SECTION 1

INTRODUCTION

CITY OF COCOA BEACH, FLORIDA
STORMWATER MASTER PLAN

PARSONS ENGINEERING SCIENCE, INC.

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SECTION 1
INTRODUCTION

1.1 OVERVIEW

The City of Cocoa Beach currently has an established stormwater utility for the management of stormwater. This entity is responsible for addressing infrastructure, flooding, and water quality issues related with the stormwater runoff that is generated by the City. In addition, it is responsible for maintaining an operations and maintenance program for upkeep of the existing management system as well as addressing regulatory compliance issues as they relate to land development in the City. This utility is further tasked with meeting Florida Department of Environmental Protection (FDEP) and St. Johns River Water Management District (SJRWMD) regulations through everyday activities and in planning for future development and stormwater improvements.

The City has undertaken the development of a Stormwater Master Plan to assess current stormwater management facilities and practices with respect to flooding and water quality level of service. The plan was jointly funded by the City, the SJRWMD, and the Indian River Lagoon National Estuary Program (IRLNEP). The culmination of the Master Plan effort is a detailed Capital Improvement Program (CIP) that will guide the City's Stormwater Utility in the coming years as it addresses flooding and water quality issues.

Cocoa Beach is located on a barrier island in Brevard County, Florida as shown in Figure 1-1. This unique geographical setting provides many advantages but also many obstacles to effective stormwater management. Stormwater runoff as a whole is easy to address qualitatively, as it generally works its way through storm sewers from east to west ultimately discharging into the Banana River. The City on the whole is old being primarily developed in the 1950's and 1960's. As such, much of the City's infrastructure is approaching its useful service life. Also, the City is essentially built out which limits the options available for implementation of large scale or centralized stormwater controls.

At present, the issue of water quality is of primary importance as the City attempts to comply with upcoming NPDES regulations with Total Maximum Daily Load (TMDL) pollutant reduction requirements. Meeting the intent of upcoming regulations is imperative as the majority of the City's stormwater runoff discharges into the Banana River (see Figure 1-2). The Banana River is part of the Indian River Lagoon (IRL) system, which is classified as an Outstanding Florida Waterway and is on the USEPA's 303(d) list of impaired waters. This classification is assigned to areas warranting the highest protection from further degradation of water quality. The SJRWMD has received extensive scientific and technical input from the IRLNEP to attempt to quantify TMDL's within the Banana River that will be required to restore and protect the IRL. The efforts of the SJRWMD in quantifying these limits are quite challenging in that they must first determine defensible TMDL criteria and practically achievable water quality limits that can achieve water quality conditions. To date, however, there has been no specific recommended water quality standards provided to the City to use as a basis for capital improvement planning.

SITE VICINITY MAP
STORMWATER MASTER PLAN
CITY OF COCOA BEACH, FLORIDA

Figure 1-1

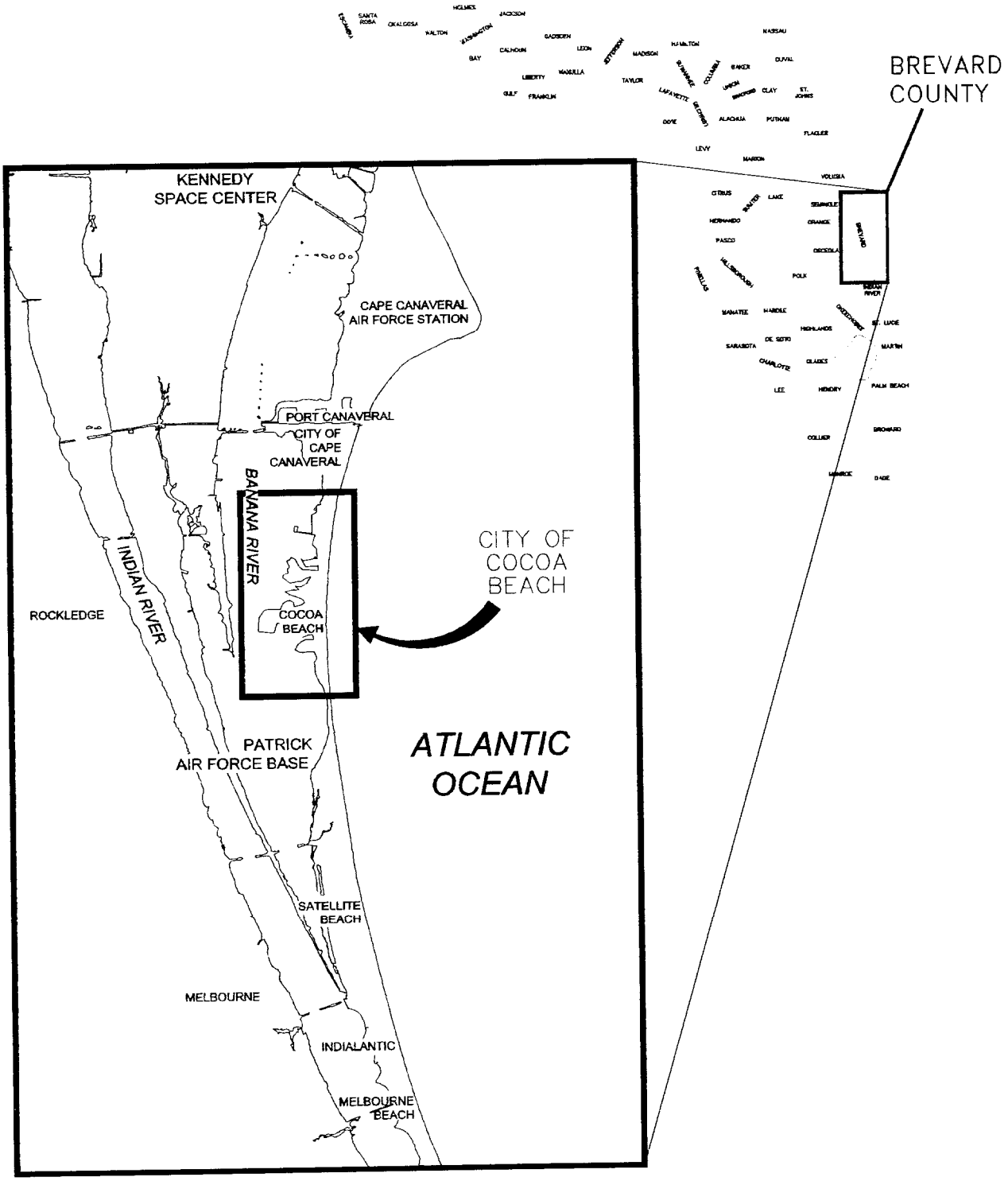

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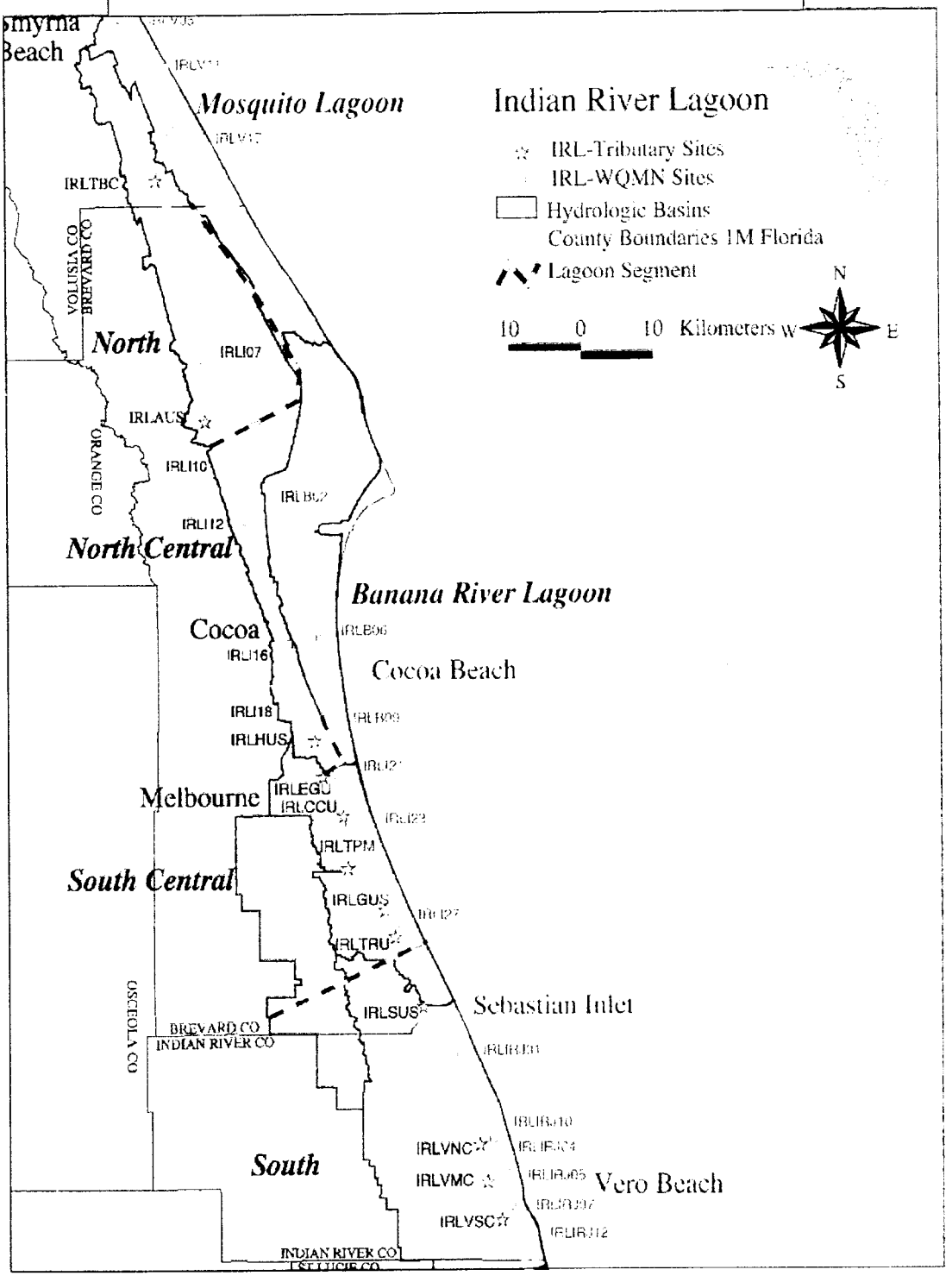
FIGURE 1-2
INDIAN RIVER LAGOON SYSTEM



Source: /sjr/irl/arcview proj/wendy stations.apr 04/20/1999

MAP SOURCE: SJRWMD

The lack of specific regulatory criteria presents a significant challenge to Cocoa Beach in the development of a financially feasible CIP that can address a regulatory goal that has not yet been established, nor is quantifiable. The City of Cocoa Beach have attempted to meet this challenge with practical and innovative approaches in implementing stormwater Best Management Practices (BMPs) that can efficiently reduce pollutant loadings that degrade water quality and relieve chronic flooding issues. Rather than relying entirely on unestablished goals and published criteria for multi-parameter pollutant loadings, this Master Plan focused on a program of reducing sediment loads and stormwater discharges using a combination of active and passive sediment controls. Using a historical baseline condition pollutant estimates compared with current pollutant loading estimates, realistic interim pollutant loading reduction goals (PLRGs) were developed accounting for technological, economic, and political constraints. The end result is a CIP that can provide a comfortable pathway to future regulatory compliance.

1.2 SITE DESCRIPTION

The City of Cocoa Beach lies along Florida's East Coast barrier islands between the environmentally sensitive Banana River and the Atlantic Ocean. The majority of land uses within the City of Cocoa Beach are comprised of older single-family residential developments, high intensity hospitality, or commercial uses leaving little vacant land for the management of stormwater. The majority of the urban development in Cocoa Beach occurred in the late 1950s and 1960s. Historical and present day photographs are included as Figure 1-3.

Within the limits of the City of Cocoa Beach, a total of nine major stormwater basins have been delineated covering an area of approximately 2,200 acres. The majority of stormwater runoff drains through a storm sewer pipes discharging to the Banana River through numerous outfall points. Numerous small management systems such as swales, exfiltration, or small retention/detention features also exist, generally associated with private developments. There is also a significant amount of stormwater runoff which discharges directly to the Banana River via overland flow.

As discussed above, the Banana River is part of the IRL. The SJRWMD has specific authority and responsibility for managing the northern part of the IRL Basin, comprised of Volusia, Brevard, and Indian River counties. The remaining sections of the IRL are controlled by the South Florida Water Management District (SFWMD). The IRL region consists of three distinct water bodies–the Banana River, Mosquito Lagoon, and the IRL proper–and extends 156 miles along the Atlantic coast. To protect and restore the rich biodiversity of this estuary, the EPA included this system into its National Estuary Program (NEP) to address its environmental problems on a local and national scale.

1.3 MASTER PLAN ORGANIZATION

The Master Plan document has been organized into three volumes. The first volume us an Executive Summary, an abbreviated version of the entire plan composed of the summaries of each Stormwater Master Plan section. Volume II is the detailed analysis in text and tabular form. This is the main portion of the Stormwater Master Plan and its components are described below. The third and last volume is the Appendices and Supporting Data on which many of the findings and recommendations are based.

SECTION 1 – INTRODUCTION: This section presents an overview of the Master Plan including the purpose and goals of the plan and a general description of the project area. Included is a description of each of the individual plan components. The appendix provides a list of resources utilized in developing this plan.

SECTION 2 - BASIN CHARACTERISTICS: This section presents a summary of the physical and hydrological characteristics of the City upon which the flooding and water quality assessments are based. Included are descriptions of topography, stormwater subbasins, soil characteristics, current and historical land uses, impervious areas, and hydrological parameters such as rainfall and evaporation. This data is relied upon as the basis of the engineering evaluations provided in the plan.

SECTION 3 - FLOODING ASSESSMENT: This section details efforts to identify flooding and infrastructure related problems and quantify their causes. Included is a discussion of current problems based on record review, interviews with relevant personnel, and data provided by the City. Following problem discussion, details regarding the Level of Service (LOS) criteria used to evaluate the performance of the stormwater management system are provided. A hydrological/hydraulic model was developed to simulate the design storm response of key portions of the stormwater management system. The key components of this model area discussed along with the results. The final portion of this section summarizes the model results in the context of the defined LOS criteria to identify specific areas of the stormwater management system that warrant further investigation through the implementation of structural or maintenance related BMPs.

SECTION 4 - WATER QUALITY ASSESSMENT: This section summarizes the assessment process developed to address water quality issues and attempts to define an effective strategy for establishing pollutant reduction goals. The assessment follows procedures the SJRWMD is currently evaluating which link pollutant load reduction goals (PLRGs) to meeting 1943 environmental conditions for the aerial coverage of seagrass within the Indian River Lagoon. The section includes a detailed discussion of the regulatory criteria governing water quality requirements and establishes the primary pollutants of concern with respect to Cocoa Beach and the Banana River. A detailed pollutant loading model was developed to quantify current historical, and future scenarios to provide the basis for establishing a viable PLRG and a water quality LOS to which to base management decisions.

SECTION 5 - BMP EVALUATION: The purpose of this section is to identify solutions for addressing the problems and/or deficiencies identified in the flooding and water quality assessment sections. These solutions are primarily addressed in the form of Best Management Practices (BMPs) for stormwater. The section provides background data on the various BMPs discussed, identifies existing BMPs, and provides rationale for various potential BMPs recommended for the City to implement under the CIP. Also, included in this section are further details on the development of a technologically based PLRG to aid in establishing level of service criteria for water quality.

SECTION 6 - CAPITAL IMPROVEMENT PROGRAM: This section provides details on the Capital Improvement Program (CIP) recommended for the City. The purpose of the CIP is to provide a technically defensible implementation plan of projects that address specific