality of life; protect the environment; promote smart growth; and maintain fiscal responsibility. To view the City's complete vision plan, Fast Forward Fort Lauderdale 2035 please visit the City's webpage.

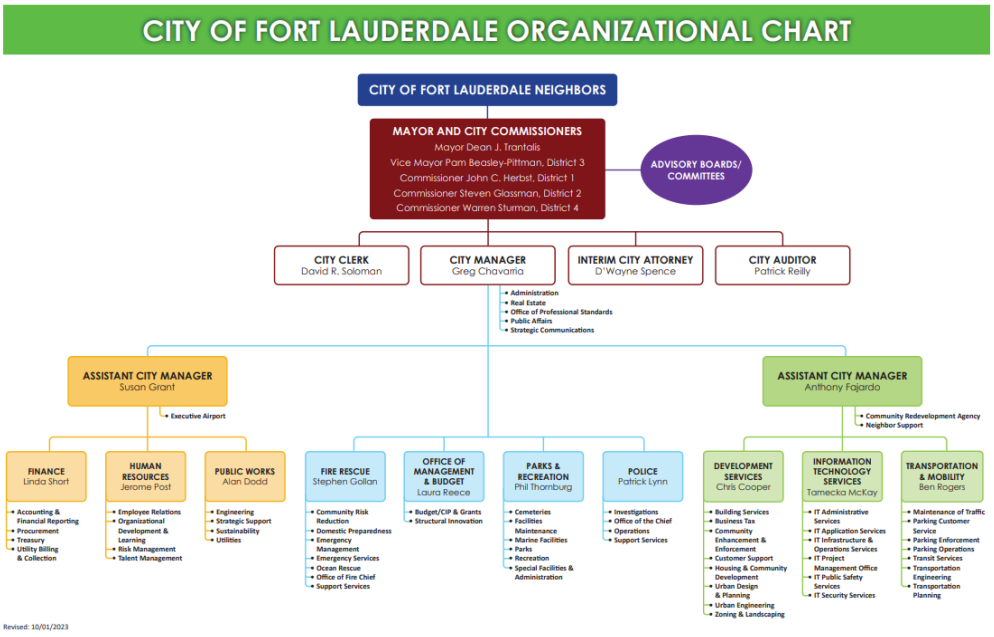


Figure 41. City of Fort Lauderdale Organization Chart

B. Laws and regulations impacting land use and development in the study area

Under Florida Statutes, Chapter 163, each local government is required to prepare a land use plan element for its jurisdiction, which will be more definitive to meet specific local needs; however, this local land use element must be consistent with the Broward County Land Use Plan under the Broward County Charter. To determine the consistency, local governments must submit their land use plans, which have been prepared in conformance with the Florida Statute, to the Council for certification review. If the Council finds the local plan to be in substantial conformity to the Broward County Land Use Plan, the local land use plan will be certified by the Planning Council and become the land use guide for that jurisdiction with full force and effect of law under the Charter when adopted by the local governmental unit in conformance with the State Act. Unless otherwise noted, municipal plans may always be more restrictive than the County Plan.

Local jurisdictions must submit their own land use plans to the Council to be reviewed for (re)certification. If the Council determines the local land use plan is in substantial conformity with the County Land Use Plan, the Council will certify the local plan. A detailed explanation of (re)certification is found in the Plan Implementation Requirements Section of this plan. The preparation of other required or optional elements of the comprehensive plans for each of the local jurisdictions is the responsibility of that jurisdiction.

XIV. Resources Folder Index

2014 Fort Lauderdale Vulnerability Assessment
2018 FDOT Manual of Uniform Minimum Standards for Design (Greenbook)
2019 Southeast Florida Regional Climate Change Compact's Unified Sea Level Rise
2023 King Tide Briefing
2024 Emerging Trends Real Estate
Adopted Community Investment Plan (CIP) 23-27
Adopted Community Investment Plan (CIP) 24-28
Broward County Land Use Plan
Colliers City of Fort Lauderdale Market Trends
Comprehensive Plan 2040
Comprehensive Plan Volume II
Fortify Fort Lauderdale Briefing
Fort Lauderdale Comprehensive Utility Strategic Master Plan
FTL Transit Master Plan Executive Summary
FTL Transit Master Plan
FY24 City of Fort Lauderdale Adopted Budget
George T. Lohmeyer (GTL) Wastewater Treatment Plant Brochure
Greater Fort Lauderdale Alliance Source Book
Legal Analysis and a Florida Model Ordinance
Resilience Action Plan Report (FDOT)
Resilient Florida Program Final Rule Language (State of Florida)
Stormwater Master Plan 2018
Water Treatment Plant Fiveash Executive Summary
Watershed Asset Management Plan