APPENDIX PW-1

CITY OF MIAMI, FLORIDA

10-YEAR WATER SUPPLY FACILITIES WORK PLAN UPDATE

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LPA Hearing:
First Reading:
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1.0 INTRODUCTION

The purpose of the City of Miami Water Supply Facilities Work Plan (Work Plan) is to identify and plan for the water supply sources and facilities needed to serve existing and new development within the City's jurisdiction. Chapter 163.3177(6)(c)3, Part II, F.S., requires local governments to prepare and adopt Work Plans into their comprehensive plans within 18 months after the water management district approves a regional water supply plan or its update. The *Lower East Coast Water Supply Plan Update* was previously approved by the South Florida Water Management District (SFWMD) Governing Board on ~~February 15, 2007~~ November 8, 2018 while Miami-Dade County's 10-Year Water Supply Facilities Work Plan Update was adopted April 2022 and corresponding CDMP Text Amendments adopted on January 19, 2023. The City last adopted a 20 Year Water Supply Facilities Work Plan Update ~~April 22, 2010~~ on September 10, 2015. This Work Plan Update will be adopted with a ~~2~~10-year planning horizon to be consistent with both the Miami-Dade County and South Florida Water Management District Water Facilities Work Plans. ~~The SFWMD governing Board subsequently approved an update to the *Lower East Coast Water Supply Plan Update* (LEC Update) on Sept. 12, 2013. Based on Florida Statutes, the City must now update its Water Supply Facilities Work Plan by March 12, 2015.~~

The City of Miami has recognized the importance of water conservation through the Miami Comprehensive Neighborhood Plan (MCNP). The City recognizes that in order to maintain a proactive water conservation program there has to be an effective coordination program with Miami-Dade County Water and Sewer Department (MDWASD) to ensure the success of the program. In addition, the City maintains an excellent working relationship with WASD as a retail customer to ensure compliance with all applicable regulations and guidelines.

The City of Miami is one of 15 municipal "retail" customers. ~~Residents~~ Potable Water users within the City receive 100% of ~~its~~ all potable water directly from the Miami-Dade County Water and Sewer Department (MDWASD), which is responsible for ensuring that enough capacity is available for existing and future customers. Under this arrangement, the City will coordinate~~s~~ with MDWASD to ensure that enough capacity is available for existing and future customers and supporting infrastructure.

The Updated City of Miami Water Supply Facilities Work Plan (Work Plan) will reflect ~~whatever~~ any changes in the regional plan affecting its local water supply and work plan. In addition, since the City is a retail ~~buyer~~ customer, it will reference the initiatives already identified in Miami-Dade County's ~~2~~10-year Work Plan. According to state guidelines, the Work Plan and the comprehensive plan amendment must address the development of traditional and alternative water supplies, bulk sales agreements and conservation and reuse programs that are necessary to serve existing and new development for at least a 10-year planning period. The City of

Miami Work Plan will have the same planning time schedule as the most recently approved Miami-Dade County's ~~2~~10-year Work Plan.

Southeast Florida is one of the most vulnerable regions to the impacts of climate change and sea level rise and is expected to present significant challenges related to water resource planning, management and infrastructure. Mitigation and adaption strategies are also addressed herein ~~as a primary focal area~~.

The ~~information~~ amendments contained within this Work Plan Update will be included ~~as amendments to~~ in the various elements of the City's Comprehensive Plan.

The City's Work Plan is divided into six sections:

Section 1 – Introduction
Section 2 – Background Information
Section 3 – Data and Analysis
Section 4 – Intergovernmental Coordination
Section ~~4~~ 5 – Work Plan Projects/Capital Improvement Element/Schedule
Section ~~5~~ 6– Climate Change and Sea Level Rise
Section ~~6~~ 7– Goals, Objectives, Policies

1.1 Statutory History

The Florida Legislature enacted bills in the 2002, 2004, ~~and~~ 2005, 2011, 2012, 2015 and 2016 sessions to address the state's water supply needs. These bills, especially Senate Bills 360 and 444 (2005 legislative session), significantly changed Chapter 163 and 373 Florida Statutes (F.S.) by strengthening the statutory links between the regional water supply plans prepared by the water management districts and the comprehensive plans prepared by local governments. In addition, these bills established the basis for improving coordination between the local land use planning and water supply planning.

In 2005, lawmakers revised state water law, Section 373.707, F.S., and created the Water Resource Protection and Sustainability Program, which requires a higher level of water supply planning coordination between water management districts and local governments.

Effective July 1, 2010, the Florida legislature passed an amendment to Section 373.707, F.S., which concerns water management district funding of alternative water supply projects. The legislation added "water conservation projects that result in quantifiable water savings" to those projects eligible for funding,

In 2011, the Florida Legislature updated Chapter 163, Part II, F.S., to include The *Community Planning Act* (163.3164, F.S.), which addresses the state's water supply needs. The Act requires each municipality and county to adopt and maintain a comprehensive plan. In Florida, all proposed and approved development in the

community must be consistent with the comprehensive plan. In terms of water supply planning, information about state requirements for local government comprehensive plans is available in each regional water supply plan update.

As of June 2012, 90 percent of all local governments within the SFWMD developed and formally submitted their Water Supply Facilities Work Plans. The development of these plans has assisted the SFWMD in coordinating future water supply planning and permitting with local government land use planning.

The 2012, 2015 and 2016 Statute changes clarified certain language which does not materially impact the City of Miami

1.2 Statutory Requirements

In order to meet water supply and water facilities planning requirements, local government comprehensive plans must address the following:

1. Coordinate appropriate aspects of their comprehensive plan with the appropriate water management district's regional water supply plan. [Section 163.3177(4)(a), Florida Statutes.]

2. ~~Revise the Potable Water Sub-Element to adopt a water supply facilities work plan covering at least a 10-year planning period to meet existing and projected demand. The work plan should address those water supply facilities for which the local government has responsibility and include the facilities needed to develop alternative water supplies. The work plan should also identify conservation and reuse measures to meet future needs. [Section 163.3177(6)(c), Florida Statutes.]~~

3. ~~Revise the Conservation Element to assess current and projected water needs and sources for at least a 10-year planning period. The analysis must consider the existing levels of water conservation, use, and protection and the applicable policies of the water management district, and the district's approved regional water supply plan. In the absence of an approved regional water supply plan, the analysis must consider the district's approved water management plan. [Section 163.3177(6)(d)3, Florida Statutes.]~~

4. ~~Revise the Capital Improvements Element to identify capital improvements projects to be implemented in the first 5 years of the work plan for which the local government is responsible, including both publicly and privately funded water supply projects necessary to achieve and maintain adopted level of service standards; and adopt a five-year schedule of capital improvements to include those projects as either funded or unfunded, and if unfunded, assigned a level of priority for funding. [163.3177(3)(a)4, Florida Statutes.]~~

5. ~~Revise the Intergovernmental Coordination Element to adopt principles and guidelines to be used to coordinate the comprehensive plan with the regional~~

~~water supply authority (if applicable) and with the applicable regional water supply plan. [163.3177(6)(h)1, Florida Statutes.]~~

~~6. During the Evaluation and Appraisal review, determine if comprehensive plan amendments are necessary to reflect statutory changes related to water supply and facilities planning since the last update to the comprehensive plan. If necessary, transmit the amendments to incorporate the statutory changes as appropriate. [Section 163.3191(1) and (2), Florida Statutes.]~~

~~7. Ensure that adequate water suppliers and facilities are available to serve new developments no later than the date on which the local government anticipates issuing a certificate of Occupancy and consult with applicable water suppliers prior to approving a building permit, to determine whether adequate water supplies will be available to serve the development by the anticipated issuance date of the Certificate of Occupancy. [FS 163.3180(2)(a), effective July 1, 2005.]~~

2. Ensure that its future land use plan is based upon availability of adequate water supplies and public facilities and services [s.163.3177(6)(a), F.S.]. Data and analysis demonstrating that adequate water supplies and associated public facilities will be available to meet projected growth demands must accompany all proposed Future Land Use Map amendments submitted for review.
3. Ensure that adequate water supplies and facilities are available to serve new development no later than the issuance by the local government of a certificate of occupancy or its functional equivalent and consult with the applicable water supplier to determine whether adequate water supplies will be available to serve the development by the anticipated issuance date of the certificate of occupancy [s.163.3180 (2)(a), F.S.].
4. For local governments subject to a regional water supply plan, revise the General Sanitary Sewer, Solid Waste, Drainage, Potable Water, and Natural Groundwater Aquifer Recharge Element (the “Infrastructure Element”), within 18 months after the water management district approves an updated regional water supply plan, to:

   a. Identify and incorporate the alternative water supply project(s) selected by the local government from projects identified in the updated SFWMD Regional Water Supply Plan or the alternative project(s) proposed by the local government under s. 373.709(8)(b), F.S. [s. 163.3177(6)(c), F.S.];

   b. Identify the traditional and alternative water supply projects, and the conservation and reuse programs necessary to meet water needs identified in the SFWMD Regional Water Supply Plan [s. 163.3177(6)(c), F.S.]; and,

   c. Update the Work Plan for at least a 10-year planning period for constructing the public, private, and regional water supply facilities identified

in the element as necessary to serve existing and new development. [s. 163.3177(6)(c), F.S.].

5. Revise the Five-Year Schedule of Capital Improvements to include water supply, reuse, and conservation projects and programs to be implemented during the five-year period [s. 163.3177(3)(a)4, F.S.].
6. To the extent necessary to maintain internal consistency after making changes described in Paragraph 1 through 5 above, revise the Conservation Element to assess projected water needs and sources for at least a 10-year planning period, considering the SFWMD Regional Water Supply Plan, the applicable District Water Management Plan, as well as applicable consumptive use permit(s). [s.163.3177 (6)(d), F.S.]. The plan must address the water supply sources necessary to meet and achieve the existing and projected water use and demand for the established planning period, considering the SFWMD Regional Water Supply Plan [s.163.3167(9), F.S.].
7. To the extent necessary to maintain internal consistency after making changes described in Paragraphs 1 through 5 above, revise the Intergovernmental Coordination Element to ensure coordination of the comprehensive plan with the SFWMD Regional Water Supply Plan [s.163.3177(6)(h)1., F.S.].
8. While an Evaluation and Appraisal Report is not required, local governments are encouraged to comprehensively evaluate, and as necessary, update comprehensive plans to reflect changes in local conditions. The evaluation could address the extent to which the local government has implemented the need to update their Work Plan, including the development of alternative water supplies, and determine whether the identified alternative water supply projects, traditional water supply projects, and conservation and reuse programs are meeting local water use demands [s.163.3181(3), F.S.].
9. A local government that does not own, operate, or maintain its own water supply facilities, including, but not limited to, wells, treatment facilities, and distribution infrastructure, and is served by a public water utility with a permitted allocation of greater than 300 million gallons per day is not required to amend its comprehensive plan in response to an updated regional water supply plan or to maintain a work plan if any such local government's usage of water constitutes less than 1 percent of the public water utility's total permitted allocation. However, any such local government is required to cooperate with, and provide relevant data to, any local government or utility provider that provides and natural groundwater aquifer recharge element updated in accordance with s. 163.3191. Any local government may verify its qualifications for the exemption with the Florida Department of Economic Opportunity (DEO) [s. 163.3177(6)(c)4., F.S.].

2.0 BACKGROUND INFORMATION

2.1 Overview

The City of Miami, known as the "Magic City", is located in Southeast Florida, in Miami-Dade County on the Miami River, between the Florida Everglades and the Atlantic Ocean. The current boundaries of the City encompass an area of approximately ~~35~~ 56 square miles (including both land and water areas). The City of Miami was incorporated in 1896 and has grown into one of the world's renowned centers where people can work, live and play while enjoying a high quality of life. The City of Miami, known for its diverse culture and ethnicities, is the largest municipality in Miami-Dade County.

The City of Miami is substantially built-out. An evaluation of land uses, excluding water by gross acreage has revealed the following approximate breakdown: Industrial (1.77%); Vacant (3.01%); Residential (33.57%); Government/Institutional (4.89%); Commercial (5.87%); Mixed-Use (0.49%); Parks (5.52%); Utilities (3.91%); and Roads/ROW 20.56%). ~~Between 2000 and 2010, t~~The City of Miami population ~~grew from 362,470 to 399,457, an increase of ten percent (10.2%)~~[1] estimate by the U.S. Census Bureau (July 2021) was 439,890. ~~By all~~ From the projections, growth will continue to occur in Miami and the region, with future development potential and population growth limited by the scarcity of vacant and developable land. ~~Current estimates of population trends have incorporated the recent deluge of development and redevelopment of new large scale residential projects. The City's greatest development potential will occur as mid to high rise redevelopment projects. For these reasons, it is anticipated the City of Miami will receive a much greater share of the County's population growth.~~

For the purposes of this Update, the population projections data found in the Miami-Dade County 10-year Water Supply Facilities Work Plan Update (Exhibit C-4, WASD Retail Municipal Customers), adopted in April 2022, will be utilized (See **3.0** Table A).

2.2 Relevant Regional Issues

The Lower East Coast, LEC, Planning Area traditionally has relied on fresh groundwater from the Surficial Aquifer System, SAS, and fresh surface water *from Lake Okeechobee* as the primary water source for urban, agricultural, and industrial uses. In many areas of the LEC Planning Area, development of these sources has been maximized due to potential impacts on the regional system, wetlands, existing water users, and the potential for saltwater intrusion. *As population and water demand increased, the development of other water source options also increased*. Therefore, new or increased allocations from these freshwater sources will be reviewed on an application-by-application basis to determine if a project meets the consumptive use permitting criteria. As a result, diversification of water supply

[1] ~~Population projections provided by *Miami-Dade County RER, Planning Division, 2010 Census TAZ Data*~~

sources, such as use of the upper Floridan aquifer, increased storage, reclaimed water, and appropriate water conservation has been occurring in the LEC Planning Area and is expected to continue to occur in the future. The source options are dependent on location, use type, demand, regulatory requirements, and cost.

~~Since the previous water supply plan updates, the national economic downturn has slowed residential and commercial development, and in turn, overall population growth, leading to a reduced rate of increase in future urban water demands. Although population growth may be slower than previously projected, the growth is such that additional water supplies over the 20-year planning horizon will likely be required in many areas. This reinforces the need for local governments to develop alternative water sources to ensure adequate future water supplies.~~

Additionally, Southeast Florida is one of the most vulnerable regions to the impacts of climate change and sea level rise as a result of our flat topography, porous limestone geology, and dense coastal development. Climate change and sea level rise are expected to present significant challenges relating to water resource planning, management and infrastructure for the counties located in south Florida, including Broward, Miami-Dade, Monroe, and Palm Beach Counties. The primary concern to water supply is salt water intrusion into the freshwater Biscayne aquifer, the primary source of drinking water in Miami-Dade County. Local governments and water utilities in the southeast Florida region have ~~begun to~~ formalized the integration of water supply and climate change considerations as part of coordinated planning efforts, including updates to local government and water utility 10-year Water Supply Facility Work Plan and enhancements to local government's Comprehensive Plans. Key considerations for communities within the four County Compact planning area areas include: 1) sea level rise, 2) saltwater intrusion, 3) extreme weather, and 4) infrastructure investments to support diversification and sustainability of water supply sources, and adaptive storm water and wastewater systems. Results of evaluation and data analysis completed to date indicate that within the next thirty years MDWASD will be able to operate well fields and water treatment facilities as designed, as groundwater modeling indicates even with a high level of projected sea level rise, ~~our~~ these well fields will not be impacted by salt water intrusion. Further modeling is currently underway to extend the planning scenarios fifty years out and will include climate changes such as increases and decreases in annual precipitation, and extreme weather events.

Regional issues that affect the City of Miami include minimizing pressure on the Everglades and Biscayne Bay ecosystems and Biscayne and Floridan Aquifers. To that end, the Comprehensive Everglades Restoration Plan (CERP) is providing the foundation for one of the largest ecosystem restoration projects in the world. The SFWMD and the US Army Corps of Engineers have partnered in order to restore, protect and preserve the water resources of central and southern Florida, including the Everglades. Various projects under CERP help ensure the proper quantity, quality, timing, and distribution of waters to the Everglades and all of South Florida.

The goal of CERP is to capture fresh water that now flows unused to the Atlantic Ocean and the Gulf of Mexico and redirect it to areas that need it most.

The SFWMD's priorities have focused on creating Water reservation rules to facilitate construction of CERP project components. The City is in support of CERP and other restoration projects listed in the 2018 Lower East Coast (LEC) Water Supply Plan Update that further the Northern/Southern Everglades 20-year commitment to Everglades restoration, including the C-111 South Dade, C-111 Spreader, Biscayne Bay Coastal Wetland BBCW L-31 East Flow-way, BBCW Deering Estate and BBCW Cutler Wetlands projects.

The South Florida Water Management District is the state agency responsible for water supply in the Lower East Coast planning area which includes the jurisdictional boundaries of the City of Miami. SFWMD plays a pivotal role in resource protection, through criteria used for Consumptive Use Permitting. As pressure increased on the Everglades ecosystem resource, the Governing Board initiated rule making to limit increased allocations dependent on the Everglades system. As a result, the Regional Water Availability Rule was adopted by the Governing Board on February 15, 2007 as part of the SFWMD's water use permit program. This reduced reliance on the regional system for future water supply needs, mandates the development of alternative water supplies, and increasing conservation and reuse.

Even with an ever-increasing population, withdrawals from the Aquifers will be limited, greater conservation will be required to reduce per capita use; and reclaimed water must continue to be an important alternative water source per the 2008 Leah G. Schad Ocean Outfall Program. The City does not have any domestic wastewater facilities which discharge to the ocean, but supports Miami-Dade County efforts in reducing wastewater outflows and providing for reuse, which are noted in Section 4.5.1.2. (page 4-8) in the MDWASD 10-year Plan, adopted April 2022.

The 2018 Lower East Coast Water Supply Plan Update notes that a number of utilities have diversified their water supplies, including treatment and storage technologies, and water conservation programs. These alternatives include constructing brackish Floridan aquifer wells and reverse osmosis treatment plants, reclaimed water treatment and distribution facilities, and aquifer storage and recovery systems.

From FY2013 to FY2018, the SFWMD provided more than $3 million in alternative water supply funding for 11 projects in the LEC Planning Area. Funded projects created 9.25 million gallons per day (mgd) of new reclaimed water capacity and 4.19 mgd of additional reclaimed water distribution or storage in the LEC Planning Area.

The 2018 Lower East Coast Water Supply Plan Update water supply major issues are as follows: 1. Fresh surface water and groundwater are limited; further withdrawals could have impacts on the regional system, wetlands, existing legal uses, and saltwater intrusion. As a result, additional alternative water supplies need

to be developed. 2. Surface water allocations from Lake Okeechobee and the Water Conservation Areas are limited in accordance with the Lake Okeechobee Service Area RAA criteria. 3. Construction of additional storage systems (e.g., reservoirs, aquifer storage and recovery systems) to capture wet season flow volumes will be necessary to increase water availability during dry conditions and attenuate damaging peak flow events from Lake Okeechobee. 4. Expanded use of reclaimed water is necessary to meet future water supply demands and the Ocean Outfall Law. 5. Expanded use of brackish groundwater from the Floridan aquifer system requires careful planning and wellfield management to prevent undesirable changes in water quality.

Through the Natural Groundwater Aquifer Recharge Goal AR-1 the City supports the actions MDWASD and Miami-Dade DERM in protecting the integrity and functions of groundwater aquifer recharge areas.

As further outlined in Section 3.6 of this Plan the City will support and assist in disseminating information to the extent possible on water conservation related programs and incentives from Miami-Dade County and SFWMD. As a retail customer the City will support MDWASD efforts outlined in the Miami-Dade County Water Conservation Plan, dated November 2020.

As a result of these regional water supply issues the City has updated its “Water Supply Facilities Work Plan” as required by Florida Statutes. Since the City is a retail customer, the adopted policies within the City’s Comprehensive Plan currently require the City to be consistent with the approved versions of the SFWMD’s LECWSP (adopted November 8, 2018), and the County’s 10-Year Water Supply Facilities Work Plan (adopted April 2022). The City shall coordinate with the County’s Work Plan to identify and develop those water supply projects necessary to meet the City’s projected water demands.

Additional Comprehensive Plan policies require the City to consider the impacts of climate change and sea level rise as an integral component of all planning processes. Rise in sea level shall be taken into consideration in all future decisions regarding the design, location, and development of infrastructure and public facilities in the City to meet or exceed adopted Level of Service (LOS) Standards. The City shall work with Miami-Dade County to support the implementation of climate related policies.

The City of Miami has also established a “City of Miami Sea Level Rise Committee”, February 26, 2015, to study sea level rise and its effect on the City of Miami and make recommendations. The Office of Resilience and Sustainability was formed in November 2016 to enhance these efforts. In 2019, the City of Miami consolidated the Sea Level Rise Committee and Waterfront Advisory Board into the Climate Resilience Committee. The charge of the Committee has expanded to include: (1) recommending, to the Commission, changes to City Code and policy that will help

the City thrive in the face of all climate change threats, and (2) providing input on City-owned waterfront land use issues when tasked.

3.0 DATA AND ANALYSIS

The intent of the data and analysis section of the Work Plan is to describe the information that local governments need to provide to state planning and regulatory agencies as part of their proposed comprehensive plan amendments, particularly those that would change the Future Land Use Map (FLUM) to increase density and/or intensity. ~~Additionally, population projections should be reviewed for consistency between the County and South Florida Water Management District's Water Supply Plan. For the purpose of this report Miami-Dade County Department of Regulatory and Economic Resources (RER) Planning Division, based on the 2010 Census and derived from Transportation Analysis Zone (TAZ) population projections will be used to calculate City of Miami projected water demands.~~

3.1 Population Information

The City's existing and future population figures as shown in **Table A** ~~are~~ derived from ~~2010 census and TAZ. Between 2000 and 2010, the City of Miami population grew from 362,470 to 399,457, an increase of ten percent (10.2%)[2]. By 2015, the City's population is anticipated to increase to 444,485; 2020 to 490,456; 2025 to 536,427; 2030 to 582,398; and 2033 to 609,981[5] (represents an increase of forty percent over the 2014 population). By all projections, growth will continue to occur in the region, with future development potential and population growth limited by the scarcity of vacant and developable land~~ the MDWASD Retail Municipal Customers Report estimate (Exhibit C-4) adopted April 2022. Below is a comparison in tabular format. As stated previously, for the purpose of water supply planning the MDWASD projections will be utilized. As shown in **Table B**, the MDWASD Update states that the MDWASD Service Area has a 2020 population of 2,407,121.

For informational purposes, the total 2016 population of Miami-Dade County, in which the City's population is included, was 2,700,794 (Table B-1. PWS and DSS population projections for the Miami-Dade LEC Planning Area, *2018 LEC Water Supply Plan Update*). Of that total the Miami-Dade WASD serviced 2,351,064 residents.

Table A
City of Miami
Population Projections ~~Comparisons~~

~~YEAR~~	~~MDC-RER 2010 CENSUS TAZ[3]~~
~~2014~~	~~435,290~~
~~2015~~	~~444,485~~

~~[2] Population projections provided by *Miami-Dade County*, RER, Planning Division, 2010 Census TAZ Data~~
~~[3] Population projections provided by *Miami-Dade Department , RER, Planning Division, 2010 Census TAZ*~~

~~2020~~	~~490,456~~
~~2025~~	~~536,427~~
~~2030~~	~~582,398~~
~~2033~~	~~609,981~~

YEAR	CITY OF MIAMI
2020	457,001
2025	496,232
2030	535,463
2035	574,694
2040	613,925

Table B
City vs. Miami-Dade County Population Comparison

	2020	2025	2030	2035	2040
City of Miami	457,001	496,232	535,463	574,694	613,925
MDWASD Service Area	2,407,121	2,533,548	2,659,975		
Miami-Dade County Total Pop.	2,777,310	2,924,743	3,072,175		

Sources: Exhibit C-4, MDWASD Retail Municipal Customers – Water Service Area Population by Utility Served, MDWASD 10-Year Water Supply Facilities Work Plan (~~October 2020~~April 2022) and Table 4-2 Population Projections to be Served by WASD (Page 4-2).

The City does not have additional data on domestic self-supply systems. After review of City records it has been determined they are incomplete with respect to self-supply systems.

3.2 Maps of Current and Future Areas Served

The map depicting the ~~current~~ general location of the City ~~boundary served by the MDWASD system~~ is provided in **Figure 1**. The map shown as **Figure 2** shows the City of Miami area services by MDWASD ~~Retail Municipal Customers~~ and as shown on the 2020 Water Service Areas Map included in Miami-Dade CDMP20220002 Text Amendments (Figure 2.5.1-1, page 59) adopted on January 19, 2023, while **Figure 3** provides the locations of the Miami-Dade County Wellfield Protection Cones of Influence map (Figure 3.1: WASD Wellfields, Wellfield Protection Areas, page 3-6, MDWASD 10-Year Water Supply Facilities Work Plan (April 2022)).

3.3 Potable Water Level of Service Standard

Based on the adopted 20 Year Water Supply Facilities Work Plan of April 22, 2010, the City of Miami adopted ~~and currently maintains~~ a potable water LOS level of 155 gallons per capita per day which was ~~17% of the county total demand for water~~ the

countywide standard. An update of the per capita use estimated by Miami-Dade Water and Sewer Department in the April 2022 ~~2~~10-Year Water Supply Facilities Work Plan (shown in Exhibit C-2) by municipality was determined ~~by taking a 3-year average from 2011 to 2013. Results indicate that the initial per capita rate has declined due to water use reductions resulting from water conservation and reuse irrigation water projects. Therefore, the current water demand projections for Miami Dade County are based on an initial system-wide finished water daily per capita use rate of 137.2~~ to be 97.54 gallons per capita per day (gpcd).

~~The MDWASD as also determined the City of Miami water demand projection has declined to 92.05 gallons per capita per day (gpcd).~~ The City of Miami ~~needs to~~ will revise the LOS level that the City has adopted and found in Policies PW-1.2.1 and CI-1.2.3. If future population increases project higher demands, the City will work with the County and SFWMD to refine projections during the five year updates to the water management plan and also through the State mandated Evaluation and Appraisal Report process.

3.4 Population and Potable Water Demand Projections by City

Population projections for the City of Miami's service area in five-year increments from Year ~~2014 to 2033~~ 2020-2040 are shown in **Table ~~B~~C**. ~~Within the City, the population served by MDWASD is expected to increase approximately 40% from Year 2014 to Year 2033.~~

Table ~~B~~ C.
~~Existing and Projected~~ Potable Water Demands for the City of Miami and MDWASD Overall Water System Capacity and Demand

~~WATER SUPPLY UTILITY SERVICE WITHIN LOCAL GOVERNMENT'S JURISDICTION~~							
~~Million Gallons/day (MGD)~~							
~~Year~~	~~Population Projections[4]~~	~~Gallons/Capita/ Day~~	~~Average Demand (MGD)~~	~~MDWASD[5] Adjusted Finished System Demand~~	~~Demand as % of County~~	~~MDC Alexander Orr Plant Capacity (MGD)~~	~~MDC Hialeah-Preston Plant Capacity (MGD)~~
~~2014~~	~~435,291~~	~~92.05~~	~~40.07~~	~~306.43~~	~~13~~	~~217.74~~	~~225~~
~~2015~~	~~444,485~~	~~92.05~~	~~40.91~~	~~308.80~~	~~13~~	~~217.74~~	~~225~~
~~2020~~	~~490,456~~	~~92.05~~	~~45.17~~	~~319.76~~	~~14~~	~~217.74~~	~~225~~
~~2025~~	~~536,427~~	~~92.05~~	~~49.38~~	~~330.72~~	~~15~~	~~217.74~~	~~225~~
~~2030~~	~~582,398~~	~~92.05~~	~~53.61~~	~~344.37~~	~~16~~	~~217.74~~	~~225~~
~~2033~~	~~609,981~~	~~92.05~~	~~56.15~~	~~352.98~~	~~16~~	~~217.74~~	~~225~~

~~[4] Population projections provided by *Miami-Dade Department RER, Planning Division, 2010 Census TAZ Data*~~

~~[5] Adjusted after taking credit in finished water demand projections for reductions in finished water use associated with water conservation *Miami-Dade County Water Supply Facilities Work Plan, 2015*~~

Year	Population Projections	Gallons/Capita/Day	Average Demand (MGD)	Rated Capacity (MGD)	Finished Water Demand (MGD)
2020	457,001	97.54	44.58	463.93	336.12
2025	496,232	97.54	48.40	463.93	350.03
2030	535,463	97.54	52.23	463.93	366.16
2035	574,694	97.54	56.06		
2040	613,925	97.54	59.88		

Sources: MDWASD Retail Municipal Customers Report estimate (Exhibit C-4) and Table 2.5.1-2 Miami-Dade County Water Supply Facilities related text amendments (CDMP20220002).

3.5 Water Supply Provided by ~~Other Entities~~ MDWASD

The Miami-Dade County ~~2~~10-Year Water Supply Facilities Work Plan (~~2014 – 2033~~ April 2022) is attached as Appendix ~~B~~A. The County Work Plan generally contains all supply and distribution information concerning its Countywide facilities, conservation measures, alternative water supply projects, historical data and projections, planned facilities, capital improvements, climate change and sea level rise impacts. The intent of the County Work Plan is to meet the statutory requirements mentioned in subsection 1.2 of this plan and to coordinate the MDWASD's water supply initiatives with the SFWMD's *Lower East Coast Water Supply Plan Update*.

The SFWMD initially issued a Water Use Permit, (WUP) for Miami-Dade County on November 15, 2007. The water use permit limits the annual allocation and the maximum monthly allocation until the permit expires. The ~~L~~latest modifications to this MDWASD WUP, No.1300017-W, ~~to the MDWASD~~ were approved on ~~February 9th, 2015~~ March 8, 2022 and will now expire on December 27, 2065. ~~The modified and extended Permit has a duration of 20 years and expires on February 9th, 2035.~~

The MDWASD's service area is all portions of Miami-Dade County within the Urban Development Boundary (UDB), excluding the service areas of North Miami Beach, Homestead, Florida City, and approximately 65% of North Miami's service area. The water demands of the areas within the Urban Expansion are considered in the 10-year planning horizon ~~between 2015 - 2033~~.

The MDWASD water service area contains interconnected systems and, for the most part, functions as a single service area. The service area ~~may be~~ is broken down into three sub areas by water treatment facilities: the Hialeah-Preston area, the Alexander Orr Jr. area, and the South Dade area.

The County's ~~2~~10-Year Water Supply Facilities Work Plan (~~2014 – 2033~~ April 2022), Appendix C (Exhibit C-7, Retail Municipal Customers Water Demand Projections), "~~Water Supply for Municipalities~~ Municipal Population and Demand Projections" ~~summarizes Miami-Dade County's Work Plan for Municipalities as follows:~~ includes data on population projections and per capita water usage.

- ~~Exhibit C -1 through 8, describe Water Supply Service Areas, Retail and Wholesale Customers, respectively, by utilizing municipal population projections and projected water demand projections. These water demand projections were computed utilizing the Municipal per capita value that applies to each municipality. The system wide water demands noted in Table 5-2 of the County's Work Plan are based on a system wide finished water daily per capita rate of 137.2 gallons per capita per day (gpcd). For the City of Miami the daily per capita rate is 92.05 gallons per capita per day (gpcd) was used. The population data was derived from Miami-Dade County Department of Regulatory and Economic Resources (RER), Planning Division based on the 2010 Census and derived from Transportation Analysis Zone (TAZ). This subsection also provides a brief discussion of MDWASD's water conservation.);~~

- ~~The 20-Year Water Supply Facilities Work Plan details the facilities and proposed alternative water supply (AWS) projects that are planned in order to meet the water demands through 2033. The proposed projects, by their location, volume of water produced, and timing of implementation will be sufficient to meet the water demand increases. The AWS projects and annual average daily demand (AADD) assumes that all current wholesalers will remain in the MDWASD system through 2033. The AWS projects are included in the County's Capital Improvement Element.~~

~~In the 20-Year Work Plan, the~~ MDWASD is committed to meet the water demands for the municipalities and unincorporated areas within ~~the~~ its service area. The City of Miami is served by both the Hialeah-Preston (north of Flagler Street) sub-area and Alexander Orr, Jr. sub-area (south of Flagler Street) water treatment plants.

The Hialeah-Preston sub-area is comprised of dedicated low-pressure pipelines, remote storage tanks, pumping facilities, and high pressure systems. This sub-area delivers water to Hialeah, Miami Springs, the City of Miami, and other portions of northeastern Miami-Dade County. The Hialeah-Preston sub-area, water treatment plant is supplied by four water supply wellfields (Hialeah- capacity 12.5 MGD; John E. Preston – capacity 53.28 MGD; Miami Springs – capacity 79.30 MGD; and Northwest -149.35 MGD), with a total designed capacity of approximately ~~295~~ 220.94 MGD.

Alexander Orr Jr. sub-area is comprised of a high pressure system with two major piping loops. This sub-area delivers water to nearly all of Miami-Dade County south of Flagler Street to SW 248th Street, including Virginia Key, Fisher Island, The

Village of Key Biscayne and, upon request, to the City of Homestead, and Florida City. The Alexander Orr, Jr. subarea, water treatment plant is supplied by four water supply wellfields (Alexander Orr, Jr.- capacity 74.4 MGD; Snapper Creek – capacity 40.0 MGD; Southwest – capacity 161.2 MGD; and West 32.4 MGD), with a total designed capacity of approximately 308 MGD. In this subarea, there are also Upper Floridan Aquifer wells at two of the wellfields (West Wellfield (WWF) and the Southwest Wellfield (SWWF)). These wells have a total capacity of 25.08 MGD. MDWASD anticipates using these wells for storage of fresh Biscayne Aquifer water during the wet season (when operating water levels in the canal allows) for extraction and use in the dry season. In order to use the Upper Floridan Aquifer wells, the MDWASD installed an ultra-violet (UV) light disinfection system at both the SWWF and the WWF to provide treatment of the Biscayne aquifer water prior to injecting in the Floridan Aquifer. MDWASD is currently cycle testing the Aquifer Storage/ Recovery (ASR) wells at both the West and Southwest Wellfields.

~~Hialeah-Preston sub-area is comprised of dedicated low-pressure pipelines, remote storage tanks, pumping facilities, and high pressure systems. This sub-area delivers water to Hialeah, Miami Springs, the City of Miami, and other portions of northeastern Miami-Dade County. The Hialeah-Preston sub-area, water treatment plant is supplied by four water supply wellfields (Hialeah- capacity 12.5 MGD; John E. Preston – capacity 53.28 MGD; Miami Springs – capacity 79.30 MGD; and Northwest -149.35 MGD), with a total designed capacity of approximately 295 MGD.~~

3.6 Conservation

Water conservation is the key to maintaining the health and productivity of the Surficial and Floridan Aquifers. Promoting water conservation equipment, techniques, and practices will benefit customers economically and maintain a realistic water demand picture for utilities. Protection of the aquifer system and wellfields (Figure 3.) through conservation and reuse, recharge enhancement, limitations on withdrawal, regulation of land use, and maintenance of minimum flows and levels will ensure the availability of an adequate water supply for all competing demands, maintain and enhance the functions of natural systems and preserve water quality.

The City of Miami works in coordination with MDWASD, SFWMD and state efforts aimed at promoting conservation through a variety of means including:

- Water Use Efficiency requirements included in the Code of Miami-Dade County
- Limiting Irrigation Hours
- Florida-Friendly Landscape Ordinance
- Rain Sensor Ordinance
- Water Conservation Rate Structure
- Leak Detection and Repair Program
- Public education
- Offering low-cost kits to its customers to reduce water use in their homes (High-Efficiency Fixtures).

MDWASD has developed a Water Conservation Plan (November 2020) which is included as Exhibit 29, MDWASD 10-Year Water Supply Facilities Work Plan (~~2014 – 2033~~ April 2022). As a retail customer the City of Miami will support MDWASD efforts outlined in the Miami-Dade County Water Conservation Plan, dated November 2020.

For more information about WASD's Water Conservation Program visit http://www.miamidade.gov/conservation/home.asp.

3.6.1 County-wide Issues

The Miami-Dade Water Use Efficiency Plan

~~Currently,~~ MDWASD is implementing a 20-year Water Use Efficiency Plan and is experiencing reductions in per capita water consumption by implementing all Best Management Practices (BMPs) included in the 20-year Water Use Efficiency Plan, which was approved by the South Florida Water Management District in May 2007. The lower demand is also the result of lower-than-projected population growth, permanent landscape irrigation restrictions, water loss reduction from Florida Friendly landscaping in new construction, in right of ways, and the installation of high efficiency plumbing fixtures in new construction and some reuse within the three wastewater treatment plant sites or in their vicinities. Because of these efforts, the County has achieved 16.19 MGD of water saving through fiscal year 2021.

As a result, the Water Conservation projections included within the MDWASD 10-Year Water Supply Facilities Work Plan were revised based on the ~~2010 Annual~~ Water Conservation Plan ~~Conserve Florida Report~~ 2021 Annual Report (~~March 2011~~ January 1, 2021 – December 31, 2021), Exhibit F, MDWASD 10-Year Water Supply Facilities Work Plan. The savings from water conservation translate into more potable water available for residential and non-residential use, capital and operating savings, which allow systems to defer or avoid significant expenditures for water supply facilities and wastewater facilities.

Water Conservation Plans and Development Codes

Miami-Dade County has developed recommendations for new developments that would achieve higher water use savings than currently required by code. Miami-Dade County has enacted water use efficiency-legislation including permanent landscape irrigation restrictions, landscape ordinances requiring Florida Friendly landscaping in new construction, in right of ways, and the installation of high efficiency plumbing fixtures in new construction and some reuse within the three wastewater treatment plant sites or in their vicinities. This was done by The Board of County Commissioners amending Water Use Efficiency standards creating or amending Sections 8-31, 32-84, 8A-381, 32-8.2, 32-83.1, 18A, 18B of the Code of Miami-Dade. All future development within the City ~~will be~~ is required to comply with these water conservation measures as provided through these water use efficiency legislations, which may be amended from time to time. The list of legislation and ordinances relating to water use efficiency standards are presented in Appendix D of

the MDWASD Water Supply Facilities Work Plan and are also posted in the Miami-Dade Water Conservation Portal.

Per Capita Consumption
The MDWASD establishes per capita consumption for all municipalities including those in its retail customer service area. Based on this data, the MDWASD will work with the municipalities to address those with higher than average per capita usage and will target programs for those areas. The County anticipates that the implementation of the BMPs identified in the 20-Year Water Use Efficiency Plan will result in an adjusted system wide per capita of ~~133.56~~ 139 gpcd ~~by 2033~~ through the planning 10-year planning period.

The City has been successful in implementing, as applicable, its water conservation policies and supporting efforts by Miami-Dade County and the South Florida Water Management District in their efforts to promote water conservation and reuse. The City promotes the policies, requirements and procedures as outlined in ~~Section 3.7~~ this 10-Year Water Supply Facilities ~~w~~Work Plan Update. As shown by the City's per capita consumption rate of 97.54 gallons per capita vs. 139 generally systemwide, the City has been a leader by this metric.

3.6.2 Local Government Specific Actions, Programs, Regulations, or Opportunities
The City will coordinate future water conservation efforts with the MDWASD and the SFWMD to ensure that proper techniques are applied. In addition, the City will continue to support and expand existing goals, objectives and policies in the comprehensive plan that promote~~s~~ water conservation in a cost-effective and environmentally sensitive manner. The City will continue to actively support the SFWMD and Miami-Dade County in the implementation of new regulations or programs that are designed to conserve water during the dry season.

3.7 Reuse
3.7.1 Regional and County-wide Issues
State law supports reuse efforts. ~~For the past years,~~ Florida's utilities, local governments, and water management districts have led the nation in implementing water reuse programs that increase the quantity of reclaimed water used and public acceptance of reuse programs. Section 373.250(1) F.S. provides that "water reuse programs designed and operated in compliance with Florida's rules governing reuse are deemed protective of public health and environmental quality." In addition, Section 403.064(1), F.S., provides that "reuse is a critical component of meeting the state's existing and future water supply needs while sustaining natural systems."

~~The City of Miami supports water reuse initiatives under consideration by both the SFWMD and Miami-Dade County. The County has committed to implement a total of 117.5 MGD of water reuse as noted in Appendix F. of the County's 20-year water Supply Facilities Work Plan (2014-2033). In the 20-year Work Plan, the County identified a number of water reuse projects and their respective schedule. According to the Plan, MDWASD is currently implementing a total of 16.49 mgd of reuse at the~~

~~North, Central, and South Wastewater Treatment Plants, used for industrial, public and non-public irrigation. Furthermore, 27.6 mgd of reclaimed water will be used to recharge the Floridan Aquifer, and up to 90 mgd of reuse water will be provided to the FPL for Turkey Point cooling.~~

The County's projected finished water demands are now markedly lower than anticipated when the first 20-year water use permit application was submitted. ~~This demand reduction has eliminated the anticipated supply shortages which were the basis for an ambitious schedule of several costly alternative water supply projects. As such, reuse to address water supply is no longer required or needed.~~ As such, wastewater reuse to address water supply demands is no longer required, and other alternative water supplies (Floridan aquifer, water conservation, C-51 reservoir, etc.) have been determined to be more viable and shall be considered in the future. WASD is currently implementing a total of 16.49 MGD of reuse at each of the Wastewater Treatment Plants, primarily for in-plant (process water) use. In addition, WASD will be providing up to 15 MGD of reclaimed water from the South District Wastewater Treatment Plant to the FPL facilities at Turkey Point, per Miami-Dade County Resolution No. R-579-20 approved by the BCC on June 16, 2020.

3.7.2 Local Government Specific Actions, Programs, Regulations, or Opportunities
The City will continue to support the SFWMD and Miami-Dade County water reuse projects, and implementation of new regulations or programs designed to increase the volume of reclaimed water used and public acceptance of reclaimed water.

4.0 INTERGOVERNMENTAL COORDINATION

The provision of water supply needs in the City of Miami is achieved in coordination with local, county, and regional partners including Miami-Dade County WASD and South Florida Water Management District. MDWASD is the City's primary water partner as they provide the City its water service utilities. As part of the water supply planning process and intergovernmental coordination in general the City has reviewed the Miami-Dade County Plan while outside agencies will review the City's Plan. MDWASD ensures that water supply services are provided to most potable water users of Miami-Dade County in the most efficient and effective manner. SFWMD acts to protect the region's water supply resources and coordinates the implementation of state water regulations and policies through local water planning efforts and water supply services.

In this update of the Water Supply Facilities Work Plan, the City has reviewed its water supply related Objectives and policies and updated them as necessary. Changes to the Objectives and policies are outlined in Section 7.0. Policies are included which detail coordination efforts with both MDWASD and SFWMD. As a retail customer, the City must coordinate through data collection and billings the adequate supply of water and conservation practices with MDWASD and implement the requirements of County Code.

45.0 CAPITAL IMPROVEMENTS

~~Work Plan~~
The City is within Miami-Dade County WASD service area which provides potable water and sanitary sewer services. As discussed, the potable water and sanitary sewer systems have adequate capacity to meet the needs of current and future residents. At this time the City of Miami has no water facility projects planned. This section details water supply facilities that are planned within the County in order ~~for the City of Miami~~ to meet MDWASD's water demands through ~~2033~~ the 10-year planning period.

The information contained in the City's Comprehensive Neighborhood Plan and the Miami-Dade County WASD 10-year Water Supply Facilities Work Plan (April 2022), the *2018 Lower East Coast Water Supply Plan Update* (LEC) approved by the South Florida Water Management District (SFWMD) on November 8, 2018 and additional information found within Water Use Permit 13-00017-W are herein incorporated by reference. The Water Use Permit which was modified and approved by the SFWMD on March 8, 2022, will now expire on December 27, 2065.

45.1 Work Plan Projects
As a retail customer the City is not responsible for the provision of infrastructure for potable water treatment and distribution. Below is a partial list of MDWASD projects and changes to its Capital Improvement Schedule.

As stated previously in Section 3.5 the City is within both the Hialeah-Preston and Alexander Orr, Jr. Subareas. The MDWASD Capital Plan Bond/Fund Allocation for water projects through FY2029-2030 is $1.6 Billion. The following major Capital Improvements Projects may impact the City and are as further described in the Miami-Dade County WASD 10-year Water Supply Facilities Work Plan (April 2022) Appendix B 2021-2030 Multi-Year Capital Plan:

1) Systemwide Wellfield Improvements;
2) Systemwide Water Line Extensions and Improvements;
3) Water Treatment Plants Rehabilitation;
4) Purchase of Lake Property Adjacent to Northwest Wellfield;
5) Miami Springs Wellfield Rehabilitation – Phase 1-3; and,
6) C-51 Reservoir Water Project.

45.2 Alternative Water Supply Projects
The County's projected finished water demands are now markedly lower than first anticipated ~~when the first 20-year water use permit application was submitted to South Florida Water Management District (SFWMD) in 2007~~. ~~This demand reduction has eliminated the anticipated supply shortages which were the basis for an ambitious schedule of several costly alternative water supply projects which are no longer required or needed.~~ The decrease in water demands is a result of ~~a~~

successful implementation of the County's Water Conservation Plan and efficiency standards ~~and new population projections based on the 2010 Census~~.

~~As a result, the MDWASD applied for a modification and extension of the Water Use Permit No. 13-00017-W. to remove the requirements to complete costly and unnecessary alternative water supply projects from the existing permit. The SFWMD issued a revised Water Use Permit to the MDWASD on February 9th, 2015. The Permit has a duration of 20 years and now expires on February 9th, 2035.~~

The proposed alternative water supply (AWS) projects are to meet MDWASD's increased water demands through ~~2033~~ the 10-year planning period.~~, which encompasses the modification to the 20-year Consumptive Use Permit period.~~ AWS projects have been identified to meet water demands in the MDWASD service area and may be found in the MDWASD ~~FY 2014-2020 Capital Budget and Multi-Year Capital Plan, the MDC 20-Year Water Supply Facilities Work Plan (2014-2033) and Alternative Water Supply Projects, (Table 1 of Appendix A)~~ 10-Year Water Supply Facilities Work Plan (April 2022), Section 5, Sub-section 5.1 Alternative Water Supply Projects.

~~**4.2 20 Year Work Plan and Capital Improvements Plan**~~
~~As demonstrated in the previous sections, the Alternative Water Supply Plan being proposed by the County should meet the increased water demands through 2033. As a confirmation that the County is committed to fund these projects, the projects for the 20-Year Work Plan may be found in the MDWASD FY 2014-2020 Capital Budget and Multi-Year Capital Plan (Appendix A) and within the MDC 20-Year Water Supply Facilities Work Plan (Appendix B).~~

~~5~~6.0 CLIMATE CHANGE AND SEA LEVEL RISE

Southeast Florida is one of the most vulnerable regions to the impacts of climate change and sea level rise as a result of our flat topography, porous limestone geology, and dense coastal development. Climate change and sea level rise are expected to present significant challenges relating to water resource planning, management and infrastructure for the counties located in south Florida, including Broward, Miami-Dade, Monroe, and Palm Beach Counties. These communities have agreed to partner in regionally-coordinated climate mitigation and adaptation strategies as part of the Southeast Florida Regional Climate Change Compact (Compact) and have adopted a Regional Climate Action Plan (RCAP) which highlights "Water Supply, Management, and Infrastructure" as a primary focal area. http://southeastfloridaclimatecompact.org

Investigations and evaluations conducted at the national, regional, and local levels have reinforced the need to plan for the predicted impacts of more frequent and severe drought, increases in tidal and storm-related flooding, and the loss of coastal wellfield capacity due to saltwater contamination. In the absence of proactive planning, these impacts will present liabilities for coastal and inland communities

with implications for urban water supplies, water and wastewater infrastructure, and both regional and local drainage/flood control systems. Investments in water supply planning and infrastructure that account for these predicted trends will improve the resilience of our communities, provide public health benefits, and reduce the potential for economic losses.

The City of Miami along with Miami-Dade County, Broward, Monroe, Palm Beach Counties, local governments and water utilities in the southeast Florida region have ~~begun to~~ formalized the integration of water supply and climate change considerations as part of coordinated planning efforts, including updates to local government and water utility 10 year Water Supply Facility Work Plan and enhancements to local government's Comprehensive Plans. Key considerations for communities within the four County Compact planning area include: 1) sea level rise, 2) saltwater intrusion, 3) extreme weather, and 4) infrastructure investments to support diversification and sustainability of water supply sources, and adaptive storm water and wastewater systems.

Below are synopses of these considerations as enumerated more fully in the MDWASD 10-Year Water Supply Facilities Work Plan (April, 2022), Section 6 Climate Change and Sea Level Rise Plan.

~~5~~ 6.1 Sea Level Rise

Sea level rise has significant implications for water management and water supply planning in southeast Florida, the rate of which is accelerating. ~~During the previous century, the global rate of sea level rise averaged approximately 1.6 mm per year. The rate or rise increased to an average of 1.7 mm per year during the second half of the last 1 century, followed by a more significant increase to 3.3 mm per year measured during the last decade. This trend of rising sea level is reinforced by local tide data which documents an increase in regional sea level of about 9 inches during the last 100 years. While there continues to be uncertainty about the overall extent of sea level rise that might be realized in the coming century, the draft report of the Third National Climate Assessment (NCA) presents a probable range of 1 to 4 feet by 2100. In southeast Florida, partner counties in the southeast Florida Regional Climate Change Compact have collectively agreed to use modified guidance developed by the U.S. Army Corps of Engineers and a planning scenario of 9 to 24 inches additional rise by 2060, consistent with projections presented in the 2014 NCA. This unified sea level rise projection has been formally adopted by Palm Beach, Broward, Miami-Dade and Monroe Counties and is now being used to inform planning process and project design throughout the region. As the impacts of historic sea level rise are already being realized and acceleration of the rate of rise is expected to compound local impacts and vulnerabilities, it is prudent that planning processes begin to formally reflect consideration of sea level rise as a future condition with recognized implications for near-term and longer-term planning decisions.~~

Sea level rise produces varied challenges with ~~the~~ respect to water resources sustainability, water management, and water/wastewater facilities and infrastructure. Impacts include saltwater contamination of coastal wellfields, infiltration of groundwater with chloride levels into wastewater collection systems, impairing normal operations and maintenance as well as opportunities for beneficial use of reclaimed water as an alternative water supply. Water management systems are also at risk with systems constrained by rising groundwater and tail water elevations which reduce soil storage and discharge capacity, with increased potential for both inland and coastal flooding and less opportunity for long-term storage of storm water for beneficial reuse.

These realities necessitate consideration of plans and investments that may be needed to compensate for loss of existing water supplies through relocation of wellfields and the development of alternative water supplies while also seeking opportunities to expand regional water storage opportunities. These investments and considerations are in addition to concurrency planning for population growth and water demands that are typical requirements for water supply planning requirements.

For all planning purposes Miami-Dade County (including the City of Miami) relies upon the Unified Sea Level Rise Projection for Southeast Florida developed by the South Florida Regional Climate Change Compact (Figure 6-1). The projection was updated in 2019 by a panel of scientists to reflect the best available data. The latest science indicates that mean sea levels could be between 10 to 17 inches higher than 2000 levels by 2030. By 2070, average levels are expected to be 21 to 40 inches higher.

The City of Miami established a “City of Miami Sea Level Rise Committee”, February 26, 2015, (Resolution File Id: 15-00059) to study sea level rise and its effect on the City of Miami and make recommendations. As stated previously, the Office of Resilience and Sustainability was formed in November 2016 and In 2019, the City of Miami consolidated the Sea Level Rise Committee and Waterfront Advisory Board into the Climate Resilience Committee.

Greater Miami & the Beaches (GM&B) is a collaboration among Miami-Dade County and the cities of Miami and Miami Beach, created to respond to the global trends major cities face including urbanization, globalization and climate change. GM&B was selected to join the 100 Resilient Cities Program pioneered by the Rockefeller Foundation in 2016. In 2019, GM&B released the Resilient305 Strategy that addresses prioritized resilience challenges, which was developed through extensive intergovernmental and community collaboration (https://resilient305.com/). The resilience strategy is designed to address GM&B’s key shocks and stresses, such as hurricanes and infrastructure failure. The strategy includes actions related to water management including water quality, flooding mitigation, and infrastructure hardening.

As a 100 Resilient Cities partner MDC was eligible and selected as one of five global communities to pilot the City Water Resilience Approach to diagnose the strengths and weaknesses of the water system using quantitative and qualitative indicators and to develop an action plan that builds water resilience. WASD led this process that bridged water, wastewater, and stormwater management, both upstream and downstream of our county, and which directly advances water-related actions in the Resilient305 Strategy, particularly Action 54: Employ a One Water Approach. Some key messages we heard from our stakeholders include the importance of better coordination between water stakeholders, the need for catchment-level partnerships and water management projects and practices, and a strong call for sharing water quality and related data to ensure evidence-based decision-making, and the need for proper valuing of ecosystem services.
https://wwwresilienceshift.org/publication/greater-miami-water-resilience-profile-cwra/

~~5~~ 6.2 Saltwater Intrusion

The primary concern to MDWASD water supply is salt water intrusion into the freshwater Biscayne aquifer, the primary source of drinking water in Miami-Dade County. Results of evaluation and data analysis completed to date indicate that within the next thirty years MDWASD will be able to operate its wellfields and water treatment facilities as designed, as groundwater modeling indicates even with a high level of projected sea level rise the county's wellfields will not be impacted by salt water intrusion.

~~However, with that being said, a~~Along the coast of southeast Florida, and several miles inland, groundwater supplies and potable wells are vulnerable to saltwater contamination. The Biscayne Aquifer which serves as the region's primary water supply is a shallow, surficial aquifer characterized by limestone karst geology which is highly porous, and transmissive. As a result, coastal saltwater intrusion of the aquifer has begun to restrict coastal water supplies and necessitates the development of western wellfields, changes in wellfield in water management operations, and reclaimed water projects to enhance aquifer recharge. ~~Historically, changes in land use, drainage of the Everglades, wellfield operations, and sea level rise have been recognized to influence the location of the saltwater front within the productive layer of the aquifer. At the toe of the front, chloride concentrations exceed drinking water standards of 250 mg/l and thus restrict and/or require abandonment of wellheads located east of the saltwater intrusion line. Hydrologic modeling has revealed that sea level rise when combined with coastal wellfield pumping has accelerated the movement of the front, doubling the rate at which the front has progressed during the last several decades. It is expected that sea level rise will constitute an increasingly significant influence on the rate of saltwater migration during the next several decades and that significant wellfield capacity will be lost with an additional 2 foot increase in sea level, the extent of which will vary along the coast. It is therefore prudent for water utilities throughout the region (both inland and coastal) to consider adaptation plans that might include wellfield relocation or~~

~~expansion of western wellfields as part of planned efforts to meet regional water demands. .Continuation of groundwater monitoring and modeling efforts will be critical to predicting the movement of the front under sea level rise scenarios anticipated over the next several decades and adaptation efforts should continue to be refined in accordance with predicted and realized trends.~~

Saltwater intrusion in Miami-Dade County is monitored through a joint effort of the Miami-Dade WASD, Miami-Dade Department of Regulatory and Economic Resources (RER), and the U.S. Geological Survey (USGS) through Joint Funding Agreements and as part of the WUP #13-00017-W requirements.

~~5~~ 6.3 Extreme Weather Events

As extreme events increase in frequency and severity, the City and MDWASD will consider impacts and risks associated with drought, water shortages and reduced groundwater tables, all of which can hasten saltwater intrusion and exacerbate water supply impacts. Conversely, more intense and rapid rainfall will cause flooding, increased runoff, as well as impacts to the natural systems and provide less recharge potential.

Extreme rainfall events can increase damage to low-lying utility infrastructure and prolong surface water flooding. The increases in groundwater and sea level will challenge the function of drainage systems and can contribute to excessive flooding for even mild storm events. Predicting for the combined influences of storm events, high tides and sea level rise on drainage system functions and other public infrastructure is a critical planning need as is the assessment of viable water supplies and impacts to the natural systems from prolong droughts.

WASD entered into a JFA in 2014 (JFA 14GGESMC0000110) with the USGS to continue the modeling effort, and will develop additional future scenarios with County Departments, local governments, a n d regional agencies for further climate change and sea level rise assessment.

~~5~~ 6.4 Infrastructure Development

With increasing climate change there is a need to diversify water supply sources, treatment technologies and to provide adaptive storm water and wastewater infrastructure design criteria to ensure long-term sustainability of key facilities. ~~Conversely, alternative water treatment technologies generally have a high energy demand and carbon footprint that can exacerbates the climate change impacts.~~ Strategic infrastructure planning should incorporate these constraints and work within ~~with~~ the Goals, Policies and Objectives of the City's ~~Comprehensive Planning~~ MCNP processes and water supply facility work plans· to provide for long-term sustainable and balanced approach for future development. Additionally, WASD requires that capital improvement projects include an assessment of climate change and sea level rise, as stated in Section 6.2 of the Work Plan adopted in April 2022 and included in Section 2-1, Code of Miami-Dade County.

Options that provide for a diversification of water projects and protection of resources will be fundamental to this effort and may include: regional water storage such as the C-51 Reservoir; aquifer storage and recovery (ASR); the development and use of highly treated wastewater (reverse osmosis) for recharge hydrodynamic barriers; the relocation and/or regionalization of wellfields and treatment facilities away from low-lying areas; and enhancing operational flexibility.

Finally, the support of regional water conservation efforts is a proven strategy for extending the timeline to develop these expensive alternative water supply technologies and should be a prominent objective and dedicated effort to support water resource protections under the threat of sea level rise and climate change.

~~**5.5** Recent Governmental Actions~~

~~As part of the Miami-Dade County Evaluation and Appraisal Report adopted in 2011, climate change was identified as one of the priorities to address in the County's Comprehensive Development Master Plan (CDMP). Miami-Dade has incorporated climate change considerations and language in several of the Elements of the CDMP update which was approved by the Board of County Commissioners in October, 2013. Additionally the following has taken place.~~

1. ~~The Miami-Dade Sea Level Rise Task Force was created by Resolution R-599-13 on July 2, 2013 to review the relevant data and prior studies, assessments, reports, and evaluations of the potential impact of sea level rise on vital public services and facilities, real estate, water and other ecological resources, water front property, and infrastructure.~~

2. ~~Miami-Dade Board of County Commissioners adopted in September an ordinance relating to the rules of procedures of the Board of County Commissioners amending Section 2-1 of the Code of Miami-Dade County, Florida, to require that in all agenda items related to planning, design, and construction of county infrastructure a statement be included that the impact of sea level rise has been considered.~~

3. ~~Sampling of the monitor wells is done by the USGS, under a co-operative Joint Funding Agreement (JFA) contract with Miami-Dade County for wells currently included in the salt front monitoring program (JFA #14GGESMC0000109).~~

4. ~~Miami-Dade WASD entered into a JFA with the USGS in 2007 (JFA #08EOFL208004) to delineate the current extent of saltwater intrusion in the Biscayne aquifer, to characterize how the extent has changed since the last mapping effort, to improve salinity monitoring in the Biscayne aquifer and to identify the sources of the saltwater to better understand the actions required to prevent or mitigate saltwater intrusion.~~

~~5. Miami-Dade County entered into a Joint Funding Agreement GFA 08EOFL20817) with the USGS in February 2008 to develop an integrated surface/ groundwater numerical flow model, with one of the objectives of the project to evaluate if sea level rise will cause salt water intrusion into coastal wellfields. The numerical model is designed among other uses to evaluate if the current surface-water structure control operational criteria effectively control saltwater intrusion with projected population increase and sea level rise. The USGS has completed the preliminary model and initial scenarios regarding sea level rise, and results are pending publication. The model simulation period is from 1/1/1996 to 12/31/2010, with daily surface-water and groundwater timesteps.~~

~~6. MDWASD entered into a JFA in 2014 (JFA 14GGESMCOOOOIIO) with the USGS to continue the modeling effort, and will develop additional future scenarios with County Departments, local governments, regional agencies for further climate change and sea level rise assessment.~~

~~7. The City of Miami established a "City of Miami Sea Level Rise Committee", February 26, 2015, (Resolution File Id: 15-00059) to study sea level rise and its effect on the City of Miami and make recommendations.~~

~~6~~7.0 GOALS, OBJECTIVES AND POLICIES

POTABLE WATER

Goal PW-1

Ensure that all ~~residents and workers~~ potable water users within the City have adequate access to safe drinking water through the efficient operation of centralized, County operated potable water treatment facilities and ancillary potable water transmission system.

Policy PW-1.2.1

The City will ensure, through its concurrency management system that potable water facilities shall be in place to *serve* new development or redevelopment no later than the issuance of a certificate of occupancy or its functional equivalent in compliance with level of service standards for transmission capacity of ~~92.05~~ 97.54 gallons per capita per day (GPCD). (See Natural Resource Conservation Policy NR-2.1.5 and Capital Improvements Policy CI-1.2.3.)

Policy PW-1.2.2

Pursuant to Chapter 163.3177(6)(c), F.S., the City has adopted an updated Water Supply Facilities Work Plan (contained in Appendix PW-1 of the MCNP) for a ~~2~~10-year planning period ~~(2014-2033)~~ to be consistent with the MDWASD planning period and that is also consistent with the current Lower East Coast Water Supply Plan Update approved by the South Florida Water

Management District (SRWMD) on November 8, 2018 and ~~the current adopted~~ Miami-Dade County's 10-Year Water Supply Facilities Work Plan adopted April 2022 and corresponding CDMP Text Amendments adopted on January 19, 2023. The City's Work Plan and the County's Work Plan are incorporated into the ~~City's~~ Miami Comprehensive Neighborhood Plan by reference. The City's work plan will be updated, at a minimum, every 5 years and within 18 months after the South Florida Water Management District's approval of an updated Lower East Coast Regional Water Supply Plan. (See Natural Resource Conservation Policy NR-2.1.7.)

Policy PW-1.2.5
In the development of ~~its~~ MDWASD's future potable water supplies, the City shall, to the maximum extent feasible, assist in and utilize methods which preserve the integrity of the Biscayne Aquifer, protect the quality of surface water and related ecosystems, considered compatible with the South Florida Water Management District's Lower East Coast Regional Water Supply Plan, and comply with ~~that~~ those land use and environmental protection policies of the City MCNP, Miami-Dade County Comprehensive Development Master Plan, the Strategic Regional Policy Plan for South Florida, and the State Comprehensive Plan.

Objective PW-1.3
The City and Miami-Dade County shall coordinate ~~with~~ in the preparation of the Miami-Dade County 10-Year Water Supply Facilities Work Plan to identify and develop those water supply projects necessary to meet the City's projected water demands for a ~~2~~10-year period.

Policy PW-1.3.1
The City's adopted ~~an updated~~ Water Supply Facilities Work Plan (Work Plan), dated ~~September 10, 2015~~ XXXXX, is incorporated as follows in Appendix PW-1 of the MCNP. This document is designed to: assess current and projected potable water demands; evaluate the sources and capacities of available water supplies; and, identify those water supply projects, using all available technologies, necessary to meet the City's water demands for a ~~2~~10-year period. The City's Work Plan shall remain consistent with projects as listed in the South Florida Water Management District's Lower East Coast Regional Water Supply Plan adopted November 8, 2018. The Work Plan will be updated, at a minimum, every 5-years and within 18 months after the South Florida Water Management District's approval of an updated Lower East Coast Regional Water Supply Plan. The Work Plan shall address climate change and sea level rise that may impact the potable water infrastructure and sources. The potable water supply facilities necessary to satisfy projected water demands for the City of Miami during the ~~2014-2033~~ planning period are ~~shown in~~ attached as Appendix A of the 10-Year Water Supply Facilities Work Plan (Appendix PW-1).

Policy PW-1.3.2
The City shall be consistent with the current approved version of South Florida Water Management District's Lower East Coast Regional Water Supply Plan, adopted November 8, 2018 and ~~the current adopted~~ Miami-Dade County's 10-Year Water Supply Facilities Work Plan adopted in April 2022 and corresponding CDMP Text Amendments adopted on January 19, 2023 in developing and updating its ~~2~~10-Year Work Plan.

Policy PW-1.3.4
The City shall take all necessary steps to ensure that all future development shall comply with the landscape standards in Sections 18-A and 18-B of Miami-Dade County Code and chapter 40E-24, FAC, Mandatory Year-Round Landscape Irrigation Measures Conservation Measures. (See related Policies NR-2.1.8 and NR-2.1.9)

NATURAL RESOURCE CONSERVATION

Policy NR-2.1.7
Pursuant to Chapter 163.3177(6)(c), F.S., the City has adopted an updated Water Supply Facilities Work Plan (contained in Appendix PW-1 of the MCNP) for a ~~2~~10-year planning period ~~(2014-2033)~~ to be consistent with the MDWASD planning period and that is also consistent with the current Lower East Coast Water Supply Plan Update approved by the South Florida Water Management District (S~~R~~FWMD) on November 8, 2018 and ~~the current adopted~~ Miami-Dade County's 10-Year Water Supply Facilities Work Plan adopted April 2022 and corresponding CDMP Text Amendments adopted on January 19, 2023. The City's Work Plan and the County's Work Plan are incorporated into the City's Comprehensive Neighborhood Plan by reference. (See Potable Water Policy PW-1.2.2.)

Policy NR-2.1.9
The City will continue to implement the same or more stringent water conservation measures as provided through Chapter 8 - Building Code ~~(updated September 2, 2008)~~, Chapter 32 - Water and Sewer Regulations ~~(updated September 2, 2008)~~, and Chapter 18A and 18B - Landscape Ordinance ~~(updated May 5, 2009)~~, of the Miami-Dade County Code of Ordinances and chapter 40E-24, FAC, Mandatory Year-Round Landscape Irrigation Measures Conservation Measures.

CAPITAL IMPROVEMENTS

Policy CI-1.2.3

* * *

c) Potable Water Transmission Capacity – ~~92.05~~ 97.54 gallons/resident/day. (See Potable Water Policy PW-1.2.1 and Natural Resource Conservation Policy NR-2.1.5.).

INTERGOVERNMENTAL COORDINATION

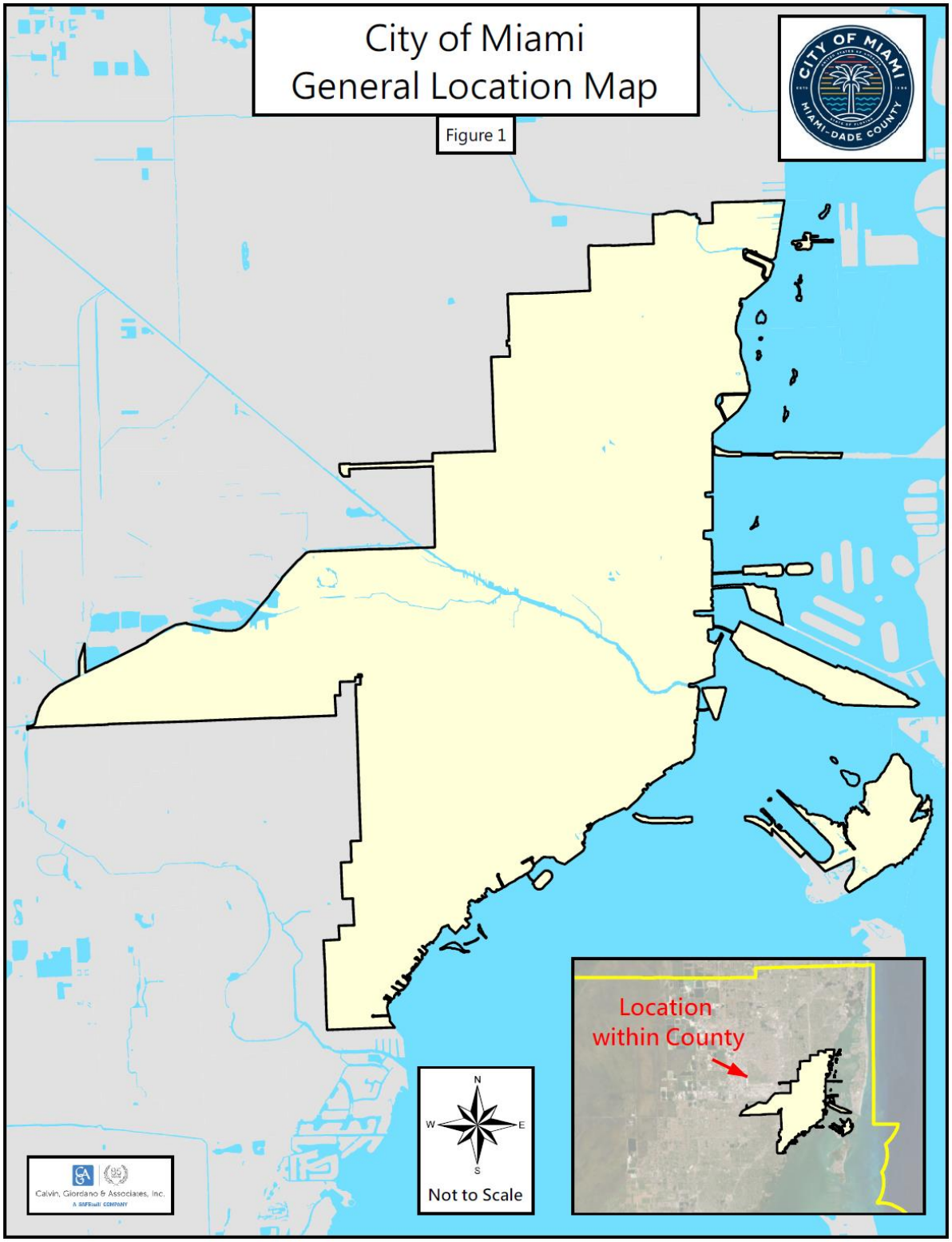
Policy IC-1.1.9
The City will coordinate with the South Florida Water Management District concerning its jurisdictional authority as necessary and support its efforts concerning the *2018 Lower East Coast Water Supply Plan Update*, ACCELER8 Everglades and CERP and the Biscayne Bay Coastal Wetlands Project to protect an Outstanding Florida Water – Biscayne Bay. The City hereby adopts by reference the Miami-Dade County Comprehensive Development Master Plan Amendments adopted January 19, 2023, the Miami-Dade ~~Water and Sewer Department~~County's 10-year Water Supply Facilities Work Plan (April 2022), the *2018 Lower East Coast Water Supply Plan Update* (LEC) approved by the South Florida Water Management District (SFWMD) on November 8, 2018 and additional information found within Water Use Permit 13-00017-W are herein incorporated by reference. The Water Use Permit which was modified and approved by the SFWMD on March 8, 2022, will now expire on December 27, 2065.

Policy IC-1.1.~~9~~10
In its development of future potable water supplies and the Water Supply Facilities Work Plan as outlined in Objective PW-1.3, the City shall consider, and be compatible, with the South Florida Water Management District's Lower East Coast Regional Water Supply Plan, adopted November 8, 2018.

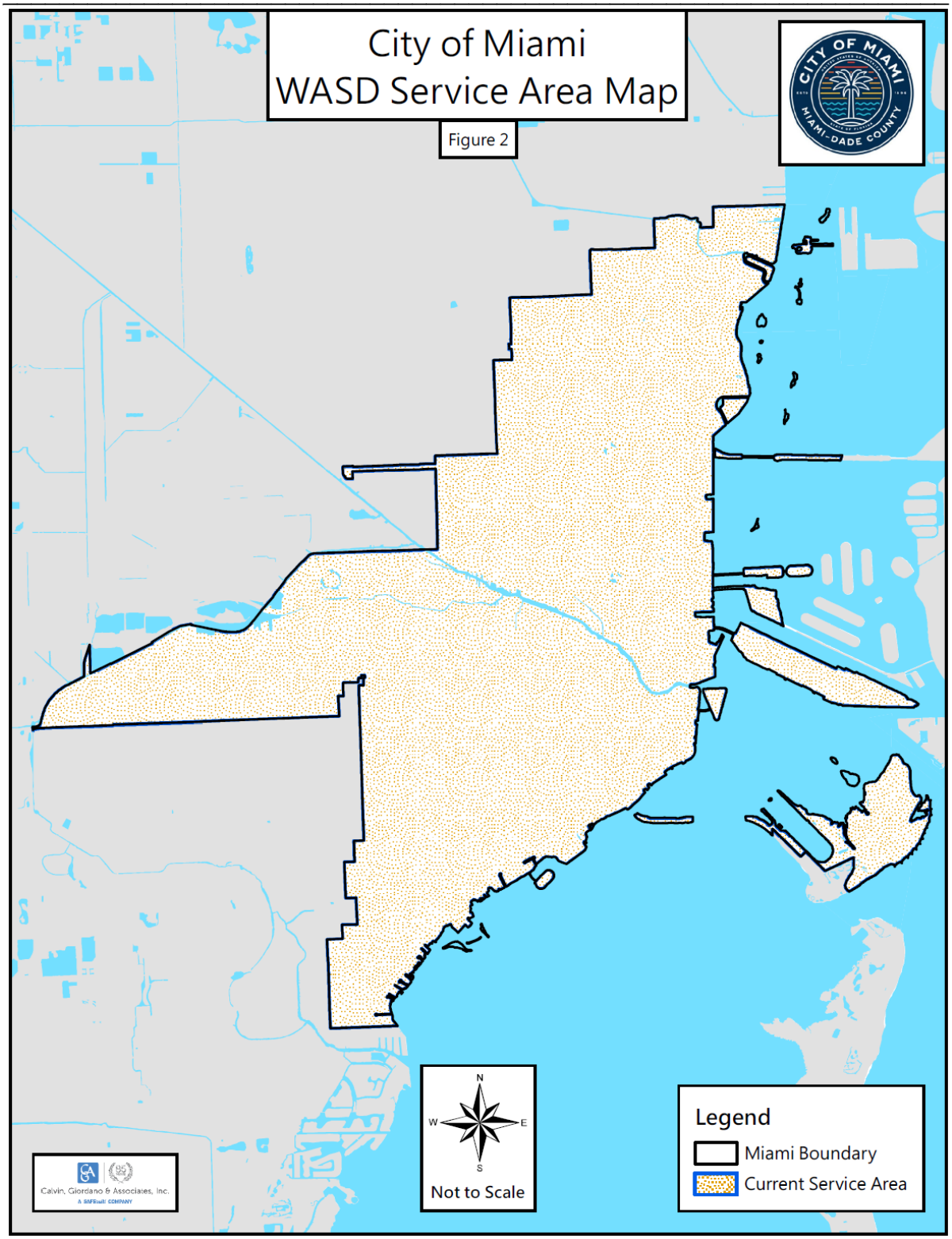
RENUMBER EXISTING POLICIES: IC-1.1.~~10~~11, IC-1.1.~~11~~12, IC-1.1.~~12~~13

FIGURES/MAPS

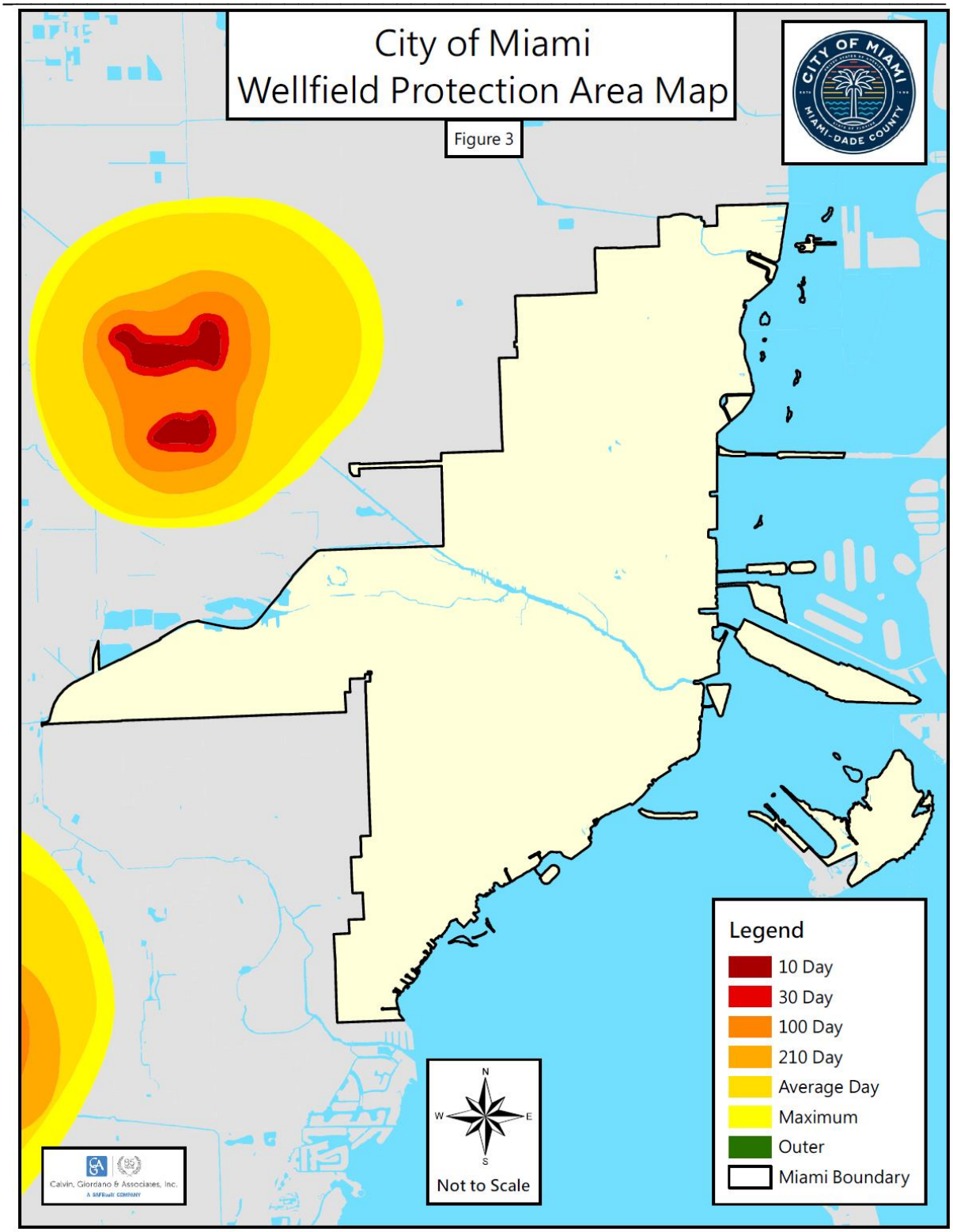
~~The following map indicates the City of Miami service area by Miami-Dade County Water and Sewer Department (MDWASD).~~



Source: Miami-Dade County Land Management System



Source: 2020 Water Service Areas Map included in Miami-Dade CDMP20220002 Text Amendments (Figure 2.5.1-1, page 59) adopted on January 19, 2023.



Source: Miami-Dade County Wellfield Protection Cones of Influence map (Figure 3.1: WASD Wellfields, Wellfield Protection Areas, page 3-6, MDWASD 10-Year Water Supply Facilities Work Plan (April 2022)).

APPENDIX A

MDWASD 10-Year Water Supply Facilities Work Plan (April 2022)