

# CITY OF MIAMI BEACH

## Engineer's Report for the Stormwater Revenue Bonds, Series 2015



**July 17, 2015**

**FINAL**

Prepared by

**AECOM**

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## Table of Contents

1.	Introduction.....	6
1.1	Background.....	6
1.2	Study Assumptions .....	7
2.	Public Works Department and Stormwater System Development.....	7
2.1	Description of the Existing Stormwater System.....	7
2.2	Administration and Staffing .....	9
3.	Stormwater System .....	12
3.1	System Description .....	12
3.2	Permitting Requirements.....	17
3.2.1	Federal.....	17
3.2.2	State.....	18
3.2.3	Local – Miami Dade County Department of Regulatory and Economic Resources (DRER).....	19
3.2.4	Pending Federal and State Regulations.....	19
3.3	Facility Evaluation .....	23
3.4	Utility Billing .....	23
4.	Capital Improvements.....	25
4.1	Planned Improvements .....	25
5.	Financial Analysis.....	35
5.1	Introduction.....	35
5.2	Customer Usage and Growth.....	35
5.3	Annual Revenue Requirements from Rates .....	35
5.4	Projected Financial Results at Prevailing Rates .....	36
5.5	Projected Financial Results with Stormwater Rate Adjustments.....	36
5.6	Comparison of Stormwater Utility Rates.....	37
6.	Conclusions and Recommendation .....	50



## List of Figures

Figure 1	City of Miami Beach Study Area	8
Figure 2	Organizational Chart for City's Stormwater System	11
Figure 3A	Existing Primary Stormwater Management System (North Beach)	13
Figure 3B	Existing Primary Stormwater Management System (South Beach)	14
Figure 4	City of Miami Beach LIDAR Elevations Less than 2.2 ft, NAVD	16
Figure 5	Proposed Stormwater Projects	26
Figure 6	5 Year Stormwater Master Plan	27

## List of Tables

Table 5.1	Budgeted and Projected Stormwater System ERUs and Fee Revenues at Prevailing Rates	38
Table 5.2	Budgeted and Projected Stormwater System Operating Expenses	39
Table 5.3	Budgeted and Projected Stormwater System Annual Debt Service Requirements	40
Table 5.4	Budgeted and Projected Stormwater System Other Revenue Requirements	41
Table 5.5	Projected Stormwater System Revenues, Expenses and Debt Service Coverage at Prevailing Rates	42
Table 5.6	Projected Stormwater System Revenues, Expenses and Debt Service Coverage with Rate Increases	44
Table 5.7	Projected Operation of the Stormwater Rate Stabilization Account with Rate Adjustments	47
Table 5.8	Comparison of Stormwater Utility Fees for Cities and Counties in Florida – FSA 2014	48



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Ms. Patricia Walker  
Chief Financial Officer  
City of Miami Beach, Florida  
1700 Convention Center Drive  
Miami Beach, Florida 33139

Subject: Engineer's Report for the City of Miami Beach, Florida  
Stormwater Revenue Bonds, Series 2015

Dear Ms. Walker,

AECOM has prepared this letter report to present pertinent engineering information for the Official Statement relating to the issuance by the City of Miami Beach, Florida (City) of its Stormwater Revenue Bonds, Series 2015 (Series 2015 Bonds). The Series 2015 Bonds are being issued to finance continued construction of improvements to the stormwater systems throughout the City as begun with proceeds from the City's Stormwater Revenue Bonds, Series 2000 (Series 2000 Bonds) and Stormwater Revenue Bonds, Series 2011A (Series 2011 Bonds).

This Engineer's Report contains information prepared by AECOM relative to the City's stormwater system as developed and proposed in part by the 2011 City of Miami Beach Citywide Comprehensive Stormwater Master Plan prepared by CDM Smith Inc. (2011 SWMP) and makes reference to both the 2011 SWMP and the 1997 Comprehensive Stormwater Management Program Master Plan prepared by CH2M Hill (1997 SWMP) in combination with various Basis of Design Reports developed by other engineering consultants.

Subsequent to adoption of the 2011 SWMP, the City implemented policy changes related to flood mitigation and drainage and roadway Level of Service to maintain flood protection while taking into account sea level rise, king tide events, and increased rainfall depth, intensity and distribution. AECOM evaluated the prior reports and studies and has updated the citywide master stormwater model to evaluate areas deficient in Level of Service. Based on this analysis, it was determined that the drainage designs contained within the 2011 SWMP were inadequate to serve the City's needs. In addition, as a result of the predicted increase in groundwater levels resulting from sea level rise, the City has implemented a working policy to (over time) reduce and/or eliminate the use of exfiltration trenches, gravity drainage wells and stormwater injection wells due to concerns over reliability and decreasing capacity, which further modified the 2011 SWMP drainage designs.



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Various aspects of the City's stormwater system are included in this Engineer's Report in the following format:

- Introduction
- Public Works Department and Stormwater System Development
- Stormwater System
- Capital Improvements, and
- Financial Analysis

It is the intent of this Engineer's Report to identify proposed projects that will provide comprehensive solutions for improving the City's stormwater management system performance for the next 50 years. Appropriate consideration has been given to water quality of the Biscayne Bay and Operation and Maintenance (O&M) of an expanded system. The presented capital improvements allow the City's stormwater systems to meet the increasing performance, permitting and regulatory demands while modernizing the existing system to meet the drainage and roadway level of service desired by the City of Miami Beach.

Respectfully submitted;

**AECOM**

Thomas F. McGowan, PE  
Project Manager



## 1. Introduction

### 1.1 Background

The City of Miami Beach (City) has experienced tidal flooding for many years. The tidal flooding has been severe during higher than average tides experienced in the spring and the fall of the each year. The fall high tides are the highest tides of the year, and are also known as the King Tides. Tidal flooding occurs when the Biscayne Bay water surface elevation rises sufficiently to backflow into the City's stormwater management system and up through the stormwater inlet grates, flooding the roadway curb and gutter. During some high tide events, the tidal flooding can overtop the roadway curb and gutter and sidewalks, filling the streets of the City with salt water. Tidal flooding poses a threat to public health and safety and inconveniences the public. The flooding has caused major damage to structures and killed lawns and landscaping. In addition, tidal flooding saturates the base structure of roadways, causing deterioration and failure of roadways prior to their expected useful design life.

AECOM has prepared this letter report to present pertinent engineering information for the Official Statement relating to the issuance by the City of its Stormwater Revenue Bonds, Series 2015 (Series 2015 Bonds). The Series 2015 Bonds are being issued to finance continued construction of the improvements to the stormwater systems throughout the City, as begun with proceeds from the City's Stormwater Revenue Bonds, Series 2000 (Series 2000 Bonds) and Stormwater Revenue Bonds, Series 2011A (Series 2011 Bonds). The City authorized AECOM to prepare an Engineer's Report in support of the City's planned issuance of approximately \$300 million of Stormwater Revenue Bonds within the next five years to upgrade the City's stormwater management system (the Stormwater Program). The Series 2015 Bonds will be issued to provide \$100 million of proceeds for such a purpose.

In July 2008, CDM Smith Inc. (CDM Smith) was retained by the City to perform a Stormwater Rate Study projecting annual revenue requirements for Fiscal Years 2009 through 2014, including operating expenses, existing and prospective debt service, administrative fees, depreciation/renewal and replacement requirements, and capital expenditures. The City's current stormwater utility rates are in effect based on recommendations from the CDM Smith Stormwater Rate Study. On October 1, 2014, the City raised the stormwater utility rates in anticipation of the issuance of the Series 2015 Bonds.

This Engineer's Report presents the results of an updated analysis, and describes the organization and management of the City's Public Works Department and the specific responsibilities of the Stormwater Utility (as defined in City Resolution No. 2000-24127 dated October 18, 2000 (the Bond Resolution) authorizing issuance of stormwater revenue bonds). This report outlines the City's stormwater service areas, facilities, operations, Capital Improvement Program (CIP), and historical and projected financial performance of the Stormwater Utility.



In July 2014, the City retained AECOM to evaluate the Citywide Comprehensive Stormwater Management Master Plan prepared by CDM Smith (2011 SWMP) to analyze and update its stormwater management practices, infrastructure, funding, and regulatory policies.

In this capacity, AECOM has analyzed, reviewed and assessed various aspects of the Stormwater Utility infrastructure, management, operations and finances.

This Engineer's Report contains information prepared by AECOM relative to the City's stormwater system, as developed and proposed in part by the 2011 SWMP. This Engineer's Report makes reference to both the 2011 SWMP and the 1997 Comprehensive Stormwater Management Program Master Plan prepared by CH2M Hill, (1997 SWMP), in combination with various Basis of Design Reports developed by other engineering consultants. In addition to AECOM's analysis and update, these previously developed reports and studies provide AECOM the means of assessing the technical merit for the issuance of the Series 2015 Bonds.

## 1.2 Study Assumptions

Information utilized in preparation of this report relies upon information provided by the City and other parties. AECOM has not independently verified all of the supplied information. However, the information follows general trends of the City related to the management of its stormwater infrastructure. AECOM has no reason to believe the supplied information is not valid for this report, yet no assurances are made with respect thereto. Specific assumptions used in this report are presented throughout the course of this report and are provided to clarify the basis of analysis.

## 2. Public Works Department and Stormwater System Development

### 2.1 Description of the Existing Stormwater System

The City of Miami Beach is a highly urbanized coastal community located in southeast Florida and is a major economic resource to the region. Bounded by the Atlantic Ocean and the environmentally sensitive Biscayne Bay Aquatic Preserve, which is also an Outstanding Florida Water (OFW), the existing stormwater system covers approximately 4,200 acres, as shown in **Figure 1**. The area has relatively low-lying topography that is bisected by intracoastal waterways, a subtropical climate with high intensity rainfall, significant tidal influence, limited soil storage for infiltration, high amounts of impervious area, and limited available surface storage. These factors have all contributed to historical, and have the potential to contribute to future, severe rainfall and tidal flooding.

Tidal events can cause both flooding and erosion. The City is comprised of a series of islands and has a perimeter of seawalls around the island system. Topographic elevations range from approximately 10 feet referenced to North American Vertical Datum of 1988 (feet-NAVD) to 0.0 feet-NAVD, and much of the City's stormwater infrastructure and roads lie at or below 6 feet-NAVD. Low street gutter elevations range as low as 0.5 feet-NAVD.







The City's stormwater management system is tidally influenced and consists of approximately 340 City maintained outfalls served by swales, inlets, storm drains, culverts, bridges, gravity and pumped recharge wells, exfiltration systems, channels, canals, pump stations, and retention/detention storage systems.

Miami Beach is one of 33 municipalities that entered into an Interlocal Agreement (ILA) with Miami-Dade County in 1993, authorizing Miami-Dade County to be the lead permittee in submitting a National Pollutant Discharge Elimination System (NPDES) Stormwater Permit Application. One condition of the ILA requires the City to develop a stormwater master plan that is consistent with Miami-Dade County's Master Plan.

The City's stormwater system currently operates under Florida Department of Environmental Protection (FDEP) Municipal Separate Storm Sewer System (MS4) Permit No. FLS000003-003, which adheres to the federal NPDES requirements of the Clean Water Act. The MS4 Permit for the Stormwater Utility expires on June 20, 2016. As recorded in the City's stormwater Geographic Information System (GIS) database, the stormwater infrastructure in place includes approximately 4,750 stormwater inlets, 7,900 conduits (gravity pipes and force mains), 2,575 manholes, 25 pumping stations, and 340 stormwater outfalls. In addition, the City has 3 pump stations under construction and an additional 12 in final design or currently under contract to construct. This does not include the several private, County, and State owned pump stations and outfalls within the City limits.

## 2.2 Administration and Staffing

The City is organized under the Commission-Manager form of government. The governing body of the City is the City Commission, which establishes policies for proper administration of the City. The City Commission is composed of seven members, including the Mayor. The Mayor and Commissioners are elected to their offices by an at-large vote of the citizens, and the Vice-Mayor is chosen by majority vote of all members of the City Commission. Six Commissioners serve staggered four year terms, and the Mayor serves a two year term. The City Commission appoints a City Manager to act as administrative head of the City. The City Manager serves at the pleasure of the City Commission, carries out its policies, directs the operations of the City and has the power to appoint or remove heads of all departments.

**Figure 2** presents the organizational chart for the City's Public Works Department. The Public Works Department is responsible for the operation and maintenance of the facilities of the stormwater system. Eric T. Carpenter, PE is the Public Works Director reporting to the Assistant City Manager, Mark Taxis, and is assisted by an Assistant Public Works Director.

The Director of the City's Infrastructure Division of the Public Works Department, Mike Alvarez, is responsible for the daily operations of the stormwater system. The Infrastructure Director oversees Operation and Maintenance (O&M) and minor construction of the following:

- Sewer collection system
- Water distribution system



- Stormwater collection and disposal system
- Pump stations
- Water metering

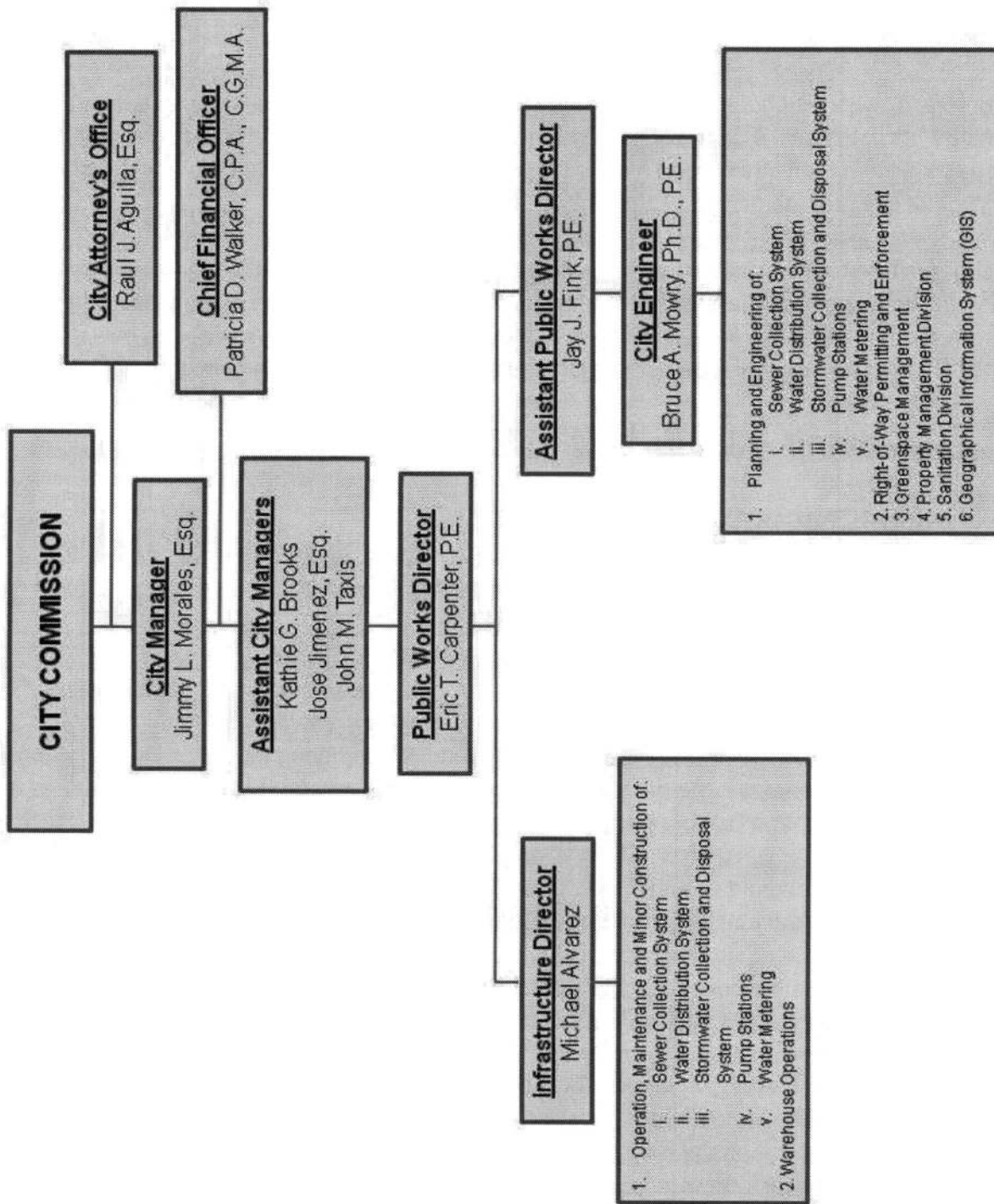
The Infrastructure Director also oversees warehouse operations.

Other Public Works Department Divisions are overseen by the Assistant Public Works Director, Jay Fink, PE who reports to the Public Works Director. The City Engineer, Bruce Mowry, Ph.D., PE, is responsible for the daily operations of these divisions. These Department Divisions provide the following services:

- Planning and Engineering of the following:
  - Sewer collection system
  - Water distribution system
  - Water Metering
  - Stormwater collection and disposal system
  - Pump stations
- Right-of-Way permitting and enforcement
- Greenspace Management
- Property Management Division
- Sanitation Division
- Geographic Information Systems (GIS)

The Public Works Department is supported by other departments within the City. The City Manager's office provides managerial and administrative guidance. The Finance Department performs the utility billing function. The Procurement Department performs several functions including, among others: handling requests for payment of invoices received by the Public Works Department; advertising and awarding of all construction contracts; handling all requests for proposals for engineering consultants and contracts; and facilitating purchases of required equipment. The Office of Budget and Performance Improvements (OBPI) approves all spending requests and allocates funding for all water, wastewater and stormwater operations. The Fleet Maintenance and Property Management Department performs vehicle fleet maintenance and building maintenance, respectively. The Human Resources Department handles all personnel functions. The Capital Improvement Project Office provides planning, design review, fiscal and construction management services of major City capital projects.

The City bills monthly for water, wastewater, stormwater, and sanitation services on the same bill. There are four billing cycles each month. The prioritization of applying payments is first to stormwater, second to sanitation, third to wastewater, and last to water.



**Figure 2**  
City of Miami Beach, Florida  
Organizational Chart for City's Stormwater System



Payments are due within twenty one (21) days from the date of the bill. A one and one-half percent (1.5%) penalty is added to all charges on the bills if not paid within the twenty one (21) days.

Customers for whom a check has been returned by the bank are notified to replace their check with either; cash, cashier's check or money order within five days. For returned checks, the customer's account will be charged a minimum of \$25.00 or five percent of the amount of the check, whichever is greater.

The charges for utility services constitute a lien against the premises and become effective and binding as such lien from the date upon which the account becomes due, unpaid and in arrears. Liens accrued as set out in the City Code are of the same dignity as liens acquired by virtue of the City Charter, whereby an interest rate of ten percent accrues to such delinquent accounts.

### **3. Stormwater System**

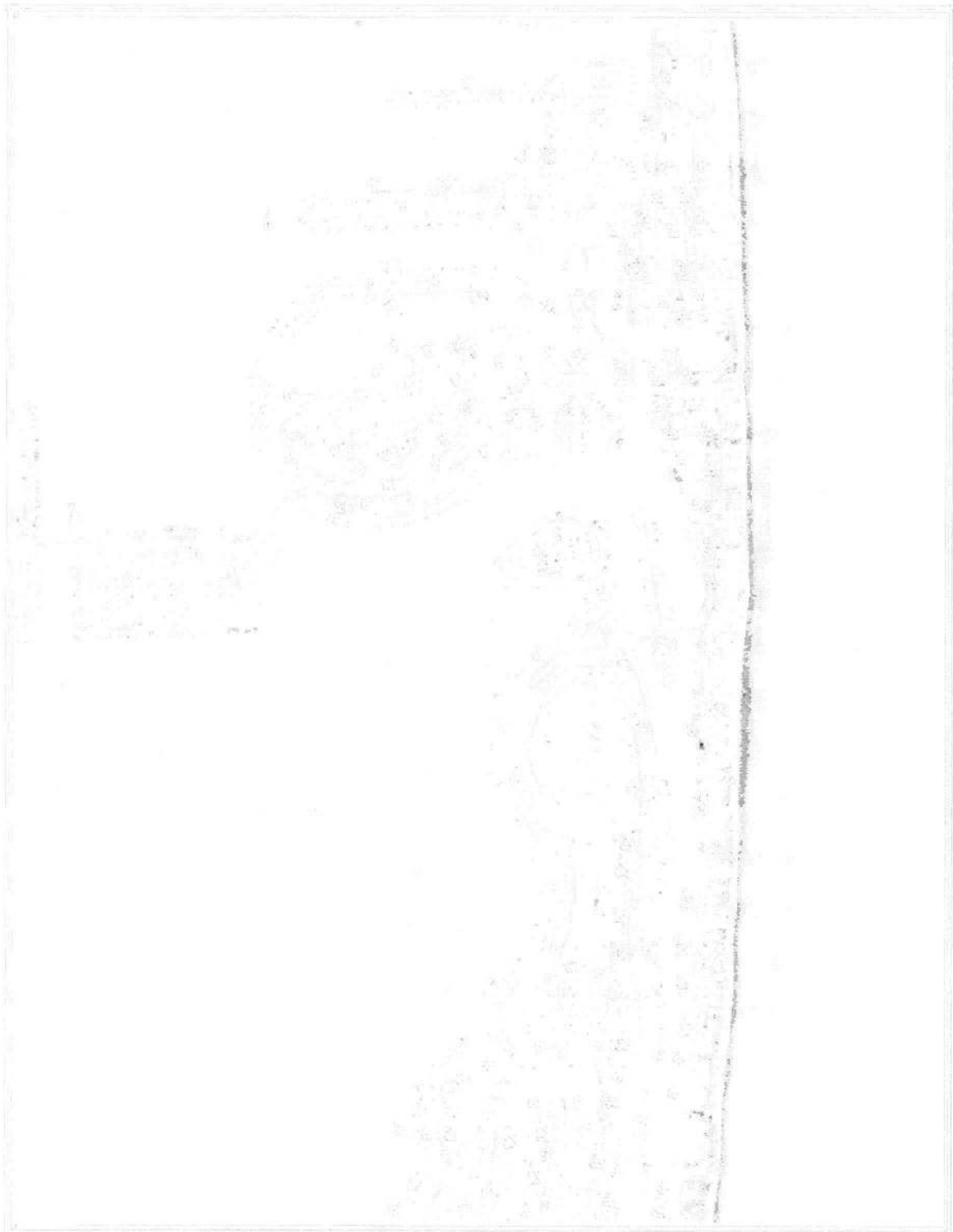
#### **3.1 System Description**

In 1903, the United States Army Corps of Engineers (USACE) dredged the first opening to the Atlantic Ocean, cutting through mangrove swamps at Government Cut. The dredging project allowed for a safer, more direct access to the Port of Miami.

Through the 1900s, Miami Beach was dredged and built; the beach, on the east side, is the highest part of the City. The west side, along West Avenue, is the lowest. The majority of the storm drainage was constructed between the 1930s and 1960s during the City's initial population booms. Generally, the drainage system flows by gravity from east to west, where water drains into Biscayne Bay or one of its tributary waterways.

As development has expanded within the City and green areas have transitioned into developed land, some of the natural phenomena that occur in a tidally influenced community have been exacerbated. Under present day conditions, when the Bay is at high tide or groundwater conditions, the City experiences flooding. During storm events, flooding occurs due to excess runoff as well as the inundation of the stormwater network by tidal backflow, elevated groundwater and rainfall. **Figure 3** shows the general layout of the City's Primary Storm Water Management System (PSMS) which was evaluated as part of the 2011 SWMP.

The existing stormwater management facilities are inadequate in many areas of the City. In most areas, the existing stormwater system is based on development patterns and groundwater and coastal conditions of the 1930s and 1960s, and has localized improvements to address flooding issues. Those systems constructed between the 1930s through 1960s have served their design life. Due to age, development, and updated regulatory requirements, the overall system requires upgrades to improve both stormwater quality and conveyance.



Data Source: City of Miami Beach  
**City of Miami Beach**  
**Northern Portion of Existing Primary Stormwater Management System**  
0 900 1,800 3,600 5,400 Feet  
Figure 3A  
**AECOM**



Data Source: City of Miami Beach

**City of Miami Beach**

**Figure 3B**

**Southern Portion of Existing Primary Stormwater Management System**





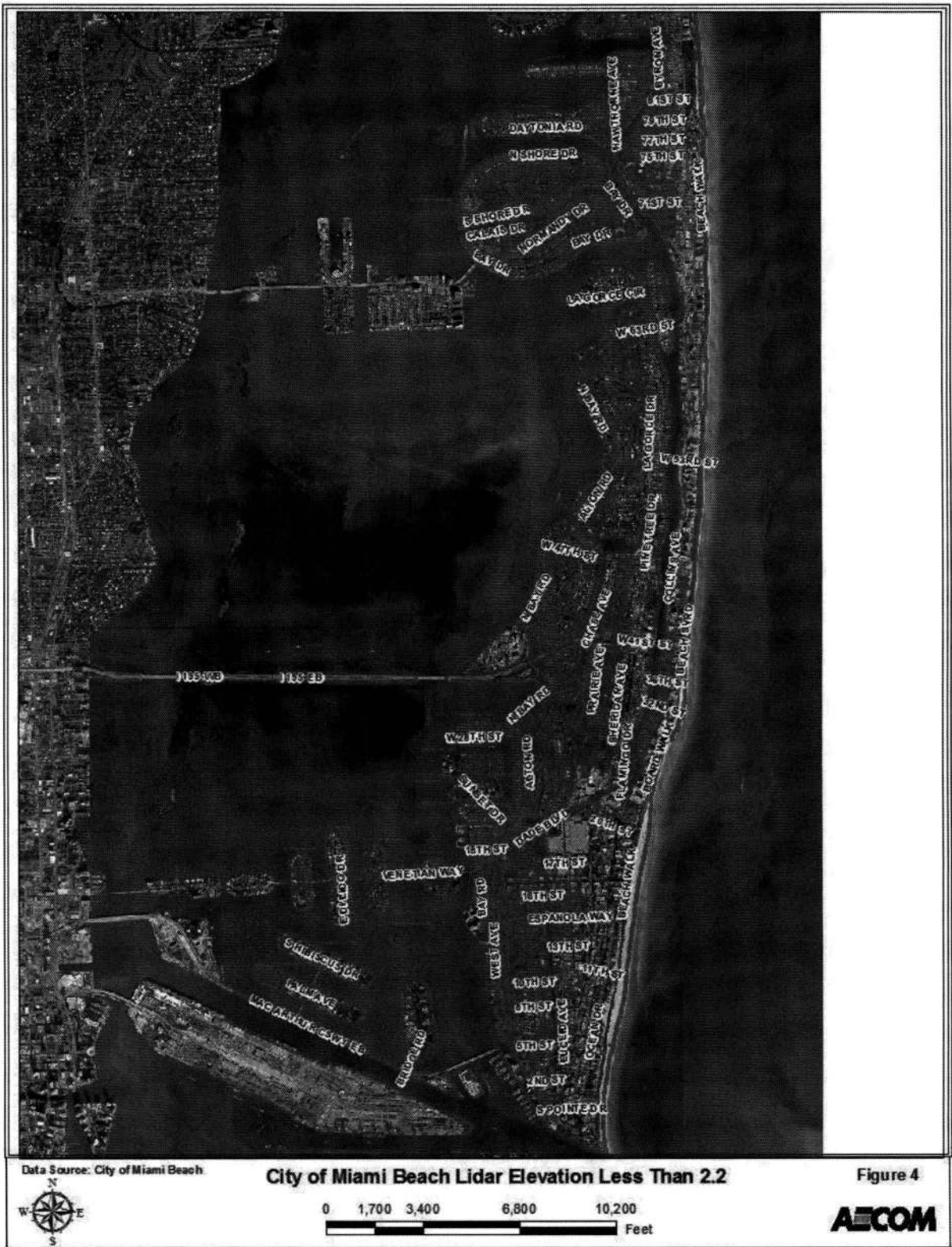
The City's stormwater master plan is reviewed and evaluated approximately every five years, with portions of the plan updated as determined to be necessary during such review and evaluation. The City conducts a comprehensive analysis and update of its stormwater master plan approximately every ten to fifteen years to address any remaining deficiencies within the system and any changes that have occurred, or are expected to occur, in permitting and regulatory requirements.

Capital improvement projects identified as part of the 1997 SWMP were funded from the proceeds of the City's Stormwater Revenue Bonds, Series 2000 (Series 2000 Bonds) and revenues from the Stormwater Enterprise Fund for the highest priority flooding areas. The completion of the capital improvements from the 1997 SWMP has improved the performance and operation of the stormwater system in several areas. The 1997 SWMP identified 34 drainage basins as high priority basins. The Capital Improvement Program (CIP) originally presented in the 1997 SWMP identified proposed projects by stormwater basin number. In the 2011 SWMP, these improvements were grouped together and reclassified as neighborhood projects or by general community. The purpose of these improvements is to provide a higher Level of Service as defined by improved flood protection and control of pollutant loading in the stormwater system.

Subsequent to the adoption of the 2011 SWMP, the City has implemented policy changes related to flood mitigation and drainage and roadway Level of Service to maintain flood protection while taking into account sea level rise, king tide events, and increased rainfall depth, intensity and distribution. As such, the existing drainage designs contained within the 2011 SWMP were determined to be inadequate to serve the City's needs. In addition, as a result of the predicted increase in groundwater levels resulting from sea level rise, the City has implemented a working policy to, over the next ten to fifteen years, reduce and/or eliminate the use of exfiltration trenches, gravity drainage wells and stormwater injection wells due to concerns over reliability and decreasing capacity. This condition warranted further modifications to the 2011 SWMP drainage designs. The City is currently undertaking an intensive review of its building and zoning codes to evaluate and develop solutions to these issues, and over the next year will adopt a plan for phased implementation of the revised code.

As such, the drainage components of the neighborhood improvements contemplated in the 2011 SWMP have been re-evaluated based on Sea Level Rise and higher groundwater conditions. **Figure 4** depicts the areas of the City lying below an elevation of 2.2 feet-NAVD. These areas will be inundated during normal high tide with the adopted 50-Year Sea Level Rise of 1.50 feet. With a projected Mean High Water at 1.50 feet, NAVD and a normal high tide cycle of 0.70 feet, the water level in the Biscayne Bay would be at 2.20 feet, NAVD. At these elevated Bay and groundwater levels, gravity drainage systems and conventional best management practices will not function, thereby necessitating the changes to the 2011 SWMP drainage designs currently being analyzed by the City.







## 3.2 Permitting Requirements

The City's stormwater management system is regulated by federal, state, and local agencies. Therefore, any modifications or improvements to the City's stormwater system need to be developed within the following regulatory and permitting framework.

### 3.2.1 Federal

The following is a summary of the federal agencies with which coordination either has been conducted, or will require coordination to implement the Stormwater Program.

#### 3.2.1.1 *United States Environmental Protection Agency (US EPA)*

The US EPA was mandated by Congress through Section 405 of the Water Quality Act of 1987 to promulgate a National Pollutant Discharge Elimination System (NPDES) permitting program for municipal stormwater discharge. Miami Beach is a co-permittee with Miami-Dade County and coordinates on this program for compliance.

The US EPA has delegated the NPDES permitting authority to the FDEP. During the development of the 2011 SWMP, the US EPA was in the process of updating the MS4 permit program, which is the permit program applicable to the Stormwater Utility. The new rule contained additional requirements for the Best Management Practices (BMPs) and documentation on their performance. The 2011 SWMP included the potential future needs of those requirements and the pending numeric nutrient criteria (NNC) for all discharges. Since then, FDEP has updated its rules for the MS4 permit program and has implemented the new rules to be followed and requirements to be met as each MS4 permit is updated. The MS4 Permit for the Stormwater Utility expires on June 20, 2016. The City is in the process of updating its permit compliance procedures and will have all requirements in place prior to the expiration of the MS4 permit.

#### 3.2.1.2 *Federal Emergency Management Agency (FEMA)*

FEMA's mission is to support citizens and first responders to natural disasters to ensure that as a nation we work together to build, sustain, and improve our capability to prepare for, protect against, respond to, recover from, and mitigate all hazards. The Robert T. Stafford Disaster Relief and Emergency Assistance Act, PL 100-707, signed into law November 23, 1988, amended the Disaster Relief Act of 1974, PL 93-288. This Act constitutes the statutory authority for most Federal disaster response activities. FEMA regulates riverine (stormwater) and coastal (tidal) floodplains and floodways under the National Flood Insurance Program. CDM Smith used tools developed by FEMA to identify and quantify flood risks, including Flood Insurance Studies, Flood Insurance Rate Maps, and the HAZUS Program (a nationally applicable standardized methodology that contains models for estimating potential losses from earthquakes, floods and hurricanes) coupled with the models of the City's PSMS to estimate structural and economic damage costs from the 2- through 100-year design storm events. This information is contained within the 2011 SWMP.

Coordination with FEMA allows for the support of flood map revisions and communication of economic impacts in a manner recognized by the Federal government for cost-benefit comparisons. The improvements identified in the City's Stormwater Program and timing for their implementation are in accordance with (or are more comprehensive or aggressive than) what is currently required, or expected to be required under FEMA regulations.

### **3.2.1.3 United States Army Corps of Engineers (USACE)**

The United States Army Corps of Engineers (USACE) is the primary federal agency that develops guidance parameters for civil infrastructure design consideration for projects impacting environmentally sensitive water and OFW, like the Biscayne Bay.

A nationwide permit (NWP) from the USACE is required when up to one-half acre of waters of the United States (e.g. Biscayne Bay or its tributary canals) are impacted, and the USACE requires that original grades are restored to the site after completion of construction. Under the NWP program a pre-construction notification (PCN) submittal is required. The Regional Conditions and General Condition for NWP require that the PCN include the following information:

- A map of the entire corridor including a delineation of all wetlands and waters of the United States within the corridor.
- An alternative analysis which addresses the selection of an alternative which avoids and minimizes wetland impacts to the maximum extent practicable.
- For all submerged utility lines across navigable waters of the United States, a location map and cross-sectional view showing the utility line crossing from bank to bank is required. In addition, the location and depth of the Federal Project Channel shall be shown in relation to the proposed utility line. In general, all utility lines shall be buried at least 6 feet below the authorized bottom depth of the Federal project channel and at least 3 feet below the bottom depth in all subaqueous areas.
- A delineation of affected special aquatic sites, including wetlands, vegetated shallows (e.g., submerged aquatic vegetation, seagrass beds). This work must be conducted between April 1 and September 30 due to the growth season of aquatic vegetation.

In general, permitting coordination with USACE is required when modifications to stormwater outfalls or seawalls result in impacts to OFW, as previously discussed. However, many of the projects to be funded under the Capital Improvement Program are exempt from Federal permitting. More localized impacts are permitted at the State and local level. These permits are typically obtained during the detailed design process for each project.

## **3.2.2 State**

The following is a summary of the state agencies with which coordination was conducted in preparation of the 2011 SWMP.

### **3.2.2.1 South Florida Water Management District (SFWMD)**

The SFWMD has responsibilities for stormwater management under F.A.C. Chapters 40E-4, 40E-40 and 40E-400 through issuance of an Environmental Resource Permit (ERP).

In 2013, the Statewide ERP Rule (Chapter 62-330, F.A.C.) was adopted, unifying the ERP rules for the State. The SFWMD regulates surface water management under F.A.C. Chapters 40E-40 and 40E-41. In addition, its responsibilities include regulation of dredge and fill activities. Since the SFWMD has jurisdiction, their criteria and standards will be used as guidelines for conceptual planning of both water quality and quantity improvements. These guidelines are provided in the South Florida Water Management District ERP Information Manual 2014.

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

The FDEP regulates environmental programs in the State of Florida and has been delegated NPDES MS4 permit authority; therefore, it is responsible for implementing the stormwater element of the Federal Municipal NPDES Program as part of the FDEP's Wastewater Facility and Activities Permitting program. The stormwater element of the NPDES program is mandated by the Clean Water Act (CWA) Section 402(p). Authorized by Section 403.0885, Florida Statutes (F.S.), the FDEP's federally approved NPDES stormwater program is set out in various provisions within Chapters 62-4, 62-620, 62-621 and 62-624 of the Florida Administrative Code (F.A.C.). Chapter 62-624, F.A.C. specifically addresses MS4 permit requirements.

The City is one of the 33 entities authorized for stormwater discharge under the comprehensive Miami-Dade County NPDES MS4 permit (Permit Number FLS000003-003), which expires on June 20, 2016. The City is authorized to discharge to waters of the state per the approved Stormwater Management Program effluent limitations, monitoring requirements, and other provisions as set forth in this permit. The City has actively been fulfilling the requirements of the permit related to its existing outfalls. These efforts are documented in annual reports submitted by the City to the FDEP. The City is currently in compliance with these requirements.

The FDEP also regulates underground injection control permits for wells (gravity recharge wells and pumped injection wells).

### **3.2.3 Local – Miami Dade County Department of Regulatory and Economic Resources (DRER).**

DRER regulates various environmental permitting for the construction or modification of stormwater-related infrastructure in Miami-Dade County such as coastal construction, dewatering, wetlands, wells, and stormwater. Specifically for stormwater management, DRER requires a Class II permit for related stormwater improvement projects and outfalls. The City has obtained the required permits for improvements to the Stormwater Utility that are under construction, or are already completed and expects the timely acquisition of additional permits required for the Series 2015 Project.

### **3.2.4 Pending Federal and State Regulations**

Over the last few years, three significant related water quality and stormwater regulation issues have emerged that will likely impact the City in the near future. They are:

- The ongoing Total Maximum Daily Load (TMDL) program by FDEP.
- The Numeric Nutrient Criteria (NNC) Rule approved by FDEP.
- US EPA NPDES MS4 Rule revisions



### **3.2.4.1 FDEP TMDL Program**

The TMDL program is required by the Clean Water Act to identify the maximum allowable loads for all sources to impaired waters and also identify the load reductions to achieve the designated use(s). The FDEP leads this effort working with local stakeholders, including water management districts, cities, counties, and private interests.

The TMDL program works to develop a scientifically sound database of information and calibrated and validated hydrology, hydraulic and water quality models to identify the TMDL, build on pollutant load reduction goals, support the load allocation and reduction process, and establish the foundation for evaluations of management practices to improve water quality. Based on these efforts, it is the most watershed-specific information for informed decisions for water quality and water environmental health. Enforcement would be through NPDES permitting for domestic wastewater, industrial wastewater and MS4 stormwater outfalls.

The draft of the TMDL program for the Biscayne Bay was originally planned for July 2010, but is currently on hold with no scheduled completion date. This program could ultimately lead to a Basin Management Action Plan (BMAP) that would require the City to complete retrofits to reduce nutrient loads to Biscayne Bay. These pending requirements for enhanced Best Management Practices (BMPs) to reduce flooding and protect and improve water quality are discussed in the 2011 SWMP.

The Series 2015 Projects are currently being designed to include BMPs to reduce flooding and improve water quality consistent with those that are likely to be required in the BMAP for the Biscayne Bay.

#### **3.2.4.2 US EPA Numeric Nutrient Rule**

In 1998, the US EPA produced the National Strategy for the Development of Regional Nutrient Criteria, requiring the US EPA to produce nutrient criteria guidance documents by 2000. It also required states that have narrative nutrient criteria to develop numeric nutrient criteria (NNC).

The State of Florida Numeric Nutrient Criteria Development Plan (FDEP, March 2009), prepared by the FDEP describes Florida's plan for development of regional NNC via the use of a technical advisory committee (TAC). The TAC first met in January of 2001 and has met more than 25 times since its formation. Its membership consists of scientists and practitioners who have experience related to lake, river and/or estuarine water quality, members from local government, engineering and scientific consultants, university representatives and environmental interests. With the FDEP staff providing facilitation and technical resources, the TAC addressed lake and riverine nutrients initially and later turned to estuarine NNC in June of 2008.

Environmental interests in Florida filed a complaint in the U.S. District Court in July 2008 (amended in January 2009), alleging that the US EPA had failed to perform its "non-discretionary duty" to set NNC for Florida according to section 304(a) of the Clean Water Act.

In January 2009, the US EPA issued a statement that, for the State of Florida (and only Florida), new or revised nutrient criteria are necessary to meet the requirements of the Clean Water Act. In December 2009, the US EPA entered into a consent decree with the environmental plaintiffs, requiring the US EPA to issue draft NNC for flowing streams and lakes in Florida in January 2010 and for estuaries in January 2011.

On January 14, 2010, the US EPA proposed a rule entitled "Water Quality Standards for the State of Florida's Lakes and Flowing Waters." With this rule, the US EPA proposed water quality standards in the State of Florida that would set a series of numeric limits on the amount of phosphorus and nitrogen, also known as "nutrients," that would be allowed in Florida's lakes, rivers, streams, springs and canals.

After several public hearings, on April 22, 2011, the FDEP submitted a petition to the US EPA requesting the US EPA to withdraw its January 2009 determination that NNC are necessary in Florida, repeal Federal rulemaking completed in November 2010 to establish such criteria for inland lakes and streams, and refrain from proposing or promulgating any further NNC. The petition outlined the FDEP's plans to undertake its own rulemaking for nutrient criteria for state waters. The projected rulemaking schedule called for a Notice of Rule Development in June 2011, a rule development and public outreach process through the summer and early fall of 2011, and adoption of a final rule in January 2012, followed by a legislative ratification process under Florida law. The US EPA supported the FDEP's commitment to recommence its rulemaking efforts for both inland and estuarine waters. The US EPA recognized that states have the primary role in establishing and implementing water quality standards for their waters.

On September 29, 2011, the FDEP published a draft of the proposed rule in the Florida Administrative Code (F.A.C.), titled Chapter 62-302 regarding nutrient standards. The rule was then presented to the Florida Environmental Regulation Commission (ERC), the Florida Legislature, and the Governor, who signed House Bill (HB) 7051, ratifying the proposed rule. There was a challenge to the rule that was filed by the public interests environmental law organization, Earthjustice. However an administrative law judge upheld the state's proposed new water quality rules on June 7, 2012.

On November 30, 2012, the US EPA announced its approval of the FDEP's NNC. However, the US EPA also proposed additional regulations that would apply the US EPA's criteria to those waters not covered by the FDEP's NNC, such as urban storm water conveyances, open ocean waters, and many estuaries where the FDEP Total Maximum Daily Loads (TMDLs) have already been adopted. Since the US EPA developed NNC on waters not covered by the FDEP's NNC, the US EPA and the FDEP entered into an agreement on March 15, 2013, known as "Path Forward", to develop a plan for the FDEP to develop NNC for the remaining waterbodies before the US EPA's deadline of September 30, 2013.

Since the agreement, the FDEP adopted a NNC Implementation Document on April 23, 2013; adopted criteria for additional estuaries on June 20, 2013; and produced a report titled, "Status of Efforts to Establish Numeric Interpretations of the Narrative Nutrient Criterion for Florida



Estuaries and Current Nutrient Conditions of Unimpaired Waters”. This report was submitted to the Governor as required by the “Path Forward” agreement and Chapter 2013-71, Laws of Florida, on August 1, 2013.

On September 24, 2013, a hearing was held on the US EPA’s motion to approve the Florida regulations. On January 7, 2014, the US District Court granted the US EPA’s motion to modify the consent decree between the US EPA and various environmental organizations. The action allows the US EPA’s approval of the FDEP’s plan for NNC regulations in Florida to move ahead, and denies the environmental parties’ motion to enforce the original consent decree.

Earthjustice filed a motion on March 6, 2014 to appeal Judge Hinkles’ order allowing the US EPA to modify the consent decree to conform it to the “Path Forward” agreement between the FDEP and the US EPA. On April 2, 2014, the US EPA filed to withdraw their proposed rule on NNC in Florida and on June 20, 2014, Earthjustice and other environmental groups filed their initial appeal of Judge Robert Hinkle’s order allowing the US EPA to accept the FDEP’s plan for NNC in Florida.

Neither the US EPA nor the FDEP have NNC for South Florida waterbodies, especially canals. The FDEP drafted the “South Florida Canal Aquatic Life Study” and presented the study to stakeholders on November 1, 2012. This study proposes to perform a comprehensive assessment of South Florida canals and the aquatic life associated with those canals. The objectives of the study are:

- Assess aquatic life in South Florida canals;
- Determine interrelationships between aquatic life in canals and other variables that affect aquatic life;
- Evaluate the differences in conditions for South Florida canals; and
- Collect information that can be used to guide management decisions.

Eventually, this study will be used to determine if NNC are necessary for these waterbodies.

There are many opinions on what the effect of the US EPA NNC will be on the State of Florida public stormwater discharges. At a minimum, additional BMPs will be needed to address nutrient removal from urban stormwater sources. The BMP treatment train concepts as presented in the 2011 SWMP are applicable to this water quality rule while also providing flood control and stormwater harvesting benefits. The Series 2015 Projects are currently being designed and permitted with water quality BMPs that meet or exceed existing regulatory requirements and anticipated additional requirements.

### **3.2.4.3 SFWMD and FDEP Unified Statewide Stormwater Treatment Rule**

The SFWMD and the FDEP have been working with various groups in southwest Florida over the last eight years in the development of supplemental water quality criteria for Environmental Resource Permits (ERPs) in order to better protect water quality. These supplemental criteria would give credit for additional non-traditional best management practices (BMPs) and encourage stormwater reuse while controlling the average annual volume of discharge and nutrients to historic (pre-development) levels.



The FDEP has been working to extend these criteria to a unified statewide rule that considers variations in hydrology and physical characteristics across Florida. If adopted as currently drafted, this rule would exempt retrofits for stormwater systems that provide some load reduction, such as stormwater master plan projects with water quality BMP features. The rule is currently on hold, and there is no way to determine with any reasonable degree of certainty when, or if, a unified statewide rule will be adopted, or if adopted, in what form the rule will be adopted.

#### **3.2.4.4 US EPA NPDES MS4 Revisions**

As discussed above, the US EPA has updated the MS4 permit program and the update contains additional requirements for Best Management Practices (BMPs) and documentation on their performance and costs. The Series 2015 Projects are currently being designed and are expected to be permitted with water quality BMPs that meet or exceed existing regulatory requirements and the anticipated additional requirements.

### **3.3 Facility Evaluation**

The 2011 SWMP identifies stormwater improvements for implementation in several high priority drainage basins, as defined by the 1997 SWMP. The design and construction of these improvements are already underway and many of them have been completed. Factors used in the prioritization of the drainage basins in the 1997 SWMP were pollutant loading, pollutant concentration, flooding potential, citizen complaints, and ranking by City staff. As part of the 2011 SWMP, surface water hydrologic and hydraulic modeling was performed using the US EPA Stormwater Management Model (SWMM) to estimate and evaluate flooding Level of Service (LOS) and alternative solutions to meet LOS. The CDM Smith Watershed Management Model (WMM) was used to perform surface water quality and BMP evaluations. Both are public domain tools that are widely used for stormwater master planning applications.

Model parameter estimates were checked for validity during actual storm and tidal events throughout the year 2010, as practical. Investigations; including photo-archive retrievals, field visits, photography in combination with flood depth measurements and discussions with City staff were performed as part of the validation stage. Storm event rainfall data was retrieved from City rain gages and tidal data was retrieved from the National Oceanic and Atmospheric Administration.

AECOM was tasked in 2014 with revising the US EPA SWMM model to determine areas deficient in LOS under the City's current standards and to suggest modifications to the drainage designs contained within the 2011 SWMP to better achieve the current LOS standards. AECOM is responsible for confirming the necessity of the projects and the degree by which the basin's LOS is being achieved, as defined by the current City LOS standards.

### **3.4 Utility Billing**

A stormwater utility fee is assessed against each property in the City based on existing City utility accounts, application for service, and Miami-Dade County Tax Assessor property information or other ownership records.



Each account is assigned a number of equivalent residential units (ERU) that are used to determine the stormwater fee. The ERU is the estimated average horizontal impervious area of residential developed property per dwelling unit. This estimated average is calculated by dividing the total estimated impervious area of four residential categories (single family, mobile home, multi-family and condominium) by the estimated total number of dwelling units. For the City, one ERU is equal to 791 square feet. For the purpose of the Stormwater Utility, the minimum number of ERUs per dwelling unit is one.

The City had maintained a steady ERU rate from 2003 to 2008 of \$5.80 per month. In recent years the City has faced significant increases in expenditures for construction of projects, as well as operation and maintenance of current Stormwater Utility infrastructure. As a result, in 2008, CDM Smith provided recommendations to support proper funding to expand, operate and maintain the Stormwater Utility, make debt service payments and maintain coverage requirements. A series of Stormwater Utility rate adjustments were recommended, which resulted in an ERU rate of \$9.06 per month until FY 2014. The City raised the ERU rate to \$16.67 per month on October 1, 2014 in anticipation of the issuance of the Series 2015 Bonds. The fee is structured as a flat rate for all residential customers.

To receive water, sewer, and stormwater services from the City, property owners fill out an Application for water service at the City's Finance Department and pay a deposit according to an established schedule. The Finance Department is responsible for preparing and issuing one itemized bill for water, sewer, stormwater, and garbage disposal (except for commercial accounts) services provided by the City. Those services are billed on a monthly basis.

Stormwater Utility fees may be reduced by 50 percent for properties within the City that meet one of the following criteria:

- The property is subject to a valid NPDES permit.
- The property is served by a private disposal system meeting State, County, and City criteria.
- A portion of the property is served by a private disposal system meeting State, County, and City criteria. The fee reduction only applies to that portion of the property served by the system.

To date, no Stormwater Utility customer has requested, or has been granted such a reduction.

The fees collected by the City with respect to the Stormwater Utility, including investment earnings, are deposited in the Stormwater Enterprise Fund and used for planning, constructing, financing, and operating and maintaining the Stormwater Utility and the infrastructure of the stormwater management system. The Stormwater Enterprise Fund tracks the operations, capital expenditures, and revenues of the Stormwater Utility.

The City has streamlined and improved the system that was in place to capture ERU changes in the review and approval of construction plans. The resulting method enhances communication and coordination of the several City departments included in the Stormwater Utility billing process, such as Public Works, OBPI and Finance.



## 4. Capital Improvements

### 4.1 Planned Improvements

The 1997 SWMP identified 34 drainage basins as high priority basins. The CIP originally presented in the 1997 SWMP identified proposed projects by stormwater basin number. In the 2011 SWMP, improvements were reclassified and are now grouped together by the neighborhood or general community where the improvements will be made. The capital improvement projects listed below are a combination of active projects pre-defined by the 1997 SWMP, project-specific Basis of Design Reports, and projects identified as part of the 2011 SWMP. In most instances, the stormwater improvements were coordinated with components of the City's Neighborhood Right-of-Way projects. Such projects included improvements to other neighborhood utilities, such as water, sewer, streetscape, and street lighting. Emphasis was given to avoid re-entering a neighborhood which had recently completed neighborhood improvements.

The purpose of these improvements is to provide a higher LOS defined as improved flood protection and control of pollutant loading in the stormwater system.

The amount of funding to be derived from the City's issuance of stormwater revenue bonds is calculated as the additional monies needed to construct additional water management features above and beyond those already included in the capital budget for the neighborhood projects.

The improvements consist of one or a combination of the following:

- Repair, replace, and/or install curbs and gutters,
- Reconstruct and/or raise streets and sidewalks,
- Repair, replace, and/or install collection systems, catch basins and manholes,
- Construct pumping stations and water quality treatment devices, and
- Repair or upgrade existing outfalls (inclusive of tidal backflow prevention devices).

The projects listed below will provide comprehensive solutions for improving the City's stormwater management system performance for the next 50 years. Appropriate consideration has been given to the water quality of Biscayne Bay and the operation and maintenance of an expanded stormwater management system. The presented capital improvements allow the Stormwater Utility systems to meet increasing performance, permitting and regulatory demands while modernizing the existing system to meet the level of service desired by the City.

The projects listed below are identified for funding under the Stormwater Program. The total cost of the Stormwater Program is estimated to be \$431,941,516. The unfunded portion of the Stormwater Program is estimated to be \$413,130,932. It is expected that the proceeds from the Series 2015 Bonds will fund \$100 million of these projects. Summaries of the estimated program cost by neighborhood are shown in tabular format in **Figure 5**, and graphically in **Figure 6**.

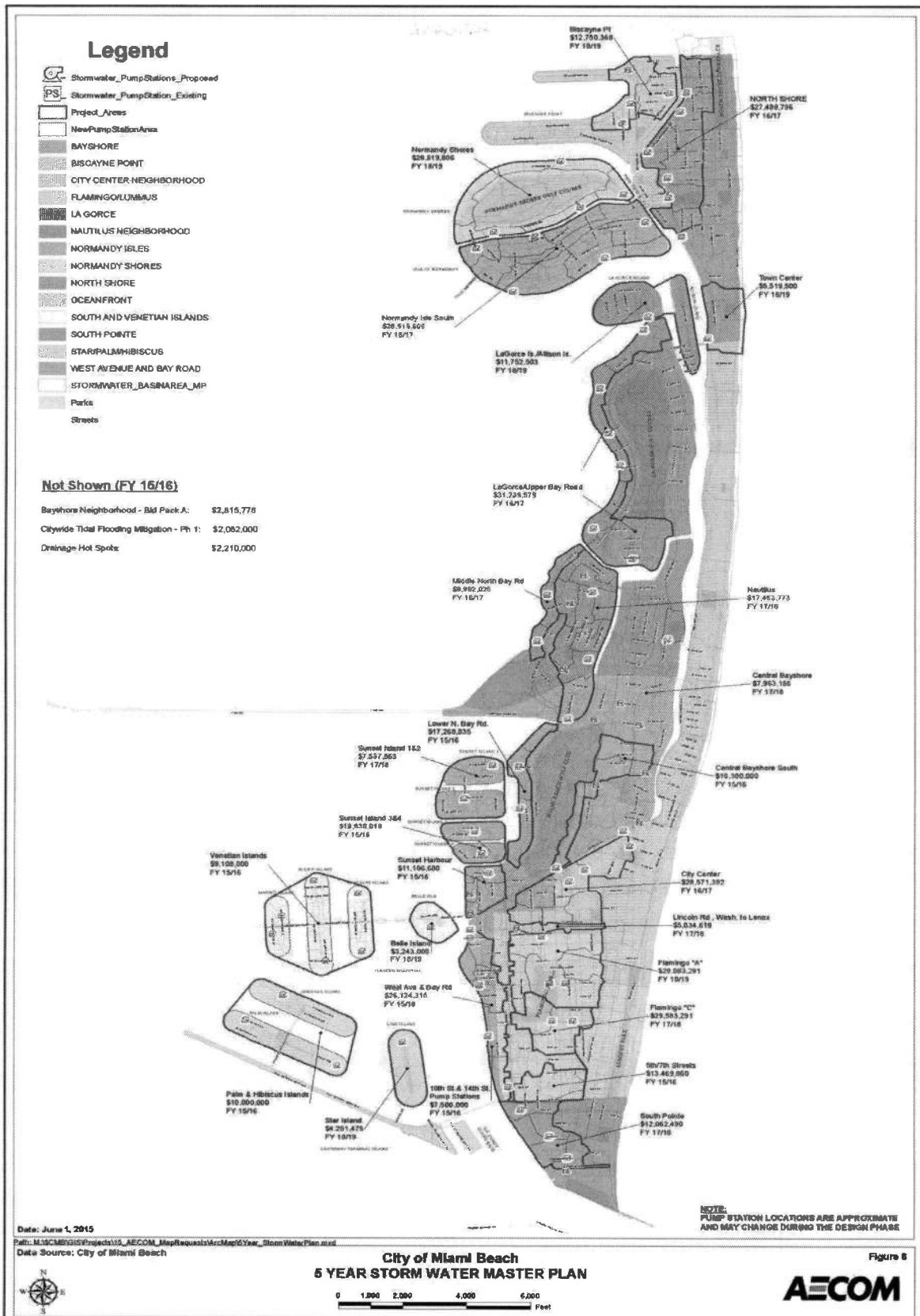


Figure 5: Proposed Stormwater Bond Projects

Location Name	Engineer Projected Cost	CP Funded	Funds Required	Line of Credit	FY15/16	FY16/17	FY17/18	FY18/19	Sub-Total for Each Project
Tier 4 FDOT Alton Road Integrated Solution	\$ 95,237,973		\$ 95,237,973						
Flamingo "A"				\$ 3,750,000				\$ 29,583,291	\$ 33,333,291
Flamingo "C"				\$ 3,750,000			\$ 29,583,291		\$ 33,333,291
City Center						\$ 28,571,392			\$ 28,571,392
Flamingo Park 6th Street (5th/7th St)	\$ 13,469,860	\$ 4,609,700	\$ 8,869,160		\$ 3,000,000	\$ 5,869,160			\$ 8,869,160
West Avenue & Bay Road	\$ 26,124,315		\$ 26,124,315		\$ 13,195,000	\$ 12,929,315			\$ 26,124,315
North Shore	\$ 27,488,796		\$ 27,488,796			\$ 13,744,398	\$ 13,744,398		\$ 27,488,796
Lower North Bay Road	\$ 17,268,835	\$ 4,808,607	\$ 12,462,228	\$ 3,237,000	\$ 9,430,228				\$ 12,462,228
La Gorce /Upper Bay Road	\$ 31,239,579	\$ 6,731,883	\$ 24,507,596			\$ 24,507,596			\$ 24,507,596
La Gorce Island/Alton Island	\$ 11,752,503		\$ 11,752,503					\$ 11,752,503	\$ 11,752,503
Sunset Island 3 & 4	\$ 18,930,018	\$ 2,871,294	\$ 15,958,724	\$ 4,177,000	\$ 11,781,724				\$ 15,958,724
Biscayne Point	\$ 12,750,368		\$ 12,750,368					\$ 12,750,368	\$ 12,750,368
Star Island	\$ 4,251,475		\$ 4,251,475					\$ 4,251,475	\$ 4,251,475
South Pointe	\$ 12,062,490		\$ 12,062,490				\$ 12,062,490		\$ 12,062,490
Lincoln Road Washington Ave to Lenox	\$ 5,034,819		\$ 5,034,819				\$ 5,034,819		\$ 5,034,819
Normandy Isle South	\$ 28,519,806		\$ 28,519,806			\$ 14,259,803	\$ 14,259,803		\$ 28,519,806
Normandy Shores	\$ 28,519,806		\$ 28,519,806					\$ 28,519,806	\$ 28,519,806
Nautilus	\$ 17,453,773		\$ 17,453,773				\$ 17,453,773		\$ 17,453,773
Sunset Harbour	\$ 11,186,680		\$ 11,186,680	\$ 70,000	\$ 11,116,680				\$ 11,186,680
Other Pump Conversions									
Central Bayshore	\$ 7,963,185		\$ 7,963,185				\$ 3,981,578	\$ 3,981,578	\$ 7,963,185
New Pump Stations									
Belle Island	\$ 3,243,000		\$ 3,243,000					\$ 3,243,000	\$ 3,243,000
Middle North Bay Road	\$ 9,992,025		\$ 9,992,025			\$ 9,992,025			\$ 9,992,025
Sunset Island 1&2	\$ 7,537,563		\$ 7,537,563				\$ 7,537,563		\$ 7,537,563
Town Center	\$ 5,519,500		\$ 5,519,500					\$ 5,519,500	\$ 5,519,500
Bayshore Neighborhood - Bid Pack A	\$ 2,815,776		\$ 2,815,776	\$ 2,815,776					\$ 2,815,776
Citywide Tidal Flooding Mitigation - Ph 1	\$ 2,062,000		\$ 2,062,000	\$ 2,062,000					\$ 2,062,000
Drainage Hot Spots	\$ 2,210,000		\$ 2,210,000	\$ 2,210,000					\$ 2,210,000
<b>SUB-TOTAL</b>	<b>\$ 402,533,616</b>	<b>\$ 18,810,884</b>	<b>\$ 383,722,932</b>	<b>\$ 22,066,776</b>	<b>\$ 48,523,633</b>	<b>\$ 109,873,689</b>	<b>\$ 103,657,514</b>	<b>\$ 99,601,320</b>	<b>\$ 383,722,932</b>
Under Construction									
Venetian Islands	\$ 9,108,000		\$ 9,108,000	\$ 8,863,000	\$ 125,000				\$ 9,108,000
Palm & Hibiscus Islands	\$ 10,000,000		\$ 10,000,000		\$ 10,000,000				\$ 10,000,000
Central Bayshore South	\$ 10,300,000		\$ 10,300,000		\$ 10,300,000				\$ 10,300,000
<b>Grand Total</b>	<b>\$ 431,941,516</b>	<b>\$ 18,810,884</b>	<b>\$ 413,130,932</b>	<b>\$ 31,049,776</b>	<b>\$ 68,946,633</b>	<b>\$ 109,873,689</b>	<b>\$ 103,657,514</b>	<b>\$ 99,601,320</b>	<b>\$ 413,130,932</b>

Years	Funding requirements
Fy 15/16	\$ 99,998,409
Fy 16/17	\$ 109,873,689
Fy 17/18	\$ 103,657,514
Fy 18/19	\$ 99,601,320







### ***Flamingo Park 6<sup>th</sup> Street (5<sup>th</sup> / 7<sup>th</sup> Streets) – Neighborhood Improvements***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

**Estimated Project Cost: \$13,469,860**

### ***West Avenue & Bay Road – Neighborhood Improvements***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, 6) Convert existing pumping stations discharge piping from injection wells and add force mains to new outfall, and 7) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

**Estimated Project Cost: \$26,124,315**

### ***Lower North Bay Road – Neighborhood Improvements***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

**Estimated Project Cost: \$17,268,835**

### ***LaGorce / Upper Bay Road – Neighborhood Improvements***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

**Estimated Project Cost: \$31,239,579**



### ***Sunset Islands 3 & 4 – Neighborhood Improvements***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

**Estimated Project Cost: \$18,830,018**

### ***Sunset Harbour – Neighborhood Improvements***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

**Estimated Project Cost: \$11,186,680**

### ***Venetian Islands – Neighborhood Improvements***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

**Estimated Project Cost: \$9,108,000**

### ***Palm & Hibiscus Islands – Neighborhood Improvements***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

**Estimated Project Cost: \$10,000,000**



***Central Bayshore South – Neighborhood Improvements***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, 6) Convert existing pumping stations discharge piping from injection wells and add force mains to new outfall, and 7) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

**Estimated Project Cost: \$10,300,000**

***City Center – Neighborhood Improvements (Tier 4 FDOT Alton Road Integrated Solution)***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

**Estimated Project Cost: \$31,428,531**

***Flamingo Park “A” – Neighborhood Improvements (Tier 4 FDOT Alton Road Integrated Solution)***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

**Estimated Project Cost: \$32,380,911**

***Flamingo Park “C” – Neighborhood Improvements (Tier 4 FDOT Alton Road Integrated Solution)***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

**Estimated Project Cost: \$31,428,531**



### ***North Shore – Neighborhood Improvements***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

**Estimated Project Cost: \$27,488,796**

### ***LaGorce Island / Allison Island – Neighborhood Improvements***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

**Estimated Project Cost: \$11,752,503**

### ***Biscayne Point – Neighborhood Improvements***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, 6) Convert existing pumping stations discharge piping from injection wells and add force mains to new outfall, and 7) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

**Estimated Project Cost: \$12,750,368**

### ***South Pointe – Neighborhood Improvements***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, 6) Convert existing pumping stations discharge piping from injection wells and add force mains to new outfall, and 7) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

**Estimated Project Cost: \$12,062,490**





***Lincoln Road – Neighborhood Improvements (Washington Avenue to Lenox Avenue)***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, 6) Convert existing pumping stations discharge piping from injection wells and add force mains to new outfall, and 7) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

**Estimated Project Cost: \$5,034,619**

***Normandy Isle South – Neighborhood Improvements***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

**Estimated Project Cost: \$28,519,606**

***Normandy Shores – Neighborhood Improvements***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, and 6) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

**Estimated Project Cost: \$28,519,606**

***Nautilus – Neighborhood Improvements***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, 5) Construct pump stations, controls and force mains, 6) Convert existing pumping stations discharge piping from injection wells and add force mains to new outfall, and 7) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

**Estimated Project Cost: \$17,453,773**





***Central Bayshore Neighborhood – Existing Pump Station Conversion***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system, and reduce reliance on gravity or pressurized drainage (injection) wells. The improvements consist of one or a combination of the following: 1) Construct additional stormwater collection system piping to interconnect existing pipe networks, 2) Construct water quality treatment devices, 3) Convert pumping stations discharge piping from injection wells and add force mains to new outfall, and 4) Construct new outfall and/or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

**Estimated Project Cost: \$7,963,155**

***Star Island – New Pump Station***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Construct additional stormwater collection system piping to interconnect existing pipe networks, 2) Construct water quality treatment devices, 3) Construct pumping stations, controls and force mains, and 4) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices),

**Estimated Project Cost: \$4,251,475**

***Middle Bay Road – New Pump Station***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Construct additional stormwater collection system piping to interconnect existing pipe networks, 2) Construct water quality treatment devices, 3) Construct pumping stations, controls and force mains, and 4) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices),

**Estimated Project Cost: \$9,992,025**

***Sunset Islands 1 & 2 – New Pump Stations***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Construct additional stormwater collection system piping to interconnect existing pipe networks, 2) Construct water quality treatment devices, 3) Construct pumping stations, controls and force mains, and 4) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices),

**Estimated Project Cost: \$7,537,563**



### ***Town Center – New Pump Station***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Construct additional stormwater collection system piping to interconnect existing pipe networks, 2) Construct water quality treatment devices, 3) Construct pumping stations, controls and force mains, and 4) Repair or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices),

**Estimated Project Cost: \$5,519,500**

### ***Belle Island – New Pump Station and Existing Pump Station Conversion***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system, and reduce reliance on gravity or pressurized drainage (injection) wells. The improvements consist of one or a combination of the following: 1) Construct additional stormwater collection system piping to interconnect existing pipe networks, 2) Construct water quality treatment devices, 3) Construct pumping stations, controls and force mains, 4) Convert existing pumping stations discharge piping from injection wells and add force mains to new outfall, and 5) Construct new outfall and/or upgrade existing outfall pipes and seawalls (inclusive of tidal backflow prevention devices).

**Estimated Project Cost: \$3,243,000**

### ***Bayshore Neighborhood Improvements – Bid Package A***

The purpose of the project improvements is to provide a higher LOS defined by flood protection and control of pollutant loading in the stormwater system. The improvements consist of one or a combination of the following: 1) Repair, replace, and/or install curbs and gutters, 2) Reconstruct and/or raise streets and sidewalks, 3) Repair, replace, and/or install collection systems, catch basins and manholes, 4) Construct water quality treatment devices, and 5) Construct pump stations, controls and force mains.

**Estimated Project Cost: \$2,815,776**

### ***Citywide Tidal Flooding Mitigation Phase 1***

The purpose of the project improvements is to prevent the backflow of water from the Biscayne Bay into the City's stormwater management system and up through the stormwater inlet grates flooding the roadway curb and gutter. This tidal flooding poses a threat to public health and safety, inconveniences the public, and has caused major damage to structures, and killed lawns and landscaping. In addition, tidal flooding saturates the base structure of roadways causing failure of roadways prior to their expected useful design life. This project consists of the installation of backflow prevention valves (aka "Tideflex" valves) on a majority of the PSMS outfalls to the Biscayne Bay and in the lowest lying areas of the City.

**Estimated Project Cost: \$2,062,000**



### ***Drainage Hot Spots***

This project will provide localized stormwater improvements that address drainage “hot spots” within the City. The project will provide funding to allow City staff to design, contract for, and implement solutions to limited areas of the City which are within the definition of the projects approved by the City Commission in the Resolution authorizing issuance of the Series 2015 Bonds, but not incorporated into other neighborhood improvement projects identified in the Stormwater Program.

**Estimated Project Cost: \$2,210,000**

## **5. Financial Analysis**

### **5.1 Introduction**

The City has essentially committed the proceeds of the Series 2000 Bonds and Series 2011 Bonds to projects and costs related to the issuance of such bonds. It is now timely to issue additional bonds to continue with the implementation of the infrastructure improvements from the Stormwater Program. This section of the Engineer’s Report presents an analysis of the financial operations of the City’s Stormwater Enterprise Fund (SEF). Financial performance is projected through FY 2020 based on the City’s FY 2015 adopted budget.

### **5.2 Customer Usage and Growth**

**Table 5-1** projects the numbers of ERUs to be charged for service through FY 2020. The 2011 SWMP estimated that approximately 109,000 ERUs were currently being served by the City. The City’s FY 2015 budget reflects gross Stormwater Utility fee revenue billings based on 109,000 ERUs. Based on recent historical performance, utility collections are approximately 98 percent of billings. To project revenues for FY 2015 and annually thereafter, the City assumes billing a constant 109,000 annual ERUs at a collection rate of 98%, yielding an effective revenue generation base of 107,000 ERUs. No ERU growth beyond FY 2015 is anticipated in the budget projections.

### **5.3 Annual Revenue Requirements from Rates**

The rate covenant contained in Section 502 of the Bond Resolution prescribes that Net Revenues (which equal Revenues less Current Expenses) be sufficient in all years to pay not less than 110 percent of the Principal and Interest Requirements and 100 percent of all other requirements of the Bond Resolution. Those other requirements are potential deposits to the Reserve Account, Rate Stabilization Account, and Subordinated Indebtedness Account in the event that conditions require such deposits to be made. All capitalized terms in this section not normally capitalized and not otherwise defined herein shall have the meanings assigned to such terms in the Bond Resolution.

**Table 5-2** presents actual FY 2014, budgeted FY 2015 and projected FY 2016 through FY 2020 annual operating expenses (Current Expenses) related to the SEF. All line items are projected to inflate at an annual rate of three percent.

**Table 5-3** presents the actual FY 2014, budgeted FY 2015 and projected FY 2016 through FY 2020 annual Principal and Interest Requirements. All information in this table was furnished by City staff and its Financial Advisor. There are no annual deposits projected to be required to the Reserve Account and the Subordinated Indebtedness Account during the analysis period ending FY 2020. The City has a policy of operating the Rate Stabilization Account to transfer into operations annually sufficient amounts to generate debt service coverage of at least 120 percent and to subsequently transfer out from operations to such account any excess amounts not required to meet annual cash needs. In addition to the revenue requirements described above, the City funds several other categories of expenditures from net operating revenues: administrative fees; capital; depreciation funded renewals and replacements (R&R); and reserves for future capital projects. **Table 5-4** presents for each of these categories the actual amounts for FY 2014, budgeted amounts for FY 2015, and projected annual amounts for FY 2016 through FY 2020. All categories are projected to grow beyond FY 2015 at an annual rate of three percent.

#### **5.4 Projected Financial Results at Prevailing Rates**

**Table 5-5** presents the actual FY 2014, budgeted FY 2015 and projected FY 2016 through FY 2020 at the prevailing Stormwater Utility user charge rates. As can be seen, the rate covenant test established in the Bond Resolution was met in FY 2014 and is projected to be met in FY 2015 through FY 2020.

The City is issuing the Series 2015 Bonds. The additional bonds test in the Bond Resolution requires that a debt service coverage factor of 110 percent, excluding from the calculation of Revenues any amounts from the Rate Stabilization Account, be achieved to satisfy this test during any 12 month Measurement Period.

#### **5.5 Projected Financial Results with Stormwater Rate Adjustments**

**Table 5-6** presents historical, budgeted and projected annual financial results through FY 2020 with necessary adjustments in Stormwater Utility rates to meet the additional bonds test for the stormwater revenue bonds projected to be issued in FY 2017 and FY 2019. As can be seen, the October 1, 2014 eighty four (84) percent increase in the Stormwater Utility fee to \$16.67 per month per ERU provides for the generation of Revenues sufficient to meet the minimum 110 percent debt service coverage requirement for the additional bonds test, employing Fiscal Year 2014 as the 12 month Measurement Period. Thereafter, should additional bonds be issued as contemplated, rate increases would be required In FY 2017 and FY 2019.

**Table 5-7** is the companion table showing historic, budgeted and projected operation of the Rate Stabilization Account through FY 2020, with the anticipated rate adjustments in FY 2017 and FY 2019. As can be seen, transfers to operations are made in each year in amounts sufficient to meet the annual 110 percent debt service coverage requirement. Transfers in from operations are then made so as not to generate any surpluses in any years.

## 5.6 Comparison of Stormwater Utility Rates

**Table 5-8** compares for Florida local governments monthly stormwater utility fees, as compiled in 2014 by the Florida Stormwater Association (FSA). The current Stormwater Utility Rates for the City are also included on Table 5.8. The City's existing fee is above both average and maximum rates of other jurisdictions shown on the Table. Based on the FSA 2014 report, the Average ERU rate is \$5.68, which is slightly higher than the average ERU rate of \$5.22 reported in 2011. Not including the City, the FSA 2014 report provides a range in monthly rates per ERU from \$0.75 to \$13.77.



**Table 5.1 Budgeted and Projected Stormwater System ERUs and Fee Revenues at Prevailing Rates**

Description	FISCAL YEAR <sup>[1]</sup>						
	Actual	Budgeted	Projected				
	2014	2015	2016	2017	2018	2019	2020
<b>ERUs</b>							
Total Average Annual Number of ERUs <sup>[2]</sup>	109,000	109,000	109,000	109,000	109,000	109,000	109,000
Projected Number of ERUs <sup>[3]</sup>	107,000	107,000	107,000	107,000	107,000	107,000	107,000
<b>STORMWATER FEE REVENUES</b>							
Existing Charge per ERU/Month <sup>[4]</sup>	\$9.06	\$16.67	\$16.67	\$22.67 <sup>[5]</sup>	\$22.67 <sup>[5]</sup>	\$27.89 <sup>[5]</sup>	\$27.89 <sup>[5]</sup>
Total Annual Revenues <sup>[4] [6]</sup>	\$11,715,299	\$21,544,560	\$21,544,560	\$29,300,602	\$29,300,602	\$36,039,740	\$36,039,740

[1] Data provided by the City.

[2] Budgeted FY 2014 revenues based on 109,000 ERUs. Presently approximately 109,000 ERUs are served by the City's SEF. A lower value is used for projection purposes. No growth beyond FY 2014 is assumed. The ERUs are rounded to the nearest 1,000.

[3] Equals 98% of Total Average Annual Number of ERUs, based on the recent history of collections of approximately 98% of total billings.

[4] Amounts for FY 2015 and FY 2016 are based on the City's existing charge per ERU per month adopted effective October 1, 2014.

[5] Rates projected for FY 2017 and FY 2019 are recommended rate increases to pay debt service on bonds proposed to be issued, but such rate increases have not been approved by the City Commission.

[6] Equals Projected Number of ERUs multiplied by charge per ERU/Month, multiplied by 12 months.

**Table 5.2 Budgeted and Projected Stormwater System Operating Expenses**

Description	FISCAL YEAR <sup>[1]</sup>						
	Actual	Budgeted	Projected				
	2014	2015	2016	2017	2018	2019	2020
<b>Personnel Services <sup>[2]</sup></b>							
Salaries (\$)	1,286,507	1,334,900	1,374,900	1,416,100	1,458,600	1,502,400	1,547,500
Retirement Contributions (\$)	391,000	322,400	332,100	342,100	352,400	363,000	373,900
Health Insurance (\$)	140,105	126,700	130,500	134,400	138,400	142,600	146,900
OPEB Contribution (\$)	412,070	336,800	346,900	357,300	368,000	379,000	390,400
All Other (\$)	67,108	60,858	62,558	64,258	65,958	67,758	69,658
<b>Subtotal Personnel Services <sup>[2]</sup></b>	<b>\$ 2,296,790</b>	<b>\$ 2,181,658</b>	<b>\$ 2,246,958</b>	<b>\$ 2,314,158</b>	<b>\$ 2,383,358</b>	<b>\$ 2,454,758</b>	<b>\$ 2,528,358</b>
<b>Other Operating Expenses <sup>[2]</sup></b>							
Contract Maintenance (\$)	397,505	555,200	571,900	589,100	606,800	625,000	643,800
Internal Service Charges (\$)	357,511	625,200	644,000	663,300	683,200	703,700	724,800
Sanitation Contribution (\$)	637,000	637,000	637,000	637,000	637,000	637,000	637,000
All Other Operating Expenses <sup>[3]</sup> (\$)	311,752	398,600	410,500	422,900	435,500	448,600	462,100
<b>Subtotal Other Operating Expenses(\$)</b>	<b>1,703,768</b>	<b>2,216,000</b>	<b>2,263,400</b>	<b>2,312,300</b>	<b>2,362,500</b>	<b>2,414,300</b>	<b>2,467,700</b>
<b>Total Operating Expenses (\$)</b>	<b>\$ 4,000,558</b>	<b>\$ 4,397,658</b>	<b>\$ 4,510,358</b>	<b>\$ 4,626,458</b>	<b>\$ 4,745,858</b>	<b>\$ 4,869,058</b>	<b>\$ 4,996,058</b>

[1] Data provided by the City's Public Works and Finance Departments.

[2] Projected to inflate annually at a rate of 3.00% beyond budgeted FY 2015.

[3] Excludes Administration Fees, Depreciation Funded R&R, and Operating Contingencies 5%, and includes Line of Credit Fees.



**Table 5.3 Budgeted and Projected Stormwater System Annual Debt Service Requirements**

Description	FISCAL YEAR <sup>[1]</sup>						
	Actual	Budgeted	Projected				
	2014	2015	2016	2017	2018	2019	2020
Series 2009 Bonds (\$)	1,983,676	1,977,000	1,977,000	1,970,000	1,965,000	1,962,000	1,962,000
Series 2011 Bonds (\$)	3,865,196	4,852,000	4,852,000	4,846,000	4,853,000	4,851,000	4,853,000
Series 2015 Bonds (\$)	0	0	5,128,000	4,808,000	4,803,000	4,810,000	4,804,000
Additional Future Prospective Revenue Bonds <sup>[2]</sup> (\$)	0	0	0	1,848,000	6,449,000	12,908,000	12,936,000
State Revolving Fund Loan <sup>[3]</sup> (\$)	0	0	0	0	458,000	458,000	458,000
<b>Grand Total All Revenue Debt (\$)</b>	<b>5,848,872</b>	<b>6,829,000</b>	<b>11,957,000</b>	<b>13,472,000</b>	<b>18,528,000</b>	<b>24,989,000</b>	<b>25,013,000</b>

[1] Data provided by the City Finance Department, and its Financial Advisor, RBC Capital Markets, LLC.

[2] Assumes additional debt issued in FY 2017 and in FY 2019, each in the aggregate principal amount which will provide \$100,000,000 of proceeds to finance Stormwater Program projects, maturing approximately thirty years from the date of issuance, amortizing annually and accruing interest at an assumed interest rate of 5.5% per annum.

[3] The obligation to make such debt service payments is junior and subordinate to the obligation to pay debt service on the Series 2015 Bonds and the Outstanding Bonds and other obligations issued, or to be issued, under the Bond Resolution on a parity with the Series 2015 Bonds.



**Table 5.4 Budgeted and Projected Stormwater System Other Revenue Requirements**

Description	FISCAL YEAR <sup>[1]</sup>						
	Actual	Budgeted	Projected				
	2014	2015	2016	2017	2018	2019	2020
Administrative Fees <sup>[2]</sup> (\$)	435,000	446,000	459,400	473,200	487,400	502,000	517,100
Capital <sup>[3]</sup> (\$)	148,000	1,302,400	1,341,500	1,330,251	666,281	448,921	1,230,871
Depreciation Funded R&R <sup>[2] [3]</sup> (\$)	2,115,910	2,179,400	2,244,800	2,312,100	2,381,500	2,452,900	2,526,500

[1] Data provided by the City Finance Department.

[2] Beyond Fiscal Year 2015, projected to grow at an approximate annual rate of 3.00%.

[3] Represents amount needed to fund certain capital items on a pay-as-you-go basis.



**Table 5.5 Projected Stormwater System Revenues, Expenses and Debt Service Coverage at Prevailing Rates**

Description	FISCAL YEAR <sup>[1]</sup>						
	Actual	Budgeted	Projected				
	2014	2015	2016	2017	2018	2019	2020
<b>Revenues</b>							
Stormwater User Fees <sup>[2]</sup> (\$)	11,715,299	21,544,560	21,544,560	21,544,560	21,544,560	21,544,560	21,544,560
Interest <sup>[3]</sup> (\$)	142,033	130,000	130,000	130,000	130,000	130,000	130,000
Rate Stabilization (\$)	1,847,255	0	150,000	0	0	0	1,000,000
Less: 5% Allowance <sup>[4]</sup>	0	(1,077,228)	(1,077,228)	(1,077,228)	(1,077,228)	(1,077,228)	(1,077,228)
<b>Total Revenues (\$)</b>	<b>13,704,587</b>	<b>20,597,332</b>	<b>20,747,332</b>	<b>20,597,332</b>	<b>20,597,332</b>	<b>20,597,332</b>	<b>21,597,332</b>
<b>Current Expenses:</b>							
Operating Expenses <sup>[5]</sup> (\$)	4,000,558	4,397,658	4,510,358	4,626,458	4,745,858	4,869,058	4,996,058
5% Contingency Allowance <sup>[6]</sup> (\$)	0	219,883	225,518	231,323	237,293	243,453	249,803
<b>Total Current Expenses (\$)</b>	<b>4,000,558</b>	<b>4,617,541</b>	<b>4,735,876</b>	<b>4,857,781</b>	<b>4,983,151</b>	<b>5,112,511</b>	<b>5,245,861</b>
<b>Net Revenues Available for Debt Service (\$)</b>	<b>9,704,029</b>	<b>15,979,791</b>	<b>16,011,456</b>	<b>15,739,551</b>	<b>15,614,181</b>	<b>15,484,821</b>	<b>16,351,471</b>
<b>Revenue Bond Debt Service</b>							
Series 2009 Bonds (\$)	1,983,676	1,977,000	1,977,000	1,970,000	1,965,000	1,962,000	1,962,000
Series 2011 Bonds (\$)	3,865,196	4,852,000	4,852,000	4,846,000	4,853,000	4,851,000	4,853,000
Series 2015 Bonds <sup>[7]</sup> (\$)	0	0	5,128,000	4,808,000	4,803,000	4,810,000	4,804,000
State Revolving Fund Loan <sup>[8]</sup> (\$)	0	0	0	0	458,000	458,000	458,000
<b>Total Revenue Bond Debt Service (\$)</b>	<b>5,848,872</b>	<b>6,829,000</b>	<b>11,957,000</b>	<b>11,624,000</b>	<b>12,079,000</b>	<b>12,081,000</b>	<b>12,077,000</b>
<b>Debt Service Coverage<sup>[9]</sup> (%)</b>	<b>165.9</b>	<b>234.0</b>	<b>133.9</b>	<b>135.4</b>	<b>129.3</b>	<b>128.2</b>	<b>135.4</b>

Description	FISCAL YEAR <sup>[1]</sup>						
	Actual	Budgeted	Projected				
	2014	2015	2016	2017	2018	2019	2020
<b>Other Sources and (Uses) of Funds</b>							
Net Revenues After Debt Service <sup>[10]</sup> (\$)	3,855,157	9,150,791	4,054,456	4,115,551	3,535,181	3,403,821	4,274,471
Less: Administration Fees <sup>[11]</sup> (\$)	(435,000)	(446,000)	(459,400)	(473,200)	(487,400)	(502,000)	(517,100)
Depreciation Reserve/ R&R <sup>[11]</sup> (\$)	(2,115,910)	(2,179,400)	(2,244,800)	(2,312,100)	(2,381,500)	(2,452,900)	(2,526,500)
Capital <sup>[11]</sup> (\$)	(148,000)	(1,302,400)	(1,341,500)	(1,330,251)	(666,281)	(448,921)	(1,230,871)
Yields: Annual Surplus / (Deficit)	1,156,247	5,222,991	8,756	0	0	0	0

- [1] Data provided by the City's Public Works and Finance Departments, and its Financial Advisor, RBC Capital Markets, LLC.
- [2] See Table 5.1 of this report. For the purposes of this Table 5.5, Revenues are projected assuming no future rate increases.
- [3] Includes only interest allowed to be considered within the definition of "Revenues" for debt service coverage purposes, as such term is defined in the Bond Resolution.
- [4] Allowance for uncollectible revenues.
- [5] Information based on operating expenses provided in the City of Miami Beach Stormwater System Rate Study – See Table 5.2.
- [6] Allowance for potential future cost increases beyond those reflected in inflation factor.
- [7] Assumes issuance of the Series 2015 Bonds in the aggregate principal amount which will provide \$100,000,000 of proceeds to finance Stormwater Program projects, maturing approximately thirty years from the date of issuance, amortizing annually and at a true interest cost of 4.45%, which represents interest rates as of June 11, 2015 plus 0.25%.
- [8] The obligation to make such debt service payments is junior and subordinate to the obligation to pay debt service on the Series 2015 Bonds and the Outstanding Bonds and other obligations issued, or to be issued, under the Bond Resolution on parity with the Series 2015 Bonds.
- [9] Equals Net Revenues Available for Debt Service divided by Total Revenue Bond Debt Service. A minimum of 110% of the Principal and Interest Requirements of the Outstanding Bonds is required by the rate covenant in the Bond Resolution. Total Revenue Bond Debt Service includes debt service payments projected on the State Revolving Fund Loan, but such debt service does not constitute Principal and Interest Requirements for purposes of the rate covenant in the Bond Resolution.
- [10] Equals Net Revenues Available for Debt Service minus Total Revenue Bond Debt Service.
- [11] See Table 5.4 of this report.



**Table 5.6 Projected Stormwater System Revenues, Expenses and Debt Service Coverage with Rate Increases**

Description	FISCAL YEAR <sup>[1]</sup>						
	Actual	Budgeted	Projected				
	2014	2015 <sup>[2]</sup>	2016 <sup>[2]</sup>	2017 <sup>[3]</sup>	2018 <sup>[3]</sup>	2019 <sup>[3]</sup>	2020 <sup>[3]</sup>
Annual Increase in Stormwater User Fee Rates	0%	84.0%	0%	36.0%	0%	23.0%	0%
<b>Revenues</b>							
Stormwater User Fees <sup>[4]</sup> (\$)	11,715,299	21,544,560	21,544,560	29,300,602	29,300,602	36,039,740	36,039,740
Interest <sup>[5]</sup> (\$)	142,033	130,000	130,000	130,000	130,000	130,000	130,000
Rate Stabilization (\$)	1,847,255	0	150,000	0	0	0	1,000,000
Less: 5% Allowance <sup>[6]</sup>	0	(1,077,228)	(1,077,228)	(1,465,030)	(1,465,030)	(1,801,987)	(1,801,987)
<b>Total Revenues (\$)</b>	<b>13,704,587</b>	<b>20,597,332</b>	<b>20,747,332</b>	<b>27,965,572</b>	<b>27,965,572</b>	<b>34,367,753</b>	<b>35,367,753</b>
<b>Current Expenses:</b>							
Operating Expenses <sup>[7]</sup> (\$)	4,000,558	4,397,658	4,510,358	4,626,458	4,745,858	4,869,058	4,996,058
Plus 5% Contingency Allowance <sup>[8]</sup> (\$)	0	219,883	225,518	231,323	237,293	243,453	249,803
<b>Total Current Expenses (\$)</b>	<b>4,000,558</b>	<b>4,617,541</b>	<b>4,735,876</b>	<b>4,857,781</b>	<b>4,983,151</b>	<b>5,112,511</b>	<b>5,245,861</b>
<b>Net Revenue Available for Debt Service (\$)</b>	<b>9,704,029</b>	<b>15,979,791</b>	<b>16,011,456</b>	<b>23,107,791</b>	<b>22,982,421</b>	<b>29,255,242</b>	<b>30,121,892</b>
<b>Revenue Bond Debt Service</b>							
Series 2009 Bonds (\$)	1,983,676	1,977,000	1,977,000	1,970,000	1,965,000	1,962,000	1,962,000
Series 2011 Bonds (\$)	3,865,196	4,852,000	4,852,000	4,846,000	4,853,000	4,851,000	4,853,000
Series 2015 Bonds <sup>[9]</sup> (\$)	0	0	5,128,000	4,808,000	4,803,000	4,810,000	4,804,000
Series 2017 Bonds <sup>[9]</sup> (\$)	0	0	0	1,848,000	6,449,000	6,454,000	6,468,000
Series 2019 Bonds <sup>[9]</sup> (\$)	0	0	0	0	0	0	6,468,000
State Revolving Fund Loan <sup>[10]</sup> (\$)	0	0	0	0	458,000	458,000	458,000
<b>Total Revenue Bond Debt Service (\$)</b>	<b>5,848,872</b>	<b>6,829,000</b>	<b>11,957,000</b>	<b>13,472,000</b>	<b>18,528,000</b>	<b>18,535,000</b>	<b>25,013,000</b>

Description	FISCAL YEAR <sup>[1]</sup>						
	Actual	Budgeted	Projected				
	2014	2015 <sup>[2]</sup>	2016 <sup>[2]</sup>	2017 <sup>[3]</sup>	2018 <sup>[3]</sup>	2019 <sup>[3]</sup>	2020 <sup>[3]</sup>
Calculated Debt Service Coverage For Rate Covenant <sup>[11]</sup> (%)	165.9	234.0	133.9	171.5	124.0	157.8	120.4
<b>Other Sources and (Uses) of Funds</b>							
Net Revenues After Debt Service <sup>[12]</sup> (\$)	3,855,157	9,150,791	4,054,456	9,635,791	4,454,421	10,720,242	5,108,892
Less: Administration Fees <sup>[13]</sup> (\$)	(435,000)	(446,000)	(459,400)	(473,200)	(487,400)	(502,000)	(517,100)
Depreciation Reserve/ R&R <sup>[13]</sup> (\$)	(2,115,910)	(2,179,400)	(2,244,800)	(2,312,100)	(2,381,500)	(2,452,900)	(2,526,500)
Capital <sup>[13]</sup> (\$)	(148,000)	(1,302,400)	(1,341,500)	(1,330,251)	(666,281)	(448,921)	(1,230,871)
<b>Yields: Annual Surplus / (Deficit)<sup>[14]</sup> (\$)</b>	<b>1,156,247</b>	<b>5,222,991</b>	<b>8,756</b>	<b>5,520,240</b>	<b>919,240</b>	<b>7,316,421</b>	<b>834,421</b>
Rates (\$)	9.06	16.67	16.67	22.67	22.67	27.89	27.89
Change (\$)	0.00	7.61	0.00	6.00	0.00	5.21	0.00
Change (%)	0	84.0	0	36.0	0	23.0	0

Please refer to the footnotes to Table 5.6 on the next page.



**Footnotes for Table 5.6:**

- [1] Data provided by the City's Public Works and Finance Departments, and its Financial Advisor, RBC Capital Markets, LLC.
- [2] Rates for FY 2015 and FY 2016 have been adopted and became effective on October 1, 2014
- [3] Rates projected for FY 2017 through FY 2020 are recommended rate increases to pay debt service on proposed bonds, but have not been approved by the City Commission.
- [4] See Table 5.1 of this report.
- [5] Includes only interest allowed to be considered within the definition of "Revenues" for debt service coverage purposes, as such term is defined in the Bond Resolution.
- [6] Allowance for uncollectible revenues.
- [7] Based on information relating to operating expenses provided in the City of Miami Beach Stormwater System Rate Study – See Table 5.2 of this report.
- [8] Allowance for potential future cost increases beyond those reflected in inflation factor.
- [9] Assumes issuance of the Series 2015 Bonds, Series 2017 Bonds and the Series 2019 Bonds each in the aggregate principal amount which will provide \$100,000,000 of proceeds to finance Stormwater Program projects, maturing approximately thirty years from the date of issuance and amortizing annually. The Series 2015 Bonds are assumed at a true interest cost of 4.45%, which represents interest rates as of June 11, 2015 plus 0.25%. The Series 2017 and Series 2019 Bonds are assumed at an interest rate of 5.50%.
- [10] The obligation to make such debt service payments is junior and subordinate to the obligation to pay debt service on the Series 2015 Bonds and the Outstanding Bonds and other obligations issued, or to be issued, under the Bond Resolution on parity with the Series 2015 Bonds.
- [11] Equals Net Revenues Available for Debt Service divided by Total Revenue Bond Debt Service. A minimum of 110% of the Principal and Interest Requirements of the Outstanding Bonds is required by the rate covenant in the Bond Resolution. Total Revenue Bond Debt Service includes debt service payments projected on the State Revolving Fund Loan, but such debt service does not constitute Principal and Interest Requirements for purposes of the rate covenant in the Bond Resolution.
- [12] Equals Net Revenues Available for Debt Service minus Total Revenue Bond Debt Service.
- [13] See Table 5.4 of this report.
- [14] Equals amounts transferred Out From Operations to Rate Stabilization. See Table 5.7 of this report.

**Table 5.7 Projected Operation of the Stormwater Rate Stabilization Account with Rate Adjustments**

Description	FISCAL YEAR <sup>[1]</sup>						
	Actual	Budgeted	Projected				
	2014	2015	2016	2017	2018	2019	2020
<b>Sources of Funds</b>							
Beginning Balance <sup>[2]</sup>	7,526,336	5,679,081	9,902,072	8,760,828	13,229,619	12,391,940	17,691,382
Transfers in from Operations <sup>[3]</sup>	0	5,222,991	8,756	5,520,240	919,240	7,316,421	834,421
<b>Total Sources of Funds</b>	7,526,336	10,902,072	9,910,828	14,281,068	14,148,859	19,708,361	18,525,803
<b>Uses of Funds</b>							
Transfers Out to Operations <sup>[4]</sup>	(1,847,255)	0	(150,000)	0	0	0	(1,000,000)
Other <sup>[5]</sup>	0	(1,000,000)	(1,000,000)	(1,000,000)	(1,000,000)	(1,000,000)	(1,000,000)
<b>Total Uses of Funds</b>	(1,847,255)	(1,000,000)	(1,150,000)	(1,000,000)	(1,000,000)	(1,000,000)	(2,000,000)
<b>Ending Balance<sup>[6]</sup></b>	5,679,081	9,902,072	8,760,828	13,281,068	13,148,859	18,708,361	16,525,803

[1] Data provided by the City Finance Department.

[2] Unencumbered balance as of 10/1/2014. Thereafter, equals Ending Balance from prior year.

[3] Beginning in FY 2015, taken from Table 5.6 of this report, as Annual Surplus/(Deficit) and Transferred In to Rate Stabilization Account.

[4] Beginning in FY 2015, taken from Table 5.6 of this report, as Transfer in from Rate Stabilization Account.

[5] Assumed to be \$1,000,000 in all years for miscellaneous pay-as-you-go projects.

[6] Equals Total Sources of Funds minus Total Uses of Funds in each year.



Table 5.8 Comparison of Stormwater Utility Fees for Cities and Counties in Florida – FSA 2014

Stormwater Utility	Monthly Rate per ERU	Stormwater Utility	Monthly Rate per ERU	Stormwater Utility	Monthly Rate per ERU	Stormwater Utility	Monthly Rate per ERU
<b>CITIES</b>							
City of Altamonte Spgs	6.75	City of Fort Meade	4.25	City of Miami Springs	3.67	City of St. Pete Beach	47.09 yr
City of Atlantic Beach	8.39	City of Fort Myers	4.80	City of Mount Dora	6.50	City of St. Petersburg	6.84
City of Auburndale	0.75	City of Fort Pierce	4.50	City of Oldsmar	4.00	City of Stuart	3.95
City of Bradenton Beach	8.33	City of Fort Walton Bch	3.00	City of Mulberry	4.00	City of Sunrise	6.82
City of Cape Canaveral	5.00	City of Gainesville	8.56	City of Naples	12.80	City of Tallahassee	7.95
City of Cape Coral	6.25	City of Gulfport	3.21	City of Neptune Beach	3.00	City of Tamarac	9.19
City of Casselberry	7.00	City of Haines City	54.24/yr.	City of Niceville	4.51	City of Tampa	3.00
City of Clearwater	13.77	City of Hallandale Beach	3.35	City of North Lauderdale	3.00	City of Tarpon Springs	5.65
City of Clermont	3.00	City of Holly Hill	6.00	City of North Miami Beach	4.50	City of Tavares	4.50
City of Cocoa	5.75	City of Jacksonville	5.00	City of Oakland Park	6.00	City of Titusville	6.62
City of Cocoa Beach	6.00	City of Jacksonville Bch	4.78	City of Orlando	9.99	City of Wilton Manors	4.37
City of Coconut Creek	3.46	City of Key West	7.90	City of Ormond Beach	8.00	City of Winter Haven	3.16
City of Coral Gables	8.20	City of Kissimmee	8.08	City of Oviedo	4.00	City of Winter Park	11.56
City of Daytona Beach	8.67	City of Lake Alfred	2.00	City of Palm Coast	11.65	City of Winter Springs	5.50
City of DeBary	7.00	City of Lake Worth	6.30	City of Pensacola	5.07	Town of Jupiter	4.37
City of Delray Beach	5.33	City of Lakeland	6.00	City of Pompano Beach	3.21	Town of Melbourne Beach	3.00
City of Doral	4.00	City of Leesburg	5.50	City of Riviera Beach	4.50	Town of Pembroke Park	9.00
City of Eagle Lake	4.00	City of Maitland	8.60	City of Rockledge	3.75	Village of Indian Creek	4.38





Stormwater Utility	Monthly Rate per ERU	Stormwater Utility	Monthly Rate per ERU	Stormwater Utility	Monthly Rate per ERU	Stormwater Utility	Monthly Rate per ERU
City of Edgewater	8.00	City of Melbourne	3.00	City of Safety Harbor	7.25	Village of Pinecrest	4.00
City of Fort Lauderdale	3.50	City of Miami Gardens	4.00	City of St. Augustine	7.00	Volusia County	6.00
<b>City of Miami Beach (2015-2016)</b>	<b>\$16.67</b>						
COUNTIES							
Brevard County	3.00	Lake County	.4984 mills	Miami-Dade County	4.00	Polk County	.1 mil
Charlotte County	10.71	Leon County	7.08	Pasco County	3.92		
Hillsborough County	1.00	Marion County	1.25	Pinellas County	9.67		

Reference: Florida Stormwater Association (FSA) 2014 Stormwater Utility Survey

## 6. Conclusions and Recommendation

AECOM has made the following conclusions with respect to the stormwater system during the course of preparing this Engineer's Report:

- The capital improvement program for the Stormwater Utility is necessary to improve the flood protection level of service and water quality of the City's stormwater management system.
- Continuation of the City's planned capital improvement program for the Stormwater Utility will entail the need for significant additional funding, as described in this Engineer's Report.
- The City's stormwater management system is well maintained, well managed and in good operating condition. Effective planning policies provide for the necessary inspection, repair, improvement and replacement of the City's stormwater management facilities and have enabled the City to comply with state and federal regulations.
- The City's stormwater management system has the physical capacity to meet existing demands. Implementation of the projects included in the capital improvement program will enable the City's stormwater management system in the areas served by those projects to meet projected demands and comply with state and federal regulations expected to be in effect during the study period of this Engineer's Report (Fiscal Years 2015 through 2020) (the "Study Period").
- The financial plan for improvements to the City's stormwater management system, as described in this Engineer's Report, includes adequate funding for improvements to be constructed and installed in the manner and time periods currently contemplated.
- In the event the City elects to issue additional Stormwater Revenue Bonds in FY 2017 and FY 2019 in the amounts currently contemplated, and as described in this Engineer's Report, rate increases applicable to the stormwater system customers are projected to be necessary prior to the issuance of such bonds.
- Key staff of the City in charge of the operations and maintenance of the City's stormwater management system and the implementation of improvements to the system are well qualified and capable of effectively managing the responsibilities of such operations, maintenance and implementation.
- The methodology used to develop the capital improvement program for the City's stormwater management system, the timing of the implementation of the program and the cost of its improvements was an appropriate methodology for such purposes.

- Subject to the rate increases recommended in this Engineer's Report, if Stormwater Revenue Bonds are issued in the principal amounts and time periods currently projected, revenues of the City's stormwater management system projected in this Engineer's Report will be sufficient to meet all operating and other expenses of the system during the Study Period and to satisfy all of the requirements of the rate covenant set forth in the Bond Resolution. Such Revenues will also provide sufficient funds for planned capital improvement expenditures of the City's stormwater management system that are expected to be funded from current Revenues.
- The amounts projected in this Engineer's Report for Revenues and Current Expenses of the City's stormwater management system and the sources of funds projected to be available to fund scheduled or anticipated improvements throughout the Study Period are reasonable.
- Improvements to be made to the City's stormwater management system have been or are expected to be designed in accordance with usual and customary engineering practices and involve proven technology and proven configurations of that technology.
- The projected cost and time periods for implementing the improvements to the City's stormwater management system to be financed with proceeds of the Series 2015 Bonds are reasonable.
- In the opinion of the Consulting Engineers, the City's issuance of the Series 2015 Bonds in the aggregate principal amount set forth in the Official Statement related to the Series 2015 Bonds, at the time and for the purposes described in this Engineer's Report, is an advisable undertaking.

AECOM recommends that the City proceed with the issuance of the Series 2015 Bonds; continue the implementation of the capital improvement program for the Stormwater Utility and as necessary, the adoption of rate adjustments in anticipation of future issuance of additional Stormwater Revenue Bonds.

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