

# **CITY OF MARCO ISLAND COMPREHENSIVE PLAN**



## **Proposed Evaluation and Appraisal Report Based Amendments**

### **Data and Analysis**

March 3, 2008

# CITY OF MARCO ISLAND

## Comprehensive Plan

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**History of the Island**

The progressive development of Marco Island, the small island paradise situated off the west coast of Florida, dates back to 1880. Tennessean W.T. “Captain” Collier founded the village of Marco shortly after the Civil War and lived with his family in a make-shift palmetto shack, exporting cabbages on weekly sailing trips to the Key West markets. Soon after, the Collier family opened a store and gradually other families followed them to the 6,000 acre settlement. Collier eventually opened a twenty room hotel that allowed eager fishermen to enjoy room and board while taking in bountiful catches from the gulf. Collier pioneered the first road for the remote island, a path built of sand and shell that led a mile towards the beautiful gulf beaches. Progress would eventually come, slow but sure.

In 1922, Barron Collier, Sr., no relation to Captain Collier, bought most of the island and soon formed Collier City. Collier constructed a railroad in 1927, however, diminishing shipments of clams led to the railway’s demise in the mid-1940s. In the late 1950s Marco Island was the site of a missile tracking station built to trace the route of rockets fired from Eglin Air Force Base near Pensacola. Barron Collier, Sr. died in 1939, leaving among his vast estate, the pristine Marco Island property to his three sons.

When the Mackle brothers discovered Marco Island in 1962, the missile tracking station was virtually out of service. After falling in love with the sandy white beaches and warm gulf breezes, the Mackle’s, founders of the Deltona Corporation which developed over 5,000 homes and 100,000 homesites throughout Florida, envisioned developing Marco Island into a full community. After lengthy negotiations with the Collier family, the Mackle brothers were able to move forward with initial development planning for the Island.

With the Town of Naples only 16 miles to the north and a sparse population of less than 16,000 in Collier County as a whole, Deltona knew that in order for Marco Island to succeed, it must be a fully functional community that would draw visitors and potential homeowners alike.

In 1964, James Vensel, Vice President of architecture and engineering for Deltona, designed a master plan that provided for 10,839 homesites along with additional areas for apartments, condominiums, hotels and motels. A maze of 91 miles of canals afforded three-fourths of the lots as waterfront property. A golf course, yacht club, and additional 275 for commercial development, along with five schools and 17 churches, were slated to create an idyllic community amidst the paradise island lifestyle architecturally modeled after Hawaii. Vensel recognized the history of the island by naming over 400 streets for historic and pioneering figures from Marco’s past, such as Calusa Court, which acknowledged the sea-faring tribe of Calusa Indians that lived on the island and hunted sharks throughout the gulf waters.

## **Data and Analysis**

## **History of the Island**

As Marco Island was relatively undeveloped land, the area lacked proper roadways and clean drinking water. The process of dredging the land for pipe work was long and tedious; this involved constructing a rock quarry lake nine miles from Marco, then running a waterline to a purification pumping station on the island, which then extended to 25,000 feet of mains laid throughout the island. Additionally, a sewage treatment plant was built, 24,000 feet of sewer pipe laid as well as 3,000 feet of gas piping. "Mosquito dikes" were built to help control the infestation of mosquito breeding, although insect repellent and insecticide spray planes were still in popular demand. Dredging the land to build canal system produced the necessary fill utilized during the infrastructure development to build up the region. Once the land had been raised 6 feet above high tide level and the canals dug, a seawall was made of large cement slabs 4-5 feet wide and 12 feet long was constructed surrounding the island.

Deltona had taken the tiny island gem from being virtually uninhabitable, to a fully functioning community area. In 1965, Deltona opened a sales office and the rush to build homes and businesses on the island oasis was off and running. On opening day over 25,000 people flocked to Marco Island, impressed by the cluster of 12 model homes that ranged from \$14,900 for a small inland home to \$41,500 for a larger home on the waterfront. Shopping centers, which included a hardware store, beauty parlor/barber shop, convenience store, and gas stations were built to show visitors that Marco Island featured every imaginable amenity, not to mention a Deputy Sheriff as Marco Island's lone enforcement officer.

The 100 room hotel and 44 villa units called The Voyager, was located just down the beach from the Emerald Beach Condominiums, Marco Island's first high-rise condominiums complete with a swimming pool and 50 car garage. Deltona opened the Polynesian styled County Club in 1966 and a five acre marina in early 1967. The Marco Beach Hotel, boasting 370 luxurious rooms and a multitude of conference rooms, opened in December 1971. Marco Island continued to grow as the construction of beachfront condominiums and hotels peppered the white, sandy shoreline.

Deltona formed the Marco Island Airways in 1972, maintaining a fleet of three 15-passenger Beechcraft planes flying five round-trips daily between Marco and Miami, ultimately linking the island to every important northern city in the U.S. The 4,000 foot airstrip would bring countless visitors to Marco Island. The construction of roadways and bridges allowed easy access to the various points of interest throughout the community. A business district was created on the west side of Bald Eagle Drive and Collier Boulevard intersection.

Deltona faced many hurdles along the way to Marco's success, such as permitting problems for dredging operations and eventually a cease and desist order from the Army Corps of Engineers, who in 1971 exerted jurisdiction over wetlands and navigable waterways. Although Deltona constructed artificial reefs to help compensate for environmental impacts from the development of Marco Island, continued efforts to proceed with development throughout the island were stalled by denial of

dredge and fill permits. With continuing permit difficulties, home sales began to decline in 1974.

The Deltona Corporation found itself deep in debt when individuals refused to pay on contracts that were not delivered due to permitting delays. Ultimately the permitting hurdles were too much, and the Deltona Corporation was sold in the early 1980s.

Marco Island continued to grow and prosper through the 1980s and 1990s as part of Collier County. In 1994 the Collier County Commissioners authorized the preparation of a Master Plan for Marco Island to address infrastructure and future development needs. The Master Plan was completed in 1996 and served as the guide for the eventual incorporation of Marco Island in 1997. The Master Plan also served as the basis for the original Comprehensive Plan for the City of Marco Island.

While more than one incorporation initiatives were attempted, on the fifth try a majority of voters approved incorporation in August, 1997. The new City of Marco Island, Florida’s 400<sup>th</sup> city, began in earnest to become a full service municipality. The City hired its first and only City Manager in March, 1998 and with a small staff began the necessary steps toward self-reliant governance. In January, 2001 the City adopted its first comprehensive plan to manage future growth, and shortly thereafter completed a revised Land Development Code to guide and direct future development. Over the years the City assumed greater roles including the establishment of a local police force, assumption of control and management of community parks and recreation facilities and services, and, with voter support, the acquisition of water and wastewater facilities from a private entity.

While incorporation created a City, the roots of the community were sown by the Deltona Master Plan. The City is now the custodian of that visionary plan, a legacy the citizenry of Marco Island should take great pride in. Yet with that legacy comes responsibilities, primarily the responsibility to see that vision carried through build-out. Deltona sold and permitted Marco Island as a residential community with sufficient commercial development to serve the needs of residents. The goal of the Mackle brothers was to develop a tropical paradise that would sell. The City’s role is to promote, enhance, and protect that tropical paradise through build-out.

**I. Future Land Use Element**

This component of the City’s Future Land Use Element (FLUE) is designed to provide the data and analysis showing current and projected population, existing and future land use conditions, and opportunities to improve the living environment of the Island. Utilizing information presented in conjunction with the 2005 Evaluation and Appraisal Report (EAR) this section will form the basis to support goals, objectives and policies, contained in Part I of the Plan, to prudently and strategically guide the future growth of Marco Island. As such, it is the Future Land Use Element (FLUE), more than any other comprehensive plan element, which will provide the direction and guidance to carry the community to build-out. All other plan elements and sub-elements are dependent on the land development patterns contained on the Future Land Use Map. It will be the prudent use of land, densities and intensities, which will determine the final outcome of the original Deltona plan. This element is a vital guidepost to ensure that the community envisioned is sustained and will flourish into the premiere City expected by current and future residents.

**A. Existing Land Use Characteristics**

To adequately address the issue of future land use patterns, a community must look at its current land use inventory and patterns for guidance. To maintain a relevant FLUE a current inventory of existing land use is required. Table 1.1 identifies the existing land use pattern on the Island. Additionally, natural resources provide an important, limiting effect, on future development, and thus are shown on the existing land use map series which is presented in subsequent Plan elements including: beaches and shores, including estuarine systems; rivers, bays, harbors and floodplains; wetlands; and soils.

Table 1 presents the approximate acreage and general range of density or intensity of existing use for the gross land area (2005) included in each existing land use category applicable to Marco Island.

**Table 1.1  
Existing Land Use**

<u>Land Use Categories</u>	<u>Acreage</u>	<u>Density</u>	<u>% of Total</u>
Residential:			
Single Family	1,717	4 units/acre	23.7
Vacant Single Family	795	4 units/acre	11.0
Multifamily	402	6-10 units/acre	5.6
Vacant Multifamily	7	6-16 units/acre	0.1
Resort Residential	99	16-26 units/acre	1.4
PUD	272		3.8
Vacant PUD	159		2.2

## Data & Analysis

## Future Land Use

Commercial:	196	2.7
Vacant Commercial	42	0.6
Government	6	0.1
Institutional	70	1.0
Utilities	23	0.3
<u>Recreation/Open Space/Preservation</u>	<u>3,167</u>	<u>47.6</u>
Total	6,883 acres	100%

*Sources: Per 2005 EAR Report and the City of Marco Island Planning Department*

From the table, it is evident that a large proportion of Marco Island is either built-out or in conservation use. Approximately 52.4% of the Island's land mass is developed or situated for either residential, commercial, governmental/institutional or resort usage, with residential uses being by far predominant. Another 47.6% of Marco Island's land is taken up by public lands and/or conservation uses. The estimated acreage, outside of PUD's still available for residential development is 802 acres.

Since the annexation of Key Marco (Horr's Island) and surrounding keys in August 2004, the corporate limits of Marco Island encompass the bulk of the island's landmass. The only areas outside the corporate limits are the community of Goodland, and residual mangrove areas. Goodland is a small residential enclave with limited commercial uses. The residual land area is predominantly wetlands and mangrove, with no development potential.

## **B. Population Trends and Projections**

A viable comprehensive plan must be based on well documented residential and seasonal population estimates and projections. As the original comprehensive plan was written prior to the release of the 2000 Census, early attempts to forecast trends and projections proved exceedingly difficult. The 2005 EAR report and subsequent University of Florida estimates provide reasonable sources for future permanent population trends and projections. Seasonal population estimates are more difficult to project, and therefore, the methodology utilized by the citizen volunteers of the Marco Island Master Plan (1996) will continue to be used until another system is deemed superior and more accurate.

### **1. Permanent Population**

Per the original Data and Analysis document (2001) the permanent population estimates for the City were as follows:

**Data & Analysis**

**Future Land Use**

<u>Year</u>	<u>Island Population</u>
1990	9,773
1995	11,010
2000	12,670
2005	14,285
2010	15,792

In March 2004, the City amended the Future Land Use and Capital Improvement Elements at which time City staff revised the permanent population estimates based on the 2000 Census, information provided by the University of Florida, and building permit data. The revised permanent populations (2005) were as follows:

<u>Year</u>	<u>Island Population</u>
1990	9,773
1995	11,010
2000	14,879
2005	15,930
2010	17,398

Per the latest population projections by the Shimberg Center at the University of Florida, (2006) the projected total population for Marco Island between 2002 and ~~2025~~ **2030** are as follows:

<u>Year</u>	<u>Island Population</u>
2002	14,799
2005	15,239
2006	15,719
2010	16,315
2015	17,338
2020	18,332
2025	19,187
<b><u>2030</u></b>	<b><u>20,000*</u></b>

\*Extrapolated population for the year 2030 derived utilizing growth trends reflected in Shimberg projections above.



## 2. Seasonal Population

In addition to the permanent population, the City has a significant part-time or seasonal population. Not only is Marco Island a desirable vacation destination, it is also a popular haven for seasonal residents. By definition provided by the State, “seasonal population means part-time inhabitants who utilize, or may be expected to utilize, public facilities or services, but are not residents. The seasonal population includes tourists, migrant farm workers, and other short-term and long-term visitors”. Those who make up Marco’s seasonal population are not only vital to the economic well-being of our community, but they also place demands on our municipal services and infrastructure. Due to the seasonal population influx, Marco Island is a small city with median sized city responsibilities.

The Marco Island Vision Planning Committee (Marco Island Master Plan, 1996) developed a well thought-out strategy to estimate the seasonal population of the Island. In determining the seasonal population the Committee considered such factors as vacancy rates from hotels and motels, delivery and sales of newspapers, and water usage. The Marco Island Master Plan contained the following table to facilitate estimates of seasonal population.

**Table 1.2**  
**Marco Island Monthly Occupancy Rate**

January	90%
February	95%
March	89%
April	80%
May	75%
June	50%
July	40%
August	40%
September	43%
October	55%
November	70%
December	75%

Using the above seasonal rates and combining with established residential populations, the latest population projections (inclusive of both permanent and seasonal populations) are shown in Table 1.3.

The U.S Postal Service has provided data that shows the number of residential addresses serviced by mail delivery on a monthly basis for Marco Island. The data shows that there are 8,000 addresses served during the months of May through September. The number increases throughout the seasonal

months with a peak number of 16,000 residential addresses served in February, which is double the number served in the non season months.

**Table 1.3 - Population Estimates and Projections**

<u>Year</u>	<u>Permanent</u>	<u>Seasonal</u>	<u>Peak</u>
2006	15,719	24,521	40,240
2008	16,017	24,252	40,269
2010	16,315	23,983	40,298
2013	16,928	24,261	41,189
2015	17,338	24,446	41,784
2018	17,934	25,282	43,216
2020	18,332	25,839	44,171
2025	19,187	27,131	46,138
2030	20,000*	28,270	48,270

\*Extrapolated population for the five and ten year planning periods and for year 2030 have been derived utilizing growth trends reflected in Shimberg projections for permanent population above.

**C. Availability of Facilities and Services**

Per state requirements, existing and future land use conditions must be assessed to ascertain the availability of facilities and services as identified in the transportation, sanitary sewer, solid waste, stormwater management, potable water, natural groundwater aquifer recharge, and recreation and open space elements to serve existing and future development at or above the adopted level of service (LOS) standards. The 2005 EAR report shall serve as the basis for updates to the original text of this subsection.

**1. Transportation**

The adopted goal of the City’s Transportation Element is, “To provide and encourage a multimodal transportation system that meets the circulation needs of Marco Island in a safe and efficient manner, but does not adversely impact the quality of life of the residents.” In furtherance of the adopted goal, there are seven objectives and twenty-eight (28) supporting policies.

Since incorporation transportation issues have been a dominant topic for the City, both in terms of policy direction and in capital improvement planning. As such, the Transportation Element has proven to be an extremely important policy document to focus discussions and decisions. Further, the Transportation Element has truly fostered a multimodal approach to Island-wide transportation planning, regional planning, and public/private investments.

The City originally adopted a Level of Service (LOS) standard of “D” for all roadways on Marco Island, except for the portion of Collier Boulevard between the Jolley Bridge and San Marco Road, which has a LOS standard of “C”. To remain consistent with the City’s concurrency management system, a LOS “D” is to be maintained on all Marco Island roadways as measured on a peak season, peak hour basis. If traffic volumes exceed the maximum permitted volumes under LOS “D”, the roadway will be determined deficient and operating under unacceptable conditions. If a road for which a LOS “D” standard is adopted and exceeds the level’s thresholds, the road is allowed to operate at a LOS “E” for a period not to exceed two years. After that point the road is classified as unacceptable.

Based upon current concurrency data and traffic counts, three Marco Island roadways have been measured for concurrency.

SR 951 (Collier Boulevard) from the Jolley Bridge to the south of CR 92 (San Marco Road) currently operates at a LOS “C”. San Marco Road from SR 951 to the east (toward Goodland) and Bald Eagle Drive (CR 953) from the north of SR 951 to CR 92 both currently operate at a LOS “C”. No other roads on Marco Island have traffic volumes that would approach a LOS “D”.

As such, based on the analysis of available data and quarterly traffic counts, the City’s roadway network functions and operates at levels that do not present current or projected level of service (LOS) deficiencies. As demonstrated in the Data and Analysis section of the Capital Improvements Element, available road capacity will accommodate the limited population growth expected to occur within the next 5 year planning period. A more detailed discussion of transportation issues can be found in Section II - Transportation Element.

## **2. Sanitary Sewers**

The adopted goal of the City’s Sanitary Sewer Sub-element is, “To protect the health and safety of the public by ensuring wastewater treatment facilities and services are environmentally sound, cost effective, and meet the community’s present and future demands.” In furtherance of this goal there are three objectives and thirteen (13) policies.

At the time the original comprehensive plan was prepared there were three entities providing sanitary sewer services on Marco Island: Florida Water Services (FWS); Collier County; and Old Marco (North Marco) Utilities. All wastewater collected on Marco was treated at the FWS wastewater treatment plant on Elkcam Circle. Only approximately fifty (50%) percent of the Island was within established sewer districts. The remainder of the Island was technically within the County’s service area, but until sewers were extended, development in those areas was dependent on individual septic tanks. Available sewer service will accommodate the population growth expected to occur within the next 5 year planning period.

### 3. Solid Waste

There are three adopted goals in the City's Solid Waste Sub-element. The first goal reads to, "Promote the efficient and economical balance of public and private solid waste collection and disposal services for the City of Marco Island that will meet established requirements in a manner that will protect the public health, safety, and environmental resources of the community." The second goal reads to, "Encourage expansion of recycling programs to include office, commercial, and industrial customers to enhance re-use of waste stream materials." The third goal reads simply, "Abatement of illegal dumping activities." In furtherance of these goals there are four objectives and thirteen (13) policies.

The collection and disposal of solid wastes generated on Marco Island continues under the supervision and management of the Collier County Solid Waste Management Department. Waste Management of Collier County, Inc. is the franchised waste collector to provide collection services to residential and commercial generators on the Island. The current arrangement for the collection and disposal of solid waste is both efficient and economical. In terms of solid waste level of service standards the City has adopted by reference the LOS standards of Collier County. Further, through actions by Collier County, efforts are underway to expand the recycling of commercial waste materials.

The current LOS standards for solid waste management are as follows:

1.10 tons of Solid Waste per capita per year. A minimum of two (2) years of constructed, lined landfill cell space at the calculated waste generation rate. A minimum of ten (10) years of permissible landfill capacity at the calculated generation rate.

As the City is not the primary provider of solid waste services, the level of service standards adopted by Collier County will remain operable for the City's concurrency management system. Any changes to the County's adopted LOS for solid waste services should be acknowledged by the City in its next applicable Large-scale comprehensive plan amendment cycle. Available facilities will accommodate the limited population growth expected to occur within the next 5 and 10 year planning periods.

### 4. Stormwater Management

The adopted goal of the City's Stormwater Management Sub-element is, "To protect the health and safety of the public by ensuring stormwater management facilities are properly maintained, environmentally sound, cost effective, and meet the community's present and future demands." In furtherance of this goal there are four objectives and eleven (11) policies.

Stormwater management involves manmade means to address the flow of water that results from a rainfall event. Stormwater management facilities include structures that are designed to collect, convey, hold, divert, or discharge stormwater and may involve stormwater sewers, canals, detention or retention facilities. The Deltona Corporation built most of the existing stormwater management structures located on the Island in the 1960s and 1970s. With incorporation and establishment of the City’s Public Works Department, the operation and maintenance of stormwater facilities have become the responsibility of the City.

Marco Island’s stormwater management and drainage facilities consist of a system of swales, catch basins, underground drainage conduits, and outfall structures of various materials which collect and discharge the runoff from rainfall events. The runoff is generally discharged directly into manmade and natural water bodies, which are in turn connected to the natural bays and tidal water bodies. Ultimately all discharged water is received by the Gulf of Mexico.

As the result of a Drainage Report the City adopted as the LOS design standard for stormwater facilities the ten (10) year, one-hour storm event with a 3.3 inches/hour intensity duration. Further, the Report devised a five-tiered LOS standards for existing and future drainage system components, which was also adopted and reads as follows:

- \* LOS Standard A: Upstream (US) Ground Elevation - Upstream Hydraulic Grade Line (US HGL) > 0.5 Feet
- \* LOS Standard B: US Ground Elevation - (US HGL > 0.2 Feet
- \* LOS Standard C: US Ground Elevation - US HGL > or = 0.0 Feet
- \* LOS Standard D: US HGL < or = 5.2 Feet\*
- \* LOS Standard E: US HGL > 5.2 Feet\*

*(\*) Denotes standards that may be acceptable at a limited number of roadway locations due to extreme topographical conditions.*

As a coastal community with a relatively flat terrain, stormwater management is an important component in any public works project, especially roadways. A prime example is the installation of curb and gutters in connection with the reconstruction of North and South Collier Boulevard. And as stated in the FY 2004 Annual Level of Service (LOS) Report, “In regard to applicable stormwater drainage LOS standards, the City had adhered to the appropriate LOS design standards based on the hydraulic circumstances or conditions of the project area. Therefore, the City is in conformance and compliance with adopted LOS standards.” As demonstrated in the Data and Analysis section of the Capital Improvements Element, available facilities will accommodate the population growth expected to occur within the next 5 and 10 year planning periods.

## **5. Potable Water**

The adopted goal of the City’s Potable Water Sub-element is to, “Assure a sufficient, dependable, and

high quality potable water supply to meet the needs of Marco Island on a timely basis, at a reasonable cost, and, at a minimum, complies with all federal and state requirements to protect the health and safety of the public.” In furtherance of this goal there are five objectives and fifteen (15) policies. As demonstrated in the Data and Analysis section of the Capital Improvements Element, available facilities will accommodate the population growth expected to occur within the next 5 and 10 year planning periods.

## **6. Parks and Open Space Facilities**

The adopted goal of the City’s Park and Open Space Element reads, “To enhance Marco Island’s open space and recreational opportunities while maintaining its tropical, small town character.” In furtherance of this goal there are four objectives and fifteen (15) policies.

Of all the comprehensive plan elements, the park and open space initiatives undertaken by the City during the past six years clearly exceed the community’s expectations. The City has successfully acquired numerous sites for new and expanded recreational opportunities such as “the Glon” property (Veteran’s Park), strategic lots and parcels along a 1.5 mile pathway corridor, and a waterfront lot at the Factory Bay Bridge. Significant park renovations/enhancement projects at Winterberry and Mackle parks have either been completed or in final design stages, with identified capital improvement funding. And most importantly the City has established a fully functioning Park and Recreation Department.

With an inventory of over 100 acres of total community parkland, the adopted LOS standard of 1.2882 acres/1,000 residents there is sufficient active parkland acreage to support both projected permanent and peak season populations well into the future.

The provision of regional parks is the responsibility of Collier County. The current LOS standard for regional parks is 2.9412 acres of land/1,000 residents. Based on the latest AUIR Report prepared by Collier County there is sufficient surplus in regional parklands to meet and exceed five year projected demands. Thus, as demonstrated in the Data and Analysis section of the Capital Improvements Element, available inventory of parklands will accommodate the population growth expected to occur within the next 5 and 10 year planning periods. Further it is known that many seasonal residents will utilize private recreational facilities as provided at each of the hotels on Marco Island.

## **7. Natural Groundwater Aquifer Recharge**

The adopted goal of the City’s Natural Groundwater Aquifer Recharge Sub-element is, “To continue to support and monitor state, county, and regional water management district efforts to protect, conserve, and manage the quality and quantity of natural groundwater resources.” In furtherance of this goal there are five objectives and thirteen (13) policies.

With the acquisition of Florida Water Services (FWS) facilities the City has inherited, and expanded,

a number of wells both on and off Marco Island. On the Island there are 21 wells that draw brackish water to supply the reverse osmosis plant. These wells are generally 500 to 600 feet in depth, and have been installed under FDEP and Water Management District permits. There are six wells at the City's facility located north of the SR 951/SR 41 intersection. These wells supplement the surface water supply captured and stored in the Collier Pits. In addition, the City is actively pursuing ASR (aquifer storage and retrieval) wells as a viable means to enhance capacity and storage of treated water resources. Significant changes have been made to this sub-element due to the acquisition of potable water and sanitary sewer facilities and service. Please refer to IV Infrastructure Element for a more detailed discussion.

## **8. Schools**

Since the original comprehensive plan was adopted Chapter 163, Florida Statutes, was amended to requires that each county, all municipalities within that county, and the district school board to establish by interlocal or other formal agreement executed by all affected entities, joint school planning processes consistent with adopted intergovernmental coordination elements. Beginning in the fall of 2002 the City of Marco Island, along with Naples and Everglades City, Collier County, and the District School Board, met to develop an interlocal agreement for Joint School Planning. In February 2003 the three cities and the school district formally executed the required interlocal agreement. The executed document has been found sufficient to meet statutory requirements, and is on file with the Department of Community Affairs.

Since 2005, Marco Island has been working jointly with Collier County, the City of Naples, the City of Everglades City, and the District School Board of Collier County to address requirements for school concurrency as required by Senate Bill 360 passed by the Florida Legislature in 2005.

The Collier County School Board currently owns two tracts on Marco Island, the Tommie Barfield site and Tract K. The Tommie Barfield site is developed with both an elementary school, and a new Charter Middle School currently under construction. For the past seven years the Middle School has been operating out of a campus composed of trailers on the Tommie Barfield site. The Interlocal Agreement has fostered a more cordial and cooperative relationship between the City and the School District. For example City Council approved a resolution supporting the construction of the permanent Middle School facility. The School District was receptive to the City's comments and concerns, and through thoughtful dialogue agreed to location as desired by the City and its citizenry.

## **D. Vacant Land Analysis**

### **1. General Characteristics**

Per the 2005 EAR report, "Since incorporation there has been a healthy mix of development on the Island, with over 1,500 new single-family homes, 650 multifamily dwelling unit, 150 hotel units, and

1000,000 feet of commercial space. Several major development projects have been completed including the Esplanade, the Marriott Hotel PUD, and Cape Marco.” In conjunction with the 2004 large-scale comprehensive plan amendment process, the amount of vacant land was thoroughly tabulated in 2005. At the time of the original plan adoption there was 1,358 acres of vacant, developable land. In March 2005 the amount of vacant developable land was 1,004 acres, a decrease of 354 acres.

Some of the vacant land is platted single-family residential property which is subject to existing environmental constraints that render the property unbuildable. In the majority of cases the constrained lots were platted prior to the Deltona Settlement. Due to vegetative constraints (e.g., mangroves, tropical hammocks), these lots have not been improved with necessary infrastructure to allow for future development. The lots are generally located adjacent to Barfield Bay and along CR 92. Often these lots provide urban habitats for protected species such as gopher tortoises, burrowing owls, and bald eagles. The City has, and will continue to seek, land acquisition grants to secure some of these lots for conservation, open space or passive recreational purposes.

## **2. Availability of Land to Support ~~for~~ Population Growth**

With the annexation of Key Marco, there is sufficient land resources to accommodate the future growth desired by Marco Island. The projected permanent population in 2015 is projected to be 17,338.

The City of Marco Island currently includes an available inventory of approximately 2,090 vacant single-family residential lots available for development. Population projections indicate an increase of 1,619 persons by the year 2015. At an average of 2.16 persons per household, the vacant single family residential lots will accommodate an additional population of 4,514 persons, for an overall total population of 20,233. This is a capacity to accommodate 233 persons more than the total permanent population projected for the year 2030. Thus, available inventory of residential property will accommodate population growth expected to occur within the next 5 and 10 year planning periods.

## **E. Natural and Historic Resources**

As further elaborated in the Conservation and Coastal Management Element, the Island is blessed with numerous natural resources. It was the Island’s natural resources and the threat of possible degradation that prompted the Deltona Settlement that curtailed future development plans by Deltona on Marco Island. Natural resources do pose a barrier to development on a number of platted lots. In particular the presence of mangrove and tropic hammock on or near platted lots have rendered these lots for all intents and purposes unbuildable. Further, the habitats for protected animal species such as gopher tortoises, burrowing owls, and bald eagles, can be found throughout the City and should be protected.



The City recognized early the importance of natural and historic resources and has maintained on staff an environmental specialist to monitor and evaluate development projects and impacts to the local environment. And through vigorous code enforcement actions, infractions involving degradation or disturbances against the environment have been diligently pursued, and significant fines and restoration efforts imposed.

## **1. Soils**

There are seven soil classification listed in the Soil Survey of Collier County Area which include:

- 32 Urban Land
- 34 Urban Land-Immokalee-Oldsmar, Limestone substratum, complex
- 35 Urban Land-Aquents complex, organic substratum
- 36 Udorthents, shaped
- 40 Durbin and Walfert Mucks, frequently flooded
- 42 Canaveral-Beaches complex
- 45 Paola Fine Sand, gently rolling

Soil permeability and water table affect development patterns on Marco Island. The relatively flat terrain magnifies this affect. The soil types listed above are all sandy soils with varying degrees of permeability and varying depths to the water table. The most permeable soils are Paola and Canaveral-Beaches Complex. The least permeable are the Durbin and Walfert Mucks, frequently flooded. Most of the other soils have been modified or imported by development activities and the permeability varies greatly (Master Drainage Plan, 2000).

Water table elevation on Marco Island are generally high and greatly influenced by tidal variations. The majority of the areas that are mapped as urban soils exhibit high water tables. Some areas, primarily the areas that have been mapped as Paola or Canaveral soils have relatively low water tables as measured from the surface due to good permeability and higher elevations.

The relatively impermeable silty sands that were excavated as a result of constructing the canals were widely distributed over much of the urban classified soil types. There are areas of Marco Island that exhibit perched water table conditions as a result of silty soil layers that have reduced permeability and prevent the water from percolating to the tidally influenced water table. These areas are very localized and are typically wet in the rainy season as a consequence of the daily rainfall events. Most areas have had a drainage system installed to help to control the seasonal high water table and runoff.

## **2. Topography**

Topography on Marco Island varies from elevations below sea level to elevations of fifty (50) feet above sea level. The development plans for the roadways and urban land on Marco Island included

excavating navigable canals and placing the excavated materials on the existing mangrove swamps that characterized the majority of the island's native pre-development landscape. The pre-development elevations in these areas varied from below sea level to elevations of two to four feet above sea level. The areas that were not mangrove swamps consisted of relatively flat coastal sandy uplands, varying in height from four to seven feet above sea level. Marco Island also contains a unique ridge of sandy elevated soils that generally surround Barfield Bay and range in elevation from seven to fifty (50) feet.

The development of Marco Island's infrastructure has resulted in the following average post-development elevations of 4.5 to 8.0 Feet NGVD (National Geodetic Vertical Datum) or sea level as commonly referred. Undeveloped lots range in elevation from 5.0 to 7.0 feet NGVD. Seawalls vary in elevation from 4.0 to 5.0 feet NGVD. Typically swales vary in elevation from 2.5 to 5.0 feet NGVD. Exceptions to these generalized elevation descriptions existing along the beachfront, surrounding Barfield Bay, within the southeastern portion of the Estates section, and on the south side of Robert's Bay. These areas contain a unique soil deposit that consists of small rolling dune like hills and elevations in these areas range from 10.0 to 50.0 feet NGVD.

### **3. Critical Wildlife Areas**

There are currently sixteen Critical Wildlife Areas (CWAs) in the State of Florida, and the Marco Island area encompasses four of those CWAs. They are the Bird (or ABC) Island, Big Marco Pass, Caxambas Pass, and Rookery Island. The ABC Island CWA consists of three emergent mangrove islands located along the eastern shore of Marco Island in the Big Marco River. It was established in 1993 to protect species and habitat.

The Big Marco Pass CWA was established in 1988. It serves as a valuable nesting and over-wintering site for over 40 species of migratory and resident shore birds. These State owned sandbars and mudflats are located adjacent to Tigertail Beach. Caxambas Pass CWA was also established in 1988 and serves as another valuable nesting and over-wintering site for migratory species. The Rookery Island CWA was established in 1978, and lies within the Rookery Bay National Estuarine Research Preserve. A more detailed discussion of the four Critical Wildlife Areas can be found in the Conservation and Coastal Management Element.

### **4. Dredge Spoil Sites**

Other than temporary or emergency sites, the City of Marco Island has no dredge spoil disposal responsibilities and no designated disposal sites.

### **5. Historic Resources**

The Island has a rich and varied history, stretching as far back as 5,000 years. The Calusa period has been pieced together from artifacts found on the Island. The Calusa Indians were most probably

descendants of the early Mayans of the Yucatan, although the word “Calusa” is thought to be a corruption of the name Caloosa or Carols, a province of Indians and the name of their chief. The first record of Calusa artifacts was in the spring of 1895 when Captain Bill Collier, son of Marco’s founder W. T. Collier, uncovered ancient wooden articles, shell tools, and netted cordage while digging in silt and muck near his garden on Key Marco, as Marco Island was then called. The most significant find was the “Marco Cat” which is now on display at the Smithsonian Institute.

While there are few actual structures that warrant historical significance, there are three areas in the City where archeological finds are probable. Figure \_\_\_ shows the known historical and archeological sites in the City. They are:

- \* The Marco Inn;
- \* Doxsee Quarters and Workers House;
- \* W.D. Collier, Jr. House;
- \* Church of God; and
- \* Ideal Fishing Camp

The City also has various historical markers designating sites of historic importance to the City of Marco Island. Markers are located at the terminus of the old railroad, at Clam Factory and at the base of Jolley Bridge.

The City should implement either an agreement to work through the County’s Historical Preservation Board, or seek the creation of a local board. Further, all lots proposed for development in and around high probability areas should be thoroughly analyzed prior to the issuance of a building permit. The City should also investigate funding sources to assist property owners in designated areas have complete archeological assessments undertaken as soon as possible. These actions will allow for the potential discovery of significant sites, and permit the City to take appropriate actions to protect and preserve such sites.

**F. Future Land Use**

The adopted goal of the City’s Future Land Use Element is, “To enhance Marco Island’s quality of life, environmental quality, and tropical small town and resort character by managing growth and assuring a stable residential community with sufficient businesses to serve the needs of residents and visitors.” In furtherance of this goal there are twelve objectives and forty-nine (49) policies.

**1. Future Land Use Map (FLUM)**

Based on the physical layout of the community, the concept developed by the Deltona Corporation, and the 2004 large-scale amendment, the current Future Land Use Map (FLUM) was created and revised. Table \_\_\_ below provides the total land area for each future land use category.

**Table \_\_\_\_**  
**Future Land Use Acreages**

<u>Categories</u>	<u>Acreage</u>	
	(Pre Annexation)	(Current)
Low Density Residential	2,381	2,381
Medium Density Residential	35	35
High Density Residential	385	385
Resort Residential	97	97
<u>Planned Unit Development (PUD)</u>	<u>448</u>	<u>1,252</u>
Sub-total	3,346	4,150
Village Commercial	35	35
Community Commercial	80	80
Heavy Commercial	36	36
<u>Mixed-Use Town Center</u>	<u>120</u>	<u>120</u>
Sub-total	271	271
Recreation/Community Facilities	273	273
Preservation/Conservation (Public)	1,960	2,121
<u>Preservation/Conservation (Private)</u>	<u>68</u>	<u>68</u>
Sub-total	2,301	2,462
<b>TOTAL</b>	<b>5,918</b>	<b>6,883</b>

**2. Future Land Use Categories**

**Residential Categories**

**Low Density Residential:** Residential dwellings shall be limited to detached single-family structures. Non-residential uses permitted within this district area are limited to those uses that are compatible and/or support the residential character of the area. The non-residential uses contemplated include: parks, open space and recreational uses, churches, libraries, cemeteries, schools, day-care centers, family care facilities, and essential services as defined in the Land Development Code (LDC). A density less than or equal to four (4) dwelling units per gross acre is permitted.

**Medium Density Residential:** Residential dwellings shall include detached single-family structures,

duplexes, and multifamily dwellings. Non-residential uses permitted within this district are limited to those uses that are compatible and/or support the residential character of the area. The non-residential uses contemplated include: parks, open space and recreational uses, churches, libraries, cemeteries, schools, day-care centers, family care facilities, and essential services as defined in the Land Development Code (LDC). A density less than or equal to six (6) dwelling units per gross acre is permitted.

**High Density Residential:** Residential dwellings shall be limited to multifamily structures and less intensive units such as single-family and duplexes, provided they are compatible with the district. Non-residential uses contemplated include: parks, open space and recreational uses, churches, libraries, cemeteries, schools, day-care centers, family care facilities, and essential services as defined in the Land Development Code (LDC). A density less than or equal to sixteen (16) dwelling units per gross acre is permitted.

**Resort Residential:** Residential dwellings shall be limited to multifamily structures. Hotels and motels, timeshare facilities, and family care facilities are permitted. Non-residential uses permitted within this district are limited to those uses that are compatible and/or support the residential resort character of the area. The non-residential uses contemplated include: parks, open space, recreational uses, and other related essential services as defined in the LDC. A density of less than or equal to sixteen (16) dwelling units per gross acre are permitted, and a density less than or equal to twenty-six (26) hotel/motel or timeshare units per gross acre is permitted.

### **Commercial Categories**

**Community Commercial:** The purpose of this category is to provide for centers of activity that serve the need of the surrounding community. Mixed-use residential/commercial uses are permitted. Non-commercial uses contemplated include: parks, open space and recreational uses, churches, libraries, cemeteries, schools, day-care centers, family care facilities, and essential services as defined in the LDC.

**Village Commercial:** The purpose of this category is to provide a mixture of residential uses and appropriate commercial uses to maintain the historic village character of the area. New residential development is permitted within this district at a maximum of eight (8) units per gross acre when specific development standards are followed. All residential dwelling unit structures and accessory uses are allowed provided they are compatible with the district.

A variety of commercial uses (ranging from C-1 to C-5) will be permitted that serve the needs of the residents and traveling public while maintaining the village atmosphere. Specific development criteria that encourage pedestrian and bicycle access, open view corridors of the waterfront, strengthen the historic character of the areas and identify permitted commercial uses, that may include mixed use residential/commercial have been incorporated into the LDC in the Village Commercial Overlay. Non-commercial uses contemplated include: parks, open space and recreational uses, churches,

libraries, cemeteries, schools, day-care centers, family care facilities, and essential services as defined in the LDC. A density of less than or equal to eight (8) dwelling units per gross acre are permitted.

**Mixed-Use Town Center:** The purpose of this category is to create a major activity center that serves the community of Marco Island. The Mixed-use Town Center District shall function as a center of residential, commercial and entertainment activities on the Island. Uses permitted within this district shall include commercial (effective January 1, 2009 as specified in **the amended Mixed-Use Town Center Overlay ranging from C-1 to C-4**), offices, governmental, institutional, and residential. Non-commercial uses contemplated include: parks, open space and recreational uses, churches, libraries, cemeteries, schools, day-care centers, family care facilities, and essential services as defined in the LDC. A density of less than or equal to ~~nine (9)~~ **twelve (12)** dwelling units per gross acre are permitted when specific development standards are met.

**Heavy Commercial: As a result of the 2005 Evaluation and Appraisal (EAR) Report, the community recognized the need to retain a commercial area that will provide for heavy commercial uses as allowed in the C-5 Commercial Zoning District. As shown on the amended Mixed-Use Town Center Overlay, the purpose of this new category is to accommodate heavy commercial uses (C-5 intensity) and public infrastructure facilities. Residential Density is permitted at a maximum density of twelve (12) dwelling Units per acre.**

### **Recreational/Community Facilities Category**

The purpose of this category is to create recreational/community facility districts to serve the Marco Island community. Uses permitted within this district shall include parks, open space and non-commercial recreational uses, churches, beach access/parking facilities, schools, utility sites, government facilities, day-care centers, family and group care facilities, hospitals, civic and cultural facilities, and those essential services defined in the LDC. Conditional uses permitted include archery ranges, cemeteries, community centers, golf ranges, marinas, boat ramps, private clubs, yacht clubs, public swimming pools and tennis facilities.

### **Preservation/Conservation Category**

The purpose of this category is to preserve and conserve natural resources and habitat on privately or publicly owned land. Uses permitted in this district include passive parks, natural trails, nature preserves, and wildlife sanctuaries.

### **Affordable Housing Density Bonus Program**

The City has developed an Affordable Housing Density Bonus (AHDB) Program which will allow for the potential for developers to construct affordable dwelling units on the Island. Per the 2005 EAR report, the original allocation of 120 potential AHBD units was revised to be 169. The table below identifies the future land use categories that have been allocated additional affordable housing units

under the AHDB program:

**Table \_\_\_\_\_**  
**Affordable Housing Unit Density Bonus Program**

<u>Future Land Use Category</u>	<u>AHDB Units</u>
High Density Residential	50
Village Commercial	15
Community Commercial	25
Town Center / Mixed Use	50
Recreation/Community Facility	29
<b><u>Unallocated</u></b>	<b><u>282</u></b>
<b><u>Total AHDB Units</u></b>	<b><u>169</u></b>

**G. Key Issues and Opportunities**

At the time of the original comprehensive plan the City identified ten issues to monitor into the future. The following represents the analysis conducted in conjunction with the 2005 EAR report, and recommended actions deemed appropriate to further address the original ten issues:

**1. Redevelopment**

As stated I the original Data and Analysis discussion, “There are two types of redevelopment the City should be involved with. The first is the redevelopment of individual properties and structures. Those should be adequately addressed via the architectural and site design guidelines. The second type of redevelopment involves a larger scale project, a process in which specific areas are reviewed for the potential for area-wide redevelopment”.

Since Plan adoption the City has adopted enhanced architectural and site design guidelines for commercial and mixed use projects. Those design regulations govern the development and redevelopment of commercial properties, and have resulted in significant improvements to building facades and on-site amenities.

There has been, and continues to be, a sufficient inventory of vacant commercial land to accommodate new commercial development in lieu of redevelopment projects. And to that end, mixed-use projects have been a stimulating factor in new commercial development. As the community progresses toward build-out the inventory of vacant land will continue to decrease. With existing policies to avoid commercial sprawl, redevelopment will become the norm for future commercial development. Likewise the inventory of existing vacant multifamily zoned properties is nearly empty. As such new multifamily projects will either need to progress forward as mixed use projects (in competition for commercially zoned property) or redevelop existing sites.

Lastly there has been a continued increase in the number of single family demolitions, prompted by the rapid escalation in property values, particularly waterfront properties. This trend shows no sign of slowing, with the older Deltona era homes on prime water frontage the most likely candidates.

Three specific policies related to island-wide density reductions were recommended in the 2005 EAR and will be implemented in conjunction with the April, 2007 large-scale comprehensive plan amendment cycle.

## **2. Mixed Use Development**

“The concept of Mixed Use Development has been espoused on Marco Island since the adoption of the Marco Island Master Plan (MIMP). Unfortunately, the MIMP and the Land Development Code do not fully define and provide clear guidelines as to how potential mixed-use projects will be reviewed and approved. Mixed Use development provides a tremendous opportunity for a prudent use of commercial land, yet needs to be refined to prevent possible abuses, which could undermine and detract from commercially zoned properties.” (2001)

Upon adoption of the original comprehensive plan the City adopted a new land development code that provided for mixed use development as a conditional use within the C-1, C-2, C-3 and C-4 commercial zoning districts. Within each commercial zoning district the terms and conditions for a potential mixed-use project are outlined, including maximum density, commercial/residential area ratios, and maximum heights. Mixed-use projects must undergo public hearings before both the Planning Board and City Council prior to final approval. Such projects are also subject to adopted commercial architectural and site design guidelines. Examples of approved mixed-use projects include the Esplanade, Provence of Marco, and Royal Crown.

Since the adoption of the original comprehensive plan the City has approved mixed-use plans ranging from five to seventy-two (72) units over commercial. While mixed-use projects will continue to be a viable alternative to commercial development, concerns over density will probably lead to a reduction in the number of residential units allowed in such projects. For example, in the Town Center / Mixed Use category, the current residential density of 12 units per acre will be considered for a possible reduction with preparation of a Town Center Sub Area Plan. Such a reduction would help incrementally reduce actual density, while still providing enough residential units to make a mixed use project economically viable.

## **3. Rezoning**

“The temptation to rezone property to accommodate a desired project can be very seductive to a community. Nevertheless the City of Marco Island should be wary of any further rezoning that would deviate from the Future Land Use Plan. The City has inherited a well conceived and designed master planned community. The initial development plan of the Mackle brothers and the Deltona Corporation has been held true over the past 35 years. The Future Land Use Plan developed in conjunction with



the Marco Island Master Plan (MIMP) reaffirmed the community's desire to see the continuation of the Deltona development plan." (2001)

There has been limited rezoning of property on Marco Island since incorporation. A total of six sites, ranging from large PUD rezonings, to 1 acre parcels, have been rezoned since 1998. An ordinance that set the minimum size for a PUD rezoning coupled with a specific policy that states, "The City will resist the rezoning of non-commercially zoned land that would extend commercial outside areas delineated for commercial land uses per the Future Land Use Map. No request shall be approved if inconsistent with the Future Land Use Map" have served the community well.

#### **4. Public/Civic Use Space**

"The City should begin efforts to investigate property/space needs for future public and civic uses. Land resources on the Island are limited, and development pressures are enormous. Rather than waiting to see what is leftover, the City should think of our public needs at build-out, and acquire such acreage necessary to accommodate projected needs as soon as possible. Acreage acquired would not have to be developed immediately, nor would it be used solely for governmental purposes. Further, the City must anticipate and plan for civic needs, uses and facilities that are, and will be expected, by residents of a premiere community." (2001)

Since adoption of the original comprehensive plan the City has aggressively sought the acquisition of land and physical assets. Aside from the facilities and land resources acquired in conjunction with the \$101 million purchase of Florida Water Services, the City has also acquired the current City Hall site, the 6.85 acre Veterans Park property, two pocket park sites, and parcels needed to complete the 1.5 mile bicycle trail system.

While the trend of identifying and securing land for public/civic use space will continue, the focus will shift to the development and redevelopment of such properties, in particular the City Hall complex, Mackle Park, and the water and wastewater facilities. The City should continue to identify and pursue opportunities to acquire land resources for future needs, especially capital facilities.

#### **5. Commercial Space**

"Based on the original master plan layout for the community and the desire to restrict commercial development, the amount of land zoned for commercial purposes is limited. As such, the existing commercial areas are surrounded by low-density, residentially zoned areas, which a) limit the ability for future expansion, and b) place potentially high intensity development in close proximity to low intensity residential uses. With the constraints imposed the City must take an active role in ensuring that our commercial resources are utilized wisely and available for the level of commercial usage expected from a residential community." (2001)

The adopted goal statement for the Future Land Use Element has been reinforced by objectives and policies that prevent the sprawl of commercial zoning into residential areas. Those objectives and

policies have been extremely effective, and thus the use and development of commercial establishments have been contained within areas designed on the Future Land Use Map. There is no City interest in pursuing amendment to the Future Land Use Map to expand commercial opportunities at this time. Rather, there will be attention paid to potential reduction in the Town Center / Mixed Use District to provide for a new “Heavy Commercial” land use category, and to remove church owned properties from the commercial land use designation to a residential designation.

## **6. Water-Dependent and Water-Related Uses**

“Water-related land uses are plentiful with the City of Marco Island. From the oceanfront resorts, to the marinas, to the homes located on canals, the City’s water resources play an important part in creating the ambiance of the Island...” (2001)

Marco Island was envisioned and created to be a water-oriented community by the Deltona Corporation. Their vision is continued today, with water access and water amenities as a defining character of the community. The City has been supportive of petitions to retain and expand commercial marina facilities, especially the Marco River Marina. The City has endorsed dredging projects to aid navigational routes. Further, City code requires commercially zoned properties that abut waterfront locations to construct a public pedestrian walkway along the bulkhead when the property is developed or redeveloped. This adopted code, which is in furtherance of an adopted comprehensive plan policy, has been well received by the community, and integrated into several projects such as the Esplanade and Sunset Cove.

Yet the Deltona Corporation’s vision is rapidly approaching an important crossroad, whereby the character is being pressed to the limit by the introduction of larger vessels, expanding private dock facilities, and loss of commercial marine space. Existing regulatory tools to govern private docks and vessels may not be sufficient to protect the overall water-oriented character of the Island.

## **7. Conservation, Preservation, and Open Space**

“The City needs to develop a program to facilitate the identification of land areas deemed crucial for conservation, preservation, and open space purposes. We share an urban environment with many protected species whose future survival and vitality depends on conscientious forethought and planning. Bald eagles, gopher tortoises, burrowing owls, and seas turtles are common sites on the Island. The City needs to protect their habitat areas now to ensure that these species will continue to thrive on Marco Island. Thoughtful planning and cooperative interaction with conservation groups will be essential to making sure a program both attainable and successful.” (2001)

As presented in greater detail in the Conservation and Coastal Management Element, the City has implemented significant activities in furtherance of adopted objectives and policies of the original comprehensive plan. Through diligent plan review and stringent enforcement, the City has made the protection of endangered and threatened species a priority for the community. The City must continue

efforts to educate the community on the importance of these species, and how people can co-exist in a mutually beneficial manner.

The City has an established track record of pro-active environmental programs and policies. The City has cooperative relationships with Conservation Collier and other environmental groups to pursue land acquisitions to protect and preserve native habitats. One recent success story was the acquisition of the Otter Mound property by Conservation Collier. Environmentally sensitive areas and strategic lots should be identified for future acquisition. Further, the City should incorporate natural areas and preserves in conjunction with future developments of City owned properties, such as Tract R-C and Tracts C&D.

## **8. Build-Back**

“Build-back refers to policies and procedures to address and direct redevelopment in the aftermath of a catastrophic event, most likely a hurricane. Being a barrier island that is susceptible to tropical storms and hurricane damage, it is very important that the City consider and adopt build-back policies. The City must take a tough stand when developing build-back policies and procedures to minimize future risks of loss of property and life...” (2001)

## **9. Multi-Modal Transportation Network**

“To maintain the City’s small town, tropical feel, many people advocate the promotion and implementation of a multi-modal transportation network. Such a network would promote choice in transportation modes, and would advance a balanced approach to future transportation improvements...While physical improvements are and will continue to be made within the public rights-of-way, there has to be complimentary improvements from the private side to develop the linkages necessary to complete the network...” (2001)

Since incorporation and spurred by policies in the comprehensive plan, the City has aggressively implemented a multi-modal approach to transportation planning and project development. Policies require that, “All roadway improvement projects (except intersections or signal projects) incorporate bicycle and pedestrian facilities in the design, funding, and implementation, unless deemed technically unfeasible due to significant site conditions or circumstances. To that end the on-going reconstruction of Collier Boulevard incorporates significant bicycle/pedestrian amenities and features. The City has also adopted codes that require bicycle and pedestrian facilities for new development/redevelopment with associated parking credits.

## **10. Off Island Development (SR 951 Corridor)**

“The Island does not want to see, and will firmly oppose, urban sprawl and strip development along SR 951 south of Manatee Road. While potentially ripe for development, this area is surrounded by environmentally sensitive lands which are and should be protected. The City should take steps to

## **Data & Analysis**

## **Future Land Use**

ensure sufficient notice and review of proposed developments within five miles of the city limit. To that end, the City and County should collaborate on planning issues in this area to ensure that undesired development does not occur along SR 951.” (2001)

Since adoption of the original comprehensive plan there has been significant development occurring off-island along the 951 corridor, both north and south of the 951/41 intersection. Such off-island growth presents interesting challenges and opportunities for the Marco Island community, including traffic, economic development, coastal resource access, and hurricane evacuation. In 2002, the City and County entered into an interlocal agreement to provide mutual courtesy review of pending land use petitions along SR 951 within five miles of the City limit. The existing agreement appears to provide an appropriate mechanism for courtesy review and interaction between City and County planners.

## II. Transportation Element

### Introduction

The roadway system on Marco Island was established in the 1960s and 1970s when the major issue was efficient motor vehicle travel. Until incorporation there had been little change to the system that Deltona had constructed. Since incorporation the City recognizes that it is important to continue with efficient and safe motor vehicle travel, but also to balance that transportation system with pedestrian, bicycle, and other modes of travel. To fully understand and appreciate opportunities and challenges with the inherited transportation network the City early on commissioned a Right-of-Way Report and a Bridge Study. Both of those documents continue to serve as cornerstones to transportation planning for the Island.

#### A. Existing Transportation System

The City's existing roadway network, which totals 124 centerline miles is shown in Figure 2.1.

##### 1. Functional Classification and Number of Lanes

Consistent with Florida Department of Transportation (FDOT) roadway classification specifications, Marco Island's roadway system contains the following three functional categories.

**Local Roads:** A roadway providing service which is of relatively low average traffic volume, short average trip length or minimal through-traffic movements, and high volume access for abutting properties. The majority of roads on Marco Island are classified as local roads.

**Collector Roads:** A roadway providing services which is of relatively moderate average traffic volume, moderate trip length, and moderate operating speed. Collector roads collect and distribute traffic between local roads and arterial roads. Eleven roads and road segments have been designed as "local collector" roads as part of the original comprehensive plan, signifying their importance to the local transportation network.

**Arterial Roads:** A roadway providing service which is relatively continuous and of relatively high traffic volume, long trip length, and high operating speed. In addition, every United States numbered highway is an arterial road.

In addition there are fifteen (15) bridges on Marco Island. The bridges were assessed early into cityhood, and several major replacement and/or repair projects have occurred to date. Bridge repairs/replacement projects continue to be identified and funded in the Five Year CIP.

[Insert Map of Roadway Network]

Figure 2.1

The various functional classifications of the Marco roadway network are listed below along with the

number of lanes for each facility. The Island’s roadway network is comprised of one minor arterial, two collectors, eleven local collector roads, and numerous local roads.

<b><u>Roadway</u></b>	<b><u>Designation</u></b>	<b><u># Through Lanes</u></b>
North Collier Boulevard (Jolley Bridge to CR92)	Minor Arterial	4
Bald Eagle Drive (CR 953)	Collector	3/2
San Marco Road (CR 92)	Collector	2
North Barfield Drive	Local Collector	2
South Barfield Drive	Local Collector	4/2
South Collier Boulevard (South of CR 92)	Local Collector	4
Winterberry Drive	Local Collector	2
Landmark Street	Local Collector	2
Elkcam Circle	Local Collector	2
S. Heathwood Drive	Local Collector	2
Yellowbird Street	Local Collector	2
Hernando Drive	Local Collector	2
Tigertail Court (portion)	Local Collector	2
Kendall Drive (portion)	Local Collector	2

## **2. Road Maintenance**

Through agreements with the Florida Department of Transportation (FDOT) and Collier County, the City of Marco Island has assumed, or will assume, the responsibilities for maintenance of all roads on Marco Island, except for the approach to and the Jolley Bridge.

## **3. Parking Facilities**

Parking issues on the Island are focused on specific areas, most notably the area around the County’s regional park at Tigertail Beach, and the East Elkcam Circle commercial area. Beach parking may not be adequate to serve the current and future County residents and visitors who are, and will continue to be attracted. Consequently vehicles which cannot be accommodated within the regional parks facilities overflow into neighboring properties.

One of the recommendations contained in the revised commercial architectural and site design guidelines is to effectively and efficiently utilize alley right-of-way space, and land adjacent thereto, for commercial parking. Allowing the incorporation of alley parking in an overall site development/redevelopment plan could help relieve current and future commercial parking concerns. Likewise the City has acknowledged and endorses on-street parking along Marco Lake Drive, and by Veteran’s Park. The City should consider the need for a Municipal Parking Garage

## **4. Public Transit System**

The Island is currently served by Collier Area Transit (CAT), a public transportation system that operates throughout Collier County. There are two services for the Island, the Marco Island Circulator which runs a circuit on and off the island, and the Marco Express, which originates in Imokolee and brings riders along North and South Collier Boulevard in the morning, and reverses direction in the afternoon.

The CAT system provides a safe, cost effective alternative to private vehicular travel. Further, the system allows Marco residents with the ability, through transfers, to travel to destinations throughout the County. System wide CAT had over 900,000 riders in 2005. The City should review the number and location of bus stops associated with the CAT System.

## **5. Bicycle and Pedestrian Facilities**

When the City incorporated, it inherited a disjointed system of pedestrian ways and limited bicycle facilities. The City made it an early priority to address that situation through the preparation of the Right-Of-Way Report and the development and implementation of a successful sidewalk improvement (assessment) program.

Since then all major roadway projects, particularly the reconstruction of Collier Boulevard have made pedestrian facilities a primary component of the new streetscape. Further, the City has worked with the private sector to secure public access to waterfront locations in the Town Center. The City now has a Bike Path Committee to assist in the selection of bike paths and shared pathways.

The City is working to secure grant funding and has acquired several parcels for a 1.5 mile off-road multi-purpose pathway that links San Marco Road to Mackle Park, then south to Winterberry Park, then along Winterberry Drive through Tracts C and D. In addition the Leland Way pathway project links Mackle Park to the YMCA. In addition, a number of roads have been signed for shared use, and provide safer, lower volume alternatives. The Island's Bicycle and Pedestrian Facilities are shown on Figure 2.2.

## **6. Port Facilities**

There are no port facilities in the City of Marco Island, nor is Marco Island identified by the state as a deep water port.

## **7. Airports**

In the early planning stages of Marco Island, the Deltona Corporation determined that along with the upscale resort area, an airport was needed capable of accommodating small air carrier and general aviation aircraft. Construction of the off-island Marco Island Executive Airport began in 1972 and was completed in 1976.



[Insert Bicycle - Pedestrian Facility Map]

Figure 2.2

Through a land swap with the State of Florida, the County acquired the airport property and the 5,000 foot runway. Managed by the Collier County Airport Authority, the airport continues to be marketed and developed as a facility to service primarily **general aviation** corporate-type aircraft

and limited commuter services.

The Collier County Land Development Code contains an airport overlay zoning map for the Marco Island Executive Airport with noise contours. The airport is located far enough from the populated portions of the City that there are no clear zone issues.

## **8. Rail Lines and Intermodal Terminals**

There are no freight or passenger rail lines or terminals on Marco Island. There are no intermodal terminals on the Island, and access to such facilities would require leaving the Island and traveling to either Naples or Fort Myers.

## **9. Public Transit Trip Generators and Attractors**

There are several existing trip generators and/or attractors on the Island including the major resort hotels, Tigertail Beach, South Beach, the Esplanade, Old Marco, community parks and the library. Visitors, workers, and residents travel to these locations daily, and with the initiation of the CAT (Collier Area Transit) system, most can be reached by bus either directly, or within walking proximity.

## **10. Hurricane Evacuation Routes**

Based on the SLOSH (Sea, Lake and Overland Surges from Hurricanes) Model, Marco Island has been designated a Tropical Storm/Category 1 Hurricane Evacuation Zone. The City is dependent on two routes off the island for the safe, orderly, evacuation of its affected population. Both of the routes, Collier Boulevard and San Marco Road, have bridges that connect Marco Island to the mainland. It is critical that the bridges are maintained, and further, the Jolley Bridge be expanded to four lanes as soon as possible.

The City of Marco Island is currently in the process of evaluating the potential for expansion of Jolley Bridge to four (4) lanes that would include construction of a second parallel bridge. This would result in a two-span bridge with two north bound lanes and two south bound lanes.

The City and County have worked together in regard to evacuation related issues. There are several factors taken into account when calculating evacuation zone clearance times. The first is the nature of the threat of natural elements. These include gale force winds in advance of the storm, sustained rains that reduce visibility and flood poorly drained roads, and storm surge flooding. The second factor is the number of vehicles leaving a zone, and the capacity of the route(s) to carry traffic, which are assessed to determine clearance times. It is expressed in hours, which is the number of hours needed to move cars (and people) past a given point. Clearance times are based on a primary assumption that the evacuation routes are operating at capacity the entire time it takes for all the assumed vehicles to clear the route.

The Collier County Transportation Element (as amended) discusses the methodology by which evacuation times are forecasted. Among the data inputs germane to the calculation of evacuation times/resource needs Countywide are the following:

Persons per Household	2.4
Vehicles per Household	1.1
Percent Evacuating	100%
Percent to Friends/Relatives	13%
Percent leaving County/Region	34%
Persons per Vehicle	2.18
Persons going to Public Shelters	16%

Travel time to a destination is another factor in calculating evacuation times. There are a number of possible destinations: public shelters, friends, et cetera, in the County and any destination outside the County. According to the original Data and Analysis document, "...Marco Island Bridge has the lowest capacity of the SR 951 segment. This fact associated with a large vulnerable population creates the highest evacuation times in the county even with the assumption that CR 92 can also be used to evacuate the Marco Island and Goodland areas. However this time is expected to be reduced by 55 to 62 percent even with additional population growth, because of an additional bridge span to be constructed which will more than double the capacity of the Marco Island Bridge."

Until the Jolley Bridge expansion is complete the evacuation times for Marco Islanders will remain the longest in the County, and as the City grows, will continue to be exasperated by additional population and vehicles. The following Table 2.1 from the 1997 Collier County Transportation Element lists evacuation times in hours as the time needed to reach shelters from Marco Island.

**Table 2.1**  
**Time to Clear - Hurricane Evacuation**  
**Marco Island Via SR 951 and CR 92 (in hours)**

<u>JULY</u>			<u>NOVEMBER</u>		
<u>Slow</u>	<u>Intermediate</u>	<u>Quick</u>	<u>Slow</u>	<u>Intermediate</u>	<u>Quick</u>
8.3	6.7	6.1	9.6	7.7	7.1

**B. Existing Traffic Conditions and Level of Service**

**1. Level of Service (LOS) Standards**

As a qualitative measure of operational characteristics, the Level of Service (LOS) descriptions used for transportation planning, adopted from the Transportation Research Board, Highway Capacity Manual, 1985 (Washington, DC: TRB, 1986), are as follows:

- LOS “A”** The highest quality of service a particular class of highway can provide. It is a condition of free flow in which there is little or no restriction on speed or maneuverability caused by the presence of other vehicles in the traffic stream. Stopped delay at intersections is minimal.
- LOS “B”** A zone of stable flow and representing reasonably unimpeded traffic operations at average travel speeds. The ability to maneuver within the traffic stream is only slightly restricted and stopped delays are not bothersome. Operating speed is beginning to be restricted by other traffic. Drivers are not generally subject to appreciable tensions.
- LOS “C”** Still represents stable traffic flow operations, however, the ability to select speeds, maneuver and change lanes may be more restricted than in LOS B. Longer queues (traffic lines) and/or adverse signal coordination may contribute to lower average travel speeds. Motorists will experience an appreciable tension while driving.
- LOS “D”** Approaching unstable flow. Tolerable operating speeds are maintained but are subject to considerable and sudden variation. Freedom to maneuver and driving comfort are low because of increased lane density. The probability of accidents has increased and most drivers consider this level of service undesirable.
- LOS “E”** The upper limit of LOS “E” is the capacity of the facility. Operation at this level of service is unstable, and speeds will fluctuate widely from point to point. There is little independence of speed selection and maneuverability. Driving comfort is low and accident potential is high.
- LOS “F”** Describes forced-flow operations and represents traffic flow characteristics by extremely low speeds. Speed and rate of flow are below levels attained in LOS “E”, and may, for short time periods, drop to zero. Intersection congestion is likely at critical signalized locations, with high approach delays resulting with the queue continuing to grow upstream as long as the arrival rate continues to exceed the discharge rate.

The original comprehensive plan adopted a LOS “D” as the minimum acceptable level of service for Marco Island’s roadway, except for the state controlled portion of SR 951 (San Marco Road to the Jolley Bridge), which was required to operate at a LOS “C”.

## **2. Current Travel Conditions**

Pursuant to an April 2005 report prepared by the Collier County Traffic Operations Department, average daily traffic counts (ADT) were provided for keys roadways on Marco Island subject to LOS standards. The table below is intended to illustrate the difference between the maximum traffic under adopted LOS standards, and actual traffic counts, for selected roadways.

**Table 2.2**  
**Average Daily Traffic Counts - 2004**

<u>Roadway</u>	<u>Classification</u>	<u>Adopted LOS Max. Volume</u>	<u>2004 Volume</u>	<u>V/Std Ratio</u>
N. Collier Blvd.	Minor Arterial	38,900	27,743	0.713
S. Collier Blvd.	Minor Arterial	29,500	18,885	0.640
Bald Eagle Drive	Collector	15,300	13,233	0.865
San Marco Road	Collector	15,300	12,080	0.790
North Barfield Dr.	Local Collector	13,400	8,480	0.633
South Barfield Dr.	Local Collector	13,400	4,267	0.318
Winterberry Drive	Local Collector	13,400	4,961	0.370
Elkcam Circle	Local Collector	13,400	6,940	0.518
S. Heathwood Dr.	Local Collector	13,400	5,515	0.411
Yellowbird Street	Local Collector	13,400	2,469	0.184
Tigertail Court	Local Collector	13,400	2,756	0.205
Kendall Drive	Local Collector	13,400	3,454	0.258
Jamaica Drive	Local Collector	13,400		

As of 2005 all roadways on Marco Island operate within adopted Level of Service (LOS) standards.

### **3. Availability of Transportation Facilities**

As the entire Island is completely platted, there should be no need to add new streets to serve the existing or future land uses. As such, it is vital that the existing transportation network function to

its full capacity. While the current system exceeds the parameters for LOS “D” service, various system upgrades have been undertaken to enhance traffic flow and capacity. Examples include a number of intersection improvements, closing off median cut-throughs, and as warranted, requiring turn lanes for new commercial and multifamily developments.

To further the concept of multimodal travel options, the roadway network has been and will continue to be augmented with bicycle and pedestrian facilities. These improvements include both on-street and right-of-way upgrades, coupled with site improvements such as required bicycle parking facilities at new commercial/multifamily developments, pedestrian nodes and interconnections, and street trees.

#### **4. Adequacy of Transportation System for Hurricane Evacuation**

As previously discussed, the evacuation routes and times have been analyzed by the County as part of their Emergency Management Plan. Evacuation times from Marco Island are currently the highest in all of Collier County. Real relief will only come with the expansion of the Jolley Bridge to include a second span. Yet even with the expansion of the bridge to two spans that will reduce current evacuation times by over 50%, Marco Island will still have the highest Category 1 evacuation times in the County. Not only is the bridge construction vital, but equally important is public education stressing early, voluntary evacuations. With the recent hurricane history, the public is keenly aware of the power of hurricanes, and will be more willing to leave in the face of a viable threat.

#### **5. Relationships and Compatibility of Transportation and Land Use**

The Future Land Use Map (FLUM) reinforces the original development pattern for Marco Island as envisioned by the Deltona Corporation. The allocation of land uses originally envisioned complimented the transportation network for the Island. As there have only been minor deviations from the original Master Plan over the years, the transportation network has served, and will continue to serve the needs of the community.

One of the focuses of the Right-Of-Way Report was to increase the capacity of the existing transportation system through intersection improvements, closing of medians, and the eventual conversion from rural to urban roadway sections. To that end, the North and South Collier Boulevard projects incorporation all these recommendations, as well as provide for sub-grade utility upgrades/expansion, and bicycle and pedestrian facilities. Functionality, beautification, and value are the hallmarks of recent transportation network improvements.

#### **6. Analysis of Intermodal Needs**

These issues continue to best be addressed at the MPO level as there are no intermodal links currently located on the Island.

## **C. Analysis of Future Transportation System Needs**

### **1. Travel Demands Patterns**

The existing and future land use data sets contained within the Future Land Use Element are the chief inputs into the transportation model used to predict future traffic volumes for the Marco Island Transportation system in this element. The model used by the Collier County MPO (Metropolitan Planning Organization) is the Florida Standard Urban Transportation Model Structure (FSUTMS). Figure 6 shows the 2020 network published in the final report of the Long Range Plan Update.

### **2. Traffic Circulation Constraints**

In many parts of Marco Island, traffic circulation movements are constrained by water bodies, golf courses, and other geographic features. In many instances approved developments block the way of logical extensions of urban collectors and arterial roads. However, in no case will the City pursue expansion of roadways that would encroach into or potentially compromise fragile ecological features or habitats.

### **3. Future Traffic Circulation**

Based on the original comprehensive plan, and supplemented by annual Level of Service Reports, the Island’s roadways are anticipated to function above the adopted LOS “D” standard well into the future, and therefore the City can focus on desired upgrade projects rather than rectification of deficiencies. Further, the Island’s roadway network is functioning and will continue to function at a level that will not create any problems for future development. Nevertheless the City continues to make system upgrades the enhance safety, capacity, bicycle/pedestrian usage, and beautification.

### **4. Future Road Link and Bridge Capacity Improvements**

Table 2.3 identifies the existing and proposed number of lanes for the primary roadways on the Island. The decision on future number of lanes for the roadways was based on future traffic volumes, current conditions, and community desires. Hurricane evacuation also plays an important role in determining roadway widths and lane requirements.

**Table 2.3**  
**2010 Roadway Lane Summary**

<u>Roadway</u>	<u>From/To</u>	<u>Existing Lanes</u>	<u>Planned</u>
----------------	----------------	-----------------------	----------------

Collier Boulevard	Jolley Bridge/Collier Ct.	4	4
N. Barfield Dr.	Bald Eagle/San Marco Rd.	2	2
S. Barfield Dr.	San Marco Road/South	4	4
Bald Eagle Dr.	N. Barfield Dr./San Marco Rd.	2	3/4
San Marco Road	Collier Blvd./East of Barfield Dr.	2	3/4
Winterberry Dr.	S. Collier Blvd/S. Barfield Dr.	2	2
S. Heathwood	Bald Eagle Dr./Winterberry	2	2

The potential widening of Bald Eagle Drive and San Marco Road will continued to be studied. Intersection improvements should help relieve congestion along these roadways, which should enhance capacity and safety, and keep the roadways operating at or above adopted LOS “D” standards.

The City will continue to work with the State of Florida to ensure adequate funding is available to build the companion span to the Jolley Bridge. This major improvement will eliminate severe bottle-necking on and off the Island, and will enhance evacuation times in the event of a hurricane.

## 5. Major Intersection, Maintenance and Traffic Operations Improvements

There are ten major intersections on the Island for which improvements have either been made, or will be made in conjunction with future roadway projects. The ten major intersections are listed below:

1. North Collier Boulevard/North Barfield Drive.
2. North Collier Boulevard/Bald Eagle Drive
3. Collier Boulevard/San Marco Road
4. Bald Eagle Drive/San Marco Road
5. Barfield Drive/San Marco Road
6. Collier Boulevard/Tigertail Court
7. Kendall Drive/Collier Boulevard
8. Winterberry Drive/Collier Boulevard
9. North Barfield Drive/Bald Eagle Drive
10. Bald Eagle Drive/Elkcam Circle

The existing, interim, and maximum improvements to the ten intersections identified above were analyzed and conceptually designed by the City’s transportation consultant. The improvements, which are combinations of right and left turning lanes and signalization, are consistent with the roadway cross sections proposed for the Island. In only a few locations will the proposed improvements not be able to be accommodated within existing right-of-way. The maximum improvements at the intersections of Bald Eagle Drive/Elkcam Circle and North Collier Boulevard/Kendall Drive involved signalization.

A situation mandating special consideration occurs when intersections (e.g., South Heathwood and Winterberry Drive) are located too near to bridges or other vertical alignments. Vertical



alignments disrupt sight lines and affect vehicular speed. These intersections should be signed to make drivers, pedestrians, and bicyclists aware of potential dangers. Vehicular speeds should be reduced to minimize the danger potential at these intersections.

In addition to the improvements discussed above, the Five Year Schedule of Capital Improvements contained in the Capital Improvement Element presents cost and time frames for programmed improvements which are needed for maintenance, traffic flow and operational purposes. None of the subject local transportation improvements are required to maintain roadway LOS standards. These on-going improvements will, in total, improve the capacity of the transportation network and keep the City's primary roads at or above the adopted LOS "D" standard.

## **6. Planned and Programmed FDOT and MPO Projects**

The current Five Year CIP for Marco Island serves as the de-facto program for MPO projects on Marco Island, except for major projects such as the Jolley Bridge expansion. Per the 2007 CIP the City has committed \$4,930,789 for bridge improvements; \$10,421,319 for roadway improvements; \$542,979 for pedestrian/bikeway improvements; and \$256,325 for streetscape improvements. These commitments are both engineering and financially feasible. Over the course of the next five year CIP (2008 - 2011) the City is planning to expend an additional \$6,500,000 for bridge improvements; \$2,375,000 for roadway improvements; and \$700,000 for streetscape improvements.

## **7. Maintaining LOS Standards and Advancing Plan Goals, Objectives and Policies**

Marco Island experiences a significant seasonal traffic variation. The peak season begins in November and extends through April. There is also an increase in population and traffic during the summer months, but that increase is not nearly as significant as the increase during the winter months.

To remain consistent with established concurrency guidelines, the City of Marco Island must maintain adopted LOS "D" standards. Up to 2005 Collier County's Transportation Department provided quarterly traffic counts for thirty (30) stations throughout the Island. The City now contracts with a private company to provide quarterly traffic counts. Should a roadway begin to near the threshold for LOS "D" operation, more diligent effects will be undertaken to measure traffic volumes to determined peak hour volumes. However, as of 2007 no roadway subject to concurrency requirements is close to LOS "D" thresholds.

## **8. Internal Plan Consistency**

Based on the analysis contained herein and in the other elements of the Comprehensive Plan, the adopted LOS "D" standard is appropriate to maintain and enhance the Island atmosphere desired, and will focus attention on alternative modes of transportation. The LOS "D" justified in this element is referenced in the Future Land Use Element, the Capital Improvement Element, and the

Concurrency Management component of the Plan.

## **9. Programs to Support Public Transportation**

The City will continue to support Collier Area Transit (CAT) to promote the continuation and expansion of public transportation for Island residents and visitors.

### **III. Housing Element**

#### **Introduction**

According to Rule 9J-5.010, “the purpose of this (housing) element is to provide guidance to local governments to develop appropriate plans and policies to meet identified or projected deficits in the supply of housing for moderate income, low income and very low income households, group homes, foster care facilities, and households with special housing needs, including rural and farmworker housing.” While the focus from the state’s perspective is on the need and supply of affordable housing units, housing on Marco Island remains a complicated issue that involve numerous factors such as high land acquisition and construction costs, limited large tracts for development, limited multifamily zoned property, private deed restrictions, and the island’s vulnerability to natural disasters.

Marco Island is primarily a residential community. Guided by sound zoning and the economics of the marketplace, the Marco community continues to adapt to changing population characteristics as single family dwellings increase in a manner that will enhance the tropical nature of the island, improve the quality of life of the residents, and increase the overall property values. This vision is consistent with the Deltona Public Offering Statement to prospective buyers, dated October 1970, which read, “Marco Island is being developed into a residential community and land is restricted for residential purposes, with sufficient land restricted for commercial purposes to reasonably service the community.”

Balancing the requirements from the state with the vision for the community continues to provide many challenges and opportunities for Marco Island. As housing, particularly single family, has been closely linked to the island’s quality of life, it is very important that this element be thoroughly reviewed and analyzed, and that the goals, objectives and policies adopted foster a spirit of cooperation and resolve in addressing the City’s future needs and responsibilities.

In updating the original Housing Element Data and Analysis section the 2000 US Census and 2004 housing information from the Shimberg Center at the University of Florida have been utilized.

#### **A. Housing Characteristics and Conditions**

##### **1. Housing Stock**

A significant amount of the developable land area on Marco Island is intended for detached single family residential development at an average density of four (4) units per acre or less. Table 3.1 shows the number of dwelling units on Marco Island in 2000 by unit and type.

**Table 3.1**  
**2000 Dwelling Units by Type**

<b>Type</b>	<b>Number</b>	<b>Share</b>
Single Family	5,577	37.5%
Multifamily (2+)	9,267	62.3%
Mobile Home	23	0.1%
Other	4	0.0%
<b>Total</b>	<b>14,871</b>	<b>99.9%</b>

*Source: 2000 US Census*

The table below illustrates that in the case of permanent residents, the housing stock on Marco Island is predominately owner-occupied. As the table also shows, occupied housing units make up less than 50% of the total housing units on the Island (7,134 units of 14,871 total units).

**Table 3.2**  
**2000 Dwelling Units (Occupied) by Tenure**

Owner Occupied	6,217 Units	87.1%
Renter Occupied	917 Units	12.9%
Total Occupied	7,134 Units	100%

Table 3.3 illustrates a relatively new inventory of dwelling units. Approximately 66% of the existing dwelling units on Marco Island have been constructed since 1980. The table also identifies several older structures that may have the potential for rehabilitation or tear-down and reconstruction.

**Table 3.3**  
**2000 Total Dwelling Units by Age of Structure**

Year Structure Built	Number
1999 to March 2000	539
1995 to 1998	1,836
1990 to 1994	1,908
1980 to 1989	5,545
1970 to 1979	4,100
1960 to 1969	808
1940 to 1959	109
1939 or earlier	26
Total	14,871

**Sub-Standard Housing**

The City relies on the State’s definition, found in s.420.0004 F.S. (1991), for a description of sub-standards housing units which includes:

- Any unit lacking complete plumbing or sanitary facilities for the exclusive use of the occupants;
- A unit which is in violation of one or more major sections of an applicable housing code and where such violation poses a serious threat to the health of the occupant; or
- A unit which has been declared unfit for human habitation but could be rehabilitated for less than 50 percent of the property value.

Based on the 2000 Census there were seven (7) dwelling units on Marco Island lacking complete plumbing facilities, and seven (7) units lacking complete kitchen facilities.

**Mobile Home Parks**

There is only one mobile home “park” on Marco Island, which is located in the Old Marco area and accommodates sixteen (16) units. There are a few, older mobile home units (7) that currently occupy individual lots. These units are nonconforming and most likely will be replaced with

detached single family dwelling units in the near future.

### **Historically-Significant Housing**

The City of Marco Island has very few structures vested with any formalized historic designation. These structures are generally used for commercial purposes; none are currently used or proposed for occupancy as dwelling units. The known and archeological sites in the City are the Old Marco Inn, Doxsee Quarters and Workers House, W.D. Collier Jr. House, the Church of God chapel, and the Ideal Fishing Camp.

## **2. Cost of Housing**

The information provided in Table 3.4 indicates that high cost of housing opportunities on the Island for renters. Of the units on Marco Island for which rent was paid, over 60% paid monthly rent in excess of \$750. Conversely, only 6% of rental units had monthly rent of less than \$500. In 2000 the median rent for renter-occupied units was \$859.

**Table 3.4  
Renter-Occupied Unit by Gross Rent, 2000**

Gross Rent	Number of Units
Less than \$299	4
\$300 to \$499	50
\$500 to \$749	175
\$750 to \$999	290
\$1,000 to \$1,499	165
\$1,500 or more	116
No cash rent	146
<b>TOTAL UNITS</b>	<b>946</b>

*Source: 2000 US Census*

Another issue that may not be evident from the table, but which merits discussion, is the relative small number of units available for annual occupancy. This small number of annual rental units leads to higher average rents. Also, there are many units that could be offered for annual occupancy, but are instead rented on a seasonal basis. This not only constrains the annual rental market, but due to the high seasonal rents charged, could be partially responsible for the overall high rental rates on the island.

Table 3.5 speaks for itself. Marco Island is a premiere community, with relatively high housing values. Over 47 percent of the owner occupied units in 2000 were valued at over \$300,000. Further, almost 5 percent of the owner occupied units were valued over \$1,000,000.

**Table 3.5**  
**Value Specified Owner-Occupied Units, 2000**

Value	Number of Units
Less than \$50,000	16
\$50,000 to \$99,999	76
\$100,000 to \$149,999	303
\$150,000 to \$199,999	526
\$200,000 to \$299,999	974
\$300,000 to \$499,999	923
\$500,000 to \$999,999	648
\$1,000,000 or more	163

*Source: 2000 US Census*

Values have continued to rise since 2000 when the median value of an owner-occupied unit was \$291,100. Based on the Collier County Property Appraiser the 2004 average value of a single family home on Marco Island was \$545,740; the average value of a mobile home was \$289,203; and the average value of a condominium unit was \$332,431.

Table 3.6 shows that housing costs constitute a significant portion of incomes, with over 1/3 of all owner-occupied households spending 30% or more of their monthly income on home ownership related costs.

**Table 3.6**  
**Monthly Owner Costs as a Percentage of Household Income, 1999**

Percentage of HH Income	Number	Percent
Less than 15%	1,191	32.8%
15% to 19.9%	336	9.3%
20% to 24.9%	449	12.4%
25% to 29.9%	244	6.7%
30% to 34.9%	213	5.9%
35% or more	1,143	31.5%
Not computed	53	1.5%

*Source: 2000 US Census*

Likewise, table 3.7 shows that rental costs constitute a significant portion of incomes, with over 42% of all renter-occupied households spending 30% or more of their monthly income on home rental related costs.

**Table 3.7**  
**Monthly Renter Costs as a Percentage of Household Income, 1999**

Percentage of HH Income	Number	Percent
Less than 15%	172	18.2%
15% to 19.9%	106	11.2%
20% to 24.9%	63	6.7%
25% to 29.9%	49	5.2%
30% to 34.9%	119	12.6%
35% or more	283	29.9%
Not computed	154	16.3%

*Source: 2000 US Census*

### **3. Housing Construction Activity**

The state also requires local governments to maintain an inventory of housing construction activity



affecting changes in the number of housing units within the local government’s jurisdiction based on new construction, conversions, mobile home placements and removals, in number of units for the years since the latest decennial United States Census.

**Table 3.8**  
**New Housing Construction Activity 2000 - 2005**

Year	New SF Units	New MF Units
2000	369	237
2001	257	111
2002	199	254
2003	209	525
2004	231	639
2005	136	614
<b>TOTAL</b>	<b>1,169</b>	<b>2,380</b>

*Source: City of Marco Island Planning & Development Department*

#### **4. Household and Income Projections**

As the original Housing Data and Analysis component was assembled in 1999-2000 and pre-dated the 2000 US Census, the component utilized 1990 data when Marco Island was considered a Census Designated Place (CDP). The Selected Population and Housing Characteristics 1990 for the Marco Island CDP reported an average household size of 2.16 persons. In the 2000 Census the average household size was reported at 2.08 persons per household, with 2.06 persons per owner-occupied unit, and 2.25 persons per renter-occupied units.

**Table 3.9**  
**Household Projections by Tenure (2005-2025)**

Year	Owner-Occupied HH's	Renter-Occupied HH's	Total Occupied HH's
2005	6,551	910	7,461
2010	7,213	956	8,169
2015	7,874	977	8,851
2020	8,549	999	9,548
2025	9,118	1,059	10,177

*Source: Shimberg Center Household Demographic Data Access Tool, 2006*

Tables 3.10 and 3.11 offer a glimpse into the future and illustrates projected household incomes on Marco Island to the surrounding metro areas HUD-estimated median income of \$66,100 in 2006. The tables bely the image Marco Island is or will be only for the wealthy. Rather it reinforces the concept that the amenities and quality of life of Marco Island will continue to attract households of various means and income ranges, and that households are willing to pay a premium to live on the island. Further the tables allude to the fact that most many older island residents depend on social security and pensions.

**Table 3.10**  
**Household Income versus Area Median Income - Owner Occupied**  
**(2000 - 2015)**

Year	HH Income Vs. AMI	Number of HH's
2000	< 29.9%	445
2000	30% - 49.9%	534
2000	50% - 79.9%	1,014
2000	80% - 119.9%	1,257
2000	> 120%	2,972
2005	< 29.9%	482
2005	30% - 49.9%	588
2005	50% - 79.9%	1,069
2005	80% - 119.9%	1,316
2005	> 120%	3,0996
2010	< 29.9%	541
2010	30% - 49.9%	668
2010	50% - 79.9%	1,195
2010	80% - 119.9%	1,440
2010	> 120%	3,379
2015	< 29.9%	603
2015	30% - 49.9%	752
2015	50% - 79.9%	1,308
2015	80% - 119.9%	1,562
2015	>120%	3,649

**Table 3.11**

**Household Income versus Area Median Income - Renter Occupied  
(2000 - 2015)**

Year	HH Income Vs. AMI	Number of HH's
2000	< 29.9%	150
2000	30% - 49.9%	121
2000	50% - 79.9%	178
2000	80% - 119.9%	208
2000	> 120%	249
2005	< 29.9%	158
2005	30% - 49.9%	126
2005	50% - 79.9%	175
2005	80% - 119.9%	201
2005	> 120%	250
2010	< 29.9%	173
2010	30% - 49.9%	140
2010	50% - 79.9%	177
2010	80% - 119.9%	208
2010	> 120%	260
2015	< 29.9%	185
2015	30% - 49.9%	146
2015	50% - 79.9%	186
2015	80% - 119.9%	199
2015	>120%	261

**5. Housing Demand and Needs**

Table 3.12 compares projected housing needs with demand to show how many permanent housing units will be needed to be constructed on the island by type from 2010 to 2025.

**Table 3.12  
Permanent Housing Projected Needs 2010 - 2025**

Year	Single Family Units	Multifamily Units
2010	327	250
2015	731	566
2020	1,153	894
2025	1,529	1,188

*Source: Shimberg Center, 2006*

**Land Requirements to Meet Need**

All lots on Marco Island have been platted for a particular use, be it single family, multifamily or commercial. Absent any significant annexation of raw land, which is not likely, the amount of available, readily developable property is finite. Approximately 77% of the platted single family lots have been developed. As demonstrated previously in the Future Land Use Element, there is sufficient vacant residential land to accommodate population growth and single family needs through the year 2025, or build-out, whichever occurs first.

The inventory of available land zoned for multifamily usage is nearly depleted. Once the multifamily lots are developed the focus will be on redevelopment of existing properties, or utilization of mixed use projects in commercial areas to provide new sites for multifamily housing opportunities. The future redevelopment of existing multifamily properties will be complicated by the fact that most of the properties are either condominiums or time-shares. However the strength of the market can overcome ownership issues, and redevelopment provides a terrific opportunity to encourage new projects, such as the conversion of the former Radisson property.

**B. Housing Affordability**

To better understand the issue of “affordability” the state provides a series of definitions to cover the subject and the degrees of affordability. Those definitions are repeated below to help educate and inform users of this plan.

“Affordable housing” means housing for which monthly rents or monthly mortgage payments, including taxes and insurance, and utilities, do not exceed 30 percent of that amount which represents the percentage of the median adjusted gross annual income for the households or persons

indicated in s. 420.0004 F.S. (1991).

“Low income household” means one or more natural persons or a family, the total annual adjusted gross household income of which does not exceed 80 percent of the median annual adjusted gross income for households within the state, or 80 percent of the median adjusted gross income for households within the metropolitan statistical area (MSA) or, if not within an MSA, within the county in which the person or family resides, whichever is greater.

“Moderate income household” means one or more natural persons or a family, the total annual adjusted gross household income of which does not exceed 120 percent of the median annual adjusted gross income for households within the state, or 120 percent of the median adjusted gross income for households within the metropolitan statistical area (MSA) or, if not within an MSA, within the county in which the person or family resides, whichever is greater.

“Very low-income household” means one or more natural persons or a family, the total annual adjusted gross household income of which does not exceed 50 percent of the median annual adjusted gross income for households within the state, or 50 percent of the median adjusted gross income for households within the metropolitan statistical area (MSA) or, if not within an MSA, within the county in which the person or family resides, whichever is greater.

## 1. Affordable Housing Projections

The following tables were generated by the Shimberg Center at the University of Florida utilizing their Affordable Housing Need Assessment (AHNA) models for Marco Island for the years 2002 through 2025. As stated in the AHNA overview, “This indicator encompasses a broad range of households likely experiencing distress because of their housing costs. With their low incomes, the large portion of income taken up by housing costs is likely to limit these households’ ability to afford other necessities...In addition to this summary level information, we believe a more detailed understanding of the presence of low-income and cost-burdened household can help local governments plan for and target assistance...”.

**Table 3.13**  
**AHNA Affordable Housing Need Summary 2005-2025**  
**Number of Severely Cost Burdened Households With**  
**Income Less Than 80% AMI by Tenure**

<u>Tenure</u>	<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>	<u>2025</u>
Owner	401	437	479	521	563
Renter	147	156	166	171	184

**Table 3.14**  
**Projected Increase in Cost-Burdened Households 2005-2025**

**Growth in Severely Cost Burdened Households With  
Income Less Than 80% AMI by Tenure**

<u>Tenure</u>	<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>	<u>2025</u>	<u>Total</u>
Owner	20	36	42	42	42	182
Renter	2	9	10	5	13	39

The following table illustrates the additional units that would need to be constructed to keep pace with the growth in households. Note that this table shows the construction need for all households at all income levels, not just those who would be expected to pay more than 50% of income for housing.

**Table 3.15  
Construction Need for Low-Income Households by Income  
As a Percentage of AMI 2005-2025**

<u>Household Income as Percentage of AMI</u>	<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>	<u>2025</u>
< 30%	37	111	185	261	355
30% to 49.9%	48	140	232	340	453
50% to 79.9%	49	167	299	425	551
80% to 119.9%	54	185	298	420	533
120% or more	127	420	691	956	1,139

## **2. Private Sector Involvement**

There are several inducements to encourage the private sector to incorporate affordable units into their projects. These include the provisions for mixed-use developments and an affordable housing density bonus (AHDB) program. Both of these inducements have been in place for years, yet despite these opportunities, there have been no projects to date whereby the private sector has included affordable housing units.

## **3. Local Affordable Housing Program**

Both the federal government and the state encourage jurisdictions to enter into cooperative agreements to address the issue of affordable housing. Such agreements can create broader opportunities to address constraints to housing affordability such as high acquisition costs, coastal high-hazard vulnerability, and limited available land resources. To that end, prior to the adoption of the original comprehensive plan the City of Marco Island and Collier County entered into an Interlocal Agreement for Housing. At its' basic the agreement recognized the limitations on Marco Island, and thus allowed the City to become part of the County's program, based on a funding formula.

Since the Interlocal Agreement between the City and the County was implemented in January 2001 the total funds expended by the County for affordable housing projects was \$7,236,606. As of February 2005 the City had contributed \$343,814 to support the program. The breakdown of programs supported by this contribution were as follows:

<u>Program</u>	<u>Total Housing Units</u>	<u>City's Contributions</u>
Down Payment Assistance	585	28
Owner Occupied Rehab	157	7
Impact Fee Relief	337	16
Land Acquisition	139	7

#### **4. Regional Strategies**

The Regional Policy Plan identifies a number of housing programs that have been created by state and federal agencies to fund the construction and maintenance of affordable housing. While these programs may not be applicable to Marco Island, they are indicative of funding opportunities that are available.

#### **5. Federal Programs**

“Community Development Block Grants (CDBG)” are available to entitlement communities throughout the country. A community that does not qualify as an entitlement community based on population size may apply for a portion of the state’s share of CDBG funds. Funds may be used for acquisition, site preparation and improvements, and construction activities. CDBG funding for entitlement communities is administrated by the Department of Housing and Urban Development (HUD). State CDBG funds are administrated by the Florida Department of Community Affairs (DCA).

“HOME Investment Partnerships (HOME)” program provides funding to participating jurisdictions throughout the country. If a community is not designated as a participating jurisdiction (based on population size), it may apply for funding under the state’s HOME allotment. Non-profit groups may apply to the jurisdiction to receive funds for rental and home ownership housing, moderate or substantial rehabilitation, or tenant-based rental assistance. A local match is required. Eligible applicants include local governments and non-profits. HOME funds for entitlement communities are administered by HUD. State HOME funds are administered by DCA.

“HOPE for Homeownership of Single Family Homes (Hope 3)” provides grants to acquire and rehabilitate single-family properties for low-income households or to provide assistance to low-income households to do the same. Eligible applicants include private non-profit organizations, pubic agencies in cooperation with private non-profit organizations, and cooperative associations. This program is administered by HUD.



## **6. State Initiatives**

“Affordable Housing Guarantee Loan Program” is designed to stimulate private sector lending for affordable housing. The program benefits very low and low-income persons and is administered by the Florida Housing Finance Agency (FHFA).

“Elderly Homeowner Rehabilitation Program” offers grants to local governments that have housing rehabilitation programs. The fund must be used for very low and low-income elderly homeowners. No matching funds are required. This program is administered by DCA.

“Homeowner Assistance Program (HAP)” provides a no interest second mortgage loan to home buyers to help cover down payment and closing costs. Very-low, low, and moderate-income individuals may apply for this program which is administered by FHFA.

“State Apartment Incentive Loan (SAIL)” provides low-interest loans to builders of affordable housing. This program is extremely competitive. Both for-profit and non-profit developers may apply to FHFA which administers the program.

“State Housing Initiative Partnership (SHIP)” provides funds to local governments for a variety of housing construction and rehabilitation activities. The local government prepares a yearly plan specifying the amount of money to be spent on the various activities or strategies. Non-profit groups and individuals may apply to the local government for the use of these funds. The SHIP program is administered by FHFA.

## **C. Provision of Housing to Meet Needs**

The City of Marco Island has sufficient property and infrastructure capacity to accommodate our future residential populations. Unfortunately that property is ever increasing in value, and thus in acquisition costs. Coupled with the lack of contiguous vacant lots, the ability to assemble parcels for housing projects is severely constrained. Because of this affordable housing will not be concentrated in specific areas, but rather will be scattered where opportunities arise.

The affordable housing issue has become magnified over the past five years. Workforce housing, those who work in essential positions (e.g., police/fire, teachers) are the new focus on affordable housing. The City faces this challenge with its own workforce, and must identify strategies that can help keep key employees on the Island.

### **1. Improving Housing Conditions**

In 2000 it was noted that 62 housing units on the island were “overcrowded” in that they housed more than one person per room. 7 units on the island lacked complete kitchen facilities, and 7 units lacked complete plumbing facilities. These situations can be addressed on two front; through investigation of building code violations related to unsafe or unsanitary conditions, and through new

architectural and site design guidelines. Further, with the continuation of tear-downs and reconstruction, many of the older structures, which may have one or more of the above mentioned deficiencies, will be removed permanently from the housing stock of the island.

## **2. Affordable Housing Sites**

Per the adopted Interlocal Agreement the City and the County are to investigate potential sites for affordable housing projects and units on the Island. It is acknowledged that this joint investigation has not taken place in earnest, and that opportunities have been possibly missed. Nonetheless, the rapid escalation in land values, both on and off the Island make site selection limited, and the County needs to focus their program (which is supported by the City) on those areas where large tracts can be assembled.

## **3. Group and Foster Care Homes**

The City's adopted Land Development Code allows group homes and foster care facilities in residential areas either by right, or by conditional use approval. In the case of assisted living facilities (ALF's) which have six or fewer residents, they can locate in any residential zoning district by right. Larger ALF's and group homes must first submit an application for conditional use approval. While conditions may be imposed, the presumption is that the use can be compatible with the surrounding residential area. Further, such facilities may be eligible for building permit and/or site improvement fee relief.

## **4. Conserving Historically-Significant Housing**

The overwhelming majority of housing units on Marco Island have been constructed within the last thirty years. There is currently no program, or perceived need, to conserve the existing housing stock. Rehabilitation and/or demolition activities are generated by private interests rather than through public intervention. That being said, some of the original Deltona models (e.g., the Michigan model) are approaching fifty years, and possibly eligible for preservation purposes. It may be worthwhile for the City to identify some good examples of construction from the Deltona era, and seek some type of state or federal designation.

## **D. Affordable Housing Strategy and Opportunities**

### **1. Partnership with Collier County**

Based on the success of neighboring jurisdictions it was determined that an Interlocal Agreement with Collier County would be the most prudent course to address affordable housing needs. The executed interlocal agreement with Collier County formally recognizes the City as an incorporated component of the County's Housing Program, and serves as the primary source of affordable housing both on and off Marco Island. It was perceived that by working collaboratively with an established area-wide Housing Program, and pooling resources, the issue of affordable housing

could be more effectively and efficiently managed without unnecessary duplication of efforts. The existing interlocal agreement has served the community well, and the financial contribution from Marco Island demonstrates the City's commitment to addressing affordable housing.

## **2. Affordable Housing Incentives**

The adopted Comprehensive Plan contains several policies related to the deferment and/or waiver of impact and building fees for eligible projects that advance affordable housing or group/foster opportunities, whether publicly or privately operated. In addition, the City has policies to support the construction of sidewalks and other public improvements in conjunction with new housing projects. To date those policies have not generated much interest from the private sector.

The City continues to encourage and support the efforts of non-profits in the provision of affordable housing, both on and off the Island. Examples envisioned include assisting non-profits with preparation of state and federal grants, building and site development fee reductions/waivers, and the encouragement of private lenders and financial institutions to provide low-interest loans, reduced closing costs, et cetera, to individuals and groups seeking to construct affordable housing units.

## **3. Architectural and Site Design Guidelines**

The City's adopted guidelines provide opportunities for affordable units within mixed use projects. Further the City's Future Land Use Map and Element recognize available density units to accommodate affordable housing projects that may pursue additional density via the affordable housing density bonus (AHDB) program. Again, to date no developer has sought to utilize these programs to advance affordable housing projects on the Island.

## IV(a) Potable Water Sub-Element

### Introduction

One of the most defining moment in history of the new City was the acquisition of potable water and sanitary sewer assets and facilities from Florida Water Service (FWS) in November 2003. With voter approval of a \$101,000,000 bond City went from a service-receiver to a service-provider. A reliable source of potable water at a reasonable cost is of vital concern to all city residents.

#### A. Existing Potable Water Facilities

With the acquisition of FWS assets and resources the City of Marco Island became the primary source for potable water and sanitary sewer services not only for city residents, but also for the residents of Marco Shores located approximately two miles north of the island. Figure 4.1a shows the former Florida Water Services (FWS) facilities that were acquired by the City, including off-island facilities.

There are two potable water treatment facilities on the island, and a smaller “package treatment” facility at Marco Shores. One potable water treatment plant is located off Windward Drive, in the East Elkcam Circle area of the island. The raw (untreated) water supply for the Elkcam Circle plant is piped from a surface aquifer that is located nine miles north of the island. This open aquifer, the “Collier Pit” or “Marco Lake” collects rainfall and surface waters that naturally flow into the lake, as well as drawing from the Lower Hawthorne Aquifer. This potable water treatment facility is permitted to pump and treat 6.7 million gallons per day (mgd).

The second on-island treatment facility is the Reverse Osmosis (RO) plant, located off Heathwood Drive behind Mackle Park. The raw water treated through the reverse osmosis process comes from 18 wells, each approximately 500 feet depth, drawing water from the Hawthorne Aquifer, which is part of the deep Florida aquifer system. The RO plant is permitted to treat 6.0 mgd. The combined permissible treatment capacity of the two in-Island plants is 12.7 mgd, or 1.7 mgd greater than in 2000 when the original comprehensive plan was adopted. The third treatment facility, located off-Island, is a 720,000 gallon per day (gpd) package plant located in the Marco Shores development.

In addition to the treatment plants the City maintains transmission and distribution lines, force mains, and six ASR (aquifer storage and retrieval) injection wells.

#### B. Potable Water Demand

The demand for potable water is influenced primarily by two factors. The first factor is the significant population fluctuation during “season” (November through April) when the current year-round population of 15,239 (2005 Shimberg estimate) swells to over 38,000 due to the influx of

**Figure 4.1a  
Former Florida Water Service Facilities  
Acquired by the City of Marco Island**

**Insert FWS Diagram**

Tourist and seasonal residents.

The second factor is the amount of rainfall fluctuation throughout the year. The “dry season”, when rainfall averages 1 to 2 inches per month correlates when the population on the island is at its greatest. Conversely, during the “wet months” (June through September) average rainfall is about 8 to 9 inches per month when the service population is at its lowest levels.

The original comprehensive set a Level of Service (LOS) standard of 200 gallons per capita per day for potable water. With the total permissible capacity of the on-Island treatment facilities at 12.7 mgd there is more than sufficient treatment capacity to meet peak season population LOS requirements (12,700,000 gallons / 38,000 people = 334 gallons per capita per day). However when combining peak season population with irrigation needs during the corresponding dry season, the system could potentially be pushed to meet demands without other strategies and policy measures in place. These include:

- Permitting new construction only after issuance of an finding of adequate public facilities pursuant to Article X (Concurrency Management) of the Land Development Code to ensure adequate potable water capacity is available to accommodate new growth and development
- Future capital projects to increase treatment and/or storage capacities
- Expansion of wastewater effluent usage for irrigation purposes
- Landscape code changes to promote drought tolerant, low water species
- Water conservation

**C. Water Conservation**

With the assumption of potable water services the City has established and adopted significant water conservation regulations as contained in Section 18 of City Code. In particular Section 18-75 provides for year-round landscape irrigation restrictions which limits irrigation to three days per week between the hours of 12:01 am and 8:00 am. In addition, “all water irrigation activities must and shall be operated in an efficient manner so as to not allow water to be applied to travel lanes on adjacent roadways” and “all water irrigation systems shall be equipped with a properly installed rain sensor switch”. Failure to comply can result in an initial fine of \$75 and \$500 for repeat offenders.

The City does provide exceptions to the irrigation limitations for:

- Landscaping irrigation from which the source of the water is 100 percent reclaimed water.
- Landscaping irrigation from which the source of the water is 100 percent saltwater.

- Irrigation wholly from a low volume irrigation system.
- Use of low volume mobile washing equipment provided all unused water drains into only a previously ground surface.
- Water use to the extent authorized by a specific consumptive use permit, or similar permit, issued to the respective water user by the South Florida Water Management District.

**D. Natural Resource Impacts**

The potential impacts on the adjacent natural environment are vast and important. Historically freshwater in southwest Florida flowed across the surface of the land as sheet flow, percolating through wetlands in the estuaries. The weir on Henderson Creek, used to adjust water levels in the Marco Lake aquifer and controlled by the South Florida Water Management District, has altered the historical pattern of freshwater hydrology that affects the estuaries northeast of Marco Island (Rookery Bay). The estuaries and wetlands are the buffer system that protects Marco Island’s pristine surface waters, which in turn protect many number of plants and animal species that inhabit and depend on this environment.

Also located at the Elkcarn Circle treatment plant site is a deep well injection system. The effluents from both the brine left over from the RO plant process and the wastewater treatment plant are injected into this 3,400 foot deep well. This allows the water to percolate back through layers of rock, sand and soil and naturally recharge the aquifer. Water quality of both these effluents need to be monitored to ensure that groundwater contamination does not occur. If the total solids for these effluents are too high the water is pumped to a pond at the Marco Shores Reclaimed Water Refuse site to allow it to naturally percolate.

**E. Future Water Facilities Needs**

When the City acquired the potable water assets from Florida Water Services it recognized that there were significant infrastructure issues to address in addition to the need to enhance and expand capacity. While there is currently sufficient capacity to meet the adopted LOS standard of 200 gallons per capita per day, over the next five years (2006 - 2010) the City, through its Utility Department (Marco Island Utilities), will expend over \$41,000,000 in potable water system capital expenditures. Funded through bonds, impact fees, and assessments, these capital improvements projects will enhance service delivery, storage capacity, facility expansion, and overall system reliability. A small portion of the \$41 million will be used for enhancements to the Marco Shores operations. The funding for off-Island improvements located on Marco Shores will be paid by those system users.

**IV(b). Sanitary Sewer Sub-Element**

**Introduction**

The purpose of this sub-element is to provide for the necessary wastewater treatment and transmission and disposal facilities and services which will serve existing and future Marco Island residents, businesses, and visitors at or above the adopted Level of Service (LOS) standard. The adopted goal for the Sanitary Sewer sub-element is, “To protect the health and safety of the public by ensuring wastewater treatment facilities and services are environmentally sound, cost effective, and meet the community’s present and future demands.”

**A. Existing Wastewater Facilities**

When the original Data and Analysis section of the 2001 Comprehensive Plan was prepared there were three entities involved in the collection of sanitary sewerage on Marco Island: Florida Water Services, Collier County, and North Marco Utilities (Old Marco). These three entities provided collection service (all treated by FWS) for approximately 50% of the Island. The remaining areas, which were mostly low density residential areas, utilized individual septic tank system. Throughout the initial years of cityhood, and after the acquisition of the water/wastewater system from FWS, permits for individual septic tank systems were issued by the Collier County Health Department to accommodate new residential growth and development on the Island.

When the City acquired the wastewater facilities from Florida Water Services in November 2003 the City acquired an aging system, that had minimal capital upgrades over the last several years of private ownership. In terms of assets and facilities acquired the City got the main wastewater treatment plant on Windward Avenue (Elkcam Circle) with a permitted treatment capacity of 3.5 million gallons per day, a deep well for effluent disposal, reclaimed water lines to the golf course, Tommie Barfield Elementary School, and down a portion of Collier Boulevard serving commercial and multifamily developments, miles of collection lines and lift stations. Off-island the City also assumed ownership of the Marco Shores package treatment plant, a reclaimed water reuse site at Marco Shore, and a reclaimed water distribution lines. These former FWS assets and facilities are shown on Figure 4.1.b

For the past several years the new Marco Utility has been working diligently to make neglected system-wide improvements, coordinated system upgrades in conjunction with major infrastructure projects such as the reconstruction of Collier Boulevard, and prepared plans for the future expansion of sanitary sewer services for the entire Island. Most of the initial system upgrades and maintenance projects were financed by the initial bond to purchase the utility and its assets from Florida Water Services. While Collier County no longer maintains any wastewater services on the Island (transferred to the City), North Marco Utilities continues to provide collection services to a limited customer base in the Old Marco area. The collected wastewater is treated by the City.



**Figure 4.1b**  
**Former FWS Assets and Facilities Acquired by the City**

**Insert Map**

## **B. Current Wastewater Demand and Capacity**

### **1. System Capacity**

The City of Marco Island acquired the wastewater (sanitary sewer) facilities and assets from Florida Water Services (FWS) in November 2003. FWS owned and operated one on-Island treatment facility on East Elkcarn Circle, and one off-Island treatment plant at Marco Shores. The Elkcarn Circle facility acquired from FWS is now operated by Marco Island Utilities, which is responsible for the 3.5 million gallon per day (mgd) contact stabilization plant, 50 miles of sewer collection lines, 64 wastewater lift stations, and 25 miles of reuse distribution lines. The off-island facility at Marco Shores, also operated by Marco Island Utilities has a permissible capacity of 300,000 gallons per day (gpd).

### **2. Effluent Disposal**

The wastewater effluent disposal system at the current treatment plant is not nearly adequate to fully and efficiently dispose the quantity of effluent generated at a 3.5 mgd facility if at full capacity. Thus other means of effluent disposal are necessary, such as utilization of irrigation quality (IQ) water on golf courses, for landscaping, and roadway medians. Approximately 2.2 mgd of treated effluent (IQ) is disposed of via spray irrigation at the Marco Island Golf Course and the Marco Shores Golf Course. The remainder is distributed to customers along Collier Boulevard for irrigation purposes.

In addition, adjacent to the wastewater treatment plant is a deep well injection system for the disposal of brine reject water from the Reverse Osmosis (RO) potable water plant. Wastewater effluent that does not meet FDEP total dissolved solids requirement is piped off-island to a percolation pond at the Marco Shores development for naturally settling and infiltration recovery.

With the high cost per unit for potable water, expanding the re-use of treated water for irrigation purposes is desired by many potential on-Island customers, particularly multifamily and commercial developments. And as a service provider, the ability to recoup some treatment costs associated with the resale of treated water is very attractive. Over the next seven years the City is seek to expand storage capacities for treated effluent by 2 mg, and expand the distribution system to make reuse water available to a wider customer base. The enhanced storage capacities will allow for a more reliable source for irrigation throughout the year, particularly in the dry season.

### **3. Current Demand**

The 2001 Comprehensive Plan established a Level of Service (LOS) standard of 100 gallons per capita per day for sanitary sewer service. This was the LOS standard that was applicable prior to cityhood, and which Florida Water Service was committed to providing.

Based on the Wastewater Inventory contained in the 2006 Annual Level of Service Report there is

sufficient sanitary sewer capacity at 100 gallons per capita per day to provide consumers in existing service areas up until 2011.

**C. Future Wastewater Needs**

The City of Marco Island is providing sewer service to areas currently utilizing septic tanks through the Septic Tank Replacement Program to occur over a seven year period beginning in 2006. Table 4.1b outlines the approved design and construction schedule.

**Table 4.1b  
7-Year Septic Tank Replacement Program**

Sewer District	Year Built	ERC's	Average Flow (gallons per day)
South Barfield	2006	125	27,500
Tigertail	2006	253	55,660
North Marco	2007	298	65,560
North Barfield	2007	468	102,960
West Winterberry	2007	648	142,560
Lamplighter	2008	393	86,460
Sheffield	2008	441	97,020
Kendall	2009	671	147,620
Mackle Park	2009	656	144,320
Gulfport	2010	346	76,120
East Winterberry North	2010	116	25,520
East Winterberry South	2010	196	43,120
Copperfield	2011	250	55,000
Goldenrod	2011	367	80,740
Estates	2012	569	125,180
<b>Total</b>		<b>6,094</b>	<b>1,30,680</b>

**Figure 4.2b**  
**Sewer District Plan**  
**Approved by City Council May 22, 2006**

**Insert Map**

The Septic Tank Replacement Program will be funded via neighborhood assessments. The City will provide a range of payment options and deferral programs to allow for payment of costs associated with the program.

In addition to the septic tank program, the City, through its Utility Department, will embark on a capital improvement program that will both expand and enhance the wastewater system capacity. Concurrent with the septic replacement program the City will be expanding treatment capacity from 3.5 to 5.0 million gallons per day by 2011. Between 2006 and 2010 the City will make over \$117,000,000 in system upgrades and expansion projects, both on-island and off-island at the Marco Shores facility. These future capital expenditures are further detailed in the Capital Improvement Element section of this plan.

Per the capital plans adopted by the City, there should be sufficient capacity over the next five years, and beyond, to accommodate new growth and development consistent with the adopted LOS standard of 100 gallons per capita per day, including those new customers from converted septic tank systems. Nonetheless, the City will require that a finding of adequate public facilities is issued in conjunction with and prior to the issuance of any new development permit.

#### **D. Natural Resource Impact and Reuse Options**

Marco Island is a city that has over 100 miles of waterway canals that exchange water with a surrounding vast and important estuarine system. There is not a large and rapidly flowing stream or river to assimilate large discharges of wastewater generated by the city. The city depends upon the high quality of surface waters for the tourist industry, surrounding fishery industries, and of course, a high quality of life for life for Island residents and tourists. The protection of these surface waters is very critical.

The wastewater treatment facility has no opportunity to discharge treated effluent into the surrounding surface waters. As noted before, the effluent is distributed in a several different ways: spray irrigation, deep well injection, and piping to a percolation pond for recharge to the aquifer. The potential to expand and enhance the re-use of treated wastewater is huge, and only limited by infrastructure capacity. The charged re-use lines along Collier Boulevard and to Hideaway Beach PUD have had a very positive response from the multifamily and resort property users. "Reuse of reclaimed water and water conservation are integral parts of Florida's long-term water resource management strategy. We can conserve water supplies, recharge aquifers, and postpone expensive development of new water supply sources by reusing reclaimed water" - Carol M. Browner, Secretary, FDEP (2000). The list below describes reuse applications that could benefit the City of Marco Island:

**Treated Wastewater Reuse Options**

- Irrigation - used for parks, golf courses, roadway medians, and residential lawns
- Fire protection - supplied to hydrants and sprinkler systems for fire protection
- Toilets - used in toilets in hotel, condominiums, and commercial buildings if piping system is kept separate
- Environmental enhancement and restoring wetlands - high-quality reclaimed water can enhance surface waters and restore wetlands that have been drained or altered
- Dust control - sprinkled on construction sites to reduce blowing dust
- Fountains - used in decorative ponds, fountains and other landscaping features.

As the entity responsible for the treatment of sanitary sewer effluent, the City realizes the tremendous opportunity, and demand for re-use water for irrigation purposes. For many years the amount and users of re-use water resources was limited to a few golf course and commercial/multifamily locations due to system storage and distribution capabilities, and wide fluctuation in the amount of treated wastewater available for re-use. It is important to remember that during periods of heavy sanitary system usage (in season) it is also the wet season; thus when the greatest amount of re-use water can be generated, the need for irrigation is at its lowest. The adopted 2006 Water/Sewer Utility Fund CIP identifies future capital projects to expand storage of re-use water by 2.0 MG (million gallons) and to expand the re-use water distribution system. These system upgrades will be paid for via future bonds and user assessments.

Several concerns for the effect of wastewater disposal upon the natural resources include groundwater and surface water quality contamination via the abundance of septic systems. These concerns will be addressed and alleviated through the progressive septic tank replacement program which will occur between 2006 and 2012. Further, water quality testing is on-going to ensure compliance with State water quality regulations.

## **IV(c).Storm water Management Sub-Element**

### **Introduction**

The purpose of this sub-element is to provide for the necessary storm water management facilities and services which will serve existing and future Marco Island residents, businesses and visitors at or above the adopted level-of-service standard.

Storm water management involves man-made means to address the flow of waters that result from a rainfall event. Storm water management facilities include structures that are designed to collect, convey, hold, divert, or discharge storm water and may involve storm water sewers, canals, detention facilities and retention facilities. The Deltona Corporation constructed the majority of the storm water management structures on Marco Island in the 1970s and early 1980s. At the end of the Deltona period the operation and maintenance of the storm water facilities became the responsibility of the Collier County.

Collier County operated and maintained the storm water management and drainage infrastructure until the City incorporated in August 1997. With the creation of the City's Public Works Department, the operation and maintenance of storm water facilities became the responsibility of the City effective October 1, 1998. That acknowledgment of responsibility coincided with the transfer of rights-of-way from Collier County to the City via an Interlocal Agreement.

### **A. Storm water Management Facilities**

#### **1. Existing System**

The following summary lists the public and private facilities providing storm water management services within the community:

- *Facilities Located Within City Rights of Ways and Drainage Easements* - This is the largest category of drainage facilities within the City of Marco Island. The City is responsible for operation and maintenance of such facilities, except driveway culverts that are the responsibility of property owners.
- *Large Planned Unit Developments (PUDs)* - This category consists of master planned communities that are larger than 10 acres in size. There are five PUD's of this size on Marco Island: Hideaway Beach; Cape Marco; Key Marco; Marriott Resort Complex; and Calusa Island Marina.
- *Small Private Facilities* - This category consists of small light industrial, commercial, residential and institutional land use sites that are generally less than 10 acres in size. Individual property owners are responsible for the operation and maintenance of on-site storm water facilities.

*Institutional Facilities* - This category consists of churches, libraries, educational facilities, parks and other governmental facilities. Individual property owners and entities are responsible for the operation and maintenance of on-site storm water facilities.

Marco Island's storm water management and drainage facilities consist of a system of swales, catch basins, underground drainage conduits, and outfall structures of various materials which collect and discharge the runoff from rainfall events. The runoff is generally directly discharged into man-made and natural water bodies which are in turn connected to the natural bays and tidal water bodies. All water bodies receiving direct discharge are classified as Class II or Class III waters in accordance with the Florida State classification system (Chapter 62-302.400, F.A.C.). The City also contains water bodies that have "Outstanding Florida Waters" designation, but those do not receive any direct discharge. Ultimately all runoff is received by the Gulf of Mexico.

## **2. Elevation Characteristics**

Based on the Marco Island Drainage Report (dated 4/2000), Marco Island is a relatively flat barrier island. The topography on Marco Island has been severely altered, primarily by Deltona's development of the island.

Topography on Marco Island varies from elevations below sea level to elevation of 40 to 50 feet above sea level. The historical development plans for the roadways and urban land on Marco Island included excavating navigable canals and placing the excavated materials on the existing mangrove swamp that characterized the majority of the island's native, pre-development landscape. The pre-development elevations in those areas varied from below sea level to elevations of 2 to 4 feet above sea level. The areas that were not mangrove swamps consisted of relatively flat coastal sandy uplands, varying in height from 4 to 7 feet above sea level. Marco Island also contains a unique ridge of sandy elevated soils that generally surround Barfield Bay and range in elevation from 7 to approximately 45 feet above sea level.

The development of Marco Island's infrastructure has resulted in the following average post-development elevations. The majority of the roadways vary in elevation from 4.5' - 8' NGVD (National Geodetic Vertical Datum) or sea level as it is commonly referred to. Undeveloped lots range in elevation from 5' - 7' NGVD. Seawalls vary in elevation from 4' to 5' NGVD. Typically swales vary in elevation from 2.5' to 5' NGVD. Exceptions to these generalized elevation descriptions exist along the beach front, around Barfield Bay, within the southeastern portion of the Estates section, and on the south side of Robert's Bay. These four sizable areas contain a unique soil deposit that consists of small rolling dune-like hills with elevations ranging from 10' to 45' NGVD.

## **3. Soil Types**

There are seven (7) soil classifications listed in the Soil Survey of Collier County Area for the Marco Island area including:



32	<i>Urban Land</i>
34	<i>Urban Land-Immokalee-Oldsmar, limestone substratum, complex</i>
35	<i>Urban Land-Aquents complex, organic substratum</i>
36	<i>Udorthents, shaped</i>
40	<i>Durbin and Wulfert Mucks, frequently flooded</i>
42	<i>Canaveral-Beaches complex</i>
45	<i>Paola Fine Sand, gently rolling</i>

Soil permeability and water table greatly affects the drainage patterns on Marco Island. The relatively flat terrain magnifies this affect. The soil types listed above are all sandy soils with varying degrees of permeability and varying depths to the water table. The most permeable soils are Paola and Canaveral-Beaches complex. The least permeable soils are the Dublin and Wulfert Muck, frequently flooded. Most of the other soils have been modified or imported by development activities and the permeability varies greatly.

Water table elevations on Marco Island are generally high and greatly influenced by tidal variations. The majority of the areas that are mapped as urban soils exhibit high water tables. Some areas, primarily the areas that have been mapped as Paola or Canaveral soils have relatively low water tables as measured from the surface due to good permeability and higher elevations.

The relatively impermeable silty soils that were excavated as a result of constructing the canals were widely distributed over much of the Urban classified soil types. There are areas of Marco Island that exhibit perched water table conditions as a result of silty sand layers that have reduced permeability and prevent the water from percolating to the tidally influenced water table. These areas are very localized and are typically wet in the rainy season as a consequence of the daily rainfall events. Most areas have had a drainage system installed to help control the seasonal high water table and runoff. (*Soil Survey of Collier County, 1998*)

## **B. Design Capacity**

Allowable storm water discharge rates are a critical factor in the design of storm water management facilities. Typically design criteria limits off-site discharge rates to levels that do not cause adverse off-site impacts. The allowable discharge rates are typically determined either by historic pre-development discharge rates, rates established by existing development or prior permits, or amounts based on system capacity from downstream receiving facilities. On Marco Island, ultimate receiving water bodies are typically tidally-influenced can be considered “infinite sinks”. Most of the infrastructure on Marco Island was not sized to limit discharge rates to pre-development discharge rates.

### **1. Rainfall Event Standard**

A design rainfall event is required for the design of storm water management facilities. The design rainfall event is typically derived from area specific climatic data. The statistical probability for the recurrence of the design rainfall event is usually expressed in terms of a yearly recurrence interval. For example, a 10 year rainfall event is a typical standard. The inverse of the recurrence interval is

actually the probability of the event occurring in a given year. Thus, a rainfall event with a 10 year recurrence interval is typically called a ten-year event and actually has a 1 in 10 probability of occurring in a given year.

The design rainfall event and discharge limitations is directly related to the size and associated cost of constructing water management facilities, the methodology used for design and the objective of the design. Typically, the greater the rainfall that falls for a given storm event the lower the probability that the event will occur in a given year and the more costly the infrastructure needed to protect the public from flooding. A municipality's design storm event attempts to balance the cost of the resultant sizing of storm water infrastructure with public safety and the protection of property.

## **2. Design Methodologies**

There are two different methods typically used in Southwest Florida to design storm water management systems, including underground drainage systems.

The FDOT uses the Rational Method at the core of their methodology for sizing storm water facilities. Collier County and the City of Naples also use the Rational Method for sizing of storm water conduits. This method uses a rainfall intensity produced by a selected design storm, the area of the watershed that generates runoff which will be routed through the conduit being sized, and the runoff characteristics of the watershed, and then calculates a flow. The flow is then used as a parameter in Manning's Equation for open channel flow to size the drainage conduits. Frictional losses (commonly referred to as head loss) through the conduits from the upstream catch basins in the conduit series to the downstream point are kept within a range that will not cause flooding.

The Rational Method has been successfully used and is widely accepted for sizing drainage pipes within small, urbanized basins with limited outfall potential. This set of circumstances specifically describes the conditions encountered on Marco Island. Deltona development plans approved by the various regulatory agencies that had jurisdiction at that time used the Rational Method and did not restrict discharge to the degree of today's more stringent regulatory levels.

Another design method uses the Santa Barbara Urban Hydrograph and storm water runoff routing algorithms to route the volume or rainfall runoff through the storm water conduits into development lakes and to final discharge facilities. This method accounts for rainfall runoff storage capabilities of a given drainage basin. This method is typically used to calculate flood elevations resulting from design storms lasting from one to three days in isolated development basins with restricted discharge capabilities. Restrictions in discharge allowance are caused by both physical and regulatory concerns.

The South Florida Water Management District (SFWMD) specifies the use of this method for sizing water management facilities within an enclosed system with limited outfall constraints. Most large development currently being constructed within the SFWMD permitting area use this method. Typically these developments have severe limitation related to the quantity of water than can physically be discharged from the development site because of environmental considerations and physical capacity problems associated with existing drainage ditches and canals that were

undersized. This method generally requires lakes and detention facilities to store storm water runoff. This method was not used to size the infrastructure on Marco Island.

### 3. Level-of-Service Standards

The Master Drainage Report (March, 2000) began with a review of the Deltona Corporation's plans for the development of the Island which indicated that their drainage system was designed to pass a 10 year, 1 hour storm with an intensity of duration of approximately 3.3 inches per hour. The Rational Method was used to size the drainage system conduits. The design storm of 1 hour is the rainfall event that both the City of Naples and Collier County use as the minimum standard for the design of subsurface drainage facilities. Per the Master Drainage Report, it was recommended that the City of Marco Island utilize the 10 year, 1 hour storm event as the minimum standard for the design of subsurface drainage facilities for the City.

Other minimum/maximum design criteria recommended by the Drainage Report's consultant included:

*Minimum Site Grade Elevations* - The City should require that storm water facilities for new development be designed in accordance with the South Florida Water Management District and Collier County criteria for establishing minimum site grades.

*Minimum Water Quality Design Criteria* - The City should require that new facilities be designed in accordance with the South Florida Water Management District and Collier County criteria for water quality treatment prior to discharge to City rights-of-way or drainage facilities.

*Minimum Storm Drain Pipe* - The generally accepted minimum size for storm sewer drainage conduit for municipalities in Southwest Florida area is 15 inches. The City of Marco Island should also use this minimum pipe size.

*Maximum Distance Between Structures* - Drainage inlets should be supplied at sufficient intervals to accept one hundred percent (100%) of the runoff resulting from the design storm. Using Florida DOT Design Manual criteria, and the recommended design storm event (10 year, 1 hour, 3.3 inches/hour) the following table can be generated:

Pipe Size (Inches)	Maximum Distance Between Structures (Feet)
15"	100'
18"	300'
24-36"	400'
42" and >	500'

*Minimum Driveway Culvert Size* - The generally accepted minimum size driveway culvert for many municipalities in the area is 12". The City of Marco Island should consider using this minimum culvert size as a guide. Actual driveway culvert size shall be a function of roadway classification, capacity requirements, and maintenance considerations.

*Minimum Slope and Velocity* - The industry wide minimum acceptable slope for drainage conduits (stormsewer) is related to maintaining a minimum velocity of 2.5 feet per second for water within the drainage conduits, unless other controlling criteria (friction loss) makes this unattainable. For open swales, the Florida DOT has a minimum required physical slope of 0.0005'/foot and the City should adopt this as an absolute minimum for swale conveyances.

The Master Drainage Report mapped at the drainage basins and sub-basins on the island, and inventoried and assessed the condition of existing infrastructure. In some cases drainage conduits that were to be installed never were placed in the ground, outfalls were either not installed or undersized, and durable materials were scrapped in favor of less durable, metal pipes. The thirty-four page hydraulic report recommended the following:

The Level of Service (LOS) design standard for new storm water facilities on Marco Island should be the ten (10) year, one (1) hour, storm with a 3.3 inches/hour intensity duration.

Further, the Report recommended that existing and future drainage system components follow a LOS design hierarchy based on site specific criteria:

LOS Standard A: Upstream (US) Ground Elevation - Upstream Hydraulic Grade Line (US HGL) > 0.5 Feet.

LOS Standard B: US Ground Elevation - US HGL > 0.2 Feet.

LOS Standard C: US Ground Elevation - US HGL > or = 0.0 Feet.

LOS Standard D: US HGL < or = 5.2 Feet, NGVD\*.

LOS Standard E: US HGL > 5.2 Feet, NGVD\*.

(\*) May be acceptable at a limited number of roadway locations due to extreme topographical conditions.

For existing drainage system components a level not to exceed the parameters of LOS C shall be adopted.

### **C. Existing Drainage Conditions**

To provide a thorough analysis of the existing systems and conditions, the Master Drainage Report was commissioned and completed in March, 2000. Field observations and existing plans of record were used to document the geometry (pipe sizes and elevations) and conditions of the existing storm water drainage system. Two levels of documentation were performed. One level documented the parameters needed to construct the computer simulation and hydraulic model of the drainage system. This level was primarily concerned with verifying that Deltona's construction plans were implemented as represented on the official plans of record.

The second level of documentation used field observations to assess the conditions of the above ground improvements for infrastructure rehabilitation and maintenance planning purposes. Field observations were performed by directly assessing the condition of the visible above ground and visually accessible below ground improvements. Some of the above ground observations were used to characterize the probable conditions of the below ground improvements.

## **1. Field Verification**

A review of the original record drawings was performed. Field spot checks were conducted to verify the accuracy of the record drawings. The information required to construct the computer model was determined and consisted of the following parameters:

1. Catch Basin Type.
2. Invert Elevation on Inflow Conduits.
3. Invert Elevations of Outflow Conduits.
4. Inflow Conduit Size.
5. Outflow Conduit Size.
6. Contributing Area.
7. Rainfall Runoff Coefficient.

All of the systems dimensional information presented above, with the exception of the rainfall runoff coefficient which is calculated, and the contributing area, were determined and recreated from the Deltona Corporation's record drawings. This information was used to construct a computer model, which had the capability of simulating the performance of the drainage system during different rainfall events. A ten (10) year, one (1) hour storm was used to estimate levels of service.

Field observations determining the size and installed elevation of the existing drainage facilities were made in conjunction with the efforts aimed at documenting the condition of the above ground improvements. All of the above ground improvements, which generally consisted of catch basins and other catchments, were measured and pipes connecting to these drainage improvements were also measured. Based on the consultant's review of the record drawings and extensive field measurements, they deemed the record drawings to be of sufficient accuracy to use in the computer model.

The second level of documentation was limited to field observations regarding the condition of existing catch basins and outfall structures. The observations were intended to provide a preliminary estimate of the need to rehabilitate those components of the existing drainage system.

**Table 4 ( c ).1**  
**Storm water Drainage Systematic Issues**

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<b>Drainage Conditions</b>	<b>Resultant Problems</b>	<b>Solutions</b>
Deteriorated Outfall Pipes	Pavement Settlement, Sinkholes	Replace Deteriorated Pipes
Raised Concrete Drainage Structures	Inhibit Maintenance & Inspections, Roadside Obstructions	Replace and/or Cut Down Structures
Blocked Swales, Non-Connected Outfalls	Nuisance Ponding	System Inspection with Desilting and Clean-out
Swale Intersections	Nuisance Ponding	Eliminate Swale Intersections, Add Additional Piping
Swale Driveways	Nuisance Ponding, Dam Effect	Regrade Swale, Create Additional Outfalls

## **2. Computer Modeling**

The entire storm water drainage system was modeled using XP SWIMM software, which the Water Management District has found acceptable for water management design. The modeling exercise helped identify systematic deficiencies, and assisted the consultant in drafting priorities for remedial work. The modeling allowed the City's storm water infrastructure to be analyzed on a basin by basin basis, and for appropriate LOS standards to be applied for existing and future system upgrades. As a result of the Master Drainage Report the City focused, and continues to focus, attention on storm water drainage related capital expenditures. From the installation of missing outfalls, to desilting of pipes, to the installation of culverts for private drives, the City has made the elimination of storm water flooding a priority. Often storm water improvement have been coupled with street improvements, providing for cost savings and minimizing inconveniences to adjacent properties and the traveling public.

## **D. Future LOS Conditions**

Resolution and preventative maintenance are the hallmarks of Marco Island's strategy to address storm water drainage. Between 2006 and 2010 the City has earmarked \$4,110,000 for storm water drainage projects in the Capital Improvement Plan. The following items are included under the storm water drainage improvement projects:

- Water quality improvements
- Citywide drainage improvements (special needs)
- Florentine Gardens outfall (enhanced)
- Swallow Avenue outfall (enhanced)
- Elkcam Circle Outfall
- 

## **E. Natural Resource Impacts**

Storm water runoff into the waterway canals that ultimately end up in the bays and tidal creeks

around Marco Island could impact water quality, fishing and recreational uses. The community was designed with a canal system engineered to benefit from the twice-daily tidal exchange. This tidal exchange promotes the storm water outfall to move at a regular rate to the Gulf of Mexico instead of remaining stagnant in the canals.

The initial development of Marco Island left very few natural drainage features. There are limited fresh water resources, small lenses, located primarily within the area surrounding Barfield Bay that is topographically elevated and contains areas that vary in elevation from 7' NGVD to 45' NGVD. There is one naturally occurring freshwater pond that has been used as a drinking water supply dating back to the Calusa Indians. Currently no outfalls would affect freshwater resources on the Island.

The Public Works Department has established water testing programs to monitor water quality for capital projects, particularly related to sanitary sewers. This program provides a mechanism to track potentially harmful effects to the natural and man-made resources of the Island.

## **F. Regulations and Programs**

### **1. South Florida Water Management District (SFWMD)**

SFWMD is the entity most directly responsible for storm water permitting, with the Big Cypress Basin responsible for primary system storm water infrastructure construction and maintenance. While there are no facilities on Marco Island owned and operated by the Big Cypress Basin, the regulations that cover the design and construction of storm water facilities are governed by rules and regulations that are detailed in SFWMD's "Management and Storage of Surface Water Permit Information Manual" also known as the "Basis of Review". The District is responsible for both water quantity and water quality discharge regulations.

As the man-made canals on Marco Island are generally classified as Class II waters, SFWMD normally would not require additional water quality treatment. However, some of the receiving water bodies that surround the Island are considered Outstanding Florida Waters, and thus the District should be consulted in regard to any new storm water system improvement project.

### **2. Florida Department of Environmental Protection (FDEP)**

The FDEP is involved in the review and permitting of stand-alone marinas and multifamily projects. Their storm water regulations are in accordance with the regulations found in the SFWMD's "Basis of Review" document.

### **3. United States Corps of Engineers (Corps)**

The Corps does not typically regulate storm water discharges. The Corps may need to be contacted and permit applications pursued should the construction of drainage systems require any fill of a

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## **Storm water Management Sub- Element**

federal jurisdictional wetland. Typically this situation would not occur on Marco Island since most of the drainage facilities and outfalls are constructed in what are considered uplands, and most of the seawall outfalls are considered upland man-made works.



## **IV(d). Solid Waste Sub-Element**

### **Introduction**

Solid waste collection and disposal is a fundamental service provided by a local government. Collier County has outsourced collection and disposal to Waste Management Inc., of Collier County. Through contractual agreements the City subcontracts with Collier County for the extension of this service from Waste Management. The solid waste collection fee (assessment) is included on the property tax bills for residential units (4 units or less). Waste Management bills commercial collection according to the level of service received. Private haulers also provide removal services to commercial, industrial, and construction customers. Residential recycling and yard waste removal services are also available to citizens of Marco Island.

### **A. Existing Collection and Disposal Facilities**

The collection and disposal of solid wastes generated on Marco Island are currently under the supervision and management of the Collier County Solid Waste Management Department. Marco Island is located within Solid Waste Collection District Number 1 where solid waste collection is mandatory. Waste Management of Collier County, Inc. is the franchised waste collector to provide collection services to residential, commercial and industrial generators on the Island. Other wastes, resulting from land clearing, construction materials, and demolition wastes may be collected by any independent waste collector who has an approved occupational license with the County.

In residential areas of Marco Island, solid waste collection services include twice-weekly curbside pick-up and curbside recycling and yard debris pick-up on a weekly basis. Residential customers can make special arrangements with Waste Management for the removal of large items such as discarded furniture and appliances. The frequency of commercial and industrial collection depends on the waste stream generated by a particular use or business.

Solid waste collected by Waste Management is brought to the Naples landfill for final disposal. This 320 acre facility, which is approximately 20 miles north of Marco Island, is operated by contract with Waste Management of Florida, Inc. In addition to the Naples facility, the County has one other landfill site, a 100 acre facility in Immokolee, which services the eastern portion of the County.

The Naples landfill, which contains six cells, is comprised of scales, maintenance facilities, processing areas, disposal areas and stormwater management areas. Cells #1 and #2 have not been used for landfilling since 1976. These cells are currently being reclaimed for future lined cell space by mining the old waste and separating the remaining waste from the soil by screening. The soil is used for daily cover in the active area of the landfill. The old waste is being deposited into the lined cell after white goods and tires are removed for recycling. Cells #3 and #4 reached capacity in May 1988, and have been closed per FDEP regulations. Cell #5 is currently used for processing yard trash (biomass) into mulch.

Cell #6, an 80 acre area was constructed with a 60-mil high-density polyethylene membrane layer and a leachate collection system that meets FDEP requirements. Monitoring wells have been established at the landfill site and scheduled well testing as required provides assurance that groundwater and natural aquifer recharge areas are being protected from possible contaminants. The total capacity of the Naples landfill facility, with upgrades, is estimated to last approximately 25 years.

Some of the waste stream generated on Marco Island, in particular yard debris and construction materials, is brought to the transfer station located on Elkcam Circle. The function of a transfer station is to provide temporary collection of solid waste prior to transport to a processing plant or to final disposal. The transfer station is the only solid waste facility located on Marco Island, and is permitted by the Florida Department of Environmental Protection. This County owned and operated facility does not handle large volumes of solid wastes. The transfer station also functions as a collection center for recyclable materials, white goods, and household hazardous materials.

The Marco Island transfer station and the Naples landfill are both owned and operated by Collier County. County Department of Solid Waste employees staff the transfer station, which is a collection facility. Per franchise and contractual agreements, Waste Management of Florida, Inc., provides collection services on Marco Island, and operation and maintenance of the Naples landfill facility.

The Naples landfill accommodates solid waste generated within Solid Waste Collection District Number 1. The district encompasses the western 2/3 of Collier County, except for the City of Naples and Everglades City. Due to the large geographical area served by the Naples landfill, predominant types of land use for unincorporated areas are not included as part of the City's comprehensive planning program.

Contractors, businesses and residents of Marco Island, as well as the neighboring, unincorporated areas of Goodland, Isles of Capri, and developments along the SR 951 corridor utilize the Marco Island transfer station.

**B. Solid Waste Sources**

The transfer station on Elkcam Circle was originally used as an incinerator. That function ceased in 1979, when the facility was converted to a transfer station by Collier County. As the facility was not originally designed as a transfer station, it has been re-engineered to meet its current use.

Four major sources of solid waste include, with percentage of total waste received:

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## Solid Waste Sub-Element

.	Residential	19%
.	Commercial	32%
.	Construction and Demolition	20%
.	Yard Trash (Biomass)	20%
.	All Other	14%

### C. Level of Service Standards

The original Level of Service standards for Solid Waste adopted in the 2001 Comprehensive Plan were based on the Solid Waste Sub-element prepared by Collier County, as adopted in 1997. Those LOS standards are as follows:

- 1.10 tons of Solid Waste per capita per year
- A minimum of two (2) years of constructed lined landfill cell capacity at the calculated waste generation rate.
- A minimum of ten (10) years of permissible landfill capacity at the calculated generation rate.

The two years of lined cell requirement addresses the amount of time required to design, permit and construct a new cell area on an existing permitted landfill site. The ten-year requirement assures adequate time to identify, purchase, rezone, design, permit and construct a new landfill site.

The method used by the County to calculate the two year supply of constructed cell capacity is to multiply the weighted population average by the annual per capital waste generation rate to yield the total tons of lined cell space consumed each year. This total is then subtracted from the remaining constructed cell capacity. The method for calculating the ten-year capacity is based on the permissible tonnage capacity at existing sites. This method is consistent with the current calculation for the two-year minimum supply of constructed lined cells.

As the City is not the primary provider of solid waste services, the levels of service adopted by, and as amended in the future, will operable as the standards for the City's concurrency management system.

### D. Facility Capacity Analysis

Collier County has developed and implemented a Solid Waste Master Plan. The County has established the means to provide for solid waste collection and disposal facilities for a 20-year planning period and beyond. The County is engaged in the process from securing additional landfill sites. A landfill operating contract is in place that provides for daily operations and all capital costs for future construction, closure and post-closure monitoring. The current tipping fee schedule

## **Data & Analysis**

## **Solid Waste Sub-Element**

provides payment to the contractor, County administration overhead and reserves for development of future solid waste management. The County has developed a pay-as-you-go program with no debt service. Continued accumulation of reserves will provide funding for future solid waste management needs, keeping Collier County, the entity responsible for solid waste services, in a very strong position financially.

There is no formal allocation of landfill space for waste generated on Marco Island. Rather the waste stream from Marco Island is considered part of the overall waste stream handled at the Naples landfill site. As all users within District 1 are allocated 1.10 tons of waste per capita per year, the proportionate share of Marco Island would be based on the City's population as a percentage of the total population of District 1.

## **IV(e). Natural Groundwater Aquifer Recharge Sub-Element**

### **Introduction**

Aquifers can be defined as those underground sediments that yield water in sufficient quantities to be valuable as a source of supply. The potable water supply for Marco Island, and all of Collier County, comes from the Surficial Aquifer System. It is the most important of the major aquifer systems in terms of public water supply, as designated in a “Preliminary Assessment of Groundwater in Western Collier County” report by the South Florida Water Management District.

In 1972, via the Water Resources Act, the State of Florida created five regional water management districts based on the natural hydrogeologic basins. These districts identify the nature and extent of groundwater resources within their specific area. The primary goal of the water management district is to provide flood protection, protect water quality and supply, restore and manage natural ecosystems, and provide emergency operations in the event of a hurricane. The City of Marco Island is within the South Florida Water Management District (SFWMD), Big Cypress Basin.

SFWMD has designated all of Collier County a “Critical Water Supply Problem Area”. This designation means that water resource problems are critical or are expected to become critical over the next 20 years due to the history of substandard water quality, potential for movement of saline water into the groundwater, or lack of water to serve future needs. Near the coast, groundwater supplies are very limited, shallow, and vulnerable to overdraft, contamination, and salt-water intrusion. Like many Florida coastal cities, the City of Marco Island must use an expensive desalinization (Reverse Osmosis) treatment system, and also pump water from an aquifer outside the city’s boundaries to meet the water supply demands of the community.

### **A. Use and Protection of Groundwater Resources**

Marco Island is not a significant recharge area for any major aquifers that are used for public water supply. Raw water is drawn from sources of water located on the mainland called the “Collier Rock Pits” and a complimentary infiltration gallery. The rock pit water supply consists of two pits with areas of 27 and 19 acres. The infiltration gallery consists of a 4,000 and 3,000 foot long galleries from which water is withdrawn. The water drawn from the pits and infiltration galleries are blended prior to pumping approximately 11 miles to the Marco Island water treatment plant. This rock pit area is not located within the City of Marco Island, and thus is protected via Collier County’s Groundwater Protection Ordinance (Ord. 91-103, as amended, and Division 3.16, LDC).

Within the City of Marco Island there are 18 wells (approximately 500 to 575 feet deep) used to supply the Reverse Osmosis (RO) treatment plant. The wells draw from the Hawthorne Aquifer which is part of the deep Florida aquifer system. This aquifer is recharged north of Lee County, approximately 150 miles north of the Island. The wetland systems, which are areas of groundwater recharge, surrounding the borders of the City are area of direct regulation of land use.

All groundwater contains dissolved minerals in which water quality is altered through the mixing of

different chemical properties. The water quality of the Surficial Aquifer system which is recharged from surface water can be contaminated by sewage, industrial discharge, stormwater runoff, agricultural waste from fertilizers, pesticides, herbicides, and saltwater intrusion.

## **B. Regulatory Programs**

Existing regulations and programs that govern land use and development adjoining groundwater recharge areas or wetlands are in place and administrated through many agencies, specifically the US Army Corps of Engineers, Florida Department of Environmental Protection, and the South Florida Water Management District.

The US Army Corps of Engineers obtains its regulatory authority through Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. In 1984, the Groundwater Protection Rule was established with guidelines for the restoration, conservation, and management of the State's groundwater resources. Florida was the first state in the nation to adopt such a rule. The Florida Water Quality Assurance Act required FDEP to maintain a statewide groundwater quality monitoring network and database. Under the State's 1993 environmental streamlining initiative, land alteration activities or works affecting water resources were regulated under one type of permit, the environmental permit. The water management districts and FDEP have developed uniform wetland delineation, mitigation banking, and environmental resource permitting criteria. Types of activities regulated include:

- Projects with impacts on wetlands or other surface waters (dredge and fill)
- Use of SFWMD lands, canals or levee right-of way
- Taking water from lakes, canals, streams or aquifers
- Drainage system construction or operation
- Well construction

The environmental permitting criteria are effective in protecting wetland systems. They are deficient in protecting recharge areas. There are exemptions for permitting for the use of wetlands, such as, an area below one half acre in size and mining proposals. There are no criteria specifically addressed to aquifer recharge areas, though it is one of the functions of wetlands.

As the entity responsible for the provision of potable water, the City of Marco Island must be vigilant to the potential of groundwater contamination. Many man-made sources of contamination have the potential, but also the lack of confinement, high recharge, relatively high permeability, and a high water table, increases the risks for contamination. Also with the increasing demands on aquifer resources, the constant threat of saltwater intrusion is always a possibility along the coast.

## **V. Conservation and Coastal Management Element**

### **Introduction**

Located in the southwest region of Florida, Marco Island is part of the largest mangrove-based estuarine system in the world and the largest (7,000+ acre), most northern most island of the Ten Thousand Island chain that extends to the tip of Key West. The City is completely surrounded by water: to the west by the Gulf of Mexico, to the north by Big Marco Pass and the Big Marco River, to the east by the Big Marco River and Goodland Bay, and to the south by Blue Hill Bay, Robert's Bay, Caxambas Bay and Caxambas Pass. Further, the City has over 100 miles of canals, providing direct and in-direct access for island residents. State designated Critical Wildlife Areas (CRAs) and Aquatic Preserve areas are also located within and around the city limits. Topography ranges from sea level at the Gulf to 45+ feet on Indian Hill. The highest elevations are the result of shell mounds left by the Calusa Indians.

With six miles of white sand beaches, a unique mixture of temperate and tropical climates, and many opportunities for recreational and business pursuits, Marco Island is a destination for tourists and a second home for many winter residents. The Gulf-front beaches provide hotels and condominiums for most seasonal visitors, but the majority of permanent residents reside in single family homes located on canals that lead to the Gulf of Mexico and the Ten Thousand Island National Estuary.

Yet despite all the attributes coastal living provides for the citizens and visitors of Marco Island, there are serious threats and issues commensurate with such close proximity to the water. These issues are further complicated due to the Island's location within an important, coastal eco-system. Examples of coastal issues to be addressed by this Plan Element include:

- Tropical storm and hurricane preparation & evacuation;
- Beach erosion;
- Coastal flooding;
- Boating safety;
- Environmental resources; and
- Manatee protection

A primary purpose of the Conservation and Coastal Management Element is to establish and promote the proper balance between conservation, use, and the protection of natural resources within the city limits. The Element identifies and analyzes the following areas: surface water, groundwater, floodplains, known sources of valuable minerals, areas known to have experienced soil erosion, air quality, protected species (vegetation and wildlife), and areas that are commercially and recreationally important for fish/shellfish, wildlife, marine habitats, and vegetative communities. As the natural resources of Marco Island are discussed throughout this Element, it is important to keep in mind that this island resides within a vast interconnected ecological system that contains important environments and habitats that the city benefits from.

This Element also provides a forum by which coastal concerns and issues can be fully addressed and analyzed through adopted goals, objectives and polices.

## **A. Natural Resource Systems**

### **1. Natural History and Geology**

Historically, the peninsula of Florida has had a cyclic process of emergence and submergence beneath the ocean. Slightly more than one million years ago during the Pleistocene Era, the coast of Collier County emerged from a declining sea level and began to form the coastline we recognize today. Marco Island is within the Gulf Barrier Chain physiographic province. The Gulf Barrier Chain is a string of barrier islands from Longboat Key to Cape Romano. It is believed that these islands formed as dune ridges and spits from sand supplied by coastal headlands, rivers, and formerly emergent areas of the continental shelf. When the rise in sea level began to slow 4,000 to 5,000 years ago, the island was acted upon by wind, currents and waves to form islands parallel to the shoreline.

Figure 5.1 graphically presents an inventory of important natural areas in southwest Florida. It is evident from the inventory that Marco Island and its immediate environs have the heaviest concentration of animals, plants and natural communities, documenting its place as a truly unique and diverse environmental asset to the region and the state.

### **2. Soils and Minerals**

In general, the estuarine system bordering Marco Island consists of an upper layer of quartz sand, shell, and crushed limestone underlain with Tamiami Limestone. The nearshore sediments consist primarily of quartz dominated sand over layers of fine sand and silty clay. Calcium carbonate contents of the sandy bottom increases further offshore. The island side of the island is vegetated with mangroves. Sediments along this vegetated area consists of fined grained, dark carbonate muds with a high percentage of organic matter mixed with light colored silt-sized shell debris. Due to construction and “trucking in” of fill soils, most of the soil is considered “disturbed” or urban soil. Figure 5.2 depicts the soil distribution on Marco Island and countywide.

There are no known sources of commercially valuable minerals mined within the city limits, although the potential for offshore oil production in federal and state waters is a possibility. Such an activity would definitely have to be monitored and managed effectively in order to have no impact on fishing and tourist industries that depend on this coastline and the waters surrounding. Public input would be needed to reflect and discuss if this type of operation would be feasible or desirable.

### **3. Surface Water**

Surface waterbodies in Marco Island include nearshore waters, estuaries, bays, man-made lakes and canals. Florida’s surface waters are classified into five categories according to their present and



future uses. Table 5.1 lists the categories found in the Florida Administrative Code (FAC), Chapter 62. Generally the highest water quality with the most stringent regulations in place is Category I, although Category II and III may receive the same or even greater regulation depending on the intended use.

**Table 5.1**  
**Categories of Surface Water**

<b><i>Category I</i></b>	Potable water supplies.
<b><i>Category II</i></b>	Shellfish propagation or harvesting.
<b><i>Category III</i></b>	Recreation, propagation and maintenance of a healthy, well-balanced population of fish and wildlife.
<b><i>Category IV</i></b>	Agricultural water supplies.
<b><i>Category V</i></b>	Navigation, utility, and industrial uses.

*Source: Section 62-302.400 FAC*

Shellfish, such as oysters and scallops, feed by filtration or microscopic particles in the water column and are capable of filtering bacteria, viruses, or dissolved contaminants from polluted waters. Thus, the Florida Department of Environmental Protection (FDEP) has regulated Category II waters further by breaking them down into three sections to ensure the safety for human consumption of shellfish as shown in table 5.2.

**Table 5.2**  
**Category II Surface Water**

<b><i>Safe for Human Consumption</i></b>	Approved or conditionally approved for shellfish harvesting.
<b><i>Unsafe (Polluted) for Human Consumption</i></b>	Prohibited for shellfish harvesting.
<b><i>Lacking Significant Shellfish Resources</i></b>	No harvesting performed.

*Source: FDEP, FAC 62-302.4*

The State of Florida names certain submerged lands and associated waters “aquatic preserves” and describes them as waters that are of “exceptional biological, aesthetic, and scientific values.” These preserves are set aside forever for the benefit of future generations (Section 258.36, Florida Statutes). Two bays abutting Marco Island have been designated as aquatic preserves: Rookery Bay

and Barfield Bay.

Class III waters are considered suitable for recreation, and the propagation and maintenance of a healthy population of fish and wildlife. The following waters on the Island are designated as Class III: Marco River, Robert's Bay, Collier Bay, Smokehouse Bay, the waterway canals, and the nearshore waters of the Gulf of Mexico (Chapter 62-302, FAC).

Recreationally important, the approximately 100 miles of man-made waterway canals on the Island had an inconsistent history of monitoring before cityhood. They are categorized as Class III, predominately marine waters, but have tidal exchanges twice daily with the surrounding Class II waters of the Rookery Bay Natural Estuarine Research Reserve (RBNERR). One of the most important policies of the original Comprehensive Plan was to establish a water quality monitoring program for the inland waterways of the Island. Performed by the City's Environmental Specialist, the monitoring program has now been in effect for over 7 years.

Per the adopted policy the City monitors water quality at 12 sites throughout the island. The monitoring sites are listed below and note on Map5.1.

- Kendall Drive
- North Collier Bridge
- Windmill
- North Barfield Bridge
- Perrine Court
- Jane Hittler Park
- Hollyhock Court
- Hummingbird
- McIlvaine
- East Winterberry Bridge
- West Winterberry Bridge
- Health Care Center

The City monitors the following three parameters: fecal coliform, total nitrogen, and enterococcus species. For fecal coliform the Heath Department's standards for on site treatment requires an effluent fecal coliform value of less than 200 colonies per 100 milliliters (ml) sample. Per the City's DEP wastewater treatment plant permit, the treated wastewater can have a maximum fecal coliform of 25 colonies per 100 ml sample with 75% of all samples reading 0.

In regard to total nitrogen Marco Island waterbodies are designated by DEP as Class III surface waters. The state regulations state that, "In no case shall nutrient concentrations of a body of water be altered so as to cause an imbalance in the natural populations of aquatic flora or fauna."

The Enterococcus species are a subgroup of fecal Streptococci whose normal habitat is the gastrointestinal tract of warm-blooded animals. The Enterococcus Group is a valuable indicator form determining the extent of fecal contamination of recreational surface waters. Studies at marine and

fresh water bathing beaches indicate that swimming-associated gastroenteritis is related directly to the quality of the bathing water and that the Enterococci are the most efficient bacterial indicators of water quality. For recreational fresh water the guideline is 33 Enterococci /100 ml while for marine waters it is 35/100 ml.

**Table 5.3**  
**Surface Water Quality Monitoring Program**  
**Year 2001 - 2006**

	FECAL COLIFORM	ENTEROCOCCUS	TOTAL NITROGEN
	<i>200 Colonies/100 ml</i>	<i>35 Colonies/100 ml</i>	<i>0.9 mg/L</i>
	<i>Range</i>	<i>Range</i>	<i>Range</i>
Kendall	0-42	0-46	0-3.2
North Collier Bridge	0-68	0-110	0-3.1
Windmill	0-123	0-282	0-3.1
North Barfield Bridge	0-270	0-430	0-3.0
Perrine Court	0-81	0-238	0-2.9
Jane Hittler Park	0-500	0-1040	0-2.9
Hollyhock Court	0-350	0-370	0-3.1
Hummingbird	0-220	0-270	0-3.1
McIlvaine	0-26	0-243	0-2.9
East Winterberry Bridge	0-146	0-108	0-3.0
West Winterberry Bridge	0-480	0-480	0-3.0
Health Care Center	0-86	0-92	0-3.1

*Source: City of Marco Island*

#### **4. Groundwater**

Groundwater is water that is found below the land's surface. The groundwater flow (speed and direction) depends on the permeability of soil and rock layers and the relative pressure of the groundwater. Groundwater moves down gradient from high water pressure areas to low pressure areas. Aquifers are water-bearing layers of porous rock, sand, or gravel. Rainfall is the primary source of water for aquifers. The force of gravity allows the rainfall to percolate down through

porous surface soils and enter the aquifer. Areas that have this downward groundwater flow are called recharge areas. Due to the different permeability rates of soil types, the rate of aquifer recharge from rainfall varies from one location to another.

## 5. Floodplains

Coastal flooding is generally due to severe ocean-based storm systems. Hurricanes, tropical storms, and extra-tropical storms such as “northeasterns” are the principal causes, with flooding occurring when storm tides are higher than the normal high tide, and are accompanied by water moving at relatively high velocities with intensive wave action. The maximum intensity of a storm tide occurs at high tide, so storms that persist through several tides are the most severe. The velocity and range of coastal floods vary in part with the severity of the storm event that induces them. The damaging effects of coastal flooding are caused by a combination of the higher storm tide water levels, rain, winds, waves, erosion, and battering by debris.

In the City’s Floodplain Management Ordinance (#98-18), a floodplain is defined as “any land area, including watercourses, susceptible to partial or complete inundation by water from any source.” Figure 5.2 shows the location of the FEMA flood zones in the City. All property located within the City of Marco Island is considered to be located in a floodplain. Approximately 90% of the city is also located within a Special Flood Hazard Area (SFHA). A Special Flood Hazard Area is defined as “the base floodplain delineated on a Flood Insurance Rate Map (FIRM).” On the Marco Island FIRM, the SFHA is mapped as Zone AE of Zone VE. Zone AE is a numbered A Zone with a base flood elevation in relation to NGVD. Zone VE is a numbered V Zone with base flood elevation in relation to NGVD and which is subject to coastal high hazard flooding.

~~Due to the devastating effects of Hurricane Wilma in October 2005~~ The City of Marco Island declared a new “Lowest Floor Elevation” of AE 10.0 effective November 17, 2005 **that applies to new construction. Remodeling of existing structures may occur at existing structure elevations unless the value of the reconstruction exceeds 50% of the value of the structure, in which case minimum FEMA elevations shall apply.** While models utilized in conjunction with the preparation of FIRM maps had identified areas on Marco Island with flood elevations below AE 10.0, the effects of the hurricane prompted City officials to set AE 10.0 as the minimum elevation for the Island. Figure 5.2 shows the areas upon which the city mandated AE 10.0 elevation are applicable, along with other flood elevations effective throughout the city.

## 6. Protected Flora and Fauna

The following table (5.4 and 5.5) list the local species that are considered endangered, threatened or of special concern. The Florida Fish and Wildlife Conservation Commission (Chapter 39-27, FAC) maintain the State of Florida lists of animals. The Florida Department of Agriculture (FDA) and Consumer Services (Chapter 5B-40, FAC), maintains the plant lists. The federal list of animals and plants is administrated by the U.S. Fish and Wildlife Service [(50 CFR 17 (animals) and 50 CFR 23 (plants)]. The definitions of these classifications are as follows:

- Endangered: Any species that is in danger of extinction throughout all or a significant portion of its range.
- Threatened: Any species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.
- Species of Special Concern: Any species that could easily become threatened unless “appropriate protective management techniques are initiated or maintained.” (Florida Wildlife Code)

**Table 5.4**  
**Endangered, Threatened and SSC Plants on Marco Island**

<b>Species Common Name</b>	<b>Scientific Name</b>	<b>Designated Status</b>	<b>Agency</b>
Florida Tripsacum	<i>Tripsacum flordian</i>	Endangered	FDA
Simpson’s Zephyry Lily	<i>Zephyranthes simpsonii</i>	Threatened	FDA
Shell Mound Prickly Pear Cactus	<i>Opuntia stricta</i>	Threatened	FDA
Giant Leather Fern	<i>Acrostichum danaeifolium</i>	SSC	FDA
Satin Leaf	<i>Chrysophllum oliviforme</i>	Endangered	FDA
West Indian Mahogany	<i>Swietenia mahogani</i>	Endangered	FDA

*Source: Florida Department of Agriculture and Consumer Services (FDA), Chapter 58-40, FAC*

Staff botanists from RBNERR have documented the vegetation listed in Table \_\_\_\_\_. The West Indian mahogany, Florida tripsacum, and Simpson’s zephyr lily were all observed within landscaped properties on Marco Island. Many other plants that are designed as endangered, threatened and species of special concern have also been observed on the small keys south of Marco in the 10,000 Island area.

Table 5.5 lists the animals that are either endangered, threatened, and species of special concern that have been document on Marco Island.

**Table 5.5**  
**Endangered, Threatened and SSC Animals on Marco Island**

<b>Species Common Name</b>	<b>Scientific Name</b>	<b>Designated Status</b>	<b>Agency</b>
West Indian Manatee	<i>Trichechus manatus latirostris</i>	Endangered	FWS
Atlantic Green Turtle	<i>Chelonia mydas</i>	Endangered	GFC, FWS
Atlantic Ridley Turtle	<i>Lepidochelys kempii</i>	Endangered	GFC, FWS
Atlantic Loggerhead Turtle	<i>Caretta caretta</i>	Threatened	GFC, FWS
Gopher Tortoise	<i>Gopherus poluphemus</i>	Threatened	GFC
Mangrove Rivulus	<i>Rivulus marmoratus</i>	SSC	GFC
Southern Bald Eagle	<i>Haliaeetus leucocephalus</i>	Threatened	GFC, FWS
Brown Pelican	<i>Pelecanus occidentalis</i>	SSC	GFC
Burrowing Owl	<i>Speotyto cunicularia</i>	SSC	GFC
Florida Black Bear	<i>Urus americanus floridanus</i>	Threatened	GFC
Reddish Egret	<i>Egretta rufescens</i>	SSC	GFC
Snowy Egret	<i>Egretta thula</i>	SSC	GFC
Tricolored Heron	<i>Egretta tricolor</i>	SSC	GFC
White Ibis	<i>Eudocimus albus</i>	SSC	GFC
Roseate Spoonbill	<i>Ajaia ajaia</i>	SSC	GFC
Little Blue Heron	<i>Egretta caerulea</i>	SSC	GFC
Common Snook	<i>Centropomus undecimalis</i>	SSC	GFC
Eastern Indigo Snake	<i>Drymarchon corais couperi</i>	Threatened	GFC, FWS
Red Rat Snake (Corn)	<i>Elaphe guttata guttata</i>	SSC	GFC
Bluetail Mole Skink	<i>Eumeces egregius lividus</i>	Threatened	GFC, FWS
Florida Scrub Jay	<i>Aphelocoma coerulescens</i>	Threatened	GFC, FWS
Limpkin	<i>Aramus guarauna</i>	SSC	GFC
Piping Plover	<i>Charadrius melodus</i>	Threatened	GFC, FWS

White-crowned Pigeon	<i>Columba leucocuphala</i>	Threatened	GFC, FWS
Least Tern	<i>Sterna antillarum</i>	Threatened	GFC, FWS
Roseate Tern	<i>Sterna dougallii</i>	Threatened	GFC, FWS
Florida Sandhill Crane	<i>Grus canadensis pratensis</i>	Threatened	GFC
American Oystercatcher	<i>Haematopus palliatus</i>	SSC	GFC
Wood Stork	<i>Mycteria americana</i>	Endangered	GFC, FWS
Osprey	<i>Pandion haliaetus</i>	SSC	GFC
Florida Tree Snail	<i>Liguus fasciatus</i>	SSC	GFC

Source: Florida's Endangered Species, Threatened Species, and Species of Special Concern, Official Lists, April 1996, Florida Fish and Wildlife Conservation Commission

## 7. Special Wildlife Species

### Bald Eagle

The Southern Bald Eagle is classified as a threatened species by both the federal government and the State of Florida. Marco Island has had a long history of providing habitat for this species. Bald eagle pairs generally mate for life and may use the same nest year after year. Since 1980 the local office of the Florida Fish and Wildlife Conservation Commission have conducted a Bald Eagle Production Study on and around Marco Island. For years, three well known sites on Marco Island for bald eagles were Tract K (**1 site**) and the Island Country Club property (**2 sites**). **One active nest exists on the Island Country Club site.** Tables 5.6 and 5.7 present annual data from 2000 onward related to specific nesting sites.

**Table 5.6**  
**Bald Eagle Production Study: Nest Number Co-05**

Nesting Season	Active (Yes or No)	Incubation (Yes or No)	# Of Young Hatched	# Of Young Produced	Comments
2000	Yes	Yes	2	2	
2001	Yes	Yes	2	2	
2002	Yes	Yes	1	1	
2003	Yes	Yes	2	2	
2004	Yes	Yes	3	3	
2005	Yes	Yes	2	2	

*Source: Florida Fish and Wildlife Conservation Commission, Naples Office*

**Table 5.7  
Bald Eagle Production Study: Nest Number Co-08**

Nesting Season	Active (Yes or No)	Incubation (Yes or No)	# Of Young Hatched	# Of Young Produced	Comments
2000	Yes	Yes	1	1	
2001	Yes	No	--	--	
2002	Yes	No	--	--	
2003	Yes	No	--	--	
2004	No	--	--	--	
2005	No	--	--	--	

*Source: Florida Fish and Wildlife Conservation Commission, Naples Office*

Although bald eagle nests are legally protected, a nest itself is relatively inconsequential to a pair of eagles. The actual nest site that originally attracted the pair is what is of critical importance. Even though nests and/or nest sites can be disturbed by human activity, eagles are resilient and will return. Typically the birds will re-build a nest on the same site (a pair can reconstruct a nest in a little time as a week), sometimes even the same tree. Therefore, in instances where nests, or even nest trees, are lost, guidelines for protection of the site need to be continued for a period extending through at least two complete breeding seasons subsequent to the loss, to ensure that the bald eagles habitat remains. This is also true for “abandoned” nests. In certain circumstances the birds may use a couple of nests at a time, so a nest that is built but not inhabited (“abandoned”) should not be disturbed. Tract K is a prime example of a nesting site that over time has been “abandoned” but nonetheless receives on-going protection. The City of Marco Island continues to view bald eagle nesting sites as a critical issue and will cooperate with both state and federal agencies monitoring this threatened species.



## Burrowing Owls

Historically the burrowing owl occupied treeless grasslands and pastures of central and southern Florida. Due to development of urban communities, most of their habitat has been lost. The owls are predominant throughout the neighborhoods of the City of Marco Island, especially prevalent when a lot has been cleared and the soil broken then not disturbed for a period of time. They live as single breeding pairs or in loose colonies consisting of two or more families. Unlike other owls, the burrowing owl is active both day and night. Typically during daylight they can be seen standing erect at the mouth of their burrow. They mainly eat insects, such as roaches and cricket moles, which are beneficial for urban communities. They also are known to consume small lizards, frogs, snakes and rodents. Burrowing owls roost and nest underground, usually in sandy soil, in burrows that extend 4 to 8 feet. Nesting season begins in March with eggs laid between October and May. Burrows seem to decrease during summer months, when frequent heavy rains cause many to flood.

The burrowing owl is one of Florida's smallest owls with an average height of 9 inches and a 21 inch wing-span. Because of the decrease in population due to habitat loss caused by rapid development, this species is protected from harassment and/or disturbance by state law. Burrowing owls, their eggs, and nests are also protected under the Federal Migratory Bird Treaty Act. This Act prohibits nest destruction without a permit issued by the U.S. Fish and Wildlife Service. Policy to issue permits to allow nest destruction is viewed as a last resort after all reasonable alternatives have been proven impractical. Permits are only issued if the nest is concluded to be "inactive" which means it is containing no eggs or flightless young.

With this in mind, property owners and developers are recommended to take cautionary measures to guard any nest from accidental destruction. Pursuant to Ordinance 01-34, in conjunction with the issuance of a building permit the City will flag the property for any burrowing owl nests (or other species of special concern), and constantly monitor the site throughout construction. Several cases have been presented to the Code Enforcement Board involving disturbances to burrowing owls nests, and significant fines have been levied. Other measures, such as roping off the areas around the buffer zone of the burrow and placing a T-perch near the opening of the burrow will increase the chance of the owl's nesting success.

Public awareness for the protection of this species comes from the Florida Fish and Wildlife Conservation Commission, the City of Marco Island, and the Collier County Department of Natural Resources. In cases where an application for the removal of a burrow is pursued, these agencies work to guide residents/developers on proper procedures and precautions.

## Gopher Tortoises

The gopher tortoise is classified by the Florida Fish and Wildlife Conservation Commission as a

species of special concern. Currently it is found throughout Marco Island because three conditions needed for healthy tortoise populations are sufficiently met: well-drained, sandy soils for digging burrows, sufficient low plant growth for food, and open sunny areas for nesting. Tortoises can also live in some man-made environments such as grassy roadsides or pastures.

The gopher tortoise is considered a “key stone” species because the burrows provide shelter for more than 360 species of animals including snakes, lizards, rabbits, quail, burrowing owls, Florida mice, skunks, armadillos, and many invertebrates. These animals use the burrows to escape predators, adverse weather conditions, and even fire. Some species can not even exist without the tortoise burrows.

The gopher tortoise is declining throughout its range. In Florida, the population is estimated at 30% of their original numbers. Many factors contribute to this decline and include urban development, road mortality, inadequate law enforcement, and careless use of herbicides and pesticides. First and most serious is the urban development of gopher tortoise habitat. As the City of Marco Island reaches the build-out stage, a critical issue will be to ensure that people and tortoises can live within close proximity of each other.

The State of Florida lists the tortoise as a non-game species and requires citizens to obtain a scientific collecting permit for possession. Builders are required to obtain a “Special Permit” to relocate up to five tortoises from their burrows and move them on the same property. A “General Permit” is needed for off-site relocations and any activity involving more than five tortoises. To assist with the issuance of necessary permits the City, pursuant to Ordinance 01-34, investigates all construction sites prior to the issuance of building permits to assure any burrow or activity is noted, and the proper precautions/permits are received prior to actual construction.

## Manatees

The West Indian (or Florida) Manatee is a large, marine mammal averaging 1,000 pounds to as much as 1,500 pounds as an adult. Feeding an average of six to eight hours per day, they consume aquatic vegetation and, if available, shoreline vegetation. Their diet is not apparently related to specific plants. Found in canals, rivers, estuarine systems, saltwater bays, and even open ocean waters, the manatee inhabit warm water environments. They do migrate along the coast of Florida with cold water temperatures prompting the migration. Another reason they migrate is the need for fresh water for drinking.

Listed as an endangered species by both the U.S. Fish and Wildlife Service and the Florida Fish and Wildlife Conservation Commission, these slow moving animals with no system of defense, are susceptible to watercraft collisions, poaching, ingestion of fishhook and monofilament line, entanglement in crab trap lines, and pollution. In addition, rapidly shrinking habitat due to coastal development and a combination of high mortality rates and low reproductive rates have led to serious doubts that the species will be able to survive in the United States.

Critical habitats for the West Indian Manatee are listed by the U.S. Fish and Wildlife Service as, “all

U.S. territorial waters adjoining the coast and islands and all connected bays, estuaries, and rivers from Gordon’s Pass near Naples, Collier County southward to and including White water Bay, Monroe County.” This expansive description of critical habitat for the manatee includes all surface water within the City of Marco Island.

To combat the threat to the manatees’ survival, several legislative actions have been taken. The United States Marine Mammal Protection Act of 1972 banned hunting of manatees (and most marine mammals), imposed a permit system to capture manatees for research, and forbade the importing or exporting of manatee parts or products. Additional protection resulted from the Endangered Species Act of 1973, which classified the species as endangered. Endangered is defined as, “in danger of extinction without human protection.” Since 1974 the Florida Department of Environmental Protection (FDEP), working with Florida Marine Research Institute, have been gathering evidence on species mortality. The mortalities have been categorized by watercraft, human related (other than watercraft), peri-natal, other natural causes, and unknown sources. Table 5.8 tracks these statistics from 2000 to 2005. Red tides and cold water temperatures can lead to respiratory ailments that impact manatees, and can cause spikes in annual mortality rates.

**Table 5.8**  
**Manatee Mortality Data for Collier County (2000 - 2005)**

Year	Watercraft	Human Related	Perinatal	Other Natural	Unknown Sources	Total #
2000	5	0	6	8	16	35
2001	8	0	0	14	9	31
2002	6	0	2	2	3	13
2003	7	0	6	19	5	37
2004	5	0	4	8	6	23
2005	4	0	8	12	10	34
2006	1	0	1	5	7	14

*Source: Florida Marine Research Institute, Education Office*

Seeing the negative effects of boating and human activities on manatee welfare, the State of Florida passed the Florida Manatee Sanctuary Act, enforced by FDEP, which established boating restrictions in important manatee habitats. The City has adopted “no-wake, idle speed” zones throughout the island’s waterways and canals to enhance protection within the City’s limits (See Figure 5.3).

Sea Turtles

Between May 1<sup>st</sup> and August 31<sup>st</sup>, the beaches along the Gulf of Mexico on Marco Island have long been an important nesting area for the loggerhead turtle. Listed as a threatened species since 1973 by the Federal Endangered Species Act, the loggerhead turtle is the most common sea turtle in Florida. Though green sea turtles and Kemp's Ridley turtles have been seen swimming in waters surrounding Marco Island, only the loggerhead turtle has had a history of nesting on Marco's beaches.

The name "loggerhead" comes from its large head that can be up to 10 inches wide. It has large, powerful jaws for crushing shell-encased animals such as clams and crabs on which it feeds. The turtles spend most of their time feeding or sleeping in open ocean waters. Females will travel hundreds of miles to feed or nest. Sandy, warm beaches are needed for nesting and incubation of eggs. A loggerhead may nest 1-7 times a season at 14-day intervals in a 2 to 3 year cycle. Nesting occurs at night. Over a sixty day period the eggs incubate themselves in the warm Gulf coast sand. The hatchlings emerge as a group from their nest during the cool night hours. Hatchlings continue to emerge through the month of October in the Marco Island area. Once out of the nest, the hatchlings move down the beach toward the Gulf of Mexico to swim offshore. Predators that naturally eat the baby turtles are birds, raccoons, crabs and fish. Man-made threats range from drowning in shrimp trawlers and other fishing gear, swallowing trash mistaken for food, pollutants in the water, to artificial lighting that disorients. The turtles that succeed in making it offshore, usually one out every one thousand hatchlings, remain for years floating and drifting along the edge of the ocean current. Sea turtles are believed to live up to 80-100 years.

A Turtle Monitoring Program was initiated on the Island by Collier County in 1990. Each morning biologists patrol the beach looking for evidence of nesting turtles. Each sea turtle emergence is examined and determinations are made to whether it is a nest site or a false crawl. If nesting has occurred, the site is marked with stakes and warning tape, and if necessary covered with a metal screen to protect it from predators. After the hatching occurs, the biologists excavate the nest to determine how many hatchlings emerged from the nest. Eggs are counted and a hatchling success (the number of hatched eggshells in relation to total number of eggs) is calculated for each nest.

During the nesting season, one of the biggest concerns for a productive season is the control of artificial beach lighting. It can have negative effects on both the female turtle approaching the beach as well as the newly emerged hatchlings. A turtle approaching the beach from offshore may be disoriented and deterred from nesting if they see bright lights. The turtles that make it onshore can be frightened off by artificial lights which can cause a "false crawl" or occur. A "false crawl" is when a female crawls onto land from the sea but does not lay her eggs. The same artificial lights that frighten the adult turtle will attract newly emerged hatchlings. Instinctively, in natural conditions, the hatchlings will be drawn to the Gulf of Mexico by the natural reflective light of the water. With artificial lights, the natural reflective light can be brighter and confuse the hatchling turtles. The disoriented hatchlings end up in gutters, parking lots, swimming pools, and roadways instead of the ocean.

Ordinance 01-35 outlines restrictions to outdoor lighting during sea turtle nesting season. The beaches are patrolled during the night, and if a lighting violation is noted, there is an outreach effort

to correct the violation with the property owner. If the violation is not corrected, or if an “irreparable situation” occurs, then formal action before the Code Enforcement Board will be pursued. Over the years several violations have been prosecuted before the CEB, and significant fines have been imposed.

Table 5.9 tracks nesting activities on Marco Island from 2000 to 2006. As turtles have a tendency to return to the beach from which they were hatched, it is not safe to assume that when a false crawl occurs a turtle will nest at another location. Prime nesting habitat is limited due to beachfront properties with heavy public access.

**Table 5.9**  
**Marco Island Beach Monitoring Data**

Year	Total Nests	False Crawls
2000	50	52
2001	79	115
2002	28	54
2003	55	80
2004	59	97
2005	39	75
2006	56	107

*Source: Collier County Department of Natural Resources*

## **8. Air Quality**

The Florida Department of Environmental Protection (FDEP) monitors air quality for particulate matter (PM), as described in Rule 62-204, FAC, as “any airborne finely divided solid or liquid material.” The PM 10 monitor, which reads particulate matter with an aerodynamic diameter less than or equal to 10 micrometers, is located in Naples. The average monthly particulate level is approximately 50 micrograms PM/cubic meter, which is within acceptable limits under State air quality regulations. Hence air quality is generally good and within the limits established through the federal Clean Air Act. The U.S. Environmental Protection Agency (EPA) lists Collier County, including Marco Island, as an “attainment area” due to the air quality.

Generally vehicle exhaust (combustion) or construction activities minimally affect air quality on Marco Island. FDEP issues air quality permits, but does not routinely monitor or inspect facilities, although they will respond to complaints from property owners and citizens.

### **B. Coastal Habitats**

## **1. Vegetative Cover**

Coastal strand vegetation in Florida occurs primarily along high-energy shorelines. These areas typically exhibit zonation, with sparse pioneer species such as sea oats, sea purselane and railroad vine predominant immediately landward of the barren, sandy beach zone. Behind this foredune is a somewhat more stable vegetative assemblage including saw palmetto, cabbage palm, seagrape, wax myrtle, scrub oak, and often Australian pine or Brazilian pepper. The more woody, stable backdunes may resemble sand pine scrub in general growth form, and to a certain extent, in species composition. Bays and estuaries host beds of seagrass which are very important to the coastal ecology. Seagrasses play a vital role in producing detrital food for the estuary, providing protection for young organisms, provides a substratum for various marine organisms, and harbor diverse bottom animals. Mangrove swamps occur along low-energy coastlines. Species composition, productivity, and ecological benefits associated with mangrove swamps vary widely with the tidal regime, substrate conditions, salinity, and degree of disturbance of the swamp or upland. Red mangroves tend to dominate below mean low water, with black mangroves occupying the shallow intertidal area and buttonwoods occupying the drier inner zone. White mangroves may occur throughout the swamp, or dominant landward of the black mangroves, but it is uncommon in the deeper, permanently inundated zone. Areas with irregular topography may exhibit little zonation, with three mangrove species intermixed with no definite pattern.

## **2. Wetlands and Mangrove Areas**

Wetland is a general term used to describe a diverse ecosystem that is periodically inundated with fresh and/or salt tidal waters. Water is the dominant factor that determines the nature of soil development, and the types of plants and animals that live in the soil or on its surface. With tidal flooding, warm climate, and sheet flow by nutrient-rich waters, there is a diverse population of organisms that reside in the wetlands around Marco Island that are predominately described as mangrove-fringed estuaries or mangrove swamps. Figure \_\_\_ shows the potential wetland areas on Marco Island.

The three species of mangroves present in this area are the Black Mangrove (*Avicennia germinans*), the White Mangrove (*Laguncularia racemosa*), and the Red Mangrove (*Rhizophora mangle*). The Red Mangrove tends to dominate below the mean low water line, with the Black Mangrove occupying the shallow intertidal area, and the White Mangrove occurring throughout the swamp. Mangroves grow best in environments with low wave energy, which benefits the accumulation of sediments, the shallow root system, and promotes propagules (roots) to establish. The bays of the area are fringed by dense growth of Red Mangroves and all contain small islets of the species. This type of habitat serves as a safe nursery ground due to the seasonally abundant food resources and the low frequency of large predators for shish that are spawned offshore. Also this ecosystem is important habitat for a wide variety of invertebrates, reptiles, birds and mammals that are in turn important for the commercial, recreational, and tourist industries.

Man-induced destruction of mangrove systems have occurred in Florida in various ways, including direct dredge and fill operations. It has been found that loss of mangrove systems throughout Florida is not substantial, but significant losses in specific locations, including Tampa Bay, the Florida Keys and Marco Island have been cited ("The Ecology of Mangroves, 1982"). It has not been conclusively determined to date why the mangrove systems around Marco Island have been impacted. However there is evidence of approximately 40 acres of die-off around the southeastern portion of the island near County Road 92. Destruction of mangroves mainly began in the state's three lower counties (Collier, Dade, and Monroe) when the dredge and fill activities were ongoing between 1943 and 1972 to construct Highway 41. Diking, long-term flooding, and non-point sources of pollution contribute to the susceptibility of mangroves. Even though mangroves usually occur in areas of high sedimentation, they can not tolerate heavy loads of fine, flocculent material. This coats the propagules and may result in death of the plant. This can happen in areas that are channelized, like the Marco Island "profile", and which allows the intrusion of large quantities of sands and fine muds to enter the ecosystem.

State-owned lands around Marco Island with severely disturbed mangrove forests have been subjected to restoration efforts by Rookery Bay National Estuary Research Reserve (RBNERR). Restoration efforts in two such areas are being monitored for the recolonization of fish and invertebrates, and renewed use by shore and wading birds. Long-term studies will determine the best techniques that can help regulatory agencies achieve greater success in future restoration projects.

Protective measures for mangroves are included in Florida's Mangrove Trimming and Preservation Act and includes prevention of:

- Out-right destruction from dredging and filling;
- Drainage, diking, or flooding;
- Any alteration of hydrological circulation patterns, particularly involving tidal currents;
- Introduction of fine, flocculent materials;
- Increased wave action from boat wakes and seawalls; and
- Oil/chemical spills and herbicide application.

Permits for clearing, filling, and any other construction activity must meet all federal, state, and local rules and regulations before approval by the City. As part of the "Deltona Settlement" the U.S. Army Corps of Engineers issued approximately 39 permits in the Barfield Bay area for lot clearing and filling. Those permits expired in 1999. Due to ownership turnover very few of those original permits were acted upon. For those that did utilize permits, the City carefully monitored trimming and/or mangrove removal activities to ensure consistency with permit requirements. Since then the City continues to monitor mangrove resources, and unauthorized trimming activities are subject to action before the Code Enforcement Board, and significant fines and restoration orders have been issued.

### **3. Beaches**

Beach and dune systems are described as the area of unconsolidated material that extends landward from the mean low water line to the area of marked change in material or physiographic form or to the line of permanent vegetation. Typically the beach is divided into four zones:

1. Dunes - influenced by wind or major storms;
2. Backshore - subject to irregular wave action due to tidal surges and wind;
3. Foreshore - subject to wave breaking action; and
4. Nearshore - which is submerged.

Historically Marco Island consisted of multiple beach ridges. Beach ridges evolve through the process of sand being washed upland by wave run-up and overwash. Subsequently, vegetation colonizes and stabilizes these accretional features. This process, repeated over time, results in multiple ridges. Plants and animals that live within beach and dune habitats have adapted to the constant motion of sand, wind, and wave action. Plant species that are present on the dunes and also help stabilize this system with deep roots include sea oats, railroad vine, and beach elder. Seagrape and saw palmetto may be observed behind the dune line. This vegetation has to be salt tolerant and be able to recover rapidly from severe stresses, such as wind, shifting soils, sea spray, and lack of freshwater. Many endangered and threatened species rely on this environment for survival. The animals range from minute invertebrates (sand fleas, coquinas, and other shellfish) to macro invertebrates (fiddler crabs and ghost crabs) to mammals (raccoons) and a large number and variety of shore birds. Sea turtles also use dune areas and the sandy beach for nesting purposes.

Barrier islands are characterized as dynamic, low-lying narrow strips of sand that are able to migrate with changes in sea level. As a barrier island, Marco Island serves an important environmental function. It protects the mainland from major storm surges and damage, and acts as a buffer to the estuarine system located within and behind it. Due to the near complete development of beachfront property on the island, the natural ability for the island to migrate and shift is “stressed”. This stress could easily show its effect in an event of a tropical storm or hurricane when drastic erosion occurs and there is not a natural process left to replenish the sand.

The littoral drift, defined as how sand is deposited and removed along the beach via wave energy, has gradually changed the profile of the Marco Island beachfront. For Collier County, the annual average net wave-induced sand transport is north to south, due to more wave energy moving into the beach from the northwest than the southwest. This is a natural condition, but to keep a balance between human activity and conservation this action will have to be constantly monitored and managed. Management often involves the placement of protective surrounds (groins), planting of vegetation, and renourishment projects.

The foreshore and nearshore beach zones normally contain valuable seas grass beds which serve as feeding grounds for a wide variety of fish and other sea fauna. Marco Island’s sea grass beds have not been mapped in detail, however this environmentally sensitive resource should be protected to the maximum extend feasible whenever beach renourishment or other public or private projects are planned along the Island’s coastline.



## **4. Estuaries and Bays**

Estuarine water systems are some of the most biologically rich of all coastal waters. An estuary is defined as a semi-closed naturally existing coastal body of water with shallow water depths (less than 20 feet), good distribution of nutrients throughout the water column, and regular tidal exchange with freshwater input. Salinity is a factor that changes regularly, varying from fresh to seawater and may fluctuate seasonally. Based on this description, most of waters surround Marco Island are considered estuarine. Two natural bays bordering and within the city limits, Barfield Bay and Collier Bay, can also be described as estuarine waters. Both bays have mangrove fringed borders, tidal flats, oyster beds, and sea grass beds as subsystems within the environment. Each subsystem plays a significant role in the estuarine ecology. As the population on the island increases, so does the boating traffic and other human related activities that can adversely affect these environments.

Construction of waterway canals, recreational and commercial boating/fishing, sediment runoff from urban development, and other non-point sources of pollution have caused degradation of the estuarine habitats around Marco Island. As noted with mangrove swamps, the construction of highway 41 resulted with the alteration of the historic sheet-flow of coastal freshwater input into the estuarine system of South Florida. The timing of the freshwater input now is significantly different than historic, natural conditions. Pollutants from “upstream” agricultural activities combined with stormwater runoff also contribute to the overall degradation of water quality. Adverse man-induced effects on an estuarine system are generally difficult to restore.

### **C. Special Resource Protection Areas**

#### **1. Rookery Bay National Estuarine Research Reserve**

In the late 1960s the United States Congress recognized the need to protect coastal resources from pollution and the impact of development. To help protect these critical environments from further harm, the National Estuarine Sanctuary Program was created as part of the Coastal Zone Management Act (CZMA) in 1972. Amendments in 1985 and the re-authorization in 1990 changed the name of the program to the National Estuarine Reserve Research System (NERRS). The National Oceanic and Atmospheric Administration (NOAA) was given the responsibility to designate the estuarine reserves within the United States. To date there are 22 such reserves. Once a research reserve is established, the goal is to provide opportunities for long-term estuarine research and monitoring, education that progresses scientific knowledge and enhances public awareness of estuaries, and finally, to provide a basis for more informed coastal management decision-making.

Bordering the northern and eastern city limits of Marco Island is the Rookery Bay National Estuarine Research Reserve (RBNERR). The official boundaries are listed in Florida Statutes, Chapter 258, and depicted in Figure 5.5. Designated in 1978 by NOAA, this system represents a nearly pristine mangrove estuarine system and is part of the Ten Thousand Islands, which is one of the largest mangrove-forested regions in the “New World” (Rookery Bay NERR, Management Plan, 1990). A three-member Reserve Management Board made up of representatives from the Florida

Department of Environmental Protection, the Nature Conservancy, Inc., and the National Audubon Society, provide management direction for this reserve. The current area of Rookery Bay NERR incorporates key land and water components that total 110,000 acres. Only 12% of this acreage is estimated as open surface water, with the remaining acreage is composed of estuarine mangrove wetlands, fresh/brackish water marshes, and upland habitats consisting of pinelands, cabbage palms, and coastal hammocks. Rookery Bay itself provides habitat for recreationally and commercially important fish and shellfish.

Considering that southwest Florida is one of the fastest growing areas in the nation, Marco Island is fortunate to have an abundance of State-owned land on its' borders to create a natural and environmentally-unique setting. Due to the rapid urban growth in Collier County, land use within the primary watersheds of Rookery Bay (and the Ten Thousand Islands) is changing at an unprecedented rate. As a result, non-point source pollution, runoff from agriculture, golf courses, construction, nurseries, and lawns have the potential to negatively impact the natural communities downstream of the source, which is the City of Marco Island. These sources of non-point pollutants will continue to affect water quality in Rookery Bay and as a result, Marco Island. To combat this problem of altered hydrology and water quality that may negatively impact habitats and ultimately cause a shift in plant and animal community structures, the Rookery Bay NERR Management Plan has identified the protection of the watershed as its' highest priority.

## **2. Barfield Bay Aquatic Preserve**

Located in the southeast area of Marco Island, Barfield Bay has an important role in the estuarine system. Mangrove wetlands border the bay where many species nest, grow their young, and live. It is designated as an aquatic preserve (AP) by the State of Florida and maintained by the FDEP. Research is the basic foundation of resource management. Management of this preserve encompasses water quality studies, mangrove studies, and other effective methods of habitat conservation and restoration.

## **3. Hideaway Beach Conservation Areas**

Hideaway Beach is a private residential community within the City of Marco Island. It is located at the north portion of the island situated between the Gulf of Mexico to the west, Big Marco Pass to the north, and Smokehouse Bay to the east. The area totals approximately 305 acres with 132 acres defined as conservation areas. The conservation areas are distributed throughout the development and are available, in various degrees, for the use and enjoyment of the Hideaway Beach property owners. The conservation areas are defined in the "Deltona Agreement". Local, state, and federal regulations determine the potential degree of use and managed conditions of the conservation areas.

Geography, topography, and/or vegetation community can separate the variety of areas contained within the 132 acres. Eight conservation areas have been created as follows:

1. Collier Bay Mangrove System
2. Big Marco Pass

3. Gulf of Mexico Shoreline
4. Twin Lagoon Area Uplands
5. Twin Lagoon Area Mangroves
6. Big Lagoon Mangroves
7. Miscellaneous Lands Adjacent to the Golf Course
8. Miscellaneous Lands North and West of the Golf Course

These areas are shown in Figure 5.6. A management plan was designed in August 1996 to maintain and preserve the essential nature of these areas. Primary management activities consist of exotic vegetation removal, prevention of additional establishment of exotics, and maintenance of the several public access trails. The City of Marco Island will only permit trimming and vine removal if site plans and activities are in compliance with the existing management plan, and state and federal rules and regulations.

#### 4. Critical Wildlife Areas (CWA)

In 1977 the State of Florida established the Critical Wildlife Area Program. Areas that have concentrations of one or more species that are in the danger of becoming extinct are protected and posted with signage that states the intent. There are currently **sixteen** Critical Wildlife Areas (CWA) in Florida and the Marco Island area encompasses four of these as noted in Table 5.10.

**Table 5.10**  
**Active Critical Wildlife Areas in the Marco Island Area**

Name	Year Designated	Closure Period	Species
ABC Islands	1993	Year-round	Hérons, egrets, pelicans, magnificent frigates
Big Marco Pass	1988	Year-round	Terns, black-skimmers,
Caxambas Pass	1988	Year-round	Terns, black-skimmers, wintering shorebirds
Rookery Island	1978	Year-round	Hérons, egrets

*Source: Florida Fish and Wildlife Conservation Commission, 1999*

Private property owners and the Florida Fish and Wildlife Conservation Commission (FFWCC) cooperate in designating the areas for protection. The areas become mini-sanctuaries for the wildlife surrounded by urban development. Biologists evaluate and monitor the sites yearly and draft rules referred to as the Establishment Order of the area. These describe specific boundaries, the species using the area, and the terms and conditions (including dates) under which the area is established. Signs are posted to clearly show the critical nature of the site and the potential impact of human disturbance. This program is enforced under the Florida Administrative Code 39-19.005, which

states that it is illegal to take or disturb any wildlife, enter or operate a vehicle, or knowingly allow a dog under your care within any CWA during the period designated by the Establishment Order for the area.

### **ABC (Bird) Islands CWA**

The ABC Islands CWA consists of three emergent mangrove islands located along the eastern shore of Marco Island in the Big Marco River. Herons, egrets, and pelicans nest and year-round roost on all three islands. The CWA was established in 1993 to protect the species and habitat. The islands are situated between two navigable channels, but human disturbance is rare since they are located in shallow waters outside the boating channel. Public awareness programs explaining why this habitat is valuable will continue.

### **Big Marco Pass CWA**

Established in 1988, the Big Marco Pass CWA is a valuable nesting and over-wintering ground for over 40 species of migratory and resident shorebirds, as well as wading birds. Included in the group is the black skimmer, a “species of special concern”, and the snowy plover and least tern, both “threatened”. The State-owned sandbars and mudflats in this CWA are located adjacent to Tigertail Beach County Park. Public access for much of the sandbar is greatest during the winter months due to the swell in tourists and seasonal residents visiting Marco Island. Occasional disturbance is a real problem for the bird population in the Big Marco Pass CWA.

### **Caxambas Pass CWA**

Established in 1988, Caxambas Pass CWA is also a valuable nesting and over-wintering site for most of the same species that reside on Big Marco Pass. Increase boating traffic in this area has generated concern for the bird population. Many boaters stop at the sandbar to camp, fish, shell and stroll. Signage is present to ward off public disturbances, but more education is needed to ensure these bird populations and their habitat remain intact.

### **Rookery Island CWA**

Established as a CWA in 1978, Rookery Island lies within the Rookery Bay National Estuarine Research Reserve (RBNERR). Herons and egrets nest and roost year-round on this island.

## **D. Coastal Zone Issues and Management**

### **1. Coastal Planning Area Conditions**

The State provides guidelines for applicable local governments in establishing their “coastal planning area” by specifying that such areas can be: (1) water and submerged lands of oceanic water

bodies or estuarine water bodies, (2) shorelines adjacent to oceanic waters or estuaries, (3) coastal barriers, (4) living marine resources, (5) marine wetlands, (6) water-dependent facilities or water-related facilities on oceanic or estuarine waters, (7) public access facilities and oceanic beaches or estuarine shorelines, and (8) lands adjacent to such occurrences where development activities would impact the integrity or quality of the above.

Another important factor in designation a coastal planning area is the coastal high hazard area that is defined as the evacuation zone for a Category 1 hurricane. Pursuant to the Hurricane Storm Tide Atlas for Collier County, prepared by the Southwest Florida Regional Planning Council, the majority of Marco Island, as well as the two approaches to the City, are vulnerable to not only Category 1 hurricanes, but also tropical storms. Some isolated highland areas are rated as subject to Category 3 hurricanes or higher. Further, Marco Island is a barrier island, and as such, acts as a buffer for sensitive estuarine eco-systems further inland.

Based on the above criteria, the entire municipal boundary of the City is within the coastal planning area. This in turn presents many exciting challenges and opportunities for the community to wrestle with as the City grows into the future.

### **Existing Land Use Conditions**

The land use patterns within Marco Island were significantly influenced by the Mackle Brothers and the Deltona Corporation who created an island master development plan in the 1960s and 1970s. The vast majority of the City is platted and planned for single family residential dwelling units. Although there are pockets of multifamily housing, most high-rise hotels, resorts, and multifamily developments are located along Collier Boulevard from Clam Bay south to Caxambas Bay. One large and two smaller commercial areas were planned to provide services for Island residents and visitors.

A table summarizing the existing land uses by acreage for the City of Marco Island and a map of the existing land uses can be found in the Future Land Use Element (Chapter 1).

### **Land Use Conflicts**

Because of the proximity of water resources, including oceanic, bays, rivers and canals, Marco Island is a boater's paradise. Further, Marco Island is a vacation destination for tens of thousands of visitors. Accommodating the needs of varying users can lead to conflicts. For example, there is only one public boat ramp, which is utilized by City and County residents, as well as visitors. Marina space is in short supply, and the opportunities for expansion are limited and, more importantly, face high land costs and strict permitting hurdles. Having water access is a valuable commodity, with few remaining sites for commercial or multifamily uses. As waterfront locations diminish, there will be increased pressures to provide alternative locations for water access, especially for private boaters. The need for additional boat launching facilities is discussed in the Recreation and Open Space Element.

Initially a concern for the original comprehensive plan was the limited opportunities for public beach access. Since incorporation the City has worked with private development to incorporate public beach access as part of their approved development proposals. From the public access points at Tigertail Beach County Park and the South Beach Access available at the time of cityhood, two new locations, north of the Marriott and adjacent to the Radisson property have emerged. The expansion of public beach access points is one of the most significant achievements for the City.

## **Water-Related and Water-Dependent Land Uses**

Water-related land uses are plentiful within the City of Marco Island. From the oceanfront resorts, to the marinas, to the homes located on canals, the City's water resources play an important role in creating the ambiance of the Island. In contrast, water-dependent uses absolutely must be on a land directly adjoining the water. Examples include marinas, boat ramps and public/private beach access points. Figure 5.7 shows the location of the island's primary water-related and water-dependent uses.

**Marinas.** There are 2 public and 2 private marinas within the City of Marco Island. Each offers various amenities and services including sales, accessories, and storage (wet and dry) of boats.

The City of Marco Island was adopted Manatee Protection and Marina Siting development review criteria under Section 54-117 of the Land Development Code. Under this section rating criteria are applied to both multiple slip docking and marina facilities. When reviewing new and/or renovated facilities the following ratings are applied:

- A *preferred rating* is given to a site that has or can legally create adequate water depth and access, will not impact native marina habitat, and will not impact a high manatee use area.
- A *moderate rating* is given to a site where: there is adequate water depth and access, no impact to a high manatee use area, but there is an impact to native marine habitat; there is adequate water depth, no impact to native marine habitat, but impacts a high manatee use area; and when the water depth is less than four feet mean low water (MLW), no impact to native marine habitat, and no impact to a high manatee use area.
- A *protected rating* is given to a site where: there is adequate water depth and access, but there is an impact to native marine habitat and there is an impact to a high manatee use area; there is not adequate water depth, there is impact to or destruction of native marine habitat and there is impact to a high manatee use area; there is not adequate water depth, no impact to marine habitat, but there is impact to a high manatee use area; or there is not adequate water depth, there is impact to marine habitat, and not impact to a high manatee use area.

Under the review criteria for shoreline vegetation such as mangroves, no impact is defined as no greater than five percent of the native marine habitat is disturbed. For sea grasses, no impact means that no more than 100 square feet of sea grasses/native marine habitat can be impacted.

Based on the Marina Siting Criteria matrix, the following are allowable wet slip densities:

- **Preferred Sites.** New or expanded wet slip marinas and multifamily facilities shall be allowed at a density of up to 18 boat slips for every 100 feet of shoreline. Expansion of existing and construction of new dry storage facilities is allowed. Expansion of existing and construction of new boat ramps is allowed.
- **Moderate Development Sites.** New or expanded wet slip marinas and multifamily facilities shall be allowed at a density of up to 10 boat slips for every 100 feet of shoreline. Expansion of existing dry storage facilities is allowed. Construction of new dry storage facilities is prohibited. Expansion of existing boating ramps is allowed. Construction of new boat ramps is prohibited.
- **Protected Sites.** New and expanded wet slip marinas and multifamily facilities shall be allowed at a density of 1 boat slip for every 100 feet of shoreline. Expansion of existing dry storage facilities or construction of new dry storage facilities is prohibited. Expansion of existing boat ramps or construction of new boat ramps is prohibited.

***Boat Ramps.*** Based on the inventory of marina facilities, there are two public boat ramps on Marco Island. The ramp at Caxambas Park is a County owned and operated facility providing a boat ramp, parking lot, fuel, and bait shop. The other ramps is located at the Calusa Island Yacht Club and Marina.

***Boating Activity and Safety.*** Marco Island is a haven for recreational boaters. The Coast Guard Auxiliary estimates that over 250 boats per day pass under the Jolley Bridge. That number grows exponentially during peak weekends and holidays. As a public service, the City’s Waterway Advisory Committee has prepared a brochure entitled “Boating Information and Regulation”. The brochure is intended for mass distribution and provides answers to common boating questions. Also, the City has a Waterways Ordinance to regulate waterway safety.

## **Redevelopment and Historic Sites**

The City has a rich history based in great part to the oceanic and water resources of the Island. While there are locally important historic sites, they are relatively small in size, and are located on private property. Figure , presented earlier in the Future Land Use Element, identified areas of Historical and/or Archeological Probability on Marco Island.

One area that has and will continue to receive special attention is “Old Marco”. Site specific architectural and site design guidelines have been adopted applicable to the “Old Marco” area, and since the area is now completely built-out, will position the City to guide future redevelopment that will compliment and add to the ambiance of Old Marco.

## **Economic Base**

Despite a large retiree population, a review of census economic data reveals that Marco Island has a robust, diversified economic base. While a world-class destination such as Marco Island will have a strong service/retail trade employment, there are a significant number of individuals engaged in professional specialties, especially in the real estate and finance sectors. Tables 5.11 and 5.12 display 2000 economic data by occupation and industry. The median family income in **2006 was reported to be \$66,100 (Shimberg Center).**

**Table 5.11  
Employment by Occupation, 2000**

Occupation	Number	Percent
Management, professional, and related occupations	1,970	35.7
Service occupations	1,101	20.0
Sales and office occupations	1,809	32.8
Farming, fishing, and forestry occupations	22	0.4
Construction, extraction, and maintenance occupations	344	6.2
Production, transportation, and material moving occupations	267	4.8
Totals	5,513	100.0

Source: 2000 US Census

**Table 5.12  
Employment by Industry, 2000**

Industry	Number	Percent
Agriculture, forestry, fishing and hunting, and mining	16	0.3



Construction	410	7.4
Manufacturing	174	3.2
Wholesale trade	159	2.9
Retail trade	668	12.1
Transportation and warehousing, and utilities	258	4.7
Information	108	2.0
Finance, insurance, real estate, and rental and leasing	968	17.6
Professional, scientific, management, administrative, and waste management services	591	10.7
Educational, health, and social services	630	11.4
Arts, entertainment, recreation, accommodations and food services	1,188	21.5
Other services (except public administration	236	4.3
Public administration	107	1.9
Total	5,513	100.0

*Source: 2000 US Census*

## **Public Facilities and Infrastructure**

Figure 5.9 shows the public facilities located in the coastal high hazard zones on and near Marco Island. The entire City of Marco Island is located in a coastal high hazard area. As such, all public facilities, including underground infrastructure, has the potential for damage from a storm event. Other than relocating well off the island, the City’s most prudent action will be to ensure that new public facilities are designed to minimize the exposure or vulnerability to storm damage, and that existing infrastructure be monitored for deficiencies that could easily fail as a result of a storm event.

Since the “coastal planning area” comprises the entire City, detailed inventories of existing public facilities and infrastructure are found in other Elements of the Comprehensive Plan. Analysis of infrastructure capacities and minimum level of service standards are established in those elements.

## **2. Natural Disaster Planning**

The City is an active participant in the County’s Local Emergency Management Planning team. The County’s Emergency Operations Center (EOC) is responsible for the coordination of emergency and/or natural disaster planning. The primary natural disaster threat to Marco Island and all of

southwest Florida is from hurricanes, and the large component of disaster planning centers around preparation for, and impact mitigation from, these potentially deadly storms.

## **Hurricanes**

Until Hurricane Wilma made a direct landfall in the Marco area, the Island had not suffered a hit from a hurricane in recent times. Prior to Wilma the last hurricane to bring some damage to the Island was Hurricane Andrew in 1992. Andrew was what is known as an ‘exiting storm’ that is to say, it was passing from the east coast to the west coast, and because of its small size, it did not produce significant damage on the Island. Figure 5.10 shows the storm history points for Collier County. The area has suffered direct hits in the past, most particularly Hurricane Donna in 1960, which was a category 4 hurricane (the same as Andrew), passing immediately to the east of the Island. At that time Marco Island had a population of less than 400 and was not developed. Table 5.13 below provides the accepted parameters for different categories of hurricanes.

**Table 5.13**  
**Saffir/Simpson Hurricane Scale**

<b>Storm Category</b>	<b>Central Pressure</b>	<b>Winds (mph)</b>	<b>Storm Surge (ft)</b>
1	>28.94	74-95	4-5
2	28.50-28.91	96-110	6-8
3	27.91-28.41	111-130	9-12
4	27.17-27.88	131-155	13-18
5	<27.17	>155	>18

*Source: National Hurricane Center*

Hurricanes are attended by a variety of hazards that make them even more dangerous than is readily apparent. Most people tend to focus on the wind. The wind hazard, due to sound construction on Marco Island, would not be a serious concern for any storm of a Category 1 or less intensity level. The main danger is from hurricane storm surge. Marco Island is vulnerable to hurricane storm surge; even a Category 1 hurricane can produce a storm surge which could inundate parts of the Island, and cause flooding of residential and commercial areas, as well as, on the evacuation routes, such as CR 92. According to Collier County Emergency Management, the City is in an evacuation zone for a Category 1 hurricane or greater due primarily to storm surge flooding. Even a strong tropical storm on Marco Island can cause some storm surge flooding on Collier Boulevard and on the north end of the Island in the vicinity of Hideaway Beach and Tigertail Beach. Tropical storm Bob (1985) caused this type of flooding, including flooding of some bridge approaches. Improvements have been made to these bridge approaches so that tropical storm flooding at those locations is far less likely.

### 3. Regulatory Ordinances and Programs

#### **FEMA - Floodplain Management**

To address floodplain management issues, the City adopted Ordinance No. 98-18 which defines a floodplain as “any land area, including watercourses, susceptible to partial or complete inundation by water from any source”. Virtually all properties located within Marco Island are considered to be located in a floodplain. Figure shows the FEMA flood zone designations for Marco Island. Approximately 90% of the City is also located in a Special Flood Hazard Area.

#### **National Flood Insurance Program**

The Nation Flood Insurance Program (NFIP) is one of the several federal disaster programs which has established minimum construction standards intended to reduce damages from storm events in coastal high hazard areas. The program was started in 1968 as a nationwide system of flood insurance for designated floodprone areas. Each area is studied to produce a map that indicates how high flood waters might rise, which is known as the base flood elevation (BFE). Local governments then adopted regulations to reduce the impacts of future flooding. In exchange for the local regulations, property owners can obtain flood insurance that is guaranteed by the federal government. While a municipality can impose stricter regulations than recognized minimum standards, the most important regulation is that the lowest floor level of new and rehabilitated buildings must be above the base flood elevation. The base flood elevations are shown on a series of official Flood Insurance Rate Maps (FIRM). Marco Island officially was enrolled in the program in October 1998. ~~Due to the impacts of hurricane Wilma in 2005~~ The City **has** established 10.0 feet NGVD as the lowest possible minimum base flood elevation for the island **for new construction. Reconstruction of existing structures may occur at pre-existing elevations, or at the minimum prescribed FEMA elevation, consistent with FEMA requirements, in instances where the cost of reconstruction exceeds 50% of the value of the structure.**

#### **Coastal Construction Control Line**

The State of Florida began regulating shoreline development in 1971. Along the beachfront the State imposes stricter construction standards to minimize damage to the natural environment, private property, and human life. An important State regulation in this regard is the designation of the Coastal Construction Control Line (CCCL), which is a precise line running just inland of barrier island beaches. Figure shows the CCCL limits on Marco Island. Through the City’s Building Construction and Administrative Codes, heightened concerns regarding construction activities seaward of the CCCL are adequately addressed.

#### **Community Rating System**

The Federal Emergency Management Agency (FEMA) evaluates floodplain management programs

of local governments and issues a rating under the Community Rating System (CRS). The Community Rating System encourages and rewards local governments that undertake efforts to reduce flood losses and promote the purchase of flood insurance. The major benefit for citizens of CRS-rated communities is that they will receive flood insurance premium rate credits which lower insurance costs for all property owners. Local governments are rated on a scale of one to ten, with one being the highest rating achievable. This rating is not a measure of how safe a community is from flooding; rather it is a measure of how hard a local government is currently trying to reduce its vulnerability to flooding. In 1998 the City adopted a local Floodplain Management Ordinance. In 1999 a CRS plan was prepared and presented to FEMA for review and evaluation. Following a field visit to the City, FEMA accepted the City's CRS plan and granted the City an initial rating of 7. **The City improved its rating to a 6 in 2005.**

### **Repetitive Loss Properties**

Another area of concern for the Community Rating System (CRS) program is the identification and/or tracking of repetitive loss properties. To be considered a repetitive loss property, a property must have had two or more claims of at least \$1,000 paid by the NFIP since 1978. This information is available from the FEMA regional office. It will be important to track the number of claims from hurricane Wilma, the number of repetitive loss properties on the Island.

### **Local Regulations**

The City has adopted ordinances that directly affect the use of the coastal resources of the community. These are (1) the Marco Island Beach Management and Vessel Control Ordinance, and (2) the Marco Island Vehicles on the Beach Ordinance. These ordinances augment other important local regulations previously discussed.

***Marco Island Beach Management and Vessel Control Ordinance.*** The intent of this ordinance is to promote water safety through the regulation of boat speeds and delineation of areas of operation. Water vessels for hire must comply with certain safety standards, and the owner/operator must be registered with the City. In addition, the activities of beach vendors are also regulated.

***Marco Island Vehicles on the Beach Ordinance.*** The purpose of this ordinance is to limit and regulate the movement and speed of vehicles permitted to operate upon the beach areas of Marco Island. The ordinance contains special restrictions that apply during sea turtle nesting season.

In addition to the above ordinances and those discussed throughout this Element, the City has a Beach Advisory Committee and a Waterways Committee.

## **4. Beach Maintenance and Access**

### **Beach Erosion**

Like all of the State's beaches, Marco Island beachfront is a valued environmental, recreational, and commercial resource. The inlet system is a natural resource for the Marco beaches. Maintaining this sand source should be considered in the public interest. Nourished beaches provide direct economic benefits to the community through the tourism industry, as well as, storm protection of property. While this area is listed as a non-critical erosion shoreline, erosion still does occur due to natural forces, imprudent coastal development and adverse human-related activities.

Though the most significant contribution contributed directly related to coastal erosion in Florida is the construction and maintenance of navigational inlets. Inlets, such as the Big Marco Pass and Caxambas Pass, that are artificially widened and/or deepened to allow access of commercial and recreational vessels, contribute to the erosion occurring on the Marco Island beachfront. When these passes are maintained, the natural flow of sand (littoral drift) is interrupted resulting in the accumulation of sand in the inlet channel (and at the jetty, if present) and a loss of sand to the surrounding beaches. Major erosion area compass the entire west Marco coastline, including the Hideaway beach area.

The FDEP's Bureau of Beaches and Coastal Systems evaluates beach erosion problems throughout the State seeking viable solutions. The Florida Beach Erosion Control Program was established to achieve protection, preservation, and restoration of sandy beaches in a concerted effort with local, state and federal governmental bodies. Financial assistance is available and has been a primary source of funding to local governments for beach erosion and preservation activities.

## **Beach Renourishment**

Renourishment is a process by which sand is brought to a beach location to augment the sand in place. Sand is generally either "trucked" to the site or pumped from offshore "borrow" areas. The intent is to place enough sand to replenish the beach, and provide a check on continued diminution. Beach renourishment with compatible sand is often chosen as the preferred action for mitigating beach erosion. Beach renourishment has the following benefits for a community:

- Offsets the effects of erosion;
- Provides storm protection;
- Provides habitat for shorebirds, sea turtles, and many other beach species; and
- Recreation

Renourishment can also have significant environmental impacts on the immediate coastal resources such as sea grass beds, and these negative impacts must be mitigated to the maximum extent possible as projects are planned and implemented.

The sand used for renourishment is generally from three types of sources:

- 1) Mechanical: Excavated from pass or inlet, stockpiled and placed onto the beach.
- 2) Hydraulic: Transported by pipe from an offshore sand source with seawater as a

transport medium.

- 3) Upland: Trucked from an inland quarry and spread on the beach.

The sources that have been used on Marco Island for renourishment have been hydraulic and upland.

## **VI. Parks and Open Space Element**

### **Introduction**

State growth management rules require local governments to prepare “a recreation and open space element indicating a comprehensive system of public and private sites for recreation, including, but not limited to, natural reservations, parks and playgrounds, parkways, beaches and public access to beaches, open spaces, and other recreational facilities.”

The Marco Island community is served by a wide array of public and private recreation sites and several active and passive open space areas. With outstanding natural resources and a favorable climate, recreation and open space opportunities are, and will continue to be, a primary component of the City’s superb quality of life.

Within one year of incorporation the City was successful in acquiring title to five neighborhood and community parks from Collier County. The City has also acquired title to the former Glon property (Veteran’s park) as well as several undeveloped tracts to support linear parks and greenways. The County still owns and operates three park facilities on the Island. Private developments host numerous amenities for their residents, including swimming pools and tennis facilities. Further, there are several private and quasi-public clubs and organizations that provide important recreational facilities and amenities that are available for a fee.

The City now has a Parks and Recreation Department to operate and maintain the community parks and open space areas throughout the community. From active league play to concerts, the City’s Park and Recreation Department provide residents and visitors with year-round recreational opportunities.

### **Park and Recreation Definitions**

To provide a solid basis for a thorough review and critique of existing and future recreation and open space areas, the State of Florida provides the following park, recreation and open space definitions:

- ***Community Park*** - a park located near major roads, and designed to serve the needs of more than one neighborhood.
- ***Neighborhood Park*** - a park which serves the population of a neighborhood and is generally accessible by bicycle or pedestrian ways.
- ***Open Space*** - means undeveloped lands suitable for passive recreation or conservation uses.
- ***Park*** - means a neighborhood, community or regional park.
- ***Private Recreation Site*** - means sites owned by private, commercial or non-profit entities

available to the public for purposes of recreational use.

- **Public Access** - means the ability of the public to physically reach, enter or use recreation sites including beaches and shores.
- **Public Recreation Sites** - means sites owned or leased on a long-term basis by federal, state, regional or local government agencies for purposes of recreational use.
- **Recreation** - means the pursuit of leisure time activities occurring in an indoor and outdoor setting.
- **Recreation Facility** - means a component of a recreation site used by the public such as a trail, court, athletic field or swimming pool.
- **Recreational Use** - means activities within areas where recreation occurs.
- **Regional Park** - means a park which is designed to serve two or more communities.

## **A. Recreation and Open Space Sites and Facilities**

### **1. Public Sites and Facilities**

There are currently eight public park sites, one joint use recreational facility, and five passive, open space locations on Marco Island. Figure 6.1 shows the location of these public sites while Table 6.1 presents key information on these park and open space locations. Of the eight park sites, three are owned and managed by Collier County as part of their Regional Park system. While they are considered by Collier County as part of their Regional Park system, the parks actually function as community parks in terms of use and accessibility to Marco Islanders. The City owns outright five park sites, and four open space sites. The facilities at Tommie Barfield are owned by the Collier County School Board, by maintained by the City through an Interlocal Agreement. In total the residents and visitors of Marco Island have ready access to 100 acres of neighborhood, community, regional and joint-use parklands and amenities, and another 6.8 acres of accessible, passive open space.

### **2. Private Recreation Sites**

In addition to the public recreation sites and amenities, there are several private recreation sites that provide facilities and amenities for the Marco Island community. Table 6.2 identifies some of the private recreation sites on the Island, and a brief summary of facilities that are available to the public, for a fee, on Marco Island.



**[Insert Marco Island Park Map]**

**Table 6.1  
Park and Open Space Facilities on Marco Island**

<b>Neighborhood Parks</b>	<b>Ownership/Management</b>	<b>Facilities</b>	<b>Acreage</b>
Leigh Plummer	City of Marco Island	Passive, playground	5
Tommie Barfield	Collier County School Board/City of Marco Island	Baseball, tennis, playground	10
TOTAL			15 acres
<b>Community Parks</b>	<b>Ownership/Management</b>	<b>Facilities</b>	<b>Acreage</b>
Frank E. Mackle	City of Marco Island	Community Center, Basketball, Jogging Path, playground	30
Winterberry	City of Marco Island	Ballfields	5
Racquet Club	City of Marco Island	Tennis/Racquetball	3
*Veterans'	City of Marco Island	To be Master Planned	7
Tigertail Beach	Collier County	Public beach access, parking, playground	32
Caxambas	Collier County	Boat ramp, parking, fuel	5
South Marco	Collier County	Beach Access, parking, picnic	3
TOTAL			75 Acres
<b>Open Space</b>	<b>Ownership/Management</b>	<b>Facilities</b>	<b>Acreage</b>
Jane Hittler Park	City of Marco Island	Passive	>1
Pier 81 Easement	A&N Corporation	Passive	>1
Tracts C&D	City of Marco Island	Linear park, trail	6
Barfield/Collier Blvd.	City of Marco Island	Passive, gateway	>1
Heathwood/San Marco	City of Marco Island	Passive/parking	>1
TOTAL			7 Acres

*Source: City of Marco Island staff*

**Table 6.2**

## Private Recreational Facilities on Marco Island

Facility	Classification	Facilities/Amenities	Land/Water Acreage	Total
Marriott Resort	Resort	Tennis, Pools, Beachfront	34.5/0.0	34.5
Island County Club	Golf Course	Golf, Tennis	105.0/21.5	126.5
Island Yacht Club	Yacht Club	Saltwater Marina, Slips	<b>5.0/12.0</b>	17.0
YMCA	Recreation Center	Gymnasium, Pool, Tennis, Playground	9.0/0.0	9.0
Marco Island Marina	Marina	Saltwater Marina, Slips, Dry Storage	_____	_____
Moran's Barge	Marina	Saltwater Marina, Boat Launch-Ramp	2.5/8	10.5
Cedar Bay marina	Marina	Saltwater Marina, Boat Launch-Ramp		

Other private recreational uses on Marco Island include Marco Island Resort, the Hilton, Calusa Bay Marina, Residents' Beach, and Hideaway Beach. .

### 3. Existing Conditions

In reviewing the original vision of the City, population growth and demographic trends, and the inventory of existing facilities, the following conclusions were included in the original Data and Analysis document. Updates to the initial conclusions are *noted* where appropriate.

1. The City is moving quickly towards build-out - remaining land is platted for single-family homes and the future development of large park sites (5 acres and larger) is unlikely. *The City, with voter approval, acquired property known as "the Glon property" (7+ acres) for a new, downtown park site.*
2. Population is still increasing and is getting younger - public facilities must be flexible to accommodate changing needs. *While the population is increasing, the median age continues to rise (60+ years). Nonetheless there is a significant number of children on the Island and their recreational needs are being addressed through the City's Park and Recreation Department, and enhancements to existing and future parks.*
3. The existing Park and Open Space system facilities are, generally speaking, at a high level of quality. However, the use of many facilities is dramatically affected by climatic conditions

throughout the year due to lack of shade trees, shade structures, etc. *The City recognizes this problem and incorporates trees, shade structures and other amenities to help make facilities comfortable for year-round use and enjoyment.*

4. The existing system relies heavily on partnerships. *Partnerships are still important, but the City has assumed a greater leadership role.*
5. The City lacks a public, downtown “signature” gathering space capable of sustaining public activities. *Resolved with the purchase of the “Glon” property.*
6. The City’s Right-of-Way Report sufficiently addresses the need for shaded sidewalks and bicycle facilities. *The City continues to fund and implement a street tree planting program.*
7. Excluding the City’s extensive waterway system, Marco Island’s natural lands are generally inaccessible to residents.
8. “Blue” open space is abundant with approximately 75% of private residential lots located on canals - yet public views and use of the waterfront is disappearing. *Public access to waterfront locations in commercial districts has been implemented in conjunction with new development.*
9. “Green” open space is rapidly disappearing [vacant lots].

## **B. Level of Service Standards**

### **1. National/State Facility Standards**

In analyzing current and future recreation and open space needs it is crucial to investigate appropriate levels-of-service based on population, demographic patterns, future land uses, existing facilities, and other factors. While national and state standards are helpful in providing a quick assessment of a community’s surplus or deficiency in recreational facilities, local calibration is vital to ensure needed and desired amenities are provided or planned. The original Data and Analysis document contained a table comparing existing facilities on Marco Island with generally accepted state standards. However the City has used its best judgment and the wishes of the community to upgrade facilities and amenities to serve current residents.

### **2. Regional and Community Park LOS Standards**

For guidance in developing a level of service (LOS) standard for parkland acreage on Marco Island, City staff consulted the Collier County Growth Management Plan (GMP). The County’s GMP identified an LOS standard of 2.9412 acres per 1,000 residents for regional parks and 1.2882 acres per 1,000 residents for community parks.

As stated earlier in this element, the regional park facilities on Marco Island truly act and serve as extensions of the City’s community park network. These “regional parks” are readily accessible by residents, and are located adjacent to residential areas of the community. While there is a fee charged for the use of these facilities, residents of Marco Island, as well as, Collier County can access the parks free of charge with a resident sticker. Tigertail Beach provides a local alternative to Resident’s Beach for those residents who elect not to join that facility. Likewise, the South Beach access is free to anybody, with only a modest charge for accessory parking. The Caxambas boat launching facility provides a means for inland boat owners to quickly access the water resources of Marco Island. The regional parks located on Marco Island, which total approximately 40 acres, provide important special use facilities (i.e., beach access, boat launching) to augment and enhance the City’s neighborhood and community park network.

The City of Marco Island currently owns or operates two neighborhood and three community parks that total 53 acres. Veterans’ Park is still to be master planned. Combining the park resources owned by the City with those County owned facilities on the Island, the total parkland on Marco Island is 100 acres. Utilizing the Community Park LOS standard of 1.2882 acres/1,000 residents, the City has sufficient active city-owned neighborhood and community parklands to accommodate growth through build-out. Further, the City has imposed a Park Impact Fee to help fund park improvements associated with new development.

The provision of Regional Parks is the responsibility of Collier County. The current LOS for regional parks is 2.9412 acres of land per 1,000 residents. To facilitate the expansion of regional parks the County also imposes an Impact Fee. Per the most recent Count report, there is sufficient regional parklands to meet and exceed demands over the next five years.

### **C. Park Facilities and Programs**

The Marco Island Community Recreation Complex may be considered the “Heart of the Island” since it provides the majority of active recreation services, programming and community meeting space in a central location. Mackle Park serves as the hub and organization center of the Recreation Complex. The facilities also included in the “Complex” are:

- YMCA
- The Racquet Center
- Winterberry Ballfield
- The Library
- City Hall
- Tommie Barfield Elementary School and the Charter Middle School

Bicycle and pedestrian connections between these facilities have been enhanced to increase accessibility to and from these facilities.

### **D. Area Public Lands and Open Space Sites**

Considering the fact that southwest Florida is one of the fastest growing regions in the nation, the

City of Marco Island is fortunate to have an abundance of state owned lands surrounding its borders. With this vast buffer of protected public land, the community can easily meet the recreational and open space needs of the population through build out.

Through the Conservation and Recreation Lands (CARL) program, land acquisition helps remedy the fast rate of development from encroaching on important natural systems. The CARL program enables the State of Florida to purchase lands that hopefully protect habitats and species that are of special concern, threatened or endangered.

Rookery Bay National Estuarine Research Reserve (RBNERR) bordering Marco Island to the north and east, is approximately 110,000 acres of conservation land. Though the main foundation for this site is research, regional public access is encouraged. Walking trails, a new nature center, recreational fishing, canoeing, bird watching and many educational exhibits and programs are all offered to the public year-round. According to Rookery Bay, one of its highest priorities is to acquire more lands that cover the natural flow of waters to protect watersheds and restore the estuary to its natural state.

Inside Marco's southeast border is Barfield Bay, designated as an Aquatic Preserve (AP) by the State of Florida. Playing an important role in the estuarine system surrounding this area, Barfield Bay is a nursery ground for many species that are threatened or endangered. Many Marco Island residents use this area for recreational fishing and site-seeing outings.

Within and adjacent to the boundaries of the City are four Critical Wildlife Areas (CWAs). The Florida Critical Wildlife Program began in 1977 and it's a cooperative approach to protecting concentrations of one or more wildlife species that are endangered of extinction. The cooperation between the Florida Fish and Wildlife Conservation Commission and property owners creates small sanctuaries or reserves for the wildlife that the community can also enjoy.

Table 6.3 below lists the four CWAs located within and adjacent to the City's border. All areas are protected by the State although they all have limited public access for the enjoyment of these unique environments and the species that inhabit them.

**Table 6.3**  
**Active Critical Wildlife Areas in the Marco Island Area**

NAME	YEAR DESIGNATED	CLOSURE PERIOD	SPECIES
ABC Islands	1993	Year-round	Hérons, egrets, pelicans
Big Marco Pass	1988	Year-round	Terns, black skimmers, wintering shorebirds
Caxambas Pass	1988	Year-round	Terns, wintering shorebirds
Rookery Island	1978	Year-round	Hérons, egrets

**ABC Islands CWA** - Consists of three emergent mangrove islands located along the eastern shore of Marco Island in the Big Marco River. The islands are situated in shallow waters between navigable channels that are heavily traveled by resident boaters. Because people rarely, if ever, land on these islands, they provide wonderful protection for year-round species that nest at these locations.

**Big Marco Pass CWA** - The state-owned sandbars and mudflats of the Big Marco Pass CWA are located adjacent to Tigertail Beach County Park. Public access for much of the sandbar is year-round, but greatest during the winter months due to the swell in tourists and seasonal residents. Foot traffic along the sandbar is a constant recreational activity for Marco Islanders and visitors.

**Caxambas Pass CWA** - Located on the southern border of the City, this CWA consists of several sandbars that are valuable nesting and over-wintering grounds for over forty (40) species of migratory and resident shorebirds, as well as wading birds. Many boaters from the Marco Island area stop at the sandbars to camp, fish, shell and stroll. In the past years the sandbars have grown and shifted due to currents and storms.

**Rookery Island CWA** - Rookery Island is located within the Rookery Bay National Estuarine Research Reserve and is a year-round roost and nesting sites for herons, egrets and other wading birds. Canoeists and boaters access this CWA for bird watching and fishing in the nearby mangrove environments.

**Hideaway Beach Conservation Areas** - Hideaway Beach, located along the northwest coast of the island, is a private residential community. That total area of this community is 305 acres. Of that total acreage 132 acres are designated as conservation lands and owned by the State of Florida. The 132 acres are separated into eight units that are distinguished by the variety of geographic, topographic and/or vegetative communities present. The conservation lands are distributed throughout the community and, in varying degrees, are available for the use and enjoyment of Hideaway residents.

A management plan was prepared in August 1996 to maintain and preserve the essential nature of the conservation lands. Primary management activities consist of exotic vegetation removal,

preventing the establishment of exotics, and maintenance of several public access trails. Since incorporation the City has become the local agency responsible for monitoring activities associated with implementation of the management plan, including issuing permits for mangrove trimming and vegetation removal and/or planting.

**Coconut Island** - This small island sitting off the northern shore of Marco Island is part of the barrier island beach system, and naturally continues to shift and migrate with the currents and large storms. This is a popular destination for boaters to picnic, swim, fish and camp. This state owned island provides great recreational value and benefits to the community.

## **E. Future Park and Open Space Opportunities**

### **1. Acquisition and Shared Use**

Most of the remaining opportunities to acquire and/or share land for park and open space use will occur on lands zoned RSF (residential single family) or CON (conservation). Under the current Land Development Code (LDC), “certain structures and uses designed to serve the immediate needs of the single family development in the RSF district such as governmental, educational, religious, and non-commercial recreational uses are permitted as conditional uses as long as they preserve, and are compatible with the single family character of the RSF district.”

Likewise, land currently zoned conservation can by right be used as publicly owned parks; open space and recreational uses; biking, canoeing, and natural trails; equestrian paths; nature preserves and wildlife sanctuaries. Thus, if conservation zoned land is acquired or under a shared use agreement, no rezoning would be required as a precursor to public recreational/open space use and enjoyment.

Based on the initial development plan and subsequent platting of Marco Island, a large residential community was created. The recreational sites and amenities initially allocated may not meet the needs and expectations of future residents. As lifestyles change the City must seek to provide the recreational amenities desired, which may include acquisition of additional land to support trails, access to natural areas, and ballfields.

The conditional use rezoning process provides safeguards for both the public and the City. Conditional use approval can only be granted after public hearings and the preparation of detailed site development plans. Neighbors would receive notices of the public hearings and have opportunities to comment on the plans and intended uses. Conditions such as hours of operation, location of parking facilities, et cetera, could be imposed on the site to mitigate potential conflicts with adjoining uses.

### **2. Potential Park and Open Space Sites**



The original Data and Analysis document contained an inventory of lots that were deemed potential sites for acquisition for park and/or open space purposes. The eight original sites are listed below along with the current status thereof:

1. Town Center Civic/Green Space Presence - 6 parcels, Elkcam Circle. *The City has acquired approximately 7 acres, including canal front acreage, at this desired location.*
2. North Barfield Waterfront Park/Boat Ramp - 3 parcels, N. Barfield Drive. *Of the three lots the City has only been able to acquire one lot, that being closest to the sheriff sub-station.*
3. Clam Bay Pedestrian Park - 1 parcel, North Collier Boulevard. *Despite numerous efforts to purchase the lot remains in private ownership. However the enhanced pedestrian ways in conjunction with the reconstruction of Collier Boulevard will provide some access and views of the Bay.*
4. Mackle Park Expansion - 7 parcels, Heathwood Drive and Andalusia Terrace. *The City acquired land north of the park to support a multipurpose trail system to link the Racquet Center with Mackle Park, and a lot south of the Park on Auburndale providing a link to Winterberry Park.*
5. Racquet Club Expansion - 3 parcels, Heathwood Drive. *No lots have been acquired.*
6. New Park, Marco Lake Area - 9 parcels, Bald Eagle Drive, Marco Lake Drive, Yellowbird Street. *No lots have been acquired.*
7. New Neighborhood Park, Flamingo Circle - 3 parcels, Flamingo Circle. *No lots have been acquired.*
8. New Neighborhood Park, Seagrape Drive - 3 parcels, Seagrape Drive. *No lots have been acquired.*

There are several other sites throughout the island that could, and should, be considered for future acquisition, including a series of lots along Barfield Bay. The Barfield lots and some along Granada Drive have great potential for passive open space projects and programs which could provide opportunities to preserve key habitats on the fringe of urban development.

### **3. Bicycle and Pedestrian Linkages**

When the City incorporated it inherited a disjointed system of pedestrian ways and limited bicycle facilities. The City has made it a priority to address this situation, through the development of a sidewalk improvement program. The long-term goal is to provide connectivity via sidewalks and/or bicycle facilities to promote modal choice for system users. A successful assessment program was implemented to eliminate sidewalk system gaps along the City's arterials, collector and local collector streets. In addition, all new development is required to install sidewalks.

All new roadway projects are required to incorporate pedestrian facilities.

#### **4. Capital Improvements**

The Schedule of Capital Improvements (SCI) located in the Capital Improvement Element (Chapter 8) lists park improvements for the years 2008-2012.

## **VII. Intergovernmental Coordination Element**

### **Introduction**

According to State growth management rules, the purpose of the intergovernmental coordination element is to identify and resolve incompatible goals, objectives, policies and development proposed in local government comprehensive plans and to determine and respond to the needs for coordination processes and procedures with adjacent local governments, and regional and state agencies.

The City of Marco Island has and will continue to need to interact and coordinate with many external entities. The following provides a list of the entities with which the City will coordinate in implementation of the comprehensive plan. The first part of the element identifies existing partners and the City office or department with primary responsibility for coordination.

### **Adjacent Communities**

City of Naples  
Everglades City  
Collier County

### **Regional Agencies**

Southwest Florida Regional Planning Council (SWFRPC)  
South Florida Water Management District (SFWMD)

### **State Agencies**

Department of Community Affairs (DCA)  
Department of Environmental Protection (DEP)  
Department of State, Division of Historical Resources  
Department of Transportation

### **Other Agencies and Partners**

Collier County School Board  
U.S. Army Corps of Engineers (USCOE)  
Federal Emergency Management Administration (FEMA)  
Lee County Electrical Cooperative  
The Conservancy of South Florida  
Rookery Bay National Estuarine Research Reserve

## **A. City Coordination Mechanisms**

Current and desired coordination between the City of Marco Island and the entities identified in this element are summarized below. The summary includes the coordination mechanism in place (or contemplated), the subject(s) of that coordination, the nature of the relationship, and the City office/department charged with primary responsibility for the coordination.

**1. Entity: City of Naples**

Coordination Mechanism: Intergovernmental Affairs Coordinating Committee.

Coordination Subject(s): Issues of mutual involvement and concern, such as TDC funding and MPO projects.

Relationship Status: On-going committee composed of Council members and City Managers.

Marco Island Contact: City Manager.

**2. Entity: City of Everglades City**

Coordination Mechanism: No formal mechanism (possible inclusion on the Intergovernmental Affairs Coordinating Committee).

Coordination Subjects(s): TDC funding, inlet management, MPO projects.

Relationship Status: Informal, casual contact.

Marco Island Contact: City Manager/Community Development Director.

**3. Entity: Collier County**

Coordination Mechanism(s): Interlocal Agreements, Memorandums of Understanding, Contracts, Staff Interaction.

Coordination Subjects(s): Growth Management, Impact Fees, Affordable Housing, Solid Waste Management, Regional Parks, Beach Management, Long-Range Transportation Plan, Enhancement Grant Projects, Property Information/Assessments.

Relationship Status: Very active on multiple levels.

Marco Island Contact(s): City Council, City Manager, Department Directors and Staff.

4. **Entity:** *Southwest Florida Regional Planning Council*
- Coordination Mechanism: Inlet Management Convocation, Ad Hoc Committees, etc.
- Coordination Subject(s): Regional Policy Plan, Inlet Management, Affordable Housing, Hurricane Preparation, Developments of Regional Impact, General Issues of Regional Concern.
- Relationship Status: Improving.
- Marco Island Contact: Community Development Director.
5. **Entity:** *South Florida Water Management District*
- Coordination Mechanism: Regulatory.
- Coordination Subject(s): Water Management, Conservation, Everglades Restoration, District Water Flow, Permitting.
- Relationship Status: Cooperative.
- Marco Island Contact: Public Works Director.
6. **Entity:** *Collier County School Board*
- Coordination Mechanism: Interlocal Agreement.
- Coordination Subject(s): Joint School Planning, Student Populations, Shared Use of Facilities.
- Relationship Status: Agreement Partners.
- Marco Island Contact: Community Development Director.
7. **Entity:** *FEMA, U.S. Corps of Engineers.*
- Coordination Mechanism: Regulatory Permits, Flood Rate Insurance Maps (FIRM).
- Coordination Subject(s): Floodplain Management, Dredging, Settlement Lot Issues, Community Rating System Planning, Disaster Planning.
- Relationship Status: Cooperative.
- Marco Island Contact: Chief Building Official, Environmental Specialist.

**8. Entity:** *Lee County Electrical Cooperative*

Coordination Mechanism: Franchise Agreements, Right-of-Way Permits.

Coordination Subject(s): Franchise Issues, Right-of-Way Issues.

Relationship Status: Contractual.

Marco Island Contact: City Manager/Public Works Director.

**9. Entity:** *Conservancy of South Florida, Rookery Bay*

Coordination Mechanism: Informal.

Coordination Subject(s): Environmental Issues, Water Quality, Exotic Species Removal, Natural Resource Management, etc.

Relationship Status: Cooperative.

Marco Island Contact: Environmental Specialist.

**B. Coordination Issues, Needs and Opportunities**

**Issue 1: *Development Pressures in Unincorporated Areas along the 951 and 92 Corridors.***

Description - The City is concerned with development pressures along the 951 and 92 corridors, with regard to protection of environmentally sensitive lands, water quality, and hurricane evacuation.

Coordination Mechanism and Effectiveness - The City must work with Collier County, the Regional Planning Council, the Department of Environmental Protection, Rookery Bay and the Nature Conservancy to ensure future development is consistent with adopted regional, county, and conservation management plans. Continue cooperative arrangements for courtesy plan review as provided in executed Interlocal Agreement with Collier County. Actively follow and comment on future Developments of Regional Impact. Pursue funding options and seek commitments for the fast-track construction of the Jolley bridge expansion.

**Issue 2: *Hurricane Evacuation.***

Description - Active hurricane seasons in 2004 and 2005 reaffirmed the fact that Marco Island is vulnerable to hurricanes and tropical storms, and after several evacuations, the City and Community continue to learn and improve upon hurricane preparation and evacuation procedures.

Coordination Mechanism and Effectiveness - Close contact with the Collier County Emergency Operations Center (EOC), implementation of the “Code Red” system, and website posting have vastly improved the City’s ability to assess storm threats and policies and procedures to guide evacuations.

*Issue 3: Beach Enhancement/Renourishment*

Description - Maintaining the City’s coastal resources, especially the beach areas is vital to the City’s quality of life, economy, storm surge protection, environmental well-being, and public recreation. This natural resource needs constant monitoring, and at time enhancements or renourishment to continue to function properly.

Coordination Mechanism and Effectiveness - The City must work the Collier County, DEP and US Army Corps of Engineers to assure needed projects are fully analyzed and construction funds secured. Likewise the City must pursue TDC funds for beach related services. The City’s Beach Advisory Committee plays an important role in identifying potential issues, and recommends strategies to address.

*Issue 4: Solid Waste*

Description - Currently Collier County manages the collection, transport, and disposition of solid waste materials from residential properties on Marco Island, with private haulers serving the balance of users/customers.

Coordination Mechanism and Effectiveness - As the cost for service managed by Collier County is very favorable for customers, no change in the provision of solid waste collection services is recommended. However, the City is vitally interested in the continued well-being of the County’s landfill facilities, and will need annual assurance of remaining capacity.

*Issue 5: Affordable Housing*

Description - The City and Collier County have had an Interlocal Agreement for Housing since 2000. That document outlines the roles, responsibilities and obligations of both parties in the provision of housing services.

Coordination Mechanism and Effectiveness - The City should strive to maintain the relationship with the County through the current Interlocal Agreement. Further, the City and the County must investigate innovative strategies to address affordable housing, especially for essential public servants (e.g., police, fire, and teachers).

**C. Local and Regional Comprehensive Plans**

## 1. Collier County Growth Management Plan

The Collier County Growth Management Plan was used extensively in conjunction with preparation of the original Marco Island Comprehensive Plan. The County's GMP served as an important data source, and provided default elements, sub-elements, and level of service standards for those facilities and services for which the County was the primary provider (e.g., solid waste, regional parks, sanitary sewers). The current solid waste level of service standard for Collier County remains the default standard for Marco Island.

## 2. Southwest Florida Strategic Regional Policy Plan

The Strategic Plan follows a format this is somewhat different than the 1995 Regional Policy Plan that was in effect during the preparation of the original Comprehensive Plan. Under the old format, the Regional Comprehensive Policy Plan was required to address each of the 26 goals in the State Comprehensive Plan. Due to changes in the rules that governs regional plans Regional Planning Councils are now required to address only five issues. The goals, strategies, and action portion of the SWFRPC Plan addresses the five mandatory regional issues, which are:

1. Affordable Housing
2. Economic Development
3. Emergency Preparedness
4. Natural Resources
5. Regional Transportation

The Marco Island Comprehensive Plan has attempted to address these regional issues, when applicable, as integral parts of the plan.

Among those regional issues that are specifically addressed in this Plan are:

- Affordable housing;
- Hurricane preparation;
- Protection of coastal and marine resources; and
- Transportation

**Affordable Housing** - The Southwest Florida Strategic Regional Policy Plan (2002) enumerates five goal statements in regard to affordable housing. The Regional Plan describes this situation as follows:

*“The housing needs of a community are not limited by city and county boundaries. People often work in one community but reside in another due to factors such as cost, personal choice, and convenience. This pattern is especially common among people who work in the service sector within moderate to high income areas. Although the jobs and services they provide are required by the area's population, the employees earn wages that make it impossible for them to live there. Thus,*



*they work in one area and live in another, more affordable community. Addressing housing from a more regional approach allows communities the opportunity to share resources and enhance cost effectiveness.”*

As revealed in the Housing Element of this Comprehensive Plan, the need for affordable housing is not only a Marco Island issue, but an issue of County and regional magnitude. Addressing the affordable housing needs of Marco Island and Collier County will require continued coordination and cooperation, and may require technical assistance from the RPC to identify opportunities to share resources and enhance cost effectiveness.

**Hurricane Preparation** - Due to the large concentration of populations in hurricane vulnerable areas along the southwest Florida coast, hurricane preparation and evacuation is an issue of regional concern. As large populations flee coastal areas in the threat of a hurricane, evacuation concerns are compounded as traffic volumes surge, especially along the primary evacuation routes. It is essential that the parties responsible for hurricane preparation coordinate with adjoining jurisdictions, especially at the county level, to ensure traffic will flow in the most efficient, judicious manner possible, under highly stressful conditions.

Emergency preparedness is relevant to the region due to the overall low-lying nature of the area’s topography, and its susceptibility to storm induced flooding. It is crucial that our local LEPC be in sync with regional and state emergency preparedness plans to provide the greatest degree of protection to human life and safety.

**Protection of Coastal and Marine Resources** - Past development activity has significantly altered large areas of southwest Florida’s coastline. Such development activity was typically unconcerned with the needs of natural systems and other users of coastal resources. Shoreline development impacts to coastal ecosystems have led, in conjunction with other factors, to a decline in fishery resources, the elimination of public shoreline access, destruction of the natural storm buffering functions of beaches and dunes, and adverse impacts to endangered and threatened species of plants and animals, including extinction of some coastal species or populations.

That rather grim synopsis is found in the Regional Policy Plan. As stewards of our natural environment, regional cooperation is vital to stop the trend of degradation, and shift our focus to preservation and enhancement. Natural dynamics greatly add to the complexity of addressing coastal resource needs and concerns. Incorporation and/or review of adopted regional strategies into local comprehensive plans will facilitate cooperation between jurisdictions region-wide. Further, participation in regional forums, addressing such issues as inlet management, will provide for logical, systematic approaches to environmental management.

**Transportation** - Past and continued population, urban, rural and economic growth requires further facility development to provide service within metropolitan areas made up of different local governments, to connect metropolitan areas within the region, to connect metropolitan and non-metropolitan areas within the region, and to interconnect to other regions. As such, transportation planning involves a variety of participants. In all cases, local governments are the major participants

because of their land use authority, right-of-way ownership, and service needs. Most issues of transportation, though, cannot be contained within any single jurisdiction, or be adequately addressed by any single entity, as uses may conflict with each other. Transportation affects, and is affected by, virtually all other community issues of the region. Consequently, joint strategies among the region's many different entities are necessary for the region to more capably meet the challenges of the 21<sup>st</sup> Century.

The City of Marco Island is a voting member of the Collier County Metropolitan Planning Organization (MPO). Such organizations provide the opportunity to enhance coordination, to help articulate funding needs for facilities, to adjudge the efficacy of competing transportation modes, and the greater public benefit of land use/transportation conflicts. Further, the MPO provides a forum for a "jury of peers" in evaluating multi-jurisdictional/regional benefits from the viewpoint of the recipients of transportation funds.

Active participation by the City on the MPO is critical, not only in regard to transportation issues on Marco Island, but also adjoining roadway projects. The transportation issues facing Collier County have a direct bearing on the economy and well-being of Marco Island. As a voting member of the MPO Marco Island must take advantage of the forum to insure that transportation plans, and the allocation of funds for projects, are in the best interest of our citizens and the County. Until complete, the most important transportation project will be the construction of the second span to the Jolley Bridge.

Although by no means exhaustive, this section has demonstrated that regional plans have been consulted, and that many of the issues of special concern on Marco Island are also issues of regional significance. Continued coordination with the Regional Planning Council is necessary to insure successful implementation of the City's comprehensive plan.

#### **D. Intergovernmental Coordination Processes**

This element establishes a process to determine if development proposals would have significant impacts on other local governments or state or regional resources or facilities, and shall establish a process for mitigating those impacts. To facilitate review and applicability of this subsection, the following definition of a development of regional impact (DRI) is derived from state law:

*"Development of Regional Impact"* - means any development, which, because of its character, magnitude, or location, would have a substantial effect upon the health, safety or welfare of citizens of more than one county.

Chapter 380, F.S., entitled Land and Water Management outlines the role and responsibility of a local government when faced with a proposal that may reach the threshold of a DRI. As required by state law, the Regional Planning Council serves as the clearinghouse for DRI applications.

Currently there is only one DRI located on Marco Island, Cedar Bay Marina. Most likely the City will be addressing DRI issues involving projects outside the corporate limits, but may have an

impact on the residents of Marco Island. Of particular concern is proposed development along SR 951 and SR 41, especially those proposed in close proximity to the Marco Lakes.

The City needs to take a proactive stance in regard to off-Island DRIs, and ensure that potential impacts are adequately addressed and mitigated. Such DRIs can create impacts that both directly and indirectly affect the citizens and visitors of Marco Island. Impacts include increased traffic and roadway congestion, hurricane evacuation, the need for additional affordable housing, demands on potable water supplies and other infrastructure, and environmental degradation.

As state above, the Regional Planning Council serve as the clearinghouse for DRIs, and is responsible for coordinating the review process for affected jurisdictions. Should there be proposed development on Marco Island that approaches the threshold for consideration as a DRI, the City will work with the RPC to ascertain the projects status. While the City will be actively involved in all phases of project review and permitting, input from all other affected or interested parties will be garnered through the RPC's DRI coordinating process.

Rule 9J-5 discusses at great length coordination of the development review process, and encourages local governments to establish procedures for the analysis of impacts. It is in the City's best interest to meet with the RPC to formalize procedures for the review of DRIs on Marco Island to ensure timely, thorough review of such projects.

## **1. Identification of Regional Resources and Facilities on Marco Island**

The Strategic Regional Policy Plan contains three definitions that describe regional resources:

*“Regionally significant medical facilities”* - means a medical facility which provides one or more of the following specialized medical services: obstetrics; pediatrics; psychiatric; AIDS support; alcohol/chemical dependence; Alzheimer diagnosis; burn unit; cancer services; emergency room; trauma center; geriatric assessment; home health services; newborn nursery; neonatal intensive care; psychiatric adult; psychiatric children; psychiatric geriatric; psychiatric outpatient; and women's health.

*“Regionally significant natural resources”* - a natural resource or system of interrelated natural resources, that due to its function, size, rarity or endangerment retains or provides benefits of regional significance to the human or natural environment, regardless of ownership (27E-5.002(4), F.A.C.).

*“Regionally significant roadways”* - a roadway should be considered for the designation as a regionally significant roadway if it crosses county boundaries, is a component of the state highway system, provides access to a regionally significant facility or a regional activity center, or is a designated hurricane evacuation route.

The Marco Healthcare Center provides emergency medical facilities on the Island. The facility can provide urgency care services for residents and visitors. The facilities and services of the Center are

augmented through affiliation with Naples Hospital. The facilities are linked via helicopter service in the event of a serious, life-threatening situation.

As discussed in far greater detail in the Conservation and Coastal Management Element, there are four Critical Wildlife Areas (CWAs) on and around Marco Island. The four CWAs are the ABC Islands, Big Marco Pass, Caxambas Pass, and Rookery Island.

State routes 951 and 92 (Collier Boulevard and San Marco Road) should be considered regionally significant roadways for their important role in hurricane evacuation. Further, the 951 corridor will continue to be a magnet for future off-island development, some of which may be DRIs. The City must take an active role in regard to off-island development, especially for potential congestion impacts and degradation of hurricane evacuation effectiveness.

While there have been several large projects on Marco Island including the Esplanade, the Marriott Resort Expansion, and Marco Island Marina, none of these projects have reached the threshold of a DRI.

## **2. Future School Sites**

With the executed Interlocal Agreement for Joint School Planning the City is in full compliance with state requirements for school coordination. With the construction of the new Charter Middle School, the educational facilities to serve the community seem complete. **Tract K remains available in the School District's inventory of sites for a High School when needed.** ~~Without a viable site to host a High School, students will continue to leave the Island.~~

## **3. Annexation**

The annexation of Key Marco in 2004 is illustrative of the City's stance toward annexation. Currently the City will consider annexation requests from property owners who wish to voluntarily become part of the city and whose properties are contiguous to existing city limits. Such applications are assessed for positive and/or adverse impacts on the effective and cost efficient delivery of public facilities and services, and other issues affecting the city. If areas are annexed, Marco Island will coordinate with affected jurisdictions to ensure an equitable and smooth transition of governmental services.

## **VIII. Capital Improvements Element**

### **Introduction**

The purpose of the Capital Improvement Element is to evaluate the need for public facilities on Marco Island as identified in the other comprehensive plan elements; estimate the cost of improvements for which the City has fiscal responsibility; analyze Marco's capability to finance and construct the necessary improvements; adopt financial policies to guide the funding of improvements; and schedule the funding and construction of improvements in a manner necessary to ensure that capital improvements are provided when required based on needs identified.

Development of the original Capital Improvement Element (CIE) was complicated by the fact that the City of Marco Island was not the primary entity responsible for the provision of many important public service facilities. At the time the original comprehensive plan was adopted the City was responsible for transportation, storm water management, and community parks. Non-City entities were responsible for potable water, sanitary sewers, and solid waste. Since plan adoption in 2001, the City has purchased the water and wastewater facilities from the original provider, Florida Water Services, and now is the responsible entity for the provision of those critical services.

### **Definitions**

To assist in the preparation of this element, the following definitions are provided by the State for guidance:

*Capital budget* - means the portion of each local government's budget which reflects capital improvements scheduled for a fiscal year.

*Capital Improvement* - means physical assets constructed or purchased to provide, improve or replace a public facility and which are large scale and high in cost. The cost of a capital improvement is generally nonrecurring and may require multi-year financing. For the purposes of this rule, physical assets which have been identified as existing or projected needs in the individual comprehensive plan elements shall be considered capital improvements.

*Concurrency* - means that the necessary public facilities and services to maintain the adopted Level of Service standards are available when the impacts of development occur.

*Concurrency management system* - means the procedures and/or processes that the local government will utilize to assure that development orders and permits are not issued unless the necessary facilities and services are available concurrent with the impacts of development.

*Currently-available revenue sources* - means an existing source and amount of revenue presently available to the local government. It does not include a local government's present intent to increase

the future level or amount of a revenue source which is contingent on ratification by public referendum.

*Facility availability* - means whether or not a facility is available in a manner to satisfy the concurrency management system.

*Infrastructure* - means those man-made structures which serve the common needs of the population, such as: sewage disposal systems; potable water systems; potable water wells serving a system; solid waste disposal sites or retention areas; storm water systems; utilities; piers; docks; wharves; breakwaters; bulkheads; seawalls; bulwarks; revetments; causeways; marinas; navigation channels; bridges; and roadways.

*Public building and grounds* - means structures or lands that are owned, leased, or operated by a governmental entity, such as civic and community centers, hospitals, libraries, police stations, fire stations, and government administrative buildings.

*Public facilities* - means transportation systems or facilities, sewer systems or facilities, solid waste systems or facilities, drainage systems or facilities, potable water systems or facilities, education systems or facilities, park and recreation systems or facilities, and public health systems or facilities.

*Public facilities and services* - which must be made available concurrent with the impacts of development means those covered by comprehensive plan elements required by Section 163.3177, Florida Statutes, and for which level of service standards must be adopted under Chapter 9J-5, Florida Administrative Code. The public facilities and services are: roads, sanitary sewers, storm water, potable water, parks and recreation, and mass transit, if applicable

*Services* - means the programs and employees determined necessary by local government to provide adequate operation and maintenance of public facilities and infrastructure as well as those educational, health care, social and other programs necessary to support the programs, public facilities, and infrastructure set out in the local plan or required by local, state or federal law.

## **A. Public Facility Levels-of-Service**

One of the purposes of the comprehensive planning process is to analyze the various components that comprise the physical characteristics of the community, and to identify deficiencies and limitations. Throughout this Plan those components have been addressed under specific element headings. It is through the CIE that the various components are drawn together to provide a unified, coherent strategy for the provision of facilities and services to ensure that minimum levels of service are maintained and that such facilities and services will be in place to accommodate new development.

The following is a brief summary of those components that impact and/or are impacted by new development. More extensive detail can be found in the appropriate plan element.

### **1. Transportation Facilities**

Marco Island has 383 roads totaling a combined length of 127 centerline miles. There are 24 miles of roads that function as arterials, collectors, and local collectors. The remaining 103 miles of road are local streets providing access to residential development. On these streets the daily traffic counts is not expected to exceed 1,000 vehicles per day and are typically sixty (60) feet in total right-of-way width.

The 2001 Comprehensive Plan established a Level of Service (LOS) “D” as the minimum acceptable level of service standards for all roads on Marco Island, except the State owned and maintained portion of North Collier Boulevard (SR 951), which has a LOS “C”. A LOS “D” is defined as “traffic conditions approaching unstable flow. Tolerable operating speeds are maintained but are subject to considerable and sudden variation. Freedom to maneuver and driving comfort are low because of increasing lane density. The probability of accidents has increased and most drivers consider this level of service undesirable.”

While the majority of the Island’s roads function well above LOS “D” this relatively low standard was established in part to recognize that the citizens do not want to overwhelm the Island with roadway pavement. During the preparation of the Right-of-Way Report (1999) citizens stated that they are willing to accept some traffic delays during peak season in order to maintain the “island look”. The City’s future transportation network will be premised on a balanced, multimodal strategy.

Since July 1999 the City has been a voting member of the Collier County Metropolitan Planning Organization (MPO). This presence is extremely important as transportation demands increase, especially off-island. Further, it allows the City to participate in the planning and implementation of other transportation issues, such as mass transit and traffic management strategies. The City has no port, aviation or mass transit facilities or services.

## **2. Potable Water**

In November 2003 the City acquired all potable water assets and facilities from Florida Water Services (FWS) and become the provider of potable water for all the residents of the City, as well as newly assumed customers on Marco Shores, located approximately 6 miles north on the mainland. The City operates the potable water system through Marco Island Utilities. The Utility has a permittable treatment capacity on-island of 12.7 million gallons per day (mgd), operates two treatment plants (Elkcam Circle and Heathwood Drive), producing and distributing 3.1 billion gallons of potable water annually through 112 miles of water transmission lines, serving up to 40,000 customers daily.

The 2001 Comprehensive Plan established a Level of Service standard of 200 gallons per capita per day for potable water. While the permittable treatment capacity for potable water meets the adopted LOS standard for even peak season demands, without water conservation efforts and other policy considerations, the system could be strained by demands during the dry season, which also

corresponds with peak season. Capital improvements for the potable water system are located in a specific Capital Improvement Plan for the Utility, which is separately funded from the City's CIP. Over the next five years the Utility will expend \$23,013,735 on capital improvements related to the potable water system. However, these expenses are related to system upgrades or to correct infrastructure issues associated with the acquisition of an aged and under-maintained private water system, and not to correct LOS deficiencies.

### **3. Sanitary Sewer**

Likewise, in November 2003 the City also assumed sanitary sewer service responsibilities due to the acquisition of Florida Water Services assets and facilities. The City operates the sanitary sewer system through Marco Island Utilities. The Utility has a permittable treatment capacity at the Elkcam Circle facility of 3.5 million gallons per day (mgd), maintains 50 miles of sewer collection lines and 64 wastewater lift stations, collects and treats 730 million gallons of wastewater annually, and produces and distributes 401 million gallons of reuse water for irrigation purposes.

At the time the original Comprehensive Plan was adopted three entities were providing sanitary sewer collection services on the Island; FWS, Old Marco Utilities, and Collier County. The 2001 Comprehensive Plan established a Level of Service standard of 100 gallons per capita per day for sanitary sewer. While nearly all commercial and multifamily properties were on the sanitary sewer system originally designed by Deltona, approximately 50% of the single-family residential areas were served by individual septic systems. In 2005 the City embarked on an ambitious, and contentious, program to "sewer the Island". Beginning in 2006 through 2012 the City will complete a 7-Year Septic Tank Replacement Program. This \$75 million project, financed through assessments will complete the sewerage of the Island. Capital improvements for the sanitary sewer system are located in a specific Capital Improvement Plan for the Utility, which is separately funded from the City's CIP. Over the next five years the Utility, inclusive of the neighborhood assessment program for septic tank replacement, will expend \$68,605,200 on capital improvements related to the sanitary sewer water system. However, these expenses are related to system upgrades, expansions, and to correct infrastructure issues associated with the acquisition of an aged and under-maintained private water system, and not to correct LOS deficiencies.

### **4. Solid Waste**

The collection and disposal of solid wastes generated on Marco Island remains under the supervision and management of the Collier County Solid Waste Management Department. Marco Island is located within Solid Waste Collection District Number 1, where solid waste collection is mandatory. Waste Management of Collier County, Inc. is the franchised waste collector to provide collection services to residential, commercial and industrial generators on the Island. Other wastes, resulting from land clearing, construction materials, and demolition wastes are generally collected by independent waste collection firms licensed by the County. Approximately 50% (by weight) of the total County waste stream is handled by independent businesses or private haulers.



Solid waste collected by Waste Management is brought to the Naples landfill for final disposal. This 320 acre facility, which is approximately 20 miles northeast of Marco Island, is operated by contract with Waste Management of Florida, Inc. In addition to the Naples facility, the County has one other landfill site, a 100 acre facility in Immokalee, which services the eastern portion of the County. The total capacity of the Naples landfill facility, with upgrades, is estimated to last approximately 15 years.

The 2001 Comprehensive Plan adopted, by reference, the same Solid Waste LOS standard as Collier County, which is:

1. 1.10 tons of solid waste per capita per year.
2. A minimum of two (2) years of constructed lined landfill cell at the calculated waste generation rate.
3. A minimum of ten (10) years of permittable landfill capacity at the calculated generation rate.

## **5. Parks and Open Space**

Shortly after incorporation Collier County deeded over to the City the neighborhood and community parks located on the Island. Currently the City is responsible for two neighborhood parks, five community parks (one - Veteran's, to be master planned and developed), and four open space areas. In total area, the City is responsible for the operation, programming, and maintenance of approximately 68 acres of active and passive park and open space areas.

The 2001 Comprehensive Plan established a Level of Service standard of 1.2882 acres per 1,000 residents for community parks. Based on current population projections the City has ample capacity in owned community parklands to serve resident populations through build-out. However the Marco Island community has high expectations for the recreational assets, amenities and programs offered by the City, and thus while not LOS driven, the City will continue to expand and enhance the City's community and neighborhood park network. Per the 2008 CIP the City will expend over \$5,055,000 for recreational and open space projects.

There are also three regional parks located on Marco Island; Tigertail Beach, Caxambas Boat Ramp, and South Marco Beach Access. These facilities are owned, operated, and subject to the administrative control of Collier County.

## **6. Storm water Management**

Marco Island's storm water management and drainage facilities consist of as system of swales, catch basins, underground drainage conduits, and outfall structures of various materials which collect and discharge the runoff from rainfall events. The runoff is generally directly discharged into man-made and natural water bodies which are in turn connect to the natural bays and tidal water bodies. All water bodies receiving direct discharge are classified as Class II or III waters in accordance with the

Florida State classification system (Chapter 62-302.400 F.A.C.). The City also contains water bodies that have “Outstanding Florida Waters” classifications. However, storm water discharges do not directly discharge into these waters. Ultimately all discharged water is received by the Gulf of Mexico.

In 1999-2000 the City hired a consultant to prepare a Master Drainage Report. The consultant performed a thorough evaluation of the complete drainage system on the City and found that the existing system was designed to pass a ten (10) year, one (1) hour storm, with an intensity of duration of approximately 3.3 inches per hour. That design standard was consistent with designs approved by FDOT, the City of Naples, and Collier County.

The adopted Level of Service standard for storm water management was greatly influenced by the findings of the Master Drainage Report. The City adopted for existing storm water facilities a LOS design standard of the ten (10) year, one (1) hour storm, with an intensity of duration of approximately 3.3 inches per hour. Further, the City adopted a five tiered LOS system based on the Drainage Report’s modeling for existing and future drainage system components, which provided the following design LOS standard hierarchy:

- LOS Standard A: Upstream (US) Ground Elevation - Upstream Hydraulic Grade Line (US HGL) > 0.5 Ft.
- LOS Standard B: US Ground Elevation - US HGL > 0.2 Ft.
- LOS Standard C: US Ground Elevation - US HGL > or = 0.0 Ft.
- LOS Standard D: US HGL < or = 5.2 Ft. NGVD\*
- LOS Standard E: US HGL > .2 Ft. NGVD\*

(\*) May be acceptable at a limited number of roadway locations due to extreme topographic conditions.

There are no current LOS deficiencies to the existing storm water network. However the existing system has been substantially upgraded and improved since cityhood, and over the next five years the City will expend \$3,550,000 toward system upgrades, enhancements and maintenance projects.

## **7. Public Education and Public Health Systems**

The public educational system located on Marco Island consists of Tommie Barfield Elementary School and the Marco Island Charter Middle School. The two schools, located adjacent to one another, are located on one of two tracts owned by the School District on Marco Island. These schools provide educational facilities for grades kindergarten through eighth grade. High school facilities are located off-Island. Tommie Barfield is operated and maintained by the Collier County School Board. The Charter Middle School is a quasi-independent facility that is operated under agreement with the School Board. A new Charter Middle School facility is currently under

construction.

The other School Board owned property, Tract K, is currently undeveloped, and no immediate plans for its use are known at this time.

The Marco Island Healthcare facility is located on Heathwood Drive. This facility, affiliated with Naples Hospital, provides urgent care for Islanders. This facility is on the sanitary sewer and potable water system, and has no impact on the existing transportation or storm water drainage network.

## **B. Existing Revenue Sources and Funding Mechanisms**

A variety of revenue sources and funding mechanisms are available for capital improvement financing. The revenue sources currently available are discussed below:

### **1. Ad Valorem Taxes**

Chapter 166, Florida Statutes, provides for the levy of Ad Valorem taxes on real property and tangible personal property. The definition in Section 192.001 states, “the term ‘property tax’ may be used interchangeably with the term ‘Ad Valorem tax’”. The Florida Constitution limits local governments to a maximum of 10 mills of Ad Valorem taxation.

The City’s taxable value for 2007 was proposed by the Collier County Property Appraiser to be \$11,570,581,313. At the adopted millage rate of 1.2833, the Ad Valorem revenue will be \$14,106,000. This revenue is budgeted to allow for uncollectible revenue from prompt payment discounts of up to 4%, and other adjustments in accordance with Florida Statutes.

### **2. Local Option Gas Tax**

Local governments are authorized, pursuant to ss. 206.41(1)(e) and 206.87(1)(c) F.S. to levy up to 11 cents of local option fuel taxes in the form of two separate levies. The first is a tax on one to six cents on every net gallon of motor and diesel fuel sold in the County, pursuant to s. 336.025(1) (a), F.S. A tax of six cents was adopted by Collier County in March 1987. The proceeds may be used to fund transportation expenditures.

The second tax is a one to five cent levy upon every net gallon of motor fuel sold in a County, pursuant to s. 366.025(1) (b), F.S. Diesel fuel is not subject to this tax. This additional tax was adopted by Collier County effective January 1994. These funds must be used to meet the capital element of the comprehensive plan.

Any newly incorporated municipality, eligible for participation in the distribution of monies under the Local Government Half-Cent Sales Tax and Municipal Revenue Sharing Program and located in a county levying either local option fuel tax, is entitled to receive a share of the tax revenues. The

distribution shall be:

- Equal to the County’s per lane mile expenditure in the previous year times the number of lane miles within the municipality’s jurisdiction or scope of responsibility, in which case the County’s share would be reduced proportionately; or
- Determined by the local act incorporating the municipality.

Collier County extended the six-cent fuel tax in 1999. Through an agreement with the City of Naples, Collier County designated 4.97% of the fuel tax collection to Marco Island. This percentage is equal to that calculated by the above formula.

### **3. Municipal Cigarette Tax**

In 1943 Florida levied its first tax on cigarettes at a rate of three cents per pack. It was not until 1971 and the creation of the Municipal Financial Assistance Trust Fund that the state began to share a portion of the state cigarette tax revenues with municipalities. The enacting legislation, creating the Trust Fund, required that the fund be financed from the proceeds of a two-cent per pack tax. The current tax is \$0.339 per pack. The share of this fund for an individual municipality is not determined by the value of cigarettes sold within the boundary of each city. Instead, a formula is used where the primary factor is the ratio of each city’s population versus the countywide municipal population. These funds are considered to be general revenue and can be used for any specific public purpose.

### **4. Municipal Revenue Sharing Proceeds**

Chapter 72-360, Laws of Florida, created the Revenue Sharing Act of 1972, providing for general revenue sharing. Revenues from this fund comes from 32.4% of the tax on each pack of cigarettes, the one-cent municipal gas tax, and 25% of the State’s alternative fuel decal user fee. The share of this fund for an individual municipality is determined by a complex formula that includes its own population, statewide municipal population, county population, county sales tax collections, total statewide sales tax collections from municipalities, municipal poverty valuation, statewide municipalities’ property valuation, and by a factor measuring relative revenue-raising ability. About 35% of these funds are a result of the municipal gas tax. This percentage of the proceeds can be used only for transportation purposes, including transportation related public safety activities.

### **5. Half-Cent Sales Tax**

Chapter 82-154, Laws of Florida, created the local government half-cent sales tax program. The primary purpose of the tax was to provide relief from Ad Valorem taxes in addition to providing counties and municipalities with revenues for local programs. Current revenues from this fund come from 9.653% of the state sales tax, which is shared by both counties and cities. The distribution formulas are population-oriented but not directly proportional to population increase. Municipalities can use these funds for municipal-wide programs. These funds can also be pledged towards

repayment of bonds or used for capital projects.

## **6. Franchise Fees**

The City has adopted franchise agreements with Lee County Electrical Cooperative, Time Warner and Marco Island Cable. The agreements provide for payment of a franchise fee equal to 5% of revenues.

## **7. Impact Fees**

Impact fees are used to allow new development to pay its proportionate share of capital outlay and infrastructure improvements required because of new development. Impact fees that can be use for capital improvement projects include:

- Community Park Impact Fees
- Road Impact Fees
- Water Impact Fees
- Wastewater Impact Fees

In addition these impact fees the County also collects several other impacts fees for schools, regional parks, EMS, libraries, correctional facilities, and governmental facilities. It is the County's responsibility to provide for these services, and insure that facilities are installed/upgraded concurrent with new development.

## **C. Fiscal Implications of Future Public Facility Needs**

Table 8.1 identifies the level of projected capital improvement projects (excluding potable water and sanitary sewer projects) the City intends to undertake from FY 2008 to 2012. No improvements in Table 8.1 are necessary to correct LOS deficiencies, but rather are system enhancements and preventative maintenance activities.

Table 8.2 identifies projected potable water and sanitary sewer projects for FY 2008 to FY 2012.

~~Table 8.3 demonstrates that all planned capital improvements are financially feasible through the budgeting and appropriation of sufficient funds from identified sources of revenues.~~

### **1. Transportation Network**

Currently all roadways on Marco Island are functioning within established LOS parameters (LOS D, except for the State controlled portion of SR 951, which is LOS C). It is further projected that the roadway network on Marco Island will remain under LOS parameters into the next five years, and in most cases, well beyond. As the roadway network functions within established LOS parameters, there are no LOS based deficiencies that require capital improvements to insure available capacity

for development purposes.

Nonetheless the City continues to make great strides in upgrading the transportation network on the Island with capacity improvements, bridge repairs and replacements projects, and new bicycle and pedestrian facilities to promote and advance the goal of a multi-modal transportation network providing choice in modal options.

### TRANSPORTATION FACILITIES LOS SUMMARY

Adopted LOS:      Minor Arterial (e.g., Collier Boulevard)      LOS “C”  
Collectors, Local Collectors, Local Roads      LOS “D”

Note: Required Level of Service is measured at P.M. Peak Hour

Current Capacity:      Minor Arterial (e.g., Collier Boulevard) > LOS “C” (38,000 ADT)  
Collectors, Local Collectors, Local Roads > LOS”D” (15,300 ADT  
collectors & 13,400 ADT local collectors)

Total Current      Minor Arterials operating at a LOS > “C” [27,814/38,000 (2004)]  
Demand:      Collectors operating at LOS > “D” [13,370/15,300 (2004)]  
Local Collector operating at LOS > “D” [12,080/13,400 (2004)]

Projected Capacity:      Minor Arterial (e.g., Collier Boulevard) > LOS “C” (38,000 ADT)  
Collectors, Local Collectors, Local Roads > LOS”D” (15,300 ADT  
collectors & 13,400 ADT local collectors)

Note:      The City continues with an aggressive roadway and bridge improvement program. Capacity enhancement projects, such as Bald Eagle Drive, will help to improve flow through signalized intersections and reduce stopping times. Projected population growth through the future 5 and 10 year planning periods will not cause any significant deterioration in existing levels of service. Per the 2008 CIP \$6,770,000 is projected for transportation improvements beyond the North Collier Boulevard reconstruction.

## **2. Parks and Open Space**

Presently the City of Marco Island owns, operates or manages two neighborhood parks and five community parks that total 53 acres. In addition there are three County owned regional park facilities on the Island which total 40 acres. All these park facilities are readily accessible and usable by Marco Islanders.

The adopted LOS standards for parkland on Marco Island are as follows:

— 1.2882 acres active community parkland per 1,000 residents

\_ 2.9142 acres of regional parkland per 1,000 residents

As Marco Island is only responsible for the provision of community parkland, there is more than sufficient acreage owned, operated, and maintained by the City to meet and exceed the adopted LOS standard over the next five years, and throughout build-out.

### **PARK AND OPEN SPACE LOS SUMMARY**

Adopted LOS: 1.2882 acres of active parkland per 1,000 permanent residents.

Current Capacity: 53 acres of community parkland.

Current Demand: 20.63 acres of community parkland [16,017 permanent population (2008) x 1.2882 acres/1,000 permanent residents].

Committed Demand: 0.32 acres of community parkland [120 permitted (not built) dwelling units x 2.16 persons per dwell x 1.2882 acres/1,000 permanent residents].

Total Demand: 20.99 acres of community parkland [Current + Committed Demand]

Available Capacity: 32 acres [Current Capacity - Total Current Demand]

Projected Total: 21.81 acres of community parkland [16,928 permanent population (2013) Demand (2013) x 1.2882 acres/1,000 permanent residents.

Surplus or: +31.2 acres of community parkland.  
Deficiency 2012

Note: The parkland resources currently owned and/or operated by the City of Marco Island exceed the adopted LOS standard. CIP funds will be utilized to improve and enhance these parklands over the next five years.

**Table 8.1**  
**SCHEDULE OF CAPITAL IMPROVEMENTS 2008-2012**  
**(Transportation Facilities, Storm water Drainage, Parks and Recreation)**

**Note:** **None of the improvements described in the following Schedule of Capital Improvement tables are required to correct current or projected Level of Service deficiencies from 2008 through 2012.**

**Collier County is the entity solely responsible for meeting and maintaining adopted Level of Service (LOS) standards for Solid Waste.**

**Prepared pursuant to recommendations contained in the June 15, 2007 ORC Report and Chapter 163 F.S., and Rule 9J-5 F.A.C.**



**Table 8.1(a)**  
**SCHEDULE OF CAPITAL IMPROVEMENTS 2008-12**  
**TRANSPORTATION FACILITIES IMPROVEMENTS/ENHANCEMENTS**

[ -----Committed Funding Sources-----] [----Projected Funding Sources---]

PROJECT		FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	TOTALS
Description	Location/Address	Expenditure / Revenue Source(s)	Expenditure / Revenue Source(s)	Expenditure / Revenue Source(s)	Expenditure / Revenue Source(s)	Expenditure / Revenue Source(s)	Expenditure / Revenue Source(s)
Bald Eagle Turn Lanes(1)	Bald Eagle Between Goldenrod & Elkcam Circle	---	---	---	\$75,000 / \$75,000 GF	\$400,000 / \$400,000 GF	\$475,000 / \$475,000 GF
Street Improvements(2)	City-wide	\$190,000 / \$150,000 RIF \$40,000 GF	\$280,000 / \$200,000 RIF \$80,000 GF	\$400,000 / \$200,000 RIF \$200,000 GF	\$400,000 / \$225,000 RIF \$175,000 GF	\$300,000 / \$225,000 RIF \$75,000 GF	\$1,570,000 / \$1,000,000 RIF \$570,000 GF
Bridge Repair(3)	E. Winterberry Bridge	\$1,100,000 / \$1,100,000 GF	---	---	---	---	\$1,100,000 / \$1,100,000 GF
Bald Eagle & E. Elkcam Circle	Bald Eagle North of NCB to Chalmers / E.	\$470,000 / \$410,000 FDOT	---	---	---	---	\$470,000 / \$410,000 FDOT
Bridge Repairs (City-wide)(5)	BR # 034117 Kendell Dr. South @ Clam Bay	\$325,000 / \$325,000 GF	---	---	---	---	\$325,000 / \$325,000 GF
Bridge Repairs (City-wide)(6)	BR # 034118 Hernando Dr. @ Clam Bay	\$435,000 / \$435,000 GF	---	---	---	---	\$435,000 / \$435,000 GF
Bridge Repairs (City-wide)(7)	BR # 036001 N. Barfield @ Factory Bay	---	\$750,000 / \$750,000 GF	---	---	---	\$750,000 / \$750,000GF
Bridge Repairs (City-wide)(8)	BR # 036002 N. Barfield @ Marco River Inlet	---	\$750,000 / \$750,000 GF	---	---	---	\$750,000 / \$750,000GF
Bridge Repairs (City-wide)(9)	BR #034116 Goldenrod Ave @ Smokehouse Bay	---	---	\$545,000 / \$545,000 GF	---	---	\$545,000 / \$545,000 GF

Bridge Repairs (City-wide)(10)	Br# 034117 Kendell Dr. @ Clam Bay	---	---	---	\$350,000 / \$350,000 GF	---	<b>\$350,000 / \$350,000 GF</b>
	ANNUAL TOTALS	\$2,520,000 / \$1,960,000 GF \$410,000 FDOT \$150,000 RIF	\$1,780,000 / \$1,580,000 GF \$200,000 RIF	\$945,000 / \$745,000 GF \$200,000 RIF	\$825,000 / \$600,000 GF \$225,000 RIF	\$700,000 / \$475,000 GF \$225,000 RIF	\$6,770,000 / \$5,300,000 GF \$1,000,000 RIF \$410,000 FDOT

Notes: No projected LOS deficiencies 2008-2012  
Projects, Expenditures and Revenues per adopted FY 2008 Budget.

Abbreviations:GF - General Fund  
RIF - Road Impact Fees  
FDOT - FL. Dept. of Transportation

- (1) Bald Eagle Drive turning lanes will be provided between Goldenrod Avenue and Elkcam Circle and at the intersection of N. Barfield Drive and Bald Eagle Drive.
- (2) This project involves the partial or full reconstruction of roadway intersection areas to resolve drainage problems, to replace asphalt pavement, to resolve inadequate turning radii, to remedy safety concerns, to alleviate excessive ponding of storm water, and to construct or reconstruct paved shoulders and sidewalk improvements.
- (3) The current bridge has been significantly impacted by age and two hurricanes. FDOT has directed that no truck traffic shall be allowed on the bridge and monthly inspections are to be undertaken. The structural integrity of the two approach slabs are in question and continued use of the bridge is a potential safety concern.
- (4) Create a 16' wide parking/landscape area along both sides of the right-of-way to provide adequate off-site diagonal parking. Drainage will be addressed using valley gutters and improved drainage inlets between the existing pavement travel lanes, driveways and parking areas.
- (5) The following are the repairs recommended by bridge engineering consultants based on the damage and deterioration caused by Hurricane Wilma and age.
- (6) The following are the repairs recommended by bridge engineering consultants based on the damage and deterioration caused by Hurricane Wilma and age.
- (7) The following are the repairs recommended by bridge engineering consultants based on the damage and deterioration caused by Hurricane Wilma and age.
- (8) The following are the repairs recommended by bridge engineering consultants based on the damage and deterioration caused by Hurricane Wilma and age.
- (9) The following are the repairs recommended by bridge engineering consultants based on the damage and deterioration caused by Hurricane Wilma and age.
- (10) The following are the repairs recommended by bridge engineering consultants based on the damage and deterioration caused by Hurricane Wilma and age.

**Table 8.1(b)**  
**SCHEDULE OF CAPITAL IMPROVEMENTS 2008-12**  
**STORMWATER DRAINAGE IMPROVEMENTS/ENHANCEMENTS**

[ -----Committed Funding Sources-----] [----Projected Funding Sources---]

PROJECT		FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	TOTALS
Description	Location/Address	Expenditure / Revenue Source(s)	Expenditure / Revenue Source(s)	Expenditure / Revenue Source(s)	Expenditure / Revenue Source(s)	Expenditure / Revenue Source(s)	Expenditure / Revenue Source(s)
Drainage Improvements(1 )	City-wide, per drainage basins set in the Master Drainage Study	\$300,000 / \$3000,000 GF	\$600,000 / \$600,000 GF	\$400,000 / \$400,000 GF	\$400,000 / \$400,000 GF	\$400,000 / \$400,000 GF	\$2,100,000 / \$2,100,000 GF
Water Quality Improvements(2 )	City-wide (On- going maintenance or rehab. program	\$100,000 / \$100,000 SWFMD*	\$200,000 / \$2000,000 GF	\$200,000 / \$200,000 GF	\$200,000 / \$100,000 GF \$100,000 SFWMD**	\$200,000 / \$100,000 GF \$100,000 SFWMD**	\$900,000 / \$600,000 GF \$300,000 SFWMD
Elkcam Circle Outfall Replacement(3)	Between Elkcam Circle and Rose Ct.	\$100,000 / \$100,000 GF	---	---	---	---	\$100,000 / \$100,000 GF
Swallow Avenue Drainage(4)	Florentine Gardens Outfall	---	---	---	\$450,000 / \$250,000 GF \$200,000 SFWMD	---	\$450,000 / \$250,000 GF \$200,000 SFWMD
	ANNUAL	\$500,000 /	\$800,000 /	\$600,000 /	\$1,050,000 /	\$600,000 /	\$3,550,000 /

	<b>TOTALS</b>	<b>\$400,000 GF</b> <b>\$100,000 SFWMD</b>	<b>\$800,000 GF</b>	<b>600,000 GF</b>	<b>\$750,000 GF</b> <b>\$300,000 SFWMD</b>	<b>\$500,000 GF</b> <b>\$100,000 SFWMD</b>	<b>\$3,050,000 GF</b> <b>\$500,000 SFWMD</b>
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Notes: No projected LOS deficiencies 2008-2012

Abbreviations: GF - General Fund

Projects, Expenditures and Revenues per adopted FY 2008 Budget.

SFWMD - SF Water Management Dist. Grant

\*2008 SFWMD Grant award (Water Quality grant program).

\*\*SFWMD Grant receipts anticipated from established Water Quality and Drainage Programs, supplemented for General Funds.

- (1) The repair or replacement of existing storm sewers is an on-going program necessary to preserve and maintain existing storm drainage capacity. Also annual re-grading of roadside drainage swales is required to minimize nuisance ponding and to maintain adequate storm water drainage along local streets to achieve efficient discharge into receiving water bodies.
- (2) Reconstruction of existing throat type drainage inlets is recommended for both safety and maintenance purposes. The SFWMD requires that each inlet be retrofitted with a device to capture floatables, such as hydrocarbons, grease, oil and debris, before it enters waterways.
- (3) The existing outfall has failed between Elkcam Circle and the Rose Court waterway. This outfall serves Elkcam Circle as well as the new utility property to be exchanged with the County.
- (4) This system consists of two 36" diameter corrugated aluminum pipes. The joints are failing due to dissimilar metals and the method of construction. This storm sewer will be directed to the new Florentine Gardens outfall.

**Table 8.1(c)**  
**SCHEDULE OF CAPITAL IMPROVEMENTS 2008-12**  
**PARKS, RECREATION AND OPEN SPACE IMPROVEMENTS/ENHANCEMENTS**

[ -----Committed Funding Sources-----] [----Projected Funding Sources---]

PROJECT		FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	TOTALS
Description	Location/Addresses	Expenditure / Revenue Source(s)	Expenditure / Revenue Source(s)	Expenditure / Revenue Source(s)	Expenditure / Revenue Source(s)	Expenditure / Revenue Source(s)	Expenditure / Revenue Source(s)
Mackle Park Improvements(1)	1361 Andalusia Terrace	\$200,000 / \$150,000 GF \$50,000 PIF	\$300,000 / \$250,000 GF \$50,000 PIF	\$1,100,000 / \$1,000,000 GF \$100,000 PIF	\$350,000 / \$350,000 GF	\$1,425,000 / \$1,200,000 Bond* \$225,000 GF	\$3,405,000 / \$2,005,000 GF \$1,200,000 Bond* \$200,000 PIF
Winterberry Park Improvements(2)	1408 San Marco Rd.	---	\$350,000 / \$300,000 GF \$50,000 PIF	---	---	---	\$350,000 / \$300,000 GF \$50,000 PIF
Veterans Community Park(3)	Windward Drive & West Elkam Circle	---	---	---	---	\$1,000,000 / \$1,000,000 Bond*	\$1,000,000 / \$1,000,000 Bond*
Leigh Plummer Park Improvements(4)	758 N. Barfield Drive	---	---	\$300,000 / \$300,000 GF	---	---	\$300,000 / \$300,000 GF
	<b>ANNUAL TOTALS</b>	\$200,000 / \$150,000 GF \$50,000 PIF	\$650,000 / \$550,000 GF \$100,000 PIF	\$1,400,000 / \$1,300,000 GF \$100,000 PIF	\$380,000 / \$380,000 GF	\$2,450,000 / \$2,200,000 Bond** \$250,000 GF	\$5,055,000 / \$2,605,000 GF \$2,200,000 Bond*



**Table 8.2**  
**SCHEDULE OF CAPITAL IMPROVEMENTS 2008-2012**  
**(Potable Water and Sanitary Sewers)**

**Note:** None of the improvements described in the following Schedule of Capital Improvement tables are required to correct current or projected Level of Service deficiencies from 2008 through 2012.

**Prepared pursuant to recommendations contained in the June 15, 2007 ORC Report and Chapter 163 F.S., and Rule 9J-5 F.A.C.**





<b>RO Plant Membrane Replacment(6)</b>	<b>South Plant,, Lily Court and Heathwood Drive</b>	<b>\$320,000 / \$320,000 Cap. Reserves</b>	<b>\$350,000 / \$350,000 Cap. Reserves</b>	<b>\$350,000 / \$350,000 Cap. Reserves</b>	<b>\$365,000 / \$365,000 Cap. Reserves</b>	<b>\$375,000 / \$375,000 Cap. Reserves</b>	<b>\$1,760,000 / \$1,760,000 Capital Reserves</b>
<b>North Plant Filter Upgrades(7)</b>	<b>North Plant, East Elkcam and Windward Drive</b>	---	<b>\$1,598,300 / \$1,598,300 Bond</b>	---	---	---	<b>\$1,598,300 / \$1,598,300 Bond</b>
<b>North Plant Expansions(8)</b>	<b>North Plant, East Elkcam and Windward Drive</b>	<b>\$500,000 / \$400,000 GF \$100,000 SFWMD</b>	<b>\$800,000 / \$800,000 GF</b>	<b>\$600,000 / 600,000 GF</b>	<b>\$1,050,000 / \$750,000 GF \$300,000 SFWMD</b>	<b>\$600,000 / \$500,000 GF \$100,000 SFWMD</b>	<b>\$3,550,000 / \$3,050,000 GF \$500,000 SFWMD</b>
<b>South Plant Water Storage(9)</b>	<b>South Plant,, Lily Court and Heathwood Drive</b>	---	---	---	---	<b>\$4,600,000 / \$4,600,000 Bond</b>	<b>\$4,600,000 / \$4,600,000 Bond</b>
	<b>ANNUAL TOTALS</b>	<b>\$7,935,435 / \$6,265,435 WIF \$825,000 W R&amp;R \$400,000 GF \$320,000 Reserves \$25,000 Grant</b>	<b>\$3,788,300 / \$1,598,300 Bond \$1,015,000 W R&amp;R \$800,000 GF \$350,000 Reserves \$25,000 Grant</b>	<b>\$2,000,000 / \$1,050,000 W R&amp;R \$600,000 GF \$350,000 Reserve</b>	<b>\$2,540,000 / \$1,125,000 W R&amp;R \$750,000 GF \$365,000 Reserves \$300,000 SFWMD</b>	<b>\$6,750,000 / \$4,600,00 Bond \$1,175,000 W R&amp;R \$500,000 GF \$375,000 Reserves \$100,000 SFWMD</b>	<b>\$23,013,735 / \$6,265,435 WIF \$5,190,000 W R&amp;R \$3,050,000 GF 1,760,000 Reserves* \$6,198,300 Bond** \$900,000SFWMD*** \$50,000 Grant ****</b>

Notes: No projected LOS deficiencies 2008-2012  
Projects, Expenditures and Revenues per adopted FY 2008 Budget.  
\* Capital Reserves  
\*\* Anticipated Future Water Bond Issues  
\*\*\* Actual and anticipated grant awards from SFWMD  
\*\*\*\* FDEP grant award

Abbreviations: GF - General Fund  
WIF - Water Impact Fees  
Reserves - Capital Reserves  
Bond - Future Bond Issue  
SFWMD - So. Florida Water Man. District  
W R&R - Water Repair & Restoration Fund  
Grant - FDEP grant

- (1) The construction of a 4 million gallon finished water storage tanks, pump station and ancillary systems to combine current system with new.
- (2) An older area of Marco Island will be selected and sound wave technology will be used to identify leaks. Once identified and determined the source and quantity of lost water, then appropriate action will be taken.

- (3) The program will allow Marco Island Utilities to have fewer customers out of service in maintenance situations, such as water main breaks and utility relocation. The age, environment, and infrequent use of the valves have created an urgent need to begin the valve replacement program.
- (4) Water meter accuracy deteriorates with time. The normal life of a meter is 10 years. The Utility Department should replace approximately 10% per year and convert to “touch pad” devices to improve accuracy of readings.
- (5) Historically, the Utility experiences a variety of distribution and collection system repairs. These repairs are unplanned and in some cases unknown.
- (6) The Reverse Osmosis facility has 6 parallel treatment trains, each with 24 membrane tubes. As the membrane ages, the rejection level of solids decreases, allowing more dissolved solids to pass through the treatment plant. Replace one train per year with chemical cleaning of remaining trains annually.
- (7) Replacement of the media and equipment in the filter box and construct a cover for the filter box to comply with regulatory requirements.
- (8) To add an additional 1.67 million gallons per day of surface water treatment capacity.
- (9) Design and construction of a new 2-3 million gallon storage tank at the South Plant complex.

**Table 8.2(b)**  
**SCHEDULE OF CAPITAL IMPROVEMENTS 2008-12**  
**SANITARY SEWER FACILITIES IMPROVEMENTS/ENHANCEMENTS**

<b>PROJECT</b>		<b>FY 2008</b>	<b>FY 2009</b>	<b>FY 2010</b>	<b>FY 2011</b>	<b>FY 2012</b>	<b>TOTALS</b>
<b>Description</b>	<b>Location/Address</b>	<b>Expenditure / Revenue Source(s)</b>	<b>Expenditure / Revenue Source(s)</b>	<b>Expenditure / Revenue Source(s)</b>	<b>Expenditure / Revenue Source(s)</b>	<b>Expenditure / Revenue Source(s)</b>	<b>Expenditure / Revenue Source(s)</b>
<b>Renewal &amp; Replacement(1)</b>	<b>System-wide</b>	<b>\$300,000 / \$300,000 W R&amp;R</b>	<b>\$325,000 / \$325,000 W R&amp;R</b>	<b>\$350,000 / \$350,000 W R&amp;R</b>	<b>\$375,000 / \$375,000 W R&amp;R</b>	<b>\$400,000 / \$400,000 W R&amp;R</b>	<b>\$1,750,000 / \$1,750,000 W R&amp;R</b>
<b>W'Water Treatment Plan Improve(2)</b>	<b>North Plant, East Elkcarn and Windward Drive</b>	<b>\$3,257,200 / \$3,257,200 Sewer Assess.</b>	<b>\$292,200 / \$292,200 Sewer Assess.</b>	<b>\$1,112,800 / \$1,112,800 Sewer Assess.</b>	<b>\$1,137,200 / \$1,137,200 Sewer Assess.</b>	<b>\$602,300 / \$602,300 Sewer Assess.</b>	<b>\$6,401,700 / \$6,401,700 Sewer Assm't</b>
<b>Re-Use Line Extension(3)</b>	<b>Extend re-use line on S. Collier Blvd. from W'Berry Dr. to Collier Ct.</b>	<b>\$1,390,000 / \$1,390,000 Wastewater Capital Reserve</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>\$1,390,000 / \$1,390,000 Wastewater Capital Reserve</b>
<b>Deep Well Injection(4)</b>	<b>North Plant, East Elkcarn and Windward Drive</b>	<b>\$2,928,100 / 2,928,100 Sewer Assessments</b>	<b>\$2,488,100 / \$2,488,100 Sewer Assessment</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>\$5,376,200 / \$5,376,200 Sewer Assm't</b>
<b>Septic Tank Replacement</b>	<b>Per established sewer district</b>	<b>\$10,107,900 / \$10,107,900</b>	<b>\$16,797,500 / \$16,797,500</b>	<b>\$8,990,300 / \$8,990,300</b>	<b>\$7,325,900 / \$7,325,900</b>	<b>\$10,465,700 / \$10,465,700</b>	<b>\$53,687,300 / \$53,687,300 Sewer</b>

Program(5)	schedule	Sewer Assess.	Sewer Assess.	Sewer Assess.	Sewer Assess.	Sewer Assess.	Asm't
	ANNUAL TOTALS	\$17,713,200 / \$16,293,200 Sewer Assess. \$1,390,000 Cap. Reserve \$300,000 W R&R	\$19,902,800 / \$19,577,800 Sewer Assess. \$325,000 W R&R	\$10,453,100 / \$10,103,100 Sewer Assess. \$350,000 W R&R	\$8,838,100 / \$8,463,100 Sewer Assess. \$375,000 W R&R	\$11,468,000 / \$11,068,000 Sewer Assess. \$400,000 W R&R	\$68,605,200 / \$65,465,200 Sewer Asm't \$1,750,000 W R&R \$1,390,000 Cap. Reserve

Notes: No projected LOS deficiencies 2008-2012  
Projects, Expenditures and Revenues per adopted FY 2008 Budget.

Abbreviations: W R&R - Wastewater Repair and Restoration Fund  
Sewer Assessments  
Wastewater Capital Reserve

- (1) Historically, the Utility experiences a variety of distribution and collection system repairs. These repairs are unplanned and in some cases unknown.
- (2) To upgrade and expand the existing wastewater treatment plant to 5 million gallons per day capacity to facilitate the completion of the STEP program.
- (3) The utility is making provisions to increase the capability to deliver additional reuse water. The majority of potential new irrigation users are along South Collier Boulevard to Collier Court.
- (4) The existing deep injection well takes reject water from the RO facility as well as wastewater effluent that does not meet reuse standards. Expansion of the wastewater treatment plant will increase the amount of treated wastewater that may have to go down the injection well. The existing deep injection well is at maximum capacity and cannot accommodate these increase. A second injection well is required to expand these capacities.
- (5) The Septic Tank Replacement Program (STEP) requires engineering of a gravity and force main system for each of the remaining sewer assessment district. Funding includes design and professional services during construction.



### 3. Storm water Management

The City of Marco Island is responsible for the operation and maintenance of storm water drainage facilities on the island. The City has adopted a design LOS standard for existing facilities as the ten (10) year, one (1) hour design storm with a 3.3 inches/hours intensity duration. The Master Drainage Plan (2000) modeled all drainage basins and sub-basins, and found that all had been designed to meet the LOS standard. Future drainage improvements are to be designed to meet the range of LOS standard levels below depending on locations and geographical/topographical constraints:

- \_ LOS Standard A: Upstream (US) Ground Elevation - Upstream Hydraulic Grade Line (US HGL) > 0.5 Ft.
- \_ LOS Standard B: US Ground Elevation - US HGL > 0.2 Ft.
- \_ LOS Standard C: US Ground Elevation - US HGL > or = 0.0 Ft.
- \_ LOS Standard D: US HGL < or = 5.2 Ft. NGVD\*
- \_ LOS Standard E: US HGL > .2 Ft. NGVD\*

(\*) May be acceptable at a limited number of roadway locations due to extreme topographic conditions.

There are no current LOS deficiencies to the existing storm water network. However the existing system has been substantially upgraded and improved since cityhood, and over the next five years the City will expend \$3,550,000 toward system upgrades, enhancements and maintenance projects.

#### STORMWATER MANAGEMENT LOS SUMMARY

Adopted LOS: The ten (10) year, one (1) hour storm with a 3.3 inches/hour intensity duration.

LOS A: US - US HGL > 0.5 ft.

LOS B: US - US HGL > 0.2 ft.

LOS C: US - US HGL > or = 0.0 ft.

LOS D: US HGL < or = 5.2 ft., NGVD

LOS E: US HGL < 5.2 ft., NGVD

Current Capacity: Same as above. All vacant single family lots have been platted to accommodate necessary storm water drainage and retention, thus, the impacts of development of remaining lots on Marco Island will be accommodated through build out.

Projected Capacity: Same as above. All vacant single family lots have been platted to (2012) accommodate necessary storm water drainage and retention, thus, the impacts of development of remaining lots on Marco Island will be accommodated through build out.

Note: Storm water drainage projects will continue to be planned and constructed consistent with adopted LOS design standards and LOS parameters based on project location throughout the Island.

#### **4. Potable Water**

The City operates the potable water system through Marco Island Utilities. The Utility has a permissible treatment capacity on-island of 12.7 million gallons per day (mgd), operates two treatment plants (Elkcam Circle and Heathwood Drive), producing and distributing 3.1 billion gallons of potable water annually through 112 miles of water transmission lines, serving up to 40,000 customers daily.

The 2001 Comprehensive Plan established a Level of Service standard of 200 gallons per capita per day for potable water. While the permissible treatment capacity for potable water meets the adopted LOS standard for even peak season demands, without water conservation efforts and other policy considerations, the system could be strained by demands during the dry season, which also corresponds with peak season. Capital improvements for the potable water system are located in a specific Capital Improvement Plan for the Utility, which is separately funded from the City's CIP. Over the next five years the Utility will expend \$23,013,735 on capital improvements related to the potable water system. However, these expenses are related to system upgrades or to correct infrastructure issues associated with the acquisition of an aged and under-maintained private water system, and not to correct LOS deficiencies.

#### POTABLE WATER LOS SUMMARY

Adopted LOS: 200 gallons per capita per day

Current Capacity: 12,700,000 gallons per day (permitted)

Current Demand: 11,508,640 gallons per day [40,240 peak population (2006) x 286\*  
(Actual) gallons per capita per day]

Committed Demand: 51,840 gallons per day [120 permitted (not built) dwelling units x  
(Not Built/Co'ed) 2.16 persons per dwelling x 200 gallons per capita per day]

Total Current Demand: 11,560,480 gallons per day [Current + Committed Demand]

Available Capacity: 1,139,520 gallons per day [Current Capacity - Total Current Demand]

Projected Capacity: 12,700,000 gallons per day (permitted)  
(2012)

Projected Total Demand: 11,326,975 gallons per day [41,189 peak population (2013) x  
(2012) 275\*\* gallons per capita per day]

Projected Surplus or

Deficiency in 2012: +1,373,025 gallons per day

Note: As there will be sufficient capacity throughout the planning period (2008-12), even with actual user rates above the adopted LOS standard of 200 gallons per day, no Capital Improvement Projects are necessary to correct Potable Water LOS deficiencies. Nonetheless, per Table 8.2(b) the City of Marco Island will expend over \$42,000,000 in potable water system enhancements during the planning period.

(\*) 286 gallons per capita per day was the average peak season daily consumption in 2006.

(\*\*) 275 gallons per capita per day is projected as a reliable estimate of average peak season daily consumption in 2012 with the decrease between 2006 and 2012 attributes to consumer education, conservation efforts, and enforcement of water restrictions.

## **5. Sanitary Sewer**

The Utility has a permissible treatment capacity at the Elkcarn Circle facility of 3.5 million gallons per day (mgd), maintains 50 miles of sewer collection lines and 64 wastewater lift stations, collects and treats 730 million gallons of wastewater annually, and produces and distributes 401 million gallons of reuse water for irrigation purposes.

In 2005 the City embarked on an ambitious, and contentious, program to “sewer the Island”. Beginning in 2006 through 2012 the City will complete a 7-Year Septic Tank Replacement Program. Capital improvements for the sanitary sewer system are located in a specific Capital Improvement Plan for the Utility, which is separately funded from the City’s CIP. Over the next five years the Utility will expand capacity to 5.0 MGD and expend \$68,605,2000 on capital improvements related to the sanitary sewer water system. However, these expenses are related to system upgrades, expansions, and to correct infrastructure issues associated with the acquisition of an aged and under-maintained private water system, and not to correct LOS deficiencies.

### SANITARY SEWER LOS SUMMARY

Adopted LOS: 100 gallons per capita per day

Current Capacity: 3,500,000 gallons per day (permitted)

Current Demand: 3,162,375 gallons per day [23,425 non-septic population (2006) x  
(Actual) 135\* gallons per capita per day]

Committed Demand: 25,920 gallons per day [120 permitted (not built) dwelling units x  
(Not Built/Co’ed) 2.16 persons per dwelling x 100 gallons per capita per day]

Total Current Demand: 3,188,295 gallons per day [Current + Committed Demand]

Available Capacity: 311,705 gallons per day [Current Capacity - Total Current Demand]

Projected Capacity: 5,000,000 gallons per day (permitted)  
(2012)



Projected Total Demand: 4,736,735 gallons per day [41,189 peak population (2013) x 115\*\* gallons per capita per day]

Projected Surplus or Deficiency in 2012: +263,265 469,210 gallons per day

Note: As there will be sufficient capacity throughout the planning period (2008-12), even with actual user rates above the adopted LOS standard of 100 gallons per day, no Capital Improvement Projects are necessary to correct Sanitary Sewer LOS deficiencies. Nonetheless, per Table 8.2(a) the City of Marco Island will expend over \$68.6 million in sanitary sewer system expansions and enhancements during the planning period.

(\*) 135 gallons per capita per day was the approximate average daily consumption in 2006.

(\*\*) 115 gallons per capita per day is projected as a reliable estimate of average peak season daily consumption in 2012 with the decrease between 2006 and 2012 attributes to consumer education, conservation efforts, and enforcement of water restrictions.

## **6. Solid Waste**

The collection and disposal of solid wastes generated on Marco Island remains under the supervision and management of the Collier County Solid Waste Management Department. Marco Island is located within Solid Waste Collection District Number 1, where solid waste collection is mandatory. Waste Management of Collier County, Inc. is the franchised waste collector to provide collection services to residential, commercial and industrial generators on the Island. Other wastes, resulting from land clearing, construction materials, and demolition wastes are generally collected by independent waste collection firms licensed by the County. Approximately 50% (by weight) of the total County waste stream is handled by independent businesses or private haulers.

Solid waste collected by Waste Management is brought to the Naples landfill for final disposal. This 320 acre facility, which is approximately 20 miles northeast of Marco Island, is operated by contract with Waste Management of Florida, Inc. In addition to the Naples facility, the County has one other landfill site, a 100 acre facility in Immokalee, which services the eastern portion of the County. The total capacity of the Naples landfill facility, with upgrades, is estimated to last approximately 15 years.

The 2001 Comprehensive Plan adopted, by reference, the same Solid Waste LOS standard as Collier County, which is:

1. 1.10 tons of solid waste per capita per year.
2. A minimum of two (2) years of constructed lined landfill cell at the calculated waste generation rate.
3. A minimum of ten (10) years of permissible landfill capacity at the calculated generation rate.

Any LOS deficiencies, now or in the future are the sole responsibility of Collier County.

### SOLID WASTE LOS SUMMARY

Adopted LOS: 1.1 tons of solid waste per capita per year; and two (2) years of constructed lined

landfill cell capacity to accommodate annual disposal rates; and ten (10) years of permitable landfill capacity to accommodate annual disposal rates.

CIP Funding: Not applicable, responsibility of Collier County.  
(2008-2012)

Note: Solid waste collection and disposal is the responsibility of Collier County; funded through user fees collected by Collier County.

## **7. Public Schools and Public Health Systems**

The public educational system located on Marco Island consists of Tommie Barfield Elementary School and the Marco Island Charter Middle School. The two schools, located adjacent to one another, are located on one of two tracts owned by the School District on Marco Island. These schools provide educational facilities for grades kindergarten through eighth grade. High school facilities are located off-Island. Tommie Barfield is operated and maintained by the Collier County School Board. The Charter Middle School is a quasi-independent facility that is operated under agreement with the School Board. A new Charter Middle School facility is currently under construction. The other School Board owned property, Tract K, is currently undeveloped, and no immediate plans for its use are known at this time.

The Marco Island Healthcare facility is located on Heathwood Drive. This facility, affiliated with Naples Hospital, provides urgent care for Islanders.

The City of Marco Island has no LOS standards or financial obligations related to the public schools or public health services located on Marco Island.

### **D. Capital Improvement Costs**

Other than solid waste disposal, regional parks and public schools, the City is now the principal entity responsible for the provision of facilities and services subject to State required level of service (LOS) standards. As the evidence and documentation provided in this element and other Data and Analysis elements demonstrate, the City does not have any LOS deficiencies to address in conjunction with future Capital Improvement expenditures. And the City takes great pride in revealing a financially feasible five-year CIP that nonetheless expends significant capital for the enhancement and expansion of public facilities and services for the benefit of the Island residents and visitors. Between Tables 8.1 and 8.2 the City and the City's Utility will expend nearly \$107 million between 2008 and 2012 on capital improvement projects, none of which are needed to resolve LOS deficiencies.

## **E. Impact of Public Educational and Health Care Facilities**

Both public educational facilities and health care facilities on Marco Island are the responsibility of entities outside the direct control of the City of Marco Island. While the City has and continues to support the provision of these essential public services there is no direct financial or LOS responsibility by the City for the provision of either. All of the school and health care facilities on the Island receive water and sewer services, and will not adversely impact other City services subject to LOS standards over the planning horizon.

## **F. Timing and Location of Capital Improvements**

From a concurrency standpoint, all of the services and facilities provided by the City of Marco Island are either designed or constructed to have capacity sufficient to meet or exceed adopted LOS standards to accommodate anticipated growth and development into the next five years, and beyond. It continues to be recognized that some of the assets (water and sewer) recently acquired by the City is aged and in need of maintenance, upgrades or repair. The CIP's revealed in Tables 8.1 and 8.2 demonstrate the City's commitment to proactive maintenance, logical system expansion, and sound management of the services provided to the citizens of Marco Island.

## **G. Financial Feasibility**

Tables 8.1 and 8.2 provide the cost and estimated funding sources for each programmed project or activity. As none of the proposed projects are intended to address LOS deficiencies, the figure contained in these tables, which were adopted in 2007, reflect the City's continued commitment to excellence. Between Tables 8.1 and 8.2 over \$106 million will be expended over the next five years to enhance and improve the infrastructure of the City.

Any bonded indebtedness held by the City is held at the highest standards, and will not limit the City in any manner to address any potential LOS deficiency. Therefore, the Capital Improvements documented by the City in Tables 8.1 and 8.2 are financially feasible.