

# **City of Treasure Island Floodplain Management Plan**

Adopted by the Treasure Island City Commission  
May 1998

Prepared by the Treasure Island Floodplain Management Committee  
With Staff Assistance from the Pinellas Planning Council

# Chapter 1: Introduction and Purpose

## I. INTRODUCTION

Because of its location along the Gulf of Mexico, the City of Treasure Island is highly vulnerable to the effects of strong storms and severe flooding. In an effort to assist property owners, the National Flood Insurance Program (NFIP) offers federally backed flood insurance in communities, like Treasure Island, that enact and enforce regulations aimed at reducing potential damage caused by flooding. The NFIP also offers discounts against insurance premiums through the Community Rating System (CRS) program.

In order to participate in the NFIP and the CRS program, communities with ten or more properties that have received repeated flood insurance claim payments must prepare, adopt, and implement a (floodplain management) plan to reduce damage in repetitive loss areas.<sup>1</sup> The plan must adhere to the requirements specified in the *CRS Coordinator's Manual*. Due to the effects of hurricanes and strong storms, like Hurricane Elena, the Ano-name storm,<sup>2</sup> and the AStorm of the Century,<sup>3</sup> the NFIP has recorded 136 properties in Treasure Island that have made two or more flood insurance claims, each in excess of \$1,000. By surpassing the NFIP A10-property<sup>4</sup> threshold, the City of Treasure Island is required to prepare and adopt a *Floodplain Management Plan*.

## II. PURPOSE OF THE FLOODPLAIN MANAGEMENT PLAN

The primary goal of the Floodplain Management Plan (FMP) is to reduce damage to structures caused by flooding and thereby reduce the number of repetitive loss properties within the city. In support of this goal, the plan reviews several issues related to flooding, including hurricane evacuation procedures, building structural requirements, natural resource protection, and other mitigation activities. As discussed below, the FMP was developed through a series of public workshop meetings. Through these meetings and other public outreach programs, the city also believes this plan has heightened public awareness of flooding problems within the community and will result in the following objectives being met:

- Increased public safety
- Reduction of damage to property and infrastructure
- Avoidance of economic disruption and losses
- Reduction in human suffering
- Preservation of the floodplain

### **III. PUBLIC INVOLVEMENT**

The CRS program encourages the FMP be prepared by a planning committee and supervised by a professional planner. To meet this requirement, Treasure Island has contracted with the Pinellas Planning Council to lead the planning process and draft this plan, with input from a planning committee established by the City Commission through Resolution 98-12 (see Appendix C). Treasure Island's Floodplain Management Committee (FMC) is composed of both staff and residents of the community and includes:

Building Department - 1 representative  
Recreation Department - 1 representative  
Fire Department - 1 representative  
Public Works - 1 representative  
Citizens-at-Large - 4 representatives

Members of the FMC were encouraged to provide input on various flooding issues that affect Treasure Island. The Committee held six public meetings during the preparation of this Plan that focused on hazard assessment, problem identification, goals, and preventative activities (see Appendix A). These meetings were advertised in the *City Hall News* newsletter that was mailed to all residents and business owners within Treasure Island in February 1998 (see Appendix B).

Also in February, the city distributed a Floodplain Management Plan Survey<sup>®</sup> to all 5,724 residents and business owners in the community. Of these, 268 or 4.6 percent were filled-out and returned to City Hall. Among other items, the survey solicited information regarding structural data, individual flooding experiences, and possible preventative measures. The cumulative results of the survey and individual comments are included in Appendix B.

### **IV. COORDINATION WITH OTHER AGENCIES**

During the course of preparing the FMP, the following agencies were contacted and requested to provide input on the Plan:

- Pinellas County Emergency Management
- Pinellas County Planning Department
- Southwest Florida Water Management District
- Tampa Bay Regional Planning Council
- Florida Department of Community Affairs
- Florida Department of Environmental Protection
- Florida Department of Transportation
- Federal Emergency Management Agency
- U.S. Army Corps of Engineers

Furthermore, these agencies were also sent draft copies of the Plan on April 30, 1998, for comment (see Appendix C). Meetings were held on several occasions with representatives from the Pinellas County Planning Department, Pinellas County Emergency Management, and the Treasure Island Departments of Building, Fire, Public Works, and Recreation.



## Chapter 2: Background

The City of Treasure Island is located on the west coast of Pinellas County in central Florida (see Map 1). Spanning five islands, the city measures approximately 3.5 miles at its longest point and 1.25 miles in width. At 1,029 upland acres or 2.3 square miles, the community is virtually built-out with an estimated 1995 population of 7,300. With the majority of the community developed, the only remaining undisturbed natural areas are limited to small scattered marine wetlands, beaches and dunes along the coast, and two islands located in Boca Ciega Bay.

### I. PHYSICAL CHARACTERISTICS

Due to Treasure Island's proximity to the Gulf of Mexico, low topography, and extreme alteration of the natural landscape, the city is vulnerable to flooding, particularly in association with tropical storms and hurricanes.

#### A. Geographic Location

As its name implies, Treasure Island is entirely located on five islands located on the west coast of Pinellas County. The community is bordered to the west by the Gulf of Mexico, to the east by Boca Ciega Bay, to the north by John's Pass, and to the south by Blind Pass. The leading factor causing repeated flooding within Treasure Island is the community's proximity to the Gulf. Serving as a barrier against tidal storms for mainland Pinellas County, the city has faced the brunt of the most severe weather conditions. Not only does heavy rainfall associated with tropical storms pose a threat, but the community is also susceptible to storm surges.

#### B. Topography

The topography of Treasure Island is very flat, with elevations ranging from Mean Sea Level (MSL) to 7.5 feet. Dredge and fill activities created much of the community, including the residential neighborhoods of Coney Island, Capri Island, Isle of Palms, and Paradise Island.

#### C. Vegetation

Nearly all native vegetation that served as a protection against coastal tidal surges has been destroyed by urbanization and the growth and expansion of exotic plant species. Before the advent of dredge and fill development, the Boca Ciega Bay shoreline was dominated by extensive mangrove and saltmarsh communities with nearby subtidal seagrass beds. Elnor Island and Bird Key, two spoil islands found in Boca Ciega Bay, are the only sections of the city that have totally maintained their native vegetation. In areas absent of seawalls, isolated mangrove and marsh areas are scattered along properties abutting Boca Ciega Bay.

**D. Beaches and Dunes**

Treasure Island's beach and dune system stretches for approximately 3.5 miles along the Gulf of Mexico. Although high-density condominiums and hotels have encroached into this area, the city, in cooperation with Pinellas County and the U.S. Army Corps of Engineers, has been responsible for protecting much of the shoreline's original form through the completion of numerous beach renourishment programs.

The sandy beaches not only provide recreational opportunities for residents and tourists, but also perform several natural functions. Along the Gulf of Mexico, beaches and dunes serve as a buffer against threatening waves and storm surges while serving as a home and/or nesting area for birds and sea turtles. The preservation of the dune system is reliant upon continued protection against development, an active renourishment program, and the presence of native vegetation.

**II. DEVELOPMENT**

**A. Population**

Incorporated in May 1955, Treasure Island's population has grown from 3,506 residents in 1960 to an estimated 7,357 residents in 1995 (see Table 2-1). Due to its warm climate and miles of white sandy beach, the city continues to be a hot spot for tourists and seasonal residents, the latter accounting for an additional 1,500 residents inhabiting the community during the winter months. Furthermore, it is estimated that an average of 4,000 tourists who occupy hotels and motels could be found in the community on any given day. Combining these totals, the city served an estimated total population of 13,000 in 1995.

**Table 2-1  
Permanent Population Trends, 1950-1990**

Year	Population	% Change
1950	75	--
1960	3,506	4,574.7%
1970	6,120	74.6%
1980	6,316	3.2%
1990	7,266	15.0%
1995	7,357	1.2%

Sources: U.S. Bureau of the Census, 1950, 1960, 1970, 1980, and 1990.  
Pinellas County Planning Department. 1995. *Pinellas County  
Population Projections*. Appendix A.

**Table 2-2**  
**Existing Land Use Acreage and Density, 1996**

<b>Land Use</b>	<b>Acreage <sup>1</sup></b>	<b>% of Total</b>
Single-Family	303	41%
Multifamily	171	23%
Commercial	86	12%
Vacant	15	2%
Public/Semi-Public	10	1%
Recreation/Open Space	33	4%
Conservation/Reservation	126	17%
<b>Total</b>	<b>744<sup>1</sup></b>	<b>100%</b>

<sup>1</sup>Excludes right-of-way acreage

Source: Pinellas County Property Appraisers Office, 1996.

## **B. Existing Land Uses**

Treasure Island is dominated by residential uses that occupy 64 percent of all land area, excluding rights-of-way. Conservation areas amount to 126 acres or 17 percent, with the majority being beaches and dunes along the Gulf of Mexico. Of this, twenty acres are found on nearby Elnor Island and Bird Key. The remaining acreage is concentrated in three clusters along the shoreline of Boca Ciega Bay. Commercial uses occupy 12 percent of upland area and are generally located at the center of the community along the primary access route to the mainland, the Treasure Island Causeway, and along the main north-south route, Gulf Boulevard. Finally, recreational facilities, open space, and public facilities encompass only 5 percent of land area (see Table 2-2).



# Chapter 3: Inventory

## I. REPETITIVE LOSS PROPERTIES

Each year, FEMA produces a list of repetitive loss properties. This list includes all properties that have made two or more claims of at least \$1,000 to the NFIP within any 10-year period since 1978 (e.g., two claims during the periods of 1978-1987, 1979-1988, etc.). The only way in which a repetitive loss property can be removed from the list is if it has subsequently been protected from the types of events that cause the losses. Thus, buildings that have been acquired, relocated, retrofitted, or otherwise protected from frequent floods could be eligible for removal from FEMA's list. As explained in Chapter 1, communities with ten or more repetitive loss properties at any one time, like Treasure Island, must prepare a floodplain management plan.

As of March 1997, the City of Treasure Island contained 137 repetitive loss properties that are identified on Map 2. Because these units are scattered throughout the community, this *Plan* focuses on the entire city as the repetitive loss area. Therefore, all future preventative actions identified in Chapter 7 are intended to be implemented throughout the city, unless otherwise specifically stated.

At 64 units, the majority of repetitive loss properties within Treasure Island were single-family homes (see Table 3-1). Duplexes and triplexes were the second leading type of dwelling type with repetitive losses (39 units). Finally, the combination of apartment/boarding homes (4-9 units), condos, hotels/motels, and businesses accounted for the remaining 27 repetitive loss properties. Many of these structures are typically characterized by one or more of the following features:

- Structures built prior to the city joining the NFIP in May 1971 (prior to this time, buildings were constructed below the Base Flood Elevation [BFE]);
- Elevated structures which meet the BFE but which have appurtenances located below the BFE;
- Structures located seaward of the Coastal Construction Line; or
- Structures along the Gulf of Mexico or Boca Ciega Bay, especially those located in the city's FIRM Velocity Zone.

## II. CRITICAL FACILITIES

Although no hospitals, nursing homes, or adult congregate living facilities are located within city limits, the Floodplain Management Committee has identified other facilities that could be classified as critical. These include:

- 11 sewer lift stations
- Treasure Island Causeway drawbridge
- Pinellas County Water Tank

**Table 3-1**  
**Repetitive Loss Properties**  
**Dwelling Unit Type**

Dwelling Type	# of Units	% of Total
Single-Family	64	46.7%
Duplex/Triplex	39	28.5%
Apartment/Boarding Home (4-9 units)	18	13.1%
Condominium	8	5.8%
Hotel/Motel	7	5.1%
Business	1	0.7%
<b>Total</b>	<b>137</b>	<b>100%</b>

Source: National Flood Insurance Program, March 1997.

### III. NATURAL AREAS

Currently, beach and dunes are found along the Gulf of Mexico coastline stretching from the city's southern to northern boundary. Before the advent of dredge and fill development, Boca Ciega Bay's shoreline was dominated by extensive mangrove and saltmarsh communities with nearby subtidal sea grass beds. Today, in areas without seawalls, isolated mangrove and marsh areas are scattered along properties abutting Boca Ciega Bay. Tidal swamp environments are restricted to two islands, Elnor Island and Bird Key, which are found within the Bay. Finally, sea grass beds are limited to a seven-acre area near the Isle of Palms, between Capri Isle and the Treasure Island Causeway, and the shallow water surrounding Elnor Island just north of Coney Island. Sea grass consists of four species in the area and include turtle grass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*), shoal grass (*Halodule wrightii*) and widgeon grass (*Ruppia maritima*).

### IV. INFRASTRUCTURE

The existing infrastructure within the city is identified in Table 3-2. Because the entire city is located within the 100-year floodplain, these structures and uses cannot be located to a less threatened area of the community.

**Table 3-2  
Existing Infrastructure, 1998**

	<p>50 feet seawalls on the east ends of 127th, 122nd, 121st, 120th, 119th, 101st., 102nd, and 99th Avenues.</p> <p>20 feet seawall on east end of Harrell Ave., on each corner of the bridge that crosses from Capri Isle on 116th Ave, along all four corners of 115th Ave. by the Isle of Palms, on all four corners of 107th Ave. where it crosses Paradise Island, and six 20 foot seawalls and one 100 foot seawall on the bridges along the Treasure Island Causeway</p> <p>40 feet seawall on both sides of bridge to the Isle of Palms</p> <p>65 feet seawall at south end of Bayshore Drive</p> <p>680 feet of seawall behind City Hall and Fire Dept.</p>
Seawalls	2,334 feet of seawall along the Paradise Island Golf Course.
Sanitary Sewer & Potable Water Facilities	Potable water services are provided by Pinellas County. Sewage Treatment service is provided by the city of St. Petersburg. The City owns and maintains 25 miles of sanitary sewer lines and 11 lift stations.
Drainage Facilities	Natural drainage pattern of the city diverts water into Boca Ciega Bay.
Bridges	City owns the following five bridges: three bridges on the Treasure Island Causeway, a fixed bridge on the Isle of Palms and a fixed bridge on the Isle of Capri.
Marina	The city owns a municipal marina behind City Hall and four boat ramps accessing Boca Ciega Bay.
Boat Launch Facilities	A light craft launching area to the Gulf is located at Municipal Lot No. 2.

**V. FUTURE DEVELOPMENT**

**A. Population**

According to U.S. Census data, Treasure Island's permanent population was 7,266 in 1990. This number represents a 950 resident, or 15 percent, increase from the 1980 count. The Pinellas County Planning Department has estimated the 1995 population at 7,357 residents, an increase of another 91 residents since 1990. Treasure Island is also impacted by numerous seasonal residents and tourists who not only occupy hotels and motels, but single-family homes, apartments, and condominiums. In 1995, the Pinellas County Planning Department reported that the number of seasonal residents, excluding tourists, living in permanent housing amounted to 1,489 persons in 1995. Tourists accounted for an additional 4,210 persons.

**Table 3-3  
Total Population, 1995**

		<b>Population</b>
Permanent Population		7,355
Seasonal Population	Seasonal Residents	1,489
	Tourists	4,210
<b>Total Population</b>		<b>13,054</b>

Source: Pinellas County Planning Department. *Pinellas County Population Projections, 1995-2030, Appendix A.* 1995.

### **B. Housing Inventory**

According to the U.S. Bureau of the Census, the city contained 5,525 housing units in 1990. Of these 70.5 percent (3,896 units) were classified as occupied units and 30 percent (1,629 units) as vacant units.

### **C. Redevelopment**

Redevelopment has been taking place on a limited, parcel-by-parcel basis throughout the city, with the heaviest concentration occurring in the Sunset Beach area. Although in the past local officials had expressed some interest in revitalizing the primary retail-commercial area, no actions or recommendations had been taken to stimulate such revitalization. However, as indicated by the adoption of Resolution 97-102, endorsing a *Avisioning process*,<sup>@</sup> designating facilitators for the project, and appointing a steering committee to begin the process, city officials have now taken a proactive position in the revitalization/redevelopment of key areas in the city.

### **D. Future Population**

Because Treasure Island is considered a virtually built-out community, with only 13 acres of vacant land available with a residential or mixed use land use designation, the city expects that the future population will mirror existing counts. The County Planning Department has forecasted the population to grow at approximately 0.1 percent annually between 1995 and 2000. Thereafter, only a handful of new residents are expected to relocate into the city (see Table 3-4).

**Table 3-4**  
**Permanent and Seasonal Population Estimates and Projections, 1995-2030**

Year	Permanent Population	Seasonal Population		Total Population
		Permanent	Tourist	
1990*	7,266	1,471	4,200**	12,937
1995	7,355	1,489	4,210	13,054
2000	7,404	1,497	4,212	13,114
2005	7,432	1,503	4,214	13,149
2010	7,448	1,506	4,215	13,169
2015	7,457	1,508	4,216	13,181
2020	7,463	1,508	4,216	13,187
2025	7,466	1,510	4,216	13,191
2030	7,467	1,510	4,216	13,193

\*U.S. Bureau of the Census, 1990

\*\*Estimated

Source: *Pinellas County Population Projections, 1995-2030, Appendix A. 1995.*

**Table 3-5**  
**Vacant Land by Future Land Use, 1996**

Future Land Use Category	Acreage
Residential Urban	1.13
Residential Medium	5.22
Resort Facilities Medium	2.26
Resort Facilities High	4.43
Commercial General	1.8
Preservation	0.18
<b>Total</b>	<b>15.02</b>

Source: Pinellas County Property Appraiser, 1996

### E. Future Development

As shown on Map 3, Existing Land Use Map, Treasure Island offers little area for future growth. Of the 744 developable acres, only 15 acres or two percent is vacant/undeveloped. Table 3-5 lists the number of vacant acres available by land use category. As shown, acreages are limited in all land use categories and land is usually fragmented in small, isolated lots.

## Chapter 4: Problem Identification

The City of Treasure Island is located in the subtropical climactic zone along the west Florida Gulf coast. In an average year, the city receives an average of 49 inches of rain annually, most falling during the rainy season which extends from June to September. This time also coincides with the hurricane season which officially begins in June and ends in November.

### I. CAUSES OF FLOODING

Being a barrier island with flat topography, the city is vulnerable to severe storms, particularly those associated with tropical storms and hurricanes. However, many recent insurance claims have also stemmed from strong summer thunderstorms and storms preceding cold fronts. All these types of storms exhibit one or more of the following factors that can lead to coastal flooding: storm surge, high tide, and heavy rainfall.

#### A. Storm Surge

Storm surge is the abnormal rise in water level caused by the wind and pressure forces of a hurricane or tropical storm. This dome of wind driven water crosses the coastline just ahead of, and to the right of, a hurricane or tropical storm's eye. This effect produces most of the flood damage and drownings associated with storms that make landfall or that closely approach the coastline. Of all hurricane hazards, storm surge is considered to be the most dangerous as nine out of ten hurricane-related deaths are caused by drowning. The principal tool for analyzing the expected hazards from storm surge is the Sea, Lake, and Overland Surges from Hurricanes (SLOSH) numerical storm surge model developed by the National Oceanic and Atmospheric Association. (NOAA). The model predicts the tidal surge heights that result from hypothetical hurricanes with selected various combinations of pressure, size, forward speed, track, and winds.

#### B. High Tides

The most severe type of coastal flooding is seen when storm surges occur simultaneously with an astronomical high tide. In Treasure Island, the average high tide is approximately three feet.

#### C. Rainfall

Although usually not deadly, heavy rainfall can inundate potential evacuation routes and prevent persons from evacuating areas vulnerable to storm surge. Even a moderate hurricane could produce approximately six to twelve inches of rain, which could cause severe flood damage.

**II. TYPES OF STORMS**

**A. Cyclonic Storms: Hurricanes and Tropical Storms**

Among all other natural disasters, cyclonic storms have posed the greatest threat to life and property in Florida, Pinellas County, and Treasure Island. The National Weather Service identified the Tampa Bay Region, including Pinellas County, as one of the most hurricane-vulnerable areas in the United States with the potential for large scale loss of life. This is especially true of Treasure Island. Since 1886, 37 hurricanes have passed within 100 nautical miles of the mouth of Tampa Bay. Based on these statistics, a hurricane can be expected to pass within the same distance at least once every 2.8 years.

Due to the city's low elevation, Treasure Island is susceptible to flooding from the effects of both major and minor hurricanes and tropical storms. By definition, a tropical storm is a cyclonic storm with wind speeds between 40 and 73 mph with a hurricane producing wind speeds in excess of 73 mph. Rainfall amounts vary from six to twelve inches and can be responsible for severe flooding. Being a barrier island, vulnerability is paramount and so is evacuation. It is predicted that a direct hit by a Category 5 hurricane would result in millions of dollars in damage, numerous injuries and possible fatalities, and total recovery would take years to accomplish.

In December 1990, the National Hurricane Center developed the latest SLOSH model for the Tampa Bay basin. The model predicts tidal surge heights that would result from varying intensity hurricanes. The predicted storm surges that could potentially affect Treasure Island are listed in Table 4-1.

**Table 4-1  
Expected Storm Surges Affecting Treasure Island**

<b>Strength of Hurricane</b>	<b>Winds (MPH)</b>	<b>Storm Surge</b>
Category 1	74-95	6 feet
Category 2	96-110	9.5 feet
Category 3	111-130	12 feet
Category 4	131-155	16 feet
Category 5	>155	19 feet

Source: Pinellas County Emergency Management

**B. Major Rainfall Events and Frontal Storms**

Treasure Island is not only threatened by the effects of cyclonic storms, but storms that are associated with cold fronts moving in from the north and west and severe thunderstorms common during the summer rainy season. It is predicted that Pinellas County, including Treasure Island, might expect severe coastal flooding from a frontal storms once every three to five years. Pinellas County Emergency Management has concluded that the maximum threat to Treasure Island is a storm generating gale force winds from the west or southwest, striking the coastline during an astronomical high tide.

**III. FACTORS LEADING TO MORE INTENSE FLOODING**

As discussed above, coastal flooding is caused by one or a combination of three factors: storm surges, high tides, and heavy rainfall. However, in addition to these natural functions, flooding can become more intensive due to other factors. As part of the Floodplain Management Plan Survey, residents and business owners were asked to describe past flooding events and the factors that contributed to the flooding of their structure. As shown in Table 4-2, a number of respondents mentioned that low elevation and drainage problems contributed to extensive flooding.

**Table 4-2  
What Factors Contributed to Additional Flooding?**

Factor	Number of Units	% of Total
Low Elevation	31	40%
Drainage	37	47%
Seawall	10	13%
Total # of Responses	78	100%

Source: Floodplain Management Plan Survey, March 1998.

**A. Poor Drainage**

The Floodplain Management Plan Committee noted several areas that are susceptible to severe flooding due to inadequate drainage. These areas include Paradise Lane, Gulf Boulevard in the area of 105th and 106th Avenues, Sunset Beach, and the Isle of Palms, between 5th Street East and 7th Street East.

Additionally, many respondents mentioned that debris blocking nearby storm drains also escalated flooding levels. One resident noted that one severe storm that flooded her home coincided with a garbage pick-up day. Because garbage pick-up was delayed, refuse from overturned trash cans blocked storm drains.

**B. Low Elevation**

All new development and redevelopment in excess of 50 percent of the original value of the building must be elevated to or above the base flood elevation (BFE). Currently, city staff estimates that approximately 80 percent of existing homes and businesses were constructed prior to the adoption of these standards and do not meet the minimum BFE requirements. Furthermore, many home and business owners are unaware as to whether their structure is constructed in accordance with BFE requirements. As shown in Table 4-3, 47 percent of respondents to the Floodplain Management Plan Survey stated that they were unsure whether their home/business was built at or above the BFE.

**Table 4-3  
Does Home/Business Meet BFE Requirements?**

Meets BFE Requirements	Number of Units	% of Total
Yes	81	30%
No	60	23%
Don't Know	125	47%
Total # of Responses	266	100%

Source: Floodplain Management Plan Survey, March 1998.

**C. Seawalls**

Several residents mentioned that damaged seawalls contributed to additional flooding on their property. However, repairing these seawalls may only lead to additional flooding concerns. Currently accepted development practices suggest a combination of native vegetation and gradual sloping to protect property from tidal action. Where existing seawalls require maintenance, the toe area of the wall should be planted with native vegetation or rip-rap material installed to prevent additional scouring. Current regulations prohibit seawall construction along the Gulf of Mexico, even in cases where existing seawalls are damaged. However, seawall construction, in accordance with the land development regulations, is still allowed along Boca Ciega Bay.

**III. PAST FLOODS RESULTING IN PROPERTY DAMAGE**

As shown in Table 4-4, over 90 percent of insurance claims by repetitive loss properties in Treasure Island can be attributed to the following four major storms:

***No-Name Storm: June 18, 1982***

A strong frontal storm coming ashore from the Gulf of Mexico.

***Hurricane Elena: September 1-4, 1985***

The most recent major hurricane that affected the Pinellas County coastline was Hurricane Elena in the Summer of 1985. Although the center of this Category 3 storm was 80 miles from shore and storm surge ranged from only six to seven feet, heavy flooding occurred, structures were damaged, and electrical service was disrupted for over 40,000 county residents. In southern Pinellas County, Damage Assessment Teams identified more than 7,500 structures that sustained at least moderate damage. Within Treasure Island, the city had to repair sidewalks, the phone system, parking lots, and the drawbridge's hydraulic system. Although the damage was considerable, the results could have been significantly worse had Hurricane Elena come closer to the Pinellas County shoreline and been a more intense storm.

***AStorm of the Century® March, 1993***

This winter storm dropped temperatures into the high 20s, swept boats onto shore, shattered windows, and tore roofs. The storm resulted in \$20 million worth of damage and received a presidential disaster declaration. Treasure Island beaches suffered serious erosion due to strong tidal effects of the storm.

***Tropical Storm Josephine: October 7, 1996***

This tropical storm caused \$24 million in damage to homes and businesses in Pinellas County and resulted in a presidential disaster declaration. Storm surges were recorded at 6.3 above mean sea level and winds gusted at approximately 50 mph. Treasure Island experienced minor flooding problems in areas with poor drainage.

**Table 4-4  
Storm Events**

<b>Event</b>	<b>Type of Storm</b>	<b>Date</b>	<b># of claims declared by repetitive loss properties</b>
No-Name Storm	Frontal Storm	06/18/82	75
Hurricane Elena	Hurricane	08/31/85 to 09/02/85	104
AStorm of the Century®	Winter Storm	03/12/93	71
Tropical Storm Josephine	Tropical Storm	10/07/96	83

Source: National Flood Insurance Program, 1997.

## Chapter 5: Evacuation Procedures

Adopted in 1983, the *Treasure Island Emergency Action Guide* outlines the procedures to be taken by the city in response to a natural disaster, including episodes of severe flooding. The *Guide* provides standard operating procedures for emergency situations, and describes the personnel, equipment, communications and warning system involved in conducting an evacuation. In addition, an outline of the expected public response to occur during a warning period, an actual evacuation, and after the emergency passes is included. Treasure Island has designated the Fire Chief as the emergency management coordinator who oversees the development and maintenance of the *Emergency Action Guide*. Continuously updated, the document works in unison with the Pinellas County *Comprehensive Emergency Management Plan* (CEMP).

The CEMP was developed by the Pinellas County Department of Emergency Management and documents Apolicies, procedures, and guidelines to prepare for, respond to, recover from and mitigate future impacts of the hazards/disasters that could affect our area.@ Pinellas County responds to all major disasters according to the CEMP. A key component in implementing the CEMP is the Disaster Advisory Committee (DAC). Consisting of representatives from all municipalities, fire districts, disaster response agencies, and other key county officials, the DAC acts as the Aconduit for information on plans, exercises, training, and response and recovery activities.@ Furthermore, the Committee advises the Board of County Commissioners on the type and magnitude of an evacuation. Currently, Treasure Island actively participates in the DAC and the Fire Chief serves as the city@s representative.

### I. HURRICANE VULNERABILITY ZONE

Being part of Pinellas County@s barrier island system, Treasure Island is highly vulnerable to natural disasters. Based on the potential affects from severe storm, evacuation zones are grouped together in a series of five levels, Evacuation Levels A through E. Those zones that are more susceptible to the effects of a hurricane fall within Evacuation Level A. The *1997 Hurricane Guide*, distributed annually by Pinellas County and other government and private agencies, contains a color-coded map delineating evacuation levels. According to this map, the entire City of Treasure Island is located in an Evacuation Level A.

**Table 5-1  
Hurricane Evacuation Levels**

LEVEL A	Storm surge of five (5) to seven (7) feet. Complete evacuation of Zones 1 through 17. Evacuation of mobile home and travel trailer residents of Zones 18 through 136.
LEVEL B	Storm surge of seven (7) to twelve (12) feet. Complete evacuation of 1 through 46. Evacuation of mobile home and travel trailer residents of Zones 47 through 136.
LEVEL C	Storm surge of twelve (12) to fifteen (15) feet. Complete evacuation of Zones 1 through 87. Evacuation of mobile home and travel trailer residents of Zones 88 through 136.
LEVEL D	Storm surge of fifteen (15) to twenty (20) feet. Complete evacuation of Zones 1 through 114. Evacuation of mobile home and travel trailer residents of Zones 115 through 136.
LEVEL E	Storm surge of twenty (20) to twenty four (24) feet. Complete evacuation of Zones 1 through 131. Evacuation of mobile home and travel trailer residents of Zones 132 through 136.

Source: Pinellas County Emergency Management. 1997. *Pinellas County Comprehensive Emergency Management Plan*.

## II. EVACUATION POPULATION

Because all residents must evacuate when the Board of County Commissioners announces an Evacuation Level A, the evacuation population would equal the city population. Emergency transportation is provided by the county for those handicapped/disabled and elderly residents who have no other means to evacuate. Treasure Island is assigned two large buses provided by the Pinellas County School Board and they report to the Treasure Island Community Center located at 1 Park Place. The County Emergency Operation Center arranges any additional emergency transportation that may be needed.

### A. Special Needs

Residents requiring special assistance during an evacuation are urged to pre-register with the city and/or county. According to the Treasure Island Fire Department, 25 residents are currently listed on the Aevacuees with special needs@ roster. In accordance with Chapter 252.355, Florida Statutes, this roster is maintained by both the Fire Department and the Pinellas County Department of Emergency Management. Emergency personnel are charged with keeping records of all transported evacuees and where they will be taken. The city, in coordination with the Pinellas County Emergency Operations Center, would confirm that all registered people with special needs have received necessary assistance before evacuating the city's Emergency Operations Center, which is located in City Hall.

### III. EVACUATION ROUTES

The evacuation routes for the City of Treasure Island direct traffic along the Treasure Island Causeway, east on Central Avenue, north on I-275, across the Howard Frankland Bridge to I-4. The bridge approaches to the Treasure Island Causeway and the Howard Frankland Bridge are low-lying and, therefore, susceptible to flooding. The Tampa Bay Regional Planning Council's *Hurricane Evacuation Plan* identifies 31 critical route points in Pinellas County that can potentially cut off the evacuation of other areas if severe flooding occurs, two of which are within the city:

- Gulf Boulevard south of John's Pass: Inundation can impede the evacuation of North Treasure Island south to the Treasure Island Causeway; elevation 4.7 feet above mean sea level.
- Mainland approach to the Treasure Island Causeway: Inundation can impede the evacuation of Treasure Island's evacuation east to St. Petersburg; elevation 4.0 feet above mean sea level.

### IV. EVACUATION TIMES

The evacuation time specifies the estimated time needed to evacuate threatened residents including clearance time and the expected delay resulting from a reduction in roadway capacity due to the inclement weather. First, the clearance time comprises the time it takes all evacuees to return home, pack, travel on an evacuation route, wait in traffic jams, and arrive at a safe location. Second, the additional delay is the expected 20 percent reduction in roadway capacity due to rainfall. As shown in Table 5-2, evacuation times are forecasted according to an expected threat and an unexpected threat. An expected threat assumes good public response due to average lead time while an unexpected threat assumes a rapid public response due to a short lead time. Treasure Island, and other areas located in Evacuation Level A, should be able to evacuate within 13 hours for an expected threat and 12 hours for an unexpected threat.

**Table 5-2  
Pinellas County Clearance Times  
by Evacuation Level and Threat**

Evacuation Level	Expected Threat <sup>1</sup> + Additional Delay <sup>2</sup> in Hours	Unexpected Threat <sup>3</sup> + Additional Delay <sup>2</sup> in Hours
A	10 + 3 = 13	10 + 2 = 12
B	13 + 3 = 16	12 + 2 = 14
C	13 + 3 = 16	12 + 2 = 14
D	14 + 3 = 17	15 + 2 = 17
E	17 + 3 = 20	15 + 2 = 17

Source: *Pinellas County Comprehensive Emergency Management Plan*, revised 1997.

<sup>1</sup> An expected threat anticipates a good public response due to average lead time.

<sup>2</sup> Additionally delay resulting from a 20 % reduction in roadway capacity due to pre-storm rainfall.

<sup>3</sup> An unexpected threat anticipates a rapid public response due to short lead time.

## **V. HURRICANE SHELTERS**

The South Pinellas County Chapter of the American Red Cross is the lead agency providing emergency public shelter for Treasure Island. Currently, both county chapters of the Red Cross have a total of 58 primary shelters. Primary shelters are typically schools and large churches and are located in non-hurricane evacuation zones. Secondary shelters are facilities that, because of size, food preparation capability, or other factors, are not considered as primary shelters. These shelters are opened when the nearest primary shelter reaches capacity or when a major hurricane evacuation is called. Currently, evacuees are not zoned to any particular shelter. The closest primary shelters available to Treasure Island residents are Azalea Elementary School located at 1680-74th Street North and Azalea Middle School located at 7855-22nd Avenue North. These shelters have a combined capacity of 3,510 persons.

## **VI. NUMBER OF PERSONS REQUIRING PUBLIC HURRICANE SHELTER**

A number of refuge alternatives are available to the city's estimated 13,000 evacuees. As forecasted by the Tampa Bay Regional Planning Council, an estimated 15 percent of these evacuees would use public shelters. Meanwhile, other options include leaving the region, checking into a motel or hotel, or staying with a friend or relative within a non-evacuation zone. Currently, Pinellas County is recommending the AHost Home@ concept as the preferred kind of evacuation. The Host Home program solicits churches, businesses, and organizations to pre-determine the evacuation status of all members. Furthermore, these agencies are to encourage members living in non-evacuation areas to host evacuees. In cases where the entire membership lives in an evacuation area or in mobile homes, a church or facility outside that area is encouraged to accommodate those members during an evacuation.

Because of projected deficits in shelter spaces, all public education and information efforts are focused on encouraging evacuees to stay with friends, relatives, in motels/hotels, or host-homes in non-evacuation zones. Furthermore Pinellas County is looking at alternatives to traditional public shelters. These include retrofitting structures to meet shelter space criteria, using unconventional refuge locations, and evacuating guests from transient accommodations to inland Asister@ accommodations.

## Chapter 6: Preventative Measures

The Floodplain Management Committee (FMC) considered several possible preventative activities that could potentially alleviate the impact of flooding within Treasure Island. The focus of the review centered on the following six measures that are recommended by the National Flood Insurance Program (NFIP):

- Prevention
- Property Protection
- Natural Resource Protection
- Emergency Services
- Structural Projects
- Public Information

The discussion below is divided into three sections: 1) a description of each measure and associated activities; 2) the specific activities Treasure Island is currently conducting to further these measures; 3) future actions that should be implemented by the city as recommended by the FMC. As described below, although the community is undertaking many actions to mitigate future flooding, the FMC has recommended several actions associated with property protection and public information be implemented. Many of these suggested activities were developed from the responses received from the AFloodplain Management Plan Survey.@

### I. PREVENTION

Preventative measures include activities that focus on reducing flood damage through regulations and maintenance programs. Examples of regulations that can be employed by a municipality include zoning ordinances prohibiting certain uses in flood prone areas, floodplain regulations that regulate construction in flood prone areas, open space regulations, and stormwater management regulations.

Common maintenance programs that communities typically administer include drainage system maintenance and dune/beach maintenance.

#### A. Comprehensive Plan

**Current Status:** The *Treasure Island Comprehensive Plan* contains several goals, objectives, and policies regarding floodplain management and include the following:

**Objective 1.2:** By 1991, regulations for development within the 100-year floodplain shall be strictly enforced.



**Policy 1.2.2:** Recognizing that the community is located within the 100-year floodplain, the city shall adopt and strictly enforce all appropriate federal, state, and regional coastal construction codes and coastal setback regulations.

**Policy 1.2.3:** The city shall protect the natural functions of the 100-year floodplain so that the flood-carrying capacity and flood storage capacity are maintained.

**Objective 1.9:** The City of Treasure Island shall protect and restore its beaches, dunes, and natural system and establish construction standards which minimize the impacts of man-made structures on these systems.

**Policy 1.9.1:** Construction seaward of the Coastal Construction Control Line shall be subject to the permitting procedures pursuant to Section 161.05, Florida Statutes.

**Policy 1.9.2:** Seawalls shall be prohibited on the Gulf of Mexico and when existing seawalls on the Gulf of Mexico are damaged, they shall not be replaced.

Although the Comprehensive Plan does address floodplain management and encourages the use of mitigation activities, the Plan should also include language that directs the city to reduce the number of repetitive loss properties. In addition to these statements, the Comprehensive Plan also requires new development and certain redevelopment to design for a 25-year/24-hour storm event. However, this requirement was recently reevaluated during the development of the *Treasure Island Master Drainage Plan*.

In 1996, the City of Treasure Island commissioned Tampa Bay Engineering, Inc. to prepare a *Master Drainage Plan* exclusively for the city. As part of the *Plan*, each of the city's drainage basins were analyzed using a 25-year/24-hour storm event, as currently required by the Comprehensive Plan. Roughly, this translates into nine inches of rain within 24 hours. The analysis revealed that designing for such an event was beyond the ability of most developments in Treasure Island.

As concluded by Tampa Bay Engineering, the city should require developments to adhere to a 3-year design storm. Pipe diameters and inlets designed in accordance with this standard would reduce street flooding when the tide level is at or below 1.0 foot above sea level. When the tide level exceeds 1.0 feet above sea level or surmounts the seawall, storm pipes would not drain regardless of pipe size, water would back up, and flooding would occur. Furthermore, using larger pipes could also impede drainage because sediment is not carried as efficiently and would build up over time reducing conveyance capacity. The FMC strongly suggests the city adopt these recommendations within the Comprehensive Plan to enable new development and certain redevelopment to adhere to a more achievable and realistic design storm.

**Needed Action:**

1. Adopt objective and policy statements in the Comprehensive Plan directing the city to reduce the number of repetitive loss properties.
2. Amend the Comprehensive Plan to reflect the recommendations of the *Treasure Island Master Drainage Plan* requiring new development and certain redevelopment to adhere to a 3-year design storm.

**B. Land Development Code**

**Current Status:** Since joining the National Flood Insurance Program (NFIP) in 1971, the City of Treasure Island has adopted several provisions as part of the *Land Development Code* that are aimed at reducing flood damage, including the following (see Table 6-1):

**Table 6-1  
City of Treasure Island Land Development and  
Building Regulations Aimed at Reducing Flood Loss**

Zoning Regulations	Do not allow the placement of mobile homes within city limits Does not allow the placement of special care facilities (e.g., hospitals, ACLFs, group homes) within city limits.
Building Regulations	Section 66-92, <i>City of Treasure Island Land Development Code</i> , requires all new development to be elevated to or above the Base Flood Elevation.
Open Space Regulations	Section 68-362, <i>City of Treasure Island Land Development Code</i> , protects areas designated as Preservation on the Future Land Use Map.
	Section 78-141, <i>City of Treasure Island Land Development Code</i> , restricts development seaward of the coastal construction control line and protects environmentally sensitive lands.
Stormwater Management Regulations	Section 43-117, <i>City of Treasure Island Land Development Code</i> , mandates certain developments undergo review for storm drainage prior to the issuance of a building permit. These developments include all permitted uses and approved special exception uses located on lots greater than 30,000 square feet and uses, excluding single-family and two-family dwellings, located on lots abutting Boca Ciega Bay or any connecting waterway or canal.  Section 43, <i>City of Treasure Island Land Development Code</i> , states that Non-site retention methods and analysis and calculations shall be in accordance with the requirements, procedures, and methods as set forth by the city.® Section 36-77, Concurrency Management System, requires the retention of the first one-inch of rainfall on site.

Although Treasure Island continually seeks to strengthen regulations regarding floodplain management, city staff should ensure that existing provisions mirror those recommended by the agencies involved in mitigation efforts, including the Florida Department of Community Affairs (DCA), the Florida Department of Environmental Protection (FDEP), the Federal Emergency Management Agency (FEMA), and the U.S. Army Corps of Engineers. For this reason, the FMC believes a schedule should be establish in which each agency is contacted and asked to forward any new model regulations that could be adopted by the city in order to reduce flood damage.

**Needed Action:**

3. Continued strict enforcement of the AWetlands Protection Ordinance,@ stormwater management regulations, and the Department of Environmental Protection's Coastal Construction Control Line regulations.
4. Amend the *Treasure Island Land Development Code's* stormwater management requirements to reflect recommendations developed in the *Treasure Island Master Drainage Plan*.
5. Develop a schedule that calls for the continual reevaluation of the *Treasure Island Land Development Code* to ensure compliance with the recommended practices of DCA, FDEP, FEMA, and the U.S. Army Corps of Engineers.

**C. Maintenance Programs**

**Current Status:** The city actively maintains an extensive system of storm drains approximately 11 miles in length. However, all stormwater management devices located on private property are the operational responsibility of the property owner. The city should continue to actively maintain existing drainage facilities within rights-of-way and easements. However, as mentioned frequently in the Floodplain Management Plan Survey, the city should also focus its efforts on removing blockages from storm drains prior to the rainy/hurricane season and during severe storms.

Secondly, dune and beach maintenance programs are also undertaken by the city, in cooperation with Pinellas County and the U.S. Army Corps of Engineers. The most common type of dune and beach program along the Treasure Island coastline focuses on replanting vegetation (e.g., sea oats) to reduce erosion and beach renourishment projects. As described in the following section, these programs have proven successful, although continual maintenance is still required.

**Needed Action:**

6. Designate responsible parties to remove blockages from storm drains during severe storms.
7. Continued cooperation with Pinellas County and the U.S. Army Corps of Engineers to maintain the dunes and beaches through replantings and renourishment projects.

## **II. PRIVATE PROPERTY PROTECTION**

Property protection measures are used to modify buildings subject to flood damage rather than to keep floodwaters away. Many of these techniques, including floodproofing, elevating structures, and obtaining flood insurance, are financed totally or in-part by property owners. However, various grants that can supplement the cost of floodproofing or elevating a structure are available to home and business owners through the NFIP. Other property protection measures that can be employed by a community include relocation and property acquisition. Unfortunately in the former instance, structures within Treasure Island cannot be relocated to a less threatened area because the entire city lies within the 100-year floodplain.

### **A. Floodproofing**

**Current Status:** A popular technique that can be completed by property owners is floodproofing a home or business. Common floodproofing measures include sealing windows and doors against floodwaters, placing sandbags in front of doorway openings, and creating berms to prevent floodwaters from reaching a building. However, in the latter case, creating a berm can potentially create flooding or drainage problems on neighboring properties.

Several respondents to the Floodplain Management Plan Survey noted that the city should periodically provide sand to residents to facilitate floodproofing. Property owners who now choose to floodproof their homes in this manner are responsible for purchasing sand and bags. However, survey respondents suggested if the city provided the sand, residents would be more apt to store and use sandbags during severe flooding events.

#### **Needed Action:**

8. The city should investigate the cost of periodically providing sand to Treasure Island residents.

### **B. Obtaining Flood Insurance**

**Current Status:** The National Flood Insurance Program (NFIP) offers federally-backed flood insurance to floodplain residents where building code and land use control measures have been instituted by the local government. Treasure Island is one such community that has adopted these regulations and has participated in the NFIP since 1971. As reported in the Floodplain Management Plan Survey, 99 percent of all Treasure Island residents have flood insurance for their home or business. As discussed in Chapter 3, 136 properties within Treasure Island have been categorized as repetitive loss properties<sup>®</sup> due to the number of flood insurance claims they have reported in the past.

In order to track the location and spatial patterns of these repetitive loss properties, the city should use the mapping resources of the Pinellas County Property Appraiser's Office to

create a Repetitive Loss Property Map.<sup>@</sup> This map can assist city staff in cataloging the cause of flooding (i.e., elevation, poor drainage, etc.) on these properties and can also serve as an informational tool for prospective home buyers.

**Needed Action:**

9. In cooperation with the Pinellas County Property Appraiser's Office, a map of the 136 repetitive loss properties should be created and annually updated based on FEMA's repetitive loss list.

**C. Elevating Structures**

**Current Status:** As required by the National Flood Insurance Program, all new development and redevelopment in excess of 50 percent of the original value of the building must be elevated to or above the base flood elevation (BFE). Currently, city staff estimates that approximately 80 percent of existing homes and businesses were constructed prior to the adoption of these standards and do not meet the minimum BFE requirements. Furthermore, many home and business owners are unaware as to whether their structure is constructed in accordance with BFE requirements. As shown in Table 4-3, 47 percent of respondents to the Floodplain Management Plan Survey stated that they were unsure whether their home/business was built at or above the BFE and virtually all residents were not aware that grant programs were offered that could monetarily assist with elevating their structures.

**Needed Action:**

10. Inform residents regarding current BFE elevation requirements and provide brochures describing available funding sources.

**D. Property Acquisition**

**Current Status:** Many local governments have established programs to acquire properties that are subject to repeated flooding. These properties are purchased by the local government and are usually converted to a public use area, such as a park. As pointed out by the NFIP, Acquiring and clearing buildings from the floodplain is not only the best flood protection measure available, it is also a way to convert a problem area into a community asset and obtain environmental benefits.<sup>@</sup> Historically, the city has not initiated any type of acquisition program for repetitive loss properties and has not explored the possibility of obtaining grants to purchase these parcels. The FMC suggests that the city seek available grants that could apply to this type of property protection program and consider providing matching funds to acquire these structures.

**Needed Action:**

11. The city should investigate potential funding sources to acquire repetitive loss properties.

**III. NATURAL RESOURCE PROTECTION**

Preserving or restoring natural areas or the natural functions of a floodplain can reduce the impact of flooding as well as improve water quality and enhance natural habitats. Common activities conducted by local governments that can preserve natural resources include wetland protection, erosion control, and reduction of pollutant discharges.

**A. Wetland Protection**

**Current Status:** Before the advent of dredge and fill development, Boca Ciega Bay's shoreline was dominated by extensive mangrove and saltmarsh communities with nearby subtidal seagrass beds. In areas without seawalls, isolated mangrove and marsh areas are scattered along properties abutting Boca Ciega Bay. Tidal swamp environments are restricted to two undeveloped islands, Elnor Island and Bird Key, which are located within the Bay. Finally, seagrass beds are limited to a seven-acre area near the Isle of Palms, an area between Capri Isle and the Treasure Island Causeway, and the shallow water surrounding Elnor Island just north of Coney Island. Natural areas are protected by way of the city's Future Land Use Map which is included within the Comprehensive Plan.

**Needed Action:**

12. Continue to preserve wetland areas through the enforcement of the Future Land Use Map.

**B. Erosion Control**

**Current Status:** Currently, erosion along Treasure Island's beaches is controlled through a series of beach renourishment projects being conducted by the Federal government and Pinellas County. Furthermore, the city, in cooperation with Pinellas County and the State, has been involved with a number of beach stabilization projects since the early 1970s. These projects include construction of dune walkovers and the replanting of sea oats along shorelines.

To control beach erosion, the city enforces the Florida Department of Environmental Protection's Coastal Construction Control Line and restricts any structures from being constructed seaward of this boundary (see Map 4). Furthermore, the city continues to uphold Section 40-51, *Treasure Island Land Development Code*, which states that any construction which is likely to adversely impact any primary sand dune is prohibited.®

**Needed Action:**

13. Continue to preserve dunes and beaches by conducting beach replantings and renourishment projects in cooperation with Pinellas County and the U.S. Army Corps of Engineers, restricting development seaward of the Coastal Construction Control Line, and enforcing Section 40-51, *Treasure Island Land Development Code*.

**C. Reduction of Pollutant Discharges**

**Current Status:** The majority of nutrients and pollutants entering Boca Ciega Bay are the result of atmospheric deposition and stormwater runoff. Treasure Island continues to do its part in improving air quality. However, because reducing air pollutants is a regional problem, local action can more dramatically affect the amount of pollutants discharged through stormwater runoff. Through requirements outlined within the land development regulations, all new development and select redevelopment must design stormwater management facilities to accommodate a 25-year storm event and retain the first one-inch of rainfall on-site. However, recent research has revealed that designing for a 25-year/24-hour storm event is beyond the ability of most developments. As concluded by Tampa Bay Engineering and discussed under Section I, a more realistic standard would require developments to adhere to a 3-year design storm. In addition to improving stormwater management facilities, an education program can encourage the public to minimize fertilizer and pesticide usage, refrain from dumping materials into water bodies, and assist in habitat restoration by planting native vegetation.

**Needed Action:**

14. Publish information regarding fertilizer and pesticide use and the disposal of hazardous materials within the city's quarterly newsletter.

**IV. EMERGENCY SERVICES**

Emergency service measures protect residents during and after a flood. Typically, services include warning, response during, and recovery after a disaster.

**Current Status:** As discussed in Chapter 5, the city works in cooperation with Pinellas County Emergency Services during natural disasters, including severe flooding events. Adopted in 1983, the *Treasure Island Emergency Action Guide* outlines the procedures to be taken by the city in response to a natural disaster, including severe flooding. The *Guide* provides standard operating procedures for emergency situations, and describes the personnel, equipment, communication and warning system involved in supervising an evacuation. The city has designated the Fire Chief as the emergency management coordinator who oversees the

development and maintenance of the *Emergency Action Guide*. Continuously updated, the document works in unison with the Pinellas County *Comprehensive Emergency Management Plan* (CEMP).

The CEMP was developed by the Pinellas County Department of Emergency Management and documents Apolicies, procedures, and guidelines to prepare for, respond to, recover from and mitigate future impacts of the hazards/disasters that could affect our area.@ All emergency disasters are responded to by Pinellas County according to the CEMP. A key component in implementing the CEMP is the Disaster Advisory Committee (DAC). Consisting of representatives from all municipalities, fire districts, disaster response agencies, and other key county officials, the DAC acts as the Aconduit for information on plans, exercises, training, and response and recovery activities.@ Furthermore, the Committee advises the Board of County Commissioners on the type and magnitude of an evacuation. Currently, Treasure Island actively participates in the DAC and the Fire Chief serves as the city-s representative.

**Needed Action:**

15. Continue cooperative efforts regarding natural hazard preparedness between the city and Pinellas County Emergency Management.

**V. STRUCTURAL PROJECTS**

Local governments can also construct various devices aimed at preventing floodwaters from reaching property by controlling water flow. Typical projects that can prevent coastal flooding include the construction of seawalls, beach renourishment, and storm drainage improvements. As the NFIP points out, although these measures can significantly reduce the impact of flooding, the following drawbacks often accompany their implementation:

- Possible disruption of natural habitats and natural water flows
- Without regular maintenance, the risk of flooding can be increased rather than decreased
- Flooding in excess of design standards can cause extensive damage
- Can promote false sense of security or a temporary solution

**A. Seawalls**

**Current Status:** In an effort to retain fill material and prevent erosion, seawalls and other shoreline hardening devices were installed along Boca Ciega Bay in the 1950s and 60s. Consequently, dredging and filling activities involved during seawall construction destroyed vast areas of coastal, intertidal, and subtidal habitats. After monitoring their effectiveness against erosion for many years, scientists have recently discovered that shoreline hardening actually facilitates erosion and may escalate property damage during strong storms. When large waves strike a seawall, energy is displaced both downward and upward. The downward

water pressure scours out vegetation, sand, and bottom sediments in front of the seawall. While the water shunted upward commonly erodes the material landward of the seawall. Both actions create a high maintenance problem for landowners.

Currently accepted development practices suggest a combination of native vegetation and gradual sloping to protect property from tidal action. Where existing seawalls require maintenance, the toe area of the wall should be planted with native vegetation or rip-rap material installed to prevent additional scouring. New seawalls should only be constructed when the two adjacent properties possess seawalls. Current regulations prohibit seawall construction along the Gulf of Mexico, even in cases where existing seawalls are damaged. However, seawall construction, in accordance with the land development regulations, is still allowed along Boca Ciega Bay.

**Needed Action:**

16. In light of recent findings regarding the effectiveness of seawalls, city staff should reevaluate existing seawall regulations as set forth in the *Treasure Island Land Development Code*.

**B. Beach Renourishment**

**Current Status:** The City of Treasure Island, in cooperation with Pinellas County and the U.S. Army Corps of Engineers, has an active renourishment program that has helped to prevent the complete erosion of the community's beaches. The first beach renourishment project occurred in December 1964, when 10,000 cubic yards of material was dredged from Blind Pass and placed on the public beach nearby. A full-scale beach renourishment projected was completed in 1969 with the placement of 790,000 cubic yards of fill excavated from Blind Pass and from a borrow area located approximately 2,000 feet offshore. Other major renourishment projects occurred in 1971 and 1976. Recently, following severe erosion caused by Hurricane Elena in 1985, 550,000 cubic yards of material was placed along the Treasure Island shoreline.

**Needed Action:**

17. Continue to sponsor beach renourishment projects in cooperation with Pinellas County and the U.S. Army Corps of Engineers.

**C. Drainage System Improvements**

In 1996, the city commissioned Tampa Bay Engineering to develop a drainage plan that identified needed drainage improvements within Treasure Island. In December 1996, the *City of Treasure Island Master Drainage Plan* was completed. In addition to setting forth design criteria provisions that should be adopted into the Comprehensive Plan and land development regulations, the drainage plan listed recommended improvements that should be made to the

stormwater management system. Treasure Island's Stormwater Management Program has already allocated funds to complete some of these drainage improvements in 1999.

**Needed Action:**

18. Adopt a schedule of improvements to complete the recommended stormwater management improvements and installation of non-conventional devices included within the Treasure Island Master Drainage Plan.

## **VI. PUBLIC INFORMATION ACTIVITIES**

Public information activities advise property owners, potential property owners, and visitors of potential flooding hazards within the city and possible preventative activities. Public information activities can include conducting hurricane preparedness workshops, disseminating educational materials, and providing technical assistance. Although the city actively conducts each of these programs, many residents still are misinformed regarding flooding issues affecting the city.

As part of the Floodplain Management Plan Survey, residents were asked several questions regarding the impact of flooding on their homes and businesses (see Appendix B). Among other things, residents were asked if their structure had ever been flooded, was constructed in accordance with the NFIP's BFE standards, or if they were aware of any grants that were available to elevate their homes. After tabulating the responses, it became apparent that many residents could not answer these questions, especially in cases where they had recently purchased the property. Because of these results, the FMC focused their attention on improving public information activities as a method to mitigate future flooding impacts.

### **A. Information Packets**

**Current Status:** The FMC suggested creating information packets regarding flooding issues affecting the city. Ideally, the Committee envisioned every resident within the city be sent a packet. However, due to printing and delivery costs, the Committee limited the distribution list to owners of repetitive loss properties. For other residents and prospective home buyers, these packets would be made available at City Hall, local realty offices, and the library. Suggested material within the packet should include the following:

- Local FIRM maps
- Development permit requirements
- Substantial improvement regulations
- Grants being offered to elevate properties
- Hurricane evacuation procedures

**Needed Action:**

19. Create information packets regarding flooding issues affecting Treasure Island. Make packets available at City Hall, local realty offices, and the library.

**B. Outreach Program for Repetitive Loss Properties**

**Current Status:** Currently, 136 properties have been identified by FEMA as having repeated flood insurance claims. A total number of 366 claims have been calculated for these properties, or an average of 2.7 claims per property. In an effort to reduce these numbers, the city should conduct an outreach program targeted at the property owners. Not only should these residents receive the information packets discussed above, but should also be encouraged to contact the Building Department for technical assistance regarding retrofitting the property. Furthermore, city staff should provide owners with information about federal financial programs for acquisition and retrofitting as well as post-disaster relief programs.

**Needed Action:**

20. Target public education efforts on repetitive loss properties.
21. Educate city staff on federal financial programs aimed at acquiring and retrofitting these parcels as well as post-disaster relief programs.

**C. Identify Possible Repetitive Loss Properties**

**Current Status:** The FMC has suggested the city collect information regarding those properties that are most susceptible to flooding which are not currently on the repetitive loss list. These properties would include those built prior to the city joining the NFIP in 1971; properties adjacent or near other repetitive loss properties; properties in erosion prone areas; properties in areas of poor drainage; or properties seaward of the FDEP's Coastal Construction Control Line. Thereafter, the city should inform these residents of the benefits of retrofitting and available grants that could assist in floodproofing their property.

**Needed Action:**

22. Develop a list of potential repetitive loss properties based on the above criteria.



## Chapter 7: Goals and Action Plan

Based on a review of the previous chapters and discussions held during a series of public workshops, the Floodplain Management Committee has identified the following goals to guide the selection of alternative Floodplain Management Plan policies and procedures.

### GOALS:

- Minimize the threat of flooding to residents and business owners in the community
- Reduce the number of properties deemed repetitive losses as defined by the National Flood Insurance Program
- Reduce the number of areas that experience severe and frequent flooding

### ACTION PLAN:

Throughout the public participation process, the Floodplain Management Committee evaluated possible preventative activities that could reduce the impact of flooding in Treasure Island and achieve the goals listed above. Input was provided to the Committee from city staff, other governmental agencies, the public (through the Floodplain Management Plan Survey and workshops), and the Treasure Island City Commission. As summarized in Chapter 6, the Floodplain Management Committee evaluated six topic areas and developed 22 activities that should be instituted or continued to be instituted by city staff. These activities are listed below. Furthermore, the following listing also includes the parties responsible for implementing these tasks, deadline dates, and anticipated costs.

#### I. PREVENTATIVE ACTIVITIES

*Activity 1: Adopt objective and policy statements in the Comprehensive Plan regarding reducing the number of repetitive loss properties within the city.*

**Responsible Party:** City of Treasure Island Building and Public Works Departments

**Budget:** N/A

**Deadline:** December 31, 1998

*Activity 2: Amend the Comprehensive Plan to reflect the recommendations of the Treasure Island Master Drainage Plan requiring new development and certain redevelopment to adhere to a 3-year design storm.*

**Responsible Party:** City of Treasure Island Building and Public Works Departments

**Budget:** N/A

**Deadline:** December 31, 1998

**Activity 3:** *Continue strict enforcement of the Wetlands Protection Ordinance, stormwater management regulations, and the Department of Environmental Protection's Coastal Construction Control Line regulations.*

**Responsible Party:** City of Treasure Island Building Department

**Budget:** N/A

**Deadline:** N/A

**Activity 4:** *Amend the Treasure Island Land Development Code's stormwater management requirements to reflect recommendations developed in the Treasure Island Master Drainage Plan.*

**Responsible Party:** City of Treasure Island Building and Public Works Departments

**Budget:** N/A

**Deadline:** December 31, 1998

**Activity 5:** *Develop a schedule that calls for the continual reevaluation of the Treasure Island Land Development Code to ensure compliance with the recommended practices of the Department of Community Affairs, the Department of Environmental Protection, the National Flood Insurance Program, and the U.S. Army Corps of Engineers.*

**Responsible Party:** City of Treasure Island Building and Public Works Departments

**Budget:** N/A

**Deadline:** December 31, 1998

**Activity 6:** *Designate responsible parties to remove blockages from storm drains during severe storms.*

**Responsible Party:** City of Treasure Island Public Works Departments

**Budget:** N/A

**Deadline:** Summer, 1998

**Activity 7:** *Continue cooperating with Pinellas County and the U.S. Army Corps of Engineers to maintain the city's dunes and beaches through replantings and renourishment projects.*

**Responsible Party:** City of Treasure Island Public Works Departments

**Budget:** N/A

**Deadline:** On-going

## II. PROPERTY PROTECTION

*Activity 8: Investigate the cost of periodically providing sand for sandbags to Treasure Island residents.*

**Responsible Party:** City of Treasure Island Public Works Departments

**Budget:** N/A

**Deadline:** Summer, 1998

*Activity 9: In cooperation with the Pinellas County Property Appraiser's Office, a map of the 136 repetitive loss properties should be created and annually updated based on FEMA's repetitive loss list.*

**Responsible Party:** City of Treasure Island Building Department

**Budget:** \$300: Estimated cost of annually updating a Repetitive Loss Property map by the Pinellas County Property Appraiser's Office.

**Deadline:** The 1997 Repetitive Loss Property Map is to be completed simultaneously with the adoption of this *Floodplain Management Plan*. Subsequent updates are to occur within one month of FEMA's annual update of the Repetitive loss property listing.

*Activity 10: Inform residents regarding current BFE elevation requirements and provide brochures describing available funding sources.*

**Responsible Party:** City of Treasure Island Building Department

**Budget:** \$400: Estimated cost of printing brochures and including the documents within the city's quarterly newsletter.

**Deadline:** December 31, 1998

*Activity 11: Investigate potential funding sources to acquire repetitive loss properties.*

**Responsible Party:** City of Treasure Island Building Department and City Manager's Office

**Budget:** N/A

**Deadline:** August, 1998

## III. NATURAL RESOURCE PROTECTION

*Activity 12: Continue to preserve wetland areas through the enforcement of the city's Future Land Use Map.*

**Responsible Party:** City of Treasure Island Building Department

**Budget:** N/A

**Deadline:** On-going

**Activity 13:** *Continue to preserve dunes and beaches by conducting beach replantings and renourishment projects in cooperation with Pinellas County and the U.S. Army Corps of Engineers, restricting development seaward of the Coastal Construction Control Line, and enforcing Section 40-51, Treasure Island Land Development Code.*

**Responsible Party:** City of Treasure Island Building and Public Works Departments

**Budget:** N/A

**Deadline:** On-going

**Activity 14:** *Publish information regarding fertilizer and pesticide use and the disposal of hazardous materials within the city's quarterly newsletter.*

**Responsible Party:** City of Treasure Island Building and Public Works Departments

**Budget:** N/A

**Deadline:** August, 1998

#### **IV. EMERGENCY SERVICES**

**Activity 15:** *Continue cooperative efforts regarding natural hazard preparedness between the city and Pinellas County Emergency Management.*

**Responsible Party:** City of Treasure Island Fire Department

**Budget:** N/A

**Deadline:** N/A

#### **V. STRUCTURAL PROJECTS**

**Activity 16:** *In light of recent findings regarding the effectiveness of seawalls, city staff should reevaluate existing seawall regulations as set forth in the Treasure Island Land Development Code.*

**Responsible Party:** City of Treasure Island Building Department

**Budget:** N/A

**Deadline:** December 31, 1998

**Activity 17:** *Continue to sponsor beach renourishment projects in cooperation with Pinellas County and the U.S. Army Corps of Engineers.*

**Responsible Party:** City of Treasure Island Public Works Department

**Budget:** N/A

**Deadline:** On-going

**Activity 18:** *Adopt a schedule of improvements to complete the recommended stormwater management improvements and installation of non-conventional devices included within the Treasure Island Master Drainage Plan.*

**Responsible Party:** City of Treasure Island Public Works Department

**Budget:** Treasure Island's Stormwater Management Program has already allocated funds to complete some of these drainage improvements in 1999.

**Deadline:** December 31, 1998

## **VI. PUBLIC INFORMATION**

**Activity 19:** *Create information packets regarding flooding issues affecting Treasure Island. Make packets available at City Hall, local realty offices, and the library.*

**Responsible Party:** City of Treasure Island Building Department

**Budget:** \$1000: Estimated cost of compiling documents

**Deadline:** December 31, 1998

**Activity 20:** *Target public education efforts on repetitive loss properties.*

**Responsible Party:** City of Treasure Island Building Department

**Budget:** \$300: Estimated cost of mailing packets to repetitive loss properties

**Deadline:** December 31, 1998

**Activity 21:** *Educate city staff on federal financial programs aimed at acquiring and retrofitting repetitive loss parcels as well as post-disaster relief programs.*

**Responsible Party:** City of Treasure Island Building Department

**Budget:** N/A

**Deadline:** October 31, 1998

**Activity 22:** *Develop a list of potential repetitive loss properties.*

**Responsible Party:** City of Treasure Island Building Department

**Budget:** N/A

**Deadline:** December 31, 1998

## **Chapter 8: Monitoring and Evaluation**

The Floodplain Management Committee (FMC) will meet each September to review the city's progress in achieving the goals identified within the Floodplain Management Plan. Furthermore, the FMC will create the annual evaluation report, as required by the Community Ratings System. At that same time, AMap 2, Repetitive Loss Properties® will be updated.

## Appendix A: Outline of Section 510, CRS Coordinator's Manual Credit Worksheet

### Step A. Organize to prepare the plan

Item #	Item	Comments	Possible Points	Anticipated Points	Done
1	Supervised by a professional planner	Conducted by Pinellas Planning Council	2	2	✓
2	Conducted through a committee composed of staff	FMC composed of 4 staff members and 4 public volunteers.	6	6	✓
3	Planning process recognized by action of the community's governing board	Resolution #98-12 passed on February 12, 1998	2	2	✓
<b>Total</b>			<b>10</b>	<b>10</b>	

\*FMC: Floodplain Management Committee

### Step B. Involve the public

Item #	Item	Comments	Possible Points	Anticipated Points	Done
1	At least one public hearing prior to the submittal of FMP to Commission <b>(Required)</b>		2	2	✓
2	One or more public hearings held at the beginning of the process	All committee meetings are public and were advertised in newsletter.	8	8	✓
3	Implement public information activities	Newsletter	4	4	✓
4	Distribute questionnaires the public	Questionnaires distributed in March 1998	4	4	✓
5	Solicit written comments from the public (i.e. homeowners assoc., PTA, Chamber...)	Comments received in newsletter	4	2	✓
6	Planning process through planning committee	6 meetings conducted by the Floodplain Management Committee	26	26	✓
<b>Total</b>			<b>48</b>	<b>46</b>	

**Step C. Coordinate with other agencies (i.e., local, regional, state, and federal agencies)**

Item #	Item	Comments	Possible Points	Anticipated Points	Done
1	Request input from other agencies	Letters are to be sent to Pinellas Co, SWFWMD, FDEP, TBRPC...	3	3	✓
2	Meetings held with other agencies to review common problems	Meetings with P.C. Planning and Emergency Management	10	3	✓
3	Include a review of goals and plans for the area	Review of Comprehensive Plan	3	3	✓
4	Agencies review draft action plan <b>(Required)</b>	Drafts sent to those agencies identified in Step 1	2	2	✓
<b>Total</b>			18	11	

\* SWFWMD: Southwest Florida Water Management District  
 FDEP: Florida Department of Environmental Protection  
 TBRPC: Tampa Bay Regional Council

**Step D. Assess the hazard (Discussed during February 26, 1998 FMC meeting)**

Item #	Item	Comments	Possible Points	Anticipated Points	Done
1	Map, describe, and discuss flood hazards <b>(Required)</b>	Map floodplain and repetitive loss areas	5	5	✓
		Description of flood hazards (source of water, warning time, depth of flooding...)			
		Description of past floods			
2	Map and describe other natural hazards (winter storms)	Discussed winter storms	5	5	✓
<b>Total</b>			10	10	

**Step E. Assess the problem (Discussed during March 12, 1998 FMC meeting)**

<b>Item #</b>	<b>Item</b>	<b>Comments</b>	<b>Possible Points</b>	<b>Anticipated Points</b>	<b>Done</b>
1	# and type of buildings subject to hazard <b>(Required)</b>	Inventory of repetitive loss properties is currently underway.	2	2	✓
2	Describe impact that past or predicted flooding has had on city.		6	6	✓
3	Describe warning and evacuating needs and procedures	Information being obtained from Pinellas County Emergency Management.	3	3	✓
4	Identify critical facilities	Inventory currently being conducted	4	4	✓
5	Describe natural areas		4	4	✓
6	Description of development, redevelopment, and population trends	Analysis completed	5	5	✓
7	Describe impact of flooding on the community, its economy, and tax base	Described impact on community	6	6	✓
<b>Total</b>			<b>30</b>	<b>30</b>	

**Step F. Set goals (Discussed during March 26, 1998 FMC meeting)**

<b>Item #</b>	<b>Item</b>	<b>Comments</b>	<b>Possible Points</b>	<b>Anticipated Points</b>	<b>Done</b>
1	Community=s floodplain management goals <b>(Required)</b>		2	2	✓
<b>Total</b>			<b>2</b>	<b>2</b>	

**Step G. Review possible activities (Discussed during April 9, 1998 FMC meeting)**

Item #	Item	Comments	Possible Points	Anticipated Points	Done
1	Preventative activities		5	5	✓
2	Property protection activities		5	5	✓
3	Protection of natural function of the floodplain (i.e., wetland protection)		5	5	✓
4	Emergency service activities		5	5	✓
5	Structural projects		5	5	✓
6	Public information activities		5	5	✓
<b>Total</b>			<b>30</b>	<b>30</b>	

**Step H. Draft an action plan**

Item #	Item	Comments	Possible Points	Anticipated Points	Done
1	Recommendations for at least two activities listed in step g.		40	40	✓
2	Post disaster mitigation policies and procedures		10		
<b>Total</b>			<b>50</b>	<b>40</b>	

**Step I. Adopt the plan**

Item #	Item	Comments	Possible Points	Anticipated Points	Done
1	Adopt the plan		2	2	
<b>Total</b>			<b>2</b>	<b>2</b>	

**Step J. Implement, evaluate, and revise**

<b>Item #</b>	<b>Item</b>	<b>Comments</b>	<b>Possible Points</b>	<b>Anticipated Points</b>	<b>Done</b>
1	Include procedures for evaluating and revising		2	2	✓
2	Evaluate report by same planning committee that prepared the plan. (To be carried out during annual recertification.)		8		
<b>Total</b>			<b>10</b>	<b>2</b>	

Possible Points	<b>210</b>
Anticipated Points	<b>183</b>

## Appendix B: Floodplain Management Survey Results, March 1998

**Table 1  
Type of Structure**

Type		# of Responses
Residence	Single Family	185
	Multi-Family	79
Business		4
Total # of Responses		268

**Table 2  
Location of Structure**

Location	Number of Units	% of Total
Adjacent to Boca Ciega Bay, an inlet, or pass	193	72.1%
Adjacent to Gulf of Mexico	21	7.8%
Non-Waterfront	54	20.1%
Total # of Responses	268	100.0%

**Table 3  
Year Built**

Location	Number of Units	% of Total
Prior to May 1971	162	63.0%
After May 1971	95	37.0%
Total # of Responses	257	100.0%
Average	1967	

**Table 4**  
**Does Home/Business Meet FEMA Base Flood Elevation Requirements?**

Meets FEMA Requirements	Number of Units	% of Total
Yes	81	30.7%
No	60	22.7%
Don't Know	123	46.6%
Total # of Responses	264	100.0%

**Table 5**  
**Do You Have Flood Insurance?**

Flood Insurance	Number of Units	% of Total
Yes	253	94.4%
No	15	5.6%
Total # of Responses	268	100.0%

**Table 6**  
**Has Your Home/Business Ever Been Flooded?**

Flooded?	Number of Units	% of Total
Yes	31	11.8%
No	232	88.2%
Total # of Responses	263	100.0%

**Table 7**  
**How Many Times Has Your Home/Business Been Flooded?**

Number of Times	Number of Units	% of Total
1	18	60.0%
2	6	20.0%
3	4	13.3%
4 or more	2	6.7%
Total # of Responses	30	100.0%

**Table 8**  
**How Many Times Has Your Home/Business Been Flooded?**

Type of Damage	Number of Units	% of Total
Interior	17	63.0%
Minor	1	3.7%
Major	1	3.7%
Other (Garage Flooded)	8	29.6%
Total # of Responses	27	100.0%

**Table 9**  
**What Factors Influenced the Severity of Flooding?**

Factor	Number of Units	% of Total
Low Elevation	3	16.7%
Inadequate Drainage	4	22.2%
Tidal Surge	10	55.5%
Other	1	5.5%
Total # of Responses	18	100.0%

**Table 10**  
**What Preventative Measures Would Reduce Flood Damage?**

Factor	Number of Units	% of Total
Increase Building Elevation	31	39.2%
Drainage Improvements	37	46.8%
Seawall Repair	7	9.0%
Other (Beach Renourishment)	4	5.0%
Total # of Responses	79	100.0%

## Appendix C: Floodplain Management Survey Comments

### Suggestions

AIf you desire waterfront property, you always have a chance of flooding. Don't look for government to support your style of life.@

ANot much can be done by the City for existing property. If it gets destroyed in the future then it could be elevated to meet flood requirements of FEMA.@

AI consider that in the 20 plus years I have occupied my home, I have been very lucky. I would like to see sand and sand bags available during periods before the hurricane season. I feel that if I were to put sand bags around the entries of my home, I could prevent much damage from high water seeping into my home. In the past, I have asked both the city and county about this and they said I would have to buy the bags, however, neither agency makes sand available.@

ARecommend that the city provide specific assistance in raising building to higher elevation or cooperation in replacing a structure that meets current FEMA requirements, but allows the grandfathered >number of units.@

ADo not pump sand on the beach unless it is guaranteed that the sand will be rock free. Most of Sunset Beach is ruined because of large rocks pumped up on the beach last time it was pumped. It's like walking in a rock mine field.@

AI have lived in Treasure Island since 1975 and have never had a flooding problem, therefore, I feel very fortunate.@

AAll seawalls should have been same elevation. Capri Isle seawalls are higher than Sunshine Beach seawall, etc.@

AKeep storm drains clear of debris. They are often blocked after much rain. I walk a lot and notice these things. We have had a completely new seawall installed due to the age of the seawall and type of construction in the past. Maybe others should check on their seawalls and take necessary steps. Do not recall flooding on Capri where we live. Have been in Treasure Island since 1958.@

ALots must drain to the street and bay, not into adjacent neighbors yards.@

AWe replaced our asphalt driveway with brick on sand. Results are outstanding! No more water in low lying areas of lawn. Driveway absorbs water.@

AWhy not categorize those areas most vulnerable to flooding, such as Sunset Beach, in a different zone? They should be charged higher insurance premiums if they habitually file for flood damage.



Water damage is not always caused by flooding. Often, it's the result of poor construction and lack of gutters/downspouts and insufficient drainage. This is the homeowner's responsibility.

Certainly, beach renourishment has been tremendously effective. My home is Gulffront, on Sunset Beach, and the distance the water has had to cover, before reaching my home, has been a major factor. Before renourishment, I looked water damage right in the eye. With additional sand between my home and the water's edge, I've never been wet inside, so never had to file a claim, replace lot interior items, or lived in fear of surging tides.

The most effective control would be wider beach shorelines with sand dunes. This could be accomplished through erosion prevention and control devices onshore and offshore, which have proven successful in Europe and other areas.

Street storm sewer does not carry off water during heavy rainfall, and water backs up in our lower garage. No damage is done, but could in the future if situation is not corrected.

We need improved stormwater runoff systems so roads remain passable in heavy rainstorms.

### **Causes of Flooding**

Anyway to stop water from backing up storm drains. We get water from bay and from the street drains.

Beach erosion over the years has reduced protection of property.

During heavy rain, streets are flooded from run-off from properties but storm sewers are not able to handle the volume of water due to 1) sewers too small; 2) sewers plugged by foreign objects; 3) too few discharge drains.

Drain at end of 88th Avenue is worthless.

I live on Capri on 3rd Street East and have had no problems with flooding. The wind and the tide surge sometimes pushes wave action over the seawall, but no flooding.

Due to lack of street side drainage and Department of Transportation's insistence that 50 feet of unpaved gulf side property is a percolating area, ponding is to such a degree that driveway and apron continues to erode severely after every heavy rain. If powers that be inspect right-of-way next to affected area, they will see that problems with Gulf Blvd. are not too distant in the future meaning roadway erosion, pot holes, or perhaps a dangerous sinkhole.

ATwice during our tenure here the water on the street reached almost knee level, each time this was on garbage collection days. Flooding was caused by cans being washed to the drains, blocking the outlets.@

### **Experiences with Flooding**

AThis year has been the worst ever in 28 years here. The yard remains a pool for days, I now have a >collapsed= sewer line and unable to get (it) fixed because of the water level.@

AI=am very fortunate. Residents located on 118th Avenue, right off Gulf Blvd. and 1st St. E. have had floodwaters rise to my lot line from the Bay and have seen floodwater from Gulf of Mexico.@

AWe have lived here for over 30 years. Have had water on our land 2 or 3 times. The carpet got wet from seepage through the walls. That was the only flood damage and we never made an insurance claim for it.@

ANever saw flooding problem on Isle of Capri.@

AWe have lived in this house (waterfront) for 35 years and have never sustained any flood damage.@

ADrainage seems to be a problem on 115th Avenue.@

AStreet floods with much rainfall and high tides. Had to have electric wires replaced as they were sparking.@

ASections of 88th and 89th Avenues flood regularly even when the rainfall is minimal. The city has been notified regularly about this situation and residents have been led to believe that this is a problem without a solution. Some residents call the city regularly, others are defeated and do not call and have accepted that their city is uninterested in the concerns of their residents.@

AIIn the last 30 years since our home has been constructed, the water has come over the seawall maybe 6 times--none of these times has it come near the house. Our biggest concern now is the street flooding since the sewer system was changed a good many years ago. Also, the low area across Capri Bridge, which has kept us on the island a time or two when the tides rose during the night and we had no warning.@

AHow do I find out if my home doesn't meet FEMA? Last flooding was in 1985--Elena. This flooded my garage and damage claims (were) filed, but water did not enter the house but did rise to 1 inch below the flood level. Surrounding homes had 5 - 6 inches of water! I have seen the island (no land above water) flooded at least 3 times since 1961, but there has never been any water in this house!@

Resident on Isle of Palms

AWe have been in our house on Paradise Island (for) 41 years. The water has come over the seawall on several occasions but never reached our patio or come into the house. Sure, if we knew then (was built in >56) what we know now, we would have elevated the house more, but so far we have been lucky!@

AIn 1963, in planning construction of our home, it was obvious our waterfront property would always be in jeopardy. It was a GREAT disappointment, and has always been a major concern to use, when city officials denied me the protection by refusing to allow me to elevate my property in the manner I felt necessary. By redesigning construction, and reenforcing the seawall, our vulnerability situated home has avoided damage, unlike neighbors who built after us. And, with irony, today city regulations require the elevation I was denied. In 1963, there was no FEMA to require the elevation I sought.@

AIn the 45 years we have lived in this house, we have experienced water around the house 4 times. We have sandbags ready to use, changed the way water drains from the street side, and had a larger cap put on the seawall. We have had water come in the closed-in porch but not in the house. We lost the air conditioner a number of years ago but had the new one elevated.@

AOur first trouble and only insurance claim occurred during a hurricane in the early eighties (island evacuation was mandatory). Water caused some damage to the lobby area but the salt in the water caused the loss of most of our grassed area, bushes, and wooden fencing. Again we had similar flooding during the "no-name" storm but none of the damage was covered by our insurance. After the hurricane, we increased our flooding insurance (protection)...If this building elevation had been one foot higher (as well as the seawall), we would have had little damage over these last 22 years; however, the runoff onto adjacent property would have been damaging to them unless all property was to this new level.@

--St. James Condo Association