

Part 3.1. Safety

This Part of the *Sanibel Plan* establishes Goals, Objectives and Policies for public expenditures in a coastal high-hazard area, for directing population concentrations away from a coastal high-hazard area, for maintaining and reducing hurricane evacuation times, for post-hurricane recovery and for building code requirements.

Hurricane safety has always been a principal tenet of the *Sanibel Plan* and has influenced development of other Plan Elements.

Adequate off-Island evacuation routes and shelters are becoming an increasing concern to the City of Sanibel and will be addressed, to the extent possible, in the Intergovernmental Coordination Element of the *Sanibel Plan*.

Section 3.1.1. Hurricane Safety Element

Pursuant to Section 163.3177, Florida Statutes.

Background Discussion

The purpose of this Element is to protect human life and limit public expenditures in areas that are subject to destruction by natural disaster.

A summary of the data and analyses for this Element of the *Sanibel Plan*, pursuant to *Section 163.3177(7)(h) Florida Statutes*, is provided in this subsection.

The City of Sanibel is subject to periodic passage of hurricanes. Sanibel is located entirely within the evacuation zone for Category 1 hurricanes, as predicted by the National Hurricane Center and mapped by the Southwest Florida Regional Planning Council. Therefore, by rule definition, Sanibel Island is entirely within the coastal high-hazard area. The threat of hurricanes is a major influence in the development of the *Sanibel Plan*.

Hurricane Climatology

Since 1873, there have been over 50 tropical cyclones passing within 100 nautical miles of the Fort Myers area. Twenty of these storms have been hurricanes passing within 75 miles of Sanibel Island, each of which posed a significant threat to property and lives on the Island at some point in its life cycle. Hurricane Charley, striking on August 13, 2004, was the most destructive hurricane to hit the City of Sanibel since incorporation in 1974. The following year, the eye of Hurricane Wilma passed within 75 miles of the City of Sanibel.

For Sanibel, the storm surge represents a potentially devastating and dangerous event. The storm tide level predicted for Sanibel during the 100-year storm is 8 to 20 feet above mean sea level, a level that would inundate the entire island. The storm surge tides would be accompanied by large scouring and battering waves. The erosive power and battering impact of such a water flow would seriously threaten the integrity of numerous structures on Sanibel and the life of any person stranded on the Island. Of course, lesser storms can and will produce tides capable of flooding the entire Island. The 1926 hurricane did just that, and forever changed the character of Sanibel's use by wiping out the Island's farming economy.

Data and Analyses

In 1980, the City of Sanibel undertook a comprehensive effort to develop a broad based hazard mitigation program. A study, entitled "Hurricane Evacuation and Hazard Mitigation Study," was prepared for the City by the consulting firm of Rogers, Golden & Halpern in association with Simpson Weather Associates and H. W. Lochner, Inc.

The Southwest Florida Regional Planning Council (SWFRPC) prepared a comprehensive hurricane evacuation study for Southwest Florida entitled "Southwest Florida Regional Hurricane Evacuation Study". This study was updated in 2011.

Major findings and recommendations from these studies have been incorporated in this Element of the *Sanibel Plan*.

Evacuation Population

In recognition of the hurricane hazard on Sanibel and the inherent deficiencies of on-Island refuges, the City of Sanibel must plan for the evacuation of all persons from Sanibel and Captiva Islands when a hurricane warning and evacuation order is issued.

As part of the City's Emergency Management Plan, the evacuation population and number of evacuating vehicles for Sanibel and Captiva is estimated in advance of potential threats from active storms, based on conditions. The City (and Captiva Island) were successfully evacuated in 2004 and 2005 in preparation for the arrival of Hurricanes Charley and Wilma.

According to SWFRPC estimates, nearly half of the County's functional population would be displaced by evacuation for a Category 1 hurricane. It is estimated that nearly 100% of the County's functional population would be displaced by evacuation from a Category 4/5 hurricane.

Elderly and handicapped populations present special needs for evacuation assistance. The 2010 census estimated that 50 percent of Sanibel's permanent population was 65 years of age or older. A local service organization, Friends In Service Here (FISH) in coordination with the City of Sanibel Emergency Management Program and the Lee County Emergency Operations Center Special Needs program, provides assistance for individuals that require help with evacuation. Community Housing and Resources has plans to assist the elderly and disabled tenants in the Below Market Rate Housing units.

Hurricane Shelters

Public shelters accessible for Sanibel residents are listed in the SWFRPC study and in the Lee County Comprehensive Emergency Management Plan. Some shelters in Lee County can accommodate some special needs and some can accommodate pets. All public shelters should be available for Sanibel evacuees.

The SWFRPC has concluded that the volume of shelter space available for a Category 1 hurricane, which would necessitate Island evacuation, is adequate for the City and all other portions of Lee County affected by such categories of storms. Recognizable deficits exist for the entire County for increasing strength storms, which cause more shelters to stay closed. As deficits increase, Sanibel's residents will need to head to public or private sheltering options in other Counties.

Sanibel has attempted to reduce some sheltering issues through a positive effort of identifying hotels and private sheltering providers on the mainland. Further, a portion of City Hall, which is in itself elevated, has been storm-proofed to serve for the initial steps for recovery.

The City has no on-Island shelters. As a barrier island, it is not safe to remain in the City of Sanibel when a mandatory evacuation order is issued.

Evacuation Routes and Improvements

There is one primary evacuation route from Sanibel - across the Causeway and up McGregor Boulevard / Summerlin Road. This evacuation route will also be used by thousands of mainland evacuees who live in other low-lying coastal areas,

severely limiting the capacity of the route that will be available for Sanibel and Captiva evacuees.

Although Summerlin Road and the portion of McGregor Boulevard from the southeastern terminus of Summerlin Road to the Sanibel Causeway were originally planned as controlled access roads, accesses in addition to those originally envisioned have been added to accommodate development plans. The multiple access points that have been developed along the Summerlin Road and McGregor Boulevard corridor have contributed to this area becoming a hazardous stretch of highway. The hazards of these many access points will be amplified in the event of hurricane evacuation.

Although the local roads used for evacuation routes are constrained during peak season, the City's Emergency Management Program seeks to reduce the number of vehicles on local roads by restricting unnecessary trips to Sanibel prior to issuance of an evacuation order. This effort improves the level of service for the evacuation routes when emergency conditions threaten.

The City's objectives and policies for traffic circulation limit road capacity improvements to those needed for safety and those that are compatible with environmental, scenic and historic resources. Although road capacity improvements are a primary consideration for adequate hurricane evacuation, road capacity improvements are secondary to resource protection. Road improvements that would provide increased capacity for hurricane evacuation would create an impetus for further development and use of the limited and fragile resources of Sanibel.

To address this conflict among objectives in a manner consistent with Sanibel's policy not to widen roads, the City's

Emergency Management Plan contains a provision for Causeway lane conversion procedures. Depending on storm type, direction, intensity and calculated clearance time, conversion to two outbound lanes on the Causeway can be ordered by the Emergency Operations Center head in concert with the Lee County Disaster Director. Sanibel police will stop all inbound traffic allowing only predetermined vehicles to access the Causeway. This increase in road capacity on Sanibel's primary evacuation route can significantly reduce the clearance time component for calculating hurricane evacuation times. This method to increase road capacity can be enhanced by incorporating lane conversion procedures for the replacement bridges of the Sanibel Causeway.

Evacuation Times

The severity of the storm, the number of vehicles evacuating, the capacity of evacuation routes, distance to shelter destination, and behavioral tendencies are factors contributing to clearance time. Pre-landfall storm conditions, such as flooding and high wind, also add to evacuation time.

The critical link for Sanibel's near-shore evacuation is the Sanibel Causeway. This is a two-lane facility that is low lying and subject to inundation by tropical storm flooding. Upon reaching the mainland, the route becomes McGregor Boulevard / Summerlin Road and is a four-lane facility to its terminus in Fort Myers. Periwinkle Way, the primary evacuation route within the City, is planned to remain two lanes. Portions of Summerlin have been widened or are under construction to become six lanes, from the intersection with SR865 (San Carlos Boulevard) to Boy Scout Road. The reconstructed bridges of the Sanibel Causeway provide an opportunity to provide two lanes off the Island for evacuation purposes.

Recognizing that the Causeway is the critical link for reaching mainland shelters, it is a point of survival for the City to make sure that the Causeway is fully functional with undiminished capacity, and that McGregor/Summerlin's capacity for evacuation is not reduced through growth of surrounding areas beyond that which enables the City to have a timely evacuation. Currently, that time is estimated to be 13 to 14 hours to clear the Island, with more than an additional hour to reach the shelter at the expected reduced rates of speed of service level "D". This estimated time includes the Captiva evacuees and applies to all categories of hurricanes; however, great hurricanes, requiring the evacuation of major portions of the mainland, will drastically increase the time required to reach shelters.

Evacuation time is of concern for the City of Sanibel. Considering pre-landfall wind conditions of up to eight hours (and, in some circumstances, pre-landfall flooding of similar times), total evacuation of the Island to mainland shelter could take over 20 hours, exceeding the 18 hour goal for evacuation planning. Consequently, there have been alternatives discussed to reduce this time. The most common is providing two lanes off the Islands across the Causeway, which could reduce clearance time by as much as 50 percent.

The estimation and projection for hurricane evacuation clearance times for now and at build-out (existing development and approximately 600 additional dwelling units) on Sanibel and Captiva can be significantly reduced by providing a second lane for evacuation traffic along the evacuation route. This proposed increase in hurricane evacuation road capacity, which is projected to reduce and maintain evacuation clearance times below 1987 levels, is implemented by operational procedures contained in the Sanibel Emergency Management Plan rather than as a capital

improvement. The Sanibel Emergency Management Plan will continue to provide manual control of the hurricane evacuation route to assure that the level of service on the evacuation route is maintained throughout the evacuation period.

The City of Sanibel has undertaken additional operational steps to reduce evacuation times. The public notification program, the enlistment of volunteers for neighborhood and condominium notification, including door-to-door notification and the identification of persons needing special assistance have all been coordinated through the Police Department and provide a high level of assurance that the City will react quickly to the hurricane threat.

In 1983 the City and County entered into an interlocal agreement that permits the City to restrict vehicular access to the Sanibel Causeway within 48 hours of a hurricane's forecasted landfall.

Depending upon a storm's intensity and direction of approach, high winds and high tides could make it unsafe to cross the Causeway as much as 12 hours in advance of landfall. A tide gauge with remote read-out capability would be appropriate to be installed near the Causeway to permit continuous monitoring of the tides. Additional recommendations with regard to evacuations are:

- Population, including dwelling units, should be limited on Sanibel, as well as Captiva and other areas subject to tidal flooding, to that which can be safely evacuated under worst case conditions
- If an areawide evacuation is ordered, the evacuation of all zones including the mainland should be initiated at the same time. This would

permit manual control of the intersections to obtain the highest evacuation rates. It would also reduce public confusion

Recovery

The Plan for Recovery from the damage of a hurricane or evacuation of the population due to the threat of a hurricane is contained in the Sanibel Emergency Management Plan. The City's recovery from Hurricane Charley was effective and the City has employed the lessons learned from that experience to improve plans for recovery from storms that will occur in the future. Areas for staging recovery efforts from storms that will occur in the future should be identified and secured. Optimally, a small number of sites at disbursed locations will be suitable for accommodating recovery efforts from a variety of storm scenarios. Recovery will be aided by the Mobil Emergency Communications Vehicle which was put into service in 2007.

The City has constructed docking facilities at the City boat ramp, located adjacent to Causeway Boulevard, to facilitate deliveries of personnel and equipment by shallow-draft barges, should vehicular access via the Causeway be interrupted do to storm damage.

Damage Reduction

Taking measures to reduce the amount of damage sustained in a hurricane allows the community to get back on its feet more quickly following a hurricane. In addition, damage mitigation reduces the cost of replacing damaged improvements.

There are approximately 600 dwelling units located seaward of the 1974 Coastal Construction Control Line (CCCL); however, with rare exception, these units were built prior to the adoption of this Plan in 1976. There are few structures in the City of Sanibel that have a history of repeated damage in coastal storms. These structures are located on the Gulf Coast near Blind Pass. The City has acquired some of these properties.

The northernmost section of Sanibel-Captiva Road (approximately a half mile immediately south of the Blind Pass bridge) is located seaward of the State's 1991 CCCL. There is no apparent opportunity to relocate this facility, which is the hurricane evacuation route for the northern extent of Sanibel and all of Captiva. A small section of East Gulf Drive (directly south of Kinzie Island) is also located seaward of the State's 1991 CCCL.

Structures are to be elevated above or floodproofed to the 100-year storm's projected wave heights. All structures must be developed in compliance with the Flood and Stormproofing requirements of the Land Development Code.

The Florida Building Code includes standards appropriate to the hazards present on a barrier Island. This code requires all new construction to be designed and built to withstand the wind loads associated with coastal wind speeds, to have foundations deep enough to remain stable following maximum anticipated scour depths and to withstand the battering which accompanies wave action.

Additional measures that should be considered for their contribution to a damage reduction program include:

- Do not permit fill to be used for elevating structures in locations identified as being especially susceptible to scour, even though the location may be in an "AE" Zone area according to the Flood Insurance Rate Map (FIRM)
- Maintain as much dense vegetation as possible as a means of reducing wave heights and wind velocity, and require revegetation as opportunities arise for the same reasons
- Reduce permitted densities insofar as possible in undeveloped parts of "VE" Zones and the most scour-prone parts of "AE" Zones

Plan for Hurricane Safety

The threat to life and property posed by tropical storms and hurricanes necessitates the City of Sanibel having a plan in place that responds to this threat.

It is the policy of the City to develop and improve on- and off-Island evacuation to off-Island shelters as the principal means for assuring the safety of its population. On-Island refuge is not a substitute for evacuation.

Because the components of ensuring adequate means for the safe evacuation from threats of hurricanes extend well beyond the jurisdictional extent of the City of Sanibel, these concerns need to be adequately addressed in the Intergovernmental Coordination Element of this Plan.

Provisions of the Plan

1. Cooperate with Local governments of the Region to carry out the safe evacuation of populations affected by the threat from tropical storms and hurricanes.
 - a. Work closely with Lee County and State officials to implement a systematic process for making decisions on evacuation during the approach of a tropical storm or hurricane that is based on the probability of the storm striking a particular location.
 - b. Work with Lee County to develop a program to ensure that adequate off-Island shelters are open and available during a storm threat to accommodate early evacuees who are evacuating before a mandatory evacuation order is given.
2. Continue educational programs to ensure citizen understanding of the threat posed by tropical storms and hurricanes and the appropriate responses thereto.
3. Implement an effective warning system to get current information on storms to Island residents.
 - a. Maintain a 24-hour communications link with official weather information sources.
 - b. Continue to improve the communication network that enables the public to obtain relevant information concerning status and procedures during threats from storms and during recovery periods.
4. Continue to evaluate and improve the operational evacuation plan.
 - a. Maintain an up-to-date plan describing actions to be taken at various times during the approach of tropical storms and hurricanes.
 - b. When a hurricane warning is issued, provide each person in the City of Sanibel the opportunity to evacuate from the Island and encourage persons to evacuate in a timely fashion.
 - c. Encourage people to respond to early warnings and hurricane watches in order to lessen the evacuation burden after a hurricane warning is issued.
 - d. Keep in place a method of monitoring the number of vehicles on Sanibel and Captiva during the hurricane season in order to have an accurate approximation of the number of vehicles to be evacuated.
 - e. Install a tide gauge near the causeway with remote readout capability in the Police Station in order to monitor tides to assure early and timely warning or the need to close the Causeway to traffic.
 - f. Maintain an agreement with a private meteorological firm whose staff is competent in tropical meteorology to

provide the City with current information on probable effects from approaching tropical storms and hurricanes.

5. Maintain the facilities and equipment necessary to implement plans for evacuation and recovery.
 - a. Improve, as necessary, storm drainage along the evacuation route and elevate those portions of the roadway subject to early flooding.
 - b. Acquire and maintain the equipment necessary to keep evacuation routes open prior to and during an evacuation, and open roadways following a storm.
 - c. Keep the City-owned Causeway Boulevard properties available as a recovery staging area in the event the causeway is not useable following a hurricane.
6. Keep the City Hall property available for recovery operations. Keep up-to-date on Federal and State requirements to qualify the City and its residents for disaster relief assistance.
7. Limit and manage growth so that the population on the Island when a hurricane warning is issued will not be in excess of evacuation capabilities. Overloading the emergency system will reduce efficiency and deprive residents and visitors of a reasonable opportunity to reach safe shelter.
 - a. Ensure that future growth be accompanied by and coordinated with, to the maximum extent practicable,

improvements in the evacuation system, both on and off island. It is only in anticipation of such improvements that the present population should be allowed to expand, because the evacuation capacity is already taxed.

8. See that all new buildings, which are of a type that have common spaces, are developed in a manner amenable to use as an emergency recovery area. Use of such areas should be agreed upon during the approval of such development.

Goals, Objectives and Policies

Goal Statement

Reduce the exposure of human life and public and private property to the threat of natural disasters.

Objective 1

Limit public expenditures in the coastal area subject to storm surge (the VE-Zone on the FIRM) and scour.

Policy 1.1. Public expenditures in coastal areas subject to storm surge and scour will be limited to maintenance, public safety needs, recreation and open space uses, restoration or enhancement of natural resources or land acquisitions.

Objective 2

Direct population concentrations away from coastal areas subject to storm surge and scour.

Policy 2.1. Development intensity for the coastal area subject to storm surge and scour will not be increased above existing densities and that currently established on the Development Intensity Map.

Policy 2.2. Limit and manage growth so that the population on the Island does not exceed evacuation capabilities.

Policy 2.3. To the maximum practicable, future growth will be accompanied by and coordinated with improvements in the evacuation system, both on and off the Island.

Objective 3

Beyond “build-out”, hurricane evacuation times will be reduced and maintained at or below levels established in the 1995 Southwest Florida Regional Hurricane Study. Updates to this study will be employed to determine compliance with this objective.

Policy 3.1. Implement a plan to operationally provide two lanes for outbound evacuation traffic on Sanibel’s evacuation route as a means of reducing evacuation clearance times.

Policy 3.2. In cooperation with Lee County and the Florida Department of Economic Opportunity, develop an interlocal agreement to develop and implement a

plan to operationally provide two lanes of outbound evacuation traffic across the Sanibel Causeway as a means to reduce evacuation clearance times.

Policy 3.3. Cooperate with the Southwest Florida Regional Planning Council, Lee County and the Cities of Fort Myers, Bonita Springs and Cape Coral and the Town of Fort Myers Beach to implement an off-Island emergency plan for evacuation that controls traffic on evacuation routes and identifies emergency shelter locations.

Policy 3.4. Incorporate a least regret factor in the plan for hurricane preparedness to take into account the bad actor storm, i.e., the storm that does not behave as forecasted.

Policy 3.5. As the threat increases, the City will take a series of protective actions to ensure safe and timely evacuation. The decision to implement protective actions will be coordinated with adjacent local governments.

Policy 3.6. Encourage the early, voluntary evacuation of visitors during a storm threat in order to decrease evacuation time if it becomes necessary to order an evacuation. The City maintains a list of resort/hotel operators, keeping them apprised of severe weather conditions through existing weather alert communication systems.

Policy 3.7. In cooperation with Lee County, restrict visitor and non-essential traffic to Sanibel 48 hours prior to a hurricane’s forecast landfall when possible.

Policy 3.8. Encourage Lee County to operate and maintain their Bridge and Causeway facility, which runs between the mainland and Sanibel, to satisfy Sanibel's long-term need for an evacuation route to the mainland and a recovery route from the mainland. It is important to keep the bottom of the road bed for the bridges of the Sanibel Causeway elevated above the level of the anticipated storm surge of a Category 3 hurricane and to keep the bridges of sufficient width to permit motor vehicle traffic to bypass disabled vehicles.

Through continued intergovernmental coordination, the City will work with the County to promote the long-term maintenance of this vital transportation facility. The City will review the County's bridge inspection and maintenance reports. The City will also examine any inspection reports responding to natural or human-caused events that may affect the structural integrity of the facility in order to identify appropriate actions.

Policy 3.9. Acquire and maintain the equipment necessary to keep evacuation routes open prior to and during an evacuation and to reopen roadways following a storm.

Policy 3.10. Continue implementation of the tree management program to lessen the risk of trees being blown across the evacuation route. The City will identify and trim those trees that pose a potential threat or impediment to evacuation.

Policy 3.11. Continue to evaluate and improve the City's operational evacuation plan.

Policy 3.12. Cooperate with Lee County's program to provide shelter capabilities adequate to safeguard the public against the effects of hurricanes and tropical storms. On-Island refuge is not a substitute for evacuation.

Objective 4

Continue implementation of the program to encourage people to evacuate the Island when an evacuation order is issued.

Policy 4.1. Continue implementation of an education program to inform residents and visitors of proper response to hurricane evacuation orders.

Objective 5

Provide immediate recovery response to post-hurricane situations.

Policy 5.1. Continue to evaluate and improve the City's Emergency Management Plan, including post-disaster redevelopment.

Policy 5.2. The City will implement its post-disaster Redevelopment plan, as applicable.

- A Recovery Task Force directed by the City Council will conduct a structural safety damage assessment.
- Priority in redevelopment permitting will be given to repair and clean-up activities needed to protect public health, safety and welfare.

- Remain up-to-date on Federal and State requirements to qualify the City and its residents for disaster relief assistance.

Policy 5.3. Ensure that the Future Land Use Map series of the *Sanibel Plan* appropriately coordinates land uses with the results of hazard mitigation reports prepared following natural disasters affecting the City of Sanibel.

Objective 6

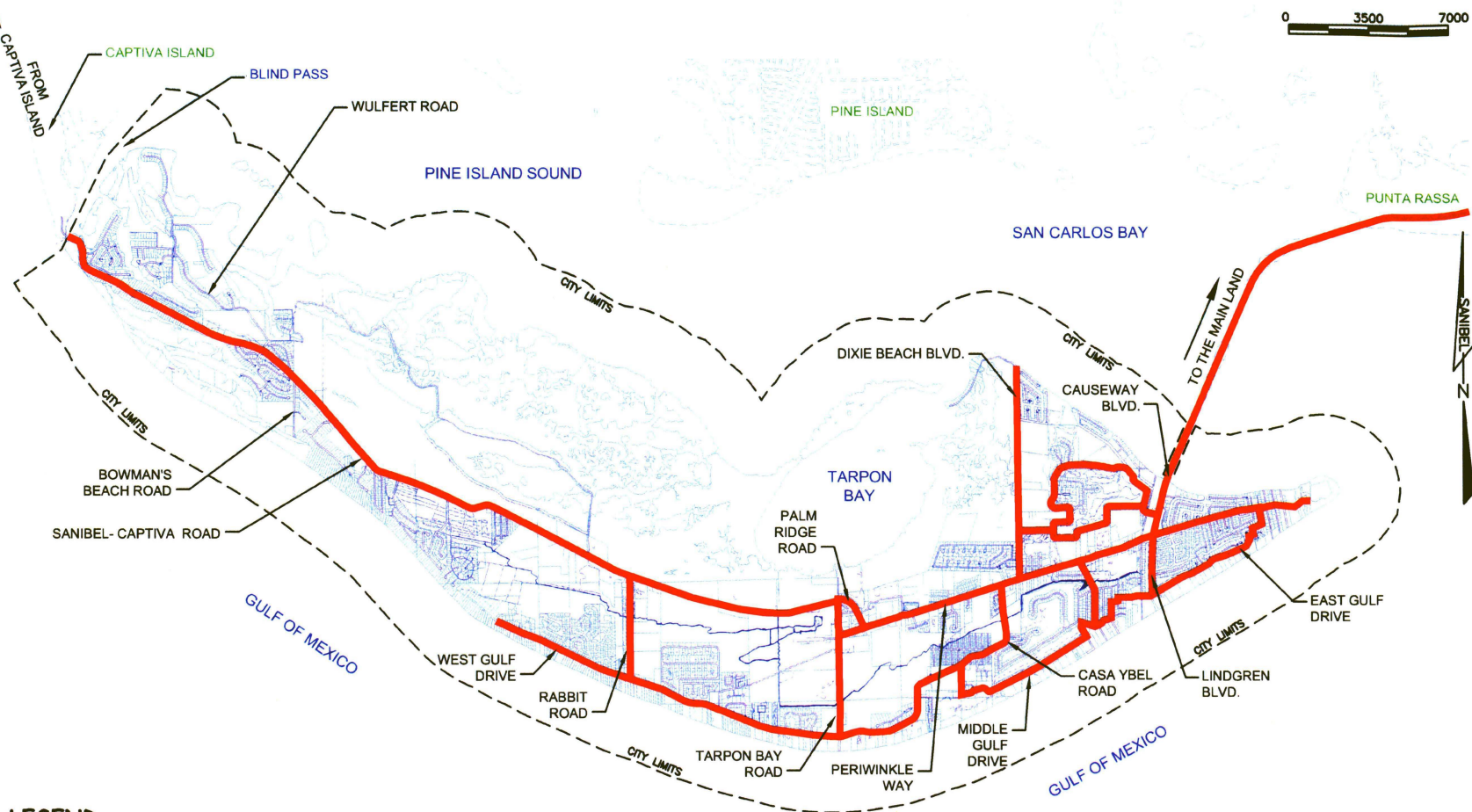
Ensure continued implementation of development regulations and building code requirements that are responsive to the threats posed by the high winds and flooding associated with tropical storms.

Policy 6.1. New and redevelopment activities will comply with requirements of the Federal Flood Insurance Program, as implemented by the Land Development Code.

Policy 6.2. Replacement or reconstruction of non-conforming structures which have been substantially damaged in excess of 50 percent of the market value of the structure or destroyed, will be done in conformance with the requirements of the Land Development Code in effect when reconstruction occurs.

Policy 6.3. Revise the Land Development Code, as appropriate, to ensure continued responsiveness to threats posed by tropical storms.

Section 3.1.1.



LEGEND

HURRICANE EVACUATION ROUTES

Policies from the Hurricane Safety Element:

Policy 3.1.

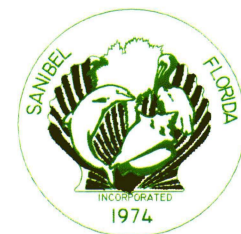
Implement a plan to operationally provide two lanes for outbound evacuation traffic on Sanibel's evacuation route as a means of reducing evacuation clearance times.

Policy 3.2. In cooperation with Lee County and the Florida Department of Economic Opportunity, develop an interlocal agreement to develop and implement a plan to operationally provide two lanes of outbound evacuation traffic across the Sanibel Causeway as a means to reduce evacuation clearance times.

Source: The Sanibel Emergency Management Plan
This graphic was redrawn from the 1997 *Sanibel Plan*.

The principle source of the base map used in this illustration is from the Lee County Property Appraiser's Office.

Prepared by the Planning Department.



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HURRICANE EVACUATION ROUTES